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RED-WINGED BLACKBIRDS AT NOCTURNAL ROOST SITES IN SAVANNAS

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The status and activities of Red-winged Blackbirds (*Agelaius phoeniceus*) in the longleaf pine ecosystem are not well understood. In longleaf pine forest, Red-winged Blackbirds (mostly females) occur infrequently and in low numbers during winter, when they are primarily opportunistic predators on seeds of open cones, an irregular resource (McNair *in press*). The occurrence of Red-winged Blackbirds in savannas has never been documented. My major objective is to document that Red-winged Blackbirds roost in savannas of the longleaf pine ecosystem. I also evaluate the structure of several nocturnal roost sites. Red-winged Blackbirds have not been previously documented to roost in savannas of the longleaf pine (*Pinus palustris*) ecosystem or other native upland grassland habitats in the southeastern United States (Meanley 1965, 1971; Yasukawa and Searcy 1995).

The Apalachicola District of the Apalachicola National Forest contains 2,329 ha of savannas, the highest concentration of native upland grasslands in northwestern Florida. These open treeless areas are normally water saturated for < 3 months/year (Frost et al. 1986). More than 95% of these savannas are concentrated around Sumatra and Wilma.

I observed Red-winged Blackbirds fly in to roost near dusk or fly out of roosts at dawn in six savannas (concentrated along Liberty County road 379 and forest service roads 123 and 180, about 10 km north of Sumatra) on almost a daily basis during the winter of 1994-1995, but few of my observations were detailed. In two subsequent winters (1995-1996, 1996-1997), I counted nocturnal winter roosts of Red-winged Blackbirds on a more systematic basis. In 1995-1996, I conducted 25 counts from mid-October to late March, in 1996-1997, 19 counts. Most larger, permanent winter roosts occurred in two of the larger savannas and I focused on these. Savanna 76A (stand 35), 66 ha, located in forest service compartment 76, was last burned by prescription on 29 July 1996. In winter 1995-1996, this wet-mesic savanna was dominated by beak rush sedge (*Rhnchospora chapmanii*) and panic grasses (*Panicum* spp.); in winter 1996-1997, this savanna was dominated by wiregrass (*Aristida beyrenchium*). Scattered black gum (*Nyssa sylvatica*) shrubs occur in the area. Savanna 71B (stand 26), 116 ha, located in compartment 71, was last burned by prescription on 22 January 1997; the previous burn was on 29 June 1995. This mesic savanna was dominated by grasses (especially wiregrass and bluestem *Andropogon virginicus*) in the winter of 1995-1996. In 1996-1997, beak rush sedge was the dominant species.

I sampled vegetation at four roost sites in December and January of 1996-1997. I obtained ten samples for each roost by passing a wooden dowel (0.9 cm diameter) through the vegetation and placing the end on the ground at 5 m intervals along two 20-m long transects which were centered on the roost site and spaced 5 m apart. I measured the number of contacts with live and dead plant material on the dowel for 10-cm intervals at each point. I also measured the maximum vegetation height within a 1-m square quadrant centered on each point.

Small numbers (< 100) of Red-winged Blackbirds arrived and roosted at night in the Wilma savannas by 19 October 1995. Larger (> 200) numbers arrived each year by mid-November (11 Nov 1995; 19 Nov 1996). Blackbirds declined precipitously by late March when the last individuals were detected at nocturnal roost sites (< 100 birds); one flock of

170 females flew over a savanna on 28 March 1995. Thus, nocturnal winter roosts in the Wilma savannas occurred over a 5-month period, but relatively large numbers were concentrated into just over 4-months (mid-November to mid-March). I detected peak numbers each winter in December (3,000, Savanna 76A, 27 December 1995; 4,300, Savanna 71B, 13 December 1996). Most birds were females; the proportion of roosting males (all immatures) was low (< 20%). All nocturnal roosts consisted only of Red-winged Blackbirds, with the exception of small numbers (< 10) of Rusty Blackbirds (*Euphagus carolinus*) at one site (Savanna 76A) on 18 November 1995. Red-winged Blackbirds roosted 7-23 min after sunset (n = 5), and departed 3-8 min before sunrise (n = 2).

The younger savanna (5-6 months post-fire) had less dense vegetation (lower number of vegetative contacts) at winter roost sites than the older savanna (18-19 months post-fire) (Table 1); 91% of all contacts were 30 cm or less. The maximum height of vegetation among the two savannas was similar (Table 1), although slightly higher in the older savanna.

This study documents permanent nocturnal winter roosts of Red-winged Blackbirds in savannas of the Apalachicola National Forest in northwest Florida. These roosts were almost always monospecific and small (≤4,300 birds), in contrast to the frequent pattern of large mixed-species roosts with other species of icterids and Starlings (*Sturnus vulgaris*), although many tidal marsh roosts contain only Red-winged Blackbirds (Meanley 1965). The seasonal timing and duration of these winter roosts in savannas are in agreement with information on Red-winged Blackbird roosts reported at many other localities on the winter range in the southeastern United States (Meanley 1965, Mott 1984, Yasukawa and Searcy 1995). Icterids other than Red-winged Blackbirds and Starlings are scarce to absent during winter in the vicinity of the Wilma savannas with the exception of Common Grackle (*Quiscalus quiscula*) which roosts in forests. American Robins (*Turdus migratorius*) sometimes join blackbird roosts during winter (Meanley 1965, 1971) but did not join Red-winged Blackbirds in these savannas.

Meanley (1965, 1971) described the specific vegetative communities that are typically used as nocturnal roost sites by Red-winged Blackbirds in the southeastern United States. Red-winged Blackbirds often select coastal wetland habitats for nocturnal roost sites (Meanley 1965, 1971; Yasukawa and Searcy 1995), although they will also select roost sites in urban and suburban areas (Mott 1984). Meanley (1965, 1971) emphasized that dense cover was the most important attribute of optimal roost sites; Meanley found highest roosting densities in deciduous trees and other tall vegetation where vertical stratification was possible. Several subsequent quantitative studies of nocturnal roost sites during autumn and winter in the eastern United States also emphasized dense canopy cover and high tree densities as important attributes (Lyon and Caccamise 1981, Micacchion and Townsend 1983). However, both Meanley (1965) and Yasukawa and Searcy (1995) also stated that dense cover provided by high marsh vegetation such as

Table 1. Number of vegetative contacts and maximum height of vegetation measured at four nocturnal winter roosts of the Red-winged Blackbird in two Wilma savannas (71B, 76A) of the Apalachicola National Forest, winter 1996-1997.

Roost site	Median number of birds	Savanna site-age (months since fire)	Number of vegetative contacts mean ± SD (median)	Maximum height (cm) of vegetation mean ± SD (median)
1-76A	600	5-6	13.4 ± 3.4 (13.5)	81.8 ± 11.9 (78.5)
2-76A	250	5-6	15.7 ± 5.1 (16)	79.6 ± 11.1 (78)
3-71B	800	18-19	22.5 ± 3.2 (21.5)	85.6 ± 10.1 (84.5)
4-71B	1,200	18-19	21.0 ± 4.2 (22)	96.4 ± 11.8 (92.5)

Phragmites is frequently used for nocturnal winter roost sites. Nocturnal winter roosts in early successional habitats, other than in marsh vegetation and rice (*Oryza sativa*) fields, preferably over water, are evidently rare (Meanley 1965, Glahn et al. 1994).

Plant species composition of the savannas I sampled in the Apalachicola National Forest was dominated by wiregrass or beak rush sedge. Vegetation density (cf., Meanley 1965, 1971; Yasukawa and Searcy 1995), specifically dense low groundcover, appeared to be the major vegetative factor which attracted Red-winged Blackbirds to use the savannas as nocturnal winter roost sites, including savannas as young as 5-6 months post-burn. Differences in groundcover density and maximum height because of time since last burn were probably of minimal biological significance since the youngest savannas were used frequently by roosting birds. Blackbirds also roosted in several of these savannas at several wet sites (3 cm standing water) dominated by *Panicum* spp.

The vegetation in these savannas is generally much shorter than other permanent winter roost sites in early successional habitats of the southeastern United States (Meanley 1965, Glahn et al. 1994, Yasukawa and Searcy 1995). Most other roost sites have been at least 1.5-2 m high, in emergent vegetation of rice fields and marshes or dry sites such as canebrakes and sugarcane (*Saacharum officinarum*) fields, where the lowest birds have perched within 15-60 cm of water or the ground (Meanley 1965, 1971; Glahn et al. 1994).

Ground roosts (i.e., grassy fields, rice stubble, weathered-down cattail marshes, and a mat of smartweed [*Polygonum* spp.] vegetation in a pond) were often exclusively composed of females (Meanley 1965). It is not evident if these aforementioned habitats were permanent winter roost sites. The most unusual temporary roost site was rice stubble coated with an ice sheet (Meanley 1965). The predominance of female Red-winged Blackbirds at these ground roost sites is consistent with results in savannas of the Apalachicola National Forest.

In addition, R. T. Engstrom (unpubl. data) observed females and immature males (about 60 birds) at a temporary (< 1 week) nocturnal winter roost site in dense groundcover of the Wade Tract in southwestern Georgia, an old-growth longleaf pine forest tract. Red-winged Blackbirds in the Wade Tract also roosted in monospecific flocks. Savannas of the Apalachicola National Forest and groundcover of longleaf pine forest in the Wade Tract are the only two localities where Red-winged Blackbirds have been documented to roost in native upland grassland habitats in the southeastern United States.

I never observed Red-winged Blackbirds that roosted in savannas of the Apalachicola National Forest to feed there nor did I see blackbirds in savannas during the day. Red-winged Blackbirds may feed in surrounding longleaf pine forest (McNair *in press*), although most birds fly in from greater distances to roost in these savannas. The separation of roosting and foraging activities during winter is the usual pattern of Red-winged Blackbirds in most natural and anthropogenic habitats in the southeastern United States (Meanley 1965, 1971). However, the small roost of Red-winged Blackbirds in the Wade tract also foraged in longleaf pine forest (R. T. Engstrom pers. comm.).

Low numbers and female sex-bias of Red-winged Blackbirds at nocturnal roost sites in savannas and dense groundcover of longleaf pine forest suggest that these upland habitats may be secondary (cf., longleaf pine forests; see McNair *in press*). However, detailed studies are required to elucidate the sex and age bias of roosting birds in the longleaf pine ecosystem, under what conditions roosting behavior occurs (e.g., anti-predator and thermoregulatory benefits; Walsberg and King 1978, Weatherhead and Hoysak 1984), and the basis for sexual segregation at these roosts (e.g., behavioral dominance: Meanley 1965, Gauthreaux 1978, Weatherhead and Hoysak 1984, Searcy 1986, Yasukawa and Searcy 1995; differential migration: Dolbeer 1982; although see McNair *in press*). I propose that nocturnal roost sites in native upland grassland habitats isolated from anthropogenic habitats during winter are probably used primarily by females. Females usually comprise a much smaller fraction of wintering birds at roosts in anthropogenic habitats (Meanley 1965, 1971; Yasukawa and Searcy 1995).

In summary, in the Apalachicola National Forest, northwest Florida, Red-winged Blackbirds occurred at monospecific nocturnal roost sites in savannas (< 2-yr post-burn), which they used repeatedly between three winters (1994-1997). The largest roost count was 4,300. Most birds were females. Birds roosting in savannas did not feed there. The possible implications of these results are discussed.

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