The Winter Roosts and Food Habits of Marsh Hawks in East Central Mississippi

by

Jerome A. Jackson, Michael W. Roberts and James E. Wright

Department of Zoology
Mississippi State University
State College, Mississippi 39652

The Marsh Hawk (Circus cyaneus), a winter resident in the southern half of the United States, often roosts in large numbers in favorable habitat. Weller, Adams, and Rose (1955) reported 80-90 birds at a roost in Missouri. Littlefield(1970) observed up to 66 at a roost in Texas,and Brimley (1935) reported as many as 75 Marsh Hawks concentrated in a small area in North Carolina. Gandy (1970) reported a communal roost of "close to two hundred birds", perhaps the largest Marsh Hawk roost ever discovered, in Lowndes County (B. E. Gandy, pers. comm.), east central Mississippi. We became aware of this large roost in March of 1971 as a result of its proximity to the newly constructed Golden Triangle Regional Airport. During March we made several trips to the roost to survey the site and collect pellets for food habit studies. The following is a summary of our findings.

The Roosts

Trips to the roost site were generally made in late afternoon so that we might observe birds coming to the area for the night. Evidence at the site indicated that a large number of Marsh Hawks had been using the roost during the winter of 1970-1971, but the largest number of birds ever observed was 23. It is possible that by the middle of March the majority of MarshHawks using the area had started their northward migration,though Gandy and Turcotte (1970) report spring records for the species in Mississippi as late as April 23. It is also possible, and perhaps probable, that construction at the airport disturbed the birds enough to make them abandon the area (the roost was located precisely at the north end of the north-south runway).

Most of the individual roosts were within a 1.1 acre quadrangle that was sharply defined by vegetation patterns and that sloped about two degrees to the north. The predominant vegetation in the roost area was broomsedge (Andropogon virginicus) and silver beard grass (Andropogon saccharoides). At the edge of the roost area the Andropogon species diminished abruptly and sericea lespedeza (Lespedeza cuneata) increased. Beyond the site, open grassland extends for approximately a mile to the north, three-fourths mile to the south, and one-fourth mile to the east and west. These boundaries are defined by second growth trees grown up at fence lines. Beyond these limits and within a radius of five miles, the countryside is about 80 percent pastureland and 20 percent second growth bottomland forest.

Individual roosts were characteristically elliptical, 15-18 inches long and 9-12 inches wide. The grasses in the roosts were neatly clipped off 2-3 inches above the ground. Most roosts contained from one to six pellets and were also marked with white fecal matter around the periphery. Three one-tenth acre circular plots were arbitrarily selected within the roost area and each roost within the plots was marked. The number of roosts per plot was 26, 36, and 45. The roosts were more concentrated on higher ground and in the center of the roost area. Some roosts were as close together as 15 inches and occasionally two roosts would appear connected by a "runway". Judging from the density of roosts in the circular plots, it seems likely that the quadrangle contained in excess of 300 individual roosts.

Food Habits

On March 5, 130 Marsh Hawk pellets were collected from approximately 45 roosts in the quadrangle. There had been over 2 inches of rain in the area since March 1, the ground was soggy, and there was evidence of numerous disintegrated pellets. The pellets collected were wet, but appeared to be of recent origin. The pellets were dried for four days at 175 F and were numbered consecutively and put in individual containers. After dissection, prey items were identified with the aid of a reference series of skins and skeletons of local birds and mammals. Reference specimens and the dissected Marsh Hawk pellets are being kept in the bird and mammal collections of the Mississippi State University Department of Zoology.

Six species of mammals, seven species of birds, and one grasshopper were identified from the pellets (Table 1). Some of the pellets also contained pieces of grass. The number of individuals of prey species in a pellet was estimated from the multiple occurrence of some bones or, in the case of mammals, incisors. Molars and incisors were the most reliable indicators for mammal species. Feathers were the most common clue for bird identification, a task which was greatly facilitated by the fact that feathers were almost entirely from the head region of the prey species. Skeletal elements and the horny covering of fringillid tongues were also used for identification.

The cotton rat (Sigmodon hispidus) was the most important prey species, accounting for 40.8 percent of the individual prey animals found in the pellets. The house mouse (Mus musculus) was also common prey (22.6 percent), and was followed in abundance by the harvest mouse (7.2 percent) and the Eastern Meadowlark (5.3 percent). We found mammals in 93.8 percent and birds in 24.6 percent of the pellets. Table 2 indicates the cumulative results of the pellet analysis as summarized by 20 pellet samples. The relative frequency of cotton rats and house mice in the pellets was established in the first sample and fluctuated little in subsequent 20 pellet samples or in the cumulative sample. Over half of the number of prey species identified were present in the first 20 pellets examined.

Discussion

The winter roosts of Marsh Hawks in Georgia have been described (Stoddard, 1931) as "beaten down" spots in a broomsedge field. Gurr (1968) describes the roosts of the Australasian Harrier (Circus approximans) as being "trampled vegetation". Our observation that the grasses in the Mississippi roosts were actually cut short may be the result of our closer scrutiny of the roosts rather than actual differences from the roosts described by these authors. The occurrence of grass in some of the pellets may be a result of the clearing or maintenance of the closely cropped roost sites.

We have found no description of the size of individual roosts of the Marsh Hawk, though the largest of the roosts we observed was much less than the "square yard" of the Australasian Harrier (Gurr, 1968). Stoddard (1931) states that

Table 1. Analysis of 130 Marsh Hawk pellets collected in Lowndes County, Mississippi.

Prey Species In 130 Pellets	Pellets Containing Prey Remains		Individuals Found in Pellets	
	%	N	%	N
Cotton Rat (*Sigmodon hispidus*)	61.5	80	40.8	85
House Mouse (*Mus musculus*)	29.2	38	22.6	47
Harvest Mouse (*Reithrodontomys humulis*)	10.7	14	7.2	15
Shrews (*Cryptotis*, *Blarina*)	7.7	10	4.7	10
Rice Rat (*Oryzomys palustris*)	5.4	7	3.8	8
Rabbit (*Sylvilagus sp.*)	1.5	2	1.0	2
Unknown Mammals	5.4	7	3.4	7
Total Pellets Containing Mammals	93.8	122		
Total Mammals Found in Pellets			83.5	174
Eastern Meadowlark (*Sturnella magna*)	9.2	12	5.3	11
Cardinal (*Richmondena cardinalis*)	6.2	8	3.8	8
Song Sparrow (*Melospiza melodia*)	1.5	2	1.0	2
Slate-colored Junco (*Junco hyemalis*)	1.5	2	1.0	2
Loggerhead Shrike (*Lanius ludovicianus*)	.8	1	.5	1
Field Sparrow (*Spizella pusilla*)	.8	1	.5	1
Starling (*Sturnus vulgaris*)	.8	1	.5	1
Unknown Birds	5.4	7	3.4	7
Total Pellets Containing Birds	24.6	32		
Total Birds Found in Pellets			16.0	33
Grasshopper	.8	1	.5	1
TOTAL PELLETS		130		
TOTAL INDIVIDUALS				208

Table 2. Occurrence of prey in Marsh Hawk pellets in relation to the number of pellets examined.

PREY SPECIES	CUMULATIVE NUMBER OF PELLETS EXAMINED													
	20		40		60		80		100		120		130	
	%*	N**	%	N	%	N	%	N	%	N	%	N	%	N
Cotton Rat	42.9	12	47.2	25	42.0	37	46.5	53	45.0	65	44.9	80	40.8	85
House Mouse	25.0	7	20.8	11	22.7	20	21.1	24	19.9	29	20.1	38	22.6	47
Harvest Mouse	3.6	1	5.7	3	6.8	6	6.1	7	6.8	10	7.9	15	7.2	15
Shrews (sp.)	7.1	2	5.7	3	3.4	3	3.5	4	4.1	6	4.8	9	4.7	10
Rice Rat	7.1	2	7.5	4	8.0	7	6.1	7	4.8	7	4.2	8	3.8	8
Rabbit (sp.)	0.0	0	0.0	0	0.0	0	0.0	0	1.4	2	1.1	2	1.0	2
Unknown Mammals	7.1	2	3.8	2	3.4	3	3.5	4	3.4	5	2.6	5	3.4	7
Eastern Meadowlark	3.6	1	3.8	2	8.0	7	6.1	7	6.2	9	5.3	10	5.3	11
Cardinal	0.0	0	1.9	1	1.1	1	2.6	3	3.4	5	4.8	8	3.8	8
Song Sparrow	0.0	0	0.0	0	1.1	1	1.8	2	1.4	2	1.1	2	1.0	2
Slate-colored Junco	0.0	0	0.0	0	0.0	0	0.0	0	1.4	2	1.1	2	1.0	2
Loggerhead Shrike	0.0	0	1.9	1	1.1	1	.9	1	.7	1	.5	1	.5	1
Eastern Field Sparrow	0.0	0	0.0	0	0.0	0	0.0	0	.7	1	.5	1	.5	1
Starling	3.6	1	1.9	1	1.1	1	.9	1	.7	1	.5	1	.5	1
Unknown Birds	0.0	0	0.0	0	1.1	1	.9	1	.7	1	3.2	6	3.4	7
Grasshopper	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	.5	1	.5	1
TOTAL		28		53		88		114		146		189		208

* % of total individuals found in pellets

** Number of individuals found in pellets

Marsh Hawks return to the same individual roost night after night. This suggests that the number of roosts may be a valid estimate of the number of hawks using the roost site. Though no concentrations of Marsh Hawks have been reported that are of the magnitude of 200 to 300 birds, Gurr (1968) has reported a winter roost of more than 150 Australasian Harriers in New Zealand, and Meinertzhagen (1956) reported a roost of well over 200 Montague's and Marsh Harriers(Circus pygargus and C. aeruginosus) in Kenya.

The high proportion of rodents in the diet of Marsh Hawks wintering in Mississippi is expected. Similar high proportions of rodents have been found by workers in Pennsylvania (Randall, 1940), Missouri (Weller, Adams, and Rose, 1955), and Michigan (Craighead and Craighead, 1956), though these investigators found voles (Microtus spp.) to be the most important food item. Stoddard (1931) found cotton rats to be the most abundant prey species in Marsh Hawk pellets from Georgia. Schnell (1968) considered the Marsh Hawk the most important avian predator of cotton rats in a study in Georgia. The geographic differences in prey indicated by these studies are a function of the distribution of the prey species,and probably indicate little or no difference in the foraging behavior of the hawks, since Microtus and Sigmodon are to a degree ecological equivalents (Svihla, 1929).

The percentage of birds in the diet of Marsh Hawks in Mississippi is higher than reported by other workers, and may reflect the large concentrations of birds known to winter in this area. Our discovery that most of the feathers in the pellets were from the head region of the prey is perhaps explained by the observation of Errington and Breckenridge (1936) that "Prey animals of the usual small sizes ... are dispatched and eaten more or less easily, the heads often being pulled off and swallowed soon after capture."

Summary

A communal roost of the Marsh Hawk in a 1.1 acre broomsedge-silverbeard grass field in east central Mississippi is estimated to have had in excess of 300 individual roosts in the winter of 1970-1971. The roosts were characteristically elliptical, 15-18 inches long and 9-12 inches wide. The grasses in the individual roosts were cropped 2-3 inches

above the ground. Analysis of 130 pellets collected at the roost site indicates that the cotton rat was the single most important prey species, accounting for 40.8 percent of the individual prey found in the pellets. Mammals accounted for 83.5 percent and birds for 16.0 percent of all prey individuals found in the pellets.

Literature Cited

Brimley, H. H. 1935. Unusual gathering of Marsh Hawks in central North Carolina. Auk, 52:445-446.

Craighead, J. J. and F. C. Craighead, Jr. 1956. Hawks, owls and wildlife. The Stackpole Co., Harrisburg, Pa.

Errington, P. L. and W. J. Breckenridge. 1936. Food habits of Marsh Hawks in the glaciated prairie region of the north-central United States. Amer. Midl. Nat., 17:831-848.

Gandy, B. E. 1970. Hawks: Unjustly accused. Mississippi Game and Fish, 33:4-5.

Gandy, B. E. and W. H. Turcotte. 1970. Catalog of Mississippi bird records. State Wildlife Museum, Jackson, Ms.

Gurr, L. 1968. Communal roosting behaviour of the Australasian Harrier Circus approximans in New Zealand. Ibis, 110:332-337.

Littlefield, C. D. 1970. A Marsh Hawk roost in Texas. Condor, 72:245.

Meinertzhagen, R. 1956. Roost of wintering harriers. Ibis, 98:535.

Randall, P. E. 1940. Seasonal food habits of the Marsh Hawk in Pennsylvania. Wilson Bull., 52:165-172.

Schnell, J. H. 1968. The limiting effects of natural predation on experimental cotton rat populations. J. Mamm., 32:698-711.

Stoddard, H. L. 1931. The Bobwhite Quail. Its habits, preservation and increase. Charles Schribner's Sons, New York.

Svihla, A. 1929. Life history notes on Sigmodon hispidus hispidus. J. Mamm., 10:352-353.

Weller, M. W., I. C. Adams, Jr., and B. J. Rose. 1955. Winter roosts of Marsh Hawks and Short-eared Owls in central Missouri. Wilson Bull., 67:189-193.

****

A Scissor-tailed Flycatcher Record

By W. H. Turcotte

On May 27, 1972 I observed a scissor-tailed flycatcher (Muscivora forficata) in a newly planted field beside Highway 49 opposite the Piney Woods School pasture fence, Rankin County. This bird was first seen perched on a wire about 1:30 P.M. by John W. Turcotte who made the sighting and reported it to me by telephone when he arrived home in Jackson. I drove to the site about 5:30 P.M. with my wife and observed the bird closely with binoculars for at least thirty minutes. It was first noticed when it flew from a small tree and alighted on a clod in the field where it remained, perching on clods as it moved about catching insects on the ground. The bird was in beautiful plumage with a full tail and bright salmon-orange markings.

Previously reported sight records for this species in literature are by M. G. Vaiden, Bolivar County, May 11,1952; May 9, 1962 by Mrs. Amy Tolman, Clermont Harbor, Hancock County, and October 7, 1962 by Sammie Danna, Jr., Bolivar County. Mrs. Ethel Floyd photographed a scissor-tailed flycatcher on May 10, 1960 at Clermont Harbor, Hancock County.

****