

Foods of nestling Red-cockaded Woodpeckers in coastal South Carolina.—Food habits of Red-cockaded Woodpeckers (*Dendrocopos borealis*) from various areas in the Gulf coastal plain have been reported by Beal (1911), Beal et al. (1941), Ligon (1970) and Baker (1971), but none of these reports provide any quantitative information on food items fed to nestlings. With the exception of two brief references to Red-cockaded Woodpeckers foraging in cornfields (Dingle 1926 and Ward 1930), we found no information on the food habits of this species in South Carolina coastal plain habitats.

From 4 May 1976 to 30 June 1976 we spent 228 hours watching four clans of Red-cockaded Woodpeckers that were rearing nestlings. Our observations at each nest began within 1 or 2 days after the first nestling hatched and continued periodically until all young had fledged. A 30–40x spotting scope mounted on a tripod approximately 9 m from the cavity entrance was used to identify food items brought to nestlings. The study sites were on the Francis Marion National Forest in Berkeley County, South Carolina. Foraging habitats of the four woodpecker clans included stands of loblolly pine (*Pinus taeda*), longleaf pine (*Pinus palustris*), and mixed loblolly pine and hardwood of various ages and stand densities.

The 12 adult woodpeckers, 2, 2, 3, and 5 per clan, made 2,594 visits to the nest cavities that contained 2, 2, 3, and 4 nestlings respectively. On 2,117 of the visits we were certain that the adults were carrying food to the nestlings, and on 773 visits we were able to identify the food item in the adult's bill (Table 1).

Foods most often identified in descending numerical order were insect larvae, cockroaches, centipedes and/or millipedes, and spiders. These four items constituted 95% of the identified foods. Considering the large number of visits (1,344) where food was present but not identified, our observations are biased towards the larger and more easily identified food items. The nestling diet was essentially 100% animal matter. Initially we did not record partial identifications of food items (e.g. "unidentified arthropod") on our data sheets. Therefore, the low number of observations in this category (Table 1) reflects uncertain identification of specific arthropods. Of the 1,344 visits where food was present but not identified, we suspected the items to be fruits only four times.

LITERATURE CITED

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TABLE 1
FOOD ITEMS DELIVERED BY 12 ADULTS TO NESTLING RED-COCKADED WOODPECKERS

Taxa	Food item	Number of times observed
Arthropoda	Unidentified	102
Insecta	Larvae	250
	Egg sacs	10
Orthoptera		
Blattidae	Cockroaches	120
	Egg sacs	2
Gryllidae	Crickets	7
Acrididae	Grasshoppers	3
Coleoptera	Beetles	6
Odonata	Damselflies	2
Lepidoptera	Moths	2
Hymenoptera		
Formicidae	Ants	4
Chilopoda and Diplopoda	Centipedes and/or millipedes	187
Arachnida		
Araneida	Spiders	78
Total		773

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Bilateral size dimorphism in House Sparrow gynandromorphs.—The occurrence of bilateral gynandromorphism among birds is rare; only 28 cases involving 12 species have been reported (Laybourne 1967 and references therein, Laskey 1969). In species whose plumage is genetically controlled, this condition results in one lateral half of the bird exhibiting male plumage, the other half female, with a sharp line of demarcation. Several specimens of sexual abnormalities are known for House Sparrows (*Passer domesticus*), but none of the 14 specimens reported or reviewed by Harrison (1961) showed a distinct bilateral dimorphism in plumage. Among the collections of the Museum of Natural History, University of Kansas, are 6 additional specimens of sexual abnormalities: 4 skins and 2 skeletons. Of the skins only one shows noticeable bilateral gynandromorphism in plumage. The skeletal specimens are of special interest in that their skeletal morphologies show bilateral size dimorphism that reflects the normal sexual size dimorphism shown in House Sparrows. These two specimens are considered true gynandromorphs rather than intersexes (see Strickberger 1968: 468).

One specimen (KU 68610) from a sample of 45 sparrows collected in Burlington, Iowa, during December 1973 and January 1974 exhibited a mixture of male and female plumage patterns. The crown showed gray coloration; throat feathers were black, with additional black feathers on the right side of the breast; and the rhamphotheca was black. The paler eyeline of females was evident. (The bird was photographed because of its unusual appearance, but only a skeleton was prepared and the skin was not saved. Dissection revealed an apparent ovary on the left side but no testislike structure.) The measurements of right and left limb components show that the left side elements are from 0.5 to 4.6% smaller than right side elements (averaging 2.3% smaller, Table 1). For these same variables I measured the right and left sides of five males and five females of the Burlington sample and found the average difference in measurements between sides to be 0.41%. For the Burlington sample, male mean values averaged 2.0% larger than female means for these six variables. This amount of sexual dimorphism is similar to that demonstrated in House Sparrow skeletal measurements by Johnston and Selander (1971).

I used a stepwise discriminant function analysis program (BMD07M, Dixon 1970) to separate males and

TABLE 1
MEANS FOR EACH SEX OF THE 14 VARIABLES MEASURED (IN mm) AND FOR EACH SIDE OF THE GYNANDROMORPH

Variable	Burlington, Iowa sample (20 ♀ ♀, KU68610, 23 ♂ ♂)				Manhattan, Kansas sample (29 ♀ ♀, KU67925, 45 ♂ ♂)			
	♀	Gynandromorph		♂	♀	Gynandromorph		♂
	Mean	left	right	Mean	Mean	left	right	Mean
1 Premaxilla	7.00		6.8	6.88	6.89		7.3	6.89
2 Skull width	15.13		15.4	15.41	15.11		15.5	15.26
3 Skull length	30.14		30.8	30.23	29.84		30.4	29.78
4 Dentary	6.23		6.3	6.28	6.17		6.0	6.16
5 Mandible	20.48		20.5	20.44	20.21		20.7	20.26
6 Coracoid ¹	17.70	17.8	18.2	18.24	17.67	18.1	18.4	17.89
7 Sternum length	22.40		23.4	23.37	22.67		24.5	22.96
8 Keel length	20.64		21.8	22.13	21.29		22.7	21.85
9 Sternum depth	9.92		10.0	10.39	9.85		10.6	9.96
10 Humerus ¹	18.38	18.4	18.3	18.70	18.21	18.4	18.8	18.56
11 Tibiotarsus ¹	27.76	28.6	28.9	28.01	27.61	28.0	28.2	27.76
12 Tarsometatarsus ¹	19.15	19.4	20.3	19.39	18.82	19.2	19.6	18.90
13 Ulna ¹	20.66	21.0	21.7	21.44	20.52	20.9	21.3	21.18
14 Femur ¹	17.38	17.7	18.1	17.65	17.51	17.3	17.5	17.66

¹ Variables of the 6-character subset.