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Featured stories

Mysteries of the kingfisher's belt

A birder keeps close watch on nesting kingfishers to discover why the female is more colorful
By Deborah Richie
Published: June 24, 2011

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A Belted Kingfisher, a female, lands on a midstream boulder and swivels her crested head to stare at my turkey-hunting blind. A fingerling trout droops from her daggerlike bill. I freeze. One stray movement from inside the screen window could instigate a sharp rattle call and flight.

Her laser gaze penetrates my hideaway, from which I view the nesting burrow on the opposite bank of Rattlesnake Creek, near my home in Missoula, Montana. Embodied in the female's plumage are the colors of this place: the bluish gray of rock, the white of frothing waves, and the burnished red of ponderosa pine bark.

Only the female wears the rufous belt that drapes across and down the sides of her white breast, below an upper blue-gray band. In a reversal of what's typical in the bird world, she's the same size but clearly more colorful than the male.

Sitting for hours in my blind watching the nest, I puzzle over this peculiar avian mystery.

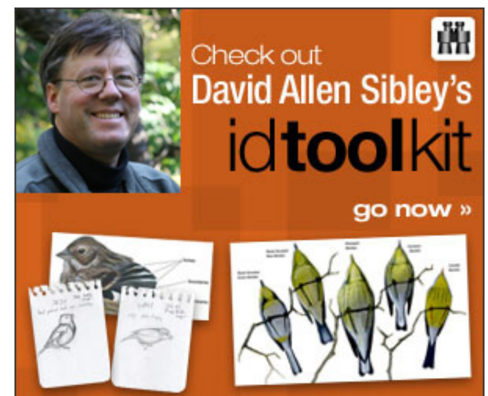
Do kingfishers swap gender roles, as shorebirds known as phalaropes do? There, the showy and larger females compete for mates and leave all the parenting up to the drab males, right down to incubating eggs and nestling care.

For most of June, I've watched the kingfisher parents bring food and disappear into the four-foot-long burrow to feed their chicks (typically a family of seven). The result? The parents appear almost equally attentive. The male holds a slight edge on numbers of fish delivered to the nestlings, but the pair excavated the nest together and took turns incubating the eggs. Clearly, they're not at all like phalaropes.

"I think it is likely that the color and belts are important in sexual recognition," says biologist Michael Hamas, who conducted groundbreaking research on kingfishers in northern Minnesota starting in the 1970s and recently retired from teaching at Central Michigan University. "The rufous belt may reduce aggression between a male and a female, so they can quickly pair up for nesting season."

Hamas, who wrote the account about the species in the reference series *Birds of North America* (No. 84), points to the bird's highly territorial nature. For males, breeding success depends on defending a diggable, vertical bank that is safe from flooding and not too far from fish-filled waters. Males in northern latitudes sometimes remain year-round to keep an eye on their prime nesting real estate. Females migrate south for the winter, and when they return, males are waiting. Glimpsing a flash of a rufous belt would be a signal to welcome a female rather than to expend energy chasing her off.

Geoffrey Hill, Auburn University ornithologist, feather plumage expert, and author of the 2010 book *National Geographic Bird Coloration,* agrees with Hamas. He speculates the female's belt could be similar to the black mustache mark of a male



Yellow-shafted Northern Flicker, the one distinctive pattern that sets a male apart from a female. (Male Red-shafted flickers have red mustache marks.) A 1936 study demonstrated that when a fake mustache was glued to the side of a female flicker's face, her own mate drove her away.

"I suspect the kingfisher belt also could be a marker for sexual identity," Hill says. "It's only a reversal of what you'd expect if you think of it as an additional color rather than a simple mark." *Melanins* are the likely source of the rufous belt color, says Hill, the same pigments that give us hair color and skin tone. Specifically, *phaeomelanin* makes the earthy rusts, chestnuts, and golds you see in Cinnamon Teal or Golden Eagles, while *eumelanin* forms black colors.

Producing melanin from amino and fatty acids within the body takes energy, but not as much as it would for feathers that are vibrant reds, oranges, and yellows. They come from *carotenes* in food that birds must find, eat, and then transfer into their feathers.

Hill's investigations of House Finches showed that the healthiest males sported the reddest feathers and had the best diet of carotene-rich foods. Females, not surprisingly, chose the brightest males over duller ones.

Since carotenes aren't involved in making the kingfisher's belt color, it seems unlikely that a bird's belt would be an indicator of health. Individual belts vary in size, pattern, and color saturation, but no one knows if the differences are meaningful. As far as mate choice, there's little possibility of flipped sex roles. A male kingfisher courts the female with aerial displays and chases, presenting her with fish, and calling to her in muted rattles. She makes the selection.

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5 fun facts about Belted Kingfishers

1.) The Belted is the only migratory kingfisher in North America and one of only 11 kingfisher species worldwide that exhibit seasonal movements.

2.) The breast band on juvenile birds is a mixture of cinnamon or brown and slaty blue. Juvenile males have a tinge of faint rufous along their flanks, and juvenile females have a faint rufous belly band.

3.) Unlike other perching birds, two of the kingfisher's toes are fused for much of their length, a useful arrangement for digging burrows yet challenging for walking.

4.) Fish that swim in shallow waters or near the surface are the primary food choice, but Belteds will also eat crayfish, young birds, aquatic invertebrates, and amphibians.

5.) Belteds typically excavate gently upward-sloping tunnels deep into earthen banks for their nests, but burrows have also been found in beaver-generated mud slides, root wads of fallen trees, sand dunes, sawdust piles, sand and gravel pits, and roadcuts.

Status symbols

Flashy colors, however, can serve other purposes besides being visual signals of gender identity or fitness of an individual bird. They can be status symbols. Studies of other species, like the Eastern Bluebird, link color variations in male plumages with social dominance: The more vivid the colors of an individual, the higher in the pecking order and the more successful he is in breeding.

Interestingly, the reddish hue on the chests of bluebirds comes not from carotene, but from melanins. Do female Belted Kingfishers similarly display their belts to compete for dominance and the right to select the males guarding limited nesting habitat?

The mystery of the rufous belt remains far from settled. For instance, why would a kingfisher need to identify a member of the opposite sex visually when an arriving call might suffice? If you've spent time on rivers, lakes, bays, and other fish-filled waterways across North America, you know that 9 times out of 10, your first sign that a kingfisher is present is its ratcheting cry.

In fact, the bird's rattles do convey individual identities, according to research by ornithologist Jim Davis, who studied kingfishers extensively in the 1970s and '80s. He demonstrated that a kingfisher incubating eggs deep in a burrow could distinguish the call of a mate from that of an unfamiliar kingfisher. Perhaps both visual and vocal cues are important.

In search of answers

After my kingfisher chicks fledged and the family melted away into the far-flung reaches of the stream, I decided to explore farther afield in a quest for answers to the rufous-belt mystery. Surely, evolution and heredity must play a role. Could a visit to the kingfisher's closest relative yield more clues?

The Ringed Kingfisher ranges throughout Central and South America and north to the Lower Rio Grande Valley in Texas. Birders from around the world pour into the valley to check off specialties like Green Jay, Altamira Oriole, and Hook-billed Kite. The trifecta of kingfishers — Ringed, Green, and (in winter) Belted — also is a draw.

Our far southern border is the tip of the tropical iceberg, and its 11 ecosystems attract a parade of rarities from Mexico and points south — including kingfishers. In fact, in January and February 2010, an Amazon Kingfisher was spotted in Laredo. It was the first record in the U.S. (See a photo in "Birding Briefs," June 2010, page 15.)

Daydreaming led to planning and finally, by early the following March, to paddling a five-mile stretch of the Rio Grande, from Chapeño near Falcon Dam to a take-out at Salineño, famed for a cluster of birdfeeders that are maintained each winter by the gregarious Cheryl Longton and her husband Dave. On the first of five days, I joined a trip offered by the Friends of the Wildlife Corridor, a nonprofit group dedicated to conserving vital habitats on the river.

Within 10 minutes of launching our canoes, a Green Kingfisher darted low across the water from the U.S. to the Mexico side, joined by her mate — a stunning male with a rusty red chest (no color reversal here). The tiny pair flitted in and out of tangled shrubs, two to four feet above the water.

Rounding the backside of an island, we saw our first and only Ringed Kingfisher hunched up high on a branch. Envision a Belted Kingfisher on steroids. Throw in a deep rufous belly and you've got the Ringed. I yelped for joy when it dove headfirst from 25 feet up into the Rio Grande. The bird came up empty-billed and flew off to the far side of the island.

"You were lucky to see one fishing; a Ringed Kingfisher will spend hours on one perch without moving," ornithologist Timothy Brush told me later at the Edinburg Scenic Wetlands, a World Birding Center site located 10 miles north of McAllen. Roseate Spoonbills, herons, cormorants, and egrets crowded the far edge of a pond. A Belted Kingfisher rattled behind us, while a Ringed Kingfisher flew in strong, steady wingbeats over the water.

Brush, a professor at the University of Texas-Pan American, is an authority on the suite of tropical birds that nest on the Lower Rio Grande, including the Ringed Kingfisher — a resident only since about 1970 and part of a trend of southern birds expanding their ranges northward.

I asked him about the similarity between the Ringed and Belted females — as if over time, the full chestnut breast of the Ringed had shrunk to become no more than a rufous band in the Belted. Might there be an evolutionary connection? Could that help explain the mystery?

Brush shook his head doubtfully, suggesting I'd started to descend that slippery slope of misconstruing how evolution works, especially with color. While Ringed and Belted Kingfishers are both crested kingfishers, sharing the same genus (Megaceryle), their color patterns likely have more to do with external factors — such as habitat or behavior.

Where, when, and how to find kingfishers

Where: Rivers, streams, lakes, bays, marshes, and canals that have clear running water. Look for places where overhanging branches provide perches at different levels and where vertical earthen banks are available for nest burrows.

When: Belted occurs year-round in most of the lower 48 states and along the coasts of British Columbia and southeast Alaska; from April to September, it's also found from eastern Canada to the west coast of Alaska. Ringed is found year-round in the Lower Rio Grande Valley of Texas. Green is a year-round resident of southeastern Arizona and south-central Texas.

How: Scan with your naked eye for a white spot in waterside trees; the white collar on all three species stands out. Listen for their calls. Belted's rattle sounds like the ratcheting of a fishing reel. Ringed has a slower, lower, deeper, and more hollow call than Belted's rattle. Green makes a quiet clicking sound, similar to clicking your tongue against the roof of your mouth.

Sun and shade play a role

In shady places, red shows up most effectively as a display color, Hill reports in *Bird Coloration*. In sunny locations, blue is more dazzling. Studies show that the evolution of feather coloration can be linked to environmental lighting. Given the Ringed Kingfisher's preference for shady tropical waters with tall perch trees, the rufous belly of both male and female fits that premise well. In contrast, the smaller Belted can inhabit sunnier habitats because its hovering prowess allows it to fish over open waters. While not as tied to shady spots, a dash of rufous in the female would show up nicely when she veers around a shadowy bend of stream.

What I've learned so far in my bit of detective work is this: The rufous belt in the female likely serves to identify gender rapidly among birds that are highly territorial. The belt color probably comes from melanin, because it's more of a cinnamon or rufous shade than bold red. Since melanins are less costly to produce than carotenes, the belt does not take much energy to retain as a feature in females. That might suggest the belt is there for a simple rather than a complex reason. However, the jury is out. It would be intriguing to investigate how the rufous colors may have evolved in Ringed and in Belted Kingfishers, comparing habitats, lighting, and whether the colors play a role in signaling and in status among females.

Research to test theories on kingfisher belt color has yet to be done, for understandable reasons. While common feeder birds make cooperative subjects for study, kingfishers do not. They're feisty, wary loners. Personally, I find their traits appealing. You have to earn your time with these noisy yet elusive guardians of waterways like Rattlesnake Creek.

In the month I spent watching the nesting pair from the blind, my rewards were great. To succeed, I had to master stillness. Through stillness, I witnessed more than the daily drama of kingfishers feeding their young. A spider wove a web on the blind's screen. Swallowtail butterflies wafted by, while an American Redstart gleaned insects two feet away. Yet each time a kingfisher arrived with that emphatic rattle and a prized fish clamped in its bill, all else faded away, and at last, on June 25, the first perky, crested chick poked its head out of a dark burrow into the sunshine of the world.

Deborah Richie is a Missoula-based writer whose work has appeared in National Wildlife and other magazines. She is writing a book about the Belted Kingfisher.

About this Article

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