Peanut field next to Dismal Swamp, Suffolk, Virginia.

Feeding behavior of the Red-winged Blackbird in the Dismal Swamp region of Virginia.—The feeding activity of blackbirds on the west side of the Dismal Swamp in the Virginia-Carolina Peanut Belt was observed each fall or winter from 1957 through 1960. Special attention was given to the Red-winged Blackbird (*Agelaius phoeniceus*) because of its importance in damaging cultivated crops along much of the Atlantic Seaboard.

Large numbers of migrant Red-winged Blackbirds begin moving into southeastern Virginia in the latter half of October, about the time of the peanut harvest, and a dense population remains through the winter. Other birds that move in with the Red-winged Blackbirds include Common Grackles (*Quiscalus quiscula*), Rusty Blackbirds (*Euphagus carolinus*), Brown-headed Cowbirds (*Molothrus ater*), and Starlings (*Sturnus vulgaris*).

Field observations and stomach examinations indicated that the diet of Red-winged Blackbirds in the area consisted of peanuts (*Arachis hypogaea*), and corn (*Zea Mays*) supplemented by various native plant foods. Peanuts were much more important in the diet than would have been expected from the records in the literature. Martin, Zim, and Nelson (1951:170) do not mention peanuts in their list of foods of the Red-winged Blackbird. Graham (1941:30–31) includes the Red-winged Blackbird in a list of seven species of birds that feed on peanuts. Crebbs (1960:59) found peanut fragments in the gizzards of 20 of 63 Red-winged Blackbirds collected at Suffolk, Virginia, from October to December.

In this area, after the peanuts are dug from the ground, they are placed in 5-foot shocks to dry for three or four weeks before they are removed from the field. The birds stop in these fields chiefly in the early morning and late afternoon as they are leaving or returning to the swamp roost. They usually feed on the peanut residue that is shattered in the digging operation on or near the ground surface. Thus damage generally is light,

contrary to some reports. However, during wet autumn seasons when the drying peanut crop remains in shocks more than the usual three or four weeks, a considerable amount of the crop may be eaten in some fields, particularly those bordering the Dismal Swamp.

The preference for ground feeding over feeding on the shock probably is a result of the birds' customary habit of feeding on the ground, and possibly also reflects the greater ease of extracting the nut from the hull while it is on the ground. A peanut sometimes is removed from a field and taken to a tree, where it is hacked to pieces on a limb. Peanut shells dropped by blackbirds have been found in the Dismal Swamp more than a mile from the nearest peanut field.

The sweet gum (*Liquidambar Styraciflua*) is one of the native foods that supplement the peanut and corn diet of the Red-winged Blackbird in this area. Large mixed blackbird flocks foraging through the farm country were observed to leave a peanut or cornfield from time to time and fly into a sweet gum and oak (*Quercus Phellos, Q. nigra, Q. Michauxii*) woods bordering the Swamp where the Red-winged Blackbirds fed on sweet gum seed and the grackles fed on acorns or beech (*Fagus grandifolia*) mast. One female Red-winged Blackbird collected in a sweet gum tree had 16 sweet gum seeds in its gizzard.

Cocklebur (*Xanthium*), a food that seems unusual, was found in gizzards of several blackbirds. The seeds of this wild plant may be a rather important food of the Red-winged Blackbird in the southeast at this season because it also was found in birds collected at New Bern, North Carolina; Jacksonboro, South Carolina; Valdosta, Georgia; and Montgomery, Alabama. The manner of extracting the seed from the seemingly tough, prickly hull was observed at Montgomery. A bird would pick up a bur from the ground in an old cornfield, fly to the limb of a tree along the border of the field, place the nut on the limb between its feet, and hack at the husk until the seed was exposed. It is also possible that seeds were easily removed from hulls that had become soft from lying on the damp ground. The recovered seeds all appeared to have been ingested whole, indicating that the birds are quite dexterous in removing them.

The seed of the loblolly pine (*Pinus Taeda*) is another unexpected food item frequently taken in the Dismal Swamp region. Seeds are picked up from the ground and also extracted from the cone on the tree. Fleetwood (1947:10) and Denton (1947:10) observed Red-winged Blackbirds extracting pine seeds from cones in trees in Georgia; Beal (1900:43) also reported this blackbird as feeding on pine seed.

Red-winged Blackbirds also were observed feeding on loblolly pine seeds in Accomac County, Virginia. On six occasions adult male Red-winged Blackbirds were seen removing pine seed from cones in loblolly pines adjacent to a river marsh. The birds usually were in small bands of fewer than 50. Two males were collected on 4 December 1959, while feeding on pine seed. One had taken 10 seeds, the other 20. The birds usually remove the hard seed coat before ingesting the kernel. During bumper-crop years (every three or four years), as in the winter of 1959 and 1960, pine seed is available in great quantities from mid-fall to late winter.

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BROOKE MEANLEY, PATUXENT WILDLIFE RESEARCH CENTER, 9 MARCH 1961

Adaptive feeding in a Ruby-crowned Kinglet.—On 26 January 1961, during a break in a sleet storm, I observed a Ruby-crowned Kinglet (*Regulus calendula*) feeding in an unusual manner. The bird caught my attention as it fluttered, about 8 feet from a well-used walkway, along the base of a wall of a building on the Duke University campus. It first seemed as if it were injured, and I attempted to catch it; but although the bird allowed close approach (4–5 feet), it easily remained out of range. The bird was, in fact, feeding. From the grass which grew between the walk and the wall the kinglet would fly to the wall and either hover close to it, jabbing with its bill into the recesses in the rock, or perch woodpecker-like on the rough surface and explore the depressions more thoroughly. The University buildings are made of rough pieces of a type of metasedimentary rock (known commercially as 'Carolina Slate') possessing numerous crevices. Inspection showed that some of these contained spider webs in which there were occasional remnants of dead, trapped insects. It was upon these that the bird was feeding, as bits of web on the feet and face attested.

Weather conditions probably account for this unusual behavior. A week later (4 February) on the day following a similar storm (a difference in water equivalent of only 0.04 inches), ice coverage of branches was measured. It was then found to vary from 33 per cent to 40 per cent of area in samples which ranged in size from 2.5 to 26 cm in circumference. Small twigs had, in general, no ice; but the trunks of many trees, especially those which were slanted in the direction of the wind, did. The normal feeding behavior of the Ruby-crowned Kinglet has been summarized by Skinner (*in* Bent, 1949. *U.S. Nat. Mus. Bull.*, 196:406) who noted that "they depend chiefly on picking insects from the bark, or catching those that fly from the bark." Under the above conditions of ice coverage, feeding in this manner would be impaired as most of the uncovered area was on the less-accessible bottoms and sides of twigs (however, see below).

Although I could find no references to feeding behavior of the Ruby-crowned Kinglet which mentioned wall-feeding, notes on other kinglet species are instructive. Forbush (1907. "Useful Birds and Their Protection") wrote of the Golden-crowned Kinglet (*R. satrapa*) hovering while feeding at tree trunks. Morris (1903. "A History of British Birds," 3:241) says that in England the Goldcrest (*R. regulus*) in "the extremity of the winter blast. . .will often approach houses in search of food, and enter greenhouses and hothouses." He goes on further to describe the trunk-feeding of this species which is similar to that of the Golden-crowned Kinglet and, in part, to the wall-feeding of the Ruby-crowned Kinglet described above: "It will alight on the branch of a tall tree. . . and after a momentary survey, will dart on its prey reposing on the back of the stem, suspend itself for a moment by a rapid motion of its wings, then return to a branch, again glance at the stem, and flit to it."