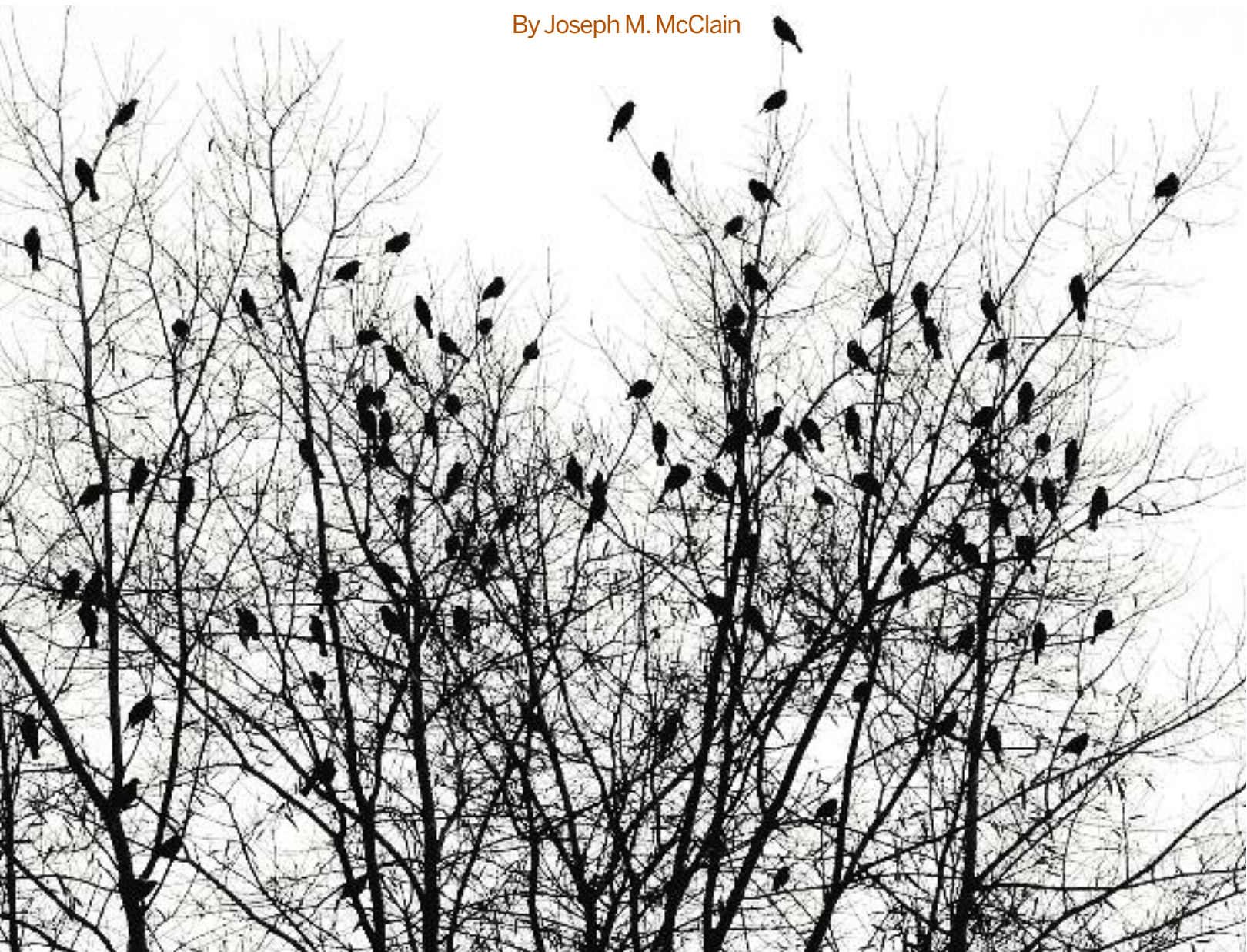


# CRACKING THE CASE

**William and Mary Faculty and Students Team Up  
to Solve the Mystery of the Rusty Blackbirds**

By Joseph M. McClain



The rusty blackbird is a species only an ornithologist can love. Even when they're in breeding plumage in the boreal region of Alaska and Canada, "rusties" are extremely nondescript-looking birds. Their undistinguished plumage takes on its eponymous rusty look when the birds are on their wintering grounds in the eastern half of the United States. They keep pretty much to wet, woody areas, shuffling through sodden leaves, looking for the soft food they prefer. Even their call is unremarkable; it sounds like a couple of seconds of a cassette tape on fast forward.

For all its lack of traditional avian aesthetics, *Euphagus carolinus* is a creature of interest, even mystery, within ornithological circles. The continent's population of rusty blackbirds has declined by as much as 90 percent over the past few decades.

"No one can tell you why," says Dan Cristol, professor of biology at William and Mary. "It's the most dramatic decline of any northern bird, the most dramatic decline of any really common bird — and it's the most mysterious decline."

Cristol leads a faculty-student team of ornithologists who have put together a clue or two in the mystery of the rusty blackbirds. It's a double mystery, in that the birds are in decline all across their range — yet a flock wintering each year on the College campus seems to be doing just fine.

## A Student Takes the Lead

Student-faculty research teams are common at William and Mary, but most often the professor initiates the project. The blackbird group, however, grew around an undergraduate, Jacob Armiger '10.

"Jacob came to me as a freshman," Cristol says. "He told me that he loved birds and wanted to study birds."

Cristol gave Armiger some articles on various ornithological problems to help him decide on a topic. He came back and told Cristol that he wanted to take on the case of the rusty blackbirds. Any conversation with Cristol is punctuated by jerks of his head whenever a bird enters his field of vision, so of course he knew about the wintering rusties on campus.

"Very few people know they're here, even though you see them over by the sundial in front of Swem Library," Cristol says. "Students going between classes step on the acorns of the willow oaks that grow over there and the birds love it. They swoop down and pig out on the cracked acorns once the next class period starts. Our students are helping a threatened species and they don't even know it."

Cristol arranged for Armiger to apprentice with the International Rusty Blackbird Technical Working Group to get some experience working with the birds, a species that offers challenges to even seasoned scientists.

"They are very neophobic. They don't like new things. They're skittish and that means that they're not going to adapt quickly to changes," Cristol says. "You

put a leg band on them and they sit there pecking at it for two hours and they might get eaten by a hawk during that time. If *anything* unusual happens, they might get eaten by a hawk, because they just don't respond that well to change."

The neophobia of the birds makes them hard to catch. After Armiger returned from the international group, Cristol set him to work with the campus flock. "Just follow the birds around campus," he told Armiger. "Find out how to catch them. Because whatever we do with these birds, first we're going to have to catch them."

Armiger spent months following rusty blackbirds around campus, learning their daily habits. Even though the birds are seen around the sundial, he found that a much better bet was the low, wet, wooded areas of the campus wildflower preserve, downstream of Crim Dell.

"We usually find them in the forest-y areas. It is best to find them at early morning or sunset," Armiger says. "They don't really like the sun shining on them or the wind. It's the same with an open-area habitat versus being in a closed habitat. They'd rather have some things around them."



After getting to know the birds, Armiger took Cristol to a spot in the campus wildflower preserve, and said, “Put the nets *right here*.” Cristol was skeptical.

“I thought I was going to have to go out there and help him more,” Cristol says. “But where he placed the nets, he caught birds. That’s an accomplishment in itself.”

## A Different Kind of Tailgating

The blackbird project began in earnest the following year when Andy McGann arrived at William and Mary to begin a master’s degree program in biology. McGann was interested in rusties as well, and began working with Cristol and Armiger. McGann and Armiger have separate, but overlapping, projects. Armiger works on the more general question of why the birds are on campus. McGann focuses on the birds’ diet, drawing blood to analyze what the birds have been eating.

The two students spent the winter working the hot spots Armiger had scouted, trying to catch and process as many rusties as possible before the flock migrated north.

Ornithology usually involves a car drive, followed by several trips schlepping equipment. The rusties like the bottom of the gully that Ukrop Way crosses near Landrum Drive, so Armiger and McGann just had to make sure they had a good spot in the handy faculty lot — not a problem when you must have nets and a banding table set up by dawn. They often set up in late afternoon as well as the morning.

“To catch them, we use a series of mist nets, which are kind of like a volleyball net with a pole on either end and trammel lines that go horizontally through the mesh, which is really fine and hard to see,” Armiger explains. “The birds fly into these pockets and they get tangled up.”

Their parking lot setup looks as if McGann and Armiger are tailgating before a football game. They sit in collapsible chairs near a

card table that holds a tackle box of banding equipment, rather than a pregame spread. They watch their nets with the relaxed expectancy of fishermen who expect a bite any second now.

Mist-netting action is never fast and furious; when you’re after rusties, a good day yields only a few birds. Tending their nets one February afternoon, Armiger points out a lurking red-shouldered hawk. “She’ll scare off any blackbirds that might happen to be around,” he says with professional resignation. McGann reminisces about their biggest day of the year: they netted eight birds. There is some bycatch as well — wrens, robins, redwing blackbirds. They band the male redwings for comparison purposes. When a bird hits the net, they go into action, making their way down the slippery slope.

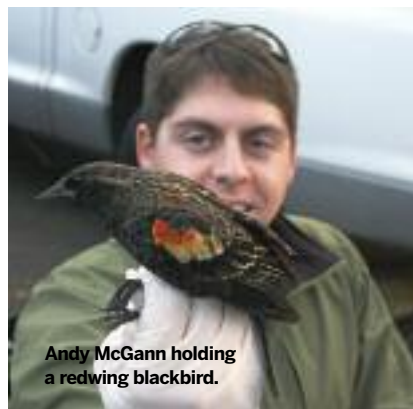
“Once you get a bird, you take it out and put it in a drawstring bag,” Armiger says. “You bring it up here, and there is a little protocol where Andy takes a bunch of biometrics — measurements, basically: wing length, tail length, length of their tarsus (lower leg bone), bill measurements. We also band it with the federal aluminum band with the serial number. Then we put a unique combination of colored plastic bands on it so we can identify the individual from a distance. Then, blood samples.”

## More Than Cracking Acorns

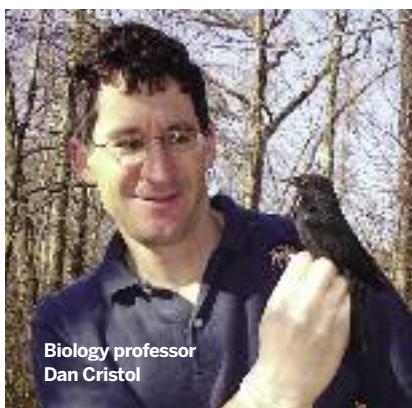
Though a challenge to catch, a rusty blackbird in the hand is no trouble at all. “They don’t bite very hard,” McGann says. “These are even easier to work with than chickadees or titmice. They are just a nice, convenient size to have in hand.” The birds don’t bite hard because their jaw muscles are weak compared with other similar-sized birds, he explains. Cristol says the weak jaw muscles explain the rusties’ fondness for small willow oak acorns, especially when pre-cracked by student feet.



Jacob Armiger '10



Andy McGann holding a redwing blackbird.



Biology professor Dan Cristol



The aluminum band is marked with a serial number to help identify the bird.



McGann (left) and Armiger tailgating on campus, waiting for birds to hit the nets.



**Above:** Acorns, cracked by the feet of passing students, are a favorite food for rusty blackbirds.  
**Right:** A flock of rusty blackbirds feeds on acorns near the sundial on New Campus.



OPPOSITE PAGE TOP MIDDLE AND RIGHT PHOTOS: JOSEPH M. MCCLAIN; OTHER PHOTOS COURTESY OF JACOB ARMIGER '10

The acorn-cracking doesn't fully explain why the wintering rusty blackbirds thrive on campus. Cristol points out that the acorns are only available in most years — years in which the oaks bear heavily — and they're only available for a few weeks of the wintering period. "This highly disturbed, modified habitat" of our campus offers no apparent advantages for wintering rusty blackbirds, he says. And yet, the blackbirds come back. McGann said this year's campus flock of around 200 was larger than most reported by birders throughout Virginia.

The results of Armiger's and McGann's data collection are yielding some additional clues, while making the case of rusty blackbirds even more mysterious.

The first two years of blood samples are being analyzed for ratios of stable isotopes of carbon, nitrogen and sulfur that occur naturally in the food. Corn is a C4 plant, while oak trees are C3, McGann explains, referring to different photosynthetic pathways. The relative presence of stable carbon isotopes in a bird's blood shows what it has been eating.

Isotope analysis will shed light on another diet-related factor. Rusty blackbirds have a varied diet and males may have different food preferences from females. One intriguing preliminary finding is in the gender makeup of the campus flock, which is three-quarters male. As Cristol points out, "A population will go down very fast if the females are disappearing."

The ornithologists say there are several possible reasons for the predominantly male campus flock. Cristol says the females could be "getting hammered" on the nest by predators or perhaps there's a problem with the diet of the females. McGann has his own ideas.

"It's likely that this is a species that exhibits a differential pattern of migration, where females go farther south than males," he says. "We are on the northern end of their wintering range, so that makes sense for what these guys are doing. Right now, no one has really published anything saying for sure that they are differential migrants."

Through the International Rusty Blackbird Technical Working Group, William and Mary's blackbirders have been sharing their data with other groups across the U.S. and Canada. The three worked on what Cristol calls a "side project," testing the birds for mercury. Cristol, McGann and Armiger are co-authors — with other blackbird

researchers — on a paper to be published in an issue of *Condor*. Though a few of the campus birds had high mercury, Cristol says, the mercury was in the bird's feathers, indicating that it had been ingested on their breeding grounds. The paper suggests that mercury contamination is unlikely to be a major element in the birds' decline.

Other suspects have been eliminated as well. Disease has been crossed off the list, as have blackbird-control programs run by the U.S. Department of Agriculture.

"A smoking gun would be a virus that only affects these birds, but no one has found such a thing," Cristol says. "I suspect that what we're going to find is a perfect storm, and not a smoking gun."

Elements of the storm could include predation by hawks. Cristol notes that hawks — particularly bird-hungry Cooper's hawks — have increased dramatically over the years. (There's even a pair nesting in a beech tree by the Sunken Garden.) The destruction of wetlands likely plays a part, as do contaminants and competition with other bird species, he says.

"Part of this complex combination is going to be the very nature of this bird, their personality if you will," Cristol says. "Because they're really, really strange birds."

## Unsolved Mystery

So as of now, the double-barreled blackbird mystery remains unsolved. Armiger will continue studying birds in grad school at Villanova. Cristol and McGann await results from the lab on the stable isotopes. Other undergrads have helped out with the rusties and one may take over Armiger's study next winter.

Despite the many unanswered questions, however, one thing remains relatively certain. As long as William and Mary students continue cracking acorns underfoot while rushing to class, these birds will likely continue to flock to campus. And that continues to provide College students and faculty with the unique opportunity to be the lead detectives in the mysterious case of the disappearing rusty blackbird. ■

*Joseph M. McClain is editor of Ideation, the research and scholarship magazine for William and Mary.*