

## NOTES

**Above-ground nests of the nine-banded armadillo in Florida.**—Accounts of the nesting habits of the nine-banded armadillo (*Dasypus novemcinctus*) in North America (Louisiana and Texas) state that the nests consisting of masses of dry vegetation are placed in burrows or, more rarely, in natural caves or crevices in rocks (Clark 1951, Fitch et al. 1952, Kalmbach 1943, Lehman 1934 cited in Kalmbach 1943, Taber 1945). This report documents use of above-ground nests by armadillos in Florida. Although armadillos have been reported to build exposed nests of straw or dry grasses on the floor of indoor laboratory quarters (Anderson and Benirschke 1966, Johansen 1961) and on the ground surface in an outdoor enclosure (Moore 1968), such nests apparently have not been previously found in the wild.

In the period 1975-80 we observed about 100 above-ground nests on the Lykes Brothers ranch near Brighton and Palmdale, Glades County. Most were in native prairie or improved pastures with frequent saw palmettos (*Serenoa repens*), occasional shrubs, and scattered cabbage palm (*Sabal palmetto*)—live oak (*Quercus virginiana*) hammocks. Several were seen in slash pine (*Pinus elliotii*) flatwoods with dense palmetto understory. We also saw three nests in a cabbage palm-live oak hammock adjacent to prairie habitat at Lake Kissimmee State Park, Polk County, in February 1981. David Austin of the Florida Game and Fresh Water Fish Commission informed us that he frequently observed armadillo surface nests in open slash pine flatwoods containing abundant palmettos on the U.S. Air Force Avon Park Bombing Range in Polk and Highlands counties, and P. J. Cone and C. E. Winegarner reported (pers. comm.) seeing several such nests in cabbage palm-live oak hammocks in Myakka River State Park, Sarasota County, in March 1977. G. Galbreath (pers. comm.) also observed occasional above-ground nests in slash pine-turkey oak (*O. laevis*) woodlands on the Archbold Biological Station, Highlands County, in 1976-78. With the exception of the last locality, sites in which above-ground nests have been found are characterized by relatively poorly-drained soils and become wet or actually flooded during periods of high rainfall.

Most above-ground nests we have observed or had reported to us were built in clumps of saw palmetto, although nests are sometimes located in the open in prairie or improved pastures with high, dense grass. At one such site in Glades County, the density of nests was about 2/ha, with a minimum distance between nests of approximately 9 m.

The nests typically consist of a shallow depression, or form, roofed over with a heap of dry plant material. Nests in the open resemble miniature hay stacks. The depression is roughly pear-shaped from above and is deepest at the expanded end where the animal rests. The restricted end has a slanting floor leading to the nest entrance at ground level. Ridges of spoil resulting from excavation of the form are usually found at the rear edge or, rarely, along one side. Average measurements (ranges in parentheses) of 10 forms were: maximum depth, 22 cm (range = 15-30), maximum width, 24 cm (20-30), length, 34 cm (30-46). The outer portion of the nest mound tends to be more compact and composed of larger plant fragments than the interior. There was no obvious nest chamber, the central region of the mound (approximately 25 cm in diameter) being loosely filled with finer plant material.

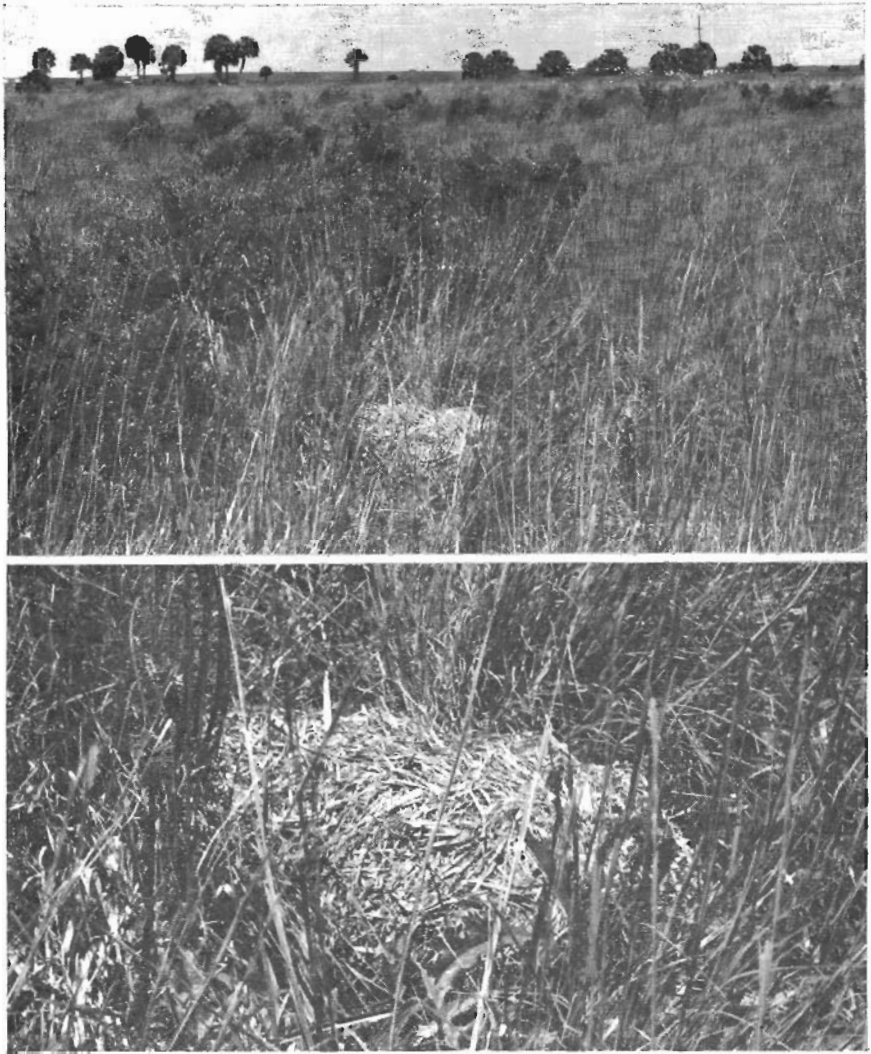


Fig. 1. Nine-banded armadillo surface nest in grassland habitat near Brighton, Glades County, Florida. Upper, general view; lower, detail of nest.

There is usually a single entrance 13-15 cm in diameter, which is loosely plugged with nest material and not readily apparent. Occasionally a nest had two or three entrances, but in such instances one entrance appeared to be used more frequently than the others.

The size, shape, and composition of the nest mound varied with site and type of nest material available. The largest nests we observed were built in the open in dense tall grass prairie (Fig. 1) and consisted of dried grasses (*Andropogon* sp., *Paspalum longipilum*). They were usually roughly circular or broadly oval in outline. Means and ranges (in parentheses) of the dimensions

of 5 examples were: maximum height of mound, 49 cm (41-61), maximum diameter, 101 cm (84-122), minimum diameter, 71 cm (43-99). All of the nests were built in association with tussocks of broom sedge (*Andropogon* sp.) with the form having been dug alongside or through the base of the clump. Nests located in saw palmetto thickets were not as large as those in open grassland. Means and ranges of four randomly selected examples were: maximum height, 31 cm (25-36); maximum diameter, 66 cm (46-86); minimum diameter, 48 cm (43-53). They were composed of dried pine needles, Spanish moss (*Tillandsia usneoides*), oak leaves, dry grasses, and fragments of palmetto fronds, the actual composition depending upon the abundance of different materials in the vicinity of the nest. The form was usually dug alongside a palmetto stem running along the ground or between two stems, with the mound heaped over the stems.

About one-fourth of the surface nests we observed were occupied. Most of the active nests were recorded during winter and spring. Except for one containing three adults and another with an adult female and three half-grown young, all nests had a single occupant.

Our observations indicate that above-ground nesting by armadillos is relatively frequent and widespread in central Florida. The location of most of such nests in poorly-drained sites suggests they are usually constructed in response to wet conditions when high water tables prevent use of burrows. In these habitats, clumps of palmettos, which are the preferred nest sites, offer a more elevated, drier site than the surrounding areas. Pacheco and Naranjo (1978) reported that a related species, *Dasypus sabanicola*, constructs surface nests during times of high water in flood savanna habitat in Venezuela.

It is noteworthy that above-ground nesting of the nine-banded armadillo has not been reported in other parts of the range where it has been extensively studied. This may indicate either that this habit is more prevalent in Florida habitats or that in other regions above-ground nests are in more inaccessible sites and thus have been overlooked.

**Acknowledgments.**—We thank David Austin, Peter J. Cone, Gary J. Galbreath, and Chester E. Winegarner for providing information on surface nests and David W. Hall for identification of plant specimens.

#### LITERATURE CITED

- ANDERSON, J. M., AND K. BENIRSCHKE. 1966. The armadillo, *Dasypus novemcinctus*, in experimental biology. Lab. Animal Care 16: 202-216.
- CLARK, W. K. 1951. Ecological life history of the armadillo in the eastern Edwards Plateau region. Amer. Midland Nat. 46:337-358.
- FITCH, H. S., P. GOODRUM, AND C. NEWMAN. 1952. The armadillo in the southeastern United States. J. Mammal. 33: 21-37.
- JOHANSEN, K. 1961. Temperature regulation in the nine-banded armadillo (*Dasypus novemcinctus mexicanus*). Physiol. Zool. 34:126-144.
- KALMBACH, E. R. 1943. The armadillo: its relation to agriculture and game. Austin, Texas, Game, Fish and Oyster Comm.
- LEHMAN, V. 1934. Armadillo investigations, 1934. MS rept. filed with U.S. Fish and Wildlife Service. (cited in Kalmbach 1943).
- MOORE, A. M. 1968. A radiolocation study of armadillo foraging with respect to environmental variables. Ph.D. thesis, Austin, Texas, Univ. of Texas at Austin.

- PACHECO, J., AND C. J. NARANJO. 1978. Field ecology of *Dasyopus sabanicola* in the flood savanna of Venezuela. Pp. 13-15 in *The armadillo as an experimental model of biomedical research*. Sci. Publ. 366, Washington, D. C., Pan Amer. Health Org.
- TABER, F. W. 1945. Contribution on the life history and ecology of the nine-banded armadillo. *J. Mammal.* 26: 211-226.
- James N. Layne, Archbold Biological Station, Route 2, Box 180, Lake Placid, Florida 33852 and Allen M. Waggener, Jr., Kanapaha Ranch, 30 Airport Road, Archer, Florida 32618.

Florida Field Naturalist 12: 58-61, 1984.

**Identification of Arctic Loons in winter plumage.**—Only two records of the Arctic Loon in Florida had been published (Kittleson 1976), by 1974, so on 18 and 19 February, 1974 observers rushed to Melbourne, Florida, to see a bird reported to be an Arctic Loon (*Gavia arctica*). Because this small loon had a short bill and a pale head, hind neck and back and because the head appeared rounded, many observers considered identifying this bird as an Arctic Loon. However, Harold Axtell (pers. comm.) of Ontario, Canada, wrote nine single-spaced, instructive pages of convincing details on why he considered this bird to be a small Common Loon (*Gavia immer*) rather than an Arctic Loon. Axtell's letter created the feeling among some observers that identifying an Arctic Loon by sight in Florida was a difficult endeavor, but after my experiences and the recent discoveries of field marks, I have concluded that Arctic Loons in winter plumage can be identified by sight in the field.

This observation presented an opportunity to evaluate available field guides. Using one Arctic Loon observation, without considering possible variations in plumages of other Arctic Loons, I compared the main field characteristics to the relative information presented in four 1983 field guides: Robbins et al. (1983), National Geographic Society (1983), the Audubon Society master guide to birding (Wahl 1983), and Harrison (1983), which I will refer to as Robbins, Geographic, Wahl, and Harrison, respectively. My grading system was as follows: if the text presented the entire field mark in a thorough manner, I graded it a 10; in a useful manner, but with minor omissions, a 9; in an adequate manner, but with some serious omissions, an 8; in a poor manner with some field marks ambiguous or inaccurate or no field marks in the text, but the field mark illustrated well, a 5; or omitted the field mark, a 0. The grades for each field mark were averaged for each guide to determine the effectiveness of each in identifying this individual bird.

On 26 December 1983 on the Jacksonville, Florida, Christmas Bird Count John Hintermister and I had the fortuitous opportunity to observe the loon continuously through telescopes for over an hour from less than 30 m away. In the calm huge tidal pool west of Ward's Bank, this resting bird floated in front of us, turning slowly on the water. Occasionally, the loon raised its head as we watched it. Although other observers saw this bird on 26 and 27 December, our sighting was so lengthy and so close that we had the opportunity to make detailed notes at leisure (Fig. 1).

**Bill.** The bill on our loon was straight, gray, thinner and shorter than a Common Loon's bill with no sharp angle on the lower mandible. Robbins stated,