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# SIMULTANEOUS USE OF A SNAG BY THREE BREEDING BIRDS IN CENTRAL FLORIDA

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Many records document simultaneous use of a tree or snag by multiple species of cavity-nesting birds. Most such nesting associations involve two species, one of which is usually a woodpecker (Hoyt 1948, Reller 1972, Venables and Collopy 1989, Ingold 1990). Fewer observations document nesting associations of three or more species. Gutzwiller and Anderson (1986) recorded simultaneous nesting by a pair each of American Kestrel (*Falco sparverius*), Red-headed Woodpecker (*Melanerpes erythrocephalus*), and European Starling (*Sturnus vulgaris*) in a decayed limb of a living tree in Wyoming. Sprunt (1931) described simultaneous site use of two pairs of Northern Flicker (*Colaptes auratus*) and one pair each of Eastern Screech-Owl (*Otus asio*), Downy Woodpecker (*Picoides pubescens*), and Great Crested Flycatcher (*Myiarchus crinitus*) in a tree in South Carolina. I describe herein the habitat characteristics, behavioral interactions, and breeding phenology of a nesting association of Red-headed Woodpecker, Northern Flicker, and Great Crested Flycatcher in central Florida. My information is based on >7 hours of observation made from mid-May through June.

The nest snag was located in a sandhill at Wekiwa Springs State Park (WSSP), Orange County, that was dominated by a longleaf pine (*Pinus palustris*) canopy, turkey oak (*Quercus laevis*) understory, and wiregrass (*Aristida beyrichiana*) ground cover. The nest snag was a lightning-killed longleaf pine that was 19.3 m in height with a diameter at breast height (DBH) of 43.2 cm. No bark remained and 8 limbs were ≥1 m long. Nest cavity height, diameter of bole at cavity entrance, and cavity orientation were, respectively, 10.1 m, 36.1 cm, and 190° for Red-headed Woodpecker; 15.7 m, 24.6 cm, and 300° for Northern Flicker; and 14.5 m, 29.0 cm, and 285° for Great Crested Flycatcher. Snags (≥7.6 cm DBH) were quantified in five 0.04-hectare circles (James and Shugart 1970) in the vicinity of the nest snag and, for comparison, at 24 additional Red-headed Woodpecker nests in WSSP sandhills. The nesting association area was below average in snag (longleaf pine and *Quercus* spp.) relative dominance (7% vs 20%, SD = 16) and longleaf pine snag density (5/ha vs 27/ha, SD = 25) and basal area (0.83 $m^2$/ha vs 1.96 $m^2$/ha, SD = 1.83), and near average in *Quercus* spp. snag density (20/ha vs 22/ha, SD = 21) and basal area (0.37 $m^2$/ha vs 0.44 $m^2$/ha, SD = 0.48).

On 14 May 1997, a color-banded male Red-headed Woodpecker and its mate were feeding nestlings at their cavity and a Northern Flicker was in its cavity. While a Red-headed Woodpecker and female Northern Flicker were in their cavities at 1235 on 15 May, a Great Crested Flycatcher arrived to feed nestlings in its cavity. The Great Crested Flycatcher attacked the female Northern Flicker three times when the latter emerged from its cavity. At 1249 the male Northern Flicker arrived, copulated with its mate, chased away the Great Crested Flycatcher, and then entered its own cavity. At 1251 both Great Crested Flycatchers perched near their own cavity. From 1300-1423 the Red-headed Woodpeckers fed twice, the male Northern Flicker remained inside its cavity tapping or excavating, and a Great Crested Flycatcher attacked the male Northern Flicker while the latter was still in its own cavity. Observations ended at 1423 when the female Northern Flicker arrived and replaced the male at the cavity.

On 21 May, observations of the nesting area were made from 0731-1146 and 1221-1309. Only the Red-headed Woodpeckers fed young during these periods, making 45 vis-

its to the cavity. When perched on the snag and not feeding nestlings, 77% (17 of 22) of the Red-headed Woodpeckers' movements were to locations within 2 m of their nest cavity and 23% (5 of 22) were to the top of the snag. Incubation periods for the Northern Flickers were 1 h 3 min and 1 h 22 min for the female, and 49 min and >54 min for the male. The Great Crested Flycatchers did not visit the snag but remained in their territory and gave 19 *wheep* calls within 100 m of the snag. Both adult Great Crested Flycatchers perched once in a large sand live oak (*Quercus geminata*) 9 m from the snag.

Several agonistic behaviors were observed on 21 May, but only one involved interaction between members of the nesting association. This interaction occurred when a Red-headed Woodpecker attempted to alight at the top of the snag, which was occupied by the male Northern Flicker. The Northern Flicker gaped as it watched the Red-headed Woodpecker approach the snag. When within 2 m of the Northern Flicker, the Red-headed Woodpecker changed its course of flight and landed at its own nest. Agonistic behaviors by a Red-headed Woodpecker toward other species consisted of "churring" at a low-flying Cooper's Hawk (*Accipiter cooperii*) and Red-shouldered Hawk (*Buteo lineatus*) and twice attacking and chasing a Red-bellied Woodpecker (*Melanerpes carolinus*) from the vicinity of the snag. Agonistic behaviors by the male Northern Flicker consisted of displacing a Red-bellied Woodpecker from the top of the snag and, in an apparently agitated manner, landing at and looking into the Great Crested Flycatcher nest cavity. However, when a Red-headed Woodpecker, Northern Flicker, and Great Crested Flycatcher once perched together in the sand live oak near the nest snag, no obvious agonistic behaviors were detected.

A Red-headed Woodpecker removed a fecal sac from its cavity on 27 May, while the female Northern Flicker was in its cavity. On 19 June, one fledgling Red-headed Woodpecker was perched near the nest snag. No Northern Flickers were present at the snag, but a female Northern Flicker was incubating three eggs in a recently excavated cavity in a turkey oak snag 50 m from the pine snag. The pine nest snag fell on 8 or 9 July. The Red-headed Woodpecker and Great Crested Flycatcher nests contained egg fragments. The Northern Flicker nest was empty.

Several ecological and behavioral factors potentially contributed to the concentration of species at the snag. The low relative dominance of snags, particularly longleaf pine, in the nesting area indicated a local scarcity of suitable substrate for cavity-nesting birds. Concurrently, the main exhibitors of sociality in North American picids are terrestrial (*Colaptes*) and some melanerpine woodpeckers (Short 1979). However, Red-headed Woodpeckers and Northern Flickers differ greatly in foraging strategy. Red-headed Woodpeckers in north-central Florida flycatch during ca. 80% of foraging time during the breeding season (Venables and Collopy 1989). Conversely, Northern Flickers are considered the most terrestrial North American woodpecker with ants constituting approximately 50% of its diet (Beal 1911). Red-headed Woodpeckers and Northern Flickers have simultaneously used a nest tree in Illinois (Reller 1972). At WSSP, this behavior has been observed twice (this account; Parks Small, pers. comm.) during observations of 110 Red-headed Woodpecker nests over 5 breeding seasons.

Taylor and Kershner (1991) studied 46 Great Crested Flycatcher pairs breeding in boxes in central Florida and stated that the flycatchers vigorously defend their territories. All picid intrusions into Great Crested Flycatcher territories were repelled and one attack against a Northern Flicker was noted as being particularly severe. Gabrielson (1915) observed Great Crested Flycatchers chasing from their nest a Red-headed Woodpecker and Northern Flicker. Stauffer and Best (1982) reported that Red-headed Woodpecker and Great Crested Flycatcher nests in riparian habitats in Iowa are "notably similar" and suggest a potential for considerable nest-site competition.

The failure of the Great Crested Flycatcher and Northern Flicker nests may have resulted from egg and young depredation. Red-headed Woodpeckers depredate the nests of Northern Flickers (Bendire 1895, Burns 1900) and many passerines (Bendire 1895,

Beal 1911) and they have been documented exhibiting this behavior at WSSP (Belson and Small 1998). Northern Flickers also depredate passerine nestlings (Allert 1934).

The color-banded male Red-headed Woodpecker used the snag continuously as a nest and roost site since the 1996 breeding season and, therefore, was present at the snag at the beginning of the 1997 breeding season. The Great Crested Flycatchers were second and Northern Flickers third to occupy the snag. The Red-headed Woodpecker breeding attempt was successful, as proven by the presence of a fledgling. The Great Crested Flycatcher and Northern Flicker nesting attempts were apparently unsuccessful. Male Red-headed Woodpeckers are highly territorial and at WSSP occupy individual snags year-round for ≤ 3 years (M. S. Belson, unpubl. data). This behavior likely contributed to the Red-headed Woodpecker being the only successful breeder of this nesting association.

These observations were made during a study of use of habitat by Red-headed Woodpeckers at Wekiwa Springs State Park. I thank the Florida Ornithological Society, Gopher Tortoise Council, and Citizens for Wekiva Basin GEOpark for their financial support. The comments of Parks Small, Walter Taylor, and Doug McNair are appreciated.

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