

by Paul Hess

Ruffs: A Unique Male Trio

After studying Ruffs intensively since 1984, David B. Lank pronounces this species “the most interesting bird in the world.” The adjunct professor at Simon Fraser University in British Columbia has three persuasive reasons for his view, and they go beyond the male’s unique plumage display for which the bird is named. Alone among birds and mammals, male Ruffs have three alternative mating strategies, each corresponding to a single plumage, behavioral, and genetic morph. Most extraordinary, and unknown until five years ago, is a male that succeeds in acquiring a mate by impersonating a female.

Two of the strategies, first described a half-century ago, are remarkable enough. In one, an “independent” or “resident” male strongly defends his courting territory within a lek against other independent males. These residents, approximately 85% of males, are largely dark-colored and have substantial amounts of black on the head tufts and ruff. In the second strategy, a “marginal” or “satellite” male does not defend a territory within a lek but is allowed free access to a resident’s territory for courting. The satellites have extensive white on the head tufts and ruff. Lank and four coauthors demonstrated in 1995 that the two morphs differ not only in plumage and behavior but also genetically (*Nature* 378:59–62).

The third morph was discovered in the spring of 2004 by workers who were netting, measuring, weighing, and banding Ruffs in The Netherlands. Among 1,134 Ruffs captured, a handful were intermediate in size between males and females. Although those birds’ plumage appeared to be exactly that of a breeding female, laboratory analysis confirmed that they were males. Joop Jukema and Theunis Piersma described this morph for the first time in 2006 (*Biology Letters* 2:161–164). They christened the female-mimic a “faeder,” an Old English word for “father,” and they estimated that faeders account for approximately 1% of the male population.

No field guide yet mentions this third morph, which Lank says is distinguishable from a smaller female only by comparative size. The subject came to birders’ attention when Ted Floyd, the editor of *Birding*, found a Ruff in Boulder County, Colorado, on 1 May 2008. Questions arose about whether it was a first-summer male, a female, or perhaps a faeder. Shorebird experts on the *Frontiers of Field Identifi-*

cation e-mail list judged it to be a year-old male in its first-alternate plumage; see the list archives <listserv.arizona.edu/archives/birdwg01.html> for May 2008, week 1. Lank agrees.

Much remains unknown about genetic, morphological, behavioral, and evolutionary aspects of the mating strategies. For example, how can a resident’s mating success possibly be served by allowing satellites and faeders to share his territory? Such questions and the search for answers are explored at Lank’s “Ruff Project” website <www.sfu.ca/biology/wildberg/ruff.html>, which includes intriguing videos of male displays and other mating behavior. Lank tells *Birding* that the project continues to produce fascinating information, including findings that faeders obtain mates by “sneaking” into a territory, by being directly solicited by females, and by “decoying” displaying males away from real females.



Three morphs of male **Ruff** breeding plumage are, from left to right, a “faeder,” a “satellite,” and a “resident.” This trio is in a captive colony at Simon Fraser University, where David Lank is studying the morphs’ roles in a unique mating system. Burnaby, British Columbia; May 2009. © Susan McRae.

In field studies on the breeding grounds in Finland and in a captive breeding flock of more than 200 birds spanning eight generations, Lank and colleagues are examining phenomena such as genetic mechanisms that maintain the minimal proportion of faeders in a population, adaptive values of males’ extreme plumage variations, patterns of mate choice by females, and the process by which the entire resident-satellite-faeder system maintains itself with no male form outcompeting the others.

New Scrub-Jay Species?

Few North American birds have taken so many taxonomic twists and turns as have jays of the genus *Aphelocoma*—in particular, those currently recognized as the Florida, Island, and Western Scrub-Jay species. Jon Dunn and Kimball Garrett needed only five words in 2001 to summarize scrub-jays' taxonomic history: Geographical variation among the far-flung populations, they said, "has intrigued and confounded ornithologists" (*Western Birds* 32:186–187).

This history takes a new twist in 2009. The North American Classification Committee of the American Ornithologists' Union (the "AOU Check-list Committee") is considering whether two, or possibly three, Western Scrub-Jay subspecies groups should be recognized as full species. Dunn and Carla Cicero have submitted a formal proposal to the committee recommending separate species status for the interior *woodhouseii* group and the Pacific coastal *californica* group. The proposal also tentatively suggests species-level classification of a *sumichrasti* subspecies group in south-central Mexico.

Ranking the interior and the coastal populations as species has gradually gained support in recent decades, based on morphological, vocal, behavioral, ecological, and genetic differences. Recent genetic findings published by Kathleen Semple Delaney, Saba Zafar, and Robert K. Wayne in 2008 (*Auk* 125:839–849) demonstrated what these authors call "a long history of isolation and evolutionary divergence" between the two groups.

In their 2001 paper, Dunn and Garrett described an extensive array of features distinguishing *woodhouseii* from *californica*. Interior birds are duller, are more grayish-blue, with a less contrasting breast band, and have a thinner bill that lacks the hook of coastal birds. Interior birds' calls are higher-pitched and usually have two syllables, whereas coastal birds' calls are lower-pitched and monosyllabic. Interior individuals are shy in comparison with often-tame coastal birds. During the nonbreeding season, interior populations disperse much more widely (although irregularly and in varying numbers) than do coastal birds.

Where they come close to meeting in eastern California, *woodhouseii* and *californica* are ecologically distinct as well, the former breeding in dry mountain ranges and the latter in oak canyons. However, where they occur together in the Pine Nut Mountains of western Nevada, some phenotypically intermediate birds may be hybrids. Although the degree of hybridization is unknown and is a priority for further research, Dunn and Cicero note that these intermediates are few and that breeding in areas of overlap appears to

be primarily assortative.

Delaney and her colleagues reported variations in mitochondrial DNA that divide the Western Scrub-Jay into two major geographic groups corresponding to *woodhouseii* in the interior of the U.S. and Mexico and to *californica* on the U.S. west coast and in Baja California. These groups may have been diverging for as long as 300,000 years—much longer than the 200,000 years estimated for divergence of the Island Scrub-Jay (*A. insularis*), which is classified as a separate species.



If a recent proposal to the American Ornithologists' Union is accepted, this **Western Scrub-Jay** of the interior U.S. would be named Woodhouse's Scrub-Jay—a species morphologically and genetically distinct from the California Scrub-Jay. *Santa Fe National Forest, New Mexico; December 2008.* © Jacob Spindelov.

Making a case for *sumichrasti* species status is less clear-cut. The Delaney team found that it is more closely related to *woodhouseii* than to other Western Scrub-Jay populations and that its mtDNA divergence from *woodhouseii* is slight. Dunn and Cicero agree that separating *sumichrasti* is "more problematical," but they suggest that its distinctions in plumage, bill structure, vocalizations, and cooperative breeding behavior are worth further evaluation.

The *woodhouseii*–*californica* divergence represents a biogeographical pattern demonstrated by many pairs of closely related taxa that are separated along a Sierra Nevada–Cascades axis between the Pacific coastal slope and the Great Basin. Examples include Pacific-slope Flycatcher and Cordilleran Flycatcher, Cassin's Vireo and Plumbeous Vireo, Oak Titmouse and Juniper Titmouse, Nashville Warbler and Virginia's Warbler, and Purple Finch and Cassin's Finch, as well as subspecies of Steller's Jay, Bushtit, White-breasted Nuthatch, and Fox Sparrow. These towering mountains clearly represent a significant barrier to gene flow between bird populations.

Tracking Songbirds' Travels

Two Purple Martins and five Wood Thrushes carrying tiny backpacks have made an ornithological dream come true: long-distance tracking of individual songbird migrants through their entire fall, winter, and spring cycle. Bridget J. M. Stutchbury and seven coauthors needed only a single page in the journal *Science* in 2009 (323:896) to report this historic look at details of small birds' long-distance movements.

Records of the travels were archived in "light-level geolocators," instruments that compile a day-to-day record of sunrise and sunset times from which latitudinal and longitudinal positions can be calculated. In 2007 Stutchbury's team fitted the units to 20 Purple Martins and 14 Wood Thrushes on their breeding grounds in Pennsylvania. In the following spring, the team captured two of the martins and five of the thrushes. When the sensors' information was downloaded and analyzed, a previously unknown story unfolded about migration routes, flight speeds and durations, stopover locations, and movements during the winter.

The two martins' fall migration was highly synchronized. They hurried south across the Gulf of Mexico to the Yucatan Peninsula, covering 2,500 kilometers in just five days. There, they stopped for three to four weeks before continuing to the wintering grounds in Brazil. The total trip, 6,700–6,800 kilometers, took 43–45 days. The martins' spring migration was slightly farther and less synchronized, but it was much faster. One traveled 7,500 kilometers in just 13 days, including four stopover days, and the other martin flew 7,600 kilometers in 27 days, including nine stopover days.

The five thrushes' flight and stopover behaviors varied greatly in the fall. They traveled as far as 3,400 kilometers to wintering grounds in a narrow latitudinal band in Hon-

duras and Nicaragua. The trips took 24–58 days, including stopovers of 15–49 days in the southeastern U.S. and the Yucatan Peninsula. As with the martins, four of the male thrushes' spring migrations were slightly farther and much faster than in the fall. They traveled 3,500–3,900 kilometers in 13–15 days, including stopovers of 4–5 days. The fifth thrush, a female, went her own way. Instead of returning directly north across the Gulf of Mexico as the males did, she

chose a far longer overland route westward through Mexico, and then northeastward from Texas to Pennsylvania.

The ability to study songbirds in this manner is the culmination of a decade of research, primarily by the British Antarctic Survey, whose engineers developed a unit to track Wandering Albatrosses. The perennial objective has been a lighter unit, and the scientific literature shows the progress: 16 grams by 2001, 9 grams by 2004, 1.5 grams by 2007, and 1.2 grams by 2009. Global satellite tracking would offer continuous data in real time, more precise locations, and no need for recapture, but a unit light enough for small birds remains an elusive goal. Martin Wikelski at the Max Planck Institute for Ornithology in Germany is urging an international effort to develop a satellite receiver system using a 1-gram tag <www.icarusinitiative.org>.

Knowing migrants' whereabouts is critical to conservation, illustrated in this case by highlighting the Yucatan Penin-

sula's importance as a stopover site. Obtaining such knowledge is expensive. The Natural Sciences and Engineering Research Council of Canada, the National Geographic Society, and the Purple Martin Conservation Association provided funding for the project. One more source is notable: proceeds from the sale of Stutchbury's acclaimed book *Silence of the Songbirds: How We Are Losing the World's Songbirds and What We can Do to Save Them* (Walker and Company, 2007).



The **Purple Martin** is one of two species recently tracked from its breeding grounds to South American winter quarters and back by the use of miniature "light-level geolocators." Wood Thrushes were similarly tracked to and from Central America in the historic project. *Harris County, Texas; May 2002.* © Brian E. Small.

Conserving the “Fool Hen”

The Spruce Grouse, famous as the “fool hen” for its seemingly stupid fearlessness of humans, has been studied well in particular localities and ecological settings. Yet it has never received a range-wide assessment of population size, habitat preferences, current threats, research needs, and requirements for conservation. A 60-page “Continental Conservation Plan for Spruce Grouse” published in 2008 by the Association of Fish and Wildlife Agencies <foolhen.org> begins to close the gaps in our knowledge.

The fundamental gap is a reliable population estimate for a species whose range spans North America’s boreal forest from Alaska to Nova Scotia, mostly in remote and inaccessible regions. Moreover, the birds are not uniformly distributed in all areas of available habitat, and local populations are known to rise and fall with stages of forest succession. After frustrating attempts to extrapolate from population densities in particular locations, the plan offers only a broad estimate ranging from 5 million to 16.5 million birds and warns that the estimate “should be viewed with a great deal of caution.”

Similar uncertainty clouds efforts to determine population trends. The North American Breeding Bird Survey does not track the species, and the Christmas Bird Count provides only a minuscule and virtually meaningless sample. In general, the plan describes the Spruce Grouse as “secure” across most of its vast range but “declining or rare along the southern fringe, particularly in the east.” A high priority, in the researchers’ view, is a standardized population monitoring system to refine what are mainly educated guesses.

The plan views hunting pressure as “of little worry” except perhaps near towns, where the birds’ tameness can make them vulnerable. Hunting is not legal anywhere the Spruce Grouse is said to be at risk. Even where it is protected from hunting in Maine, Michigan, New Hampshire, New York, Nova Scotia, Oregon, Vermont, and Wisconsin, populations are decreasing. In those regions and westward along the southern fringe, unfavorable habitat conditions are the critical threat. Beyond a general requirement of coniferous habitats for its specialized diet of conifer needles, its particular preferences with regard to forest age, structure, and composition vary greatly. The species occurs

in subalpine forests in Washington, coastal hemlock and spruce in southeastern Alaska, 10-year-old jack pines in central Ontario, mature spruce-fir in coastal Maine, and tamarack edges and bogs in Vermont. Management efforts must be tailored precisely to each forest type.

In the west, little conservation attention has been given to “Franklin’s” Grouse, the *franklinii* subspecies of Spruce Grouse, resident in the Rocky Mountains region from Alaska to Wyoming. On the eastern slopes of the Cascades and in subalpine forests of the northern Rockies, a lack of concern “is probably unjustified,” according to the plan, because timber harvest, fire suppression, infestation by bark beetles, and incursions by noxious plants may be signifi-



For the first time, **Spruce Grouse** populations are being evaluated range-wide in a continental conservation plan. Population declines are particularly severe in southern regions of this species’ vast range, and wildlife specialists want to find out why. *Somerset County, Maine; May 2009. © Garth McElroy.*

cant threats. In the upper Great Lakes and northeastern states, major concerns are urbanization, conversion of forests to agriculture, and isolation of small patches of appropriate habitat within large, unsuitable areas. Where Spruce Grouse declines are most conspicuous, major conservation studies have been undertaken in Vermont and New York, and research is active in Wisconsin.

None of this accounts for possible effects of climate change. While noting that the impact is impossible to predict, the plan speculates that conifer distribution could retract northward and that beetle infestations might intensify. In the meantime, “this wild bird as tame as a barnyard fowl,” as Edward Howe Forbush described it, faces immediate problems to be solved.