by Paul Hess

Revisions Proposed in Raptor Taxonomy

The American Ornithologists' Union listed Swallow-tailed Kite, White-tailed Kite, Mississippi Kite, and Snail Kite consecutively in 1886 in the first *Check-list of North American Birds*, and they remain placed together today. The placement is significant because the *Check-list* arranges species in a systematic order: Species listed most closely together are considered to be most closely related taxonomically. Recent genetic research, however, is revealing that these four kites are not very close relatives after all.

The latest evidence comes from a molecular survey of the diverse family Accipitridae—kites, eagles, hawks, and allies—reported by Carole S. Griffiths, George F. Barrowclough, Jeff G. Groth, and Lisa A. Mertz in 2007 (*Journal of Avian Biology* 38:587–602). Their study depicts patterns of evolutionary relationships among 54 accipitrid genera. It is the broadest molecular coverage this family has received at the genus level. Rather than using mitochondrial DNA, the authors examined DNA variations within a large nuclear gene named the RAG–1 exon.

Differences in DNA sequences produce a phylogenetic tree whose separate branches represent evolutionary clades—assemblages of related taxa whose members diverged from a shared ancestor. At the most basal level, the authors divide the Accipitridae into three subfamilies: Sagittariinae, the Secretarybird of Africa (*Sagittarius serpentarius*); Pandioninae, the Osprey; and Accipitrinae, all other species in the family.

A number of findings by Griffiths and her colleagues depart considerably from traditional taxonomic treatments, including some traditions that persist in the AOU *Check-list* today. Such departures are well illustrated by relationships among North American kites, whose lineages are shown to be less closely related than they were previously assumed to be. The new evidence scatters the kites through widely divergent evolutionary branches in the Accipitridae:

- The White-tailed Kite's genus, *Elanus*, is a far more ancient lineage than the other kite genera. *Elanus* represents a "basal" clade, which diverged from an ancestor shared by the lineage that now contains all the world's other accipitrid species except the Secretarybird and the Osprey.
- The Swallow-tailed Kite's genus, *Elanoides*, is more closely related to groups of African vultures and various raptors of Asia, Australia, and the western Pacific than to the White-tailed, Mississippi, and Snail Kites. (*Chondrohierax*, the Hook-billed Kite's genus, is not included in this study but was placed close to *Elanoides* in a molecular analysis reported by Heather R. L. Lerner and David P. Mindell in 2005 (*Molecular Phylogenetics and Evolution* 37:327–346).
- The Snail Kite's genus, *Rostrhamus*, is more closely related to *Buteo* than to our other kites.
- The Mississippi Kite's genus, *Ictinia*, is more closely related to *Haliaeetus*, the genus of Bald Eagle, White-tailed Eagle, and Steller's Sea-Eagle, than to our other kites. (The AOU did not formally recognize this close relationship until 1983 when the two genera were moved to adjacent *Check-list* positions. Originally the AOU had listed *Ictinia* and *Haliaeetus* at opposite ends of their subfamily.)

A new molecular survey of the raptor family Accipitridae uncovers surprising relationships among the family's species. For example, the **White-tailed Kite** is not a close relative of three other North American raptors called kites. *Hidalgo County, Texas; November 2007. © Alan Murphy.*

These findings for the kites are merely one facet of the Griffiths team's extensive results. The researchers provide a detailed classification of the accipitrid genera in a five-level taxonomic hierarchy—subfamily, tribe, subtribe, infratribe, and genus—to demonstrate different degrees of evolutionary divergence. The relationships of the individual genera within the higher ranks of subtribe and infratribe are presented as subject to change pending further genetic sequencing. However, the authors consider their classifications to be well-supported at the levels of subfamily and tribe, and they suggest that a number of taxonomic revisions in the Accipitridae would be "desirable."

Fruit Lovers Prefer Invasive Plants

Give hungry American Robins and European Starlings a choice between fruits of native plants and fruits of invasive plants. Which would they prefer to eat? Nancy E. LaFleur, Margaret A. Rubega, and Chris S. Elphick report interesting findings in 2007 after experiments with seven robins and ten starlings captured in Connecticut. Both species in the sample showed preferences for two non-native fruits (*Wilson Journal of Ornithology* 119:429–438).

In each of three tests the birds were offered a choice between fruits of a native and a non-native plant from their home locality in New England. Fruits for each pair were selected to match each other as closely as possible in morphology, fruiting time, and co-occurrence in local old-field habitat. Invasive autumn olive was paired with native winterberry, invasive multiflora rose with native swamp rose, and invasive glossy buckthorn with native highbush blueberry.

In that experiment, both the robins and the starlings strongly favored autumn olive and multiflora rose over the native counterparts, as judged by how many fruits were eaten in each trial. Results were different, however, when the choice was between buckthorn and blueberry. In this case, the starlings preferred native blueberry, and the robins ate both kinds of fruits with no apparent preference.

Another set of experiments used autumn olive, multiflora rose, and Asiatic bittersweet to judge the birds' willingness to eat non-native fruit when no other food was available. "Willingness" was measured by how long the birds waited before beginning to eat. Both species favored the autumn olive. Starlings began to eat it more quickly than either the multiflora or the bittersweet. Robins began to eat it sooner than the bittersweet, but they were almost as willing to eat the multiflora.

A third series of experiments tested whether the birds would prefer a familiar food over a food they had not seen before. The authors created two novel foods by altering the usual maintenance diet with food coloring to bright blue-green and to silvery gray—colors these local birds were unlikely to have encountered in the wild. When offered the familiar and the novel foods simultaneously, both robins and starlings favored the familiar one. When familiar food was not made available, the birds ate the novel food although robins waited much longer than starlings to sample it.

LaFleur, Rubega, and Elphick note that birds as abundant and wide-ranging as robins and starlings are highly effective seed dispersers. A preference for non-natives could provide an additional boost to the spread of established invasives that already are competitively destroying native plant communities. The authors suggest further that a willingness to eat unfamiliar fruits might contribute to initial expansion of newly introduced non-native plants.

Recent dietary experiments gave American Robins and **European Starlings** in Connecticut a choice of fruits from native and exotic plants. The tested birds of both species preferred exotic autumn olive and multiflora rose over similar native plants. *Harris County, Texas; July 2006. © Alan Murphy.*

Ironically, although damaging to native plant populations, invasives may benefit some bird species. For example, multiflora rose has long been recognized as a favorite winter food of the Northern Mockingbird. Edmund W. Stiles suggested further in 1982 that the mockingbird's expansion northward into New England was made possible because multiflora fruit provides a higher-energy diet in winter than many natural fruits provide in that region (*American Birds* 36:358–364). At the same time, of course, destruction of diverse native vegetation threatens populations of many other bird species.

Investigating why the tested robins and starlings preferred invasive fruits was outside the scope of the Connecticut research, but LaFleur and her colleagues view these unknown factors as "important targets for further study." Marshall Iliff and Derek Lovitch discuss this topic in *North American Birds* (Winter 2006–2007, pp. 208–224).

Birds Can Change Tree Chemistry

Birds benefit deciduous trees directly by preying on caterpillars, but coniferous trees may benefit in growth and vigor through a more subtle process of avian predation. New evidence comes from an extensive analysis of the complex food web in Colorado's ponderosa pines. Kailen A. Mooney studied a three-tier ecological community in the pine canopy, and his report in 2007 reveals remarkably fine-tuned interactions among the food web's strands (*Ecology* 88:2005–2014).

On one tier, Mountain Chickadees, Red-breasted Nuthatches, Pygmy Nuthatches, and Yellow-rumped Warblers are "top-down" predators of arthropods that live on the tree. The second tier consists of the tree's arthropods—nearly 300 species, from which he collected 111,756 individuals! They include ants and predatory spiders, as well as abundant ant-tended aphids that feed on the tree's tissues. The third tier is the tree itself, whose morphology and defensive chemistry have a "bottom-up" effect on its enemies in the middle tier.

Mooney reported in 2006 that birds can disrupt the mutually beneficial relationship between ants and aphids, with resulting effects on pine herbivores' abundance (*Ecology* 87:1805–1815). Now he demonstrates a full range of effects both "up" and "down" the tiers, which he uncovered by experimentally manipulating the system to exclude birds or ants from the trophic process. Mooney found that many interactions within the community differ according to the presence or absence of ants. Birds had stronger negative effects on pine herbivores in the presence of ants than in the absence of ants. Two examples of his findings: Birds reduced the abundance of tended aphid species by 85 percent when ants were present, but only by 61 percent when ants were absent. Birds reduced total herbivore abundance by 66 percent on trees with ants, but only by 40 percent on trees without ants.

Despite the interactive effects of birds and ants on herbivore abundance, only predation by birds ultimately "cascaded" down the trophic tiers to affect pine growth. By reducing herbivores' numbers regardless of whether ants were present, birds increased foliage growth by 18 percent and wood growth by 34 percent during the study period. These benefits did not arise from predation on needle-chewing herbivores such as caterpillars; chewers removed only 5 percent of foliage that grew during the three years of the study. Rather, the effects resulted from a reduction in aphids and other species that feed on phloem sap, which cycles nutrients through the tree.

Mooney discovered a further indirect effect when he analyzed the pines' phloem chemistry. Pine phloem contains a variety of monoterpenes, natural chemical "pesticides" in the trees' tissues, some of which are known to resist or repel parasites and herbivores. Birds increased the abundance of three monoterpenes by 83 percent on trees without ants, although no effect was detectable where ants were present. It is not known whether such changes improve a pine's "immune system" against disease or enhance its chemical defenses against enemies, but Mooney speculates that either benefit is possible. Judging by Mooney's findings, effective conservation of these pine forests requires preserving not only the trees themselves but also their entire ecological communities.

Through interactions within a complex food web, birds such as the **Red-breasted Nuthatch** can indirectly cause changes in conifers' chemistry. A recent study demonstrates the process, which involves birds, ants, aphids, and the trees' sap. *New Haven County, Connecticut; January 2004. © Jim Zipp.*

Find “Target Birds” with IBA Website

“IBA” has become a worldwide byword for habitat conservation. BirdLife International originated the Important Bird Area concept two decades ago, and it was soon adopted by the National Audubon Society in the U.S., as well as by Nature Canada and Bird Studies Canada. Approximately 2,100 locations in the U.S. and 600 in Canada are designated as IBAs. The status signifies that birds of conservation importance are present. This often translates into bird species that are highly restricted in distribution and perhaps rare—in other words, species likely to be high on birders’ want-lists.

National Audubon and Nature Canada have huge, searchable IBA databases that birders may find uniquely helpful. Enter a species in the search tool and up pops a list of IBAs where it occurs. Most pages include a detailed habitat description, a narrative discussing the IBA’s species of concern, and often an estimate of their seasonal populations. See the websites at <iba.audubon.org/iba/siteSearch.do> for the U.S. and <bsc-eoc.org/iba/IBAsites.html> for Canada.

We don’t need the websites to learn the single hotspot for Yellow-footed Gull or Island Scrub-Jay because almost every up-to-date field guide tells us exactly where to look. Most usefully, the websites can suggest places to see widespread but thinly or unevenly distributed species typically ranked as Code 2 in the *ABA Checklist*. A few sparrows at IBAs in the U.S. are examples:

- Enter Baird’s, and nine IBAs are listed. Medicine Lake National Wildlife Refuge in Montana had an estimated 647 males in the 2002 breeding season. As bonuses, 259 male Sprague’s Pipits and 836 male Chestnut-collared Longspurs were estimated in that season.
- Enter Henslow’s, and 64 IBAs are listed. Big Oaks National Wildlife Refuge in Indiana had an estimated 629 breeding pairs in 2004. Meanwhile, 122 Whip-poor-wills were censused in point-counts that year.
- Enter Le Conte’s, and 12 IBAs are listed. Crex Meadows State Wildlife Area in Wisconsin had an estimated 100 breeding pairs in 2000–2004. Approximately 1,000 pairs of Sedge Wrens and 50 pairs of Nelson’s Sharp-tailed Sparrows were also estimated there during the period.

Where are prime places to look for an uncommon species you want to see? As a start, search two databases that describe hundreds of “Important Bird Areas” (IBAs) in North America. For example, enter **Henslow’s Sparrow**, and 64 IBAs are listed where they occur. *Muskingum County, Ohio; May 2007. © Brian E. Small.*

Check out Yellow Rail on Canada’s website. Douglas Marsh near Brandon, Manitoba, had an estimated minimum of 500 pairs in 1995 at what is still believed to be Canada’s largest colony south of the Hudson Bay lowlands. A hotspot for birders in the Northeast is the Lower St. John River IBA in New Brunswick, where a breeding population of at least 100 individuals is estimated at the largest wetland complex in the Atlantic provinces.

Many of the pages have limitations. Some population estimates are as recent as 2007; others are much longer ago. There are no estimates for IBAs where censuses have not been conducted, and those are obviously no help in judging the likelihood of encountering a species; hundreds of birds might be present every year, or one bird might have been seen five years ago.

Naturally, the two websites are not substitutes for the dozens of state and regional bird-finding guides available. But a birder would need a lot of these books for guidance to prime locations for seeing widespread yet very local species.