



A film crew from Animal Planet documents Wilkes University student Matt Grammond tossing a nut as part of a presentation Sunday morning in Kirby Park.

Capturing the deceitful world of area squirrels

Animal Planet films show in Kirby Park

By Tom Henesky
Staff Writer

Acting can be tough work. Just ask the handful of Wilkes University students who woke up early Sunday morning and braved the bitter cold temperatures in Kirby Park in Wilkes-Barre.

Throughout the morning, the students — bundled, layered and wrapped — spent hours in front of a camera crew to film a show for Animal Planet.

Students from Wilkes and Central Connecticut State University (CCSU) will be featured in the show "The Most Extreme," featuring extraordinary habits of certain animal species.

In this case, the subject is the grey squirrel and the storyline is a research project by the students to explore the small rodent's penchant for deceitful behavior.

The project is headed by Wilkes University professor Dr. Mike Steele, Dr. Peter Smallwood of the University of Richmond and CCSU professor Sylvia Halkin. The research, which has been conducted for several years, shows that squirrels find food and then engage in a deceptive cache behavior when other squirrels are present. Basically, the squirrel will pretend to bury the food at several locations to thwart attempts of thievery by other squirrels.

"The squirrel will dig a hole, put its head in but keep the nut



Central Connecticut State University student Allison Gaudel digs up a squirrel cache in Kirby Park.

in its mouth," Steele said. "It will cover the hole with leaves giving the impression it's caching the seed."

Steele said the research was presented at several conferences and featured on a show by renowned wildlife researcher Sir David Attenborough. That exposure led to the upcoming Animal Planet segment, he said.

The chance to have their work featured on an Animal Planet program was incentive enough to get the biology students up early and out into the cold morning. Tom McKenna, a senior at CCSU, said his interest in animal behavior, combined with his desire to learn about the film aspect of nature programs, made Sunday a highlight in his academic career.

"It's really interesting to see the continuity of the filming and how the director works so

hard to keep everything organized and flowing," he said.

Keeping the flow was a challenge on Sunday as the cold temperatures kept the stars of the show — grey squirrels — tucked inside their warm nests for the morning. While the squirrels were conspicuously absent, the students spent hours re-enacting their research for the film crew.

"It's cold and nature doesn't always go on your schedule," said CCSU senior Stephanie Collin as she sat in her car to warm up between takes.

Director Kyle Murdoch said the crew will film six hours of footage for a three-minute segment. He said the theme of the show is "animal pirates," or species that exhibit deceitful behavior. The episode will air in August or September, Murdoch said.

"We are using this research project to show deceitful behavior that we feel is pretty extreme in the animal world," he said. "It's cold today and we need a lot of footage to make sure we're telling the right story."

For many of the students, being featured on a national television show presents a feeling of being recognized for their work.

"It's interesting that something as common as a squirrel can have such a complex behavior," said Wilkes senior Matt Grammond as he pulled on a pair of gloves in preparation for the next take. "We fit into the title of the show perfectly, because we're definitely the most extreme squirrel researchers."

henesky@citizenonline.com

CORPORATE LADDER

MARSHALL & ASSOCIATES

Attorney Matthew J. Parker has been named a member of the Elder Law Firm Marshall & Associates, LLC. A member serves the role traditionally associated with a law firm partner.

Parker has been an associate with Marshall & Associates since 2000. He provides elder law, comprehensive estate planning, estate administration, and guardianship services to seniors and their families. He is a member of the National Academy of Elder Law Attorneys, and the Elder Law Section of the Pennsylvania Bar Association.

WILKES UNIVERSITY

TL 2/25/06
Michael A. Steele, Ph.D., professor of biology and director of the division of biology, chemistry and health sciences, has been appointed the Fenner Endowed Research Chair in Biology.

The Fenner Chair is a lifetime appointee carrying responsibilities for both teaching and research. Steele's responsibilities include maintaining and expanding a research program that involves undergraduate students and is competitive with that of major research universities.

A member of the Wilkes faculty since 1989, Dr. Steele was named full professor in 2004.

Wilkes University raising awareness for at-risk animals

By Tom Venezia
Staff Writer

011-7-05

Wilkes University is spearheading an effort to raise awareness of animal species in the state whose populations are at risk.

Last month, the Pennsylvania Game Commission approved a \$38,000 grant for Wilkes to continue work on a research publication outlining 134 vertebrates (mammals, birds, reptiles and amphibians) of special concern in the state.

When the book is complete, state officials will use it to formulate a plan to manage and conserve the species detailed in the publication.

Wilkes University professor Dr. Michael Steele said the work is focused on animals listed as rare, threatened or endangered and those whose specific habitat requirements make them an indicator of environmental health.

The species were selected by the technical committee of the Pennsylvania Biological Survey. They include the Northern river otter, Indiana bat, short-eared owl, bog turtle and snowshoe hare.

Steele said several mammals of special concern, such as bat species and the Northern flying squirrel, are found in Northeastern Pennsylvania.

The timber rattlesnake and the scarlet tanager are examples of species whose specific habitat requirements make them valuable indicators of environmental health.

"Many of these are lesser known species," Steele said. "The game commission is producing conservation plans for these species for the U.S. Fish and Wildlife Service based on our accounts in the book."

The project began two and a half years ago as experts across the state were contracted to write a detailed description, range map and management recommendations for each species. The first leg of the project was funded through a \$40,000 game commission grant. The recent grant will be used for publishing costs, Steele said.

"The primary purpose of this is to present a guide for research and management and an educational tool that will be available to schools," Steele said.

Steele said the publication is under technical review for the next year. Once it is published, orders will be accepted for the book.



15 Dumbies 2005

30 1740

8 XX

Crazy Like a . . . Squirrel

Those Bushy-Tailed Rodents Might Not Be Nuts After All

When you watch squirrels darting up and down trees or back and forth across busy roads, you might say that they're well, nutty.

You would be right. But don't

mistake being nuts (or being nuts about nuts) for being stupid. It turns out that squirrels know which acorns are going to rot more quickly and eat those first. They also are good at tricking other squirrels (and people)

about where they've hidden their precious acorns.

Sylvia L. Halkin, a professor of biology at Central Connecticut State University, is studying deceptive behavior by squirrels. One of her students noticed that squirrels sometimes bury an acorn, then move nearby and pretend to bury another—behavior that might confuse another animal trying to find the acorn stash.

Halkin and her students conducted an experiment in which they gave squirrels peanuts and watched them bury them. Then the students dug up the peanuts.

The next time they gave the squirrels the peanuts, the squirrels buried a nut, then pretended to bury other nuts nearby. Or the squirrels dug many holes before burying a single nut in one of them. Or they buried the nut under a bush where the researchers could not see it. Or the squirrel climbed a tree and put the nut in a nest.

The squirrels appeared to be trying to confuse the researchers. Such trickery "gives us a glimpse into [what] may be going on in their heads," Halkin said.

Other researchers determined that squirrels bury the acorns that will keep best, such as those from red oaks, and eat acorns that are more likely to rot, such as those from white oaks.

So, while squirrel behavior may seem nutty to humans, it actually makes sense, for squirrels.

Michael A. Steele, a professor of biology at Wilkes University in Pennsylvania, says squirrels are "making very careful behavioral decisions that are critical for winter survival."

—Hartford Courant

Downright Squirrelly

Eleven species of squirrels are endangered or critically endangered. But the two types of squirrels most likely to be seen in the Washington area are not endangered:

Eastern gray squirrel

- Its body is about 11 inches long; its tail adds another nine inches.
- Lives alone in a nest of twigs, leaves and grasses in the branches of trees.

Southern flying squirrel

- Active at night (nocturnal) and actually glides, not flies.
- Often live in pairs, sometimes in larger groups.
- Eats mostly nuts but also insects and young birds.
- Its body is about 5½ inches long, with another 4½ inches of tail.

SOURCE: THE ENCYCLOPEDIA OF ANIMALS,
UNIVERSITY OF CALIFORNIA PRESS.



Washington-area squirrels are always open to a handout.

BY JACQUELYN JACOBSON—THE WASHINGTON POST

Are you looking at me? Researchers say that squirrels will try trickery to protect their acorns.



BY MARK DUNCAN—ASSOCIATED PRESS



197 21878
J.... 102 11...

PA GAME COMMISSION NOTES

Ongoing field research funded by the Pennsylvania Game Commission and U.S. Fish and Wildlife Service has uncovered that the state's northern flying squirrels are uncharacteristically sharing habitat - even nesting quarters - with their look-alike cousin, the southern flying squirrel. That may mean trouble for northern, which already are in short supply in Pennsylvania and further threatened by the European wooly adelgid, an insect that has been devouring the state's hemlock tree stands, the preferred habitat of northern.

The big problem with northern and southern sharing habitat and living quarters, according to the fieldwork - a State Wildlife Grants Program (SWG) project - is a parasite called *Strongyloides robustus* that is carried by southern and can be lethal to northern. The parasite poses no threat to the southern, but it seems to suppress the northern's ability to put on winter fat, and to even maintain its existing weight.

Pennsylvania's northern tier has always served as sort of a point of demarcation for the southern range of the northern flying squirrel, although there are two subspecies of northern found south of Pennsylvania. Both subspecies are extremely rare and have been classified as endangered species since the 1970s. Southern flying squirrels are found throughout the eastern United States. Habitat preference and lifestyle differences have helped to naturally keep the species separated for some time. But the southern flying squirrel population is booming in Pennsylvania and elsewhere. The state's northern population, conversely, is known to occur in only two sites: a large population center in Carbon and Monroe counties, and another where a northern turned up recently in Warren County.

"Southern flying squirrels are Pennsylvania's most abundant squirrel; their numbers even exceed the gray squirrels," noted Cal DuBrock, Game Commission Bureau of Wildlife Management director.

"They live in almost every block of forest in the state and at high densities. It's not hard to understand why there appears to be more contact between northern and southern, given the way southern have

saturated the state. But given the documented inability of these species to maintain a friendly coexistence, it is somewhat surprising to see them sharing living quarters and habitat."

Northern flying squirrels, which are slightly larger than southern, have been sort of an enigmatic species to biologists for decades. Their presence in the state has been recognized for some time. But given their extremely limited distribution and nocturnal lifestyle, it's not hard to understand why northern flying squirrels haven't garnered much attention over the years from wildlife managers, outdoors writers or those who frequent the state's northern woods.

"It's probably fair to say that to virtually all people, a flying squirrel is a flying squirrel," said DuBrock. "But the Game Commission has been aware of the northern flying squirrel's presence as a distinct species in the Commonwealth since as early as 1930, when it was documented in Potter, Greene and Sullivan counties."

The U.S. Congress in 2001 created the SWG Program to support the conservation and recovery of declining fish and wildlife species at the state level. With more than 1,000 animals and plants already listed as federally threatened or endangered, Congress recognized that SWGs are one of the best hopes for reversing fish and wildlife declines. Investing federal dollars at the state level - before a species declines to the point of being federally endangered - was determined to be far more effective than waiting until the populations need expensive "emergency room care" through the Endangered Species Act.

"The SWG Program already is improving the management of America's and Pennsylvania's wildlife resources by injecting otherwise unattainable funding into critically important and starving conservation programs," noted DuBrock. "It has truly helped to expand, refine and strengthen Pennsylvania's fish and wildlife management."

For some time now, the Game Commission staff biologists and members of the Pennsylvania Biological Survey's Mammal Technical Committee have contemplated the possibility of listing the northern flying squirrel as an endangered or threatened species. Dr. Michael Steele of Wilkes University, Dr. Carolyn Mahan of Penn State University's Altoona campus, and Greg Turner, formerly a Wilkes University researcher and now a Game Commission endangered

species biologist, all recommended elevating the status of the northern flying squirrel from its current designation as a "protected mammal" to a threatened or an endangered species in their SWG Program-funded research paper, titled A Manual for Long-Term Monitoring and Management of the Threatened Northern Flying Squirrel in Pennsylvania.

"We are discovering that the northern flying squirrel appears to be far more limited in its range in Pennsylvania than previously expected," the researchers reported. "Despite intensive trap efforts and extensive box surveys that have spanned more than two and a half years, we have only been able to locate approximately 17 individuals. Thus it follows that the species is in need of significant protection and further monitoring to formally evaluate the potential threats to the animal. The species distribution is further jeopardized by the current threats to hemlock forests caused by hemlock wooly adelgid, a non-native insect that causes mortality of eastern hemlock trees."

As a direct result of the SWG northern flying squirrel fieldwork, the PBS's Mammal Technical Committee has asked the Game Commission to consider listing northern as an endangered species, a two-step action that would need to be taken up by the agency's Board of Game Commissioners. The Game Commission's Bureau of Wildlife Management has asked consequently for more information and additional fieldwork to qualify the recommendation.

"One of the benefits of being proactive with declining or rare species is that it allows managers a little more time to better understand the species - as well as the extent of its problems - and make informed decisions," explained Turner. "In coming months, the research team and agency biologists plan to look deeper into the northern's status in Warren County - uncovered in May - and to probe some of the northern's historic haunts in the Honesdale area and at Promised Land State Park."

Fieldwork for the northern flying squirrel project began in January 2002 and continues. Slightly more than \$90,000 (75 percent provided by the US-FWS) has been dedicated to this research and the team to date has shed considerable light on this reclusive species. Next to the state-endangered Delmarva fox squirrel, northern flying squirrels are Pennsylvania's hardest-to-find tree roost.

Echo Pilot, Greencastle, PA	10/27/2004
Tri-County News, Slippery Rock, PA	11/5/2004
News-Sun, New Bloomfield, PA	11/10/2004
Perry County Times, New Bloomfield, PA	11/11/2004
New Republic, Meyersdale, PA	11/11/2004
Duncannon Record, Duncannon, PA	11/11/2004
Bradford Era, Bradford, PA	11/13/2004
Morning Call, Allentown, PA	11/21/2004
Allied News, Grove City, PA	11/17/2004

Christian Berg



B Burelles

29 1688
Y..8.

27 XX..1

SQUIRRELS DEVOURING PUMPKINS

203NW

By STEVE GRANT
COURANT STAFF WRITER

Judy Lamoin of Burlington caught one in the act: a haween squirrel eating one of the pumpkins on her front steps.

In 30 years in town she'd seen nothing like it.

But this is no ordinary year. Squirrels all over the East are gulping down pumpkins, and people aren't happy about it. If it isn't vandals smashing the pumpkins, it's rodents munching them.

"It happens when natural food is in short supply, as it is this year in most of the East," says Michael A. Steele, a professor of biology at Wilkes University in Wilkes-Barre, Pa., and an authority on squirrels.

In Wethersfield, Elizabeth Sittler's young children were saddened to discover that squirrels ate the Jack-o'-lanterns they carved and put on the porch stoop.

"They were really relentless," Sittler says. "Up and down the street they've gotten pretty much every pumpkin people put out. You walk by people's houses and you see half-eaten pumpkins."

The problem is that the acorn crop this year was poor. So the squirrels are seeking the pumpkin seeds instead? Not necessarily, says Sylvia Halkin, a professor of biology at Central Connecticut State University who also studies squirrel behavior. They'll readily eat pumpkins already hollowed out, too, she says.

Lamoin took a defensive tack. She picked up three pumpkins off her steps and threw them in the woods, not wanting to entice squirrels too close to the front door. Squirrels, she explains, "are not my favorite animal."

The squirrels scampered into the woods and ate the pumpkins.

She waited a week and put new pumpkins out, figuring the animals might have forgotten about the doorstep goodies. They didn't, so she brought a remaining unblemished pumpkin inside and saved it for Halloween. She carved it and put it out Sunday night with a candle inside.

"It lasted until the morning, and then they were back at it," she says.



BurrellesLuce

20 1088 27 XX...1

They Can't Get Out Of The Way Of Cars, But Other Behaviors
Demonstrate Advanced Thinking (For A Rodent)

The Squirrel's Bag Of Tricks

By STEVE GRANT
COURANT STAFF WRITER

Those little gray piles of fur, flesh and blood are as numerous on Connecticut roads this time of year as pumpkins on doorsteps.

These would be your squirrel roadkills.

Every motorist is familiar with the sad scenario: A squirrel dashes out into the road, stops, ziggs, then zags and ziggs again, right under one of the wheels.

Your street, you say, is a furlong off.

Given that most drivers are not aiming for squirrels, and given that squirrels often could avoid eternal rest by running across the road without stopping, the question is: Are they as stupid as they seem?

Stephen Hawking they are not, but scientists are discovering that squirrels are far craftier than we've given them credit for. Squirrels know which acorns are most perishable

and eat those first, and they are capable of what may be consciously deceptive behavior to protect food they have cached.

Michael A. Steele, a professor of biology at Wilkes University in Wilkes-Barre, Pa., says his research indicates "they are, on a daily basis, making very careful behavioral decisions that are critical for winter survival."

Sylvia L. Halkin, a professor of biology at Central Connecticut State University, is studying deceptive behavior in squirrels, following up on a student's observation that squirrels sometimes

buried an acorn then moved nearby and pretended to bury another acorn, behavior that might confuse another animal attempting to find the cache.

She and some of her students conducted an experiment in which they gave squirrels peanuts and then watched them bury them. Then the students dug up the peanuts.

Subsequently, they found that when they gave the squirrels peanuts, the squirrels would bury a nut, then pretend to bury other nuts nearby. Or the squirrels would dig many holes before burying a single nut in one of them. Or they might try to bury the nut under a bush where the researchers could not see them. Or the squirrel would climb a tree and put the nut in a nest.

"It seems we could induce this kind of behavior by digging up the nuts," Halkin said.

What surprised the students was that they were expecting only one kind of deceptive behavior, but the squirrels demonstrated a whole bag of tricks to waylay creatures, human or otherwise, who might steal their stash.

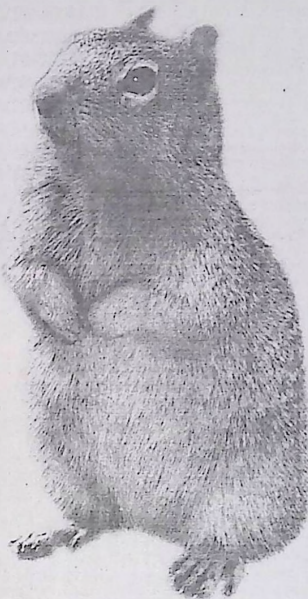
"Deceptive behavior has been documented in a number of species of animals," Halkin said. But overall "it is rare. It gives us a glimpse into the kinds of mental processes that may be going on in their heads."

Steele and Peter D. Smallwood of the University of Richmond determined that squirrels selectively bury those acorns that are least perishable, such as those from red oaks, ensuring a food supply during winter, while immediately consuming acorn species that are most perishable, such as those from white oaks.

When they do bury a white oak acorn, they first bite out the embryo, which prevents the acorn from sprouting. Experiments indicate that by doing so, the white oak acorn will remain edible for six months, Steele found. If they did not do that, the acorn would put out a sapling and become inedible.

A recent experiment, not yet published in the scientific literature, involved young squirrels raised in captivity who had never seen acorns before. The squirrels showed a strong tendency to remove the embryo from white oak acorns (they did not always do so cleanly), suggesting there is an innate tendency toward that behavior.

The reason squirrels are plentiful in Connecticut and many other places this year is that acorn crops have been good in recent years, said Peter L. Good, a wildlife biologist with the state Department of Environmental



Protection.

Unfortunately, the best documentation of the bountiful squirrel population is the growing number of them run over by cars.

Several factors are at work in the roadkill boom. This is what biologists often call the "fall shuffle," when young squirrels especially are moving around in search of food, often crossing roads to find acorns or other food, Steele said.

Compounding the situation, squirrels are especially active just after dawn and just before dusk, a time that coincides this time of year with morning and evening rush hours, a convergence that is bad news for squirrels.

That zigzag behavior, of course, is a defensive response to throw off predators, such as foxes, hawks, bobcats and coyotes.

"Many predators chasing them would be put off by that," Halkin said. "If you are chased by a hawk and you zigzag, the hawk is going to have trouble maneuvering, and you might well escape."

But a car is another matter. "The other thing about cars, they move at a speed not encountered by many things in nature," she said. "There is not a lot that comes at you at 60 mph. Probably, often the animals misjudge the speed at which cars are coming. They have no concept of that speed."

Yes, Steele said, it might appear the squirrels don't know what they are doing when crossing the road, but that is because their behavior has been well adapted over the centuries to their natural predators.

"Only recently," in the great scheme of things, "have they had to deal with cars," he said.



Hartford Courant, Hartford, CT	Steve Grant	10/21/2004
Greenwich Time, Greenwich, CT	Steve Grant	10/22/2004
Eagle Times, Claremont, NH	Steve Grant	10/27/2004
Citizen, Auburn, NY	Steve Grant	10/27/2004
Holland Sentinel, Holland, MI	Steve Grant	10/27/2004
Christian Science Monitor, Boston, MA	Steve Grant	10/28/2004
Chicago Tribune, Chicago, IL	Steve Grant	10/28/2004
Muskegon Chronicle, Muskegon, MI	Steve Grant	10/30/2004
Edmonton Journal, Edmonton, AB, CN	Steve Grant	10/30/2004
Press & Sun Bulletin, Binghamton, NY	Steve Grant	10/31/2004
St. Paul Pioneer Press, St. Paul, MN	Steve Grant	10/31/2004
Grand Rapids Press, Grand Rapids, MI	Steve Grant	10/31/2004
Ann Arbor News, Ann Arbor, MI	Steve Grant	11/8/2004
Huntsville Times, Huntsville, AL	Steve Grant	11/14/2004
Christian Science Monitor, Boston, MA		10/28/2004

B Burrells

35 4411 21
y.... 1 x....

Tiny bugs threaten flying squirrel

205F = Wilkes Univ.

Ongoing field research funded by the Pennsylvania Game Commission and U.S. Fish and Wildlife Service has uncovered that the state's northern flying squirrels are uncharacteristically sharing habitat - even nesting quarters - with their look-alike cousin, the southern flying squirrel.

That may mean trouble for northern, which already are in short supply in Pennsylvania and further threatened by the European woolly adelgid, an insect that has been devouring the state's hemlock tree stands, the preferred habitat of northern.

The big problem with northern and southern sharing habitat and living quarters, according to the fieldwork - a State Wildlife Grants Program (SWG) project - is a parasite called *Strongyloides robustus* that is carried by southern and can be lethal to northern.

The parasite poses no threat to the southern, but it seems to suppress the northern's ability to put on winter fat, and to even maintain its existing weight.

Pennsylvania's northern tier has always served as sort of a point of

species are extremely rare and have been classified as endangered species since the 1970s.

Southern flying squirrels are found throughout the eastern United States.

Habitat preference and lifestyle differences have helped to naturally keep the species separated for some time. But the southern flying squirrel population is booming in Pennsylvania and elsewhere. The state's northern population, conversely, is known to occur in only two sites: a large population center in Carbon and Monroe counties, and another where a northern turned up recently in Warren County.

"Southern flying squirrels are Pennsylvania's most abundant squirrel; their numbers even exceed the gray squirrel's," noted Cal DuBrock, Game Commission Bureau of Wildlife Management director. "They live in almost every block of forest in the state and at high densities. It's not hard to understand why there appears to be more contact between northern and southern, given the way southern have saturated the state. But given the documented inability of these species

slightly larger than southern, have been sort of an enigmatic species to biologists for decades. Their presence in the state has been recognized for some time. But given their extremely limited distribution and nocturnal lifestyle, it's not hard to understand why northern flying squirrels haven't garnered much attention over the years from wildlife managers, outdoors writers or those who frequent the state's northern woods.

"It's probably fair to say that to virtually all people, a flying squirrel is a flying squirrel," said DuBrock. "But the

Game Commission has been aware of the northern flying squirrel's presence as a distinct species in the Commonwealth since as early as 1930, when it was documented in Potter, Greene and Sullivan counties.

"Funding has always limited the Game Commission's ability to intensify its management of nongame species like the northern flying squirrel. But financial support provided by the U.S. Fish and Wildlife Service through its SWG Program has created a means for us to chart the northern flying squirrel's

See Squirrels, page 21

Squirrels

From page 14

It's overdue and important research that's finally getting the funding our traditional revenue sources - primarily license fees and timber sales - couldn't provide."

The U.S. Congress in 2001 created the SWG Program to support the conservation and recovery of declining fish and wildlife species at the state level. With more than 1,000 animals and plants already listed as federally threatened or endangered, Congress recognized that SWGs are one of the best hopes for reversing fish and wildlife declines. Investing federal dollars at the state level - before a species declines to the point of being federally endangered - was determined to be far more effective than waiting until the populations need expensive "emergency room care" through the Endangered Species Act.

"The SWG Program already is improving the management of America's and Pennsylvania's wildlife resources by injecting otherwise unattainable funding into critically important and starving conservation programs," noted DuBrock.

"It has truly helped to expand, refine and strengthen Pennsylvania's fish and wildlife management."

For some time now, the Game Commission staff biologists and members of the Pennsylvania Biological

Survey's Mammal Technical Committee have contemplated the possibility of listing the northern flying squirrel as an endangered or threatened species.

Dr. Michael Steele of Wilkes University, Dr. Carolyn Mahan of Penn State University's Altoona campus; and Greg Turner, formerly a Wilkes University researcher and now a Game Commission endangered species biologist, all recommended elevating the status of the northern flying squirrel from its current designation as a "protected mammal" to a threatened or an endangered species in their SWG Program-funded research paper, titled A Manual for Long-Term Monitoring and Management of the Threatened Northern Flying Squirrel in Pennsylvania.

"We are discovering that the northern flying squirrel appears to be far more limited in its range in Pennsylvania than previously expected," the researchers reported.

"Despite intensive trap efforts and extensive box surveys that have spanned more than two and a half years, we have only been able to locate approximately 17 individuals. Thus it follows that the species is in need of significant protection and further monitoring to formally evaluate the potential threats to the animal. The species distribution is further jeopardized by the current threats to hemlock forests caused by hemlock wooly adelgid, a non-native insect that causes mortality

of eastern hemlock trees."

As a direct result of the SWG northern flying squirrel fieldwork, the PBS's Mammal Technical Committee has asked the Game Commission to consider listing northern as an endangered species, a two-step action that would need to be taken up by the agency's Board of Game Commissioners. The Game Commission's Bureau of Wildlife Management has asked consequently for more information and additional fieldwork to qualify the recommendation.

"One of the benefits of being proactive with declining or rare species is that it allows managers a little more time to better understand the species - as well as the extent of its problems - and make informed decisions," explained Turner.

"In coming months, the research team and agency biologists plan to look deeper into the northern's status in Warren County - uncovered in May - and to probe some of the northern's historic haunts in the Honesdale area and at Promised Land State Park."

Fieldwork for the northern flying squirrel project began in January 2002 and continues. Slightly more than \$90,000 (75 percent provided by the USFWS) has been dedicated to this research and the team to date has shed considerable light on this reclusive species.

Next to the state-endangered

Delmarva fox squirrel, northern flying squirrels are Pennsylvania's hardest-to-find tree rodent.

"When compared to the thriving southern flying squirrel, which has experienced significant population gains and range expansion in recent years, the northern flying squirrel remains a veritable unknown native that continues to isolate itself from researchers and wildlife managers by holing-up in the relative obscurity provided by older stands of spruce and hemlocks in remote areas.

"Right now, the principal way we keep tabs on northern flying squirrels is to set baited live-traps for them or check nesting boxes in cold weather," Turner said.

"Once captured, we fit them with electronic radio transmitters. We will be out this fall and winter monitoring squirrels we capture in traps and checking the 550 nesting boxes we've placed during this project. We also intend to construct and install new nest boxes to expand our ongoing statewide survey."

Of course, some of the biggest news to be reported in this SWG project has been uncovering that northern and southern flying squirrels are sharing habitats and living quarters.

In most places where the ranges of these squirrels overlap, the arrangement is less than cordial, and southern often are actively aggressive toward the larger northern, frequently displacing them from established habitat.

*'To injure no man,
but to bless all mankind'*

BOSTON · THURSDAY
OCTOBER 28, 2004

THE CHRISTIAN SCIENCE MONITOR

Squirrel behavior isn't all that nutty

Most every motorist is familiar with the sad scenario: A squirrel dashes out into the road, stops, zigzags, then zags and zigzags again, right under one of the wheels.

Given that most drivers are not aiming for squirrels, the question is: Are they as stupid as they seem?

Genuses they are not, but scientists are discovering that squirrels are far craftier than you might think. Squirrels know which acorns are most perishable and eat those first, and they are capable of what may be consciously deceptive behavior to protect food they have cached.

Michael Steele, a professor of biology at Wilkes University in Wilkes-Barre, Pa., says his research indicates "they are, on a daily basis, making very careful behavioral decisions that are critical for winter survival."

Sylvia Halkin, a professor of biology at Central Connecticut State University, is studying deceptive behavior in squirrels, following up on a student's observation that squirrels sometimes bury an acorn, then move nearby and pretend to bury another one, behavior that might confuse animals attempting to find the cache.

She and some of her students conducted an experiment in which they gave squirrels peanuts and then watched them bury them. Then the students dug up the peanuts. Subsequently, they found that when they gave the squirrels more peanuts, the squirrels would bury a nut, then pretend to bury other nuts nearby. Or the squirrels would dig many holes before burying a single nut in one of them. Or they might try to bury the nut under a bush where the researchers could not see it. Or the squirrel would climb a tree and put the nut in a nest. "It seems we could induce this kind of behavior by digging up the nuts," Professor Halkin says.

What surprised the students was that they were expecting one kind of deceptive behavior, but the squirrels had a whole bag of tricks to confuse creatures, human or otherwise, who might steal their stash.

"Deceptive behavior has been documented in a number of species of animals," Halkin says. But overall "it is rare."

Professor Steele and Peter Smallwood, of the University of Richmond, determined that squirrels selectively bury those acorns that are least perishable, such as those from red oaks, ensuring a food supply during winter, while immediately consuming acorn species that are most perishable, such as those from white oaks.

When they do bury a white oak acorn, they first bite out the embryo, which prevents the acorn from sprouting. Experiments indicate that by doing so, the white oak acorn will remain edible for six months, Steele found. If they did not do that, the acorn would rot and become inedible.

A recent experiment, not yet published in scientific literature, involved young squirrels raised in captivity who had never seen acorns before. The squirrels showed a strong tendency to remove the embryo from white oak acorns (they did not always do so cleanly), suggesting there is an innate tendency toward that behavior.

The reason squirrels are plentiful this year is that acorn crops have been good in recent years, said Peter Good, a wildlife biologist with the Connecticut Department of Environmental Protection.

Unfortunately, the best documentation of the bountiful squirrel population is the growing number of them run over by cars.

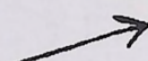
Several factors are at work in the roadkill boom. This is what biologists often call the "fall shuffle," when young squirrels often cross roads to find acorns or other food, Steele said. Compounding the shuffle, squirrels are particularly active just after dawn and just before dusk, a time that coincides with rush hours.

That zigzag behavior is a defense response to throw off predators, such as foxes, hawks, bobcats, and coyotes.

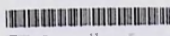
"Many predators chasing them would be put off by that," Halkin said. "If you are chased by a hawk and you zigzag, the hawk is going to have trouble maneuvering, and you might well escape."

A car, of course, is another matter.

— Los Angeles Times-Washington Post News Service



■ ANIMAL STUDIES



540
1.24

Burrell's Luce

28
11...



SUSAN BRIMO-COX

The abundant acorns in Pennsylvania's lush forests are considered delicacies by a variety of animals, including deer, wild turkeys, blue jays, woodpeckers and squirrels, to say nothing of those that fall prey to larvae, fungus and rot.

Squirrel population doing double duty in re-foresting state

Over the weekend, I visited Chippyle State Park and noticed, as I walked along the Youghiogheny River, that the acorns on the oak trees are getting quite large.

Soon, they will be ripe and fall from the trees. What will then ensue can be considered either a smorgasbord or voluntary free planting services.

Actually, it is rather amazing that there are so many woodlands in Pennsylvania today for us to enjoy.

"Penn's Woods" were rapidly cleared, especially after our nation was founded and the European population expanded westward.

By the early 1900s, most of the state was an expanse of stumps and scrub brush. Only a couple areas of virgin forest were spared.

Today, however, about 60 percent of the state's lands are forested again—some 17 million acres are in woodlands. In southwestern Pennsylvania, there is a diverse population of trees that can be seen. Among them are many species of oak tree.

Oaks are members of the beech family; the Latin name is *Quercus*. Some of the more common oak trees found in Pennsylvania include the black oak (*Quercus velutina*), scarlet oak (*Quercus coccinea*), chestnut oak (*Quercus montana*), northern red oak (*Quercus rubra*) and white oak (*Quercus alba*).

I know some trees can grow quite old, so I wasn't too surprised to read that oak trees can live to be more than 200 years old.

Once an oak tree starts bearing acorns, production typically grows as the tree and its leafy canopy gets bigger.

Acorns are produced once a year, but not necessarily every year. Growing conditions affect the acorn crop and, of course, a tree has to have enough energy to make them. It is not unusual for heavy acorn production to occur sporadically, maybe every four to 10 years or so.

I was surprised to learn how many acorns don't make it. One estimate I read is that the chance of an acorn sprouting and growing into an oak tree is one in 10,000.

What happens to all the other acorns? Well, many acorns are eaten by beetle larvae. I'm

Susan
Brimo-Cox



sure fungus and rot get others. The rest are gobbled up by deer, wild turkeys, blue jays, woodpeckers and squirrels.

Squirrels, as it turns out, are quite the little furry connoisseurs of acorns. Michael Steele, chairman of the biology department at Wilkes University in Wilkes-Barre, and colleague Peter Smallwood of the University of Richmond in Virginia, have been studying the little creatures.

Steele and Smallwood discovered that squirrels have preferences among acorns.

For example: Squirrels usually eat more of the white oak acorns they find, and bury more of the acorns from red oaks.

Why?

There are several possible reasons.

There's taste. White oak acorns contain less of the bitter, toxic substance called tannin than red oak acorns.

Then, there's the acorn's sprouting time.

White oak acorns sprout in fall, whereas red oak acorns don't sprout until spring, so they "store" better and longer.

But red oak acorns have more fat than white oak acorns, giving red oak acorns more energy value.

So, squirrels do have some "choices" to make when they find an acorn for the taking.

But because of their drive to cache acorns by burying them, squirrels also are one of the most important animals in helping oak trees spread.

Partially eaten red oak acorns can still sprout and grow into trees if the squirrels don't eat the embryos of the new trees.

And squirrels don't always find all the acorns they bury.

Squirrels have other puzzling habits, when it comes to acorns, and the scientists may eventually figure them out.

But, until then, I'm glad squirrels are helping to reforest the state with mighty oaks. If a squirrel can plant a tree that may live more than 200 years, there's certainly hope for my gardening efforts.

Susan Brimo-Cox gardens, observes nature and writes in *Chippyle*. Readers can send questions or comments to her at naturesgarden@brimo-cox.com.

WHITE PLAINS, NY
FRIDAY 142.145
SEP 17 2004



BurrellesLuce
744 4170
Y.E. 1 XX95..

More rain, acorns ... roadkill?

FRONT PAGE

Busy mating season sends more baby squirrels into streets

Joy Victory
The Journal News

September means summer is over, the kids are back in school and the Yankees are on their march to the playoffs.

Around here, it's also the season when gray squirrels die by the thousands as they dart across roads in search of food and new territory, only to get crushed by cars and trucks.

This year, thanks to a bumper

crop of baby squirrels, the roadkill count is unusually high.

As a result, high-speed routes like the Hutchinson River Parkway and the Taconic State Parkway are left littered with squashed squirrel bodies.

This month's rampant rodent roadkill likely means it was a busy reproductive year for females.

"There seems to be a lot of squirrels and a lot of dead ones, too. Usually, these things are more complex than one thing occurring," said Glenn Cole, a retired wildlife manager for the state's Department of Environmental Conservation. "The females had two, maybe three litters this year. I think there is a lot

of food; with the wet weather we've had, there's lots of berries and acorns."

In other words, a bounty of food means bountiful breeding, and more baby squirrels are being struck than usual.

When the babies get old enough, the parents force them out of the nest to find new roosting areas, said Michael Steele, co-author of "North American Tree Squirrels" and biology department chairman at Wilkes University in Wilkes-Barre, Pa.

"As they disperse, they get run over," Steele said.

While this is bad news for young squirrels, it's a feeding frenzy for such opportunistic birds as



What you can do

If you find an orphaned baby squirrel, leave it alone for a few hours to see if the mother returns. If she doesn't, put the baby in a box in a warm, quiet room and call the state Department of Environmental Conservation at 845-256-3000 and ask for a wildlife animal rehabilitator.

crows or buzzards. "Animals will come in and eat these things. At least they are not going to waste; they are part of a food chain," said Bill Lawler, director of the Greenburgh Nature Center.

Orphaned baby squirrels will seek any warm contact, including the ankle of a human, wildlife rehabilitator Val Nasetta said.

"If that happens to you, the baby was following warmth and perhaps the smell of food," said Nasetta, of Hyde Park in Dutchess County.

Birdseed — notwithstanding, squirrels prefer white oak acorns, which are plentiful this year.

"It's almost like a sugar rush," said Laura Simon, urban wildlife director of The Fuddr Us Animals. "They're moving from tree to tree in this heightened state. This is why we're always telling people ... please drive more carefully. Do look left and right, just watching."

Reach Joy Victory at
jvictory@thejournalnews.com or
914-694-5049.

These bugs have the bark, but no bite

By JOE KRAUS
For the Times Leader

They look like creatures out of the movie *Twilight*. They're black, they're long, loud, ringing that never seems to stop. And they obey natural signals that intrigue scientists, riding by the millions for years of living on tree roots as deep as 2 feet below the soil. Yet we shouldn't fear cicadas, say outdoor area experts who insist

the unusual insects will do little to harm people, pets or gardens. Instead, we should appreciate their emergence, which is expected to last about two weeks, a wonder of the natural world.

"It's something that comes along just once in a while, like Halley's comet," said Yocavitch, who works at Ricketts Glen State Park. "It's actually a nice thing to be around to see."

At the University of California at Davis, entomologist Louise Yang studies cicadas.

emerge as part of a doctoral work. He's part of a project at Hawk Mountain in Berks County, Pa., where the University of Pennsylvania's professor Michael Steele and other scientists in Pennsylvania hope that cicadas emerging here will help them understand the forests of the eastern United States.

While there are a number of different species of cicadas that emerge on 17-year cycles, the



THOMAS LEACH STAFF PHOTOGRAPHS
Donna Grey, a Penn State Cooperative Extension educator, says cicadas particularly enjoy laying their eggs in maple trees.

See BUGS, Page 12A

BUGS

Continued from Page 1A

brood about to come out covers the largest area in the country and affects the Wyoming Valley more than any other. Brood X, or the great eastern brood, overshadows brood XIV, which will emerge again in Luzerne County in 2008, and brood II, which is due again in 2013.

"For me to travel 3,000 miles to see this phenomenon doesn't seem all that strange," Yang said. "These creatures are unique in the world. They appear in our backyards, but we don't really appreciate them."

Most cicadas emerge far from population centers, and it will take a drive into one of the state parks or undeveloped areas to see them in large numbers. As a result, cicadas are unlikely to be more than a nuisance to most people.

"It's not a big deal. It's not like the invasion of the locusts," Yocavitch said. "People think they're going to crawl all over everything and nothing will be left but sticks, but that's not the case."

Penn State Cooperative Extension educator Donna Grey is equally reassuring.

"A lot of people are worried and think there's going to be a lot of damage. They wonder what to do, but there's nothing," she said. "So many people have called with worries, and I ask, 'Did you have a problem 17 years ago?' If not, then you won't have a problem this time."

Grey says the only damage anyone is likely to see will be in forested areas, maybe in the Back Mountain and Sweet Valley. Cicadas do not feed once they emerge, but the females do bore into trees to lay eggs. If too many do so on undeveloped branches, it can cut the branch off altogether.

Cicadas tend to bother deciduous trees — those that lose their leaves each fall. "It's going

CICADAS AT A GLANCE

Rest assured, cicadas are pretty harmless:

THEY DON'T BITE. If one lands on you, the worst you'll likely feel is a painless prickly sensation from the tiny hooks on their legs.

THEY DON'T EAT SHRUBS, vegetables, or flowers. In their most concentrated numbers, they sometimes damage new growth on the mature trees where they lay their eggs, but they rarely cause significant damage.

THEY LOOK FRIGHTENING, but they are nothing to fear. If you find one, check out its bright red eyes and look beneath its wings for a white teneral membrane, which is the source of its powerful sound.

They'll be gone in only two weeks, so admire them while they're still around.

to be like a pruning."

Male cicadas don't damage trees, but they'll make their presence known. Their mating songs are so loud that many people remember the noise more than anything else about a cicada emergence.

"They're noisy," Yocavitch said, "but they don't last long."

Perhaps the only hazard that the cicadas offer to most of us is that, after all of their time underground, they are the insect equivalents of klutzes.

"They don't attack people but because they're clumsy, they're going to run into people," Grey said.

All of the cicadas should die within two weeks of the emergence. The eggs they lay will hatch into nymphs and burrow back into the ground, where they will remain until 2021. They will spend that time in a mostly dormant state, so motionless that they don't damage the trees that support them.

"It's like they're taking a slow drink every now and then from the roots," Grey said. "It's not enough to harm the trees."

"Most people live with cicadas in their backyard or at least very close to them, but without seeing them," Yang said. "But they come out every 17 years and it's an event."

Effort tries to save northern flying squirrel

By Tom Vanecko
The Sunday Voice

In the Poconos, there's a small creature that is seldom seen and rarely thought about.

Despite the animal's conspicuous nature, it plays a crucial role in determining the health of the forest.

The northern flying squirrel is one of two flying squirrel species in the state.

The nocturnal creature weighs a mere five ounces and measures up to 14 inches in length and inhabits the coniferous forest habitats in Canada, Pacific Northwest and the Rocky Mountains.

In the east, the squirrel's habitat is fragmented from the Appalachian Mountains to North Carolina.

Wilkes University professor Dr. Michael Steele has been conducting research, funded by the Pennsylvania Game Commission (PGC), on the species for eight years and said while populations are healthy in other parts of the country, it's numbers are dangerously low in Pennsylvania.

With the help of research associate Greg Turner and researcher Carlyn Mahan, Steele said they have located a small population of the squirrels in the Pocono region.

"We are working to get the state to consider the northern flying squirrel an endangered species in the state," Steele said. "In the last two-and-a-half years, we live-trapped 14 animals primarily in the Poconos, where there's a fragmented population."

"This is a species of very serious concern in the state."

The reason why the squirrel is threatened, according to Steele, is habitat loss due to development and the state's long history of timbering.

Because the squirrel prefers hemlock stands, it's even more imperiled as the trees are being destroyed by the woolly adelgid insect.

"The change in the state's forest structure over the last 100 years has hurt the squirrel, and now it's

NORTHERN FLYING SQUIRREL

(*Glaucomys sabrinus*)

Northern flying squirrels are found throughout coniferous and hardwood forests of Eastern Alaska and the southern tier of Canada. In the United States they extend from the Canadian border south through California, Idaho, Montana, the Great Lakes Region south through the Appalachians.

General Characteristics

Northern flying squirrels are very small soft squirrels. They are generally dark brown in color with a white belly.

Flying squirrels don't actually fly; they glide and can travel up to 80 yards or more from trees to the ground. They will stretch out their legs and use the fold of skin between their foreleg and hindleg to act as a sail or parachute.

While gliding, squirrels can change their angle of descent and turn. Just before landing they will drop their tail and lift their forelimbs which serves as a brake.

Habits and Ecology

Northern flying squirrels are active year round during the night. They feed on nuts and seeds, but will also eat insects.

Nests

Northern flying squirrels typically make nests out of shredded bark in abandoned woodpecker or other similar holes.



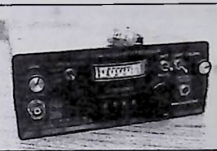
facing a further threat because of the potential loss of our hemlock trees," Steele said.

In an effort to measure and locate populations, a long-term monitoring program has been set up with the PGC funding.

Turner has been conducting live trapping where suitable habitat exists, and more than 600 nest boxes have been erected to conduct regular monitoring.

Steele said the state has made a long-term monitoring project a priority because biologists are starting to recognize the popula-

CV 4-4-04



WARREN RUDIA / THE SUNDAY VOICE

At left, Dr. Michael Steele displays a live trap used to catch northern flying squirrels for research study in the Poconos. Top is transmitter which tracks the squirrels.

tion is seriously threatened.

The squirrel feeds primarily on lichens and fungus found in the hemlock forest and is native to Pennsylvania.

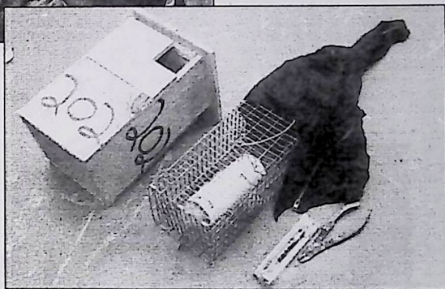
Because it inhabits old growth or mature coniferous forests, Steele said the squirrel is a telling sign of the ecological health of those areas.

"It's an extremely important indicator of the health of our forest ecosystems," he said. "When these squirrels start disappearing, it means the quality of our forest ecosystem has declined. Its presence tells us how some real subtle things in the forest may be changing."

Because the squirrel travels several hundred meters, Steele said it's important that its habitat is connected by forested corridors. Timbering and, more recently, land development, are the biggest factors negating the species preferred habitat.

Another threat to the northern flying squirrel may come from the southern flying squirrel, the more common of the flying squirrels in the state.

Steele said the southern flying



WARREN RUDIA / THE SUNDAY VOICE

A nesting box and live trap are displayed by the research team.

squirrel inhabits many of the same areas as northern species and he has found evidence of the two species sharing a nest.

"There is some speculation the southern species may exclude the northern species because it carries a parasite," he said. "It could be an example of competitive exclusion."

Steele has researched a variety of squirrel species across the country for 25 years and said the most significant finding to date in

his current project is the northern species is at much greater risk than anticipated.

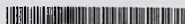
"I'm not sure what can be done to boost these populations, but we definitely have to protect their habitat and manage the landscape so they are able to disperse from one forest to the next," he said.

"They are an important part of our heritage and a critical forest health indicator, and steps need to be taken to ensure their survival in the state."



WARREN RUDIA / THE SUNDAY VOICE

Live traps are an essential tool in the study of the northern flying squirrel in the Poconos.



Burrelles
PUBLICATION SERVICES

101
..2..

93 2X....



Elizabeth Miller, New Albany, (second from left) recently received a research grant at Wilkes University, Wilkes-Barre. Others in photo are (from left): Dr. Amy McEuen, Mylinh Nguyen, junior biology major and research partner, and Dr. Michael Steele.

New Albany Student Receives Sigma Xi Research Grant

Wilkes University senior Elizabeth Miller, New Albany, was awarded a grant from Sigma Xi, a national scientific honor society, to support her research project "Agro-Farming by Gray Squirrels: An Experimental Approach."

The Sigma Xi Grant-in-Aid of Research program is highly competitive - only 20 percent of undergraduate and graduate students who apply receive funding. In collaboration with Dr. Michael Steele, chairman of the Division of Biology, Chemistry and Health Sciences Division, and Dr. Amy McEuen, a post-doctoral research fellow, Miller is testing the hypothesis that squirrels prune silver maple trees in the spring to increase the weight and quality of the seeds, which are a primary food source during their critical reproductive periods.

Miller was also recently inducted into Beta Beta Beta, a bio-

logical honor society for students, particularly undergraduates, dedicated to improving the understanding and appreciation of biological study and extending boundaries of human knowledge through scientific research.

Miller is a 2001 graduate of Wyalusing High School.



Burtelees
Information Services

4860
1228

53 11.1.

Deer conference should pay attention to hunters

Sometimes people can become so dedicated to an issue they get tunnel vision.

When I read the list of presenters and the resulting comments from a deer conference held in Hershey on Jan. 6, I came away with one conclusion: there is a narrow-minded focus that deer are the sole reason for many of our environmental problems.

The conference, entitled "The Challenge of Overabundant Deer in Pennsylvania: A Call for Partnerships," had sponsors from a variety of sources, including Audubon Pennsylvania, the state Department of Conservation and Natural Resources, PPL, Forest Products Association and PENNDOT.

Couple that with the title of the conference and one can see the agenda was clearly set from the beginning.



**TOM
VENESKY**

Naturally Speaking

According to meeting reports, Dr. Gary Alt, head of the Pennsylvania Game Commission's deer management program, said at the conference the state's deer herd is estimated at 1.5 million and if hunters don't find a way to reduce the numbers, society will find another way.

Is that a threat aimed at getting hunters to squeeze the trigger a little more often?

Alt went on to state the deer herd has probably been out of control since the 1920's, and left to their own devices, deer would eat themselves "out of house and home" and the population would crash.

Wait a minute. If the population has been "out of control" for more than eight decades, why haven't they crashed already? How long does it take?

Not surprisingly, other speakers said the state's oak forests will eventually disappear if deer continue to eat the seedlings. I really have to take issue with this one because it's a perfect example of the narrow focus being placed solely on deer.

In a recent article about eastern forest fires printed in the Harris-

burg Patriot-News, Marc Abrams, a professor of forest ecology and physiology at Penn State University said, "In my opinion, suppression of forest fire is the major reason for species change in Pennsylvania forests, but it is not the only reason. Timber practices, selective deer browsing and acid rain are also a factor."

On top of that, Wilkes University professor Mike Steele, who is conducting research on oak trees, said, "In some sites there is less oak regeneration due to deer, but that's only one of several factors. Fire, or the lack of, is the big one."

That's why I feel this conference, and those who sponsored it, are approaching things with narrow minds. Sure deer do browse oak seedlings, but as the professors state, they are one of many factors and they aren't even the main reason.

So why all the attention and desire to reduce our deer herd? From the numerous correspondences I've received from hunters all over the area, the population has already been drastically reduced. Many hunters who have written to me report seeing only a handful or no deer at all during last hunting season.

Sure, they may not have doctorate degrees in forestry or wildlife management, but hunters are the ones that are in the woods seeing things firsthand. They put the time in and cover ground, and if hunters aren't seeing deer, especially on public lands, I believe them.

Maybe the place needs to be widened and focused elsewhere.

Tom Venesky can be reached at venesky@citizensvoice.com

Wilkes study targets decline of oak trees

By Tom Peasey
Times-Staff Writer

Oak trees are the backbone of the Pennsylvania forest. Their broad canopies and towering trunks provide valuable cover and food for a variety of wildlife, and the lumber is popular for its strength and durability.

But due to a number of factors, the once mighty oaks are in danger of decline and regeneration for some species is occurring at a dangerously slow pace.

A multi-faceted study being conducted by Wilkes University may provide answers to declining oak tree populations and regeneration in the state.

The four-year study is looking at a number of variables surrounding acorn dispersal and is set to wrap up next summer.

Funded by a \$850,000 grant from the National Science Foundation, the study is being led by Dr. Michael Steele and Dr. William Terraghi, who serve as associate professors of biology. Dr. Amy McEwen, a post doctoral researcher in forest ecology at Dr. John Carlson of Penn State University and Dr. Peter Smallwood of the University of Richmond in Virginia.

In addition, the grant funded postdoctoral students at least 50 undergraduate students to participate in the work.

The study is being conducted on sites in Luzerne County the Hawk Mountain Sanctuary in Berks County the Powder Mill Nature Sanctuary in western PA and another location in western Maryland.

Steele has been researching oak trees for 10 years and said the current study is an extension of his work. He said although they don't yet have an answer to explain the decline, the study has yielded several findings that could piece the puzzle together.

For example, Steele said found the acorns of the red oak are more likely to be carried and cached by animals than white oak acorns, which are usually eaten on the spot.

A result of this is the red oak acorns are dispersed farther from the adult tree than white oak acorns, which could speed up regeneration.

"If this is the case, it's going to have a dramatic effect on forest structure," Steele said.

He explained there are several possible explanations for the dispersal disparities, such as palatability and perishability. Animals prefer the taste of white oak acorns to red oak, which are bitter.

Also, Steele explained, the white oak acorns germinate as soon as they hit the ground, which means they aren't a long-lasting food source. Red oak acorns germinate after the winter and can be stored for years.

Steele acknowledged a decline in oak populations and said one factor is browsing by deer. But he added a larger factor may be the lack of natural fire, which is allowing maple trees to take over the forest.



MIKE SHERIDAN, left, and SETH REED collect acorns in baskets for oak tree study conducted by Wilkes University.

OAK STUDY

A multi-faceted study being conducted by Wilkes University may provide answers to declining oak tree populations and regeneration in the state. The four-year study is looking at a number of variables surrounding acorn dispersal and is set to wrap up next summer.

Funded by a \$850,000 grant from the National Science Foundation, the study is being led by Dr. Michael Steele and Dr. William Terraghi, who serve as associate professors of biology. Dr. Amy McEwen, a post doctoral researcher in forest ecology, Dr. John Carlson of Penn State University and Dr. Peter Smallwood of the University of Richmond in Virginia.

The study is being conducted on sites in Luzerne County, the Hawk Mountain Sanctuary in Berks County, the Powder Mill Nature Sanctuary in western PA and another location in western Maryland.

"Maples are highly susceptible to fire, while oaks are highly tolerant," Steele said. "Fire seems to be an important component of the oak forest because it eliminates competing trees. But in for some time it's been suppressed. In some sites there is less oak regeneration due to deer, but that's only one of several factors. Fire, or the lack of, is the big one."

Steele said it's important to learn how animals disperse the oak seeds in order to determine the natural modes of regeneration. If forests are going to be managed for oak production, he said it's critical to understand how animals disperse the seeds so they can be managed too.

"One thing is clear, the white oaks don't have any advantage when it comes to dispersal," he added. "In six months we will have a much better picture of what's happening."

Terraghi's work is focusing on utilizing DNA technology to determine the parent oaks and their seedlings and how it relates to reproduction and dispersal distances.

During his four years on the project, Terraghi and his students extracted DNA samples from 7,000 adult trees and seedlings.

He found the acorns are being dispersed much further than originally suspected, and some have been found more than 100 yards from the parent tree.

"It means when you're trying to reforest an area, such as mine lands or an abandoned farm field, it will be converted back at a

greater distance and re-colonized much more rapidly," he said.

Terraghi's work also showed that very few acorns reach the seedling stage, and he estimated only one in a million acorns will sprout into a seedling.

And just because an acorn reaches the seedling stage doesn't mean it's a sure bet to grow into a towering tree. Sometimes, Terraghi said, a seedling could remain idle for 60 years on the forest floor waiting for its chance to grow.

"When a tall tree blows down, then they'll take off," he said.

Interestingly, Terraghi's work showed in many cases the leaves of oak seedlings on the forest floor aren't adapted to dim light conditions.

He said a tree that makes a leaf that works well in dim light will get burned in bright sunlight.

Since the seedlings stay idle until a larger tree falls and allows more light to reach the floor, they will have leaves ready to adapt to the new conditions.

"They're waiting for the light to get brighter and stimulate photosynthesis," Terraghi said. "It's a very important mechanism for adjusting to the environment."

Although the study is set to wrap up next summer, Steele said the work has spawned additional questions that need to be answered. He said they will be seeking more funding to keep the project going to study two more areas.

"We want to look at how forest fragmentation affects dispersal of oaks and wildlife species," Steele

PENNSYLVANIA OAK TREES



LEAVES: Alternate, simple, 4-6" long, to 1 1/2" wide, with 7-11 bristled-toothed lobes, sinuate between lobes against halfway to the midrib. Smooth, dull green above, pale with small bits of reddish-brown hair in veins beneath.

TWIGS: Greenish brown to reddish brown, smooth when mature. Buds pointed, light brown, smooth.

FRUIT: An acorn, 1 1/2 to 1 3/4" long, the cup shallow, saucer shaped, covering 1/4 of the nut, cupules reddish-brown, smooth, light brown, sometimes fuzzy on the edges. The acorns need two growing seasons to ripen; the kernel is bitter.

HABIT: Smooth and greenish-brown or grey, maturing to dark grey or nearly black and is divided into rounded ridges.

GENERAL: A dominant forest tree throughout the state growing to 100' in height in dry spots. Oaks, hickories, and many other species and birds use the acorn. It is often planted as a shade tree. The hard strong wood is used for furniture, flooring, millwork, railroad ties and veneer. The "red oak group" includes oaks with bristled-toothed leaves and acorns ripening over two seasons.



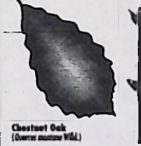
LEAVES: Alternate, simple, 6-8" long, and 4" wide, with 6-10 rounded lobes; bright green above, pale below, both surfaces smooth on mature leaves.

TWIGS: Reddish grey, often with a grayish coating. Buds rounded, reddish-brown, smooth, 1/2" long; and buds clustered.

FRUIT: An acorn, 1 1/2" long, light brown, cup bowl like, hairy inside, enclosing 1/2 of the nut; cup scales warty at the base. Acorn ripens in September after one season.

HABIT: Pale grey, scaly, not deeply fissured, often flaky.

GENERAL: A dominant forest tree on dry to moist sites throughout the Commonwealth it usually reaching 80'-100' high. This tree is very important to both wildlife and people. The acorn is an important wild food and eastern Native Americans made a flour from these acorns. Traditional uses of White oak wood include hardwood flooring, whiskey barrels and boat building. The famous Revolutionary War figure, USS Constitution, "Old Ironsides," was made of White oak. The "white oak group" includes oaks without bristled-toothed lobes and acorns that ripen in one season.



LEAVES: Alternate, simple, 5-8" long, to 3" wide, with coarse, rounded teeth. Dark green and smooth above, pale and occasionally downy beneath.

TWIGS: Smooth, grayish-brown to reddish-brown. Buds light brown, sharp pointed, edges of scales 1/4 to 1/2" long.

FRUIT: An acorn, 1 to 1 1/4" long, rich dark brown, shiny. Cup 1/2 to 1/3 inside, enclosing 1/4-1/2 of the nut; cup scales leathery. First ripens in one growing season with kernel moderately sweet.

HABIT: Grey and smooth on young trees; later brownish gray to dark grey, thick, tough, deeply fissured.

GENERAL: Also called Rock oak and Basket oak this tree grows to 80' on dry slopes and ridges throughout Pennsylvania. Lenses of acorns produced every 4-7 years are important food for deer, bear, turkey and many other birds and animals. The bark is very thick in texture and the wood heavy and strong. It is used for furniture, flooring, millwork, and railroad ties.

SOURCE: THE PENNSYLVANIA DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES. WWW.DCNH.STATE.PA.US



LEAVES: Alternate, simple, 4-8" long, 3-5" wide, each has 5-7 pointed, bristled lobes, sinuate between the lobes on halfway to the midrib on lower leaves, deeper on top leaves; smooth and shiny above and usually covered with a rust-brown fuzz below.

TWIGS: Reddish brown, usually fuzzy. Buds blunt pointed, reddish, yellow-grey, smooth.

FRUIT: An acorn, 1 1/2" long, somewhat round, light brown. The acorn cup is bowl-like with warty hairs, covering 1/2 or more of the nut; cup scales sharp-pointed, forming a loose fringe at the rim. Black oak acorns need two growing seasons to ripen; kernels are yellow and extremely bitter.

HABIT: Smooth and dark brown for many years, older trunks are dull black, furrowed, furrows forming irregular blocks; inner bark orange to orange-yellow.

GENERAL: A relatively fast-growing tree to 75' high, one of the most common oaks on dry, upland sites. The acorn is eaten by wildlife, but not preferred; the young stems and leaves are browsed by deer. A yellow dye can be made from the bark. The wood is lumped with other oak species and sold as red oak for general construction lumber and furniture.

ADAM KUCZYNSKI / THE PHARMACIAN

explained. "Also, many of the experiments have been done in a controlled situation. It's quite possible if you have red oak and hickory nuts in close proximity, the red oak might have a dispersal disadvantage when it comes to

which species are preferred by wildlife.

"Dispersal might depend on the availability of other seeds, so the composition of the forest could determine oak regeneration," he added.

Seeking homes, they make mistakes.

Autumn is often fatal as squirrels hit the road

By Porus P. Cooper
INQUIRER STAFF WRITER

For squirrels, October may be the cruelest month.

One moment, they are bushy-tailed bundles of activity; the next, they are roadkill, victims of their own foraging frenzy and youthful exuberance.

In some leafy neighborhoods, dead squirrels lie two or three to a block. The carnage, biologists say, is as much a signal of autumn as the falling leaves. And this year seems to be even worse than usual.

The eastern gray squirrels, so familiar in the urban and

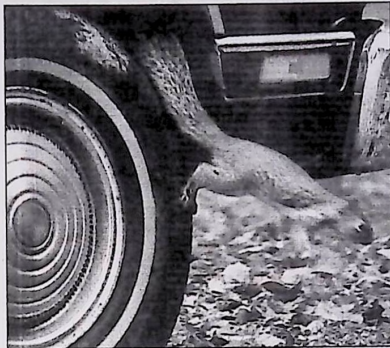
suburban landscape, are clever and human-savvy. Endowed with keen eyesight, a wide field of vision, and cat-like agility, they ought to make better pedestrians.

But nature is an unforgiving tutor, and in the squirrel world, rookie mistakes can be fatal.

Squirrels born in late summer are now making their first independent forays into the world. Like human teenagers, squirrels are impelled to travel far from the nest as soon as they can get away.

"Right now they're out looking for acorns," says one squirrel expert. "Right now they're out looking for acorns."

See SQUIRRELS on A7



LA SHINDA CLARK / Inquirer Suburban Site

Young squirrels are often fearless around cars. This squirrel recently investigated a pickup truck at Governor Printz Park in Essington.

Fall roadways spell danger for inexperienced squirrels

SQUIRRELS from all over the world are flocking to new places to live and finding sources of food to settle down for the rest of their lives," said Vagn Flyger, 81, emeritus professor of wildlife biology at the University of Maryland.

But as they try to locate new food sources and new hiding places from predators, "they make mistakes," he said.

A squirrel can live for more than a decade if it's lucky, but with cars and such predators as red-tail hawks, many don't last a year. It takes them about 10 to 14 weeks to learn "squirrel wisdom," said T. F. H. O'Connell, director of the Schuylkill Wildlife Rehabilitation Clinic in Roxborough.

"They may not be as leery of cars as adults," O'Connell said. "The younger ones may not have caught on to crossing [streets] over the phone wires."

And chances are, most of the squirrels killed on the roads are males, said Roel Lopez, assistant professor of wildlife at Texas A&M University at College Station, Texas.

Young males tend to wander farther than females do as they search for mates, he said. "They're not thinking straight."

The heavy toll on the squirrel

population is fairly typical for this time of year, experts say, although it may have been aggravated by recent high winds that brought down acorns earlier than usual.

The squirrels' feeding and hoarding frenzy may have been heightened by acorns' accessibility, said one biologist. Or it could be that the acorns that fell early were immature and therefore inedible, forcing squirrels to forage farther afield, said another.

Another factor is what squirrel researchers term "the fall shuffle," said Michael A. Steele, an evolutionary biologist who heads the biology department at Wilkes University in Wilkes-Barre and is coauthor of

North American Tree Squirrels, published by the Smithsonian Institution.

The quality of "mast" — acorn and other seed and nut crops that small wildlife depend on — is not uniform. "When squirrels recognize by mid-August that the crops are not good in one area, they move to another," Steele said.

Cheryl Trewella, information and education supervisor for the Pennsylvania Game Commission's southeast region, said her reports indicated that mast in the Philadelphia region this season "looks good."

"Right now, because of the mast crop that is dropping, squirrels are back and forth across roads, particularly in cities, so they are more inclined to get hit," Trewella said.

"The wind [that followed Hurricane Isabel] also knocked down a lot of acorns and nuts, and so they are very active," she said.

Couple that with the change of season, and it's just a risky time of year to be a squirrel. Or a raccoon or opossum, for that matter.

"The roadkill rises a lot this time of year because times are changing," said Jerry Czech, state wildlife-conservation officer for Philadelphia County. "The morning rush hour and the evening rush hour are coinciding with dawn and dusk."

"In the morning, a lot of nocturnal animals are going back to the woods, and a lot of diurnal animals are coming out. These are also times of high [automobile] traffic. Usually with a squirrel, you might not even know you hit it," Czech said.

The woods are not much safer for squirrels these days. Pennsylvania's squirrel-hunting season opened last Saturday. New Jersey's opened Sept. 27.

Last year, 200,000 Pennsylvania hunters bagged a million squirrels.

Contact staff writer Porus P. Cooper at 215-654-4781 or pcooper@phillynews.com.

Also appeared in

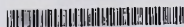
Scranton Times	Porus P. Cooper	10/24/2003
Philadelphia Inquirer	Porus P. Cooper	10/25/2003
Holland Sentinel, Holland, MI	Porus P. Cooper	10/25/2003
Sunday Gazette-Mail, Charleston, WV	Porus P. Cooper	10/26/2003
Watertown Daily Times, Watertown, NY	Porus P. Cooper	10/26/2003
Monitor, Mc Allen, TX	Porus P. Cooper	10/26/2003
Reading Eagle, Reading, PA	Porus P. Cooper	10/27/2003



But highways spell danger for experienced squirrels

By Porus P. Cooper

It's a familiar sight: a squirrel scurrying across a road, its tiny paws hitting the asphalt. For many drivers, it's a moment of panic, a near-miss accident. But for the squirrel, it's just another day on the road. In the heart of a suburban neighborhood, a small road winds through a mix of houses and trees. It's a road that's seen many a squirrel in its time. The squirrels are old hands, their tails flicking with experience. They know the shortcuts, the safe places to cross. But the road is a dangerous place for them. The cars are fast, the drivers are impatient. A single misstep can mean a long, painful journey to the other side of the road. The squirrels are resilient, though. They've survived for centuries, adapting to their environment. They've learned to be cautious, to be smart. But the road is a new challenge. It's a place where their natural instincts are tested. They must learn to navigate the dangers of the modern world. They must learn to be like the cars, to be fast, to be efficient. They must learn to be like the humans, to be clever, to be cunning. The road is a place of danger, but it's also a place of opportunity. For the squirrels, it's a chance to prove themselves, to show the world that they are still here, still strong, still smart. They are the experienced squirrels, the ones who have seen it all. They are the ones who know the road, who know the dangers, who know the shortcuts. They are the ones who are still here, still strong, still smart. They are the experienced squirrels, the ones who have seen it all.



Burrelles

-1280
1122..EA
81...

CARNEGIE MUSEUM OF NATURAL HISTORY

POWDERMILL
NATURE RESERVE

A NEW DIRECTOR

Dr. David A. Smith



MADY KENNEL

Carnegie Museum of Natural History has appointed Dr. David A. Smith as the new director of Powdermill Nature Reserve, the museum's 2,200-acre field station in Rector, Pennsylvania.

"We are very excited Dr. Smith has accepted the position of director of Powdermill Nature Reserve," says Carnegie Museum of Natural History Director Bill DeWalt. "He has a wealth of financial and nonprofit management experience. He is also well-known and respected in the communities surrounding Powdermill, and he holds board leadership positions in a variety of nonprofit organizations." Dr. Smith was a founder and partner with Lane, Noland, Smith & Company Inc., a commercial mortgage banking company, and Pentrust Real Estate Advisory Services Inc., a pension fund advisory business. He received his doctorate in economic geography from the University of Pittsburgh and a Master of Arts and undergraduate degree from Clark University, Worcester, Massachusetts.

Semi-retired since 1999, for the past seven years Smith has served as Board chairman of Magee-Womens Hospital, and is now chairman of Magee-Womens Health Corporation. He also is a board member of the University of Pittsburgh Medical Center and Forbes Reinsurance Company Ltd.

Smith regards Powdermill Nature Reserve as "a very special place" and looks forward to "helping raise the visibility and knowledge of this outstanding resource." He will be responsible for the day-to-day operations, renovating and improving the facilities, encouraging regional and national scientists to utilize the reserve for research, increasing its endowment and building stronger links with Carnegie Museum of Natural History and Powdermill's community.

SCIENCE

A New Book on Mammal
at Risk in
Pennsylvania

Dr. Joseph Merritt, the former managing director of Powdermill for the past 24 years, will continue to pursue his research as resident scientist when Dr. Smith assumes the position of director of Powdermill. In addition to ongoing research in the adaptations of shrews, flying squirrels, and other small mammals to cold, Merritt has been named co-editor by the Pennsylvania Game Commission and Fish & Boat Commission to update *Vertebrates of Special Concern in Pennsylvania*. Merritt is also currently writing a new book, *The Biology of Small Mammals: Strategies for Survival* (The Johns

Hopkins University Press).

Vertebrates of Special Concern in Pennsylvania was first published in 1985, and Merritt notes that "In the past 20 years, a lot of energy has been given to the research, conservation, and management of Pennsylvania's species of special concern. But there hasn't been a coordinated attempt to compile the increasing amount of research and recommendations about these at-risk species since the first volume was published."

The State Wildlife Grant of \$40,000 allows Merritt and colleague Dr. Michael S. Steele of Wilkes University to update the research in a single volume that will be both a technical reference and a guide for management and conservation. It will be designed to serve as a model for the development of other similar volumes on invertebrates and plants.

The Bird Atlas of Pennsylvania

Robert S. Mulvihill, field ornithologist at Powdermill Nature Reserve, has been named statewide coordinator of *Pennsylvania's Second Breeding Bird Atlas*. The project will provide an updated database presenting the current distribution for





MINDY MCMAUGHER

about 200 nesting bird species.

Like the first atlas, done from 1984-1989, the new version will update statewide locations of species of special

Robert S. Mulvihill concern, providing new information for the management of rare species. The first data collection is expected in January 2004. Samples will be taken in 10-mile-square sections statewide, with a majority of the work done in June and July when most species are nesting.

Mulvihill has recruited regional coordinators, and the project will involve thousands of volunteers from the birding community. Mulvihill also hopes to involve schools and colleges throughout Pennsylvania.

The bird atlas program was one of 15 projects selected to share in the \$2.5 million allocation from the State Wildlife Grant Program, a cost-share program administered through the U.S. Fish and Wildlife Service's federal aid program. The five-year project is expected to cost \$366,000 and will be hosted by Carnegie Museum of Natural History. ■

AUDUBON

NEW YORK, NY
QUARTERLY 300,000
JUN-AUG 2003



Burrielles

573
c212..



How do animals that store their food in different locations find it later on?

Reiss Schennum, Elgin, Illinois

TO THE AVERAGE CAR-KEY-LOSING human who is blessed with a conveniently located kitchen larder, the thought of unearthing thousands of nuts and seeds hidden months ago in hundreds of different spots boggles the mind. Yet that's exactly what some animals do. Many species depend on autumn caches for winter survival.

Some store food in dispersed food caches—an approach known as scatter hoarding. Until recently, scientists believed squirrels and other scatter hoarders, like chickadees and titmice, remembered the general whereabouts of their reserves and relied on other cues or senses, such as olfaction, to reclaim their stockpiles. But now, says Michael Steele, a Wilkes University biologist, “we know that both birds and mammals remember the exact locations of specific caches.” Take the Clark’s nutcracker, a champion at this hide-and-seek strategy. In the fall a single bird may bury pine seeds in 2,000 separate spots, then return in the winter to retrieve them, with a high level of accuracy. One nutcracker was observed digging through eight inches of snow to recover its stash. It turns out that food cachers have keen spatial memories, which means they can recall the precise locations of stationary features like trees and then triangulate from these landmarks to pinpoint their stockpiles. This type of memory is processed in the brain’s

hippocampus. Studies have found that seed-caching birds have larger hippocampi than non-seed cachers, and that this structure actually enlarges in the caching season. Good grounds for turning the term *birdbrain* on its head.

Why are there no fireflies in the West?

Samuel Genia, Olympia, Washington

FIREFLIES, OR LIGHTNING BUGS, are common names for beetles belonging to the family Lampyridae, the Latin word for “torchbearer.” According to Purdue University entomologist Tom Turpin, there are three types of fireflies: “Those that produce light as adults and larvae, those that do not produce light as adults but do

with a host of benefits, from insect mitigation to crop pollination and seed dispersal. Even the unfairly maligned vampire bat may soon turn out to be an angel in disguise. An anticoagulant from the species’ saliva is being investigated for the treatment of heart disease. We humans, on the other hand, are these mammals’ worst enemies. So if you encounter a bat in your home, keep things in perspective. It probably got in by accident. If you can’t be sure that no human or pet was bitten, you should call your local animal control or public health agency. If help isn’t immediately available, put on a pair of work gloves—never handle wildlife with your bare hands—and place a small container over the animal after it

has landed. As soon as possible, have it tested for rabies by your local health department. If you’re certain no exposure has taken place, confine the bat to one

room, open a window, and let it escape. Incidentally, bats often seek shelter in manmade structures because their traditional roosts have been destroyed. Habitat loss is a major factor in the reduction of bat populations around the globe. More than half of American bat species are endangered or in serious decline. Consider putting up a bat house as a haven for these beleaguered animals. For more information, or for tips on how to bat-proof your home, contact your local wildlife agency or Bat Conservation International (www.batcon.org).



as larvae—these are called glow-worms—and those that do not produce light in either stage.” Members of the last group have been dubbed with the oxymoron *dark fireflies*. Turpin reports that firefly species—there are more than 170 in the United States—do inhabit the West, but they are generally the unilluminated kind. Still, there are exceptions. Parts of Utah boast bioluminescent adults, and Arizona’s Jicarilla Apache tribe has a legend about fire originating from the insects—it seems doubtful that the Apaches would have this story without having seen fireflies. In the end, no one knows why many western Americans are deprived of the glow-in-the-dark beetles. It may be a matter of geographic isolation and aridity. Science has yet to shed light on the mystery.

How do I remove a bat from my house?

—Anna Deming, New Haven, Connecticut

FIRST, DON’T PANIC. DESPITE THEIR bad rap, bats do not come out of hell, and they seldom transmit rabies to people. In fact, the animals provide us

(AskAudubon)

by Carolyn Shea

MAIL YOUR NATURE QUESTIONS to Ask Audubon, Audubon magazine, 700 Broadway, New York, NY 10003; fax to 212-477-9069; or e-mail to askaudubon@audubon.org. Please be sure to include your name, address, and telephone number.

Making sense of the comings and goings of a small shuttlecock of a bird that never seems to sit still long enough to be observed (a foraging redstart changes perches every two seconds) is one of the great challenges in bird studies.

females," Marra says. "And that those males that arrive earliest have their pick of the best territories. Availability of moist forests in Jamaica may be related to breeding success in the summer."

But how could Marra know if the redstarts from the mangroves, which left first, were really the first to arrive on their breeding grounds? The answer is in the air. The invisible world of subatomic particles holds a telltale marker than can link a redstart in New Hampshire with the type of forest it wintered in 2,000 miles to the south. Carbon atoms are found in two forms—those with six neutrons in their nucleus to match the six electrons spinning around it (called carbon 12) and those with a seventh neutron (called carbon 13).

These two isotopes of carbon occur in the carbon dioxide found in the air.

When carbon dioxide is absorbed by plant tissue during photosynthesis, the rate at which carbon 13 is diffused from the air into the plant tissues differs depending on the type of photosynthetic pathway present in the plant, and also on the amount of moisture that the plant perspires through its leaves. In short, plants retain different amounts of the carbon 13 isotope, depending on their habitat. Plants in moist forests (such as mangroves) retain less carbon 13; plants in dry forests (logwood) retain more.

Marra examined insects from both the mangrove and the logwood forests. Those that had eaten the vegetation in the mangrove forest contained less carbon 13. In 1995 and 1996 Marra collected blood from the insectivorous redstarts in the two habitats and tested it for carbon-isotope levels. Those from

the mangroves had less carbon 13.

Then, in the spring of 1997, Marra netted redstarts as they arrived at Hubbard Brook. Carbon isotopes remain stable for six to eight weeks, so blood sampled after migration would still reveal whether a bird had been feeding in wet or dry forests that winter. The results confirmed his theory. Early-arriving birds at Hubbard Brook had lower levels of carbon 13 than late arrivals. "This," says Marra, "means that the quantity of moist forests may limit the number of birds that can arrive early in the spring."

The pattern was clear: From air to leaf to insect to redstart, carbon 13 left a trail, like a watermark no one noticed until it was held up to the light. And that trail leads to better understanding of the world of migratory songbirds.

The Secret of the Predator's Eyes.

Steiner-Germany has developed the new Peregrine binocular, a new record in light transmission that allows faster discovery and location of birds hidden in foliage or shadows.

Since birds are often visible for only a few seconds, seeing their true colors in bright contrast and clearly identifying the most subtle color differences is extremely important. With Steiner's new Peregrine, a new level of brightness and natural color balance is achieved by use of a new dielectric prism coating, by which over 40 layers of titanium oxide and other rare minerals are alternately applied to the glass surfaces. This Broad-Band Coating (BBC) results in superior light transmission performance over a broad range of colors. Discover the Peregrine's Secret at a dealer near you.



PEREGRINE®
8x42



STEINER
GERMANY
www.steiner-binding.com
1-800-257-7742

THE PENNSYLVANIA BUREAU OF REVENUE
BUTTERLIES



Dr. Joseph F. Merritt, resident director of Powdermill Nature Reserve, is shown in his office at Powdermill with a volume on *Species of Special Concern* like the one he will be co-editing with Dr. Michael A. Steele under a \$40,000 State Wildlife Grant from the Pennsylvania Game Commission and Fish & Boat Commission. Total project cost is estimated at \$65,548 to produce the new volume on vertebrates.

Ligonier Echo photo

Powdermill director co-editing volume on Pa. 'Vertebrates of Special Concern'

Dr. Joseph F. Merritt, resident director of Powdermill Nature Reserve, expects to be a busy man over the next few years, co-editing a large volume on *Vertebrates of Special Concern in Pennsylvania* with a colleague, Dr. Michael A. Steele of Wilkes University.

The Pennsylvania Game Commission and the Fish and Boat Commission recently announced funding of the project, which will update a publication called *Species of Special Concern in Pennsylvania*, published in 1985.

"Dr. Merritt explained that over the last 20 years, a great deal of attention has been devoted to the research, conservation and management of species of special concern in Pennsylvania. But there has been no effort to compile the growing body of information and recommendations for these at-risk species since publication of the 1985 volume.

"Although a significant contribution, this first publication included information on all species, resulting in incomplete coverage for many of these species," Drs. Steele and Merritt said in their grant proposal. "On the advice of Pa. Game Commission personnel, we propose a single volume on the vertebrates of special concern."

"The project will draw on the expertise of state biologists and others professionals to produce an edited volume of the accounts of all species of the vertebrates of concern in Pennsylvania," the proposal continued. "The primary objective of the project will be to produce a publication that serves as both a technical reference and a guide for management and conservation."

"Our goal is to produce a volume that specifically aids scientists, land managers, conservationists, and the educated lay people about the vertebrates of special concern in the state. The volume will be developed with input from various agencies and personnel and will be designed to serve as a model for development of other similar volumes on plants and invertebrates."

As an example, Dr. Merritt mentioned the Least Shrew. The project would document this small mammal's range in Pennsylvania, discuss its natural history and review its status as a species of special concern, making recommendations on the conservation of that species if appropriate. It might even identify certain areas for preservation, or suggest ways to preserve certain species.

For each species covered, there would be a summary of the distribution, description, habitat,

behavior, and ecology of that species. Each account would also include a summary of recent research, as well as research and management recommendations for the future. Photographs would be included if available.

A second section of the volume would focus on the "physiographic regions, biomes, and habitats in which vertebrate species of concern, as well as diverse assemblages of vertebrates, are known to occur," noted Dr. Merritt.

The editors first plan to contact the respective state technical committees for 1. identification of species of concern, 2. verification of each species' status, 3. recommendation of the appropriate author of each account, and 4. identification of a coordinator for each major group of vertebrates — fish, reptiles and amphibians, birds, and mammals.

In the second phase the editors will extend invitations to potential authors and then distribute detailed guidelines for manuscripts. The third and final phase of the project would involve peer review of each account or chapter, editing, revision and final copy editing of the publication.

Dr. Merritt said he expects to be working in close coordination with the Game Commission, Fish & Boat Commission, the Pennsylvania Biological Survey, the major natural history museums in the commonwealth, and with the different universities across the state which have been monitoring species of special concern.

The co-editors are negotiating with the Carnegie Museum of Natural History to publish what he expects will be a volume of over 400 pages.

Dr. Steele is chairman of the Biology Department at Wilkes University in Wilkes-Barre. He received his master's degree at Millersville University and his doctorate at Wake Forest. He has been a resident associate at Powdermill for a number of years and is the author of *North American Tree Squirrels*, published by the Smithsonian in 2001.

Dr. Merritt has been resident director of Powdermill Biological Station since 1979 where his research specialty has been the winter ecology of shrews, flying squirrels, and other small mammals. He has published a popular volume on the *Mammals of Pennsylvania* and has edited several scientific journals. He received his master's degree and doctorate from the University of Colorado, Boulder.



Burrelle's
LITHOGRAPHY & PRINTING

230
111..

21
1111..



Powdermill's Robert Mulvihill was busy last weekend hosting nearly 100 members of the Eastern Bird Banding Association, attending their annual meeting. Here he discusses moulting patterns with a group outside the banding lab. Soon Mulvihill plans to be working with hundreds of birders all over the state as coordinator of Pennsylvania's Second Breeding Bird Atlas, a five-year project intended to build an accurate database for about 200 species of birds. He'll be looking for help, and hopes to involve thousands in the project, including school children.

Ligonier Echo photo

Mulvihill coordinating Bird Atlas project

Now that the Eastern Bird Banding Association's annual conference is over, Powdermill Nature Reserve bird bander Robert Mulvihill can turn his attention to other matters — like updating his highly popular bird banding website, which should have its millionth visitor by the end of the year, and getting ready to undertake a new full-time project as statewide coordinator of Pennsylvania's Second Breeding Bird Atlas.

"Officially, in September, I will become project coordinator," Mulvihill said in a recent interview, "and that will become my primary focus." He explained that the Carnegie Museum of Natural History will host the five-year project, and become the channel for funding, but he will be in charge of lining up scientists and volunteers across the state, with the first year of data collection expected to begin next January.

"So I will have a four-month period to get the office going," he said. That means engaging leads of volunteers and lining up regional coordinators throughout the state. For the first Breeding Bird Atlas, done in 1984-1989, more than 50 regional coordinators were engaged.

Just what is a Breeding Bird Atlas? According to the Department of the State, Game and Fish and Boat Commissions, the idea is to produce "the most important infor-

mation on bird distributions that can be obtained in a manner that is scientifically indisputable, employing the volunteer birding community to generate the majority of data."

The project will also "provide an updated database, presenting the modern distribution of all nesting bird species, resulting in a comparison with the first (1980s) effort. New features will provide a look at relative abundance patterns statewide.

"Like the first atlas, the second effort will update historic locations of species of special concern statewide, providing new information for management of rare species. The atlas project will provide new levels of understanding of all bird populations that will ensure their future conservation.

"State Wildlife Grant funding for this project, to Carnegie Museum, will total \$147,000 for the first one and one-half years, toward a total project cost of \$366,000."

Mulvihill explained that with the help of regional coordinators and lots of volunteers from the birding community, he hopes to be able to "plot with accuracy and detail all the birds breeding within a region," and with a proper sampling scheme, "give a clear picture of how each individual species is distributed throughout the state."

He noted that while the previous atlas showed where certain

birds could be found, he hopes the second edition will be a better sense of where certain species are the most common, and see how a species' distribution may be related to habitat.

With the expected devastation of the state's hemlock trees by the hemlock woolly adelgid, *Adelges tsugae*, Mulvihill expects there will be a "huge change ecologically" that will have a big impact on the breeding bird population in Pennsylvania. Gathering the data now and providing an accurate database will go a long way toward documenting such changes, Mulvihill explained.

Pennsylvania's Second Breeding Bird Atlas will cover close to 200 species, noted Mulvihill, and samples will be taken in 10-mile-square sections statewide. "Most of the field work is done in June and July," he noted, although some nesting occurs earlier and some later.

The use of computers and the internet is expected to ease the problem of data entry and communicating with a statewide network of coordinators, Mulvihill explained. A system of web-based data entry is being developed. He also anticipates that the atlas will be published electronically.

Mulvihill expects to have between 500 and 1,000 "serious birders" involved in the project, but he also hopes to expand on

Continued on page 3) A



Bob Mulvihill in his office with copy of Breeding Bird Atlas.

Mulvihill heading bird atlas project

(Continued from page 1)

this by getting teachers and their classrooms involved in schools and colleges throughout Pennsylvania. "I envision thousands of people contributing to this project," he said.

Mulvihill admitted that the biggest challenge will be getting data in sparsely populated areas, like the northern tier of the state. Getting information on nocturnal birds and wetland birds can also be a challenge, he said.

In some areas, "skilled censusers" will be needed, including birders who can identify birds by the sounds they make.

Mulvihill will coordinate the statewide project from an office at Powdermill, and he said he expects to remain involved in the bird-banding program while heading up the atlas project. "The banding program will not suffer and will not be pushed aside," he promised.

The bird atlas project was one of 15 recently selected to share in a \$2.5 million allocation from the State Wildlife Grant Program, a cost-share program administered through the U.S. Fish and Wildlife Service's federal aid program.

The 15 projects were selected from a field of 46 proposals. An advisory group, comprised of Game Commission and Fish and Boat Commission staff, reviewed and ranked the projects, which totaled more than \$8 million in grant proposals. The commissioners for both agencies then gave the appropriate approval for the selected projects.

As recently reported in *The Echo*, Powdermill's resident director, Dr. Joseph Merritt, is involved in a similar project documenting "Vertebrates of Special Concern" in Pennsylvania, an effort being coordinated by Dr. Michael S. Steele of Wilkes University.

Congress is considering federal legislation to reauthorize the State Wildlife Grants Program in the 2003 fiscal year.



BURRELLE'S

46

NO

Researchers dig up squirrely facts

It didn't take long for the shameless beggars to target Michael Steele as an easy mark. His pockets bulging, he made his way straight toward the home turf of the pack of city park squirrels.

Steele, an associate professor of biology at Wilkes University in Pennsylvania, was carrying acorns, which he threw one after another to specific squirrels. He paused every so often to examine acorns that had fallen from a group of the two major types of oak trees — white and red.

Only in recent years have scientists questioned why squirrels store only certain acorns of the 32 species of oaks across eastern North America. Steele, and his colleague Peter Smallwood, an associate professor of biology at the University of Richmond, are involved in studies that could have a significant impact on oak-forest regeneration.

Both researchers note that squirrels, which have beanz-sized brains, nonetheless manage to get through all sorts of devices intended to keep them away from bird feeders.

"For a scientist, they're great models for behavioural and ecological research," Steele says.

Squirrels are extremely selective about the acorns they hoard. In about 2,000 feeding trials over the past 15 years in various Eastern states, Steele and Smallwood have found that about 85 per cent of acorns from the various species of white



Squirrels are choosy about the acorns they hoard.

oak are eaten shortly after they are found, while about 60 per cent of the acorns of red oaks are stored.

Red-oak acorns are substantially higher in both fats and tannins (the bitter-tasting compounds used to tan hides). Red-oak acorns sprout in the spring. White-oak acorns begin to germinate almost immediately after falling to the ground in autumn.

Researchers also found that among the red oak acorns eaten, often only the top half — the end farthest from the embryo — was consumed. With the embryos intact, partially eaten red oak

acorns germinated about as often as undamaged ones.

By avoiding the potentially harmful tannins contained in the bottom half of the red-oak acorn, squirrels benefit from the higher fat content contained in the top. They need this extra fat during the winter, when energy demands are at their peak.

The squirrels also spread the acorns of red oaks — which require more sunlight than white oaks — over a much wider territory. Borrowing an idea from another botanist, Steele and Smallwood tagged both white and

red-oak acorns with metal labels and then scoured woodlands to locate them.

This measure was necessary because squirrels sometimes use their own variation of the shell game to fool one another. Before they bury their treasure about 2 centimetres deep in leaf litter, they often dig several small holes and cover them up before depositing their acorn.

"Are they digging just to find the best site?" Steele wonders. "Or are they engaging in deceptive behaviour?"

"I had to laugh out loud when I finally discovered I'd been had by that burying behaviour," he adds. "I'm sure squirrels have been telling stories about how they outsmarted me for years."

In Pennsylvania, red oaks outnumber whites by three to one. Red oaks can live up to 250 years, white oaks up to 800. None in Pennsylvania come close that age because much of the state was logged between 1860 and 1910.

"Knowing where a squirrel may put an acorn can help tell us what to do to enhance conditions for natural forest regeneration," says John Bearer, a regeneration specialist for the Pennsylvania Bureau of Forestry.

"Obviously, a squirrel can't remember every place it puts an acorn, and if we keep enough big, dead trees on the ground for the squirrels to hide acorns from predators, we can encourage sprouting."

Source: Knight Ridder

CUTTINGS/Anne Raver

Now It Can Be Told: All About Squirrels and Nuts

I WATCHED a squirrel bury a chestnut the other day in a little park near my home in Brooklyn. He was holding the big nut in his long-fingered hands when he saw me out of the corner of his eye. He froze, as if considering whether or not to abandon his plan — to bury the nut, I suppose — or to ignore me and continue.

It was almost insulting how this city squirrel, far tamer than the ones I'd grown up with, apparently decided I was of no consequence and got on with the job (which was nice for me because I'd never seen such a thing before in my life).

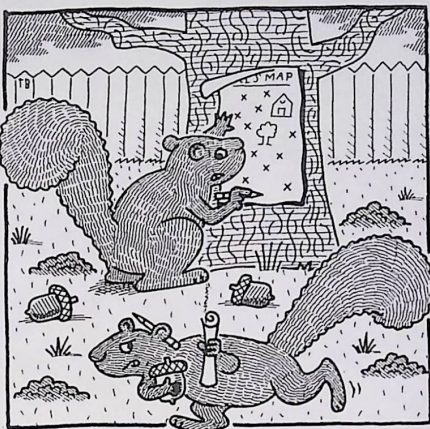
The squirrel set his nut aside and began to dig — not more than five feet from my shoes. He dug a hole so deep his little arms soon disappeared, and then his head (it was a large nut, after all, that he was about to bury). Then he quickly straightened up, grabbed the nut, put it in the hole and began scooping the soft soil back into the hole with the care of a master gardener. When the hole was filled, he patted down the soil, then proceeded to pound it with his arms like a miniature jackhammer. (He must have been trained in the old rose-planting method, in which you really stomp on the soil.) Then he scooped some leaves over the spot and was off.

I was suddenly full of questions: Would he remember where the nut was? Or would he just get lucky and find it? Or would some other squirrel find this nut and this squirrel would find that squirrel's nut and so on. Or would most of the squirrels forget most of their nuts and thus, as all those acorns sprouted into tiny oaks, contribute to the reforestation of Brooklyn?

And what if we get another 53 inches of snow this winter? And a hard crust of ice to boot? What will the squirrels do then? Does the old-timers right — and a bumper crop of acorns and a lot of squirrels scurrying about to bury them mean that a hard winter is on its way?

I scurried back to the office and started calling around for a squirrel expert. I struck gold at the biology department at Bryn Mawr College in Pennsylvania.

Peter Smallwood, who started studying squirrels about 10 years ago as an undergraduate at Ohio State University (he wanted to study whales but there weren't very many in Columbus), said there was no cor-



Tom Bloom

Some secrets about our little city neighbors.

relation between bumper crops of nuts and hard winters. Trees and shrubs produce nuts and berries on a cyclical basis. Period. And squirrels are busy when there are a lot of nuts around. It's like those people who can't sit still if there are peaches to be consumed: it's in their genes.

Dr. Smallwood proceeded to highlight some of the experiments that he and Michael Steele, a biologist at Wilkes College in Wilkes-Barre, Pa., wrote about in an article called "What Are Squirrels Doing?" in the December issue of *Natural History* magazine.

Scientists have long thought that gray squirrels, which are far more common to the Eastern Seaboard than their red cousins, can not only remember where they dug their holes, but also smell the nuts they have buried. (But they must not be too good at either skill, since studies

show they fail to recover about 74 percent of the nuts they bury.) Their failure is actually a gam for trees: squirrels are the inadvertent heroes in forest restoration.

They are also highly discriminating when it comes to deciding which nuts to eat immediately and which to store.

A gray squirrel is far more likely to bury a red-oak acorn, which is rich in fat and sprouts in the spring, than a white-oak acorn, which has less fat and tends to germinate soon after it hits the ground in the fall. In more than 1,200 feeding trials set up by Dr. Smallwood and his colleagues, gray squirrels buried more than 60 percent of the red-oak acorns they came upon, while they ate 85 percent of the white-oak acorns they found.

"If a squirrel finds a white-oak acorn that's sprouted, it will bite off the unpalatable taproot, spit that out and eat what is left," Dr. Smallwood said. "But a lot of what is useful has disappeared. So gray squirrels tend to eat the white-oak acorns immediately before they germinate."

It's simply evolution in action. "I'm not implying that squirrels are consciously thinking," he said. "But the ones that got into that habit had a

lot more to eat, so they survived."

The red-oak acorn, which is high in tannin, isn't as tasty as the white-oak acorn. Scientists think that tannin, a bitter-tasting chemical, protects the seed inside the acorn by discouraging grazing and by repelling insects — another reason why the red-oak acorn is a better candidate for underground storage.

Dr. Smallwood has seen squirrels carry a few acorns to their nests of leaves built high in the trees — or into cavities in tree trunks — but they don't seem to put in a large supply.

"If we get a cold day, they stay in their nests," he said. "If we get two bad days in a row, they might stay in both days. But by the third day, even if the weather's worse, they're back out. They're clearly hungry, so whatever food is up there, it's not a lot."

Last year, the ground at Bryn Mawr was covered with ice from January to February.

"Squirrels can dig through snow, but not ice," Dr. Smallwood said. So the squirrels on the college campus learned to "dumpster dive" he said, feasting on pizza crusts and chicken bones.

He also said that he had seen squirrels eat birds' eggs, road kill and even young nestlings in the spring.

"Spring is a hard time for them," he said. "Their acorn stores are starting to run dry, and even if the leaves have budded out, a hairy bird is a great package of protein."

Naturalists have also noticed that squirrels don't bury acorns infected with larvae, but eat these high-protein treats immediately. In fact, squirrels will often eat the tops of red-oak acorns — if infested with larvae — and then bury the bottom halves. It's the bottom half that contains the tannin-laced embryo of the oak seed, so these conservationists, which scamper a lot farther from a tree than an acorn can fall, have been spreading oak trees for thousands of years.

"Uh-oh!" shouted Dr. Smallwood, suddenly slamming down the phone. In few minutes, he returned.

"Sorry," he said. "My basketball coach has learned how to climb down from his perch, and he's gotten down by the heater and I was afraid he'd burn himself." (Dr. Smallwood has also performed mouth-to-mouth resuscitation on squirrels who went into shock, but that's another story.)

The Outdoors By Conrad Grove

Professors searching out nutty truth on squirrels

WILKES-BARRE, Pa. — It didn't take long for these Eastern biologists to figure out Steele as an easy mark. His eyes danced as he pocketed his notes and he made his way straight toward the same part of the back of city park squirrels.

Steele, an associate professor of biology at the University of Pennsylvania, was carrying 157 good stuff — acorns — and he found every one when he examined the ones that had already fallen from the trees of the major groups of oaks, white and red. Curiously, many of those acorns were only half-eaten; of those, only the tip had been nibbled.

Steele did not discount the possibility of a squirrel's having the acorn, but he suspected the gathering of acorns after the squirrel, and each greedily inspected its reward.

This was far from a controlled experiment, but if these Eastern gray squirrels behaved as they should, they would most likely immediately stuff down the acorns from white oaks and stash the acorns from the red.

The fact that squirrels bury a portion of their cache of acorns, is something new. Henry David Thoreau, for example, in a work written 125 years ago but only published in 1961, praised the "vast work" of these seed planters, noting that "it is not in vain that a squirrel lives in almost every forest tree or bush, nor in a wall or heap of stones."

But only to reveal them later, scientists questioned why squirrels cache only certain acorns. The 12 species of oaks across eastern North America, and Steele, J. and Jacques Peter, Southampton, 37, an associate professor of biology at the University of Richmond, are in the forefront of studies that could have a significant impact on oak forest regeneration.

Both researchers note that squirrels — creatures with bearded brains that scatter their message to the bird looms across the forest — are often less than model citizens.

"For a moment, they're great models for behavioral and ecological research," Steele says. "Learn to enjoy them, because they're fascinating to watch."

And more often than not, squirrels are extremely selective about what they cache. In the past 15 years in several Eastern states, Steele and Southampton, with the help of numerous undergraduates, have found that about 81 percent of acorns from the various species of white oaks are eaten shortly after discovery, while about 60 percent of the acorns of red oaks are stored.

Red oak acorns are substantially higher in both fat and tannin, the bitter-tasting compounds used to eat nuts. Red oak acorns sprout in the spring, while white oak acorns begin to germinate almost immediately after falling to the ground in the autumn.

The researchers also found that in those red oak acorns that were eaten, frequently only the top half — the end farthest from the embryo — was consumed. Because the embryos were not destroyed, such acorns from red oaks germinated about as often as undamaged specimens.

The results indicate that squirrels contained in the bottom half of the red oak acorn, are able to capitalize on the higher fat content contained in the top half during the winter, when energy demands are at a premium.

The squirrels also dispersed the acorns of red oaks — which require over a much greater territory, according to an idea from Southampton, Steele and Southampton, 37, an associate professor of biology at the University of Richmond, noted that squirrels cache acorns of white oaks and red oak acorns with acorns from the same species of oak in the same location.

This technique was necessary because squirrels sometimes employ their own variation of the shell game to escape one another before they bury their treasure. Steele says he found that squirrels often dig several small holes and cover them up before depositing the pile of acorns.

"As they digged just to find the best site," Steele explains. "Or they dig just to escape one another."

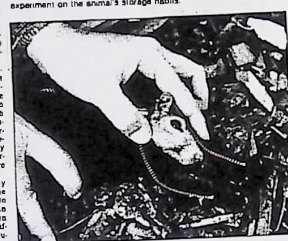
Added Southampton in a telephone interview: "I had to laugh out loud when I finally discovered it. I had had by the burying behavior. In some squirrels have been telling me how they consumed the acorns."

In another experiment, Southampton ground white oak acorns into powder, creating an artificial food, in which he added and subtracted various amounts of fat and tannin. In the fall, squirrels spent more time eating acorns with lower tannin. In the winter, tannin had much less of an effect on their dining preferences.

Steele carried the project a step



Mark Steele weighs an Eastern gray squirrel as part of an experiment on the animal's storage habits.



Steele prepares to tag a detained squirrel to monitor its location.

Further, using both artificial red and white oak acorns and placing the meat of each into the wrong shell. Even with a lake white oak acorn, he found that squirrels consistently cached the red shell. They ate the red oak acorns inside white oak shells.

In Pennsylvania, red oaks outnumber white oaks by three to one, and oaks can live up to 250 years, while acorns can live up to 100, though none ever appreciate that age because much of Pennsylvania was logged off between 1860 and 1910.

Wherever where a squirrel may put an acorn can help tell us what to do to enhance conditions for natural regeneration. Obviously, a squirrel can't remember every place it puts an acorn. And if we keep enough oaks, we can live on the ground for the squirrels to hide acorns from predators. We can encourage acorns," said Jim Beaver, a forest regeneration specialist for the Pennsylvania Bureau of Forestry.

Pennsylvania's burgeoning deer population, Beaver adds, takes a monstrous toll on oak seedlings while periodic infestation by spruce moth caterpillars ravages oaks. "We can't fight only," he is quick to point out, "but we do have serious problems with regeneration."

Steele, Southampton, was absorbed in his own serious problems the

other day in Kirby Park, where he and about a dozen Wilkes-Barre

will monitor the feeding and caching activity of squirrels throughout the fall and winter.

For the most part, these squirrels are every acorn — red or white —

can carry off a red oak, bounding about 100 yards to the outskirts of a battlefield to deposit it in a

helter.

"I will tell Steele with a temporary

name that Thoreau wasn't exactly

on target when, in 1849, he said

the forest was not a tragedy."

"We should be more civilized as

well as business if we recognized

once a year by some symbolic ceremony

the part that the squirrel plays in the economy of Nature."

Maybe it was the weather, the

first and only day of autumn, Steele

permeated. Maybe it was the time of

day and maybe, Southampton

renewed when informed of this feeding

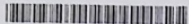
trial that ran counter to accepted

explanation.

"It's quite obvious," he said. "They

didn't read our literature."

HOUSTON, TX
MONDAY 546,856
NOV 16 1998



SURRELLES

281
-TWBCB6
-A-1-1

A REAL NUT CASE

Squirrels' hoarding habits give researchers a closer look at regeneration of oak forests

By **CONRAD GROVE**
Knight Ridder Tribune News

WILKES-BARRE, Pa. — It didn't take long for these brazen beggars to target Michael Steele as an easy mark, his eyes downcast and his pockets bulging as he made his way straight toward the home turf of this pack of city park squirrels.

Steele, an associate professor of biology at Wilkes University, was carrying the good stuff — acorns — and he paused every so often to examine the ones that had already fallen from a stand of the two major groups of oaks, white and red. Curiously, many of those acorns were only half-eaten; of those, only the top half had been munched.

Steele did not disappoint the gathering throng of plume-tailed rogues. He lobbed acorn after acorn to specific squirrels, and each greedily inspected its newfound booty.

This was far from a controlled experiment, but if these Eastern gray squirrels behaved as they should, they would most likely immediately wolf down the acorns from white oaks and slash the acorns from the reds.

The fact that squirrels bury a portion of their cache, of course, is nothing new. Henry David Thoreau, for example, in a work written 125 years ago but only published in 1993,

praised the "vast work" of these seed plunderers, noting that "it is not in vain that a squirrel lives in almost every forest tree or hollow log or wall or heap of stones."

But only in recent years have scientists questioned why squirrels cache only certain acorns of the 32 species of oaks across eastern North America, and Steele, 38, and colleague Peter Smallwood, 37, an associate professor of biology at the University of Richmond, are in the forefront of studies that could have a significant impact on oak forest regeneration.

Both researchers note that squirrels — creatures with bean-sized brains that nonetheless manage to thwart the best efforts of backyard bird feeders across the nation — are often less than model citizens.

"But for a scientist, they're great models for behavioral and ecological research," Steele says. "Learn to enjoy them, because they're fascinating to watch."

And more often than not, squirrels are extremely selective about which acorns they hoard. In perhaps 2,000 feeding trials over the past 15 years in several Eastern states, Steele and Smallwood, with the help of numerous undergraduates, have found that about 85 percent of acorns from the various species of white oaks are eaten shortly after discovery, while about 60 percent of the acorns of red

oaks are stored.

Red oak acorns are substantially higher in both fats and tannins, the bitter-tasting compounds used to tan hides. Red oak acorns sprout in the spring; while oak acorns begin to germinate almost immediately after falling to the ground in the autumn.

The researchers also found that in those red oak acorns that were eaten, frequently only the top half — the end farthest from the embryo — was consumed. Because the embryos were not destroyed, such acorns from red oaks germinated about as often as undamaged specimens.

The results indicate that squirrels, by avoiding the noxious tannins contained in the bottom half of the red oak acorn, are able to capitalize on the higher fat content contained in the top half during the winter, when energy demands are at a premium.

The squirrels also dispersed the acorns of red oaks — which require more sunlight than white oaks — over a much greater territory. Borrowing an idea from another botanist, Steele and Smallwood tagged white and red oak acorns with metal labels and then scoured woodlands to locate various caches.

That technique was necessary because squirrels sometimes employ their own variation of the shell game to dupe one another. Before they



Chronicle file

Only in recent years have scientists questioned why squirrels cache only certain acorns of the 32 species of oaks across eastern North America. Michael Steele, an associate professor of biology at Wilkes

University, and colleague Peter Smallwood, an associate professor of biology at the University of Richmond, are in the forefront of studies that could have a significant impact on oak forest regeneration.

bury their treasure an inch or so deep in leaf litter, they often dig several small holes and cover them up before depositing the palmed acorn.

"Are they digging just to find the best site?" Steele wonders. "Or are they engaging in deceptive behavior?"

Added Smallwood: "I had to laugh out loud when I finally discovered I'd been had by that burying behavior. I'm sure squirrels have been telling stories about how they outsmarted me for years."

In another experiment, Small-

wood ground white oak acorns into powder, creating an artificial food-stuff to which he added and subtracted various amounts of fats and tannins. In the fall, squirrels spent more time eating acorns with lower tannin; in the winter, tannin had much less of an effect on their dining preferences.

Steele carried the project a step further, using artificial red and white oak acorns and placing the meat of each into the wrong shell. Even with a fake white oak acorn inside, squirrels consistently cached

the red shell; they ate the red oak kernels inside white oak shells.

"Knowing where a squirrel may put an acorn can help tell us what to do to enhance conditions for natural regeneration," said John Bearer, a forest regeneration specialist for the Pennsylvania Bureau of Forestry. "Obviously, a squirrel can't remember every place it puts an acorn, and if we keep enough big, dead trees on the ground for the squirrels to hide acorns from predators, we can encourage sprouting."

Enlightened river management crucial to W-B



ON SEPT. 23, members of the Leadership Wilkes-Barre Class of 2001 toured the Susquehanna Riverfront to gain a better appreciation of regional

environmental issues and opportunities. The day's program, which was sponsored by PPL and Borton-Lawson Engineering, focused on the Susquehanna River and the parks adjacent to it.

The Susquehanna River is the major environmental feature that catalyzed early settlement in the Wyoming Valley. The Susquehanna is the nation's 16th largest river, providing more than half the freshwater flow into the Chesapeake. It has been designated one of 14 American Heritage Rivers by the Clinton administration.

Leadership participants spent the day learning about the riparian forest, the animals inhabiting the riverfront park and projects designed to improve flood protection, river access and water quality.

Luzerne County Engineer James Brozena kicked off the day's program at the Luzerne County Emergency Management Agency by outlining details of the Wyoming Valley Levee Raising Project. With progress plainly visible in the completed sections of a more visually appealing levee system, residents can look forward to flood protection from a 50-year storm event.

Brozena explained how the \$177 million dollar project included public input and community visioning. Viable ideas are being built into the project wherever possible, ensuring that the finished product will offer flood protection, while incorporating appealing architectural design and enhanced recreational opportunities.

Dr. Kenneth Klemow of Wilkes University discussed water quality, explaining how acid mine drainage and combined sewer overflows affect our watershed. Wyoming Valley owes AMD to our mining history and CSOs to antiquated sewer systems.

AMD results when surface water

COMMENTARY

ROBERT KREHELY JR.

"Attendees were left with a sense of just how important the environment is to the future of our community."

flows into mines, becomes acidic and picks up iron. At some point this iron-rich, slightly acidic water finds its way out of the mines and back into the Susquehanna River and its tributaries. According to Dr. Klemow's research, 15 of the 40 miles of tributaries feeding the Susquehanna River are impacted by AMD. He reports that promising wetlands research conducted locally has resulted in one demonstration project that removed 98 percent of the iron in the impacted water.

CSOs result when sewage and storm water share a common pipe. The combined systems in some towns can only direct 2 1/2 times dry-weather flow to the Wyoming Valley Sanitary Authority waste-water treatment plant. Any excess combined flows are diverted to the Susquehanna River through one of 56 diversion chambers between Pittston and Nanticoke.

WVSA has spent millions of dollars to reduce the frequency and volume of CSOs and the goal is to work with municipalities and local officials to eliminate or treat these events.

The next topic was the proposed inflatable dam. Paul Schweiger is Gannett Fleming's senior project manager for the Wyoming Valley Inflatable Dam Feasibility Study. According to Schweiger, the most beneficial use of an inflatable dam would involve significant recreational access and enhanced landside waterfront access. Current project hurdles include water quality, environmental concerns, a master plan for riverfront development, and institutional arrangements for a waterfront district.

The outcomes of the Gannett Fleming study show that a 4.5-mile long recreation lake could draw 400,000 visitors annually. From a cost benefit standpoint, the recommended project would return \$33 for each dollar spent. As an interesting side note, three parties launched boats for some fishing on the Susquehanna on the morning of the Leadership program.

Dr. Michael Steele of Wilkes University and attorney James Shoemaker of Hourigan, Kluger & Quinn focused on the diverse riparian forest and wildlife that coexists along our urbanized riverfront. "Riparian" means adjacent to flowing water, and this 95-year-old "forest in the city" is home to a diverse group of plants and animals thanks to vertical stratification or specialization resulting from the periodic flooding of the area. The distinctive riparian habitat makes the park's inhabitants among the most diverse in the state.

Vinnie Catrone, speaker on the riparian forest and urban forester with the Penn State Cooperative Extension, along with members of the Riverfront Parks Committee, led tours of Olmsted Park. This natural area abounds with local history, and thanks to last year's Leadership Wilkes-Barre class, an Olmsted Trail guide documents many of the historical and natural features present today.

Through this broad environmental forum, the attendees were left with a sense of just how important the environment is to the future of our community. As we work to address environmental issues, and develop and preserve existing opportunities, it is critical we achieve a delicate balance.

The goal is to maintain natural and historical features while enhancing economic and recreational opportunities. Advanced thoughtfulness and consideration will make the Susquehanna a true regional asset.

Robert Krehely Jr. is a member of the Leadership Wilkes-Barre Class of 2001. Leadership Wilkes-Barre is a 10-month program that seeks to develop leaders from the local community.

**WILLIAMSPORT
SUN-GAZETTE**

WILLIAMSPORT, PA
THURSDAY 33,343
SEP 7 2000



BURRELLE'S

505
.X20C.

51

XX... ZK

College to Hold Public Events

Lycoming College will be holding a number of events that are open to the public and free of charge.

From 4 to 5:30 p.m. today, graphic designer Scott Jensen will host a gallery talk and answer questions. The event will be held in the Art Gallery in the Snowden Library.

Also on today, there will be a lecture at noon in room G-11 in the Heim Building by Dr. Michael Steele, associate professor of biology at Wilkes University. The title is "From Seed Chemistry to Forest Structure: The Effects of Small Mammals on the Dispersal and Establishment of Oaks."

It is sponsored by Merk, the pharmaceutical company, and by the American Association for the Advancement of Science.

More information about the events is available by calling the Office of College Relations at 321-4037.

Bird feeding takes flight

Saturday event explores all aspects of popular pastime — even squirrels

With almost one in every three Pennsylvanians feeding birds these days, it's about time someone came up with an all-encompassing bird feeding pow-wow.

The Bird Feeding Spectacular the folks at the North Museum have put together for this Saturday has an impressive cast and should be intriguing, whether you're just starting out or have enough feeders to justify a second mortgage.

The cost for the daylong event is \$4 for the general public.

"Bird feeding is one of the most popular activities in the country," says Robert Gingerich, the North Museum's creative director. "It's bigger than sports in terms of economic impact."

Indeed, Pennsylvanians spend an estimated \$135 million each year on bird food, according to one study. That's hardly chicken feed.

On Saturday, there will be experts to tell you which birdseed attracts which birds and which seed not to waste your money on.

You can find out what plants, shrubs and trees attract birds and what birds decide to stay in Lancaster County year-round instead of flying south.

You'll learn how adding a source of water can pump up the numbers and types of birds at your feeding station.

Shirley Bubb, who will be talking about the latter, and her husband, Ray, have three bird baths in addition to their complex of feeders at their Manheim Township home.

They found that the number of bird species that flock to their feeding station shot up from 40 to 73 when bird baths were added.

Many are warblers that migrate through the area in spring and fall. Warblers don't frequent feeders, but are attracted to dripping water at the Bubbs' house.

Gingerich will address the unpleasant — for some people — realities of setting up bird feeders.

"You are setting out a buffet, inviting everybody in the neighborhood to eat," he notes. So don't be surprised if a hawk starts dive-bombing your song birds, or mice start showing up.

What discussion of bird feeding would be complete without touching on squirrels?

Dr. Michael Steel, an associate professor of biology at Wilkes College, will talk about his study that finds that the squirrels' habit of burying nuts affects the health and type of trees in our forests.

Nutty as it seems, Steel and

AD CRABLE

Outdoors Editor



Outdoor Trails

other researchers are finding that the chemicals in some acorns affect squirrel behavior. For example, some oaks that need their acorns to be dormant over winter apparently can keep squirrels from digging them up.

Teresa Deckard, who runs Bird Rescue of York County, will give advice on what to do if you come across a bird that might be injured or orphaned.

It's not simple. Any chick on the ground probably does need help, says Deckard, a licensed bird rehabilitator. It may have been blown out of the nest, removed by a cat or the nest may simply have fallen apart.

But when young birds become fledglings, they learn to fly by starting on the ground. They should be left alone. The parents are nearby.

If a bird needs help, most people don't know it is illegal for them to step in and care for it themselves. The birds should be taken to a licensed rehabilitator.

That's for good reason, says

Deckard. Taking in an orphaned or injured bird may be well meaning, but feeding them the wrong food can cause irreparable harm.

Feeding them milk is a no-no since birds don't digest it. Catfood may work for some birds, but for many it does not supply needed nutrients and can cause blood disease.

At the very least, it can retard feather development, meaning the bird's coat might not be able to repel water or keep out killing cold.

Bird feeding is enjoying phenomenal popularity and a big reason is because it's a simple activity that families can enjoy together. It connects people with the outdoors and with each other, Gingerich adds.

This winter, at-home feeder watchers will again be enlisted as scientists.

The Great Backyard Bird Count 2000, Feb. 18-21, invites bird watchers of all ages and skills across the nation to count and report birds to an Internet data base.

Organized by the National Audubon Society and the Cornell Laboratory of Ornithology, the grassroots effort will help scientists document the health and status of the nation's winter bird populations.

For more information or to participate, go to BirdSource at <http://www.birdsource.org>.

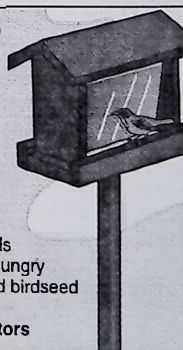
For all our growing fascination with birds, we humans need to keep in mind that feeding them is mainly for our enjoyment. There is no evidence birds need our feeders to survive.

Our prodigious offerings of suet, sunflower seeds and cracked corn are welcome and enticing. But it's still a drop in the bucket compared to what birds can glean from fields and woods.

Bird feeding spectacular

North Museum,
Saturday, Nov. 6, 9 a.m.-5 p.m.

- 9:20 a.m. Landscaping from a bird's point of view
- 10:20 a.m. Lancaster's natives: year-round bird residents
- 11:45 a.m. Bird feeding overview
- 1:15 a.m. The good that squirrels do
- 2:15 a.m. What to do with injured birds
- 2:45 a.m. When migratory birds get hungry
- 3:45 a.m. Bird feeders, bird baths and birdseed
- 4:15 a.m. Dark side of bird feeding
- All Day: Live bird banding, exhibitors



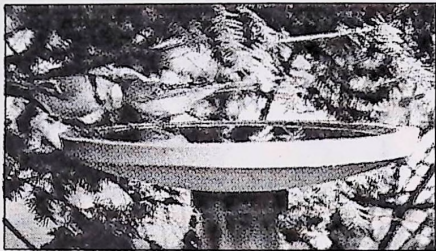
LANCASTER, PA
TUESDAY 48,437
NOV 2 1999



BURRELLE'S

222
XZ0CM

XX... EX



Ray Bubb attends to his complex of bird feeders, below, while two bluejays prepare for a bird bath, left.



Nutty truth about squirrels studied

■ They are extremely selective about which acorns they hoard.

By Conrad Grove
Knight-Ridder Newspapers

It didn't take long for these braven beggars to target Michael Steele as an easy mark, his eyes downcast and his pockets bulging as he made his way straight toward the home turf of this pack of city park squirrels.

Steele, an associate professor of biology at Wilkes University, Wilkes-Barre, was carrying the good fruit — acorns — and he paused every so often to examine the ones that had already fallen from a stand of the two major groups of oaks, white and red. Curiously, many of those acorns were only half-eaten; of those, only the top half had been munched.

Steele did not disappoint the gathering throng of plume-tailed rogues. He lobbed acorn after acorn to specific squirrels, and each greedily inspected its newfound booty.

This was far from a controlled experiment, but if those Eastern gray squirrels behaved as they should, they would most likely immediately wolf down the acorns from white oaks and stash the acorns from the reds.

The fact that squirrels bury a portion of their cache, of course, is nothing new.

Henry David Thoreau, for example, in a work written 125 years ago but only published in 1993, praised the vast work of these seed plunders, noting that "it is not in vain that a squirrel lives in almost every forest tree or hollow log or wall or heap of stones."

But only in recent years have scientists questioned why squirrels cache only certain acorns of the 32 species of oaks across eastern North America, and Steele, 38, and colleague Peter Smallwood, 37, an associate professor of biology at the University of Richmond, are in the forefront of studies that could have a significant impact on oak forest regeneration.

Both researchers note that squirrels — creatures with bean-sized brains that nonetheless manage to thwart the best efforts of backyard bird feeders across the nation — are often less than model citizens.

"But for a scientist, they're great models for behavioral and ecological research," Steele said. "Learn to say them, because they're fascinating to watch."

And more often than not, squirrels are extremely selective about which acorns they hoard. In perhaps 2,000 feeding trials over the past 15 years in several Eastern states, Steele and Smallwood, with the help of numerous undergraduates, have found that about 85 percent of acorns from the various species of white oaks are eaten shortly after discovery, while about 60 percent of the acorns of red oaks



The squirrel is a great model for behavioral and ecological research.

Eagle/Times file photo

are stored.

Red oak acorns are substantially higher in both fats and tannins, the bitter-tasting compounds used to tan hides. Red oak acorns sprout in the spring; white oak acorns begin to germinate almost immediately after falling to the ground in the autumn.

The researchers also found that in those red oak acorns that were eaten, frequently only the top half — the end farthest from the embryo — was consumed. Because the embryos were not destroyed, such acorns from red oaks germinated about as often as undamaged specimens.

The results indicate that squirrels, by avoiding the noxious tannins contained in the bottom half of the red oak acorn, are able to capitalize on the higher fat content contained in the top half during the winter, when energy demands are at a premium.

The squirrels also dispersed the acorns of red oaks — which require more sunlight than white oaks — over a much greater territory. Borrowing an idea from another botanist, Steele and Smallwood tagged both white and red oak acorns with metal labels and then scoured woodlands to locate various caches.

That technique was necessary because squirrels sometimes employ their own variation of the shell game to dupe one another. Before they bury their treasure an inch or so deep in leaf litter, they often dig several small holes and cover them up before depositing the palmed acorn.

"Are they digging just to find the

best site?" Steele said. "Or are they engaging in deceptive behavior?"

Added Smallwood in a telephone interview: "I had to laugh out loud when I finally discovered I'd been had by that burying behavior. I'm sure squirrels have been telling stories about how they outsmarted me for years."

In another experiment, Smallwood ground white oak acorns into powder, creating an artificial foodstuff to which he added and subtracted various amounts of fats and tannins. In the fall, squirrels spent more time eating acorns with lower tannin; in the winter, tannin had much less of an effect on their dining preferences.

Steele carried the project a step further, using both artificial red and white oak acorns and placing the meat of each into the wrong shell. Even with a fake white oak acorn inside, squirrels consistently cached the red shell; they ate the red oak kernels inside white oak shells.

In Pennsylvania, red oaks outnumber whites by three to one. Red oaks can live up to 250 years, while white oaks up to 600, though none in Pennsylvania even approximate that age because much of the state was logged between 1860 and 1910.

"Knowing where a squirrel may put an acorn can help tell us what to do to enhance conditions for natural regeneration," said John Bear, a forest regeneration specialist for the Pennsylvania Bureau of Forestry. "Obviously, a squirrel can't remember every place it puts an acorn, and if we keep enough big, dead trees on the ground for

the squirrels to hide acorns from predators, we can encourage sprouting."

Pennsylvania's burgeoning deer population, Bear adds, takes a monstrous toll on oak seedlings, while periodic infestation by gypsy moth caterpillars ravages mature trees.

"We're not losing oak," he said, "but we do have serious problems with regeneration."

Steele, meanwhile, was absorbed in his own serious problems recently in Kirby Park, where he and about a dozen Wilkes students will monitor the feeding and caching activity of squirrels throughout the fall and winter.

For the most part, these squirrels ate every acorn — red or white — that Steele chucked to them. Only one carried off a red acorn, bounding about 100 yards to the outskirts of a ballfield to deposit it in his lair.

It all left Steele with a temporary sense that Thoreau wasn't exactly on target, when, in "Faith in a Seed," the famous naturalist suggested:

"We should be more civilized as well as humane if we recognized once in a year by some symbolic ceremony the part which the squirrel plays in the economy of nature."

Maybe it was the weather, Steele hypothesized. Maybe it was the time of day. And maybe, Smallwood reasoned when informed of this feeding trial that ran counter to accepted grain, there was another explanation.

"It's quite obvious," he said. "They didn't read our literature."

The Outdoors By Conrad Grove

Professors searching out nutty truth on squirrels

WILKES-BARRE, Pa. — It didn't take long for these brazen beggars to target Michael Steele as an easy mark, his eyes downcast and his pockets bulging as he made his way straight toward the home turf of this pack of city park squirrels.

Steele, an associate professor of biology at Wilkes University, was carrying the good stuff — acorns — and he paused every so often to examine the ones that had already fallen from a stand of the two major groups of oaks, white and red. Curiously, many of those acorns were only half-eaten; of those, only the top half had been munched.

Steele did not disappoint the gathering throng of plume-tailed rogues. He lobbed acorn after acorn to specific squirrels, and each greedily inspected its newfound booty.

This was far from a controlled experiment, but if these Eastern gray squirrels behaved as they should, they would most likely immediately wolf down the acorns from white oaks and stash the acorns from the reds.

The fact that squirrels bury a portion of their cache, of course, is nothing new. Henry David Thoreau, for example, in a work written 125 years ago but only published in 1993, praised the "vast work" of these steel plunderers, noting that "it is not in vain that a squirrel lives in almost every forest tree or hollow log or wall or heap of stones."

But only in recent years have scientists questioned why squirrels cache only certain acorns of the 32 species of oaks across eastern North America, and Steele, 38, and colleague Peter Smallwood, 37, an associate professor of biology at the University of Richmond, are in the forefront of studies that could have a significant impact on oak forest regeneration.

Both researchers note that squirrels — creatures with bean-sized brains that nonetheless manage to thwart the best efforts of backyard bird feeders across the nation — are often less than model citizens.

"But for a scientist, they're great models for behavioral and ecological research," Steele says. "Learn to enjoy them, because they're fascinating to watch."

And more often than not, squirrels are extremely selective about which acorns they hoard. In perhaps 2,000 feeding trials over the past 15 years in several Eastern states, Steele and Smallwood, with the help of numerous undergraduates, have found that about 85 percent of acorns from the various species of white oaks are eaten shortly after discovery, while about 60 percent of the acorns of red oaks are stored.

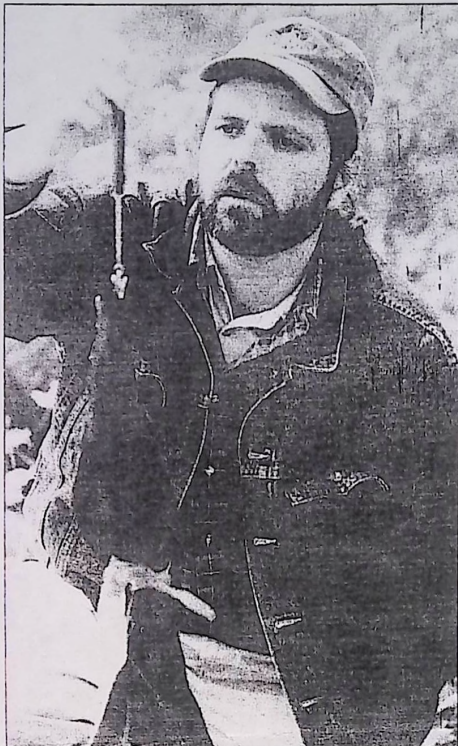
Red oak acorns are substantially higher in both tannins and the bitter-tasting compounds used to tan hides. Red oak acorns sprout in the spring; white oak acorns begin to germinate almost immediately after falling to the ground in the autumn.

The researchers also found that in those red oak acorns that were eaten, frequently only the top half — the end farthest from the embryo — was consumed. Because the embryos were not destroyed, such acorns from red oaks germinated about as often as undamaged specimens.

The results indicate that squirrels, by avoiding the noxious tannins contained in the bottom half of the red oak acorn, are able to capitalize on the higher fat content contained in the top half during the winter, when energy demands are at a premium.

The squirrels also dispersed the acorns of red oaks — which require more sunlight than white oaks — over a much greater territory. Borrowing an idea from another botanist, Steele and Smallwood tagged both white and red oak acorns with metal labels and then scoured woodlands to locate their caches.

That technique was necessary because squirrels are not known to



Michael Steele weighs an Eastern gray squirrel as part of an experiment on the animal's storage habits.



Steele prepares to tag a detained squirrel to monitor its location.

further, using both artificial red and white oak acorns and placing the word of each into the wrong shell. Even with a fake white oak acorn inside, squirrels consistently cached the red shell; they ate the red oak kernels inside white oak shells.

In Pennsylvania, red oaks outnumber whites by three to one. Red oaks can live up to 250 years, while oaks up to 800, though none even approximate that age because much of Pennsylvania was logged off between 1860 and 1910.

"Knowing where a squirrel may put an acorn can help tell us what to do to enhance conditions for natural regeneration. Obviously, a squirrel can't remember every place it puts an acorn, and if we keep enough hip, dead trees on the ground for the squirrels to hide acorns from predators, we can encourage sprouting," said Steele.

other day in Kirby Park, where he and about a dozen Wilkes students will monitor the feeding and caching activity of squirrels throughout the fall and winter.

For the most part, these squirrels ate every acorn — red or white — that Steele chucked to them. Only one carried off a red acorn, bounding about 100 yards to the outskirts of a ballfield to deposit it in its lair.

It all left Steele with a temporary sense that Thoreau wasn't exactly on target, when, in *Faith in a Seed*, the famous naturalist suggested:

"We should be more civilized as well as humane if we recognized once in a year by some symbolic ceremony the part which the squirrel plays in the economy of Nature."

Maybe it was the weather, the first cold day of autumn, Steele hypothesized. Maybe it was the time of

Outdoors Calendar

Meetings

■ **Tomorrow:** The Philadelphia Bassmasters club will meet at 7 p.m. at 9315 State Rd. Call 215-677-7079.

■ **Tuesday:** The Southeastern Montgomery County Chapter of Trout Unlimited will meet at 7:30 p.m. at the Pennypack Ecological Restoration Trust, 2955 Edge Hill Rd., Huntingdon Valley. Call 215-379-0185.

■ **Thursday:** The Main Line Fly Tyers will meet at 7:15 p.m. at the Schuylkill Center for Environmental Education, 8480 Hagy's Mill Rd., Roxborough. Call 610-630-9738.

Outings

■ **Today:** Bring a Friend Day will be held at the Schuylkill Center for Environmental Education, 8480 Hagy's Mill Rd., Roxborough. To encourage newcomers to visit the center, admission will be free. Hours: 1 to 5 p.m. Call 215-482-7300.

■ **Wednesday:** A bird walk will begin at 8 a.m. and a wildflower walk at 11 a.m. at the Tyler Arboretum, 515 Painter Rd., Media. Cost for each outing: \$3. \$1 for children 3 to 15. Free to children under 3 and members. Call 610-565-5134.

■ **Saturday and next Sunday:** On Saturday, a bird walk will begin at 9 a.m. and a nature walk at 10:30 a.m. at the John Heinz National Wildlife Refuge at Tinicum, 86th Street and Lindbergh Boulevard, Southwest Philadelphia. At 2 p.m., groundbreaking ceremonies for the \$5 million Cusano National Environmental Education Center will be held. Next Sunday, a bird walk will start at 9 a.m. All activities free. Call 215-365-3118.

■ **Saturday and next Sunday:** On Saturday, a nature walk will begin at 1 p.m. at the Green Lane Nature Center, Route 29, Green Lane. Next Sunday, a two-hour foliage hike along the Blue Horse Trail will start at 2 p.m. Meet at the Hill Road office. Both outings free. Call 215-234-8497.

■ **Next Sunday:** The Pennsylvania Game Commission will allow the public to take part in motorized tours of State Game Lands 110 in Berks and Schuylkill Counties and 211 in Dauphin, Lebanon and Schuylkill Counties. These annual tours allow people to travel on roads that are normally closed. Free. Call 610-925-3136.

Seminars

■ **Thursday:** A fly-tying seminar will begin at 8 p.m. at the Orvis store in the Brandywine Shopping Center, Downingtown. Free. Call 610-873-8400.

■ **Oct. 24 and 25:** A two-session

hunter-education course held at the Ommelanc Education Center, Roanoke, Va., and Del. Hours: 8 a.m. to 4 p.m. Participants must attend sessions to receive certificate. Call 302-323-5336.

■ **Oct. 24 and 25:** A two-trapper-education course from 9 a.m. to 4 p.m. at the Fort Dix Rod & Gun Club, Browns Mills. Call Fort Dix, N.J. Participants attend both sessions. I certification. Dress for and bring a lunch. Per requested. Call the New Division of Fish, Game at 609-629-0552.

Events

■ **Wednesday:** This is the apply for a permit to a controlled deer hunt on Tyler State Park in Bucks. The hunt is for the benefit of people. Only hunters and using manual, semi or muzzle-loader shotguns. Buckshot will be allowed to participate. To obtain a call 215-988-2021.

■ **Saturday:** Small-game rabbits, pheasants, grouse squirrels will begin in Pe it will mark the first time

STS-10

This Friday O
SAV

on major
Firestone

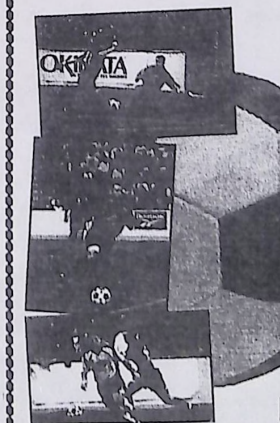
First 300 CU

**TOIL, LU
FILTER**

We'll lubricate chassis, state oil, and install a filter types may result in wear at time of purchase. Offer ends Saturday, Oct. 24.

EST
TIRE & AUTO CENT
It's a trust in
Experience the difference.

PHILADELPHIA KIXX
www.kixxonline.com



**Fam
AI**

If you haven't indoor soccer missing out only \$4 the excitement night 4 So why the fun, you

Be sure to ask about



BURRELLES

588
...2400

11... NY

Black squirrels turns out to be gray squirrels in disguise

Other than being a little warmer in winter and more conspicuous in certain environments, black squirrels are no different from their gray brethren.

"What you're seeing is different color variations," said Mike Tannenbaum, dean of the School of Science at Marist College, noting that black squirrels are simply a melanistic variety of the Eastern gray squirrel.

Mike Steele, an associate professor of biology and a squirrel expert at Wilkes University in Pennsylvania, said melanism and the less common albinism, or whiteness, occurs in many mammals.

While stressing that there

DARREN O'SULLIVAN



OUT THERE

hasn't been much research on gray squirrel melanism, Steele said a few things are known and assumed about them:

- Blackness is assumed to be a recessive gene in the squirrels.

- Gray and black-colored

squirrels will mate and sometimes produce mixed offspring.

- Studies of melanism in European red squirrels show that black individuals have more guard hairs and insulating fat, giving them a thermal advantage over the normal variety.

Dark can be dangerous

Steele said the European study may provide clues as to why melanism in gray squirrels is much more common in the northern part of the mammals' range, where survival could depend more on staying warm.

Richard Ostfeld, an animal

ecologist at the Institute for Ecosystem Studies in Millbrook, said, however, that their color would seem to make black squirrels more obvious to predators in snowy areas.

"You'd expect that these dark forms would be selected against in areas that had a lot of snow," said Ostfeld.

Steele said that studies of melanism in fox squirrels in the Midwest show that black squirrels are more common in the southern part of the range — a circumstance he said has evolved because their dark color gives the squirrels an advantage in thick forests that get little sunlight and have been blackened by fires.

The importance of animals' color as it relates to them being hunted is evident in the relative scarcity of albino squirrels. While both white and black coloring in squirrels is assumed to be caused by recessive genes, albino squirrels are less common, which Steele attributed to the fact that an all-white squirrel will stand out in stark contrast to most environments, making them easier targets for predators and far less likely to survive or mate.

In New York, pockets of melanistic gray squirrels are common in many urban areas, particularly Syracuse and Albany, which experts suggest

may be due to the lack of predators in those environments.

Bill Conners, chairman of the Federation of Dutchess County Fish and Game Clubs, said he sees black squirrels in the Pleasant Valley area, where he lives.

"There's a pocket of them out here," said Conners. "I've seen more in the Pleasant Valley area than I have in any other place in the county."

Darren O'Sullivan's Out There column appears every Sunday. You can reach him at 437-4827 or by e-mail at DEOS1@AOL.COM.



BURRELLES

122

11

More than a shell game

By CONRAD GROVE

Knight Ridder Newspapers

203 NW

WILKES-BARRE, Pa. — It didn't take long for these brazen beggars to target Michael Steele as an easy mark, his eyes downcast and his pockets bulging as he made his way straight toward the home turf of this pack of city park squirrels.

Steele, an associate professor of biology at Wilkes University, was carrying the good stuff — acorns — and he paused every so often to examine the ones that had already fallen from a stand of the two major groups of oaks,

white and red. Curiously, many of those acorns were only half-eaten; of those, only the top half had been munched.

Steele did not disappoint the gathering throng of plume-tailed rogues. He lobbed acorn after acorn to specific squirrels, and each greedily inspected its new-found booty.

This was far from a controlled experiment, but if these Eastern gray squirrels behaved as they should, they would most likely immediately wolf down the acorns from white oaks and stash the acorns from the reds.

The fact that squirrels bury a portion of their cache, of course, is nothing new. Henry David Thoreau, for example, in a work written 125 years ago but only published in 1983, praised the "vast work" of these seed plunderers, noting that "it is not in vain that a squirrel lives in almost every forest tree or hollow log or wall or heap of stones."

But only in recent years have scientists questioned why squirrels cache only certain acorns of the 32 species of oaks across eastern North America, and Steele, 38, and colleague Peter Smallwood, 37, an associate professor of biology at the University of Richmond, are in the forefront of studies that could have a significant impact on oak forest regeneration.

Both researchers note that squirrels — creatures with bean-sized brains that nonetheless manage to thwart the best efforts of backyard bird feeders across the nation — are often less than model citizens.

"But for a scientist, they're great models for behavioral and ecological research," Steele says. "Learn to enjoy them, because they're fascinating to watch."

And more often than not, squirrels are extremely selective about which acorns they hoard. In perhaps 2,000 feeding trials over the past 15 years in several Eastern states, Steele and Smallwood, with the help of numerous undergraduates, have found that about 85 percent of acorns from live oak species of white oaks are eaten shortly after discovery, while about 60 percent of the

acorns of red oaks are stored.

Red oak acorns are substantially higher in both fats and tannins, the bitter-tasting compounds used to tan hides. Red oak acorns sprout in the spring; white oak acorns begin to germinate almost immediately

contained in the top half during the winter, when energy demands are at a premium.

The squirrels also dispersed the acorns of red oaks — which require more sunlight than white oaks — over a much greater territory. Borrowing an idea

from another botanist, Steele and Smallwood tagged both white and red oak acorns with metal labels and then scoured woodlands to locate various caches.

That technique was necessary because squirrels sometimes employ their own variation of the shell game to dupe one another. Before they bury their treasure an inch or so deep in leaf litter, they often dig several small holes and cover them

up before depositing the palmed acorn.

"Are they digging just to find the best site?" Steele wonders. "Or are they engaging in deceptive behavior?"

Add Smallwood in a telephone interview: "I had to laugh out loud when I finally discovered I'd been had by that burying behavior. I'm sure squirrels have been telling stories about how they outsmarted me for years."

In another experiment, Smallwood ground white oak acorns into powder, creating an artificial food-stuff to which he added and subtracted various amounts of fats and tannins. In the fall, squirrels spent more time eating acorns with lower tannin; in the winter, tannin had much less of an effect on their dining preferences.

Steele carried the project a step further, using both artificial red and white oak acorns and placing the meat of each into the wrong shell.

Even with a fake white oak acorn inside, squirrels consistently cached the red shell, they ate the red oak kernels inside white oak shells.

In Pennsylvania, red oaks outnumber whites by three to one. Red oaks can live up to 250 years, while white oaks up to 80, though none in Pennsylvania even approximate that age because much of the state was logged between 1850 and 1910.

"Knowing where a squirrel may put an acorn can help tell us what to do to enhance conditions for natural regeneration," said John Bearer, a forest regeneration specialist for the Pennsylvania Bureau of Forestry.

"Obviously, a squirrel can't remember every place it puts an acorn, and if we keep enough big, dead trees on the ground for the squirrels to hide acorns from predators, we can encourage sprouting."

Researchers search out nutty truth about squirrels

after falling to the ground in the autumn.

The researchers also found that in those red oak acorns that were eaten, frequently only the top half — the end farthest from the embryo — was consumed. Because the embryos were not destroyed, such acorns from red oak germinated about as often as undamaged specimens.

The results indicate that squirrels, by avoiding the noxious tannins contained in

the bottom half of the red oak acorn, are able to capitalize on the higher fat content





SURRELLE'S

11A
11/26/98

BT



FURRY FORESTER. The eastern gray squirrel grows between 8 and 19 inches long, including tail. Its favorite food is acorns and nuts.

Red or white? It's nutty

203 NW
Squirrels' eating habits are key to regeneration of oak forests

BY A.J. HOSTETLER
TIMES-DISPATCH STAFF WRITER

It sounds, well, a little nutty, studying the eating habits of squirrels.

Yet that's what University of Richmond behavioral ecologist Peter Smallwood does. About 15 years ago, Smallwood began tailing squirrels, watching to see what they eat on the run and what they store for future feasts.

"Squirrels are cool. And I was just trying to understand what they do and why they do what they do," he explained.

While studying squirrel behavior, he's uncovered evidence suggesting that squirrels play an important role in how mighty oaks grow, information that could help in managing dwindling oak forests.

"It turns out that oaks in the United States are in trouble. We don't know why they're in trouble, but we have lots and lots of very old adult trees, and we don't have a next generation of oaks coming up to fill the gaps as they start to die off," Smallwood said.

"The more we know about how seeds become seedlings, the better chance we're going to have at figuring out what's going on."

gle oak produces every year. But even in good years, only about 1 percent of acorns are available to grow into an oak seedling, while as many as 500 or more acorns may be required to produce a single, 1-year-old seedling.

One reason is that many acorns are eaten by insects, squirrels, small rodents, deer, turkeys and blue jays. But squirrels, including the Eastern gray squirrel so common to Virginia, also store acorns and move them around. By failing to recover up to three-quarters of the acorns they store, squirrels influence which acorns can become oak seedlings, and how forests renew themselves, or regenerate.

Scientists and those who care for forests have suggested several possible reasons for the trouble that oaks in the eastern United States are having in regenerating. Among the fingered culprits are modern fire suppression methods, deer overpopulation and insect infestations, such as gypsy moths.

"There's a serious potential to lose the oak," said Michael Steele, a biologist at Pennsylvania's Wilkes University who frequently collaborates with Smallwood on the squirrel research. "You could look for artificial devices to help oaks regenerate, but that's too costly. So if we understand more about the ways animals



THE NUTTY PROFESSOR. Dr. Peter Smallwood, who studies squirrels' eating habits, displays acorns from a red oak (left) and a white oak.



White oak

Fagaceae *Quercus alba* is a large, long-lived tree often 80 to 100 feet tall, although trees 150 feet tall and 600 years old have been recorded.

White oaks are prized for their straight trunks, dense foliage and compact crown.

The fruit is used as food by more than 150 different kinds of birds and mammals, including squirrels and deer, which also munch on the twigs and foliage.

The white oak acorn, about 3/4-inch long, sprouts shortly after falling from the tree.



Northern red oak

Fagaceae *Quercus rubra* is widespread in the East, where it is also known as the common red oak.

It matures to about 65 to 90 feet, and has a symmetrical shape and brilliant fall foliage. Its acorns are 3/4-inch to an inch long and nearly round, with a flat, thick cap.

Red oak acorns, which sprout in the spring, are an important food for squirrels, deer, turkeys, mice, voles, and other mammals and birds.

Information

Check out these Web sites:

- Peter Smallwood's Web page, <http://www.science.richmond.edu/slide/biology/psmallw/wwsmallwood.htm>
- The World of Squirrels and Acorns, a Web site for kids of all ages from Project Ginkgo, Miami University and the National Science Teachers Association, <http://mhoai.muhio.edu/orngp/rla/>
- Dendrology, a Web site by Virginia Tech with information on more than 180 species of trees, <http://www.hv.edu/dendrology/dendrology.htm>

Oak seedlings, of course, grow from the thousands of acorns a sin-

PLEASE SEE OAK PAGE F3

Squirrel eating habits key to oak regeneration

▼ OAK FROM PAGE F1

promote regeneration, we could make the animals work for us.

"If we know what the squirrels are doing, then we can make them work for us."

♦ ♦ ♦

Smallwood began studying gray squirrels' eating habits as an undergraduate student at Ohio State University. His was a simple "Coke or Pepsi?" kind of question: Which kind of acorns do squirrels prefer, red or white?

"You could ask that about blue jays or deer," two other notorious acorn consumers, "but the thing about squirrels is, particularly on a campus like Ohio State, the campus is crawling with them, and they'll actually let you watch," Smallwood said.

"Try asking the deer which he prefers, it'll be really tough, but squirrels, you can walk up, toss them something and then stare at them and see what they do. They're easy to work with."

From his earliest research in feeding squirrels, he learned that his simple question had to be broadened to include an inquiry into squirrels' food preferences.

It turns out that gray squirrels are as fussy and habitual in their eating patterns as young children. For starters, they eat from only certain of the 32 species of oaks across eastern North America.

They're also rather particular about how they eat, according to research conducted by Smallwood and Steele. From more than 1,200 feeding trials they conducted, they found that as squirrels forage, they eat about 85 percent of white oak acorns they come across, while storing for later about 60 percent of the red oak acorns they find.

There's a method to the squirrels' decisions to snack or stash, Smallwood says. White oak acorns contain little fat (less than 10 percent) and taste pretty good to squirrels right out of the box.

On the other hand, red oak acorns are substantially higher in fat (as much as 25 percent), which makes them useful to have around the ladder in the lean winter months. They're also bitter, as a result of their high (nearly 10 percent) concentration of tannins, the same acidic compounds used to tan hides.

When squirrels do eat the red acorns right away, they frequently just nibble on them, consuming only the fatty top half while spitting out the bitter bottom portion, which contains the oak embryo. That means they avoid the noxious tannins.

The acorns also differ in when they germinate. Red oak acorns sprout in the spring, while their white oak counterparts begin to germinate almost immediately after falling to the ground each autumn.

By eating white oak acorns immediately and hoarding the red ones, squirrels are avoiding the loss of their food source to early germination.

"So what should a smart squirrel do?" Smallwood said, while handing a group of red oak and white oak acorns. "Eat these," he answered, pointing at the white oak acorns, "and bury these."

♦ ♦ ♦

Smallwood tested the field survey's results by "making" acorns to feed squirrels. He ground white oak acorns into powder, and altered the proportion of fats and tannins. He found that in the fall, squirrels go for the acorns with less tannin, while in the winter, their preferences were less noticeable.

Another experiment led Smallwood and Steele to propose that squirrels not only store red oak acorns more frequently, but also carry them farther than they do white oak acorns. They tagged both white and red oak acorns with metal labels and then scoured woodlands to locate various caches, and found that red oak acorns were spread out, or dispersed, over a much greater territory.

In 1994, Smallwood and Steele conducted an experiment to see if squirrels really are helping to determine the dispersal of oaks. If they are, then white oak seedlings would grow by their parent tree. Red oak seedlings — grown from acorns squirrels buried and forgot about — would grow further away.

Joined by two other ecologists, they mapped the loca-

tions of some 616 oak seedlings in two areas of the George Washington National Forest, near Front Royal. The location of oak seedlings is important because it affects their ability to grow. Shady, congested areas offer tougher competition than open, sunlit spaces for oak seedlings.

Oak species dominate Virginia's forests, accounting for roughly 11.3 million acres of the total 15.4 million acres of woodland, according to David Smith, a professor of forestry at Virginia Tech. White oaks outnumber red oaks — for now.

"Oak regeneration is a definite problem in Virginia," Smith said. "We have a tremendous overpopulation of deer in this state, and many acorns are eaten or killed by insects."

There are areas in western Virginia where deer have decimated oaks and their next generation, leaving meadows of ferns. "They look pretty, but it's not a healthy forest," he said.

The dispersal pattern predicted by Smallwood and Steele held up in their study of the national forest.

Most of the white oak seedlings grew close to their parent tree, within about 10 feet, where they get little space or sunlight.

"These white oaks, if the squirrel deals with you, either you're dead on the spot by having your embryo bitten off [before being stored] or you're just eaten on the spot. Either way, you're dead," Smallwood said.

"So the only ones who get to be seedlings are the ones the squirrels never found, so they grow up where they fell, near the parent."

Red oak seedlings were more likely to be widely scattered, giving them a better chance at getting enough elbow room to grow. Unlike the white oak seedlings, which crowded around their parent tree, as many red oak seedlings were found about 17 feet away from the parent as about 40 feet.

"Get away from Mom, and you're going to do better," could be the red oak's motto, Smallwood joked.

The results of this study, published this year by the Virginia Museum of Natural History, were duplicated in areas of oak forests surveyed near Wilkes-Barre, in northeast Pennsylvania, and in forest lands in western Pennsylvania.

What this implies for forest management, Smallwood says, is this: "Say you're trying to regrow oak forests... this would say that it's actually the normal thing to have happen, to have the red oaks show up first, and not have a big white oak component until later."

"That doesn't mean we have to accept that. We may want to re-create the original forest, we don't want to wait, so we're going to go out and collect white oak acorns and we're going to plant them."

Knowing where squirrels may put acorns could help tell forestry experts what to do to enhance conditions for regeneration, said John Beazley, of the Bureau of Forestry in Pennsylvania, where red oaks outnumber white.

♦ ♦ ♦

Smallwood said he and Steele plan to repeat their survey experiment, this time in Mexico's dwindling oak forests, and using DNA fingerprinting to tie oak seedlings to their parent.

Mexico has more kinds of oak trees than anywhere else, roughly 200 species, offering a wide variety of acorns, Steele said, but if he and Smallwood are right, the Mexican flying squirrels will, like their northern brethren, disperse red oak acorns more widely than white.

Smallwood also plans to expand his research to other woodland animals, such as deer mice and flying squirrels. He recently completed a preliminary test and found that flying squirrels ate all the white acorns available to them, and stored much of the red acorns.

In addition, in January, he'll place cages with tagged acorns in oak forested areas near the UR campus and in Goochland County and see what the local deer mice do.

So all in all, Smallwood says, it's not too squirrelly to ask about the role of squirrel behavior in oak forest regeneration.

"It's important to understand the role of animal dispersal in regeneration," agreed Stan Warner of the Virginia Department of Forestry. "It all helps to know each of the elements in the system."

WHAT THEY SQUIRREL AWAY AND WHY

By Conrad Grove
Knight-Ridder Newspapers

SQUIRREL — Wilkes-Barre, Pa. I didn't take long for these brazen beggars to target Michael Steele as an easy mark, his eyes downcast and his pockets bulging as he made his way straight toward the home turf of this pack of city park squirrels.

Steele, an associate professor of biology at Wilkes University, was carrying the good stuff — acorns — and he paused every so often to examine the ones that had already fallen from a stand of the two major groups of oaks, white and red. Curiously, many of those acorns were only half-eaten; of those, only the top half had been munched.

Steele did not disappoint the gathering throng of plume-tailed rogues. He lobbed acorn after acorn to specific squirrels, and each greedily inspected its newfound booty.

This was far from a controlled experiment, but if these Eastern gray squirrels behaved as they should, they would most likely immediately wolf down the acorns from white oaks and snub the acorns from the reds.

The fact that squirrels bury a portion of their cache is nothing new. Henry David Thoreau, in a work written 125 years ago and not published until 1993, promised the "vast work" of these seed plunderers, noting that "it is not in vain that a squirrel lives in almost every forest tree or hollow log or wall or heap of stones."

But only in recent years have scientists asked why squirrels cache certain acorns of the 32 species of oaks across eastern North America, and not others. Steele, 38, and colleague Peter Smallwood, 37, an associate professor of biology at the University of Richmond, are in the forefront of studies that could have an impact on oak forest regeneration.

Both researchers note that squirrels — creatures with bean-sized brains that nonetheless manage to thwart the best

Which mighty oak trees from tiny acorns grow is influenced by a scavenging rodent

efforts of backyard bird feeders across the nation — are less than model citizens.

"But for a scientist, they're great models for behavioral and ecological research," Steele says. "Learn to enjoy them, because they're fascinating to watch."

And more often than not, squirrels are selective about which acorns they hoard. In perhaps 2,000 feeding trials over the past 15 years in several Eastern states, Steele and Smallwood, with the help of numerous undergraduates, have found that about 85 percent of acorns from the various species of white oaks are eaten shortly after discovery, while about 60 percent of the acorns of red oaks are stored.

Red oak acorns are higher in both fats and tannins, the bitter-tasting compounds used to tan hides. Red oak acorns sprout in the spring; white oak acorns begin to germinate almost immediately after falling to the ground in the autumn.

The researchers also found that in those red oak acorns that were eaten, frequently only the top half — the end farthest from the embryo — was consumed. Because the embryos were not destroyed, such acorns from red oaks germinated about as often as undamaged specimens.

The results indicate that squirrels, by avoiding the noxious tannins contained in the bottom half of the red oak acorn, are able to capitalize on the higher fat content contained in the top half during the winter, when energy demands are at a premium.

The squirrels also dispersed the acorns of red oaks — which require more sunlight than white oaks — over a much greater territory. Borrowing an idea from another biologist, Steele and Smallwood tagged both white and red oak acorns with metal labels and then scoured woodlands to locate various caches.

That technique was necessary because squirrels sometimes employ their own variation of the shell game to dupe one another. Before they bury their treasure an inch or so deep in leaf litter, they often dig several small holes and cover them up before depositing the palmed acorn.

"Are they digging just to find the best site?" Steele wonders. "Or are they engaging in deceptive behavior?"

Added Smallwood in a telephone interview: "I had to laugh out loud when I finally discovered I'd been had by that burying behavior. I'm sure squirrels have been telling stories about how they outsmarted me for years."

For the most part, these squirrels ate every acorn — red or white — that Steele chucked to them. Only one carried off a red acorn, bounding about 100 yards to the outskirts of a ballfield to deposit it in his lair.

Maybe it was the weather, the first cold day of autumn, Steele hypothesized. Maybe it was the time of day. And maybe, Smallwood reasoned when informed of this feeding trial that ran counter to accepted grain, there was another explanation.

"It's quite obvious," he said. "They didn't read our literature."



File photo



WHAT THEY SQUIRREL AWAY AND WHY

By Conrad Grove
Knight-Ridder Newspapers

023 NW
I didn't take long for these brazen beggars to target Michael Steele as an easy mark. His eyes downcast and his pockets bulging as he made his way straight toward the home turf of this pack of city park squirrels.

Steele, an associate professor of biology at Wilkes University, was carrying the good stuff — acorns — and he paused every so often to examine the ones that had already fallen from a stand of the two major groups of oaks, white and red. Curiously, many of those acorns were only half-eaten; of those, only the top half had been munched.

Steele did not disappoint the gathering throng of plume-tailed rogues. He lobbed acorn after acorn to specific squirrels, and each greedily inspected its newfound booty.

This was far from a controlled experiment, but if these Eastern gray squirrels behaved as they should, they would most likely immediately wolf down the acorns from white oaks and stash the acorns from the reds.

The fact that squirrels bury a portion of their cache is nothing new. Henry David Thoreau, in a work written 125 years ago and not published until 1993, praised the "vast work" of these seed plunderers, noting that "it is not in vain that a squirrel lives in almost every forest tree or hollow log or wall or heap of stones."

But only in recent years have scientists asked why squirrels cache certain acorns of the 32 species of oaks across eastern North America, and not others. Steele, 38, and colleague Peter Smallwood, 37, an associate professor of biology at the University of Richmond, are in the forefront of studies that could have an impact on oak forest regeneration.

Both researchers note that squirrels — creatures with bean-sized brains that nonetheless manage to thwart the best



The researchers also found that in those red oak acorns that were eaten, frequently only the top half — the end farthest from the embryo — was consumed. Because the embryos were not destroyed, such acorns from red oaks germinated about as often as undamaged specimens.

The results indicate that squirrels, by avoiding the noxious tannins contained in the bottom half of the red oak acorn, are able to capitalize on the higher fat content contained in the top half during the winter, when energy demands are at a premium.

The squirrels also dispersed the acorns of red oaks — which require more sunlight than white oaks — over a much greater territory. Borrowing an idea from another biologist, Steele and Smallwood tagged both white and red oak acorns with metal labels and then scoured woodlands to locate various caches.

That technique was necessary because squirrels sometimes employ their own variation of the shell game to dupe one another. Before they bury their treasure an inch or so deep in leaf litter, they often dig several small holes and cover them up before depositing the palmed acorn.

"Are they digging just to find the best size?" Steele wonders. "Or are they engaging in deceptive behavior?"

Added Smallwood in a telephone interview: "I had to laugh out loud when I finally discovered I'd been had by that burying behavior. I'm sure squirrels have been telling stories about how they outsmarted me for years."

For the most part, these squirrels are every acorn — red or white — that Steele chuckled to them. Only one carried off a red acorn, bounding about 100 yards to the outskirts of a ballfield to deposit it in his larder.

Maybe it was the weather: the first cold day of autumn, Steele hypothesized. Maybe it was the time of day. And maybe, Smallwood reasoned when informed of this feeding trial that ran counter to accepted grain, there was another explanation.

"It's quite obvious," he said. "They didn't read our literature."

Which mighty oak trees from tiny acorns grow is influenced by a scavenging rodent

efforts of backyard bird feeders across the nation — are less than model citizens.

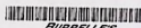
"But for a scientist, they're great models for behavioral and ecological research," Steele says. "Learn to enjoy them, because they're fascinating to watch."

And more often than not, squirrels are selective about which acorns they hoard. In perhaps 2,000 feeding trials over the past 15 years in several Eastern states, Steele and Smallwood, with the help of numerous undergraduates, have found that about 85 percent of acorns from the various species of white oaks are eaten shortly after discovery, while about 60 percent of the acorns of red oaks are stored.

Red oak acorns are higher in both fat and tannins, the bitter-tasting compounds used to tan hides. Red oak acorns sprout in the spring; white oak acorns begin to germinate almost immediately after falling to the ground in the autumn.

POST-STANDARD

SYRACUSE, NY
NOV 30 1998

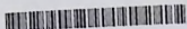


878 11... 86



A GRAY SQUIRREL munches an acorn on the limb of an oak tree in Locust Valley, Pa., in late October.

The Associated Press



BURRELLES

352
7081

11... TJ

Pennsylvania professors search out the nutty truth about squirrels

Knight Ridder Newspapers

WILKES-BARRE, Pa. — It didn't take long for these brazen beggars to target Michael Steele as an easy mark, his eyes downcast and his pockets bulging as he made his way straight toward the home turf of this pack of city park squirrels.

Steele, an associate professor of biology at Wilkes University, was carrying the good stuff — acorns — and he paused every so often to examine the ones that had already fallen from a stand of the two major groups of oaks, white and red. Curiously, many of those acorns were only half-eaten; of those, only the top half had been munched.

Steele did not disappoint the gathering throng of plume-tailed rogues. He lobbed acorn after acorn to specific squirrels, each greedily inspected its newfound booty.

This was far from a controlled experiment, but if these Eastern gray squirrels behaved as they should, they would most likely immediately wolf down the acorns from white oaks and stash the acorns from the reds.

The fact that squirrels bury a portion of their cache, of course, is nothing new. Henry David Thoreau, for example, in a work written 125 years ago but only published in 1993, praised the "vast work" of these seed plunderers,

noting that "it is not in vain that a squirrel lives in almost every forest tree or hollow log or wall or heap of stones."

But only in recent years have scientists questioned why squirrels cache only certain acorns of the 32 species of oaks across eastern North America, and Steele, 38, and colleague Peter Smallwood, 37, an associate professor of biology at the University of Richmond, are in the forefront of studies that could have a significant impact on oak forest regeneration.

Both researchers note that squirrels — creatures with bean-sized brains that nonetheless manage to thwart the best efforts of backyard bird feeders across the nation — are often less than model citizens.

"But for a scientist, they're great models for behavioral and ecological research," Steele says. "Learn to enjoy them, because they're fascinating to watch."

And more often than not, squirrels are extremely selective about which acorns they hoard. In perhaps 2,000 feeding trials over the past 15 years in several Eastern states, Steele and Smallwood, with the help of numerous undergraduates, have found that about 85 percent of acorns from the various species of white oaks are eaten shortly after discovery, while about 60 percent of the acorns of red oaks are

stored.

Red oak acorns are substantially higher in both fats and tannins, the bitter-tasting compounds used to tan hides. Red oak acorns sprout in the spring; white oak acorns begin to germinate almost immediately after falling to the ground in the autumn.

The researchers also found that in those red oak acorns that were eaten, frequently only the top half — the end farthest from the embryo — was consumed. Because the embryos were not destroyed, such acorns from red oaks germinated about as often as undamaged specimens.

The results indicate that squirrels, by avoiding the noxious tannins contained in the bottom half of the red oak acorn, are able to capitalize on the higher fat content contained in the top half during the winter, when energy demands are at a premium.

The squirrels also dispersed the acorns of red oaks — which require more sunlight than white oaks — over a much greater territory. Borrowing an idea from another botanist, Steele and Smallwood tagged both white and red oak acorns with metal labels and then scoured woodlands to locate various caches.

That technique was necessary because squirrels sometimes employ their own variation of the shell game to dupe one another. Before they bury

their treasure an inch or so deep in leaf litter, they often dig several small holes and cover them up before depositing the palmed acorn.

"Are they digging just to find the best site?" Steele wonders. "Or are they engaging in deceptive behavior?"

Added Smallwood in a telephone interview: "I had to laugh out loud when I finally discovered I'd been had by that burying behavior. I'm sure squirrels have been telling stories about how they outsmarted me for years."

In another experiment, Smallwood ground white oak acorns into powder, creating an artificial foodstuff to which he added and subtracted various amounts of fats and tannins. In the fall, squirrels spent more time eating acorns with lower tannin; in the winter, tannin had much less of an effect on their dining preferences.

Steele carried the project a step further, using both artificial red and white oak acorns and placing the meat of each into the wrong shell. Even with a fake white oak acorn inside, squirrels consistently cached the red shell; they ate the red oak kernels inside white oak shells.

In Pennsylvania, red oaks outnumber whites by three to one. Red oaks can live up to 250 years, white oaks up to 800, though none in Pennsylvania even approximate that age because much of the state was logged between

"For a scientist, they're great models for behavioral and ecological research."

— Michael Steele
Wilkes University

1860 and 1910.

"Knowing where a squirrel may put an acorn can help tell us what to do to enhance conditions for natural regeneration," said John Bearer, a forest regeneration specialist for the Pennsylvania Bureau of Forestry. "Obviously, a squirrel can't remember every place it puts an acorn, and if we keep enough big, dead trees on the ground for the squirrels to hide acorns from predators, we can encourage sprouting."

Pennsylvania's burgeoning deer population, Bearer adds, takes a monstrous toll on oak seedlings, while

periodic infestation by gypsy moth caterpillars ravages mature trees. "We're not losing oak," he is quick to point out, "but we do have serious problems with regeneration."

Steele, meanwhile, was absorbed in his own serious problems recently in Kirby Park, where he and about a dozen Wilkes students will monitor the feeding and caching activity of squirrels throughout the fall and winter.

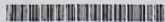
For the most part, these squirrels ate every acorn — red or white — that Steele chucked to them. Only one carried off a red acorn, bounding about 100 yards to the outskirts of a ballfield to deposit it in his lair.

It all left Steele with a temporary sense that Thoreau wasn't exactly on target, when, in "Faith in a Seed," the famous naturalist suggested:

"We should be more civilized as well as humane if we recognized once in a year by some symbolic ceremony the part which the squirrel plays in the economy of Nature."

Maybe it was the weather, the first cold day of autumn, Steele hypothesized. Maybe it was the time of day. And maybe, Smallwood reasoned when informed of this feeding trial that ran counter to accepted grain, there was another explanation.

"It's quite obvious," he said. "They didn't read our literature."



BURRELLE'S

520

...EC.

11... 27

Squirrels' nutty behavior studied

By CONRAD GROVE

Knight Ridder Newspapers

WILKES-BARRE — It didn't take long for these brazen beggars to target Michael Steele as an easy mark, his eyes downcast and his pockets bulging as he made his way straight toward the home turf of this pack of city park squirrels.

Steele, an associate professor of biology at Wilkes University, was carrying the good stuff — acorns — and he paused every so often to examine the ones that had already fallen from a stand of the two major groups of oaks, white and red. Curiously, many of those acorns were only half-eaten; of those, only the top half had been munched.

Steele did not disappoint the gathering throng of plume-tailed rogues. He lobbed acorn after acorn to specific squirrels, and each greedily inspected its newfound booty.

This was far from a controlled experiment, but if these Eastern gray squirrels behaved as they should, they would most likely immediately wolf down the acorns from white oaks and stash the acorns from the reds.

The fact that squirrels bury a portion of their cache, of course, is nothing new. Henry David Thoreau, for example, in a work written 125 years ago but only published in 1993, praised the "vast work" of these seed plunderers, noting that "it is not in vain that a squirrel lives in almost every forest tree or hollow log or wall or heap of stones."

But only in recent years have scientists questioned why squirrels cache only certain acorns of the 32 species of oaks across eastern North America, and Steele, 38, and colleague Peter Smallwood, 37, an associate professor of biology at the University of Richmond, are in the forefront of studies that could have a significant impact on oak forest regeneration.

Both researchers note that squirrels — creatures with bean-sized brains that nonetheless manage to thwart the best efforts of backyard bird feeders across the nation — are often less than model citizens.

"But for a scientist, they're great models for behavioral and ecological research," Steele says. "Learn to enjoy them, because they're fascinating to watch."



KNIGHT RIDDER PHOTO

A professor at Wilkes University is studying why squirrels prefer to eat white oak acorns and bury red oak acorns.

More often than not, squirrels are extremely selective about which acorns they hoard. In perhaps 2,000 feeding trials over the past 15 years in several Eastern states, Steele and Smallwood, with the help of numerous undergraduates, have found that about 85 percent of acorns from the various species of white oaks are eaten shortly after discovery, while about 60 percent of the acorns of red oaks are stored.

Amount of tannin

Red oak acorns are substantially higher in both fats and tannins, the bitter-tasting compounds used to tan hides. Red oak acorns sprout in the spring; white oak acorns begin to germinate almost immediately after falling to the ground in the autumn.

The researchers also found that in those red oak acorns that were eaten,

frequently only the top half — the end farthest from the embryo — was consumed. Because the embryos were not destroyed, such acorns from red oaks germinated about as often as undamaged specimens.

The results indicate that squirrels, by avoiding the noxious tannins contained in the bottom half of the red oak acorn, are able to capitalize on the higher fat content contained in the top half during the winter, when energy demands are at a premium.

The squirrels also dispersed the acorns of red oaks — which require more sunlight than white oaks — over a much greater territory. Borrowing an idea from another biologist, Steele and Smallwood tagged both white and red oak acorns with metal labels and then scoured woodlands to locate various caches.

That technique was necessary

because squirrels sometimes employ their own variation of the shell game to dupe one another. Before they bury their treasure an inch or so deep in leaf litter, they often dig several small holes and cover them up before depositing the prized acorn.

"Are they digging just to find the best site?" Steele wonders. "Or are they engaging in deceptive behavior?"

Added Smallwood in a telephone interview: "I had to laugh out loud when I finally discovered I'd been had by that burying behavior. I'm sure squirrels have been telling stories about how they outsmarted me for years."

In another experiment, Smallwood ground white oak acorns into powder, creating an artificial foodstuff to which he added and subtracted various amounts of fats and tannins. In the fall, squirrels spent more time eat-

ing acorns with lower tannin; in the winter, tannin had much less of an effect on their dining preferences.

Steele carried the project a step further, using both artificial red and white oak acorns and placing the meat of each into the wrong shell. Even with a fake white oak acorn inside, squirrels consistently cached the red shell; they ate the red oak kernels inside white oak shells.

In Pennsylvania, red oaks outnumber whites by three to one. Red oaks can live up to 250 years, white oaks up to 800, though none in Pennsylvania even approximate that age because much of the state was logged between 1860 and 1910.

Regeneration

"Knowing where a squirrel may put an acorn can help tell us what to do to enhance conditions for natural regeneration," said John Bearer, a forest regeneration specialist for the Pennsylvania Bureau of Forestry. "Obviously, a squirrel can't remember every place it puts an acorn, and if we keep enough big, dead trees on the ground for the squirrels to hide acorns from predators, we can encourage sprouting."

Steele, meanwhile, was absorbed in his own problems recently in Kirby Park, where he and about a dozen Wilkes students will monitor the feeding and caching activity of squirrels throughout the fall and winter.

For the most part, these squirrels ate every acorn — red or white — that Steele chucked to them. Only one carried off a red acorn, bounding about 100 yards to the outskirts of a ballfield to deposit it in his lair.

It all left Steele with a temporary sense that Thoreau wasn't exactly on target when, in "Faith in a Seed," the famous naturalist suggested:

"We should be more civilized as well as humane if we recognized once in a year by some symbolic ceremony the part which the squirrel plays in the economy of Nature."

Maybe it was the weather, the first cold day of autumn, Steele hypothesized. Maybe it was the time of day. And maybe, Smallwood reasoned when informed of this feeding trial that ran counter to accepted grain, there was another explanation.

"It's quite obvious," he said. "They didn't read our literature."



BURRELLE'S

387

S. 111

EN

A. 111

Biologists dig into squirrels' secrets

■ The clever rodents handle different acorns in different ways, improving their chances of surviving the winter.

By Conrad Grove
Knoxville Reader Newspapers

WILKES-BARRE, Pa. — It didn't take long for the brazen beggars to target Michael Steele as an easy mark, his eyes downcast and his pockets bulging as he made his way straight toward the home turf of a pack of city park squirrels.

Steele, an associate professor of biology at Wilkes University, was carrying the good stuff — acorns — and he paused every so often to examine the ones that had already fallen from a stand of the two major groups of oaks, white and red. Curiously, many of those acorns were only half-eaten; of those, only the top had been munched.

Steele did not disappoint the gathering throng of plume-tailed rogues. He lobbed acorn after acorn to specific squirrels, and each greedily inspected its booty.

This was far from a controlled experiment, but if the Eastern gray squirrels behaved as they should, they would wolf down the acorns from white oaks and stash those from the reds.

Only in recent years have scientists questioned

why squirrels cache only certain acorns of the 32 species of oaks across eastern North America. Steele, 38, and colleague Peter Smallwood, 37, an associate professor of biology at the University of Richmond, are in the forefront of studies that could have a significant impact on oak-forest regeneration.

Both researchers note that squirrels — creatures with bean-sized brains that nonetheless manage to thwart the best efforts of backyard bird feeders across the nation — are often less than ideal citizens.

"But for a scientist, they're great models for behavioral and ecological research," Steele says. "Learn to enjoy them, because they're fascinating to watch."

And more often than not, squirrels are extremely selective about which acorns they hoard. In perhaps 2,000 feeding trials over the past 15 years in several Eastern states, Steele and Smallwood, with the help

of numerous undergraduates, have found that about 85 percent of acorns from the various species of white oaks are eaten shortly after discovery, while about 60 percent of the acorns of red oaks are stored.

Red oak acorns are substantially higher in both fats and tannins, the bitter-compounds used to tan hides. Red oak acorns sprout in the spring; white oak acorns begin to germinate almost immediately after falling in the autumn.

The researchers also found that in those red oak acorns that were eaten, frequently only the top half — farthest from the embryo — was consumed. Because the embryos were not destroyed, such acorns germinated about as often as undamaged specimens.

The results indicate that squirrels, by avoiding the noxious tannins in the bottom half of the red oak acorn, can obtain the higher fat content from the top half during winter, when energy demands are high.

The squirrels also dispersed the acorns of red oaks — which require more sunlight than white oaks — over a much greater territory. Borrowing an idea from a botanist, Steele and Smallwood tagged both white and red oak acorns with metal labels and then scoured woodlands to locate various caches.

That technique was necessary because squirrels sometimes employ their own variation of the shell game to dupe one another. Before they bury

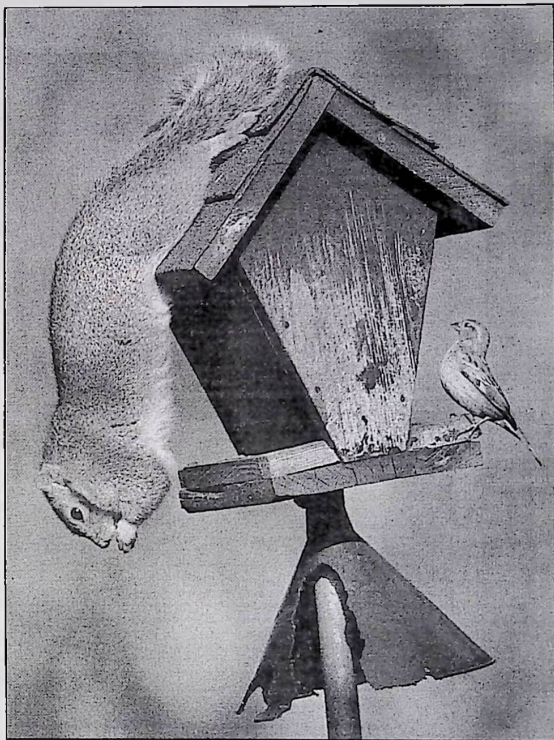
their treasure an inch or so deep in leaf litter, they often dig several small holes and cover them.

"Are they digging just to find the best site?" Steele wonders. "Or are they engaging in deceptive behavior?"

Added Smallwood in a telephone interview: "I had to laugh out loud when I finally discovered I'd been had by that burying behavior. I'm sure squirrels have been telling stories about how they outsmarted me for years."

In another experiment, Smallwood ground white oak acorns into powder, creating an artificial foodstuff to which he added and subtracted various amounts of fats and tannins. In the fall, squirrels spent more time eating acorns with lower tannin; in the winter, tannin had much less of an effect on their dining preferences.

Steele carried the project a step further, using both artificial red and white oak acorns and placing the meat of each



File photo

Squirrels are notorious for their ability to steal seed from bird feeders despite the most

elaborate measures to thwart them. This fox squirrel was spotted in Saginaw, Mich.

into the wrong shell. Even with a fake white oak acorn inside, squirrels consistently cached the red shell; they ate the red oak kernels inside white oak shells.

"Knowing where a squirrel may put an acorn can help tell us what to do to enhance conditions for natural regeneration," said John Bearer, a forest regeneration specialist for the Pennsylvania Bureau of Forestry. "Obviously, a squirrel can't remember every place it puts an acorn, and if we keep enough big, dead trees on the ground for the squirrels to hide acorns from predators, we can encourage sprouting."

Pennsylvania's burgeoning deer population, Bearer adds, takes a monstrous toll on oak seedlings, while periodic infestation by gypsy moth caterpillars ravages mature trees. "We're not losing oak," he is quick to point out, "but we do have serious problems

with regeneration."

Steele, meanwhile, was absorbed in his own serious problems recently in Kirby Park, where he and about a dozen Wilkes students will monitor the feeding and caching activity of squirrels throughout the fall and winter.

For the most part, these squirrels ate every acorn — red or white — that Steele chucked to them. Only one carried off a red acorn, bounding about 100 yards to the outskirts of a ballfield to deposit it in his larler.

Maybe it was the weather, the first cold day of autumn, Steele hypothesized. Maybe it was the time of day.

But when told of the unexpected results, Smallwood said: "It's quite obvious. They didn't read our literature."

PFBC Announces Funding For High-Priority Projects

The Pennsylvania Fish and Boat Commission and the Pennsylvania Game Commission have announced that more than \$13.1 million in Federal Wildlife Conservation Program (WCRP) funding has been awarded for high-priority, high-visibility fish and wildlife conservation projects across Pennsylvania.

WCRP is providing \$20 million nationwide for fish and wildlife conservation. Pennsylvania is receiving \$1.5 million to Pennsylvania, to "fulfill the unmet needs of wildlife within the state." The two Pennsylvania conservation agencies decided to use these federal funds for state-based wildlife conservation, recreation, and education efforts through a competitive selection process. Those proposals were reviewed by a panel of conservation, education and sporting organizations and agencies.

"These projects are intended to showcase what a new infusion of wildlife funding can accomplish," said Game Commission Executive Director Vern Ross.

The two agencies have always had limited resources to direct toward species that are not hunted or fished, yet yet where there are some of the greatest conservation challenges. Species with the greatest conservation need were the focus of this funding, and we have plenty of important work to do in that area. Selecting the best projects was no easy task," said Fish and Boat Commission Executive Director Pete Collangelo. "We worked hard in hand with our conservation partners across the state to come up with the best first-year projects we could find for this program. All WCRP projects will be high-impact in terms of public outreach, education, and recreation or in providing long-term conservation benefits for the Commonwealth."

Also, by partnering with project cooperators, the two agencies were able to maximize WCRP funds and leverage an additional \$1.1 million in private funds for the projects.

As a result of the statewide search for projects, the Commissions received 52 proposals requesting \$7.8 million. However, only \$1.5 million was available in Pennsylvania under the WCRP. The remaining monies not awarded during this first round will be dispersed in future funding rounds.

Federal legislation signed into law in November authorizes an additional \$80 million in WCRP monies for state wildlife grants programs in the 2002 fiscal year, which may result in an additional \$2 million for Pennsylvania. Other federal proposals being reviewed by Congress, including the Conservation and Reinvestment Act (CARA), could provide additional federal dollars for wildlife projects.

A summary of first-year WCRP projects follows:

Appalachian Cottontail Distribution in Pennsylvania. (southeast) The Appalachian cottontail is a species at risk in Pennsylvania. Similar in size and appearance to the cottontail Eastern cottontail, the Appalachian cottontail is known from only a few sites where the population is concentrated. The closely related New England cottontail now has been listed as a Federal Candidate species due to region-wide population declines. This project seeks to work in cooperation with Pennsylvania's sportsmen and

women to determine the distribution of this rare rabbit in Pennsylvania, identify general habitat requirements for the species, and investigate management approaches that will ensure protection of this species. Project cooperator is Lock Haven University. WCRP funding was awarded in the amount of \$71,601 toward a total project cost of \$98,140.

Assessment of the Paddlefish Reintroduction Program. (southwest) Since the early 1990s, the Fish and Boat Commission has stocked fingerling paddlefish in the Ohio and Allegheny rivers as part of its Paddlefish Restoration Plan.

While stocking may return the paddlefish to its historic range in Pennsylvania, the lack of a monitoring program to evaluate the success of stocking efforts has been an obstacle to the long-term success of the program. It is unknown if natural reproduction of paddlefish is occurring in these rivers, and no areas of high paddlefish concentration have been found.

This project is designed to determine movement, distribution, and survival of stocked paddlefish, provide an assessment of paddlefish colonization of the Monongahela River, identify critical nursery waters, and assess natural reproduction in an attempt to aid the restoration of these 6-foot behemoths into the chaotic waters. Project cooperator is Penn State University.

WCRP funding was awarded in the amount of \$178,326 toward a total project cost of \$244,100.

Building a Biodiversity Conservation Movement in Pennsylvania. (statewide) This project addresses the need for a comprehensive plan for biodiversity conservation in Pennsylvania. Immediate benefits of a biodiversity conservation plan include: 1) establishing informed priorities for inventory, monitoring and conservation; 2) identifying species of greatest conservation concern; 3) proposing solutions for unmet wildlife management needs; 4) increasing cooperation and coordination among stakeholders concerned with biodiversity. Long-term benefits include more informed citizens regarding the impacts and importance of biodiversity in their lives. The project will develop information and materials for the "Biodiversity 911" summer exhibits at the Carnegie Museum of Natural History in Pittsburgh and the Philadelphia Academy of Sciences. The project cooperator is Pennsylvania Biodiversity Partnership. WCRP funding was granted in the amount of \$157,000 toward the total project cost of \$386,300.

Distribution and Abundance of Reintroduced River Otters in the Allegheny River Drainage. (western) The Pennsylvania River Otter Reintroduction Project has been among the most successful and highly publicized wildlife projects ever implemented in the Commonwealth. In its follow-up project, advanced GIS, genetic and digital technologies will be applied to evaluate the distribution and abundance of reintroduced river otters in the Allegheny River drainage. Methods developed through that research will revolutionize the ability of natural resource agencies to monitor native and reintroduced otter populations in North America and will enhance the reputation of Pennsylvania as a leader in wildlife

conservation activities. An education and outreach program, along with live video of otters in their natural surroundings will enhance the public appreciation of this unique species.

Project cooperator is Frostburg State University (Maryland). WCRP funding was awarded in the amount of \$94,800 toward a total project cost of \$338,816.

Herp Curriculum. (statewide) The Amphibians and Reptiles Educational Curriculum is designed to provide PA school students with a first understanding of the species, ecology and habitats of Pennsylvania's native reptiles and amphibians. No such information on PA species has ever been available to our schools. The curriculum is designed to meet the environmental education standards of the PA Department of Education. The curriculum includes lesson plans, hands-on activities, audio-visual materials, resource lists, handout materials and other tools. The curriculum has been developed in partnership with the Wild Resource Conservation Fund, Pennsylvania Fish and Boat Commission, Pennsylvania Department of Education, and Carnegie Museum of Natural History.

It is the first stage of being piloted among select teachers. The Pennsylvania Fish and Boat Commission is using \$17,250 in WCRP funding and its own revenues to coordinate the \$23,000 project.

Important Bird and Biodiversity Areas and Education Project. (statewide) This project will accelerate the protection of habitats for state-listed (Endangered, Threatened, Candidate) birds at Important Bird Area (IBA) sites throughout Pennsylvania. An IBA database will be developed, monitoring programs initiated, communication tool developed, and community-based conservation planning initiated, with an emphasis on the thirty IBAs (137,000 acres) most critical to the long-term survival of threatened and endangered bird species. The project cooperator is Pennsylvania Audubon.

WCRP funding was awarded in the amount of \$126,000 toward a total project cost of \$307,100. Important Bird and Biodiversity Areas Monitoring in Southeast Pennsylvania. (southeast) This project will develop habitat and population inventory of reptiles and amphibians to support the creation of an ongoing monitoring effort for these species in southeastern Pennsylvania. Project cooperator is The Nature Conservancy. WCRP funding was awarded in the amount of \$100,000 toward a total project cost of \$129,440.

Northern Flying Squirrel Monitoring and Management. (northern) Project investigators will design and initiate a long-term nest box monitoring program for the northern flying squirrel in order to identify special management and/or protective study and protection of this threatened species. Through the use of radio telemetry, this study will also delineate specific micro-, macro-, and landscape-level habitat requirements for the species in order to better manage it and understand its importance as an indicator of human impact to the deciduous forests where it resides. Project cooperator is Wilkes University and Penn State University at Altoona. WCRP funding was awarded in the amount of \$107,580 toward a total project cost of \$147,780.

Pennsylvania Important Mammal Areas - A National Pilot. (statewide) The "important areas" concept embodies an approach to habitat management that is proactive, voluntary rather than regulatory, involves the general public in habitat conservation, and relies on science-based criteria to identify areas that provide essential habitat. First applied to birds (the national pilot project for birds was also conducted in Pennsylvania), implementation of an Important Mammal Area project will again put the Pennsylvania Game Commission on the forefront effort that blends science and public involvement to conserve biodiversity.

Project cooperators are Indiana University of Pennsylvania and the Pennsylvania Wildlife Federation. WCRP funding was granted in the amount of \$180,000 toward the total project cost of \$240,900.

Peregrine Falcon Satellite Telemetry. (statewide) Satellite telemetry units will be placed on nestling peregrine falcons in Pennsylvania to track their activity for up to three years. Through the use of satellite telemetry and web-based outreach efforts, viewers can follow the falcons' migration to their wintering grounds in Mexico, Panama, Colombia and Brazil. Many adult peregrines no longer migrate in the winter. Yet each fall, the young of the year disappear from their home ranges, presumably to head south. Few of these youngsters are ever seen again.

Why? This project seeks to answer that question through the use of satellite telemetry with these magnificent birds. The project cooperator is Canadian Peregrine Fund. WCRP funding was awarded in the amount of \$19,500 toward a total project cost of \$35,800.

Restoration of Iron Color and Bridge Shiners. (northeast) These highly-endangered fish species are known from only one location in the Commonwealth. In the past year, laboratory methods for the captive reproduction and rearing of both species have been developed by Penn State fisheries researchers. This project proposes to breed these species in captivity, restore them to suitable stream habitat in their historic range, then monitor the success of the reintroduction efforts over time. All aspects of the project will be filmed and broadcast over the world wide web.

If this project is successful, it could pave the way for future restoration attempts with other threatened and endangered fishes. Project cooperator is Penn State University. WCRP funding was awarded in the amount of \$141,221 toward a total project cost of \$194,600.

Susquehanna River Binding and Wildlife Trail. (central) The Susquehanna River Trail is the first phase of a statewide effort to provide quality wildlife viewing experiences by developing a statewide network of premier birding and wildlife trails. The Susquehanna will serve as a unifying theme for a series of loop trails emanating from the river to birding and wildlife watching locations in more than 25 counties. A series of linked sites, about thirty miles apart, will provide a forum for education as well as opportunities for other forms of outdoor recreation, such as hiking, biking, canoeing, and picnicking. The project cooperator is Pennsylvania Audubon. WCRP funding was awarded in the amount of \$120,000 toward the total project cost of \$655,300.



BURRELLES

85 00
.. 1999 II...

Squirrels really know their nuts

Knight Ridder Newspapers

Steele, an associate professor of biology at Wilkes University, was carrying the good stuff — acorns — and he paused every so often to examine the ones that had already fallen from a stand of the two major groups of oaks, white and red. Curiously, many of those acorns were only half-eaten; of those, only the top half had been munched.

This was far from a controlled experiment, but if these Eastern gray squirrels behaved as they should, they would most likely immediately wolf down the acorns from white oaks and stash the acorns from the reds.

But only in recent years have scientists questioned why squirrels cache only certain acorns of the 32 species of oaks across eastern North America, and Steele, 38, and colleague Peter Smallwood, 37, an associate professor of biology at the University of Richmond, are in the forefront of studies that could have a significant impact on oak forest regeneration.

"But for a scientist, they're great models for behavioral and ecological research," Steele says. "Learn to enjoy them, because they're fascinating to watch."

Red oak acorns are substantially higher in both fats and tannins, the bitter-tasting compounds used to tan hides. Red oak acorns sprout in the spring; white oak acorns begin to germinate almost immediately after falling to the ground in the autumn.

The researchers also found that in those red oak acorns that were eaten, frequently only the top half — the end farthest from the embryo — was consumed.

BURRELLES
19 11.11.11

2 professors study squirrels by following trail of the acorns

By CONRAD GROVE
KING'S PRESS PHOTOGRAPHER

WILKES-BARRE, Pa. — It didn't take long for these brain-beggers to target Michael Steele as an easy mark, his eyes downcast and his pockets bulging as he made his way through the herring-turf of this pack of city park squirrels.

Steele, an associate professor of biology at Wilkes University, was carrying the good stuff — acorns — and he paused every so often to examine the ones that had already fallen from a stand of the two major species of oaks, white and red. Curiously, many of those acorns were only half-eaten; of those, only the top half had been munched.

Steele did not disappoint the gathering throng of plume-tailed rogues. He lobbed acorn after acorn to specific squirrels, and each greedily inspected its newfound booty.

This was far from a controlled experiment, but if these Eastern gray squirrels behaved as they should, they would most likely immediately wolf down the acorns from white oaks and stash the acorns from the reds.

The fact that squirrels bury a portion of their cache, of course, is nothing new. Henry David Thoreau, for example, in a work written 125 years ago but only published in 1993, praised the "vast work" of these seed plunderers, noting that "it is not in vain that a squirrel lives in almost every forest tree or hollow log or wall or heap of stones."

But only in recent years have scientists questioned why squirrels cache only certain acorns of the 32 species of oaks across eastern North America, and Steele, 38, and colleague Peter Smallwood, 37, an associate professor of biology at the University of Richmond, are in the forefront of studies that could have a significant impact on oak forest regeneration.

Both researchers note that squirrels — creatures with bean-sized brains that nonetheless manage to thwart the best efforts of backyard bird feeders across the nation — are often less than model citizens.

"But for a scientist, they're great models for behavioral and ecological research," Steele says. "Learn to enjoy them, because they're fascinating to watch."

And more often than not, squirrels are extremely selective about which acorns they hoard. In perhaps 2,000 feeding trials over the past 15 years in several Eastern states, Steele and Smallwood, with the help of numerous undergraduates, have found that about 85 percent of acorns from the various species of white oaks are eaten shortly after discovery, while about 60 percent of the acorns of red oaks are stored.

Red oak acorns are substantially higher in both fats and tannins, the bitter-tasting compounds used to tan hides. Red oak acorns sprout in the spring; white oak acorns begin to germinate almost immediately after falling to the ground in the autumn.

The researchers also found that in those red oak acorns that were eaten, frequently only the top half — the end farthest from the embryo — was consumed. Because the embryos were not destroyed, such acorns from red oaks germinated about as often as undamaged specimens.

The results indicate that squirrels, by avoiding the noxious tannins contained in the bottom half of the red oak acorn, are able to capitalize on the higher fat content contained in

the top half during the winter, when energy demands are at a premium.

The squirrels also dispersed the acorns of red oaks — which require more sunlight than white oaks — over a much greater territory. Borrowing an idea from another botanist, Steele and Smallwood tagged both white and red oak acorns with metal labels and then scoured woodlands to locate various caches. That technique was necessary because squirrels sometimes employ their own variation of the shell game to dupe one another. Before they bury their treasure an inch or so deep in leaf litter, they often dig several small holes and cover them up before depositing the palmed acorn.

Are they digging just to find the best site? Steele wonders. "Or are they engaging in deceptive behavior?"

Added Smallwood in a telephone interview: "I had to laugh out loud when I finally discovered I'd been had by that burying behavior. I'm sure squirrels have been telling stories about how they outsmarted me for years."

In another experiment, Smallwood ground white oak acorns into powder, creating an artificial foodstuff to which he added and subtracted various amounts of fats and tannins.

In the fall, squirrels spent more time eating acorns with lower tannin; in the winter, tannin had much less of an effect on their dining preferences.

Steele carried the project a step further, using both artificial red and white oak acorns and placing the meat of each into the wrong shell. Even with a fake white oak acorn inside, squirrels consistently cached the red shell; they ate the red oak kernels inside white oak shells.

In Pennsylvania, red oaks outnumber whites by three to one. Red oaks can live up to 250 years, white oaks up to 800, though none in Pennsylvania even approximate that age because much of the state was logged between 1860 and 1910.

Knowing where a squirrel may put an acorn can help tell us what to do to enhance conditions for natural regeneration," said John Bearer, a forest regeneration specialist for the Pennsylvania Bureau of Forestry. "Obviously, a squirrel can't remember every place it puts an acorn, and if we keep enough big, dead trees on the ground for the squirrels to hide acorns from predators, we can encourage sprouting."

Pennsylvania's burgeoning deer population, Bearer adds, takes a monstrous toll on oak seedlings,

while periodic infestation by gypsy moth caterpillars ravages mature trees. "We're not losing oak," he is quick to point out, "but we do have serious problems with regeneration."

Steele, meanwhile, was absorbed in his own serious problems recently in Kirby Park, where he and about a dozen Wilkes students will monitor the feeding and caching activity of squirrels throughout the fall and winter.

For the most part, these squirrels ate every acorn — red or white — that Steele chucked to them. Only one carried off a red acorn, bounding about 100 yards to the outskirts of a ballfield to deposit it in his lair.

YAKIMA, WA
SUNDAY 42,500
NOV 15 1998

1998 NOV 15 10:00 AM

BURRELLES

1998
...NES

11....

Professors Search Out Nutty Truth About Squirrels

By CONRAD GROVE
KINGST RIDGER

WILKES-BARRE, Pa. — It didn't take long for these brazen beggars to target Michael Steele as an easy mark, his eyes downcast and his pockets bulging as he made his way straight toward the home turf of this pack of city park squirrels.

Steele, an associate professor of biology at Wilkes University, was carrying the good stuff — acorns — and he paused every so often to examine the ones that had already fallen from a stand of the two major groups of oaks, white and red. Curiously, many of those acorns were only half-eaten; of those, only the top half had been munched.

Steele did not disappoint the gathering throng of plume-tailed rogues. He lobbed acorn after acorn to specific squirrels, and each greedily inspected its newfound booty.

This was far from a controlled experiment, but if these Eastern gray squirrels behaved as they should, they would most likely immediately wolf down the acorns from white oaks and stash the acorns from the reds.

The fact that squirrels bury a portion of their cache, of course, is nothing new. Henry David Thoreau, for example, in a work written 125 years ago but only published in 1993, praised the "vast work" of these seed plunderers, noting that "it is not in vain that a squirrel lives in almost every forest tree or hollow log or wall or heap of stones."

But only in recent years have scientists questioned why squirrels cache only certain acorns of the 32 species of oaks across eastern North America, and Steele, 38, and colleague Peter



Associated Press

To many, squirrels are cute animals found in the park or woods. Others find them nuisances. But some scientists spend their careers studying them.

Smallwood, 37, an associate professor of biology at the University of Richmond, are in the forefront of studies that could have a significant impact on oak forest regeneration.

Both researchers note that squirrels — creatures with bean-sized brains that nonetheless manage to thwart the best efforts of backyard bird feeders across the nation — are often less than model citizens.

"But for a scientist, they're great models for behavioral and ecological research," Steele says. "Learn to enjoy them, because they're fas-

inating to watch."

And more often than not, squirrels are extremely selective about which acorns they hoard. In perhaps 2,000 feeding trials over the past 15 years in several eastern states, Steele and Smallwood, with the help of numerous undergraduates, have found that about 85 percent of acorns from the various species of white oaks are eaten shortly after discovery, while about 60 percent of the acorns of red oaks are stored.

Red-oak acorns are substantially higher in both fats and tannins, the bitter-tasting compounds used to tan hides. Red-oak acorns sprout in the spring; white-oak acorns begin to germinate almost immediately after falling to the ground in the autumn.

The researchers also found that in those red oak acorns that were eaten, frequently only the top half — the end farthest from the embryo — was consumed. Because the embryos were not destroyed, such acorns from red oaks germinated about as often as undamaged specimens.

The results indicate that squirrels, by avoiding the noxious tannins contained in the bottom half of the red oak acorn, are able to capitalize on the higher fat content contained in the top half during the winter, when energy demands are at a premium.

The squirrels also dispersed the acorns of red oaks — which require more sunlight than white oaks — over a much greater territory. Borrowing an idea from another botanist, Steele and Smallwood tagged both white and red oak acorns with metal labels and then scoured woodlands to locate various caches.

That technique was necessary because squirrels sometimes employ their own variation of the shell game to dupe one another. Before they bury their treasure an inch or so deep in leaf litter, they often dig several small holes and cover them up before depositing the palmed acorn.

"Are they digging just to find the best site?" Steele wonders. "Or are they engaging in deceptive behavior?"

Added Smallwood in a telephone interview: "I had to laugh out loud when I finally discovered I'd been had by that burying behavior. I'm sure squirrels have been telling stories about how they outsmarted me for years."

In another experiment, Smallwood ground white oak acorns into powder, creating an artificial foodstuff to which he added and subtracted various amounts of fats and tannins. In the fall, squirrels spent more time eating acorns with lower tannin; in the winter, tannin had much less of an effect on their dining preferences.

Steele carried the project a step further, using both artificial red and white oak acorns and placing the meat of each into the wrong shell. Even with a fake white oak acorn inside, squirrels consistently cached the red shell; they ate the red oak kernels inside white oak shells.

"Knowing where a squirrel may put an acorn can help tell us what to do to enhance conditions for natural regeneration," said John Bearer, a forest regeneration specialist for the Pennsylvania Bureau of Forestry. "Obviously, a squirrel can't remember every place it puts an acorn, and if we keep enough big, dead trees on the ground for the squirrels to hide acorns from predators, we can encourage sprouting."

Wilkes University biology professor awarded 1997-98 Fulbright Fellowship

Dr. Michael A. Steele, associate professor of biology at Wilkes University, has been awarded a Fulbright Fellowship to lecture and conduct research in Mexico

during the 1997-98 academic year.

The Washington, D.C.-based International Exchange of Scholars selected Steele for the fellowship based on his research record,

teaching history and a detailed research proposal.

The nine-month award will provide a salary, relocation allowance and living expenses for Steele. He will be accompanied by his wife, Margaret, and children Michael, Tyler and Emily. Wilkes University has provided a sabbatical leave for the year.

Steele's current research, conducted with Wilkes students and colleagues from Rutgers State University, the University of Pennsylvania and the University of California, focuses on the behaviour of squirrels and other food-hoarding animals, the specific decisions they make when storing acorns, and the effects of their behaviour on the regeneration of forests.

Steele will collaborate with faculty and students from National Herbarium in Puebla and the Centro de Ecología at UNAM in Mexico City.

"The award gives me an opportunity to extend my research into an environment where understanding the mechanisms of forest regeneration is critical for countering deforestation," said Steele.

The program aims to promote global understanding.



Dr. Steele

ABCNEWS.com
science

Crazy About Squirrels
The Nutty Professors

MAD OR RAD?
 YOU DECIDE



Which tastes better, acorns from red oaks or white oaks? Squirrels know, and that affects how oak forests develop. (A. Shepherd/ABCNEWS.com)

By David George Gordon
 Special to ABCNEWS.com

For the last seven years, Michael Steele and Peter Smallwood have been hanging out with squirrels, seeking to better understand the furry rodents' relationship with the woods in which they reside.

"The basic question is this," says Steele, an associate professor at Wilkes University in Wilkes-Barre, Pa. "Are tree squirrels dispersers and planters of oak forests, or merely pesky seed predators?"

During the autumn and winter months, says Steele, the squirrels subsist mainly on seeds and nuts. Active throughout the year, these animals store large quantities of food to get them through the bleak winter months.

In most instances, acorns top the list of squirrel storables. Often the squirrels bury these seeds of the mighty oak tree, returning to dig them up when hunger calls.

"To a squirrel, the acorn is a package of energy that can be easily opened and eaten in less than half the time needed for other, harder nuts," says Smallwood, an associate professor at the University of Richmond in Virginia.

what do you think?

Are Michael Steele and Peter Smallwood MAD or RAD?

87.5%

They may be nuts, but the study sounds RAD to me.

7.7%

MAD, these guys are barking up the wrong tree.

4.6%

Sorry, I'm stumped. UNDECIDED

Total Votes: 966

**Next Week's
 Mad or Rad:**

**How a tundra researcher
 got a bug up his nose**

- ▶ home
- ▶ summary
- ▶ u.s.
- ▶ world
- ▶ business
- ▶ technology
- ▶ health&living
- ▶ travel
- ▶ espn sports
- ▶ mr.showbiz
- ▶ dispatches
- ▶ abcnews shows
- ▶ gallery
- ▶ weather
- ▶ local
- ▶ search

Find Books On
Science

amazon.com

mail to ABCNEWS.com

send this page
 to a friend

toolbox



**MAD
RAD?**
ARCHIVES

Acorn Gourmet

But not all acorns are equally prized, the two squirrel-ologists have discovered. Over the years, the pair has conducted more than 1,500 feeding trials, leaving out acorns of various oak species to see which were eaten immediately or stored for mid-winter feasts.

About 85 percent of white oak acorns got devoured shortly after discovery. On the other hand, only about 40 percent of red oak acorns were eaten then and there, while the remainder got stashed for later, leaner times.

In a second set of experiments, the researchers stuck small metal tags in thousands of red and white oak acorns. After the squirrels dispersed the acorns, Steele and Smallwood used metal detectors to recover them.

"Again, the results were clear," says Smallwood. "Red oak seedlings were more widely dispersed through forests, while white oak seedlings were more likely to be found right next to the parent tree."

According to Smallwood, the acorns of red and white oaks differ in chemical makeup. Red oak acorns are rich in fats but laced with tannins — the same chemicals that make coffee bitter. White oak acorns are less fatty and lower in tannins, which probably explains why squirrels eat them right away.

Among the red oak acorns that were eaten, frequently only the top half — the end farthest from the embryo, or growing tip — were consumed. Higher levels of tannins are located near the bottom of the acorn. Because squirrel munching doesn't destroy the embryos, the damaged acorns can still germinate into red oak seedlings.

This could help us understand how oak forests regenerate after a fire or a timber harvest, says Steele.

Because of the squirrels' food preferences and feeding techniques, he explains, red oaks will be the first to colonize recently cleared forests. White oaks are likely to spread more slowly, growing from acorns the squirrels overlook.

"These rodents fail to recover up to

74 percent of their acorns," says Steele — a statistic that only the squirreliest of scholars would know. ■



David George Gordon's column appears every Friday. His latest book, The Eat-A-Bug Cookbook, is published by Ten Speed Press.

Search for more on:

SEEK

Copyright ©1998 ABCNEWS and Starwave Corporation. All rights reserved. This material may not be published, broadcast, rewritten or redistributed in any form.



Scientists track habits of squirrels to help forests

Which acorns are eaten, which are stored is key to oaks

By CONRAD GROVE

Knight Rider

WILKES-BARRE, Pa. — It didn't take long for these brown beggars to target Michael Steele as an easy mark, his eyes downcast and his pockets bulging as he made his way straight toward the home turf of this pack of city park squirrels.

Steele, an associate professor of biology at Wilkes University, was carrying the good stuff — acorns — and he paused every so often to examine the ones that had already fallen from a stand of the two major groups of oaks, white and red. Curiously, many of those acorns were only half-eaten; of those, only the top half had been munched.

Steele did not disappoint the gathering throng of plume-tailed rogues. He lobbed acorns after acorns to specific squirrels, and each greedily inspected its new-found booty.

This was far from a controlled experiment, but if these Eastern gray squirrels behaved as they should, they would most likely immediately wolf down the acorns from white oaks and stash the acorns from the reds.

The fact that squirrels bury a portion of their cache, of course, is nothing new. Henry David Thoreau, for example, in a work written 125 years ago but only published in 1950, praised the "vast work" of these seed plunderers, noting that "it is not in vain that a squirrel lives in almost every forest tree or hollow log or wall or heap of stones."

But only in recent years have scientists questioned why squirrels cache only certain acorns of the 32 species of oaks across eastern North America. Steele, 38, and colleague Peter Smallwood, 37, an associate professor of biology at the University of Richmond, are in the forefront of studies that could have a significant impact on oak forest regeneration.

Both researchers note that squirrels — creatures with beaunted brains that nonetheless manage to thwart the best efforts of backyard bird feeders across the nation — are often less model citizens.

"But for a scientist, they're great models for behavioral and ecological research," Steele says. "Learn to enjoy them, because they're fascinating to watch."

Sorting acorns

And more often than not, squirrels are extremely selective about which acorns they hoard. In perhaps 2,000 feeding trials over the past 15 years in several Eastern states, Steele and Smallwood, with the help of numerous undergraduates, have found that about 85 percent of acorns from the various species of white oaks are eaten shortly after discovery, while about 60 percent of the acorns of red oaks are stored.

Red oak acorns are substantially higher in both fats and tannins, the bitter-tasting compounds used to tan hides. Red oak acorns sprout in the spring, while oak acorns begin to germinate almost immediately after falling to the ground in the autumn.

The researchers also found that in those red oak acorns that were eaten, frequently only the top half

— the end farthest from the embryo — was consumed. Because the embryos were not destroyed, such acorns from red oaks germinated about as often as undamaged specimens.

The results indicate that squirrels, by avoiding the noxious tannins contained in the bottom half of the red oak acorn, are able to capitalize on the higher fat content during the winter, when energy demands are at a premium.

The squirrels also dispersed the acorns of red oaks — which require more sunlight than white oaks — over a much greater territory. Borrowing an idea from another biologist, Steele and Smallwood tagged both white and red oak acorns with metal labels and then scoured woodlands to locate

various caches.

That technique was necessary because squirrels sometimes employ their own variation of the shell game to dupe one another. Before they bury their treasure an inch or so deep in leaf litter, they often dig several small holes and cover them up before depositing the palmed acorn.

"Are they digging just to find the best site?" Steele wonders. "Or are they engaging in deceptive behavior?"

Added Smallwood: "I had to laugh out loud when I finally discovered I'd been had by that burying behavior. I'm sure squirrels have been telling stories about how they outsmarted me for years."

In another experiment, Smallwood ground white oak acorns

into powder, creating an artificial foodstuff to which he added and subtracted various amounts of fats and tannins. In the fall, squirrels spent more time eating acorns with lower tannin. In the winter, tannin had much less of an effect on their dining preferences.

Important for the forest

"Knowing where a squirrel may put an acorn can help tell us what to do to enhance conditions for natural regeneration," said John Bearers, a forest regeneration specialist for the Pennsylvania Bureau of Forestry. "Obviously, a squirrel can't remember every place it puts an acorn, and if we keep enough big, dead trees on the ground for the squirrels to hide acorns from

predators, we can encourage sprouting."

Pennsylvania's burgeoning deer population, Bearers adds, takes a monstrous toll on oak seedlings, while periodic indigestion by gypsy moth caterpillars ravages native trees. "We're not losing oak," he is quick to point out, "but we do have serious problems with regeneration."

Steele, meanwhile, was absorbed in his own serious problems recently in Kirby Park, where he and about a dozen Wilkes students will monitor the feeding and caching activity of squirrels throughout the fall and winter.

For the most part, these squirrels ate every acorn — red or white — that Steele chucked to them. Only one carried off a red acorn, bounding about 100 yards

to the outskirts of a ballfield to deposit it in its lair.

It all left Steele with a temporary sense that Thoreau wasn't exactly on target, when, in "Faith in a Seed," the famous naturalist suggested:

"We should be more civilized as well as humane if we recognized once in a year by some symbolic ceremony the part which the squirrel plays in the economy of Nature."

Maybe it was the weather, the first cold day of autumn, Steele hypothesized. Maybe it was the time of day. And maybe, Smallwood reasoned when informed of this feeding trial that ran counter to accepted grain, there was another explanation.

"It's quite obvious," he said. "They didn't read our literature."



BURRELLE'S

496
...nciZK
XX...b

Professors Nuts About Squirrels

BY CONRAD GROVE

KNIGHT RIDDER NEWSPAPERS

WILKES-BARRE — It didn't take long for these brazen beggars to target Michael Steele as an easy mark, his eyes downcast and his pockets bulging as he made his way straight toward the home turf of this pack of city park squirrels.

Steele, an associate professor of biology at Wilkes University, was carrying the good stuff — acorns — and he paused every so often to examine the ones that had already fallen from a stand of the two major groups of oaks, white and red. Curiously, many of those acorns were only half-eaten; of those, only the top half had been munched.

Steele did not disappoint the gathering throng of plume-tailed rogues. He lobbed acorn after acorn to specific squirrels, and each greedily inspected its new-found booty.

This was far from a controlled experiment, but if these Eastern gray squirrels behaved as they should, they would most likely immediately wolf down the acorns from white oaks and stash the acorns from the reds.

The fact that squirrels bury a portion of their cache, of course, is nothing new. Henry David Thoreau, for example, in a work written 125 years ago but only published in 1993, praised the "vast work" of these seed plunderers, noting that "it is not in vain that a squirrel lives in almost every forest tree or hollow log or wall or heap of stones."

WHY SELECTIVE?

But only in recent years have scientists questioned why squirrels cache only certain acorns of the 32 species of oaks across eastern North America, and Steele, 38, and colleague Peter Smallwood, 37, an associate professor

wood, an associate professor of biology at the University of Richmond, are in the forefront of studies that could have a significant impact on oak forest regeneration.

Both researchers note that squirrels — creatures with bean-sized brains that nonetheless manage to thwart the best efforts of backyard bird feeders across the nation — are often less than model citizens.

"But for a scientist, they're great models for behavioral and ecological research," Steele says. "Learn to enjoy them, because they're fascinating to watch."

And more often than not, squirrels are extremely selective about which acorns they hoard. In perhaps 2,000 feeding trials over the past 15 years in several Eastern states, Steele and Smallwood, with the help of numerous undergraduates, have found that about 85 percent of acorns from the various species of white oaks are eaten shortly after discovery, while about 60 percent of the acorns of red oaks are stored.

Red oak acorns are substantially higher in both fats and tannins, the bitter-tasting compounds used to tan hides. Red oak acorns sprout in the spring; white oak acorns begin to germinate almost immediately after falling to the ground in the autumn.

FROM THE TOP

The researchers also found that in those red oak acorns that were eaten, frequently only the top half — the end farthest from the embryo — was consumed. Because the embryos were not destroyed, such acorns from red oaks germinated about as often as undamaged specimens.

The results indicate that squirrels, by avoiding the noxious tannins contained in the bottom half of the red oak acorn, are able to capitalize on the higher fat content contained in the top half during the winter, when energy demands are at a premium.

The squirrels also dispersed the acorns of red oaks — which require more sunlight than white oaks — over a much greater territory. Borrowing an idea from another botanist, Steele and Smallwood tagged both white and red oak acorns with metal labels and then scoured woodlands to locate various caches.

That technique was necessary because squirrels sometimes employ their own variation of the shell game to dupe one another. Before they bury their treasure an inch or so deep in leaf litter, they often dig several small holes and cover them up before depositing the palmed acorn.

Nature's Gem of the Wyoming Valley: A Heritage Secure

As dawn's first light brushes color into the morning sky, song sparrows, red-winged blackbirds, yellow warblers, and red-eyed vireos proclaim from the trees and shrubs the start of a new day. A white-tailed doe and her fawn stroll along the river's edge, mother browsing the shoreline vegetation and youngster darting about on sometimes wobbly legs.

A glance downstream finds a white-tailed buck meandering through the brush, while upstream, an eagle's talons break the calm of the gently flowing river in a nearly successful attempt to snatch a fish that had ventured too close to the water's surface. Great blue herons occupy positions along island shorelines as their black-crowned nighttime counterparts retreat to daytime roosts. A cormorant warms its wings in the sun, while mergansers, mallards, and wood ducks, all with trailing young, paddle against the current. These sights and sounds, all gems of nature, would probably be expected only along rivers that course through the remotest reaches of North America. However, these are the gems of the Susquehanna River's natural heritage, a heritage that can be experienced during a casual stroll along the River's banks in our own Wyoming Valley.

Sometimes feared and often under-appreciated by Wyoming Valley residents, the Susquehanna River is the principal player in a drama of complex natural interactions that have made the River corridor a haven for a unique assemblage of wildlife. The Susquehanna's relatively large expanses of open water, dotted occasionally with islands and gravel bars, and lined with forests and fringing wetlands, provides a variety of habitats for an incredible diversity of native plants and animals. Violets, trout lilies, Duchman's breeches, and bluebells contribute to the springtime beauty of the riverbank forest, while great lobelia, tickseed sunflower, pokeweed, and jewelweed bloom in the flecks of sunlight that penetrate the summer canopy of silver maple, black locust, and river birch, all typical floodplain trees.

The trees, shrubs, and herbs provide refuge for numerous wild animals. Mammals ranging from white-tailed deer and flying squirrels to mice, voles and shrews, and including a potentially threatened species of fox squirrel, are among the riverbank forest's wild inhabitants. Some of these mammals, as well as some reptiles and amphibians, may fall victim to the great horned owls, screech owls, Cooper's hawks, and broad-winged hawks that are commonly found in the Susquehanna's forested and wetland environs. Songbirds ranging from Baltimore orioles and rose-breasted grosbeaks to scarlet tanagers and Carolina wrens are among the seventy-some bird species that enjoy the prime nesting habitat of these same environs, and more than fifty additional species find the natural areas along the Susquehanna River corridor to be invaluable way-stations during spring and autumn migrations. The Susquehanna's value as wildlife habitat is further demonstrated by the increasingly common sightings of bald eagles, which spend the winter months within the River corridor. The River's value to wildlife is perhaps best exemplified, however, by the peregrine falcons that have chosen the Susquehanna River corridor in the Wyoming Valley as their home.

The peregrine falcon once was a common denizen of the Susquehanna River corridor. Historically, peregrines nested on cliffs and ledges overlooking the River. In our area, Tilbury Terrace and Council Cup Scenic Overlook are believed to be among the falcon's former nest sites. During the middle of this century, the peregrine falcon experienced devastating population declines due primarily to the pesticide DDT. By 1961 breeding peregrines were absent not only from Pennsylvania, but also from their entire range east of the Mississippi River. Western populations also had been greatly reduced, and in 1969 the federal government listed the peregrine falcon as an endangered species. Subsequent recovery efforts led to the release of captive-bred peregrines, and the species' numbers have been climbing steadily. Currently, eleven breeding pairs of peregrine falcons are believed to reside in Pennsylvania. The Wyoming Valley peregrines, which were likely attracted to the area by the availability of nesting habitat, and by the abundant prey in the Susquehanna River corridor and adjacent urban areas, have not yet produced eggs because the female is still immature. However, they have chosen a nest site, and they are expected to produce eggs next year. When that occurs, the Wyoming Valley will have the distinction of hosting Luzerne County's first breeding pair of peregrine falcons since the species vanished from the eastern United States nearly forty years ago.

The Wyoming Valley's peregrine falcons and their compatriots recognize the value of the Susquehanna River corridor. Perhaps the Valley's human population can learn to appreciate the River and its environs as well. The riverbank forest provides such obvious benefits as stabilizing soils to prevent erosion, and removing from rainfall runoff nutrients that otherwise would contribute to unwelcome algae blooms in the Chesapeake Bay. However, the Susquehanna River and its islands, forests, and wetlands can also benefit the Valley's human residents by providing innumerable opportunities to view, and to learn about, an enormous variety of wildlife right in our own "back yard." Add to the educational potential the peace and solace one can experience in the relatively undisturbed pockets of nature that exist along the Susquehanna's undeveloped corridor and the value of this natural resource begins to shine as brightly as a jewel in the morning sun.

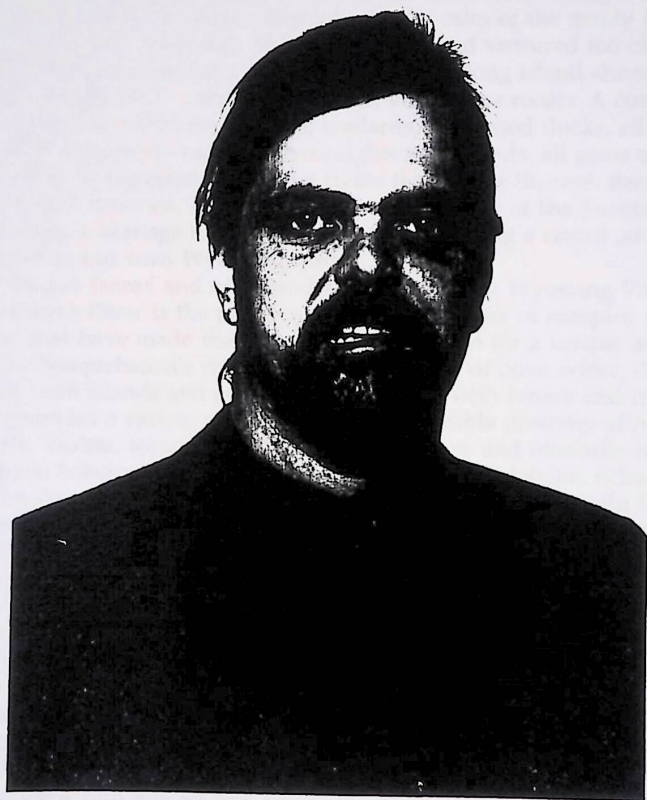
But just as bright morning sunshine warms the landscape, these treasures of the Wyoming Valley can also warm our feelings toward the Susquehanna River. The presence of white-tailed deer, fox squirrels, orioles, eagles, and peregrine falcons in the Wyoming Valley suggests that something is truly RIGHT about the Susquehanna River corridor. Special designations and recreational accouterments should be unnecessary to reveal the beauty of the Susquehanna River to the residents of the Wyoming Valley, and to enable us to find ways to enjoy, and to learn to appreciate, the River's natural heritage. However, now that the Susquehanna River has been recognized by our Nation's leaders as an outstanding component of our national heritage, we have an extraordinary opportunity to preserve the integrity of the Susquehanna's natural heritage for generations to come.

As we work to secure and maintain that natural heritage, we should all strive to ensure that the calm of the Susquehanna remains unbroken, except perhaps by an eagle's talons, or by a skipping stone tossed by a curious youngster as he explores the banks of the Wyoming Valley's natural treasure.

Robert L. Wasilewski
Vice President
Greater Wyoming Valley
Audubon Society

Michael A. Steele, Ph.D.
Department of Biology
Wilkes University





Opinion

Local Guest Writers

C.V. 10-30-98

Nature's gem of the Wyoming Valley: a heritage secure

By Robert L. Wasilewski
and Michael A. Steele, Ph.D.

Special To The Citizens' Voice

As dawn's first light brushes color into the morning sky, song sparrows, red-winged blackbirds, yellow warblers, and red-eyed vireos proclaim from the trees and shrubs the start of a new day. A white-tailed doe and her fawn stroll along the river's edge, mother browsing the shoreline vegetation and youngster darting about on sometimes wobbly legs.

A glance downstream finds a white-tailed buck meandering through the brush, while upstream, an eagle's talons break the calm of the gently flowing river in a nearly successful attempt to snatch a fish that had ventured too close to the water's surface. Great blue herons occupy positions along island shorelines as their black-crowned nighttime counterparts retreat to daytime roosts. A cormorant warms its wings in the sun, while mergansers, mallards, and wood ducks, all with trailing young, paddle against the current.

These sights and sounds, all gems of nature, would probably be expected only along rivers that course through the remotest reaches of North America. However, these are the gems of the Susquehanna River's natural heritage, a heritage that can be experienced during a casual stroll along the River's banks in our own Wyoming Valley.

Sometimes feared and often underappreciated by Wyoming Valley residents, the Susquehanna River is the principal player in a drama of complex natural interactions that have made the river corridor a haven for a unique assemblage of wildlife. The Susquehanna's relatively large expanses of open water, dotted occasionally with islands and gravel bars, and

the middle of this century, the peregrine falcon experienced devastating population declines due primarily to the pesticide DDT. By 1961 breeding peregrines were absent not only from Pennsylvania, but also from their entire range east of the Mississippi River. Western populations also had been greatly reduced, and in 1969 the federal government listed the peregrine falcon as an endangered species. Subsequent recovery efforts led to the release of captive-bred peregrines, and the species' numbers have been climbing steadily.

Currently, eleven breeding pairs of peregrine falcons are believed to reside in Pennsylvania.

The Wyoming Valley peregrines, which were likely attracted to the area by the availability of nesting habitat, and by the abundant prey in the Susquehanna River corridor and adjacent urban areas, have not yet produced eggs because the female is still immature. However, they have chosen a nest site, and they are expected to produce eggs next year. When that occurs, the Wyoming Valley will have the distinction of hosting Luzerne County's first breeding pair of peregrine falcons since the species vanished from the eastern United States nearly forty years ago. The Wyoming Valley's peregrine falcons and their compatriots recognize the value of the Susquehanna River corridor. Perhaps the Valley's human population can learn to appreciate the River and its environs as well. The riverbank forest provides such obvious benefits as stabilizing soils to prevent erosion, and removing from rainfall runoff nutrients that otherwise would contribute to unwelcome algae blooms in the Chesapeake Bay. However, the Susquehanna River



Wasilewski



Steele

“Something is right about the river.”

lined with forests and fringing wetlands, provides a variety of habitats for an incredible diversity of native plants and animals. Violets, trout lilies, Duchman's breeches, and bluebells contribute to the springtime beauty of the riverbank forest, while great lobelia, tickseed sunflower, pokeweed, and jewelweed bloom in the flecks of sunlight that penetrate the summer canopy of silver maple, black locust, and river birch, all typical floodplain trees.

The trees, shrubs, and herbs provide refuge for numerous wild animals. Mammals ranging from white-tailed deer and flying squirrels to mice, voles and shrews, and including a potentially threatened species of fox squirrel, are among the riverbank forest's wild inhabitants. Some of these mammals, as well as some reptiles and amphibians, may fall victim to the great horned owls, screech owls, Cooper's hawks, and broad-winged hawks that are commonly found in the Susquehanna's forested and wetland environs. Songbirds ranging from Baltimore orioles and blue-breasted grosbeaks to scarlet tanagers and Carolina wrens are among the seventy-some bird species that enjoy the prime nesting habitat of these same environs, and more than fifty additional species find the natural areas along the Susquehanna River corridor to be invaluable way-stations during spring and autumn migrations. The Susquehanna's value as wildlife habitat is further demonstrated by the increasingly common sightings of bald eagles, which spend the winter months within the river corridor. The river's value to wildlife is perhaps best exemplified, however, by the peregrine falcons that have chosen the Susquehanna River corridor in the Wyoming Valley as their home.

The peregrine falcon once was a common denizen of the Susquehanna River corridor. Historically, peregrines nested on cliffs and ledges overlooking the River. In our area, Tilbury Terrace and Council Cup Scenic Overlook are believed to be among the falcon's former nest sites. During

and its islands, forests, and wetlands can also benefit the Valley's human residents by providing innumerable opportunities to view, and to learn about, an enormous variety of wildlife right in our own "back yard." Add to the educational potential the peace and solace one can experience in the relatively undisturbed pockets of nature that exist along the Susquehanna's undeveloped corridor and the value of this natural resource begins to shine as brightly as a jewel in the morning sun.

But just as bright morning sunshine warms the landscape, these treasures of the Wyoming Valley can also warm our feelings toward the Susquehanna River. The presence of white-tailed deer, fox squirrels, orioles, eagles, and peregrine falcons in the Wyoming Valley suggests that something is truly *right* about the Susquehanna River corridor. Special designations and recreational accouterments should be unnecessary to reveal the beauty of the Susquehanna River to the residents of the Wyoming Valley, and to enable us to find ways to enjoy, and to learn to appreciate, the River's natural heritage. However, now that the Susquehanna River has been recognized by our Nation's leaders as an outstanding component of our national heritage, we have an extraordinary opportunity to preserve the integrity of the Susquehanna's natural heritage for generations to come.

As we work to secure and maintain that natural heritage, we should all strive to ensure that the calm of the Susquehanna remains unbroken, except perhaps by an eagle's talons, or by a skipping stone tossed by a curious youngster as he explores the banks of the Wyoming Valley's natural treasure.

Robert L. Wasilewski is Vice President of the Greater Wyoming Valley Audubon Society. Michael A. Steele, Ph.D. is a member of the faculty of the Department of Biology of Wilkes University.

Cruel winter or snow job? Folklore and experts disagree

■ Despite prevalence of acorns and coats of caterpillars, meteorologists predict typical conditions in coming cold season.

By DAVID J. RALIS

Times Leader Staff Writer

WILKES-BARRE — It's getting tougher to get out of bed, sunlight no longer streams through the window before the alarm goes off and bare feet are too chilly on the floor.

Summer went by in a blink. Trees in the surrounding mountains are ablaze now, but will soon fade into an ashen bark horizon, their energy spent.

Harbingers of gray, bitter and wet days seem everywhere. Coats have come out of hibernation. Furnaces have fired up. Night falls ever faster.

Acorns crunch underfoot as squirrels hurry to gather their food. What do they know that we don't?

The more plentiful the nuts and the earlier squirrels bury them, the harsher the winter, according to traditional folklore. Another legend says a mild winter is usually followed by harsh one.

After two benign Northeastern Pennsylvania winters in a row, we're probably due.

Two farmer's almanacs agree, predicting snow by Thanksgiving, frequent storms and intermittent cold snaps. "In contrast with last winter, November through March will be colder and snowier than normal," says the 1999 Old Farmer's Almanac by Robert B. Thomas.

So what do the experts — armed with fancy computers and reams of data — predict? Normal conditions through January, maybe a little warmer in February and a little wetter in March. High temperatures normally range from 32 in early January to 51 in late March.

And don't worry about La Nina. Although brother El Nino

brought a mild winter last year, the cooling of Pacific waters doesn't guarantee a harsh winter here, said Stephanie Kennitzer, a National Weather Service spokeswoman.

Jeff Morano is no expert. "My gut tells me it's going to be a mild winter," Morano, a computer programmer from South Wilkes-Barre, said last week while lunching in Public Square.

Still wearing a short-sleeved shirt, Barry Kremer of East Northampton Street agreed. "We had a very hot summer, so I'll go with a mild winter."

Jeff Barrett can only hope they are right. Ice is Barrett's business, but the president of the Wilkes-Barre/Scranton Penguins said he worries that deep snow could stall construction of his hockey team's arena in Wilkes-Barre Township.

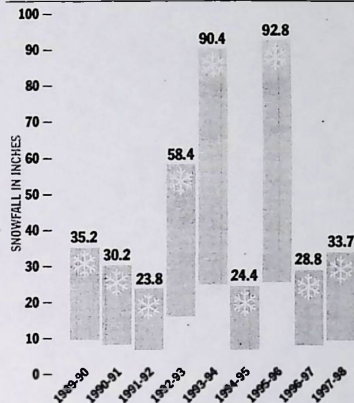
Barrett said he and his wife noticed the large number of acorns

■ See WINTER, Page 2A



People make their way through the snow during the winter of 1995. This winter is expected to be near normal, despite some traditional folklore that points to a harsher season.

Will this winter measure up?



Measured at Avoca by the National Weather Service

Winter

(Continued from Page 1A)

while house shopping recently. To him, it's proof this winter will be bitterly cold.

Just a wives' tale, right? Bill Baker, maintenance manager for the state Department of Transportation in Lackawanna County, doesn't think so.

"I also read the farmer's almanacs and I see how many nuts are coming out of the trees," Baker said. "They say that's a good sign that we're going to have a bad winter."

That theory is just nuts, said Michael Stiegl, an associate professor of biology at Wilkes University. The Fulbright scholar has spent years studying oak trees as well as the behavior of squirrels in Wilkes-Barre's Kirby Park and as far away as Mexico.

Oaks produce either boon or bust crops of acorns, and this fall's bounty was determined by the last two mild springs.

The squirrels are "saturated with a huge crop of acorns." The little tree huggers look busy because they keep moving their

stockpiles to keep other squirrels from committing "cache robbery."

Tina Haver, 24, of the Mountaintop area, believes the thin black stripes on woolly bear caterpillars will mean a mild winter. Don't scoff. One scientist agrees with her.

"There are creatures out there that know how to prepare for what's going to happen," said Ferdinand Barr, a University of Maryland professor. The Scranton native leads a team of researchers trying to improve weather-predicting computer programs. "Those shouldn't be your primary forecast. But there's a reason for it."

However, Ken Klemow, a biology professor at Wilkes University, said the stripe and coat of caterpillars, like those of other animals, are determined by nutrition, genetics and life cycles.

"If you want a weather prediction from me, call me in March," Klemow said.

Reporter David J. Ralis suffers from winter depression. He has two slightly used farmer's almanacs for sale and wants to write about squirrels in Mexico during the long months ahead. Reach him at 831-7376 or at dralis@leader.net.

■ Dr. Michael Steele, assistant professor of biology at Wilkes University, returned from a nine-month sabbatical leave in Mexico, made possible through a Fulbright Fellowship. He taught and followed up on animal/oak interactions in Mexico. Steele is the first Wilkes professor to receive this award. In Mexico, Steele extended his research on the behavior of squirrels and other food-hoarding animals. He studied the specific decisions they make when storing acorns, and the effects of their behavior on the regeneration of oak forests. Steele collaborated with faculty and students from the National Herbarium in Puebla and the Centro de Ecología at Universidad Nacional Autónoma de México in Mexico City, Mexico.

T.L. 9-13-98

■ Dr. Michael Steele, assistant professor of biology at Wilkes University, returned from a nine-month sabbatical leave in Mexico, made possible thorough a Fulbright Fellowship. He taught and followed up on animal/oak interactions in Mexico. Steele is the first Wilkes professor to receive this award. In Mexico, Steele extended his research on the behavior of squirrels and other food-hoarding animals. He studied the specific decisions they make when storing acorns, and the effects of their behavior on the regeneration of oak forests. Steele collaborated with faculty and students from the National Herbarium in Puebla and the Centro de Ecología at Universidad Nacional Autónoma de México in Mexico City, Mexico.

HAZ.T.L. 9-13-98

THE FULBRIGHT SCHOLAR PROGRAM

Purpose and Scope

For over fifty years, the Fulbright Program has offered U.S. faculty, professionals, teachers, and students the opportunity to conduct research, teach, or study abroad and to make a major contribution to global understanding. The program also brings foreign nationals to the United States to study, teach, and pursue research.

The purpose of the program is "... to increase mutual understanding between the people of the United States and the people of other countries ... and thus to assist in the development of friendly, sympathetic, and peaceful relations between the United States and other countries of the world."

The Fulbright Scholar Program, the senior scholar component of the Fulbright Program, offers grants for college and university faculty, as well as for professionals and independent scholars. Since 1946 over 30,000 American scholars have lectured and conducted research in countries around the globe.

Over 700 awards in more than 120 countries are available each competition. Approximately one-quarter are for research and three-quarters for lecturing, combined lecturing/research, or seminar participation. Multicountry research is offered in some regions. There are also seminars, distinguished lecturing and Fulbright chair appointments, as well as many other special features.

All types of individuals participate in the Fulbright Scholar Program. Every academic rank—from instructor to professor emeritus—is represented. Untenured faculty and professionals outside academe are encouraged to apply. Academic administrators regularly receive Fulbrights, as do independent scholars, artists, and professionals from the private and public sectors (lawyers, government officials, journalists, research scientists, and others).

Each year's grantees come from approximately 500 colleges and universities and public and private agencies in 50 states.

Eligibility

Applicants must meet all of the following eligibility requirements:

- U.S. citizen at the time of application; status permanent resident is not sufficient.
- A Ph.D. or equivalent professional/terminal degree at the time of application, *unless otherwise stipulated in the award description*

For professionals and artists outside academe recognized professional standing comparable that associated with the doctorate in higher education is required, unless otherwise noted.

Questions as to degree qualifications for individual awards should be directed to the staff listed for the country or program prior application.

- College or university teaching experience is required at the level and in the field of the proposed lecturing activity for lecturing and lecturing/research awards, as specified in award description.
- Foreign language proficiency as specified in award description or as required for the completion of the proposed lecturing or research project.
- Previous Fulbright scholar grantees are eligible to apply only if three years will have elapsed between the ending date of one award and beginning date of the new award.

The three-year rule does not apply to short-term grants of under two months (short-term distinguished lecturing, seminars, etc.). If prior grant was a Fulbright student grant above restrictions do not apply.

- Persons residing abroad for five or more consecutive years in the six-year period preceding the date of application are ineligible. Residing abroad is defined as living outside the United States for nine months or more in a calendar year.
- Sound physical and mental health.
- Prior conviction or current indictment for commission of a felony must be reported. Conviction or current indictment may disqualify.

Refer to the individual award description to determine that a grant is possible in your preferred country before making application.

• M. Steele 4763

897-6318

Wilkes Professor Awarded Fulbright to Mexico

Dr. Michael A. Steele, Associate Professor of Biology, Wilkes University, was recently awarded a Fulbright Fellowship from the United States Council for International Exchange of Scholars in Washington, D. C. to lecture and conduct research in Mexico over the next academic year. The nine-month award, based on Steele's previous research record, several teaching awards, and a detailed research proposal, will provide him with a salary, living expenses, and relocation allowance. He will be accompanied by his wife Margaret, and three children, Michael, Tyler, and Emily. Wilkes University has provided a sabbatical leave for the year.

Since 1947, the Senior Scholar component of the Fulbright Program has offered faculty, professionals, and independent scholars opportunities for teaching and research abroad. The primary goals of the Fulbright Scholar Program are to promote academic and professional development and to allow exchange between American professionals and those of other countries.

In Mexico, Steele will collaborate with faculty and undergraduate and graduate students from the National Herbarium in Puebla and the Centro de Ecología at UNAM in Mexico City. Steele's current research, conducted with students at Wilkes University and colleagues from Rutgers, University of Pennsylvania, and UCAL, Berkeley focuses on the behavior of food-hoarding animals, the specific decisions animals make when storing acorns and the effects of such decisions on dispersal and regeneration of oaks. Steele says "the award is an excellent opportunity to extend his current research to an environment where an understanding of the mechanisms of forest regeneration are critical for countering the effects of deforestation." He and his family are also excited about sharing in the experience of living in and learning about Mexican culture.

While quality teaching is our primary mission at Wilkes University, we also pride ourselves in having faculty that are highly professionally active. In general the public, students, and even school officials themselves sometimes underestimate the importance of research and other scholarly activities of faculty at smaller Universities like Wilkes. For several reasons, though, the level of scholarly activity by the faculty should be a primary consideration when choosing a small University. When faculty are professionally active they are often better teachers, more in touch with their field of expertise, and better able to maintain a curriculum that is current. A professionally active faculty also means that students have greater access to hands-on experiences, more meaningful exposure to their intended professions, and, often, an opportunity to network with professionals in their field. When faculty are encouraged and rewarded for scholarly work, it shows, not only in the the quality of their own work, but in the quality of the students they educate. And, when students attend a college where faculty are professionally active, they are consistently better prepared for the future.

site Leila Hadj-Chikh

Story Lead

File Number:

0045

Studying the Squirrles

Modified:

4-28-97

Date Submitted

10-1-94

Source

Clipping

Priority

☐ Hot ☐ Warm ☒ Cold

Wilkes Sources

Dr. Michael Steele

Description

Steele studied the way squirrles use acorns. He believes that squirrles play an enormous part in where oak trees grom from year to year.

Relevant Dates

Story Type

faculty

Likely Application

combine for profile

Done Where?

☐ ☒

Notes:



TIMES LEADER PHOTOS/DON CAREY

“

*The decisions the squirrels make
have a dramatic effect on the
dispersal of seeds.*

”



Dr. Michael Steele
Assistant professor of biology
at Wilkes University

Students study fate of acorns

■ *Wilkes University
group demonstrates oak
tree propagation
through squirrel ritual.*

By CECE TODD

Times Leader Staff Writer

DORRANCE TWP. — In the snow-covered woods of Dorrance Township, Wilkes University students and staff study a furry landscaper: the squirrel.

Using metal detectors, the students trudge over 50 acres searching for thousands of acorns they tagged weeks ago with small pieces of metal — acorns that now are being discovered by squirrels.

"These animals are a lot smarter than we thought," says Greg Turner, a lab research technician at Wilkes and 1994 graduate. "They can tell a difference between the acorns."

Not just any rodent, the squirrel knows white acorns are perishable and eats them right away, but stores as winter food the red acorns, which lie dormant in winter and sprout in spring if they have not been eaten. The squirrels won't ingest the metal tags.

"The decisions the squirrels make have a dramatic effect on the dispersal of the seeds," says Dr. Michael Steele, assistant professor of biology.

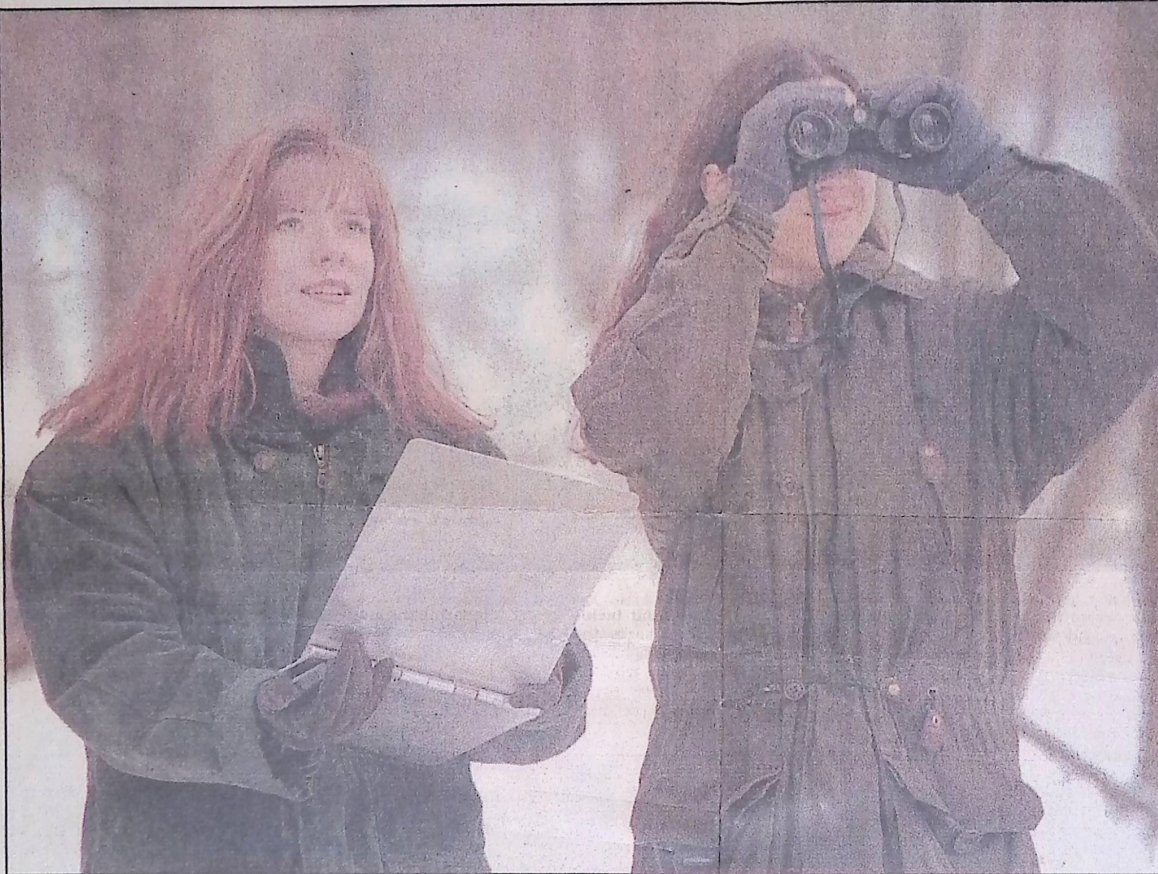
The result: This small furry rodent often is responsible for where oak trees grow.

Since 1985, Steele has been studying the relationship between squirrels and oak trees. In October, the Wilkes biologist co-authored an article, "What are Squirrels Hiding?" for *Natural History* magazine.

Based on the last four years of squirrel and acorn research, the article concluded that squirrels are vital to the regeneration of oak forests and may have been responsible for spreading the trees throughout North America after the retreat of the glaciers 10,000 years ago.

Now, with the help of a \$17,000 grant from the National Science Foundation, Steele is leading a team of Wilkes University students in further research of the tie between squirrels and

■ See SQUIRRELS, Page 7B



Kelly Cesari, left, and Lelia Hadj-Chikh, both seniors at Wilkes University, scan the trees for squirrels in Dorrance Township.

Using metal detectors, Wilkes University staff and students search for acorns hidden by squirrels and measure the distances between them. Each acorn was implanted with a small metal tag last fall. From left are: senior student Igor Kleyman; research technician and 1994 Wilkes graduate Greg Turner; and senior Joe Machuzak.



Squirrels

(Continued from Page 1B)
oak trees.

One of the latest experiments involves thousands of acorns spread out across 50 acres of woods of Dorrance Township. After collecting the acorns last fall, the Wilkes students inserted a metal tag into each one.

Then they placed the seeds into grids scattered throughout the wooded area. Each grid is covered with a screen of chicken coop wire that keeps out animals such as deer and bear but leaves enough room for the squirrels to get to the acorns.

Using metal detectors, the stu-

dents return to the woods periodically to see where the squirrels have placed the acorns and the fate of the dispersed seed.

"We're examining the effects of the abundance of acorns on dispersal," Steele says.

Or, as Turner explains, "Through the project, we can see how forests develop with the help of small animals."

The experiment will conclude this spring, and should provide valuable scientific insight, Steele says. "These kinds of questions are questions that are central to many major topics of ecology."

What Are Squirrels Hiding?

Their half-eaten acorns are clues to a complex relationship with oaks

by Michael Steele and Peter Smallwood

Naturalists and casual observers alike have been struck by the special relationship between squirrels and acorns. As ecologists, though, we cannot observe these energetic mammals scurrying up and down oak trees and eating and burying acorns without wondering about their complex relationship with the trees. Are squirrels dispersers and planters of oak forests or pesky seed predators? The answer is not a simple one. Gray squirrels may devour many acorns, but by storing and failing to recover up to 74 percent of them (as they do when seeds are abundant), these arboreal rodents can also aid regeneration and dispersal of the oaks.

Their destructive powers are well documented. According to one 1908 report, squirrels destroyed tens of thousands of fallen acorns from an oak stand on the University of Indiana campus. A professor there estimated that each of the large white oaks had produced between two and eight thousand acorns, but within weeks of seed maturity hardly an acorn could be found among the fallen leaves.

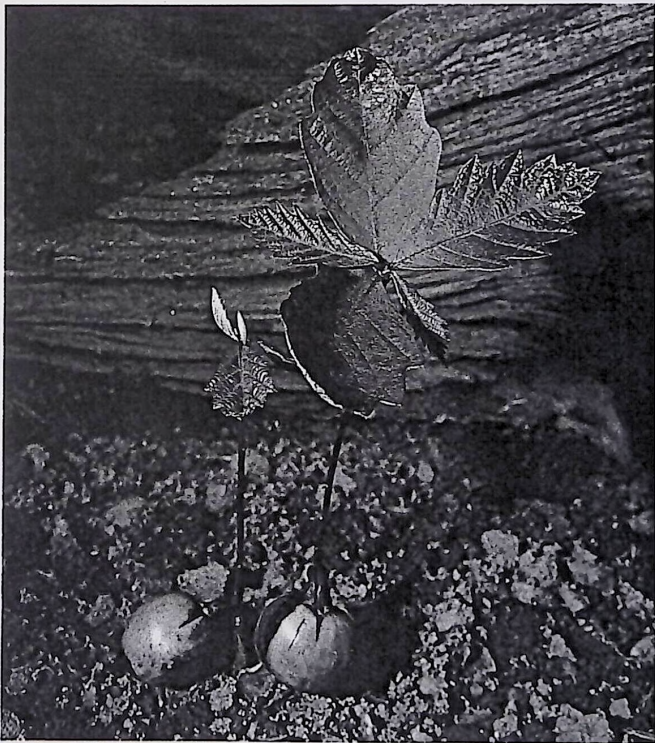
Deer, turkeys, wild pigs, and bears also feed heavily on acorns, but do not store them, and are therefore of no benefit to the trees. Flying squirrels, chipmunks, and mice are also unlikely to promote tree dispersal, as they often store seeds in tree cavities and underground burrows. Only tree squirrels—whose behavior of caching below the leaf litter often promotes successful germination of acorns—and perhaps blue jays, important long-distance dispersers (see *Natural History*, October 1986), seem to help oaks spread and reproduce.

Early in our study, we observed one particularly puzzling behavior pattern. Squirrels would pry off the caps of acorns, bite through the shells to get at the nutritious inner kernels, and then discard them

half eaten. Moments later, they would seize another acorn and repeat the routine. The ground under the towering oaks was littered with thousands of half-eaten acorns, each one bitten only from the top. Why would any animal waste so much time and energy and risk exposure to such

predators as red-tailed hawks only to leave a large part of each acorn uneaten?

Gray squirrels are generally opportunistic in their feeding habits, but at other times they are picky. They often eat a variety of budding leaves, flowers, and spring twigs, and even the pupae of giant silk



After sprouting from acorns, red oak seedlings produce their first leaves, above. Acorns of red oaks are more often cached by squirrels, while those of white oaks are immediately eaten. Right: Before caching it for use in winter, a gray squirrel nips an acorn's tip, killing the oak embryo so the seed cannot sprout.

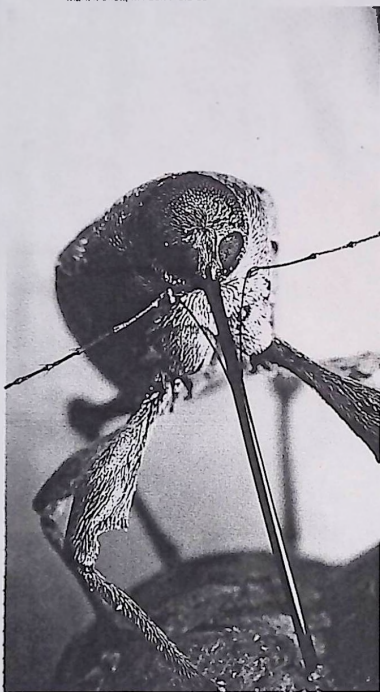
E. F. Dugginger; Bruce Coleman, Inc.



An acorn weevil feeds on oak seeds, below: Female weevils may deposit their eggs in them, and squirrels will frequently eat such infested acorns, larvae and all. Right: Two young squirrels venture from their natal nest in the spring or early summer. Within days they will be weaned and left by their mother to forage for themselves.

Mark Mottelt, Minden Pictures

Rob Simpson



moths, carrion, a bird's egg or two—and, rarely, nestling chicks. During the autumn and winter months, however, their main diet consists of nuts and seeds, and at this time squirrels readily distinguish between various species, and even parts, of acorns. Active throughout the year, the squirrels store large quantities of seeds and nuts to see them through the winter. These caches usually include acorns of some of the thirty-two oak species that grow in the squirrel's range in eastern North America.

An oak seed, or acorn (really a fruit), consists of an outer shell enclosing two young, energy-rich seed leaves (or cotyledons) that meet to surround a tiny embryo at the apex, or tip. To a squirrel, the acorn is a package of energy (between five and twenty kilocalories) that can be easily opened and eaten in less than half the time

needed for other, harder nuts or stored for use up to ten months later.

Not all acorns are the same. The two major groups of oaks—red and white—have seeds that differ generally in chemical makeup. Red oak acorns are rich in fats (18 to 25 percent of dry weight) but are laced with 6 to 10 percent tannins (the bitter-tasting, water-soluble compounds used to tan hides). White oak acorns are less fatty (5 to 10 percent) and lower in tannins (less than 2 percent). The two groups of trees also differ in when they germinate. Red oak acorns lie dormant in winter and sprout in spring; white oak seeds usually sprout soon after falling to the ground in autumn.

We knew that more fat enhances the seeds' energy value, but we also suspected that high tannin levels make them less palatable and digestible to squirrels. Tannin in oak leaves repels many insects, and some trees may even increase their tannin concentrations as a natural pesticide. Do these chemicals also repel squirrels or do the squirrels rely on them to protect their own acorn caches from insects and other pathogens? How do tannins and other acorn chemicals influence the squirrels' feeding and caching decisions? And do these behaviors, in turn, affect the distribution of oaks? These were but a few of the questions we sought to answer with a series of field experiments.

In 1980, zoologist Alan R. Lewis studied the dietary preferences of squirrels in the winter by identifying the remains of acorns left behind after squirrels had eaten from their caches. Lewis demonstrated that squirrel preferences depend not only on the energy content of the acorns but also on their relative abundance. Sometimes as many as six species of oaks grow within the range of a single gray squirrel. Lewis found that when faced with these choices, the squirrels ate more fatty acorns, except when the lower-energy acorns were more numerous. Other researchers have shown that squirrels are generally efficient in their feeding habits, expending the least amount of energy to obtain the most nutritious foods (see *Nat-*



ural History, October 1989). Ecologist Christopher C. Smith, of Kansas State University, and others had shown that given a choice, squirrels preferred to take mostly the high-fat red oak acorns.

To further analyze the squirrels' preferences, Peter Smallwood and David Peters, of Ohio State University, created "artificial acorns" with measured chemical additives. After shelling and processing white oak acorns into a dough, they added various levels of tannin and fat to simulate those in real acorns. The squirrels consistently chose to eat the acorns with lower tannin levels, particularly in autumn—even those acorns with low fat content.

These results seemed to contradict such earlier studies of squirrels' food preferences as Smith's. After wrestling with this inconsistency, however, Smallwood and



Peters realized that squirrels may exhibit different preferences for caching and eating. Perhaps squirrels use one kind of acorn for immediate consumption and another for storing. When white oak acorns germinate in the fall, they concentrate much of their nutrients in a taproot, which squirrels find unpalatable. We wondered whether squirrels might eat white oak acorns immediately because their early germination renders them unsuitable for caching, and store the red oak acorns, which germinate later, for consumption in winter and spring.

To test this idea, we presented gray squirrels in Ohio and Pennsylvania parks and campuses with both red oak and white oak acorns. In each of more than 1,200 feeding trials, we recorded whether the acorn was eaten or stored, the distance it

was dispersed, and the amount of time the animal took to eat or bury the acorn. Unambiguously, squirrels cached more red oak acorns (60 percent) and consistently ate those of the white oaks (more than 85 percent).

In a second group of experiments we attempted to determine the squirrel's role in dispersing trees—this time in mature oak forests in Pennsylvania's Pocono region. But we often failed to find the buried acorns, even after watching a squirrel only ten feet away shove a nut into a shallow hole, cover it, and brush debris over the top. Clearly, we needed a more sophisticated approach. Following the lead of botanist Victoria Sork, we tagged thousands of red and white acorns with small metal labels and, after the animals dispersed the seeds, used metal detectors to

recover them. Again, the results were clear. Squirrels either ate white oak acorns on the spot or carried them only short distances before eating them. Red oak acorns were generally carried farther away and cached intact.

Other factors besides germination schedules and seed chemistry affect the seeds' perishability. Might squirrels also respond to these in deciding whether to cache? Many acorns become infested with insect larvae, particularly weevils of the genus *Curculio*. During spring, females of several species of these beetles bore into acorns to deposit their eggs. By early fall, the maggot-sized larvae have often destroyed more than 60 percent of the crop of single trees. Would squirrels avoid wormy acorns as less suitable for storing?

We identified batches of infested acorns

Preparing to cache an acorn, a gray squirrel excavates a hole in the soil. Often squirrels go through the motions of burying acorns, only to store the seeds elsewhere.

E. A. Jones; NHPA

by having them X-rayed at a local hospital, then offered them to the squirrels. Consistently, they selected noninfested seeds for caching, but opened and consumed the infested ones, eating the weevils as well. In nearly 300 tests, the squirrels readily ate the high-protein larvae.

Sometimes squirrels kill the early-sprouting white oak acorns by excising the seed embryos just before burying them, as John Fox reported in 1982. If an acorn germinates before the squirrel can recover it, up to half its stored energy goes to the seedling rather than the squirrel. A few quick scrapes of the squirrel's incisors across the bottom of the acorn kills the embryo and preserves the seed's nutrients intact.

While this notching behavior underscores the importance of seed perishability, it does not explain the habit of biting and discarding acorns that so intrigued us at the beginning of our study. Those squirrels ate only from the acorn's top half—the end farthest from the embryo. And the acorns were of red oaks, not white. As we moved our research from parks and campuses to rural woodlands, from the scrub-oak forests of the southeastern coastal plain to the oak-hickory forests of the Middle Atlantic States, we saw the same pattern. Squirrels bit off the tops of acorns of at least seven red oak species. We also found that blue jays and common grackles did the same. Squirrels, jays, and grackles each employed a different technique to open an acorn, but all consumed only 30 to 60 percent of the kernel—and always from the top of the seed. Later we discovered that weevil larvae were found in the top of the acorn two to three times more often than in the bottom.

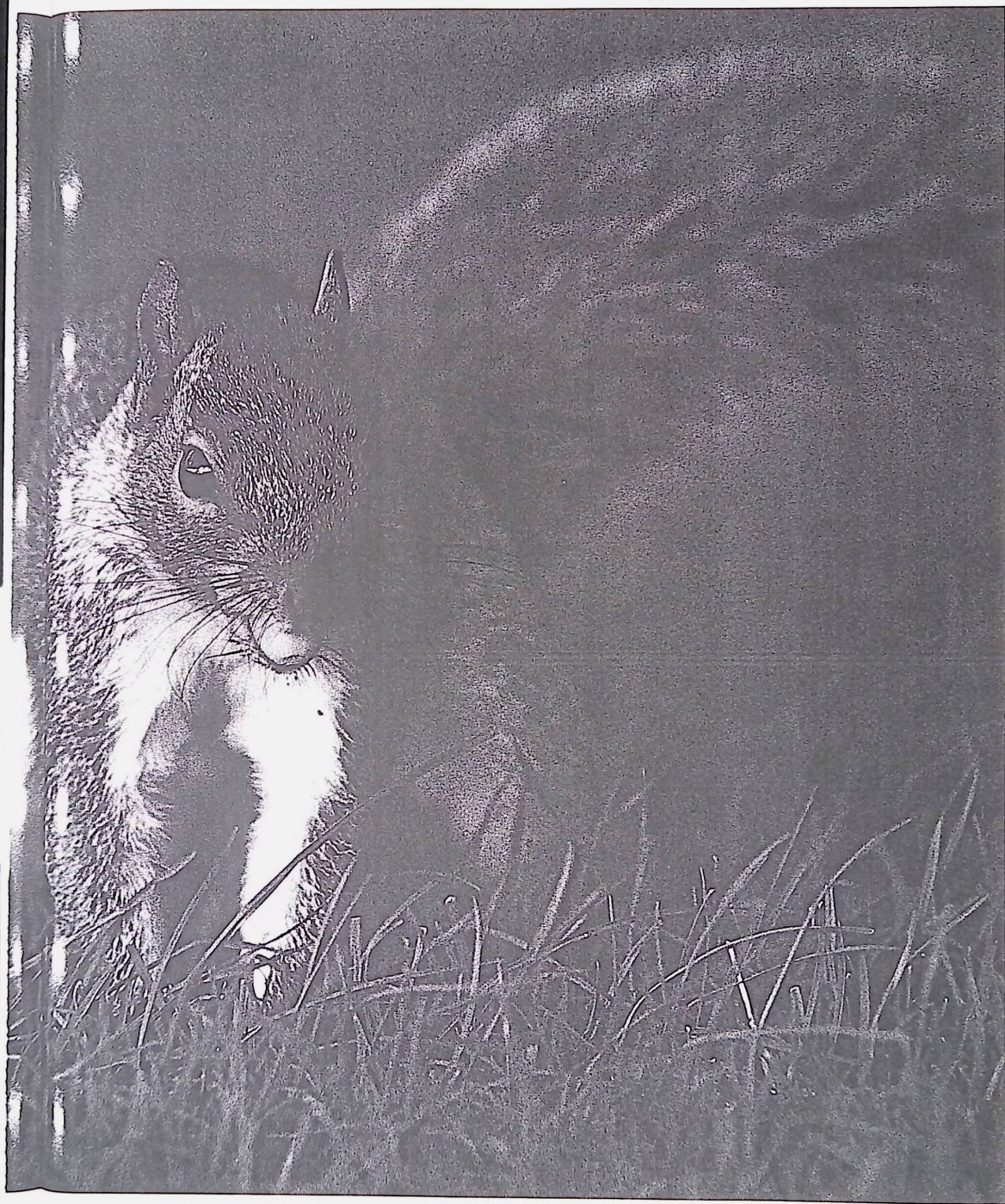
Our first guess, that higher levels of noxious tannins are located near the bottom of the acorn, where the embryo is located, was borne out by chemical tests. But we also found, in more than seventy-five trials, that squirrels frequently cached partly eaten seeds, which raises the possibility that the acorns may have become adapted to withstand such attacks. Because their embryos were not destroyed,

these seeds germinated about as often as undamaged ones. Perhaps for the oak, the half-palatable acorn is an effective strategy for survival. Maybe acorns benefit from being chosen by squirrels for burial and dispersal, as long as they are not totally destroyed.

We still wondered what factors other than tannin content influenced the squirrels' choices. What about the acorn's shape, for instance, or the toughness of its shell? In pursuit of these questions, we offered gray squirrels their choice of whole acorns, shelled acorns, and shelled acorns in which the bottom and top ends were carved to resemble the opposite ends. Squirrels ate just the top portion of both whole and shelled seeds, indicating that the shell was not the determining factor. But when we presented squirrels with carved seeds, we found that they were fooled into eating in reverse, feeding only on the disguised bottom half. Next we presented squirrels with artificial acorns that contained varying amounts of tannin. Consistently, when given those seeds with the highest tannin concentration, squirrels ate from the top half but consumed only a small amount.

Ecologist Joseph Grinnell, in a 1936 paper, pondered how oaks could colonize hilltops, since acorns are too heavy for wind dispersal and do not roll uphill. He concluded that animals must carry them to such sites. Although we are only just beginning to grasp some of the complexities of the squirrels' relationship with oak forests, we agree with Grinnell's early assessment. By dispersing red oak acorns more often and farther than white oak acorns, by excising the embryo of white oak acorns and storing primarily sound acorns, we suspect that gray squirrels can strongly influence the distribution and range of various oak species. Indeed, evidence is accumulating that along with jays, squirrels are crucial in regenerating second-growth oak forests and may even have been responsible for spreading the vast stands of oak throughout North America after the last retreat of the glaciers 10,000 years ago. □







Near the shore of Lost Lake in the Cascades, **Andrew R. Blaustein** (page 32) and Susan Walls, then a postdoctoral student, inspect toad eggs in experimental enclosures. Blaustein's study of amphib-

ian population dynamics, which he has conducted for fifteen years, seems to have had its roots in his childhood. Although he grew up in New York City and Long Island, Blaustein remembers catching lots

of toads and frogs while on family vacations in Maine and New Hampshire. His love of nature, reinforced by trips to the American Museum and a menagerie of exotic pets (which he still maintains), led him to study biology. After earning his B.A. from Southampton College in 1971, he headed west to pursue his master's degree at the University of Nevada at Reno and his Ph.D. in biology at the University of California at Santa Barbara. His thesis focused on the population dynamics of rodents, but after moving to Oregon State University in Corvallis, where he is a professor of zoology, Blaustein switched to amphibians because they were better for investigating the kinds of questions he wanted to answer. Now that he has established a link between the death of some amphibian eggs and increased UV-B radiation from the sun, Blaustein plans to continue studying how this and other factors might be contributing to the decline of many frogs, toads, and salamanders.



Ecologists **Michael Steele** and **Peter Smallwood** (page 40) first learned that they shared similar research interests in squirrels, oaks, and acorns nearly a decade ago, when they met at Highlands Biological Station in the southern Appalachian Mountains of North Carolina. But

Smallwood, below right, was busy at night studying the foraging behavior of long-jawed spiders, while Steele, left, was gone during the day studying shrew and rodent community ecology. Collaboration had to wait until they met again in Pennsylvania, where they teach at separate colleges. (Steele is an assistant professor at Wilkes University, and Smallwood lectures at Bryn Mawr.) Steele's interest in natural history goes back to his early childhood, when he collected "butterflies, other insects, and a variety of reptiles and amphibians around Chesapeake Bay. Mammals were too hard to catch then." Smallwood, a self-defined "eclectic," is going beyond spiders and squirrels to investigate sex ratios in the Florida kestrel, or sparrow hawk. ("We've discovered that they raise primarily sons early in the breeding season, and primarily daughters later on. We're trying to understand why.") For further reading, the authors recommend *The Natural History of Squirrels*, by John

Gurnell (New York: Facts on File, 1987), *Food Hoarding in Animals*, by Stephen Vander Wall (Chicago: University of Chicago Press, 1990), and *Faith in a Seed*, by Henry David Thoreau (Washington, D.C.: Island Press, 1993).



Weedling the weevils

FEEDING Selective squirrels outwit weevils and benefit from extra minerals.

Grey squirrels eat acorns. Those which are not eaten immediately are buried for consumption at a later date when food is scarce, a behaviour known as caching. The problem for a squirrel is that weevils also eat acorns, and so if a squirrel caches an acorn that is already infested with a weevil, there is likely to be little of it left by the time the squirrel unearths it.

Michael Steele and colleagues of Wilkes University, USA, wondered if squirrels could spot acorns infested with weevil larvae *Curculio* spp. and whether they treated them differently from non-infested ones. The scientists found that, when presented with either infested or non-infested acorns, grey squirrels *Sciurus carolinensis* tended to cache the sound acorns and eat the infested ones on the spot (*Journal of Mammalogy*, vol. 77, pp305-14).

What's more, in most cases, the squirrels were observed eating the weevil larvae, suggesting that they constituted an important part of the squirrels' diet. According to Jenny Bryce, a squirrel expert from Oxford University, "squirrels are known to eat unusual foods such as

soil, road salt and animal bones." Perhaps these foods provide nutrients such as nitrogen and phosphorus, which are present in low concentrations in acorns. Non-infested acorns that had their shells removed, making them more susceptible to decay, were also eaten rather than cached, and so it seems that a squirrel bases its decision of whether to eat or cache on the acorn's perishability.

STUART BLACKMAN

BACKGROUND

Nut nuggets

◆ Grey squirrels bury acorns singly – scatter-hoarding – as opposed to the larger-hoarding carried out by the North American Douglas' squirrel which puts all its nuts in one large cache.

◆ Scatter-hoarders don't remember where every acorn is buried. They locate their stash by smell, but a proportion of their booty is never found.

◆ As not all buried acorns are recovered by squirrels, caching probably has a positive influence on the dispersal of oak trees. If only those acorns that are likely to germinate are cached in the first place, this effect may be greater than was previously thought.



Flowers on heat

FERTILISATION Why lotus flowers need to warm up.

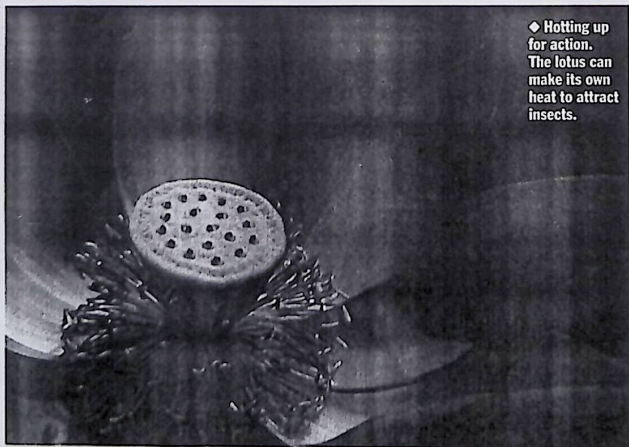
The sacred lotus is not only a stunning large flower, but it also does something quite extraordinary for a plant – it gets hot when it's ready for sex. The lotus *Nelumbo nucifera* makes its own heat, keeping up a steady and very steamy 30-35°C for up to four days at a time, even when the temperature outside drops as low as 10°C. As Roger Seymour and Paul Schultze-Motel at the University of Adelaide discovered,

the plant warms itself up as the surrounding air temperature falls, a strategy amazingly similar to, though not nearly as complicated as, hot-blooded animals such as birds and mammals (*Nature*, vol. 383, p305).

The floral furnace is clearly very important to the flower, because it burns up most of its food reserves in the process, but the sacred lotus is amply rewarded for its pains. Visiting insects such as beetles are comforted in heated bliss inside a special floral chamber, often trapped overnight as the flower closes up, and released unharmed and positively invigorated the next day. The hot overnight stay may help to energise their flight muscles, encouraging them to carry pollen from one lotus to another and so cross-pollinate the flowers.

PAUL SIMONS

◆ **Hotting up for action.** The lotus can make its own heat to attract insects.



◆ **Immediate gratification.** If the acorn is weevil infested, the squirrel eats now rather than later.

BACKGROUND

Hot flowers

◆ A surprisingly varied group of flowers make heat: some philodendrons and other aroids, waterlilies, palms and cycads.

◆ They mainly use their heat to evaporate volatile 'perfumes' used for attracting insects to pollinate them.

◆ The mystery was how the heating starts exactly when the flowers are ready for pollination, until it was discovered in the voodoo lily, an aroid plant, that heating is

SATURDAY
JUN 29 1996

BUSSELLE

EO

CURRENT RESEARCH

WILDLIFE PROGRAMS

LOCAL HISTORY

Lacawac Mission Includes Education

Lacawac Sanctuary also offers a number of educational programs dealing with research, conservation, wildlife, local history and simple exploration of the great outdoors.

LIVING INTERPRETATION

In July, the programs include the continuation of Birding Series. Part three "Habitat Improvement and Feeding" is scheduled July 7. Participants will learn to attract more birds to their yard by providing basic habitat components — food, shelter, water and space.

Subjects covered include landscaping techniques emphasizing the use of native plants; food and habitat requirements of different species; source lists, feeding strategies; seed mixes and feeders. A demonstration will be followed by a field trip to explore natural habitat components with leaders Vonnice Strasser and Pat Walters.

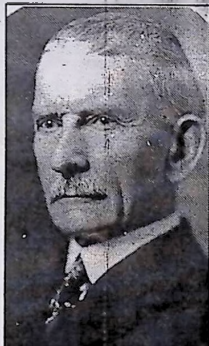
"Born Out of Necessity" on July 10 is a living interpretive experience, which compares and contrasts two of the major players benefiting from the Industrial Revolution — canals and railroads. Through the eyes of railroad trackman, Mike Mallory, learn of the changes in 1870 through 1886 that were reshaping the American scene. Richard Perwin, an educational interpretive specialist portrays the Gandy Dancer.

WHITETAIL DEER IMPACT

On July 13, a slide presentation and poster display will be part of the annual membership day "Thirty Years and Still in the Woods." A covered dish dinner and service auction follow.

Impacts of the Whitetail Deer Herbyony on the Forest Community, scheduled for July 14, includes ecologist Dr. Dan Townsend, who is investigating the changes that have occurred in terrestrial plant communities where deer have been excluded. The study, now in its second year, should begin to provide some insights into the effects of deer browsing on plant diversity and other wildlife species.

The History of the Wallenpaupack, July 17, allows participants to relive the past with Sanctuary founder L. Arthur Watres, grandson to Col. Watres, organizer of the Wallenpaupack Project, as he explains some



— COL. L.A. WATRES —

little-known history associated with the building of Lake Wallenpaupack.

WILDLIFE REHABILITATION

On July 24, Kathy Dubin, director of the Pocono Wildlife Rehabilitation Center, will present a behind-the-scenes look at the kinds of animals treated at the center as well as the causes of their need and the care given and what you should do if you find an animal in need. Non-releasable, live helpers will reinforce concepts.

Hug A Tree and Survive will be the July 27 program. A slide presentation and hands-on activities designed to teach children how not to get lost in the woods and what they should do if they do become lost. It will be presented by Jane Hawley, Thornhurst Volunteer Fire & Rescue Company. It is designed for children ages 5 to 12.

On July 28 a Sanctuary Tour includes a leisurely walk with Sanctuary founder L. Arthur Watres, who will highlight current events, research activities and Sanctuary history. A similar program is also scheduled for August 25.

REINTRODUCING FISHERS

The Overview of the Fisher Reintroduction Program is scheduled for July 31. This slide program explores the natural history of this porcupine predator and reintroduction efforts conducted by the Pennsylvania Game Commission and Penn State University. It will be presented by Timothy Conway, Pennsylvania Game Commission Wildlife Education Supervisor.

Following the Fisher program, "Into the Night On a Moonlit Walk" will give visitors an opportunity to experience the wonders of nature after dark with volunteers Mary and Pat.

Scientists from Lehigh and Drexel Universities, The University of Scranton, and Penn State know things about the forest and aquatic environments at Lacawac Sanctuary that others don't. Visitor can join the Sanctuary staff for a non-technical tour and discussion of current research projects on August 3.

PHOTO SAFARI, RAPTORS

"Photo Safari Adventures" is a slide presentation by nationally recognized wildlife biologist and photographer Dr. Gary All will focus on some of North America's most exciting wildlife and scenic photo destinations providing insight on where, when to go and what to expect. Tips on how to plan and prepare for photo safaris will be given to increase your rewards and avoid disappointments. Photographic technique, subject selection and slide sequences in the art of story telling will be illustrated. It is designed for amateurs, professionals or anyone with an interest in natural history.

On August 11, visitors can join Dr. Dan Townsend on this moderate walk to visit the forest enclosures. These enclosures were constructed to prevent deer from browsing 2.5 acres of the Sanctuary's forest. This is the second year of the long-term study to monitor changes that occur in terrestrial plant communities where deer have been excluded. The study has already provided some insights into the effects of deer browsing on plant and wildlife diversity.

Back by popular demand is Bill Streeter, director of the Delaware Valley Raptor Center, who will take a close up look at the fascinating lives of

eagles, owls, and hawks and the problems facing them on August 14. With the help of live animals from the center, he explains the complex adaptations unique to each species.

OTHER ANIMAL IMPACTS

The August 18 Victorian Garden Party, will allow visitors to indulge in an afternoon party reminiscent of days gone by with an afternoon outdoors surrounded by flowers, music, other entertainment, food, games and crafts. The raid date is August 25.

Dr. James Fehner, Associate Professor of Chemistry at Penn State University, combines academics with antique auction house experience in collecting and caring for silver. On August 21, he will share his expertise with examples from his personal collection.

Finally, "How Animals Plan Our Forests: Overview of Oak/Mammal Interactions" is scheduled for August 28. Dr. Mike Steele, Wilkes University, whose research was recently published in Natural History, will conduct this non-technical slide presentation detailing his work with mammals, primarily squirrels, and their effect on our forests.

Some of the Lacawac Sanctuary programs involve a nominal charge to non-member: and other may require advanced reservations. Additional information about the programs or membership in Friends of Lacawac is available by calling 689-9494.

Nuts about Squirrels



BY DANIEL L. CUSICK
THE SUNDAY TIMES

There couldn't be a more pointed difference than the one between the quirky, chattering gray squirrels and the quiet, methodical professor who's studying them in local woodlands.

David Byman, Ph.D., associate professor of biology at the Worthington Scranton Campus of Penn State University, is looking at *Sciurus carolinensis* — the gray squirrel — in an attempt to learn "how much energy does it require for a squirrel to keep a normal body temperature under a number of microenvironmental conditions in the tree canopy."

That is something he's been pursuing for the past 12 years, beginning with the time when he was working on his Ph.D. in zoology from Colorado State University. There, he first studied the stress

of summer heat on ground squirrels.

For the past 12 years, an associate professor at the Worthington Scranton Campus of Penn State has been studying the life and habits of the gray squirrel.

"One of the things I explore," Byman said, "is whether the gray squirrel spends more energy gathering food in winter — when similar mammals conserve energy by hibernating — than it gains from the food it gathers."

Interestingly, the squirrels have less curiosity about Byman and his works than he has about them. He still spends a lot of time in the woods, but among his tools for research

are models of squirrels made from skins of some squirrels mounted on something like sculptor's armatures, a taxidermic process. "Oh yes," he admits, "I've climbed trees" to put them into place. "But now I do it mostly by pulleys." Those models simulate conditions for squirrels in the forest canopy closely enough that Byman can deduce a great deal from examining them.

There are no ground squirrels in the immediate Northeastern Pennsylvania area, but woodchucks and chipmunks, two other creatures who live in underground burrows, do serve some of Byman's studies.

The interface between man and the animals as the former encroaches and builds homes and businesses on former open land is taking its toll, Byman said. "Overall, there is a stressful physical environment affecting the animals."

Byman's own schedule is affected by the lifestyle of the squirrels. "Generally in summer," he said, "they are bimodal," meaning they are most active in the early morning and again in the late afternoon. "That is so they can avoid the heat of midday," said the PSU biologist.

And he cleared up a question often asked by the uninformed: "How do squirrels find the nuts they buried for winter?"

He responded "They have a very good sense of scent. I don't suppose they have the memory of what they, themselves, buried. So they may get what (nuts) others buried."

FOOD FOR WINTER

Squirrels literally squirrel away nuts as food source for winter. They put them, Byman said, about one inch below ground level, one at a time, in a pattern termed scatter hoarded. Then, in deep winter when the food supply is much leaner, they smell out the nuts as food source.

Another aspect of squirrels — one that rankles many



ABOVE: David Byman, Ph.D., checks the woods near the Penn State Worthington Scranton Campus for signs of gray squirrel activity for his studies of the local rodents. LEFT: A Richardson's ground squirrel, a particular part of Byman's research, assumes a watchful stance in its midwestern habitat. RIGHT: One of the squirrel models created by Byman to determine the effect of sunlight, wind and other factors on squirrels in the forest canopy.

RICH BANICK / THE SUNDAY TIMES



MAY 15 1995
BURNELLE

SQUIRRELS

FROM PAGE F1

unwilling human hosts — is the animals' facility at raiding bird feeders. "While humans take away" certain things from squirrels in diminishing habitat, Hyman noted, "they also give."

Squirrels have an uncanny ability to feed from "squirrel-proof" bird feeders. Squirrels acquire their skills from functioning in a three-dimensional habitat. "Gray squirrels spend their lives trying to find food in trees, on the ground, beneath the soil, inside of containers — wherever there's the possibility of a meal."

He said that homeowners must realize that the squirrel's mental ability differs from many other animals in that three-dimensional aspect. "It's common to find a dog with its chain wrapped around a post, or a cat stuck in a tree, unable to find a way down. That would never happen to a squirrel" because of its increased facility at negotiating depth and space relationships.

"They are bright," Hyman said with some admiration for the squirrels. "They must solve problems to get to a food source."

SQUIRREL PROOFING

The upshot of all of this is that a squirrel will figure out a way to get to most sources of food — even in bird feeders of intricate design. Hyman said a "squirrel-proof" bird feeder is possible. "It requires a large domed metal overhang so they can't get a grip on it," he advised.

Hyman also downplayed a fear that many in the public have about transmission of diseases like rabies from squirrels. He said the fear is not entirely unfounded but that the risk is minimal. "The gray squirrel is not a major carrier of rabies," he said. "Raccoons and even pets are far more likely to carry rabies than are squirrels."

At Wilkes University, associate professor of biology Michael Steele, Ph.D., also has a professional fascination with squirrels. He recently published in the magazine "Natural History," an article coauthored with Peter Smallwood on the relationship between squirrels and acorns. It is the same basic material that he will cover in a lecture before the Lackawanna Audubon Society, today at 2:40 p.m. at the Arthraete Museum, adjacent to McBride Park in

Taylor. To study one aspect of the relationship, Steele said he now has about 6,000 acorns buried in his garden. He will determine, for example, how and when they germinate and use that as one factor in the study of squirrel feeding.

PROPAGATING FORESTS

He sees the squirrel and a necessity in helping to propagate the area's forests because oaks are one of the staples of those woodlands and squirrels are, he thinks, among the chief dispersers of the acorns from which oak trees grow.

It's strange that matters of such importance rely in good part on the eccentricities of a seed-thieving, scampering, elusive rodent that can drive every one nuts while it goes after some nuts of its own.

72 1/8/95

The Times Leader

s/2-4B

■ Military/5B

■ Forum/9B

REGION

Section B
Sunday, January 8, 1995



TIMES LEADER PHOTOS/DON CAREY

“

*The decisions the squirrels make
have a dramatic effect on the
dispersal of seeds.*

”



Dr. Michael Steele
Assistant professor of biology
at Wilkes University

Students study fate of acorns

■ **Wilkes University**
group demonstrates oak
tree propagation
through squirrel ritual.

By CECE TODD

Times Leader Staff Writer

DORRANCE TWP. — In the snow-covered woods of Dorrance Township, Wilkes University students and staff study a furry landscaper: the squirrel.

Using metal detectors, the students trudge over 50 acres searching for thousands of acorns they tagged weeks ago with small pieces of metal — acorns that now are being discovered by squirrels.

"These animals are a lot smarter than we thought," says Greg Turner, a lab research technician at Wilkes and 1994 graduate. "They can tell a difference between the acorns."

Not just any rodent, the squirrel knows white acorns are perishable and eats them right away, but stores as winter food the red acorns, which lie dormant in winter and sprout in spring if they have not been eaten. The squirrels won't ingest the metal tags.

"The decisions the squirrels make have a dramatic effect on the dispersal of the seeds," says Dr. Michael Steele, assistant professor of biology.

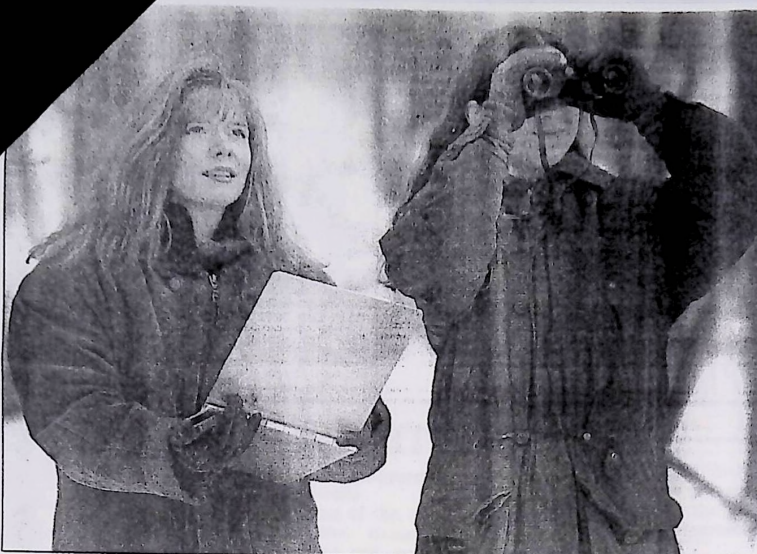
The result: This small furry rodent often is responsible for where oak trees grow.

Since 1985, Steele has been studying the relationship between squirrels and oak trees. In October, the Wilkes biologist co-authored an article, "What are Squirrels Hiding?" for *Natural History* magazine.

Based on the last four years of squirrel and acorn research, the article concluded that squirrels are vital to the regeneration of oak forests and may have been responsible for spreading the trees throughout North America after the retreat of the glaciers 10,000 years ago.

Now, with the help of a \$17,000 grant from the National Science Foundation, Steele is leading a team of Wilkes University students in further research of the tie between squirrels and

□ See SQUIRRELS, Page 7B



Kelly Cesari, left, and Lella Hadj-Chikh, both seniors at Wilkes University, scan the trees for squirrels in Dorrance Township.

Using metal detectors, Wilkes University staff and students search for acorns hidden by squirrels and measure the distances between them. Each acorn was implanted with a small metal tag last fall. From left are: senior student Igor Kleyman; research technician and 1994 Wilkes graduate Greg Turner; and senior Joe Machuzak.



R 1/8/95

Squirrels

(Continued from Page 1B)
oak trees.

One of the latest experiments involves thousands of acorns spread out across 50 acres of woods of Dorrance Township. After collecting the acorns last fall, the Wilkes students inserted a metal tag into each one.

Then they placed the seeds into grids scattered throughout the wooded area. Each grid is covered with a screen of chicken coop wire that keeps out animals such as deer and bear but leaves enough room for the squirrels to get to the acorns.

Using metal detectors, the stu-

dents return to the woods periodically to see where the squirrels have placed the acorns and the fate of the dispersed seed.

"We're examining the effects of the abundance of acorns on dispersal," Steele says.

Or, as Turner explains, "Through the project, we can see how forests develop with the help of small animals."

The experiment will conclude this spring, and should provide valuable scientific insight, Steele says. "These kinds of questions are questions that are central to many major topics of ecology."

City squirrel provides ecology lessons

BY ANNE RAVEN
The New York Times

NEW YORK — I watched a squirrel bury a chestnut the other day in a little park near my home in Brooklyn. He was holding the big nut in his long-fingered hands when he saw me out of the corner of his eye. He froze, as if considering whether or not to abandon his plan — to bury the nut, I suppose — or to ignore me and continue.

It was almost insulting how this city squirrel, far tamer than the ones I'd grown up with, apparently decided I was of no consequence and got on with the job (which was nice for me because I'd never seen this before in my life).

The squirrel set his nut aside and began to dig — not more than five feet from my shoes. He dug a hole so deep his little arms soon disappeared, and then his head (it was a large nut, after all, that he was about to bury).

Then he quickly straightened up, grabbed the nut, and began scooping the soft soil back into the hole with the care of a master gardener. When the hole was filled, he patted down the soil down, and then proceeded to pound it with his arms like a miniature jackhammer. (He must have been trained in the old rose-planting method, in which you really stomp on the soil.) Then he scooped some leaves over the spot and was off.

I was suddenly full of questions: Would he remember where the nut was? Or would he just get lucky and find it? Or would some other squirrel find this nut and this squirrel would find that squirrel's

nut and so on. Or would most of the squirrels forget most of their nuts and thus, as all those acorns sprouted into tiny oaks, contribute to the reforestation of Brooklyn?

And what if we got another 53 inches of snow this winter? And a hard crust of ice to boot? What would the squirrels do then? And are the old-timers right — does a bumper crop of acorns and a lot of squirrels scurrying about to bury them mean that a hard winter is on its way?

I scurried back to the office and started calling around for a squirrel expert. I struck gold at the biology department at Bryn Mawr College in Pennsylvania.

Peter Smallwood, who started studying squirrels about 10 years ago as an undergraduate at Ohio State University (he wanted to study whales, but there weren't very many in Columbus), said there was no correlation between bumper crops of nuts and hard winters.

Trees and shrubs produce nuts and berries on a cyclical basis. Period. And squirrels are busy when there are a lot of nuts around. It's like those people who can't sit still if there are peaches to be canned; it's in their genes.

Smallwood proceeded to highlight some of the experiments that he and Michael Steele, a biologist at Wilkes University in Wilkes-Barre, Pa., wrote about in an article called, "What Are Squirrels Hiding?" in the December issue of Natural History magazine.

Scientists have long thought that gray squirrels, which are far more common to the Eastern seaboard

than their red cousins, can not only remember where they dug the holes, but also smell the nuts they have buried. (But they must not be too good at either skill, since studies show they fail to recover about 74 percent of the nuts they bury.) Their failure is actually a gain for trees: squirrels are the inadvertent heroes in forest restoration.

They are also highly discriminating when it comes to deciding which nuts to eat immediately and which to store.

A gray squirrel is far more likely to bury a red-oak acorn, which is rich in fat and sprouts in the spring, than a white oak, which has less fat and tends to germinate soon after it hits the ground in the fall.

In more than 1,200 feeding trials set up by Smallwood and his colleagues, gray squirrels buried more than 60 percent of the red-oak acorns they came upon; while they ate 85 percent of the white-oak acorns found.

"If a squirrel finds a white-oak acorn that's sprouted, it will bite off the unpalatable tap root, spit that out and eat what is left," Smallwood said. "But a lot of what

is useful has disappeared. So gray squirrels tend to eat the white-oak acorns immediately, before they germinate."

It's simply evolution in action. "I'm not implying that squirrels are consciously thinking," he said. "But the ones that get into that habit had a lot more to eat, so they survived."

The red-oak acorn, which is high in tannin, isn't as tasty as the white-oak acorn. Scientists think that the bitter-tasting chemical protects the seed inside the acorn by discouraging grazing and repelling insects — another reason why the red acorn is a better candidate for underground storage.

Smallwood has seen squirrels carry a few acorns to their nests of leaves built high in the trees — or into cavities in tree trunks — but they don't seem to put in a large supply.

"If we get a cold day, they stay in their nests," he said. "If we get two bad days in a row, they might stay in both days. But by the third day, even if the weather's worse, they're back out. They're clearly hungry."

See **SQUIRRELS**, Page C12

GORDON N. MITCHELL

SALES
942-1000
RENTALS
968-4545



at
**HERB HOLLAND
COMPANY**
608 Airport Road

MLS

YOU CAN'T TELL A BOOK BY ITS COVER

Yes, it is an old expression, and like many proverbs, it is still true, and to paraphrase, **YOU CAN'T TELL A LOT JUST BY RIDING BY.** The larger the parcel of land the more likely this is to be true.

INTOWN, in Estes Hills, this lot lies tucked away at the sound end of Halifax. Continue across Granville, down what appears to be a gravel drive. This is a dedicated R/W, as is the green grassy area beyond the gravel. This lot lies on the left with the "right" front corner under the large white pine. There is a beautiful flat home site at the top of the hill. \$55,000.

From little acorns, **BIG** mysteries grow

EDITOR'S NOTE: Michael A. Steele is an associate professor of biology at Wilkes University.

Walking through the woods one day, a friend and I observed thousands of half-eaten acorns under several red oak trees. We wondered why so many seeds were uneaten.

We also discovered that only the top halves of the acorns were eaten. Most of the seeds were being eaten by eastern gray squirrels, birds such as blue jays and grackles, and even small mice. And all of the animals ate only the top halves of the acorns!

My friend and I proposed several explanations for this mystery.

First, we predicted that the shell of the acorn might be easier to open and that the bottom was just too tough to eat. To test this, we fed squirrels acorns with the shell and acorns without the shell. In both cases, they ate only the top halves. It seems we did not find what we expected: Squirrels probably did not avoid the bottom half of an acorn because it is too tough.

Second, we predicted that the top of the acorn might taste better than the bottom. To test this, we used chemical tests to find out if plant defense chemicals called tannins were in the top or bottom halves of the acorns. Animals often avoid tannin because it interferes with digestion and may taste bitter. We were excited to find much higher tannin levels in the bottoms of acorns.

But we still didn't prove that tannin was the reason squirrels avoided eating the bottom halves of acorns. To test this, we made fake acorns by grinding up the soft parts of acorns and adding tannins in different amounts. Then we made small balls of this acorn dough. We let the squirrels decide which balls of dough to eat. We found that those acorns with the highest tannin concentrations were only partially eaten by the squirrels.

Third, another friend suggested to us that for

squirrels, the shape of the acorn might determine why they begin to eat at the top half. To test this, we shelled acorns and carved them with a knife so the top of the acorn looked like the bottom and the bottom looked like the top. We discovered we could trick the squirrels. The squirrels flipped the carved acorns and ate from the true bottom (the carved top end)!

After these tests, we believe that squirrels eat the top halves of acorns because there are fewer tannins there, and that squirrels are able to tell the top half from the bottom half by the shape of the acorn.

Can oaks grow from half-eaten acorns? I am always amazed how one mystery can lead to so many others. Does it matter which half of an acorn a squirrel eats? The bottom

half holds the embryo, which later will grow into a tree. The top half holds the cotyledon (seed leaves) and some endosperm, which provides energy for the developing tree embryo.

Because the animals eat only the top half of the acorn and leave the embryo untouched, we thought that these half-eaten acorns might still be able to sprout into young trees. When we planted half-eaten seeds and whole seeds, we found that about 36 percent of the half-eaten seeds germinated.

Whole seeds germinated only 27 percent of the time. Even though the top half of the seed was eaten, the embryo still can develop into an oak tree.

The mystery of the half-eaten acorn is only one

The Mystery of the Half-Eaten Acorn

Reprinted with permission from
NSTA Publications, April 1996,
from Dragondoff, National Science
Teachers Association, 1840
Wilson Blvd., Arlington, VA
22201-3000.



TIMES LEADER PHOTOS/DON CARBY

■ SEE ACORNS PAGE 22



Michael Steele, associate professor of biology at Wilkes University, recently wrote about squirrels for *Gonty* magazine.

Wilkes prof shares wonder of squirrels

By MARY THERESA RIBEL
Times Leader Staff Writer

If you see a gray squirrel with a black rump scampering around Kirby Park, rest assured it is not a mutant.

As part of a biology experiment, Wilkes University associate professor Michael A. Steele has painted 65 of the furry rodents with a non-toxic hair dye.

That makes it easier for him to study the animals as they go about their business of eating and burying acorns.

Through research, Steele has learned that squirrels tend to eat the tops of acorns and leave the bottoms. New trees can

begin to grow from the embryos in the acorn bottoms just as easily as they grow from intact acorns.

The professor has written ten articles about his research for some grown-up publications — the *National History* magazine (October 1994) and the *Canadian* magazine *Wildflower* (March 1998).

More recently, he wrote about the squirrels and nuts for the premiere issue of "Dragonfly," a magazine for young investigators.

Chock full of pictures and easy-to-understand text, the new magazine is geared for students in third to sixth grade. It will be published every two months, and will feature articles written by scien-

tists and students.

The debut issue focuses on trees.

Dinosaurs are the theme of the November/December issue, followed by ice and snow in January/February. The March/April issue will be about all kinds of communication, from computers to animal sounds, and May/June's "Webs of Life" issue will be devoted to different kinds of habitats.

"It's always something new," says managing editor Monica Zerry.

Earlier this week, Zerry said the magazine was almost called "New!" in honor of the tiny salamander, but the creative staff voted down that name in favor of "Dragonfly."

Steele — a father of three children ages 3 to 15 — thinks the magazine is a good way for young people to become interested in the world around them.

"It's great," he said. "They're trying to get real science — the act of discovery — into the classroom."

In addition to the information about half-eaten nuts, Steele has discovered that tree squirrels tend to eat white oak acorns right away or to cache them close to the tree where they found them.

They're more likely to cache — or bury — red oak acorns that are not as perishable, and they spread

■ See SQUIRRELS, Page 9C

Squirrels

(Continued from Page 1C)

them farther away from the parent tree.

Sometimes, a squirrel will dig three holes and cover them again without putting an acorn inside. Then he'll dig a fourth hole and slip a nut inside.

The scientist calls this "deceptive caching," because the squirrels are trying to trick other animals who might want to steal their food.

T. 9/2/96

All this squirrel activity influences how a forest grows.

Dragonfly is a joint project of Miami University of Ohio and the National Science Teachers Association. Individual subscriptions are available for \$12.95. Teacher subscriptions for \$18.95 include a "Teacher's Companion." A discount is available for classroom groups of 20 or more.

Call 1-800-722-NSTA for information.

Acorns

(Continued from Page 1C)

piece of a very large puzzle that I have been investigating with my friend Peter Smallwood.

We found that squirrels treat different types of acorns in very different ways and that these responses help determine where oak trees grow. For example, white oak acorns are often eaten

immediately, while red oak acorns are often buried to eat later. These buried acorns are sometimes forgotten by the squirrels, and, after a long winter, the seeds germinate into new red oaks.

So, what squirrels eat and what they bury may affect which types of trees grow in a forest. We are now beginning to test these new ideas.

WALNUT CREEK, CA
SUNDAY 107,221
DEC 6 1998



BURRELLE'S

7280
..2wub

FB
XX....

Researchers examine squirrels' choosy habits

By Conrad Grove

KNIGHT RIDDER NEWSPAPERS

WILKES-BARRE, Pa. — It didn't take long for these brazen beggars to target Michael Steele as an easy mark — his pockets were bulging as he made his way straight toward the home turf of this pack of city park squirrels.

Steele, an associate professor of biology at Wilkes University, was carrying acorns, and he paused occasionally to examine the ones that had already fallen from a stand of the two major groups of oaks, white and red.

Curiously, only the top half of many acorns had been munched.

Steele did not disappoint the gathering throng. He lobbed acorn after acorn to specific squirrels, and each greedily inspected its booty.

This was far from a controlled experiment, but if these Eastern gray squirrels behaved as they should, they would most likely immediately wolf down the acorns from white oaks and stash the acorns from the reds.

The fact that squirrels bury a portion of their cache, of course, is nothing new.

Henry David Thoreau, for example, in a work written 125 years ago but published only in 1993, praised the "vast work" of these seed plunderers, noting, "It is not in vain that a squirrel lives in almost every forest tree or hollow log or wall or heap of stones."

But only in recent years have scientists questioned why squirrels cache only certain acorns of the 32 species of oaks across eastern North America.

And Steele, 38, and colleague Peter Smallwood, 37, an associate professor of biology at the University of Richmond, are in the forefront of studies that could have a significant effect on oak forest regeneration.

Both researchers note that squirrels — creatures with bean-sized brains that nonetheless manage to thwart the best efforts of backyard bird feeders across the nation — are

often less than model citizens.

"But for a scientist, they're great models for behavioral and ecological research," Steele said.

And more often than not, squirrels are extremely selective about which acorns they hoard.

In perhaps 2,000 feeding trials during the past 15 years in several Eastern states, Steele and Smallwood, with the help of undergraduates, have found that about 85 percent of acorns from species of white oaks are eaten shortly after discovery, while about 60 percent of the acorns of red oaks are stored.

Red oak acorns are substantially higher in both fats and tannins, the bitter-tasting compounds used to tan hides.

Red oak acorns sprout in the spring; white oak acorns begin to germinate almost immediately after falling to the ground in the autumn.

The researchers also found that in those red oak acorns that were eaten, frequently only the top half — the end farthest from the embryo — was consumed.

Because the embryos were not destroyed, such acorns from red oaks germinated about as often as undamaged specimens.

The results indicate that squirrels, by avoiding the noxious tannins contained in the bottom half of the red oak acorn, are able to capitalize on the higher fat content contained in the top half during the winter, when energy demands are at a premium.

The squirrels also dispersed the acorns of red oaks — which require more sunlight than white oaks — over a much greater territory.

"Knowing where a squirrel may put an acorn can help tell us what to do to enhance conditions for natural regeneration," said John Bearer, a forest regeneration specialist for the Pennsylvania Bureau of Forestry.

"Obviously, a squirrel can't remember every place it puts an acorn, and if we keep enough big, dead trees on the ground for the squirrels to hide acorns from predators, we can encourage sprouting."

Plymouth Kiwanians hear talk about values of adult education

C.V. 6-21-97

The values inherent in adult education and the growing numbers of adults returning to higher education were presented in a talk given members of the Plymouth Kiwanis Club at their recent meeting at the Happy Pizza, West Main Street. Angelo F. Grasso, club president, presided.

Introduced by Vice President Lee Klemash, the guest speaker, Becky Steinberger, West Pittston, representing Wilkes University, declared it didn't matter which level of education adults took to increase their knowledge of jobs or for personal enhancement.

Twenty-five percent of employers will pay an employee's tuition in cases where they seek to improve their job skills, said Steinberger, who also is associated with the University of Scranton and is pursuing a doctorate.

Ms. Steinberger revealed that the typical adult student is a white female who works full-time with an average age of 33, that primary reasons for adults returning to college is to advance their careers, that one-third of all undergraduates take night classes, that 70 percent of adult learners are actual degree seekers, that engineering and psychology are the most popular majors for adults returning back to school, and that 50 percent of adult students study at a community college.

At conclusion of her address, Ms. Steinberger was presented with a Certificate of Appreciation and a Shawnee Indian head statuette for her appearance before the club by President Grasso.

June birthdays of Kiwanians Helen Grasso and Charles Hagen were acknowledged with song by club members.

■ WILKES-BARRE

Wilkes professor honored
with Fulbright Fellowship

Michael A. Steele, a Wilkes University associate professor of biology, has been awarded a Fulbright Fellowship to lecture and conduct



Michael Steele

research in Mexico during the 1997-98 academic year.

The Washington, D.C.-based International Exchange of Scholars selected Steele based on his research record, teaching history and a detailed research proposal. The nine-month award will provide a salary, relocation allowance and living expenses for Steele, who will be accompanied by his wife, Margaret, and three children.

Wilkes University has provided a sabbatical leave for the year.

Steele's research, conducted with Wilkes students and colleagues from three other universities, focuses on the

behavior of squirrels and food-hoarding animals, the decisions they make when storing acorns and the effects of their behavior on the regeneration of oak forests.

In Mexico, Steele will collaborate with faculty and students from the National Herbarium in Puebla and the Centro de Ecología in Mexico City.

Wilkes Professor Awarded Fulbright to Mexico

Dr. Michael A. Steele, Associate Professor of Biology, Wilkes University, was recently awarded a Fulbright Fellowship from the United States Council for International Exchange of Scholars in Washington, D. C. to lecture and conduct research in Mexico over the next academic year. The nine-month award, based on Steele's previous research record, several teaching awards, and a detailed research proposal, will provide him with a salary, living expenses, and relocation allowance. He will be accompanied by his wife Margaret, and three children, Michael, Tyler, and Emily. Wilkes University has provided a sabbatical leave for the year.

Since 1947, the Senior Scholar component of the Fulbright Program has offered faculty, professionals, and independent scholars opportunities for teaching and research abroad. The primary goals of the Fulbright Scholar Program are to promote academic and professional development and to allow exchange between American professionals and those of other countries.

In Mexico, Steele will collaborate with faculty and undergraduate and graduate students from the National Herbarium in Puebla and the Centro de Ecología at UNAM in Mexico City. Steele's current research, conducted with students at Wilkes University and colleagues from Rutgers, University of Pennsylvania, and UCAL, Berkeley focuses on the behavior of food-hoarding animals, the specific decisions animals make when storing acorns and the effects of such decisions on dispersal and regeneration of oaks. Steele says "the award is an excellent opportunity to extend his current research to an environment where an understanding of the mechanisms of forest regeneration are critical for countering the effects of deforestation." He and his family are also excited about sharing in the experience of living in and learning about Mexican culture.

While quality teaching is our primary mission at Wilkes University, we also pride ourselves in having faculty that are highly professionally active. In general the public, students, and even school officials themselves sometimes underestimate the importance of research and other scholarly activities of faculty at smaller Universities like Wilkes. For several reasons, though, the level of scholarly activity by the faculty should be a primary consideration when choosing a small University. When faculty are professionally active they are often better teachers, more in touch with their field of expertise, and better able to maintain a curriculum that is current. A professionally active faculty also means that students have greater access to hands-on experiences, more meaningful exposure to their intended professions, and, often, an opportunity to network with professionals in their field. When faculty are encouraged and rewarded for scholarly work, it shows, not only in the the quality of their own work, but in the quality of the students they educate. And, when students attend a college where faculty are professionally active, they are consistently better prepared for the future.

site Leila Hadj-Chikh

STANDARD-SPEAKER

HAZLETON, PA
DAILY & SUNDAY 24,000

TUESDAY
MAR 11 1997

BURRELLE'S

184
...ed.

EH
.....

Wyoming Valley Audubon Society to meet in Dallas

The Greater Wyoming Valley Audubon Society will meet at 7:30 p.m. Monday at the Dallas United Methodist Church.

Professor Michael Steele of Wilkes University's biology department will discuss the lives of gray and red squirrels and their role in regenerating oak forests.

Steele has been conducting research on squirrels and their interaction with the forest environment.

The public, including non-members, is invited.

SUNDAY DISPATCH

PITTSBURGH, PA
SUNDAY 12,500

MAR 9 1997

BURRELLE'S

449
...n...

ZF
.....

Audubon Society To Meet March 17

The Greater Wyoming Valley Audubon Society will meet Monday, March 17, at 7:30 p.m. at Dallas United Methodist Church. Dr. Michael Steele, Dept. of Biology, Wilkes University, will speak on squirrels and how they plant our oak forests, based on his on-going research on squirrels and their interaction with the environment.

The public is invited.

The Greater Wyoming Valley Audubon Society draws members throughout Luzerne and Wyoming Counties.

DEC 28 1996

BURELLES
3870
1000
2A
1000

Pa. Wild Resource Conservation Fund Supports 1996-1997 Projects

HARRISBURG (Harris Co.) — The Wild Resource Conservation Board recently met for its annual meeting and approved funding for 56 projects in the amount of \$707,081.

A total of 84 applications were received requesting \$1,308,853.31 in funding. The money allocated was received from taxpayers donating their tax refunds to the Wild Resource Conservation Fund and wildlife license plate sales.

The following projects were approved for support to protect and help manage the commonwealth's non-game and wild plant species.

- Ecology & Distribution of Endangered Sedge, *Scirpus ancistrochaetus*; Penn State — Dr. William Dunston, \$7,464.

- Production of Outreach Tools; Rodale Institute — Cyane Gresham, \$9,950.

- Herbarium & Field Studies of PA Plants of Special Concern; Carnegie Museum — Sue Thompson, \$17,310.

- Development of Educational Materials of PA Native Wild Plants; Carnegie Museum — Sue Thompson, \$23,000.

- Field, Herbarium & Literature Surveys, Work on the Field Manual of Pa. Plants and Environmental Review; Morris Arboretum — Ann Rhoads, \$35,000.

- Herbarium Studies of Plant Species of Concern in Eastern Pa.; The Nature Conservancy — John Kunsman, \$20,000.

- Investigation into the historic

and extant distribution of *Amei-lancher canadensis*; Carnegie Mellon — W. Ann Robinson, \$928.

- Field Studies of PA Plants of Special Concern; Shippensburg Univ. — Larry Kloze, \$4,500.

- Field Surveys for *Aster radula*, *Solidago speciosa* and other rare *Aster* and *Solidago* species; Dickinson College — Carol Loeffler, \$1,044.

- Rare Plant and Natural Community Inventories of Northwestern Pa.; Cleveland Museum of Natural History — Kathy Fouts, \$15,000.

- An allozymal study laurentian bladder fern from Centre Co., PA; Millersville Univ. — James C. Parks, \$350.

- Public Wild Plant Sanctuary Network; Western PA Conservancy, \$4,000.

- Continuation of Field Surveys of Plants of Special Concern; Western PA Conservancy, \$22,385.

- Herpetological Educational Curriculum; Carnegie Museum of Natural History/Powdermill Nature Reserve — Terri Kromel, \$6,100.

- Writing of Publication of the Freshwater Bivalves of PA; Arthur Bogan, \$15,000.

- Status survey of Rare Fishes of Special Concern in the Delaware River Drainage of PA; Robert Criswell, \$1,595.

- Aquatic crinellids of PA: A preliminary checklist & database development; Carnegie Museum/Academy of Natural Science —

Chen W. Young/Jon Gelhaus, \$17,050.

- Status of Indigenous Lamproyeas in PA; Penn State — Jay Stauffer, \$40,705.

- Conservation and management of fish, herpetiles and aquatic species special projects; PA Fish & Boat Commission/The Nature Conservancy — Andy Shiels, \$40,000.

- PA Herpetological Atlas Project; Indiana Univ. — Arthur E. Hulse, \$13,000.

- In Situ Video of PA's Fresh Water Fish Fauna; Penn State — Jay Stauffer, \$17,607.

- GIS Mapping of Trichoptera (caddisfly) and Plecoptera (stonefly) distribution in PA; Behrend College — B C Maseller, \$5,670.

- Application of Geographical Information System Technology to Fish Conservation in PA; Penn State — Robert Carline, \$24,723.

- Wild Action Grant PA Game Commission — Theresa Alberici, \$2,500.

- Status and Distribution Study of the Yellow-Bellied Flycatcher; Ecology III — Douglas Gross, \$4,000.

- Monitor Populations of Louisiana Waterthrush in acidified and unpolluted stream habitats; Carnegie Museum of Natural History/Powdermill Nature Reserve — Robert S. Mulvihill, \$9,000.

- Protection of significant bat maternal site and restoration of adjacent farm fields; Allegheny National Forest — Brad Nelson, \$10,000.

- Small mammal community structure and dynamics in old growth forests: A long term ecological study; Shippensburg University — Dr. Gordon Kirkland, \$7,000.

- Endangered Mammal Species Research and Management; The Nature Conservancy — Jim Hart, \$20,000.

- Survey of bats at Canoe Creek State Park with Special Emphasis on the "Little Brown Bat"; Penn State — Dr. Michael Gannon, \$4,500.

- Northern flying squirrels and northern water thrushes as indicators of habitat quality in sensitive ecosystems of northeast PA; Wilkes Univ. — Michael Steele, \$8,300.

- Long-term ecological research: Small mammals as indicators of the health of PA Forest Ecosystems; Powdermill Environmental Station — Dr. Joseph Merritt, \$7,000.

- Maintenance of the Official List of the Birds of PA; PA Ornithological Records Committee — Paul Schwalbe, \$1,500.

- Young Ornithologists — research that educates; Academy of Natural Sciences — Dr. Robert Ridgely/Sally Conyne, \$10,000.

- An adopt-a-forest-nestbox of PA school children; Hawk Mtn — Keith Bildstein, Bill Hilton, \$14,000.

- Preparation and Curation of special concern mammals and bird

specimens generated by PA Game Commission & Wild Resource Conservation Fund research; Shippensburg Univ. — Dr. Gordon Kirkland, \$2,000.

- Stabilization of bat nursery church; Canoe Creek State Park — Terry Wente, \$4,000.

- Wildlife Biodiversity associated with a new forestry practice in PA; Penn State — Richard Yahner, \$19,000.

- Radiotelemetry study of experimental recolonization of an allegheny woodrat; Dickson College — Janet Wright, \$3,500.

- Biodiversity Conservation of Butterflies & Skippers in PA; Richard Yahner, \$5,000.

- Avian nesting success, species, diversity, and guild composition in fenced and unfenced riparian habitats in southwest PA; California Univ. — Gary Popotnik, \$8,000.

- Status and Distribution of Reintroduced River Otter and Fisher Populations in PA; Penn State — Tom Serfass, \$13,000.

- Reintroduction of Fishers to the Allegheny National Forest in Northwestern PA; Penn State — Tom Serfass, \$20,000.

- PA Important Bird Areas; Mid-Atlantic Region National Audubon Society — Walter Pomeroy, \$19,000.

- Landscaping for Wildlife in PA; Sweet Arrow Communications — Marcus Schneck,

(Turn to Page A21) A

1996-1997 Projects

D

(Continued from Page A20)

\$19,000.

- Osprey Monitoring; East Stroudsburg University — Larry Rymon, \$3,500.

- Birds: Special Areas Project; Ecology III, — Doug Gross, \$9,000.

- Promote Awareness of Wild Resource Conservation Fund; Robert & Thelma Clark, \$15,000.

- Public Relations Tool: New York & Pennsylvania Joint Otter Reintroduction in Allegheny Drainage; Penn State — Tom Serfass, \$10,000. The WRCF will match local contributions up to \$10,000. Private Sector donations from Scrubgrass Generating Plant, \$5,000. Ducks Unlimited, \$850. Audubon Bartramian Chapter, \$800.

- Interpretative Exhibit at the Elk Viewing Area; PA Game Commission — Theresa Alberici,

\$4,000.

- Schoolyard Habitat Facilitator Training Workshops; Audubon Council of PA — Marci Mowery, \$12,500.

- Biodiversity in PA: A curriculum supplement for PA Middle Schools; PA Biological Survey — Theresa Alberici, \$12,500.

- Completion & Implementation of a Comprehensive Wildlife Management Plan; PA Fish & Boat Commission — Brian Barber, \$12,500.

- Wild Resource Elementary Workshop; Slippery Rock — Paulette Johnson, \$4,000.

- Natural Community (Habitat) Classification for Caves in PA; The Nature Conservancy — Barbara Barton-Aldrich, \$8,000.

- Barrens Habitat Survey — PA Invertebrate Inventory Project; Carnegie Museum of Natural History — John Rawlins, \$25,000.

MONDAY
FEB 13 1995BURRELLE'S
184.00
EG

Owl plates help fund 57 wildlife projects

Those owl license plates now seen on many cars in Pennsylvania are starting to help wildlife.

The Pennsylvania Wildlife Resource Conservation Fund, which receives money from the sale of the special tags, recently awarded a record amount of funding to 57 wildlife projects across the state.

The Conservation Fund board in November approved \$685,740 in funding to protect and manage the commonwealth's non-game and wild plant species. The money came from donation check-offs on state income tax forms, and from license plate sales.

The funding amount, which will finance research and education projects, far surpasses the previous record of \$450,956 spent in 1987, and more than doubles the \$300,000 or so in funding approved in 1993.

The reason for last year's whopping increase is the money generated from the sale of license plates, which first became available in November 1993. Since then more than 150,000 plates — featuring a saw-whet owl perched on a hemlock, the state tree — have been sold, raising more than \$2.2 million for the fund.

But Wildlife Resource Conservation Fund officials expect license plate sales to decline over time, so a lot of the money raised will be invested to make sure a higher level of funding can be maintained over many years.

Already, the fund has more proposals than it can pay for. The Conservation Fund board received 75 application requesting \$1.7 million in project funding.

The projects that did get money range from the somewhat glamorous, such as a two-year pilot project to identify important bird areas in the state that will be a model for the rest of the country, to the esoteric, like a study to determine the range of the West Virginia water shrew.

The important bird areas project, to be conducted by the National Audubon Society's Mid-Atlantic Region, received \$30,000, and the water shrew study, which will be done by Jim Kennedy, got \$6,500.

Other projects have local ties.

Plates available for motor homes

Owners of motor homes and trailers can now "Do Something Wild" and show their support for the state's wild plants and animals through the purchase of a Conserve Wild Resources license plate.

Legislation approved late last year and signed by former Gov. Robert Casey expanded the popular license plate program to vehicles left out of the original bill.

Previously, only owners of cars or trucks weighing less than 9,000 pounds could buy the special plates, which directly benefit the work of the Wild Resource Conservation Fund. The plate is known for its little owl, the tiny saw-whet species which is the Conservation Fund's logo.

The Wild Resource Conservation Fund gets no money from the state's General Fund. Its programs are supported by voluntary tax check-offs, license plate sales and direct donations.

Since its creation in 1983, the fund has supported the reintroduction of osprey to Pennsylvania, the return of river otters to many state rivers, and a host of other projects including a major effort to inventory all of the state's native plants.

License plate applications are available at Pennsylvania Department of Transportation offices, PennDOT photo ID centers, state liquor stores, state police stations, state parks, and from the Wild Resource Conservation Fund.

The plates cost \$35, of which the fund receives \$15 and the state Motor License Fund gets \$20. The \$35 is in addition to the regular vehicle registration cost.

The plates may be purchased at any time of the year. If purchased at a time when registration is not up for renewal, PennDOT will provide new stickers for the rest of the registration year.

To get an application through the mail, send name and address to Wild Resources Conservation Fund, Box 8764, Harrisburg, Pa. 17105.

tists, Penn State, \$20,722.

■ The impact of white-tailed deer herbivory on aquatic and terrestrial plant communities in northeastern Pennsylvania, Daniel Townsend at the University of Scranton, \$3,477.

■ Survey and conservation of botanical species of concern in eastern and central Pennsylvania, Anthony Wilkinson of The Nature Conservancy, \$40,000.

■ Neversink Mountain plant habitat protection program, Joseph Hoffman of Berks County Conservancy, \$2,500.

■ Native plant program botanical assistant for the Department of Environmental Resources Bureau of Forestry, \$35,000.

■ Natural community classification for the state, Western Pa. Conservancy, \$42,000.

■ Pennsylvania lichens database, Academy of Natural Science, \$5,000.

■ Mosses of eastern Pa., Academy of Natural Science, \$5,000.

■ Continuation of hepatics checklist, Academy of Natural Science, \$4,585.

■ Documentation of fungi collection at Academy of Natural Science, \$5,000.

■ Ecology and distribution of the endangered sedge, *Scirpus Anistrochaetus*, Kendra Lentz at Penn State, \$7,514.

■ Field survey of selected plant species, William Olson, \$5,000.

■ Native plant habitat development manual, Audubon Council of Pa., \$6,000.

■ Teaching families and educators the necessity of preserving natural balances, Margaret Wisner, \$3,000.

■ Effects of openings in the contiguous forest on abundance and reproduction success of forest-interior birds, Hawk Mountain Sanctuary, Penn State and the Game Commission, \$12,000.

■ Bat Booster program, Hope Anwyll, \$4,000.

■ Effect of habitat structure on long-term occupancy and reproduction success of ovenbirds, Catherine Viverette at Hawk Mountain, \$7,500.

■ Radiotelemetry study of movements and resource use by Allegheny wood rats, Jane Wright at Dickinson College and John

Douglas Gross of Ecology III near Berwick received two grants — \$5,000 for his continuing study of the status and distribution of the yellow-bellied flycatcher (a forest-dwelling bird), and \$15,000 to further coordinate Pennsylvania's Special Areas Project.

East Stroudsburg University also got two grants — \$6,000 for Larry Rymon's highly-successful osprey reintroduction project, and \$3,000 for Terry Master's study of habitat use and population status of the Louisiana waterthrush (also a bird) in the Delaware Water Gap National Recreation Area.

Also, Michael Steele of Wilkes University received a \$13,000 grant to study northern flying squirrels and northern water shrews.

Here is a complete list of projects that the Wild Resource Conservation Fund is financing:

- Amphibian and reptile inventory of French Creek State Park, Donald McKinstry at Behrend College, \$7,552.

- Genetic comparison on timber rattlesnakes using DNA fingerprinting, Laurette Bushar at Beaver College, \$8,500.

- Determination of the distribution and status of the hellbender, a giant salamander, in the Susquehanna drainage, Arthur C. Hulse at Indiana University, \$2,752.

- Stoneflies of Pennsylvania, Edwin Masteller and Jane Earle at Behrend College, \$10,434.

- Freshwater molluscan research in the Susquehanna River Basin, Arthur Bogan, \$15,596.

- Biodiversity of mayflies in the state, Greg Hoover of Penn State University, \$9,782.

- The loss of fish biodiversity due to stream acidification, Bob Carline and William Sharpe at Penn State, \$9,091.

- Pennsylvania Insects book, Alfred Wheeler of the state

Department of Agriculture, \$3,000.

- Status of indigenous lampreys of Pennsylvania, Jay Stauffer at Penn State, \$21,106.

- Aquatic crane flies of the state, preliminary checklist, Jon Gelhaus of the Academy of Natural Science and Chen Young of the Carnegie Museum of Natural Science, \$13,203.

- Distribution of freshwater jellyfish in the state, Terry Peard of Indiana University, \$5,069.

- A fisheries biologist for the Pennsylvania Fish and Boat Commission, \$40,000.

- A wildlife biologist, special concern mammal program assistant for the Game Commission's Bureau of Wildlife Management, \$40,000.

- Herbarium studies of state plants of special concern, Carnegie Museum, \$10,475.

- Botanical surveys for Pennsylvania Natural Diversity Inventory listed species, Paul Wiegman of the Western Pennsylvania Conservancy, \$40,000.

- Field inventory of plant species and work to establish botanical field keys, Morris Arboretum, \$20,000.

- Plants of special concern survey in northwestern Pennsylvania wetlands, Cleveland Museum of Natural History, \$10,000.

- Database of fungi and liverworts formerly in the Herbarium of Carnegie Museum, Carnegie Museum, \$1,775.

- Presque Isle State Park exotic plant species control, Cleveland Museum of Natural History, \$5,000.

- A preliminary checklist of fungi using records from the Penn State Mycological Herbarium, Protist and Fungi Technical Committee of the Pennsylvania Biological Survey, \$17,607.

- Checklist of state algal pro-

Hall at Albright College, \$4,500.

- Abundance and nest success of songbirds in simple and complex edge habitats, Duane Diefenbach of the Game Commission, \$6,500.

- A program to train health workers, firefighters, police officers and other public officials how to handle wildlife complaints, and provide technical training to others with wildlife backgrounds, Margaret Brittingham at Penn State, \$25,000.

- Landscaping for backyard wildlife program to establish a demonstration backyard wildlife habitat next to the visitors' center at the Middle Creek Wildlife Management Area in Lancaster County, K.F. Kauffman Design, \$1,500.

- Inventory of mammalian species on state forest land, Merlin Benner of the DER's Bureau of Forestry, \$2,500.

- Backyard/wildlife habitat in Pa., Marcus Schneek, \$10,000.

- Species composition and relative abundance of small mammals in Eastern old-growth forests, Charles P. Schaadt at Penn State, \$7,000.

- Pa. Wild Resources workshop for elementary teachers, Paulette Johnson at Slippery Rock University, \$5,000.

- Pa. BayScapes wildlife habitat demonstration, Scott Steffey of the Alliance for the Chesapeake, \$9,000.

- "To be a Raptor" display at Hawk Mountain, \$3,500.

- Maintenance of the official list of the birds of Pa., Pennsylvania Ornithological Records Committee, \$2,000.

- Biodiversity and conservation of butterflies and skippers in Pa., Richard Yahner at Penn State, \$7,500.

- Biological control of purple loosestrife, a non-native plant that's degrading wetland habitats and threatening native species, Landstudies Inc., \$24,000.

SATURDAY
OCT 30 1993

585
Dec.

BURRELLE'S

2F
U

BUCKNELL UNIVERSITY

Film, "Ashes and Diamonds,"
4 and 8 p.m. Monday, Nov. 1,
Coleman 101-B. P225FF

Forum, "Dance Improvisa-
tion: Modern-Day Source of Rit-
ual and Community," Shellie
Cash-Muller, assistant profes-
sor of dance, noon Tuesday, Nov.
2, Walls Lounge, Langone
Center.

Lecture, "Human Rights and
the Role of the Health Profes-
sional in Investigating War
Crimes: Focus on the Former
Yugoslavia," Kari Hannibal, 7
p.m. Tuesday, Nov. 2, Langone
Center Forum. Hosted by the
Premedical Society and Student
Lectureship Committee.

Gallery series, "Made in
America," Essential Music/New
York City, 8 p.m. Tuesday, Nov.
2, Center Gallery, Langone
Center.

Film, "Rate It X," noon and
7:30 p.m. Thursday, Nov. 4, Gal-
lery Theatre, Langone Center.

Concert, Cap and Dagger The-
atre and Bucknell Dance Com-
pany, 5 p.m. Thursday, Nov. 4,
Tustin Dance Studio.

Forum, "The Real New World
Order," Richard Falk, Princeton
University, author of "Dealign-
ment: A New Foreign Policy Per-
spective," 8 p.m. Thursday, Nov.
4, Forum, Langone Center.

Seminar, "The Effects of
Small Mammals on the Dispersal
of Oaks," Michael Steele,
Wilkes University, 4 p.m. Fri-
day, Nov. 5, Rooke Chemistry
Auditorium.

Film, "The Day the Earth
Stood Still," 4:30 and 8 p.m. Fri-
day, Nov. 5, Vaughan Literature
Auditorium.

Opera performance, Bucknell
Opera Company, directed by
Catherine Payn, 8:30 p.m. Sat-
urday, Nov. 6, Bucknell Hall.)

■ Biology lecture

The biology department of King's College, in association with the college's biology club, will host a lecture by Dr. Michael Steele, assistant professor of biology at Wilkes University, on Thursday, Dec. 2, at 7 p.m. in the Burke Auditorium of The William G. McGowan School of Business, corner of N. River and Union Streets.

Dr. Steele, a member of Wilkes faculty since 1989, will discuss "The Effects of Small Mammals on Dispersal and Distribution of Oaks." The event is open to the public free of charge.

Dr. Steele specializes in plant/animal interactions and small mammal communities. He has directed numerous research projects.

An author of numerous papers and abstracts, Dr. Steele's research interests include behavioral population and community ecology of vertebrates, foraging behavior, plant-herbivore interactions and seed predation and dispersal.

Dr. Steele received the Carpenter Outstanding Teacher Award at Wilkes for the 1991-92 academic year. TL 11-28-93

Biology professor to lecture Dec. 2 at King's

■ Topic will be the effects of mammals on dispersal and distribution of oaks.

The biology department at King's College, in association with the college's Biology Club, will host a lecture by Dr. Michael Steele, assistant professor of biology at Wilkes University, on Thursday, Dec. 2, at 7 p.m. in the Burke Auditorium of the William G. McGowan School of Business, corner of North River and Union Streets.

Dr. Steele, a member of the Wilkes faculty since 1989, will discuss, "The Effects of Small Mammals on Dispersal and Distribution of Oaks." The event is open to the public free of charge.

Dr. Steele specializes in plant/animal interactions and small mammal communities. He has directed numerous research projects on the physical and chemical adaptations of acorns for dispersal by seed predators, the effects of

morphology, and the biogeography of small mammals on islands in the Susquehanna River.

z Author of numerous papers and abstracts, Dr. Steele's research interests include behavioral population and community ecology of vertebrates, foraging behavior, plant-herbivore interactions and seed predation and dispersal.

Active in local conservation efforts, Dr. Steele is also a member of several professional societies including the Ecological Society of America, the American Society of Zoologists, Sigma Xi Honor Society, and the International Society for the Study of Ecology.

Dr. Steele received the Carpenter Outstanding Teacher Award at Wilkes for the 1991-1992 academic year.

The Lancaster native earned a Ph.D. in biology from Wake Forest University and a B.S. in biology from Millersville University.

CV 11-27-93

Wilkes University News

Stephanie S. Geyer
Assistant Director of University Relations
Wilkes-Barre, Pennsylvania 18766
(717) 831-4772

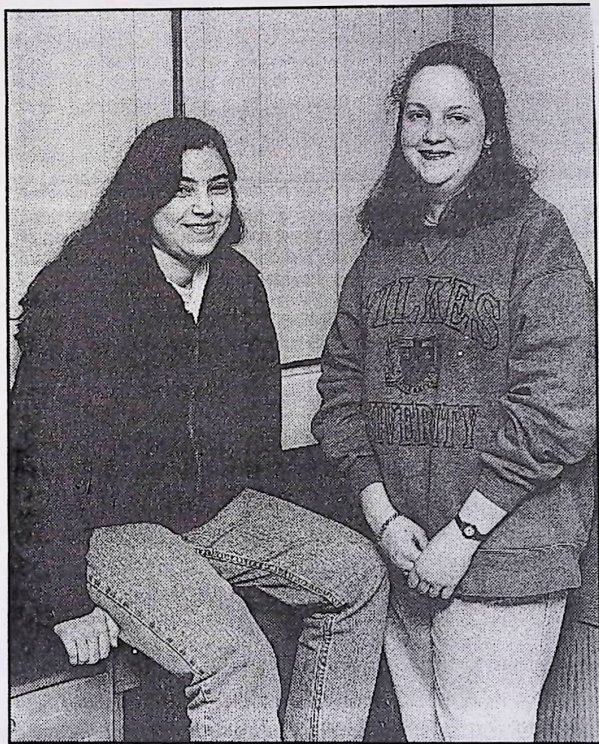
Wilkes University Student AIDS Awareness Committee Makes Donation to Local Agencies

WILKES-BARRE -- The Wilkes University Student AIDS Awareness Committee recently donated \$1,000 to the Wyoming Valley AIDS Council and the Wyoming Valley Alcohol and Drug Services. The donations were from proceeds raised during last year's World AIDS Week at Wilkes University.

The Project Names AIDS Memorial Quilt and guest speaker Jeanie White were the highlights of the Student AIDS Committee's week-long observance of World AIDS Week. The committee is already planning this year's program which will take place in December.

PHOTO: First row: Lynn Scanlon, case manager, Wyoming Valley AIDS Council; Alfie Chewning, education manager, Wyoming Valley AIDS Council; Carmen Ambrosino, chief executive officer, Wyoming Valley Alcohol & Drug Services Inc.; Sabeth Ryan, vice president, Student AIDS Awareness Committee; Kristy Hallam, president, Student AIDS Awareness Committee.

Second row: Debra Zehner, co-chairperson, Wilkes AIDS Awareness Committee; Stefanie Wolgwnik, prevention education supervisor, Wyoming Valley Alcohol & Drug Services Inc.; Anne Heineman Batory, fundraising coordinator, Wilkes AIDS Awareness Committee; Mike Steele, co-chairperson, Wilkes AIDS Awareness Committee.



WILKES BIOLOGY STUDENTS AWARDED RESEARCH GRANTS

— Two undergraduate Wilkes University biology students were recently awarded grants from Sigma Xi, the National Research Society for Scientists, to support their research projects at the University. Sigma Xi primarily funds research by graduate and highly advanced undergraduate students. They are shown from right to left: Christie Meyers, of Kingston, and Leila Hadj-Chikh of Campbell, N.Y. Both students are junior honor students who plan to pursue doctoral research in the Biological Sciences and Ecology after graduation from Wilkes University in 1995. Hadj-Chikh and Meyers will present their research at state and national meetings later this year.

TL 4-17-94

FEB 17 1994

BURRELLE'S

'Black bears' open Pymatuning programs

By ED CARLSON
Outdoor Writer

THE PYMATUNING Visitors Center begins its new season at 2 p.m. Sunday, March 20, with "Black Bears of Pennsylvania." World renowned black bear biologist Dr. Gary Alt will present an informative program on the commonwealth's black bear. By use of slides collected over years of field study, Alt will share the story and the secrets of the black bear.

The presentation is updated regularly with new findings. Don't miss this unique introduction to the black bear as only Alt can give.

Alt also will be in the Mercer County area on June 19 as the kick-off speaker for Mercer County's Junior Conservation Camp. The public will be invited.

Also at the Visitors Center:

■ At 2 p.m. April 16, the topic will be the eastern bluebird. Jack Farster, Wildlife Conservation Officer for the Pennsylvania Game Commission, will present an informative program. Topics covered will be building bluebird boxes, attracting bluebirds to your backyard, and maintaining bluebird trails.

■ From 9 a.m. to 4 p.m. April 21, a Project Wild workshop will be offered. Project Wild is a hands-on approach to teaching environmental issues to students from kindergarten through 12th grade. This workshop will be held for teachers and youth leaders interested in wildlife education. Pre-registration is needed by April 18. Call (814) 683-5545.

■ At 2 p.m. April 24, a special wild turkey program is on tap. Put Thompson and Rick Bailey, members of the Allegheny Sultans Chapter of the Pennsylvania Wild Turkey Federation, will share their secrets of calling and bagging the elusive wild turkey. Thompson will show you why he is one of the best turkey callers in the region.

The Pymatuning Visitor's Center is 2 1/2 miles south of Linville on the Hartstown-Linville Road. For more information, call (814) 683-5545.

□□□

■ The Northeast Ohio Gun Owners Rights Seminar is set for March 5-6 at the Vienna Fish & Game Club, State Route 183, Vienna, Ohio. The theme is "America in Peril!"

Topics on the agenda include: The Second Amendment; Who Controls the Children; The Hidden Agenda; America in Peril; Man the Phone Tree; Clobster-proof Congress in '94; Stop the Indefinite; and round-table discussions.

Cost including lunch both days is \$30 by pre-registering through Feb.



Hemlock Trails

26 or \$40 after Feb. 27. This includes all hand out materials.

For more information, write to: All Outdoors, 1404 Warren Road, Newton Falls, Ohio, 44444-9751, or call (216) 872-0674; or write to Herbert Campbell, 2097 Prichard Ohl-town Road, Warren, Ohio 44481, or call (216) 824-3187.

■ The state senate has confirmed the nomination of Robert Gullford for Game Commissioner, ending a long delay in filling the position, according to Sen. Bob Robbins.

Robbins, who supported the nomination, said several important safety and conservation issues have not been addressed because the position has not been filled.

"The last Game Commission meeting was canceled and critical issues were tabled due to a lack of a quorum because one commissioner had to be hospitalized," Robbins said. "I am very pleased that Mr. Gullford is finally on board and the sportsmen's agenda can move ahead."

The Pennsylvania Game Commission is made up of eight commissioners, each of whom serves an eight-year term. Commission members are responsible for the scientific management of all the state's wildlife.

■ If you want to outfit your buddies, learn the secrets of the Mepps pros by sending for your free 1994 Mepps Fishing Guide.

Forty-eight colorful pages are packed with useful how-to information, including tricks of the trade from some of the finest outdoor writers in the world. Learn new tactics for trout, bass, walleye, panfish, northern pike, musky, and salmon, plus see the entire lineup of more than 4,500 Mepps spinners and spoons.

Mepps lures have caught more winners in the Sports Afield and Field & Stream fishing competitions than any other lure.

There's a limited supply of free guides. Write: Mepps, Dept. FC94, 826 Center Street, Antigo, WI 54409-2406.

■ The Northwest Pennsylvania Chapter of Pheasants Forever is holding its second annual banquet at the Franklin Club, downtown Franklin, on Saturday. Cocktails begin at 6 p.m. and dinner at 7.

Aside from minimal administrative expenses, profits from this

year's event are earmarked to be spent in the immediate area. Most of this year's profits are for the purchase of warm season grass seed to be planted in wildlife habitat projects.

Tickets are available at Venango Rod and Gun, Maurer's Trading Post, or at the door of the Franklin Club.

■ With the tax-filing period in full swing, did you ever wonder how the monies that you check off for the "Do Something Wild, Wild Resource Conservation Fund" is spent?

Fifty-five applications permitted 38 projects to be funded from the 1992 funds received. Here is a sampling of the approved projects:

\$10,000, surveys of Pennsylvania northwestern wetlands, Cleveland Museum of Natural History, Kathy Fouts; \$3,000, rare plant monitoring and management plan for state game lands 197, Clarion University; \$8,400, impact of whitetail deer herbivory on aquatic and terrestrial plant communities in northeastern Pennsylvania, University of Scranton, Daniel Townsend.

Also, \$40,000, natural community classification ecologist, Western Pennsylvania Conservancy, Paul Wiegman; \$27,028, loss of fish biodiversity due to stream acidification, Penn State, Robert Carling and William Sharpe; \$3,000, Pennsylvania insects book, Alfred Wheeler, Dept. of Agriculture; \$4,500, Endangered and Threatened Species of Pennsylvania booklet.

Also, \$11,500, pilot survey of land use types, right-of-ways and edges in Pennsylvania using a geographical information system, Penn State, Richard Yahner; \$5,800, communities of nesting birds of islands in the Susquehanna River, Wilkes University, Michael Steele; \$6,500, river otter reintroduction, Penn State, Rob Brooks and Tom Serfass.

Also, \$4,000, abundance and nest success of songbirds in simple and complex edge habitats, Pennsylvania Game Commission, Duane Diefenbach; \$1,200, landscaping for backyard wildlife, K. F. Kauffman Design; \$8,000, wetlands awareness workshops and wetlands indicator bird species volunteer monitoring, National Audubon, Walt Pomeroy.

Also, \$3,500, To Be a Raptor display at Hawk Mountain; \$17,000, full-time mammalogist for Pennsylvania Game Commission, Shippensburg University, Gordon Kirkland; \$800, The Bally Twin Outdoor Adventures update, Wendy Plowman; \$12,000, outdoor coloring/activity book for lower elementary level, Sal and Bernie Pitera.

JUL 7, 1993

DALLAS POST
DALLAS, PA

PM - 4.310

Wilkes biology students awarded research grants

225 PF
Two Wilkes University biology students were recently awarded research grants from Sigma Xi, the National Research Society for Scientists, to support their research projects at the University.

Christine Geist of Wilkes-Barre is conducting research on the effects of small mammals on the dispersal of acorns at several field sites located in Dorrance and Moon Lake Park.

Joyce Hazeltine of Dallas, a graduate student in Biology Education, has worked for two years on the storing behavior of gray squirrels in Kirby Park. Her study is designed to examine the animal's behavior responses to various acorn and oak characteristics and the resulting influence of such decisions on the dispersal of the seeds.

Both studies attempt to demonstrate how animals help forest trees to colonize new areas. The students' research advisor, Dr. Michael Steele said, "With the loss of many oak trees in Eastern United States to the Gypsy Moth outbreak, the research projects that Joyce and Christine have conducted will have valuable



JOYCE HAZELTINE

implications for the study of oak regeneration."

Geist and Hazeltine have presented their research at state and national science conferences. They are currently preparing their study results for publication.

Wilkes University News

Stephanie Simmons
Assistant Director of University Relations
Wilkes-Barre, Pennsylvania 18766
(717) 831-4772

WILKES BIOLOGY STUDENTS AWARDED RESEARCH GRANTS

EDITORS: NOTE CONNECTION TO YOUR COVERAGE AREA.

WILKES-BARRE--Two Wilkes University biology students were recently awarded research grants from Sigma Xi, the National Research Society for Scientists, to support their research projects at the University.

Christine Geist of Wilkes-Barre is conducting research on the effects of small mammals on the dispersal of acorns at several field sites located in Dorrance and Moon Lake Park.

Joyce Hazeltine of Dallas, a graduate student in Biology Education, has worked for two years on the storing behavior of gray squirrels in Kirby Park. Her study is designed to examine the animal's behavioral responses to various acorn and oak characteristics, and the resulting influence of such decisions on the dispersal of the seeds.

Both studies attempt to demonstrate how animals help forest trees to colonize new areas. The students' research advisor, Dr. Michael Steele said, "With the loss of many oak trees in Eastern United States to the Gypsy Moth outbreak, the research projects that Joyce and Christine have conducted will have valuable implications for the study of oak regeneration."

Geist and Hazeltine have presented their research at state and national science

MORE

1ST ADD WILKES BIOLOGY STUDENTS AWARDED RESEARCH GRANTS

conferences. They are currently preparing their study results for publication.

PHOTO ID: From left: Wilkes University Biology Education graduate student, Joyce Hazletine of Dallas; Dr. Michael Steele, assistant professor of biology at Wilkes University; and Christine Geist, an undergraduate biology student at Wilkes University, are shown.

-30-

061493

Wilkes University News

Stephanie Simmons
Assistant Director of University Relations
Wilkes-Barre, Pennsylvania 18766
(717) 831-4772

WILKES STUDENT BEGINS COLLEGE AND RESEARCH CAREER EARLY

WILKES-BARRE-- Most 17 year-olds usually attend high school, go to proms, and make plans to go to college. Not this Wilkes University sophomore. Leila Hadj-Chikh, a biology major, is planning formal presentations of research projects she has worked on with one of her professors.

Leila was 16 when she graduated from Campell Central High School in New York. She admits being a little nervous about starting her college career early, but it didn't take her long to become involved in research at Wilkes University in Wilkes-Barre, PA.

Since last spring, Leila has been involved with research on gray squirrels with Dr. Michael Steele, an assistant professor of biology, and graduate student, Joyce Hazletine. Dr. Steele describes the on-going project "as graduate-level research that will result in publication in a scientific journal."

In their initial research, the authors concluded that squirrels can tell if acorns are infested with weevils, which make the acorns more perishable. Leila will eventually be involved in formal presentations at state and national conferences to explain the research and funding.

MORE

1ST ADD WILKES STUDENT BEGINS COLLEGE EARLY

"One of the reasons I'm glad I came to Wilkes is because I got the opportunity to do research," said Leila, a Trustee Scholar. Another reason she selected the small liberal arts university in northeastern Pennsylvania was because both of her parents are Wilkes graduates.

Leila has many plans for the future. She has been awarded a full-time summer residence position with the Savannah River Ecology Laboratories of the University of Georgia. She will study the population genetics of fish in Aiken, South Carolina from June through August. In the fall of 1993, she plans to be a teacher's assistant for the population and evolutionary biology class which is taught by Dr. Steele.

She is also thinking about graduate school, and hopes to attend Duke, Cornell or Princeton to work toward a doctorate and eventually become a zoologist or a research scientist in evolutionary ecology. As far back as she can remember, Leila says, "This is what I've wanted to do." For Leila, working with animals and the environment has become second nature. "It's just like being born with brown hair, it wasn't even a choice for me," she said.

Leila is also a photographer for the university's yearbook, The Amnicola, and a member of the women's varsity soccer team.

She is the daughter of Sharon and Tedj Hadj-Chikh of Campell, N.Y.

-30-

040793

PHOTO: Leila Hadj-Chikh, a sophomore biology student at Wilkes University is shown with her professor, Dr. Michael Steele, working on their research project.

Note: This story was written by communications student, Julie DePue, a junior at Wilkes University.



Pennsylvania Environmental Council

School of Science & Engineering Wilkes University Wilkes-Barre, PA 18766
717/824. 4651 x2761 FAX 717/829. 2434

Hetty E. Baiz, Director
Northeast Pennsylvania Office

PRESS RELEASE

Contact: Hetty Baiz
Annette Schultz
831-4997

RE: Northeast Environmental Roundtable - Luncheon Speaker series
WHEN: Monday, May 17, 12 Noon to 1:15 PM
WHERE: Ramada Inn, Wilkes-Barre
TOPIC: "Islands in the Clouds" (Imperiled small mammals of the Appalachians)
SPEAKER: Dr. Michael A. Steele, Assistant Professor of biology, Wilkes University

Northeast Environmental Roundtable

The Pennsylvania Environmental Council invites the public to join its newly forming "Northeast Environmental Roundtable", a series of Lunch / Speaker programs featuring timely environmental topics. "Joining the Environmental Roundtable will provide members of the public with an opportunity to stay abreast of important issues, network with others in the Northeast who are also interested in the environment, and enjoy a monthly educational and social outing", said Hetty Baiz, director of the PEC's Northeast Office. The first program will be held on Monday May 17 at the Ramada Inn in Wilkes-Barre from 12 noon to 1:15 P.M. The PEC will provide speakers free of charge. A lunch will be provided at \$6.00 per person (tax and tip included) and will include chef's choice of sandwich or salad, cup of soup and beverage. Reservations are required by Wednesday, May 12. Call the Council at 831-4997.

Luncheon Speaker

On Monday, May 17, the first lunch program, Dr. Mike Steele of Wilkes University will give a slide talk entitled, "Islands in the Clouds". His presentation focuses on how human activity and the forest landscape are affecting communities of rare, threatened, and endangered small mammals in the Appalachian Mountains, from Northeastern Pennsylvania to the Carolinas.

Background

A member of the Wilkes faculty since 1989, Steele specializes in plant/animal interactions and small mammal communities. Most recently, Steele was appointed to the staff of the Carnegie Museum of Natural History in Pittsburgh. He is also organizing an international colloquium on the biology of the tree squirrels to be held there in the spring of 1994.

"Research programs are an important part of my teaching activities," commented Steele. "The search for solutions to the environmental problems we face today can begin by instilling the importance of basic research skills in our students. My contribution to science lies not only in research, but in the development of new scientists."

Dr. Steele, an assistant professor of biology at Wilkes University, was the recipient of the Carpenter Outstanding Teacher Award for the 1991-92 academic year. The award is given annually to a member of the Wilkes faculty chosen by a faculty committee. He also delivered the Wilkes University commencement address in January 1993.

The Pennsylvania Environmental Council is a non-profit, statewide organization dedicated to the preservation and enhancement of Pennsylvania's environment through education, advocacy, and action. The Northeast Office is housed at Wilkes University.



Pennsylvania Environmental Council

School of Science & Engineering Wilkes University Wilkes-Barre, PA 18766
717/824. 4651 x2761. FAX 717/829. 2434

Hetty E. Baiz, Director
Northeast Pennsylvania Office

PRESS RELEASE

Contact: Hetty Baiz
Annette Schultz
831-4997

RE: Northeast Environmental Roundtable - Luncheon Speaker series
WHEN: Monday, May 17, 12 Noon to 1:15 PM
WHERE: Ramada Inn, Wilkes-Barre
TOPIC: "Islands in the Clouds" (Imperiled small mammals of the Appalachians)
SPEAKER: Dr. Michael A. Steele, Assistant Professor of biology, Wilkes University

Northeast Environmental Roundtable

The Pennsylvania Environmental Council invites the public to join its newly forming "Northeast Environmental Roundtable", a series of Lunch / Speaker programs featuring timely environmental topics. "Joining the Environmental Roundtable will provide members of the public with an opportunity to stay abreast of important issues, network with others in the Northeast who are also interested in the environment, and enjoy a monthly educational and social outing", said Hetty Baiz, director of the PEC's Northeast Office. The first program will be held on Monday May 17 at the Ramada Inn in Wilkes-Barre from 12 noon to 1:15 P.M. The PEC will provide speakers free of charge. A lunch will be provided at \$6.00 per person (tax and tip included) and will include chefs choice of sandwich or salad, cup of soup and beverage. Reservations are required by Wednesday, May 12. Call the Council at 831-4997.

Luncheon Speaker

On Monday, May 17, the first lunch program, Dr. Mike Steele of Wilkes University will give a slide talk entitled, "Islands in the Clouds". His presentation focuses on how human activity and the forest landscape are affecting communities of rare, threatened, and endangered small mammals in the Appalachian Mountains, from Northeastern Pennsylvania to the Carolinas.

Background

A member of the Wilkes faculty since 1989, Steele specializes in plant/animal interactions and small mammal communities. Most recently, Steele was appointed to the staff of the Carnegie Museum of Natural History in Pittsburgh. He is also organizing an international colloquium on the biology of the tree squirrels to be held there in the spring of 1994.

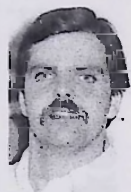
"Research programs are an important part of my teaching activities," commented Steele. "The search for solutions to the environmental problems we face today can begin by instilling the importance of basic research skills in our students. My contribution to science lies not only in research, but in the development of new scientists."

Dr. Steele, an assistant professor of biology at Wilkes University, was the recipient of the Carpenter Outstanding Teacher Award for the 1991-92 academic year. The award is given annually to a member of the Wilkes faculty chosen by a faculty committee. He also delivered the Wilkes University commencement address in January 1993.

The Pennsylvania Environmental Council is a non-profit, statewide organization dedicated to the preservation and enhancement of Pennsylvania's environment through education, advocacy, and action. The Northeast Office is housed at Wilkes University.

Wilkes will confer degrees; Steele will give address

Dr. J. Michael Lennon, acting president of Wilkes University, announced that Dr. Michael A. Steele, of Wilkes-Barre, will deliver the commencement address during ceremonies Thursday, Jan. 28, at 11:15 a.m. in the Arnaud C. Marts Sports and Conference Center.



Steele

More than 100 degrees will be conferred to university graduate and undergraduate students. The university will also present an honorary doctorate of human letters to R. Gerald Elias, administrative director of the Wilkes-Barre Area Vocational Technical School.

Steele, an assistant professor of

biology at Wilkes University, was the recipient of the Carpenter Outstanding Teacher Award for the 1991-92 academic year. The award is given annually to a member of the Wilkes faculty chosen by a faculty committee.

A native of Lancaster, he holds a Ph.D. in biology from Wake Forest University in Winston-Salem, N.C., and is also a magna cum laude graduate of Millersville University with a bachelor of science degree in biology.

He and his wife, Margaret Ann, have three children: Michael Jr., Tyler and Emily.

The degree total includes 116 bachelor's and 35 master's degrees.

The graduates:

Jeffrey Aikens, Sayre, Fine Arts; Allen D. Andes, Shavertown, Business Administration; Maria Antonishak, Wilkes-Barre, BA, English; Mary Jo Babiowski, Turnersville, NJ, BS, Business Administration; David W. Bailey, Dover, NJ, BS, Computer

Science; Nancy N. Baird, Dallas, Master of Science, Education; Andrew R. Banks, Dillsburg, Psychology; David Mark Baron, Plymouth, Master of Business Administration; Angela Lucia Basta, Pittston, Business Administration; Jill M. Berretta, Exeter, Master of Business Administration.

Michael T. Bevilacqua, Wilkes-Barre, Master of Business Administration; James A. Booth, Factoryville, Master of Science, Education; Donald J. Bordick, Plains, Bach. of Business Administration; Eric C. Borykus, West Pittston, BS, Business Administration; Cynthia L. Brandt, Vancouver, WA, BA, Art; Melissa D. Brill, Sweet Valley, Master of Business Administration; Donna J. Brown, Wilkes-Barre, BA, Psychology.

Joseph N. Bruno, III, Pringle, BS, Accounting; Michelle Brunk, Edwardsville, BA, Psychology; Anthony M. Caladis, Mountaintop, BS, Business Administration; Robert A. Casterline, Nanticoke, BS, Business Administration; Robert J. Cauley, Hazleton, Master of Business Administration; David A. Charney, Pittston, BS, Materials Engineering; David M. Chipli, Hazleton, Master of Business Administration; Jean Marie B. Chorus, Archbald, Master of Business Administration.

Karen Chura, West Hazleton, Business Administration; Michele A. Clavarella-Shaver, Wilkes-Barre, Master of Business Administration; James L. Clark, Plymouth, BA, Communications; Jonathan M. Clark, Danville, Master of Science, Education; William R. Colson, Tunkhannock, BA, History; Joelle Collins, Wilkes-Barre, BA, Sociology; Regina M. Costanzo, Throop, BA, Psychology; Joseph Adam Cochran, Scranton, BS, Accounting; Cathy Lee Culp, White Haven, BA, Psychology; Elizabeth A. Curran, Leavenworth, KS, BS, Business Administration.

Todd Edward DeRosa, Kingston, Master of Business Administration; Lisa Deaner, Gettysburg, Master of Science, Education; James John Delmonte, Pittston,

Master of Business Administration; Albert Desimone, Cedar Knolls, NJ, BA, Economics; Cristino G. DiSalvo, Williamsport, BS, Biology; Gary L. Dieter, Philadelphia, BS, Electrical Engineering; Christine Dowd, Sparta, NJ, BS, Business Administration; Christine M. Drach, Wyoming, BA, Communications; Lisa M. Duncan, Mountaintop, BA, Sociology; Holly K. Evans, Remsenburg, NY, BA, Communications.

Barbara S. Evans, Nesquehoning, Master of Science, Education; Leili Fan, Wilkes-Barre, BS, Computer Info. Systems; Amy E. Farro Portsville, BS, Engineering Management; Robert A. Feinberg, Wilkes-Barre, BA, Political Science and BS, Business Administration; Lois Strobel Flester, Berwick, Master of Science, Education; John Fletcher IV, Plainsboro, NJ, Master of Business Administration; Gerald A. Galinus, Haddonfield, NJ, Bachelor of Science; Robyn A. Gail, Budd Lake, NJ, BA, Psychology; Todd A. Garrett, McSherrystown, BS, Electrical Engineering.

Pamela Gasse, Butler, NJ, BS, Business Administration; Lisa Kristin Giovannini, Plains, Master of Science, Education; Lee Ann M. Grimes, Old Forge, BS, Business Administration; Anthony Guidi, Jr., Budd Lake, NJ, BS, Business Administration; Cindy Haefele, Wilkes-Barre, Bach. of Business Administration and BA, Economics; Russell E. Hock, Bangor, Master of Business Administration; Jerome R. Hoffman, Dover, NJ, BA, Communications.

Christine R. Hooper, Wilkes-Barre, BS, Business Administration; Keith R. Hostrander, Mountaintop, BS, Computer Info Systems; Jody A. Hummel, Luzerne, BS, Electrical Engineering; Barbara E. Jamell-Setchik, Hazleton, Master of Science, Education.

Jo Ann E. Jones, Mountaintop, BA, English; Julie Ann Jurchak, Harding, Master of Business Administration; Christopher Kaercher, Phoenixville, BS, Earth & Envir. Science; Holly L. Kaminski, Nanticoke, Fine Arts; John James Keeler, Scranton, BS, Business Administration; Margaret E. Keli, Dallas, BS, Business Administration; Peter J. Kelley, Jackson, NJ, BS, Computer Info. Systems; Nancy R. Kettell, Clarks Summit, BA, Psychology; Mark Allan Keyes, Falls, BA, Psychology; Richard K. Kim, Wilkes-Barre, BA, Psychology; Kathleen S. Klapatch, Saylorsburg, Master of Science, Education.

Elizabeth A. Krlzer, Tunkhannock, Master of Business Administration; Rosemary J. Kramer, Pine

Grove, BS, Accounting; Evan J. Kranson, Kingston, BA, Communications; Sandra Kudraka, West Pittston, BA, Psychology; Bruce G. Lambert, Mountaintop, BS, Business Administration; Joseph J. Leandri, Wyoming, Master of Business Administration; Patricia A. Lenahan, Shavertown, BA, Elementary Education; Leanne T. Leslie, Dunmore, BA, Sociology; Lei-Hai L. Liao, Ithaca, NY, Master of Business Administration; Christopher Lohr, Greentown, BS, Electrical Engineering.

Gina M. Lupini, Jessup, Music; Thomas D. MacDonald, Scranton, Business Administration; Betty A. Madura, Dupont, Master of Business Administration; Kelly M. Maheady, Larksville, BS, Medical Technology; Marlene M. Marrigoli, Pittston, Master of Business Administration; Mark Mason, Kingston, BS, Business Administration; Sharon M. Mastri, Lake Ariel, BS, Nursing; James H. McGeever, Mountaintop, BA, English; Thomas McGuire, Pittston, Bach. of Business Administration; Kim Lee Meltzer, Emmaus, Master of Business Administration; John D. Mendola, Wilkes-Barre, BA, Communications; Christina V. Metta, Nan-

(See WILKES, page 37)

Wilkes

from page 6

ticke, BA, Communications; Mary Ann Milo, Clarks Summit, BS, Business Administration.

Tsukasa Mizuguchi, Mile, Japan, Music; Stephen M. Moloney, Norristown, BS, Business Administration; Thomas J. Mooney, Perth Amboy, NJ, BS, Business Administration; Joseph B. Moskowitz, Scranton, BA, History; Michael D. Naholnik, Waymart, BS, Business Administration; Lavern F. Nau, Jersey Shore, BS, Accounting; Andrea Nicoletti, Laffin, BA, Mathematics; Gerald F. O'Donnell, Jr., Kingston, BS, Computer Info. Systems; Sally Panzeri, Trescow, BS, Accounting; Patricia A. Pandya, Wilkes Barre, BS, Business Administration; Chris Todd Peeler, Trucksville, Bach. of Music; Christine Pochis, Kingston, BS, Business Administration; Deborah Pryor, Clarks Summit, BA, Psychology; Karen M. Prysiak, Great Meadows, NJ, BA, Communications.

Vito S. Quaglia, Ashley, BA, English and BA, History; Carolyn L. Quigley, Wilkes-Barre, Bach. of Business Administration; Jennifer A. Risch, Pittston, BA, Psychology; Heather L. Rogers, Dallas, Bach. of Business Administration; Elizabeth E. Rowland, Little Rock, AR, BA, History; David J. Russo, Malden, MA, BA, Communications; Edward F. Sampson, Sugarloaf, BS, Business Administration; Christopher Scalse, Dunmore, BS, Business Administration; Christopher Schuster, Wilkes Barre, Music; Michael E. Scott, Binghamton, NY, BS, Business Administration; Carl J. Seitz, Jr., Dallas, Master of Health Administration; Barbara Ann Sharp, Friendsville, BS, Business Administration; Sylvia C. Simmons, West Pittston, BS, Accounting; Louis John Singer, Swyersville, Master of Business Administration.

Jacqueline Soff, Plains, BA, Psychology and BA, Sociology; Marty Strayer, Wilkes Barre, BS, Business Administration; Colleen M. Studders, Plains, BS, Mathematics; Michael G. Sweeney, Mount Joy, Master of Science, Education; Scott Trauger, Bethlehem, BS, Engineering Management; William J. Umphred, Wilkes Barre, BS, Business Administration; John A. Ungvarsky, Wilkes-Barre, BS, Business Administration; Lenay E. VanBrunt, Wilkes Barre, BA, Art; Jennifer Watkins, Exeter, BA, Political Science; Kathleen R. Weber, Wilkes Barre, Master of Business Administration; John M. Weiss, North Haledon, NJ, BS, Business Administration; Laura A. Welkey, Bethlehem, Master of Science, Education; Ellen S. Wheeler, Scranton, BS, Accounting.

Todd E. Wiest, Herndon, BS, Physics; Ward D. Wilcox, Kingston, BS, Business Administration; Paul J. Wodarczyk, Mountaintop, Master of Electrical Engineering; Robert J. Wooditch, Larksville, BS, Business Administration; Heather Wyman, Chester, NJ, BA, Communications; Julianne R. Wysocki, Nanticoke, BS, Business Administration; Jeffrey J. Yankow, Olyphant, BA, Economics; Karen Yefko-Ryan, Forty-Fort, Master of Business Administration; Nicolette A. Yevich, Fairb, BA, Communications; Anthony V. Yu, Edwardsville, BS, Accounting and BS, Business Administration; Lisa J. Zimmerman, Pine Grove, BA, Chemistry.

1/27/93 TL
Wilkes professor to
deliver commencement

Michael A. Steele, Wilkes-Barre, will deliver the commencement address during Wilkes University's graduation ceremonies at 11:15 a.m. Thursday in the Arnaud C. Marts Sports and Conference Center.

Steele, an assistant professor of biology at Wilkes, was the recipient of the Carpenter Outstanding Teacher Award for the 1991-92 academic year. The award is given annually to a

member of the Wilkes faculty and is chosen by a faculty committee.

A faculty member since 1989, Steele has directed numerous research projects with colleagues and undergraduate students.

Contact: Pam Pochapin
Manager of Media Relations
The Carnegie Museum of Natural History
(412) 622-3328



LIBRARY OF PITTSBURGH

MUSEUM OF ART

MUSEUM OF NATURAL HISTORY

MUSIC HALL - PERFORMING ARTS

SCIENCE CENTER

NEWS THE CARNEGIE RELEASE NEWS RELEASE NEWS RELEASE NEWS

**RESEARCH ASSOCIATES APPOINTED AT
THE CARNEGIE MUSEUM OF NATURAL HISTORY**

Pittsburgh, Pennsylvania, November 16, 1992 . . . Four research associates have been appointed to The Carnegie Museum of Natural History staff announced Dr. James E. King, director of the museum. The appointments, which are awarded to scientists with distinguished backgrounds, were made in the Sections of Vertebrate and Invertebrate Paleontology, Amphibians and Reptiles, and Invertebrate Zoology, as well as at Powdermill Nature Reserve.

Appointed a research associate in the Sections of Vertebrate and Invertebrate Paleontology is geologist Dr. Harold G. Pierce. Also a research associate in the University of Nebraska State Museum's Division of Invertebrate Paleontology, Dr. Pierce publishes consistently in the Journal of Paleontology and Nautilus, and holds memberships in the Geological Society of America, Society of Economic Paleontologists and Mineralogists, The Paleontological Society and International Association of Engineering Geology. For the past five years he has assisted The Carnegie Museum of Natural History with research on Tertiary mollusks from various western Montana sites.

Dr. Mark E. Ritke is the new research associate in the Section of Amphibians and Reptiles, where for three years he has actively researched the ecology of frogs and consulted with museum staff on experimental design and statistical procedure in ecology. Currently assistant professor in the Department of Biological Sciences at Duquesne University in

(over)

Pittsburgh, Dr. Ritke has presented numerous papers at professional meetings and published articles in the Journal of Herpetology, Herpetological Review, the Canadian Journal of Zoology and American Midland Naturalist. He is a member of the Society for the Study of Amphibians and Reptiles, and The Herpetologists' League.

The newly appointed research associate in the Section of Invertebrate Zoology is Dr. Charles F. Sturm, Jr., physician and acting center medical director with HealthAmerica in Pittsburgh. An avid malacologist with particular interest in mollusks from the Late Tertiary period to more recent times, Dr. Sturm has inventoried and donated books to the Museum of Natural History's malacological library and is preparing a revision of the fossil, *Pecten*. In addition to working with the museum, he is a frequent contributor to the New York Paleontological Society Notes and is involved in The Paleontological Society, Calvert Marine Museum Fossil Club and Delaware Valley Paleontological Society.

Dr. Michael A. Steele, assistant professor of biology at Wilkes University in Wilkes-Barre, PA, has been appointed a research associate at Powdermill Nature Reserve, The Carnegie Museum of Natural History's biological field station in the Laurel Highlands. Dr. Steele's mammalogy classes visit Powdermill often and he plans to study the dynamics of the reserve's squirrel populations. He is also organizing an "International Colloquium on the Biology of Tree Squirrels" to be held at Powdermill in spring 1994. Articles by Dr. Steele have appeared in the Journal of the Pennsylvania Academy of Science, Journal of Wildlife Management, Bulletin of the Ecological Society of America and American Midland Naturalist, among others. He holds memberships in the American Society of Zoologists, American Society of Mammalogists, Pennsylvania Academy of Science, International Society of Behavioral Ecologists and Sigma Xi Honor Society.

Appointees serve as honorary members of the Museum of Natural History staff for an initial three-year term.

#

NOV 22, 1992

THE DAILY AND
SUNDAY REVIEW
TOWANDA, PA

AM - 9.195
SUN - 9.679

Wilkes University observes AIDS Day Dec. 1st

MUTUAL
PRESS CLIPPING SERVICE

NOV 22, 1992

THE SUNDAY TIMES
SCRANTON, PA

SUN - 54.000

WILKES-BARRE — Hundreds of Wilkes University students will participate in World AIDS Day on Tuesday, Dec. 1, hosted by the students and faculty of Wilkes University. There will be 21 HIV/AIDS poster sessions in the Stark Learning Center Lobby from 9 a.m. to 9 p.m. Hourly lectures and discussions, by members of the Wilkes faculty and local organizations regarding HIV

and AIDS will be held in the Stark Learning Center, room 166, from 9 a.m. to 7 p.m.

Moderated by Wilkes students, a panel discussion will feature speakers from the community and local agencies at 7 p.m. in room 101 of the Stark Learning Center. Each presentation will emphasize the impact of AIDS on the Wyoming Valley.

"Over the last several years of teaching Biology to non-science majors, it has become clear that many students know very little about the HIV virus and AIDS. By involving the students in the organization and presentations of the AIDS program, students are more apt to learn the information," explained Debra Zehner, biology instructor at Wilkes University.

Wilkes University AIDS Day is open to local high school students and the public. For more information call 831-4753.

Allied Plans a Day On AIDS Awareness

In observance of World AIDS Day Dec. 1, Allied Services will sponsor an AIDS Awareness Symposium from 1:30 to 2:30 in its Morgan Highway auditorium.

The symposium, which is free and open to the public, will discuss the need for AIDS education and will try to dispel the myth that AIDS affects only people in large metropolitan areas.

Featured speaker will be Bernard J. Healey, Ph.D., district epidemiology manager for the Pennsylvania Department of Health, Kingston. Healey supervises disease control center activities for a 10-county area of Northeastern Pennsylvania. He works directly with hospitals, phys-

icians, community agencies and other government agencies to reduce the incidence of communicable diseases throughout the region.

Healey holds a Ph.D. from the University of Pennsylvania, master's degrees in public administration and business administration from Marywood College and Wilkes University, respectively, and a bachelor's degree in economics from King's College. He is currently an adjunct faculty member with Wilkes University, King's College, College Misericordia and the University of Scranton.

For additional information on the symposium, contact Francine Agnone-Kevra, in Allied Services Corporate Education Department.

MUTUAL
PRESS CLIPPING SERVICE

NOV 24, 1992

ABINGTON JOURNAL
CLARKS SUMMIT, PA

WKLY - 3.650

AIDS symposium at Allied Dec. 1

In observance of World AIDS Day Dec. 1, Allied Services will sponsor an AIDS Awareness Symposium from 1:30-2:30 p.m. in its Morgan Highway auditorium.

The symposium, which is free and open to the public, will discuss the need for AIDS education and will help to dispel the myth that AIDS affects only people in large metropolitan areas.

Featured speaker will be Bernard J. Healey, Ph.D., district

epidemiology manager for the Pennsylvania Department of Health, Kingston. Healey supervises disease control center activities for a 10-county area of Northeastern Pennsylvania. He works directly with hospitals, physicians, community agencies and other government agencies to reduce the incidence of communicable diseases throughout the region.

He holds a Ph.D. from the University of Pennsylvania, master's

degrees in public administration and business administration from Marywood College and Wilkes University, respectively, and a bachelor's degree in economics from King's College. He is currently an adjunct faculty member with Wilkes University, King's College, College Misericordia and the University of Scranton.

For additional information on the symposium, contact Francine Agnone-Kevra, in Allied Services Corporate Education Department

Health

Wilkes University hosts first World AIDS Day

By PAT TROSKY

Citizens' Voice Staff Writer

Hundreds of people passed through the doors of the Stark Learning Center on the Wilkes University campus Tuesday to find out more about acquired immune deficiency syndrome (AIDS) as the school participated for the first time in World AIDS Day.

From 9 a.m. to 9 p.m., visitors to the campus watched videos, heard experts discuss the biological, social and economic issues related to HIV/AIDS and picked up information, as well as condoms and lubricants, that could save many lives.

With a cure for the disease 10 to 15 years away, we all have to prepare ourselves for what is going to affect us in every phase of our lives and the best way to do that is through education.

According to a survey taken by Wilkes of 423 freshmen, sophomore, junior and senior students at the university, 75-90 percent said they were sexually active. Most said they were sexually active with 2-5 partners and 50 percent said they engaged in unsafe sexual behavior.

"With a cure for the disease 10 to 15 years away, we all have to prepare ourselves for what is going to affect us in every phase of our lives and the best way to do that is through education," Dr.

Michael Steele, a biology professor at Wilkes who, along with Deb Zehner, another professor of biology, conceived the idea to host the day-long event.

"Each year we will recognize World AIDS Day but each year it will probably take a different form," Steele said.

Zehner, who was first to see how much students in her non-major biology courses wanted to know about the HIV/AIDS issue, said others in the department quickly agreed addressing AIDS from a scientific and biological angle was one way to learn biology as well as educate young people about the disease.

Pam McDonald, a drug and alcohol education specialist and Lynn Evans, a human development instructor at Lake-Lehman School District, escorted 70 students to the seminar and found no problem filling the bus with students who wanted to attend.

"We were only allowed one bus so we had to limit the number of students that could attend. The only requirement we had was that the students had their parents' permission," Evans said, noting there were no objections to the field trip and there were many students who had to be turned away from the trip because of a lack of transportation space. "There were no parental or district complaints. These students are the adults of the '90's and understanding the disease of the '90's is important," McDonald said.

The most popular display in the lobby of the Stark Learning Center was the Lesbian, Gay and Bisex-



Citizens' Voice/Lack Kelley

Education Club participates

Education Club of Wilkes University participated in Tuesday's World AIDS Day activities on campus. From the left are: Mrs. Katherine Chase, advisor of

the club; Jennifer Frohman, Missy Catanzaro, club members and Tony Reed, biology major at Wilkes.

ual Association of Wilkes University where members of the group distributed free condoms, latex gloves and lubricants along with literature.

Robert Steele, a French instructor at Wilkes and faculty advisor of the LGBA, said \$200 was spent for the 800 condoms and latex gloves to be distributed throughout the day.

The LGBA faculty advisor said it was his opinion that this was the first event of its kind for the

region. He added that it was his hope the event not only would raise the awareness of the disease but also stimulate more public discussions of the disease as one that affects everyone and not just homosexuals.

Through education and prevention, the number of AIDS cases among the homosexual population has declined, according to Zehner. The largest increase of AIDS cases is now being seen in heterosexual females and those between

the ages of 20 and 29, she added.

Dr. Christopher Breiseth, president of Wilkes, spent part of his day attending some of the seminars and commented how extensively the subject of AIDS was covered by both students and faculty.

"This is just great," he said.

The day concluded with a panel discussion on the economics, prevention, global overview and existence of the HIV disease in the Wyoming Valley.



VITAL INFORMATION — Students wander among tables piled high with informative pamphlets and condoms during an program observing World AIDS Day

at Wilkes University. The all-day event featured lectures, videos and numerous handouts. A variety of stickers and colored condoms were distributed.

TIMES LEADER PHOTOS/PETE WILCOX

Frank talk

12/7/90.

Students come to Wilkes University to get point-blank message on AIDS

By DAWN SHURMAYTIS
Times Leader Staff Writer

Students of all ages learned about a deadly disease during a day-long program at Wilkes University devoted to AIDS education.

Along with facts, hundreds of red, yellow and blue packets of condoms were distributed Tuesday during a comprehensive observation of World AIDS Day at Wilkes University.

Lots of questions were asked and plenty of answers were provided by students from numerous campus clubs who distributed handouts detailing — among other things — AIDS symptoms, testing procedures and preventative measures.

The talk was frank, the subject serious. "What do you use these for?" asked a woman who picked up a pair of latex gloves from a table staffed by members of the Lesbian, Gay and Bisexual Association.

"What kind of sex? Who uses them, the woman or her partner?"

A 28-year-old male member of the association patiently explained when the gloves should be used, and went on to discuss various kinds of condoms as well as whether the deadly disease AIDS (acquired immune deficiency syndrome) can be contracted through oral sex.

It can.

"It's a disease that's affected millions," said Biology Club member Amy Kuzmick, 19, of Shamokin.

"People get it by having sex without condoms, by using those drug needles. Hopefully, I'll never get it."

A spokeswoman with the The Wyoming Valley AIDS Council, which staffed one of a dozen tables, said there have been 46 reported cases of AIDS in Luzerne County since 1981. More than half of those afflicted — or 45 — have died.

But the actual numbers, according to Lisa Jansen-Rena, are probably much higher.

"We don't track HIV (the virus that causes AIDS), she said. "The best guess is that

Testing AIDS knowledge

The Wilkes University Core Studies 101 class conducted a confidential survey of students on the subject of AIDS and HIV. All told, 159 freshmen, 110 sophomores, 82 juniors and 67 seniors responded. Here are some of the results:

■ 15 percent still perceive AIDS as a homosexual disease.

■ 15-20 percent underestimated the number of AIDS cases reported in the U.S. in 1989. Sixty percent underestimated the number of asymptomatic cases that will be reported in the U.S. by the end of 1993.

■ 15-20 percent incorrectly believe AIDS can be contracted by donating blood.

■ 10-15 percent incorrectly believe asymptomatic carriers of HIV will not develop AIDS.

■ 50-55 percent discussed AIDS and HIV with their parents.

for every person who has full-blown AIDS there are 10 who are HIV."

Local people with the disease most likely contracted it during their college years, which is why symposiums such as the one held at the Stark Learning Center are so important, said Jensen-Rena.

"I'm really pleased with the level of knowledge already here," she said. "And if they don't understand it, they ask."

In addition to college students, the symposium attracted scores of high school students, including 70 bused in from Lake-Lehman.

Catholic School students were discouraged by the Scranton Diocese from attending the Wilkes program because of the religious conflict surrounding condom distribution.

On Tuesday the diocese issued a press release noting it has provided HIV-AIDS education seminars for parents and students since May. The next one will be Thursday at Bishop Hoban High School in Wilkes-Barre.

Lake-Lehman student Jennifer Bendik attended three of the nine lectures offered throughout the day at Wilkes, learning about the



social, physical and financial cost of AIDS.

"It totally runs you down," said Bendik, 15. "Your body wastes away to nothing and then you die."

Other students browsing a booth staffed by psychology student Kim Warren participated in a "licorice poll" to determine whether condoms or abstinence should be promoted in schools.

Each piece of licorice carried a tag that read either "A condom could save your life" or "Abstain! It could save your life."

The majority, said Warren, chose protection over abstinence.

"One student had an idea — instead of having a nurse dispense them in the schools, put condom dispensers in the bathrooms," said Warren, 20, of Alden. "Kids would be less embarrassed."

Education Club member Jenny Frohman said, "I think more should be done in schools. There's not enough parents interacting with their children. They're too afraid, or embarrassed."

While a Wilkes class survey of nearly 400 university students revealed only between 50 to 55 percent discussed AIDS with their parents, Cathy Bringenberg said her mom sat her down for a frank talk before she left for college.

"She wanted to warn me it was out there," said Bringenberg, 21, of Bethlehem. "She told me to practice safe sex. If I was going to engage in sex, she was very blunt. I learned I could talk to her about it."

Most students said they know few people who practice casual or no sex. All were aware of AIDS and had discussed it, either in school, with parents or with friends.

"I go to bars all the time," said Rich Yenchu, a 22-year-old engineering student. "But I wouldn't have sex with a stranger. It's not worth it, not worth it at all."

World AIDS Day program at Wilkes today

By PAT TROSKY

Citizens' Voice Staff Writer

AIDS. Maybe in New York. Maybe in San Francisco. Maybe somewhere else but not here.

AIDS. The numbers are frightening. Nationwide there are 242,146 confirmed cases. Statewide there are 6,797. Locally, in Luzerne County, 71.

AIDS in Luzerne County? Yep. You bet it's here.

Today has been designated World AIDS Day and in conjunction with this, Wilkes University will host a day filled with seminars and discussions on the disease and how to deal with it. The activities are free and open to the public and will include experts on the subject who will talk about prevention, discrimination, ethics, schools and AIDS/HIV education and the moral obligations in treating patients infected with the virus.

"It will be a day filled with important information on something

that will probably touch all of our lives in some way in the future," Stephanie Simmons, assistant director of university relations, said Monday.

The HIV virus which leads to AIDS is transmitted through bodily fluids but most specifically through the exchange of blood, semen and vaginal secretions. Unprotected sex and sex with multiple partners and the sharing of needles during intravenous drug use are the most common ways the disease is spread.

According to Bernard Healey, a speaker at today's seminar and epidemiologist for the state Department of Health's regional office in Kingston, a recent Centers for Disease Control survey estimates that for every one case of

AIDS that is reported there are 10 others who are considered to be HIV positive. This means that there are approximately 1.5 to 2 million people in the United States who are HIV positive and who have the potential of spreading the disease if they are practicing risky behavior.

Bringing the numbers a little closer to home, at least 700 residents of Luzerne County are now infected with the HIV virus, Healey said.

The tragedy of all these numbers, Healey said, is that the CDC states that at least 34,000 teens are now estimated to be carrying the HIV virus and the highest number of AIDS cases that have been confirmed are in the 20-29 age group.

"This means that the virus was contracted while these individuals were teens," Healey said.

There are many drugs being tested to combat AIDS but to date, there is still no cure, according to the CDC. Recent reports have in-

(See AIDS, page 16)

In brief. . .

WHAT: World AIDS Day
WHERE: Wilkes University, Stark Learning Center
WHEN: Tuesday, Dec. 1 from 9 a.m. to 9 p.m.
CALL: Department of Health at 826-2071 for free and confidential HIV/AIDS testing.

Aids

from page 5

icated a person who is HIV positive can live from three to about 13 years with the disease. Life expectancy for a child diagnosed with AIDS is less.

Although education and prevention are the keys in stopping the spread of the deadly disease, Healey said no method of education can be successful without parental involvement.

"Parents are the ones that have to lay that foundation at home. They have to be the ones who help the child build self-esteem and self-identity. Parents have to teach children how to deal with peer pressure and how not to practice risky behavior. This isn't sex education, this is life education. All of this will help the child make healthy decisions on drugs, alcohol and unsafe sex," the epidemiologist said.

Healey said the state DOH provides free testing to anyone and the testing is confidential and anonymous if requested. It is by appointment only by calling 826-2071.

Throughout today, hundreds of Wilkes University students will

participate in the World AIDS Day activities which will be hosted by the students and faculty of the university.

There will be 21 HIV/AIDS poster sessions in the Stark Learning Center lobby from 9 a.m. to 9 p.m. Hourly lectures and discussions by members of the Wilkes faculty and local organizations regarding HIV and AIDS will be held in the Stark Learning Center room 166 from 9 a.m. to 7 p.m.

Moderated by Wilkes students, a panel discussion will feature speakers from the community and local agencies at 7 p.m. in room 101 of the Stark Learning Center. Each presentation will emphasize the impact of AIDS on the Wyoming Valley.

"Over the last several years of teaching Biology to non-science majors, it has become clear that many students know very little about the HIV virus and AIDS. By involving the students in the organization and presentations of AIDS program, students are more apt to learn the information," explained Debra Zehner, biology instructor at Wilkes.

Wilkes University AIDS Day is open to local high school students and the public. For more information call 831-4753.

CV 12/1/92

Universities will focus attention on AIDS

■ *Condom issue marks differences in approach to World AIDS Day at Wilkes University and University of Scranton*

By CLARA G. HERRERA

Times Leader Staff Writer

Condoms will be handed out at Wilkes University today.

At the University of Scranton, a Roman Catholic school, they won't.

But at both schools lectures and activities will promote awareness of acquired immune deficiency syndrome on World AIDS Day.

The condom issue probably will keep Catholic school pupils from activities at the Wilkes University campus.

Scranton Diocese school administrators were discouraged from promoting the Wilkes program to their students because of the religious conflict concerning condom distribution, according to published reports of a November letter written by Monsignor John W. Jordan, the superintendent of Catholic schools.

Jordan could not be reached for comment Monday.

But a program organizer at the University of Scranton said that discussing the use of condoms may not be avoidable.

"To talk about AIDS on a Catholic school is controversial," said Rob Sandruck, adviser for the Student Committee for AIDS Awareness, the group sponsoring University of Scranton activities.

"I think one of our goals is to make it more talkable," Sandruck said. "I mean, how do we talk about it and still remain Catholic?"

Although, the University of Scranton would "never distribute" condoms, question and answer sessions could lead to the discussion of condom use as a "medical preventive," said Sandruck.

"I think one of our goals is to make it (AIDS) more talkable. I mean, how do we talk about it and still remain Catholic?"

12/1/92 TL

Rob Sandruck

Adviser for the Student Committee for AIDS Awareness at University of Scranton

Officials at Wilkes University said publicity about the condom issue has helped to promote their program.

"It certainly hasn't hurt," said Stephanie Simmons, assistant director of university relations at Wilkes. "At the very least it has helped people become aware of the program more so than if we would have put out full page ads. It's a touchy subject."

Any promotion of the AIDS awareness will be helpful in preventing the spread of the virus that has claimed the lives of 6,887 Pennsylvania residents since 1981, said Bernard Healey, of the Pennsylvania Department of Health.

Seventy-one of those were Luzerne County residents, according to health department statistics.

"We're not promoting a specific kind of behavior," said Debra Zehner, a biology instructor who co-organized World AIDS Day at Wilkes University with biology professor Michael Steele. "If you choose abstinence, that's fine, if not, then use a condom."

"This is a virus we can not cure," Zehner continued. "If you catch this virus you die. You don't get a second chance."

World AIDS Day activities list

Schedule for Wilkes University World AIDS Day:

Lectures and Discussions in Stark Learning Center 166

9 a.m. Sexuality and the Self in American Culture

10 a.m. Anatomy of a Killer: Fundamentals of HIV Biology

11 a.m. Laws Against Discrimination: Applicability to Victims of AIDS

12 p.m. The Psycho-Social Aspects of AIDS

1 p.m. Ethics in Research: Where Does the AIDS Story Stand?

2 p.m. The Feminization of AIDS: Human Faces and Voices Behind the Statistics

3 p.m. Are Physicians Morally Obligated to Treat HIV Positive and AIDS Patients?

4 p.m. Schools and the HIV Crisis

5 p.m. Pleasure and Politics: What the Government Doesn't Want You to Know About AIDS

6 p.m. "The Normal Heart" by Larry Kramer (staging a reading of a portion of the play)

7 p.m. Panel Discussion Stark Learning Center 101

There will also be 21 HIV/AIDS poster booths set up in the Stark Learning Center lobby from 9 a.m. to 9 p.m. Information on AIDS will be distributed and questions will be answered from 9 a.m. until 5 p.m.

Schedule for the University of Scranton World AIDS Day:

7:30 a.m. "Dead Facts" — Every 15 minutes mock tombstones will be displayed showing different facts about AIDS until 7:30 p.m.

Noon A moment of silence will be observed

8 p.m. A panel discussion titled "The Real World: Life With AIDS" will be held at Eagen Auditorium in the University Student Center

9:45 p.m. A Candlelight vigil will be held on the Commons area Schedule for the Penn. State Wilkes-Barre Campus

■ 11 a.m. to 2 p.m. Members of the Student Health Club will hand out red ribbons to promote the awareness of AIDS. They will also take donations for Hospice St. John, a local hospice that cares for patients with AIDS and other terminally ill patients.

Wilkes professor will do squirrel research

Dr. Michael A. Steele, assistant professor of biology at Wilkes University, has been appointed a research associate at Powdermill Nature Reserve, The Carnegie Museum of Natural History's biological field station in Laurel Highlands.



Dr. Steele's Dr. Steele mammalogy classes visit Powdermill frequently, and he plans to study the dynamics of the reserve's squirrel populations. He is also organizing an "International Colloquium on the Biology of Tree Squirrels" to be held at Powdermill in the spring of 1994.

Articles by Dr. Steele have appeared in the Journal of the Pennsylvania Academy of Science, Journal of Wildlife Management, Bulletin of the Ecological Society of America, and American Midland Naturalist, among others.

CV 12/4/92

ST 1-24-93

Dr. Steele to Deliver Commencement Talk

Dr. J. Michael Lennon, acting president of Wilkes University, has announced that Dr. Michael A. Steele of Wilkes-Barre will deliver the commencement address during ceremonies scheduled for Thursday, at 11:15 a.m. in the Arnaud C. Marts Sports and Conference Center.



STEELE

More than 100 degrees will be conferred to Wilkes University graduate and undergraduate students. The University will also present an honorary doctorate of human letters to R. Gerald Elias, administrative director of the Wilkes-Barre Area Vocational Technical School.

Dr. Steele, an assistant professor of biology at Wilkes University, was the recipient of the Carpenter Outstanding Teacher Award for the 1991-92 academic year. The award is given annually to a member of the Wilkes faculty chosen by a faculty committee.

A member of the Wilkes faculty since 1989, Steele specializes in plant/animal interactions and small mammal communities. He has directed numerous research projects with colleagues and undergraduate students which include the physical and chemical adaptations of acorns for dispersal by seed predators, the effects of dietary tannin on mammalian gut morphology, and the biogeography of small mammals in islands in the Susquehanna River.

Most recently, Steele was appointed to the staff of the Carnegie Museum of Natural History in Pittsburgh. He will serve as a research associate at the Powder-

mill Nature Reserve, the museum's biological field station in the Laurel Highlands.

Steele brings his mammalogy classes from Wilkes to Powdermill. He plans to study the dynamics of the reserve's squirrel population. He is also organizing an international colloquium on the biology of tree squirrels to be held there in the spring of 1994.

"Research programs are an important part of my teaching activities," commented Steele. "The search for solutions to the environmental problems we face today can begin by instilling the importance of basic research skills in our students. My contribution to science lies not only in research, but in the development of new scientists."

Author of numerous papers and abstracts, Dr. Steele's research interests include behavioral population and community ecology of vertebrates, foraging behavior, plant-herbivore interactions and seed predation and dispersal.

Active in local conservation efforts, Steele is also a member of several professional societies including the Ecological Society of America, the American Society of Zoologists Sigma Xi Honor Society, and the International Society for the Study of Ecology.

The Lancaster native holds a Ph.D. in biology from Wake Forest University in Winston-Salem, N.C. Steele is also a magna cum laude graduate of Millersville University with a B.S. in biology.

The son of William and the late Hilda Steele of Lancaster, Dr. Steele and his wife, Margaret Ann have three children, Michael Jr., Tyler and Emily. The Steeles live in Wilkes-Barre.

Dr. Michael Steele receives 'Outstanding Teacher' award

CV 6/1/92

Dr. Michael A. Steele, Wilkes-Barre, assistant professor of biology at Wilkes University, received the Carpenter Outstanding Teacher Award for the 1991-92 academic year.

The award is given annually to a member of the Wilkes faculty chosen by a faculty committee. The presentation was made by Christopher N. Breiseth, university president, at the annual commencement ceremonies.

A member of the Wilkes faculty since 1989, Steele specializes in animal interactions and small mammal communities. He has directed numerous research projects with colleagues and undergraduate students which include the physical and chemical adaptations of acorns for dispersal by seed predators, the effects of dietary tannin on mammalian gut



morphology and the biogeography of small mammals on islands in the Susquehanna River.

Author of numerous papers and abstracts, Dr. Steele's research interests include behavioral population and community ecology of vertebrates, foraging behavior, plant-herbivore interactions and seed predation and dispersal.

Active in local conservation efforts, Steele is a member of several professional societies including the Ecological Society of America, the American Society of Zoologists Sigma Xi Honor Society and the International Society for the Study of Ecology.

The Lancaster native holds a Ph.D. in biology from Wake Forest University, Winston-Salem, N.C., and is a magna cum laude graduate of Millersville University with a B.S. in biology.

Dr. Steele and his wife, Margaret Ann, and their two children, Michael Jr. and Tyler, reside in Wilkes-Barre.

Schools & Colleges

Wilkes Biology Department presenting five papers to State Academy of Science

The Wilkes University Biology Department will present five research papers to the 67th annual meeting of the Pennsylvania Academy of Science Apr. 19-21 at The Inn at Reading in Wyomissing.

This is the second straight year that the Wilkes Biology Department has presented five papers to the Academy. The papers represent the research work of members of the Wilkes University biology faculty and students in a variety of areas.

Dr. Robert E. Ogren, biology professor emeritus, has been named as the cochairman of the Zoology section of the meeting and will present his paper, "Ecological Observations on the Land Planarian *Bipalium Pennsylvanicum* Ogren, With Reference to Phenology, Reproduction, Growth Rate, Food Niche."

Dr. David R. Long, assistant professor of biology, will present his work, "Functional Histology of the Salamander Tongue."

"The Effects of Tannis on Par-

tial Acorn Consumption by Mammals" will be presented by Dr. Michael A. Steele, assistant professor of biology, and one of his students, Wendy A. Bachman of Cream Ridge, N.J., a Wilkes senior.

Dr. Steele also will present a second paper he completed with Roger Powell of North Carolina State University, "Biogeography

of Small Mammals in the Southern Appalachians: Patterns of Local and Regional Abundance."

Dr. Charles Reif, biology professor emeritus, will present, "Observations of Birch Trees

(*Betula Lutea* and *Betula Lenta*) Growing in Rotted Stumps of Hemlocks (*Tsuga Canadensis*.)"

TRIBUNE

SCRANTON, PA
DAILY 35,273

TUESDAY
MAR 24 1992

498 BURRELLE'S ZE

Birds of Susquehanna islands subject of scientific survey

WYOMING COUNTY BUREAU

The Susquehanna North Branch Citizens Advisory Committee is planning a survey of island birds on the Susquehanna River.

The project — which is being spearheaded by Chaz Spacek, Wilkes University conservation chair and a representative of the Greater Wyoming Valley Audubon Society, and Dr. Mike Steele of Wilkes University — will utilize volunteers from area colleges and universities to plan and organize the survey.

Local environmentalists and bird watchers will help identify birds on islands in the river corridor.

Within the year, the group hopes to produce an educational slide show and flier to be distributed to the public.

The results will also be published in scientific journals and will form the basis for further studies.

Eventually the data will be used to indicate changes in the environment and their impact on birds and other species.

The Susquehanna North Branch Corridor covers an area almost 90 miles long, from the New York state border above Sayre to Coxton above the confluence with the Lackawanna River.

The corridor runs through Bradford, Wyoming, Lackawanna and Luzerne counties.

The group will decide which islands to survey and the type of data to be collected.

Preliminary studies are slated to begin during the breeding and nesting season from May through July.

Initial plans were discussed at a recent meeting in Tunkhannock. Among the agencies represented were the Lackawanna Conservation District, Bradford County Conservation District, Wilkes University, Keystone Junior College, local chapters of the Audubon Society, and the Pennsylvania Environmental Council.

5/17/92. TL

Steele to receive faculty award at Wilkes

Dr. Michael A. Steele, of Wilkes-Barre, assistant professor of biology at Wilkes University,



Dr. Michael Steele

has been selected to receive the Carpenter Outstanding Teacher Award for 1991-92 academic year.

The award is given annually to a member of the Wilkes faculty chosen by a faculty com

mittee. The presentation will be made by President Christopher N. Breiseth at the university commencement ceremonies on May 23.

A member of the Wilkes faculty since 1989, Steele specializes in animal interactions and small mammal communities. He has directed numerous research projects with colleagues and undergraduate students.

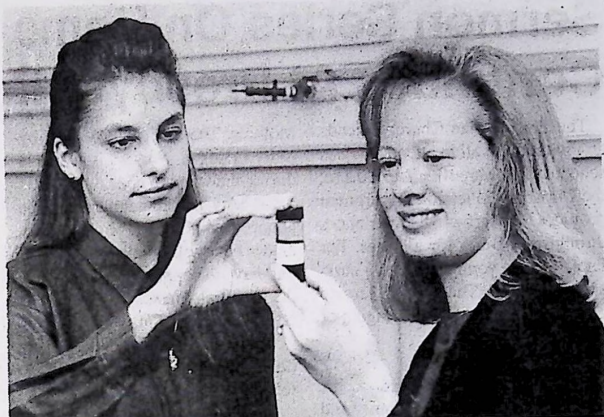
"Research programs are an important part of my teaching activities," said Steele. "The search for solutions to the environmental problems we face today can begin by instilling the importance of basic research skills in our students. My contribution to science lies not only in research, but in the development of new scientists."

The son of William and the late Hilda Steele, of Lancaster, Dr. Steele and his wife, Margaret Ann, have two children, Michael Jr. and Tyler.

MAY 6, 1992

MOUNTAINTOP EAGLE
MOUNTAINTOP, PA

WKLY - 1,650



RESEARCH GRANT RECIPIENTS- Donna Zurawski, left, and Kimberly Gavel, right, both seniors at Wilkes University, were recently awarded to grants to support their honors research projects in biology.

Research Grants Awarded

225 FF
Wilkes University seniors, Kimberly Gavel of Mountaintop and Donna Zurawski of Plains, were recently awarded research grants from state and national agencies to support their honors research in biology.

The National Honor Society for Scientists, Sigma Xi, awarded full funding to Gavel to support her research on the physical and chemical adaptations of acorns for dispersal by seed-eating animals, such as squirrels. A basic research grant from the Pennsylvania Academy of Science will allow Zurawski to study the effects of plant toxins on parasite infections in mammal mammals.

The results of both projects will have an important impact on the study of plant-animal interactions as well as on applied research that is derived from such basic ecological studies," commented Dr. Michael A. Steele, research advisor to Gavel and Zurawski and assistant professor of

Biology at Wilkes. He expects that the results from the student's research will be published in scientific journals next year.

Gavel plans to continue her education with a masters degree and possibly a Ph.D. in Environmental Toxicology. A graduate of Bishop Hoban, Gavel has received several scholarships, including the Charles B. Reif Scholarship in Biology, and the Presidential Scholarship. She has maintained a 4.0 grade point average for the past five semesters and has held a place on the Dean's list since her freshman year.

Daughter of Mr. & Mrs. Anthony Gavel of Mountaintop, Kimberly is the Secretary and Layout Editor of the Chemistry Club, a member of Biology and Earth & Environmental Science Club, and a Teaching Assistant for the Biology department at the ITEC Center.

LEADER

CORNING, NY
DAILY & SUNDAY 16,500

FRIDAY

JUN 16 1995

BURRELLE'S

174
ced.

OE

Campus Report

Leila Hadj-Chikh of Campbell, received the School of Science and Engineering Award at Wilkes University.

H a d j -
Chikh, who
received a
bachelor's
degree in
biology, was
vice president
of Sigma Tau
Delta, the
English
H o n o r

HADJ-CHIKH

Society, was a
member of both the Biological
Society and the women's varsity
soccer team, and was
photography editor for Wilkes
University yearbook, the
Amnicola.

She conducted research that
led to several scientific
publications with Dr. Michael
Steele, assistant professor of
biology. She also researched at
the Savannah river ecology
Laboratory, Aiken, S.C. and the
Institute of Ecosystems Study in
Millbrook.

She was recently awarded a
research fellowship from the
national Science Foundation to



pursue her doctoral research in
the Princeton University
department of Ecology and
Evolutionary Biology. The three-
year award will cover tuition and
research expenses and provide an
annual stipend while she
conducts her doctoral research.
She is the daughter of Sharon
and Tedj Hadj-Chikh of
Campbell.

Shawn M. McLaughlin of
Painted Post, has graduated from
Clarkson University with a
master's degree
in business
administration.

He is the son
of Donald and
M a r c i a
McLaughlin of
Painted Post.
He is a 1993
graduate of
A l f r e d
University with
a bachelor's degree in business
administration and a 1989
graduate of Corning-Painted Post
West High School. He is a
member of Delta Mu Delta,
National Honor Society in
Business Administration.



WILKES NAMES ASSOCIATE PROFESSORS: Wilkes University recently announced the following promotions to associate professor: Robert C. Tuttle, Kingston; Patricia B. Heaman, White Haven; Ann Marie Kolanowski, Kingston; Lawrence T. Kuhar, Old Forge; Linda M. Paul, Wilkes-Barre; Michael A. Steele, Wilkes-Barre; Terese M. Wignot, Jim Thorpe. Louise M. Bernard, Conyngham, and J. Michael Case, Trucksville, received promotions to professor. All of the previous also received tenure. Douglas J. Lynch, Kingston, and Dale Bruns, Dallas, received tenure. John G. Reese, Kingston, and Roland C. Schmidt, Plains, received professor emeritus status.

TL 8/6/95

TZ 4/25/95

Hadj-Chikh accepts research fellowship

Leila Hadj-Chikh, a senior biology major at Wilkes University, was recently awarded a research fellowship from the National Science Foundation (NSF) to pursue her doctoral research in the



Leila Hadj-Chikh

Princeton University Department of Ecology and Evolutionary Biology.

The three-year award will cover tuition and research expenses and provide an annual stipend while Hadj-

Chikh conducts her doctoral research. Princeton University has also offered additional funding for a fourth year of study.

Out of 6,249 applicants, NSF awarded only 728 fellowships for the 1995-1996 year. Hadj-Chikh was one of 90 fellowship recipients in biology.

Hadj-Chikh's research interests center on the interface between behavioral ecology, conservation biology and the study of plant-animal interactions.

Hadj-Chikh contacted Princeton's faculty after she received the NSF fellowship; although she had never formally applied to the university. Following a 7-hour interview with ecology and evolutionary biology faculty and graduate students at Princeton, Hadj-Chikh was offered and accepted an appointment to Princeton's Ph.D. program.

While at Wilkes, Hadj-Chikh maintained a 3.8 grade average in biology and a 4.0 in her English minor. She has conducted research at Wilkes which has led to several scientific publications with Dr. Michael Steele, assistant professor of biology. Hadj-Chikh also researched at the Savan-

nah River Ecology Laboratory, Aiken, S.C., and the Institute of Ecosystems Study in Millbrook, N.Y.

Outside of the classroom, Hadj-Chikh is photography editor for Wilkes University's yearbook, the *Amnicola*; vice president of Sigma Tau Delta, the English Honor Society; and a member of both the Biological Society and the women's varsity soccer team.

Hadj-Chikh is the daughter of Sharon and Tedj Hadj-Chikh of Campbell, N.Y.

SUNDAY TIMES

SCRANTON, PA
SUNDAY 83,651

JUN 29 1997

BURRELLE'S

4960
...6b1

ZK
.....U

The Sunday Times

NEWSMAKERS



**DR. MICHAEL
STEELE**
*Receives
fellowship*

POOSFF

•**Dr. Michael A. Steele**, associate professor of biology at Wilkes University, has been awarded a Fulbright Fellowship to lecture and conduct research in Mexico during the 1997-98 academic year.

Steele, will be accompanied by his wife, Margaret, and their three children.

•**Margi Lee**, Mount Cobb, was named to the dean's list at Villanova University.

•**Daniel Fitzpatrick**, Dalton, has been named to the dean's list at St. Francis College for the spring semester.

•**Peter J. Gvazdauskas**, Scranton, has received the Robert L. Tripp Scholarship at Pennsylvania State University. A sophomore majoring in business administration, he is the son of Peter and Linda Gvazdauskas.

•**Kevin T. Lewis**, South Montrose, has been named to the dean's list at Southern Illinois University at Carbondale, Ill. for the spring semester.

• The following students were named to the dean's list at Bucknell University for the spring semester. They are:

George A. Howanitz, Jessup;

Alfred W. Laluna, **Amanda J. Masucci**, **Marissa A. Dixon**, **Cynthia Caputo**, all of Clarks Summit; **Melissa A. Rovers**, Lake Ariel; **Justine M. Metcho**, Old Forge; **Kelly M. Hyland**, Dalton; **Leslie T. Blue**, and **David A. Daycock**, both of Barnesville; **Christopher E. Evans**, Scranton; **Steven C. Pratico**, Archbald; **Carly E. Graystock**, Forest City; **Raymond J. Schwenk**, Elmhurst.

•**Christopher Remakus**, Halstead, a student at Mount Saint Mary's College, has been named to the 21st Annual Edition of the National Dean's List.

•**Heather Fine**, Clarks Summit, has been named to the dean's list at Colby College for the spring semester.

•**Anthony Dalasio**, Clarks Green, a teacher at Lackawanna Trail Junior-Senior High School, Factoryville, has been awarded a fellowship for summer independent study by the Council for Basic Education.

•**Jerome Arnoldini**, and **Loren M. Dunham** were both nominated for the Michael M. Haduck Memorial Award to the Pennsylvania Board of Probation and Parole and the American Legion.

Arnoldini, nominated for the Institutional Agent award, is employed by SCI-Waymart.

Dunham, nominated for the Field Agent award, is employed in the Scranton District Office.

• **Gary Dohanich**, Ph.D., formerly of Fleetville, a member of

the faculty of Tulane University in New Orleans, has been promoted to the rank of full professor. He has been a member of the Department of Psychology since 1985.

Dohanich received his bachelor's degree from Lehigh University, a master's degree from Villanova University and his Ph.D. from Michigan State University. His postdoctoral training was at Rockefeller University.

He is the son of Amelia and Peter Dohanich of Fleetville and is the husband of the former JoAnn Burak, formerly of Nicholson.

•**Rachel D. Norton**, Factoryville, and **Kristi J. Hapeman**, Clarks Summit, have been named to the dean's list for the spring semester at Messiah College.

•**Kerri L. Short**, Carbondale, **Elena A. Batova**, Little Meadows, **Jill M. Wheaton**, Great Bend, and **Jennifer Blaum**, Hawley, have been named to the dean's list at Cedar Crest College for the spring semester.

•**Amanda Basta**, **Andrew Weber** and **Carolyn Rosiecki**, all of Clarks Summit; **Emily Traves**, Hawley, and **Daralyn VanDeMark**, Meshoppen, have been named to the dean's list at Lafayette College for the spring semester.

•**Alyssa Marie Morse**, Scranton, has been named to the dean's list at the College of Wooster for the second semester.

PANDA



13 • 14 settembre 1997
Operazione
Beniamino



Anno XXXI n° 8
agosto 1997
Spedizione in
abbonamento
postale
Legge 662/96
Comma 20
Articolo 2
Lettera C
Roma



M O N D O

A CURA DI PIER LORENZO FIORIO

STATI UNITI

Scoiattoli selettivi
nel conservare
le ghiande.

Gli scoiattoli gngi (*Sciurus carolinensis*) mangiano le ghiande. Quelle non mangiate subito vengono seppellite per essere consumate più tardi, quando il cibo diventerà scarso. Il problema è che anche i coleotteri curculionidi del genere *Curculio* e le loro larve mangiano le ghiande: quindi se uno scoiattolo trova una ghianda infestata dai curculionidi e la nasconde, non ne sarà rimasta molta quando questa verrà dissotterrata. Alcuni scienziati dell'Università di Wolke negli Stati Uniti hanno studiato il problema e hanno scoperto che gli scoiattoli, di fronte a ghiande con o senza larve di curculionidi, tendono a nascondere quelle sane e a mangiare quelle infestate. Inoltre quasi sempre mangiano anche le larve, che probabilmente costituiscono una parte importante della loro dieta. Anche le ghiande senza vermi ma prive del guscio, quindi più suscettibili a deteriorarsi, vengono mangiate subito e non sotterrate. Da tutto ciò si deduce che uno scoiattolo è in grado di giudicare la deperibilità del suo cibo.

("BBC Wildlife", dic. 1996)

AUSTRALIA

Fiori che vanno
in calore

La ninfea o fiore di loto non è soltanto un bel fiore, ma ha anche una

proprietà straordinaria per una pianta: si riscalda quando è pronta per il sesso. Il loto *Nelumbo nucifera* produce il proprio calore mantenendosi a 30-35°C per periodi fino a quattro giorni, anche se la temperatura dell'aria scende fino a 10°C. Due botanici dell'Università di Adelaide hanno scoperto che la pianta si riscalda mano a mano che la temperatura dell'atmosfera circostante si abbassa, una strategia straordinariamente simile a quella degli animali a sangue caldo come i mammiferi e gli uccelli. Gli insetti che visitano il fiore vi trovano una speciale camera riscaldata e vi sostano, spesso rimanendovi intrappolati durante la notte quando il fiore si richiude. Il calore dà energia ai loro muscoli mentre essi si ricoprono di polline, e li mette in grado di volare lontano e a lungo il giorno seguente, per impollinare altri fiori di loto.

("BBC Wildlife", dic. 1996)

NORVEGIA

L'importanza della
simmetria delle corna

Nelle renne (*Rangifer tarandus*), non sembra che siano le dimensioni del palco delle corna che attraggono il sesso opposto, ma la loro simmetria. Una recente ricerca ha rilevato che quanto più le renne sono in buona salute tanto più le loro corna sono simmetriche. (Ndr - Tenere presente che, a differenza di quanto avviene in tutti gli altri cervidi, nella renna e nel caribù, o renna nordamericana, le corna sono presenti in ambedue i sessi). Due scienziati dell'Università norvegese di Tromsø,

sospettando che l'asimmetria delle corna fosse dovuta a infezioni da parassiti, hanno somministrato ad alcune renne, nel periodo autunnale, dei medicinali contro i parassiti intestinali. Infatti l'estate seguente, la svermicazione senza influenzare il peso e la lunghezza delle nuove corna, le ha invece rese perfettamente simmetriche. Sembra quindi che questa simmetria sia un segnale sessuale per indicare ai corteggiatori del sesso opposto quale sono le renne in buona salute con cui accoppiarsi.

("BBC Wildlife", dic. 1996)



ambientale. L'erpetologo Nicholson ritiene che il fenomeno sia legato al diffondersi di geni di albinismo nella popolazione inglese, ma non spie come poi la pelle di questi animali prenda colori spe accesi, che non hanno ni a che fare con le normali tonalità di verde, verde-marrone o verde-giallo de rane.

(ANSA 11 mar

GRAN BRETAGNA

Il mistero delle rane
di ogni colore

La Fondazione per la Natura della Cornovaglia ha lanciato un appello alle autorità e alla comunità scientifica perché si trovi una spiegazione al mistero delle rane rosse, rosa, arancioni, gialle e crema che si trovano con crescente frequenza nel paese. Dall'estate del 1994 ci sono stati 124 avvistamenti documentati di rane di vari colori. Anche se quello dominante sembra essere l'arancione, in tre casi le rane erano addirittura multicolori. Quasi tutti gli avvistamenti sono stati fatti nell'Inghilterra meridionale, e si vuole capire se il fenomeno sia da imputare a fattori di carattere

ZIMBABWE

L'ippopotamo
non è solo erbivoro

Si è sempre ritenuto che l'ippopotamo (*Hippopotamus amphibius*) fosse un animale dall'alimentazione esclusivamente vegetale. Nel 1995, nel Parco Nazio di Hwange in Zimbabwe, u gruppo di turisti e alcuni ricercatori dell'Università Fairbanks in Alaska hanno visto un impala (*Aepyceru melampus*) inseguito dai leaoni (*Lycan pictus*) get in un fiume in mezzo agli ippopotami per trovarvi, invece della salvezza, l'enorme bocca di un gros pachiderma che l'afferrava uccideva con i lunghi can mezzo metro. Dopo ciò