

Breeding Habits, Nestling Development, and Vocalizations in the Summer Tanager

ELOISE F. POTTER

Abstract. A pair of Summer Tanagers (*Piranga rubra*) nested near Zebulon, Wake County, N.C., in the spring of 1983. Nest contents were examined almost daily from 21 May, the first day of incubation, through fledging of the young on 12 June. Incubation and nestling periods were determined. Parental behavior, development and behavior of nestlings, and vocalizations are described. Results are compared with observations of other nests of the species from the same area. Evidence indicating rearing of second broods is summarized.

Although the Summer Tanager (*Piranga rubra*) is a common breeding bird across most of the southern United States, very little is known about its nesting habits and development of the young. Several recent general works (H.H. Harrison 1975, C. Harrison 1978, Potter et al. 1980) add little to the account in Bent (1958), which gives the incubation period as "said to be 12 days," a statement apparently based on Audubon (1840). Wisely omitting Audubon's belief that the male and female sit upon the eggs alternately, Bent concludes, "Information on the development and care of the young seems to be lacking, beyond the fact, mentioned by Weston (MS.), that both sexes are known to feed the young." Although the Summer Tanager is generally assumed to be single-brooded, Mengel (1964) mentions an apparently mated male "feeding grown young" in the territory of an incubating female on 24 June.

In North Carolina the Summer Tanager breeds in residential districts and open woodlands statewide, though it is found in the mountains mostly below 2,000 feet (Potter et al. 1980). It nests regularly in or near my yard 3.5 miles N of Zebulon, Wake County, N.C. The mature mixed pine-hardwood habitat is bounded on two sides by the fairway of a golf course, and a spring flows through the lower portion of the 3.5-acre tract. In a previous paper (Potter 1973) I reported observations of five Summer Tanager nests found from 1966 through 1972 plus one unfinished nest. Only one of these nests, that of the all-red female studied in 1968, fledged young. The present paper adds data from a 1983 nest that was low enough to permit regular examination of the two nestlings from the day of hatching through fledging.

METHODS

Seated approximately 30 feet from the nest, I spent a total of 20 hours taking notes on behavior of the breeding Summer Tanagers almost daily from the date of nest discovery through fledging of the young. Additional incidental observations were recorded throughout the nesting cycle. I viewed the birds' activities with the aid of a 7 x 42 binocular and moved about the yard as necessary to follow the adults when they left the immediate vicinity of the nest. Using a household step-stool, I examined the contents of the nest almost daily. Although I did not measure the eggs or young, I did examine the nestlings in hand on several occasions. All times are Eastern Daylight Time.

RESULTS

Arrival. The first Summer Tanager of the 1983 season was heard in my yard on 29 April, a later than average arrival date. On 8 May I noted that a pair appeared to be on territory around the White Oak (*Quercus alba*) used as a nesting site three times in previous years.

Nest. Construction was not seen in 1983, but earlier observations (Potter 1973) indicate that the female builds the nest alone. Working mostly in the early morning, she gathers materials from the immediate vicinity of the nest tree. Mengel (1965) also reports construction by the female.

The 1983 nest was situated about 9 feet from the trunk and 3 feet from the tip of a horizontal bottom limb of a 50-foot Red Oak (*Q. rubra*) standing at the fork of two paths in my wooded yard. The site is adjacent to the opening created by the house and approximately 70 feet from the White Oak previously used by nesting Summer Tanagers. The nest was built in a fork, one branch of which had a sturdy twig extending under the cup. The outer portion of the nest was primarily dried pine needles. A few dried leaves, or parts of them, and several dried male pine cones were mixed with the pine needles, and spider webs were draped over most of the exterior sides of the nest cup. The interior was thinly lined with dried grasses, some of which had the seed heads still attached and forming part of the rim. The rim of the nest cup was almost perfectly round. When the nest was in full sun, light showed through the bottom. Exterior dimensions of the nest *in situ* were 4 inches in diameter and 2 inches deep, exactly the same measurements reported by Bent (1958). Interior dimensions were 2.75 inches in diameter and 1.75 inches deep, which is considerably greater than the 0.5-inch interior depth of the nest described by Bent (1958). The nest tilted slightly toward the southwest, and a cluster of leaves growing immediately above it provided shade and camouflage. Although some observers report Summer Tanager nests to be easily dislodged, this one survived three severe storms.

Height of the nest above ground was 8.25 feet, the lowest I have ever seen and lower than the range of 10 to 35 feet reported by Bent (1958). However, this height is well above the lowest given by Burleigh (1958) for Georgia (6-40 feet) and by Sprunt and Chamberlain (1970) for South Carolina (4-40 feet). Mengel (1965) reports a range of 5 to 45 feet with a median height of 12 feet for 25 nests studied in Kentucky.

Egg-laying. The nest contained three brown-speckled bluish eggs when the contents were first examined at 1230 on 21 May, and a fourth egg was in the nest at 1020 on 22 May. Assuming that the female laid one egg per day on four successive days, the first probably was laid on 19 May.

Incubation. Incubation is by the female alone (Mengel 1965, Potter 1973). Although the 1983 nest was discovered on 20 May, the female was first observed on the nest the morning of 21 May, which indicates that regular incubation began with the laying of the penultimate egg. Two eggs, apparently the third and fourth as they were on the high side of the nest, were pecked by a female Brown-headed Cowbird (*Molothrus ater*). The remaining two eggs, apparently the first and second, hatched on 2 and 3 June. This indicates an incubation period of 12 days (calculated from onset of regular daylight incubation to hatching of first egg), if incubation actually began on 21 May. The fact that the eggs hatched on successive days suggests that development of the embryos began on

the day of laying. Because the nest was tipped toward the southwest and was in full sun for good portions of each day, it is possible that sunlight provided enough warmth to induce early development. Another possibility is that the female sat on the nest at night prior to onset of regular daytime incubation. Such behavior has been noted in the Wood Thrush (Nolan 1974). Calculated from the presumed day of laying to day of hatching, the incubation period was 14 days.

In the early stages of incubation the female was a close sitter except during the warmest part of the day. She was very alert on the nest, moving her head to watch potential prey and predators, but she rarely changed positions once she settled on the eggs. Occasionally she gaped or preened. I never have seen a female Summer Tanager make any movements that I could interpret as turning the eggs. The first time I examined her eggs, the 1983 female peered down at me and raised her crown feathers while I positioned the step-stool, but she did not fly until I moved the limb supporting the nest. On 28 May she remained on the nest while three people conversed directly beneath it.

In cool or rainy weather as well as when the young were newly hatched, the female often flew directly from the nest to capture prey, swallowed it, and settled back on the eggs or young in less than a minute. The preferred position of the sitting bird was one that permitted a good view of a large open area and the prey flying through it. Foraging from the nest has been observed in other female Summer Tanagers (Potter 1973) and appears to be typical behavior. This may be the primary reason for the species' well-known habit of selecting nesting sites above roadways or adjacent to clearings.

Intervals of attentiveness and inattentiveness vary widely. Some females, such as the 1983 bird, remain off the nest so long that a casual observer might assume the nest had been abandoned. Others, like the 1968 bird, rarely stay off the nest as long as 5 minutes. Her daylight attentive periods varied from 10 minutes to nearly an hour, but she generally left the nest about every 20 minutes (Potter 1973). It should be noted that her nest was very well shaded, and her mate usually fed her promptly when she begged. He also drove her back to the nest if she stayed away too long.

The 1983 male was not seen sitting on the nest, not even during several nighttime visits. In the early stages of incubation he sang frequently but did not respond to the female's begging for food. He was first seen feeding her immediately after the nest was robbed by a cowbird on 27 May. Thereafter, he usually fed her if she begged persistently enough. These feedings frequently took place, as with other pairs, on a dead limb a few feet above the one holding the nest. Males apparently do not feed sitting females until after hatching. The 1983 male, like several others I have watched, often escorted his mate back to the nest, flying past the nest site in a conspicuous manner while she crept along the limb toward the nest; however, he rarely drove her toward the nest no matter how long she remained away from it. The 1968 male frequently drove his inattentive mate toward the nest, sometimes hovering over her until she settled on the eggs (Potter 1973).

Only once have I seen a male approach a nest closely before the first egg hatched. About 2 hours after the nest was robbed, the 1983 male came to the nest tree with food in his beak and called softly. Still calling, he moved toward the nest and approached so closely that I thought he was about to offer food to the eggs, but he did not do so and did not actually touch the nest, though he was only 2 or 3 inches from it.

Hatching. The older nestling hatched before 1805 on 2 June and the younger before 1000 on 3 June. The second egg was not pipped at 1805 on 2 June. Eggshells had been

removed prior to my first observation of each hatchling.

Feeding of nestlings. From 1000 to 1200 on 3 June, the female repeatedly begged for food and was ignored by the male. Although the male sometimes visited the nest tree, he did not approach the nest. About 1050 the female twice flew to the nest, looked into it, and called loudly. The male did not respond. At 1115 she fed one nestling, waited, poked her bill into the nest (apparently removing a fecal sac), settled on the nest, and swallowed. During a second period of observation from 1530 to 1700 on the same date, the pair seemed to be communicating better. At 1535 the female left the nest and very shortly captured two insects. The male then captured a dragonfly, killed it on a limb, and passed it to her in midair. She consumed the insect on the same limb where he had killed it. The pair moved about the yard together, and he escorted her back to the nest at 1600. She fed one nestling by regurgitation, then gradually moved away from the nest, calling loudly. She captured some prey, returned to the nest unescorted, peered into it, did not feed the young or clean the nest, and settled on her brood at 1609. At 1620 the female was off the nest, and both adults were in the nest tree. Both left briefly and returned. The female begged. The male captured prey and flew about with it in his bill, twice approaching the nest only to be chased away by the female. At 1644 she perched near the nest and he passed prey to her. Both went to the nest. He fed the older nestling by regurgitation. She ate the prey given her by the male and then fed the younger nestling. Both departed. Between 2000 and 2015 the female twice visited the nest and appeared to feed the young (light very poor). At 2015 the male came to the nest and fed her; she settled on the nest without passing food to the young.

Beginning on 4 June, the pair more or less took turns feeding the young; however, the male was often hesitant about approaching the nest. Several times he brought food to the nest and flew away without even attempting to feed the young. At least once he brought food to the nest and was unable to get the young to accept it. He apparently preferred to pass food to the female instead of feeding the young himself. Sometimes she called excitedly as he approached the nest, as if cheering him on. Occasionally the female visited the nest and only pretended to feed the young. Usually this performance stimulated the male to bring food to the nestlings.

The soft bodies of moths appear to be the preferred food for the newly hatched birds. At this stage the ground beneath favorite perches became littered with wings removed from prey. The afternoon of 4 June was the first time the parents were observed feeding whole small insects to a nestling, apparently the older one. On 9 June the male fed a small green caterpillar to one nestling, and on 10 June he provided a whole dragonfly, including wings. Very few prey items could be identified because the adults tended to arrive at the nest with the prey concealed within the mouth or crop.

Intervals between feedings are highly variable. They ranged from less than a minute to 24 minutes (average 10 minutes) for the 1968 pair and from 3 to 48 minutes (average 22 minutes) in 1983. The difference was not caused by the number of young, for both nests contained two offspring. Some of the very long intervals (44 and 48 minutes) may have resulted from the female's efforts to entice the male to feed her or the nestlings. At no time did any pair seem to have difficulty finding an adequate supply of suitable prey.

Brooding. The female brooded the young almost continuously from dusk through early morning, but frequently left the nest for long periods at midday even as early as 3 June. The morning of 10 June she left the nest at 0906, when the ambient temperature

reached 68°F. She was not seen brooding the young again until 2130. On 11 June she was not on the nest at 2025 or 2130. Apparently nighttime brooding ceased as soon as the older nestling was well feathered.

Nest sanitation. The cowbird that removed one egg from the nest cracked another. The next day the pecked egg was no longer in the nest. A broken and partly crushed Summer Tanager egg, apparently the remains of the one damaged by the cowbird, was found approximately 80 feet from the nest. Shells from the two eggs that hatched were not found, and the female is assumed to have eaten them or deposited the fragments far from the nest. In previous nestings (Potter 1973) shell fragments have been found directly under the nest and as far as 125 feet away. In no instance have I found enough fragments to account for all the eggs known to have hatched in the nest under observation. Both adults were seen picking up and swallowing fecal sacs until the young were capable of defecating over the side of the nest. After nest departure, examination revealed the interior to be free of feces. The outer wall of the cup had one white stain. A few bits of feather sheaths were matted into the nest lining, and the nest material was infested with mites.

Territory and nest defense. The tanagers regularly used about 2 acres of woods, and they occasionally flew over large portions of the adjacent fairway in pursuit of prey or intruders. In the early stages of incubation, the female tanager was amazingly tolerant of human visitors, and the male almost totally ignored both human and avian trespassers. After they had young in the nest, both adults usually attacked intruders vigorously, once almost striking me while I examined their nest. However, on warm afternoons when the female habitually left her nest unattended for lengthy feeding and preening sessions, I was able to examine the young at leisure as long as the parents were not alerted to my presence by the Brown Thrashers (*Toxostoma rufum*) that were nesting nearby. When the tanagers did harass me, they were joined on various occasions by Carolina Chickadees (*Parus carolinensis*), Tufted Titmice (*P. bicolor*), Solitary Vireos (*Vireo solitarius*), and Red-eyed Vireos (*V. olivaceus*) as well as the thrashers.

The female Brown-headed Cowbird robbed the nest at 1336 on 27 May. The female tanager had been off the nest for 6 minutes when the cowbird arrived in the nest tree with a flurry of wings. She moved quickly to the nest, pecked one egg, and then picked up another, which she carried to the ground beneath the nest tree and punctured cleanly with an oblong hole about 1/4 by 1/16 inch. The female tanager returned almost immediately and was soon joined by the male. She called loudly and constantly until she returned to the nest at 1345. On 29 May both tanagers chased a cowbird from the nest tree. It is not clear whether the pair defended the nest so well that the cowbird never could lay in it, which seems unlikely in view of their long inattentive periods, or the cowbird just decided not to parasitize the tanager nest. Perhaps the cowbird determined from the taste, odor, or texture of the punctured eggs that incubation had progressed too far for laying in the nest to be advantageous.

Although the tanagers became more diligent about nest defense after the cowbird episode, they still permitted other birds to perch in the nest tree from time to time. Only after the eggs hatched did the male show major concern about my presence 30 feet from the nest. Sometimes he perched in a tree directly above me and gave frequent alarm notes. Occasionally he dived upon me when I walked too near the nest. But most of the time I was accepted calmly—as long as I did not try to touch the nest.

Development and behavior of young. The young were examined in the nest or in hand daily from 2 June to fledging. The newly hatched birds had reddish skin and gray natal down. At 1620 on 3 June, the older nestling raised its head and permitted examination of the bill, which was mostly gray with yellow along the margins. No egg tooth was apparent. Skin was more pink than red. The thick, erect down on the crown gave the nestlings a bushy-headed appearance. The day-old nestling could raise its head high enough to be seen above the rim of the nest during feedings.

On 4 June both nestlings still had their eyes closed; the younger could raise its head above the rim of the nest; shoulders of the older could be seen during feedings.

On 5 June both nestlings still had their eyes closed; the older had blue-gray sheaths (about 1 inch long) showing prominently on the primaries.

On 8 June yellowish sheaths for the rectrices were emerging on the caudal tract of the older chick. The two birds half filled the nest cup.

On 9 June I examined the older nestling (now 7 days old) in hand and the younger closely in the nest. Both could open their eyes, but apparently kept them closed except when jostled. The younger bird's eyes were not fully open. On the older bird, sheaths were emerging on all feather tracts, including the anal ring (very tiny and yellow). Caudal sheaths that had been yellowish on 8 June were now dark gray, and tips of rectrices emerged from them. The upper mandible drooped at the tip. After one feeding, the older bird presented its anus above the rim of the nest for removal of the fecal sac, which the female swallowed before flying away. My shaking the nest elicited the same behavior. Both young moved about in the nest between feedings, but usually only their crowns could be seen. Late in the day both rested their chins on the downhill rim of the nest and gaped occasionally. When a violent wind rocked the nest, they withdrew their heads and crouched out of sight in the nest cup.

At 1940 on 10 June, I first noted droppings ($N = 3$) on the ground beneath the nest. Both young held shoulders well above the rim of the nest during feedings. Slight wing fluttering was first noticed.

On 11 June the older nestling called between feedings and held its head up without resting its chin on the rim of the nest. It preened and stretched its wings. Only a few wisps of natal down remained on the crown. A yellowish cast was apparent on the neck. The breast was white, streaked with brown. Yellow wing bars contrasted with dark brown wings. The bird occasionally leaned forward, lowering head and breast over the rim of the nest and lifting wings as if about to fly. When the 9-day-old bird was examined in hand, its chin, jugulum, thighs, back, and under wings were still mostly bare. The lower breast, though mostly white, had a yellowish cast. Wing feathers were dark brown with yellowish edgings. Sheaths had split on the rectrices, which were mostly yellow, about 0.5 inch long, and barely extended beyond the tip of the longest primary. The bill was medium gray, broadly bordered with yellow along margins. The triangular gray central portion of the upper mandible appeared sunken with the nostrils protruding. Legs were pale gray, but tips of the toes were yellowish. When I reached for it, the bird opened its bill and jabbed at my hand. It grasped the nest lining and called loudly when removed, but became silent when I allowed it to snuggle against my body. This action was soon regretted, for the bird was infested with mites. The younger nestling still wore a halo of gray natal down on the crown, and most of its feathers were at least partly sheathed. At

this time the pair of nestmates (8 and 9 days old) looked like those in the photograph by William G. Cobey at the top of page 355 in *Birds of the Carolinas* (Potter et al. 1980).

At 0900 on 12 June, the older nestling (10 days old) had already flown the nest and was perched about 5 feet above ground on a horizontal limb of a sapling growing beneath the nest tree. This bird now had brownish, buff-edged feathers on its back. The other nestling (9 days old) flew at 0950, when I checked to see if the nest was still occupied. The younger bird immediately hopped to the shelter of a rail fence. It still had sheaths on the bases of the primaries and some down on the crown, but it appeared to be ready to leave the nest. At 1200 I could hear both fledglings in the vicinity of the nest tree, but by late afternoon I could not locate them.

On 13 June I saw a female Summer Tanager feeding silently, high in the oaks, and on 16 June I saw a female accompanied by a young bird that flew well for a distance of at least 50 feet. My impression was that the pair tended their fledglings in the woods just beyond the spring. A male sang within the nesting territory as late as 22 June, and a female (presumably the one that had nested in the yard) was present on the same day. She gave a few begging calls before flying across the spring.

Vocalizations. The full, robin-like song appears to be given only by the adult male. Females and juveniles sometimes utter a *sotto voce* version of the song (Potter 1973). Mated pairs seem to use *pi-tuck* and *pit-i-tuck-i-tuck* in a casual, conversational manner, apparently just to keep in touch with each other. The nesting female frequently gives a *wherrie* begging call that ranges from barely audible to loudly insistent. She often gives this call softly while foraging for food and increases the volume as she pursues the male, particularly if he has food in his bill. Her most excited calls are accompanied by crouching and wing fluttering. The feeding male often gives a soft, low-pitched, slurred *chuurp* when he captures prey. This call is also used when the male flies from perch to perch with food in his bill. The male's alarm note is a sharp *pic*. Both the male and the female use *pit-i-tuck-i-tuck*, uttered loudly, rapidly, and insistently, in defending the nest and fledglings. The adults can utter all the sounds described above while holding food between the mandibles. Fledglings call in a *wherrie* that is more hoarse than that of the adult female, but the similarity is unmistakable.

HOW MANY BROODS?

Mengel (1965) suggests that Summer Tanagers are double-brooded. His egg data for Kentucky show completed clutches from 1 to 10 May and from 21 to 31 July, with a peak for first nestings from 21 to 31 May. A second peak is not evident. Mengel's strongest evidence for two nests in a season by the same pair is found in the following account:

On June 22, 1952, I saw a female begin construction of a nest 35 feet up in a large red oak in Levi Jackson State Park near London, Laurel County; she began the nest with a piece of white cleansing tissue, and several more of these were incorporated before the nest was completed on June 26. Incubation began on June 30 (3 or 4 eggs probably having been laid in the interim), and on this date one of the eggs was thrown unbroken to the ground in a severe storm. Incubation was still in progress when I left on July 2. It is not explicitly stated by Bent (1958) that the species is single-brooded, but this is implied. It is

therefore of interest that a male which showed every indication of being the mate of the female just discussed was feeding grown young in the territory on June 24, strongly suggesting that two nestings were undertaken by this pair. Nearby, another female was constructing an even later nest, one-third completed on July 2.

Burleigh (1958) does not mention the possibility of second broods, but his summary of nesting data suggests a nesting season long enough to accommodate them. He lists a nest with three slightly incubated eggs on 5 May and another with two incubated eggs on 22 June, as well as four young on 3 July.

In central North Carolina it is not uncommon to hear Summer Tanagers singing into late July. I have no proof that the two pairs that successfully reared young in my yard were either single-brooded or double-brooded. The 1968 pair was on territory the first week in May, but a nest was not discovered until 24 June. The first egg hatched on 2 July, and the male was first seen feeding young on 3 July. Because both of these birds were all red, I assumed no female was present and made no search for a nest in May. The 1968 male was more attentive to his mate and more regular in feeding the young than any of the other males I have observed. It is entirely possible that the late-June clutch was the second of the season and that this pair worked well together because of previous nesting experience.

In mid-June 1983 I twice observed behavior that suggests courtship. On 17 June a magenta-winged male Summer Tanager (apparently the one from a yard across the fairway from my home) gave alarm notes from the row of pines along a roadway leading to my yard. He pursued a female that had dark wing coverts and pure yellow under-tail coverts. Both birds called constantly, but no young were seen or heard. The male perched on a bare limb, cocked his tail, raised his crown feathers, and held the pose for at least a minute. He then began chasing the female as if trying to mount her; copulation was not seen. The same pair were in the same area the next day, but these birds were not seen thereafter.

On 23 June I saw a different pair of Summer Tanagers, apparently the ones that had just nested in my yard (female had red-tinged under-tail coverts), on a limb in the same row of pine trees. The male crouched in an incubating position amid a cluster of green and dried pine needles. The female watched him briefly and flew to a higher limb. The pair moved along the edge between my yard and the fairway, then cut through the yard and disappeared beyond the spring. After that date the male no longer sang in my yard. If the pair did produce a second brood, they did so in a different territory.

DISCUSSION

Of the six pairs of Summer Tanagers I have observed nesting in my yard, four have hatched eggs and two have fledged young. In both instances the successful females had mates that participated in nest defense and feeding of the young. In one instance where the eggs hatched but young were not raised to fledging, the male defended the nest and occasionally fed the female when she begged; however, he never was seen feeding the young.

The female Summer Tanager builds, incubates, and broods without assistance from the male. In fact, I have never seen a male touch the nest before hatching of the second

egg. Apparently the female must let her mate know that it is all right for him to feed the young. Both of the successful females apparently helped the male adjust to feeding young in the nest by taking food he gave them to the nestlings and feeding it to them while he watched. The 1968 male was far more attentive to his mate than was the 1983 male and had no difficulty feeding young. The 1983 male required a great deal of begging before he would feed the female and was very hesitant about approaching the nest. Sometimes the female gave me the impression that she really preferred for him to pass the food to her so she could feed the nestlings. At other times she seemed to be urging him to feed the young. In spite of her mixed signals, the male did a reasonably good job of providing food for the offspring.

Although a female Summer Tanager should have no difficulty providing sufficient food for herself and a brood of two to four young, she appears to be dependent upon the cooperation of the male. Indeed, the male's willingness and ability to participate in the care of the young may be essential to reproductive success for the species.

LITERATURE CITED

- Audubon, J.J. 1840. *The Birds of America*. Dover reprint, Vol. 3, p. 222-225.
- Bent, A.C. 1958. *Life Histories of North American Blackbirds, Orioles, Tanagers, and Allies*. U.S. Nat. Mus. Bull. 211, p. 406-507.
- Burleigh, T.D. 1958. *Georgia Birds*. Univ. Oklahoma Press, Norman, p. 605-607.
- Harrison, C. 1978. *A Field Guide to the Nests, Eggs and Nestlings of North American Birds*. Collins, Cleveland and Glasgow, p. 223.
- Harrison, H.H. 1975. *A Field Guide to Birds' Nests in the United States East of the Mississippi River*. Houghton Mifflin, Boston, p. 387-388.
- Mengel, R.M. 1965. *The Birds of Kentucky*. American Ornithologists' Union, Ornithological Monographs No. 3, p. 459-461.
- Nolan, V., Jr. 1974. Notes on parental behavior and development of the young in the Wood Thrush. *Wilson Bull.* 86:144-155.
- Potter, E.F. 1973. Breeding behavior of the Summer Tanager. *Chat* 37:35-39.
- Potter, E.F., J.F. Parnell, and R.P. Teulings. 1980. *Birds of the Carolinas*. Univ. North Carolina Press, Chapel Hill, p. 354-356.
- Sprunt, A., Jr., and E.B. Chamberlain. 1970. *South Carolina Bird Life*. Revised by E.M. Burton. Univ. South Carolina Press, Columbia, p. 508-509.

North Carolina State Museum of Natural History, Box 27647, Raleigh, N.C. 27611