

Wilson Bull., 95(3), 1983, p. 472

Male "incubation" in a Chestnut-collared Longspur.—During 1981, 16 breeding pairs of Chestnut-collared Longspurs (*Calcarius ornatus*) were studied in Grand Forks County, North Dakota. Females were mist-netted and banded with federal and colored leg bands. Daily activity observations and nest checks were made in each territory and time budgets were conducted for males. Although the "typical" male behavior during incubation involves use of perches in the general vicinity of the nest (Bailey and Niedrach, *Wilson Bull.* 50:243–246, 1938; Harris, *Wilson Bull.* 56:105–115, 1944), the males in this study were found to differ greatly in their temporal and spatial attendance to nests. Two males occasionally "stood guard" on the ground near the nest, and one male, #14, was observed "incubating" on four different occasions.

This is the first record of incubation behavior by a male for this species. The nest in territory 14 was located during the construction phase and a four-egg clutch was completed on 31 May. During egg-laying and incubation the male was frequently observed on three perches within 4.2 m of the nest. On 3 June, at 11:09, the male circled low over the nest and vocalized. When the female left the nest the male landed and began incubating. His position was observed from a distance of 3.6 m with binoculars until 11:19. At 11:22 the female returned and replaced the male on the nest. On 4 June, the male was flushed from the nest and the female was found foraging 7.2 m away. On 5 June, at 11:29, the male was again observed on the nest, being replaced by the female at 11:34. A similar exchange of positions was witnessed on 6 June at 10:30.—ANN M. WYCKOFF, *Dept. Biology, Univ. North Dakota, Grand Forks, North Dakota 58202. Accepted 30 Nov. 1982.*

Wilson Bull., 95(3), 1983, pp. 472–475

Notes on the breeding biology of Wilson's Phalarope.—During the course of other studies (Murray, *Auk* 86:199–231, 1969), I was able to observe Wilson's Phalaropes (*Phalaropus tricolor*) in North Dakota. The following notes on the breeding biology of Wilson's Phalarope supplement those of Höhn (*Auk* 84:220–244, 1967), Johns (*Auk* 86:660–670, 1969), Howe (*Condor* 77:24–33, 1975a; *Wilson Bull.* 87:248–270, 1975b), and Kagarise (*Bird-Banding* 50:12–22, 1979).

Study area and methods.—The study was carried out at the Lower Souris National Wildlife Refuge (now called the J. Clark Salyer National Wildlife Refuge) in north-central North Dakota in May, June, and July of 1965 and 1966. Wilson's Phalaropes bred on the freshwater marsh in the floodplain of the Souris River, about 4.8 km E of Upham, McHenry Co. The predominant vegetation was cordgrass (*Spartina pectinata*) interspersed with small and large patches of squirreltail (*Hordeum jubatum*), whitetop (*Scholochloa festucacea*), and phragmites (*Phragmites communis*) (see Murray 1969, for photographs of the study area). My observations were made as opportunity permitted and concerned mainly nesting biology.

Arrival.—Wilson's Phalaropes were already present by 8 May when I arrived in 1965. In 1966 I arrived on 30 April and saw the first phalaropes on 3 May (a group of one male and four females and another of two females). On 4 May I found one group of two males and three females. One male and female kept close company, feeding and resting together, and were generally undisturbed by other phalaropes (they were once approached by a female, which was chased away by the female). On 6 May the group numbered three males and eight females. Two of the males were each accompanied by a single female, whereas the third male was accompanied by four females, one of which seemed to dominate the others.

Although these observations are few and the population small, some birds did give the

appearance of being paired on arrival or, more likely, immediately after arrival (Jehl, Auk 85:515-520, 1968). One cannot be certain, however, that these pairings were permanent (at least through egg-laying) without marked individuals. These and other counts, taken haphazardly, indicate that females outnumbered males from the time of arrival until they left the marsh entirely; at least, I saw no indication of an abundance of males in almost daily, all-day visits to the marsh.

Nests.—Wilson's Phalaropes at Lower Souris built substantial nests of dead stems from surrounding grasses. The height above the ground of 11 nests ranged from 2-7 cm (\bar{x} = 5.0), and the outside diameter of these nests measured from 9-13 cm (\bar{x} = 11.3). These may have been similar to those seen by Kumlien (cited by Nelson, Bull. Nuttall Ornithol. Club 2:38-43, 1877), who thought that the nests of Wilson's Phalaropes resembled those of the Red-winged Blackbird (*Agelaius phoeniceus*). One nest (not measured because I could not find it after the birds had left) was a cup of grasses in a *Spartina* tussock. The nests at Lower Souris, then, were different from those in eastern North Dakota (Howe 1975b) and Alberta (Höhn 1967), which were more similar to those of the Red Phalarope (*Phalaropus fulicarius*) (Höhn, Ibis 113:335-348, 1971; Mayfield, Living Bird 17:7-39, 1978) and Red-necked Phalarope (*Phalaropus lobatus*) (Höhn, Auk 85:316-317, 1968), which consisted of little more than a grass-lined scrape. Indeed, the first eggs were often laid on the bare ground (Höhn, 1967, 1968; Howe 1975b; Mayfield 1978), with the lining added afterward. Perhaps the Wilson's Phalaropes at Lower Souris built such substantial nests because of the extreme wetness of the substrate.

Laying.—I found eight clutches before they were completed. Seven provided one instance and one provided two instances for which the date of laying of single eggs could be determined. Eggs were laid on consecutive days except at nest 1965-6, in which laying was interrupted by a snowstorm, and at nest 1965-1, in which the third egg was extraordinarily large. A more precise time of laying could be determined for four eggs: between 11:40 and 11:50, 11:45 and 15:40, 13:50 and 15:00, and 09:30 and 17:00.

The earliest eggs were laid on 15 May and the latest on about 7 June. Thus, the laying season on my study area spanned a little more than 3 weeks.

Clutch-size.—Of the 26 completed clutches, 25 contained four eggs, and one contained three. The latter was clutch 1965-1, in which the third egg was the unusually large one mentioned above. One incomplete clutch of two eggs was interrupted by the death of the male, whose carcass was found near the nest.

Incubation.—Not unexpectedly, males performed virtually all the incubation. However, as did Höhn (1967), I once recorded a female leaving a nest containing a completed clutch of eggs, but whereas Höhn believed his record may have resulted from a slip of his pen, I am not convinced that I was mistaken.

I was able to determine the incubation period, from the laying of the last egg to the hatching of the last egg, for three clutches. These incubation times were 20, 21, and 23 days. The latter period may have been caused by a snowstorm occurring during incubation. Following the storm I checked the five nests then under observation and found no incubating birds and cold eggs. By the early afternoon, however, the males had returned, and the eggs were warm. At least one clutch hatched, and two were later taken by predators.

Reproductive success.—In 1965, 22 of 65 eggs in 17 nests hatched, six did not hatch, nine were lost to predators, two did not hatch because the male died, and the fate of 26 was unknown (I did not keep track of them). In 1966, 15 of 40 eggs in 10 nests hatched, six did not hatch, nine were lost to predators, and the fate of nine was unknown. Thus, considering only the eggs followed, 37 of 70 (53%) hatched in the 2 years of the study.

Role of the female.—In 1965 I found females in attendance at all but one nest throughout the major portion of the incubation period. They appeared to serve as lookouts, flying up and toward me as I approached the nest, sometimes from as far away as 50 m. Often a small

group of females would form, joined shortly by the males. In order to find a nest I had to ignore the first bird to flush in an area and mark the position of the second bird to flush.

One female and a male approached me on 19 June, 5 days after the first young hatched at the nest I was inspecting. Not all the females associated with nests stayed as long. I first noticed a decline in the number of females on 18 June, and by 23 June I could find no females on the marsh. Several left while males were still incubating eggs.

Although one cannot be certain without marked birds, these observations suggest that males and females may remain paired for a lengthy period. Because these observations seemed unusual I intended to study the females more closely in 1966. In 1966, however, the females laid their eggs and immediately departed. I was able to find phalarope nests more easily because the males allowed me a closer approach before flushing, and I was not distracted by having to distinguish males from females. I chose to avoid known nest-sites as much as possible in order to reduce disturbance to the mateless males. As a result I hardly saw a phalarope after egg-laying.

Höhn (1967) stated that the females leave long before the eggs hatch, but Höhn (1967) and Johns (1969) mentioned females joining males in alarm flight or males with chicks, respectively. Only Nelson (1877:42–43) seems to describe the behavior that was so prevalent on my study area in 1965: "Incubation is attended to by the male alone. The female, however, keeps near, and is quick to give the alarm upon the approach of danger. The females are frequently found at this time in small parties of six or eight; and should their breeding ground be approached, exhibit great anxiety, coming from every part of the marsh to meet the intruder, and, hovering over his head, utter a weak nasal note, which can be heard only a short distance." Nelson (1877) also remarked upon the sudden disappearance of females (although this occurred in mid-July in Illinois rather than in late June, as I observed in North Dakota).

One other investigator has reported similar experiences with phalaropes. Concerning the Red-necked Phalarope in Labrador, Newfoundland, Austin (Mem. Nuttall Ornithol. Club 7, 1932:107) wrote, "Though I spent in all about three hours on the island in company with the male and the young, the female never put in an appearance, which is the only time that has happened to me. Whenever, elsewhere, I have found the birds obviously breeding, both parents eventually appeared, though the male was usually the first on the scene, and was always the more excited."

What seem unusual about my observations in 1965 and those of Nelson (1877) and Austin (1932) are the proportion of females attending males and the length of time the females remained in attendance. Other observations indicate fewer females attending males and briefer periods of attendance. Howe (1975b) noted two female Wilson's Phalaropes remaining near their nest-sites for 2 days after the clutches of four eggs were completed. In the Red Phalarope at Bathurst Island, Mayfield (1978) observed a female defending her mate 5 days after he found the completed clutch, although normally the pair bond ended quickly. In Siberia, also, Kistchinski (Ibis 117:285–301, 1975) noted that pair bonds ended quickly, with the males driving the females away. In Spitzbergen, however, Ridley (Ibis 122:210–226, 1980) observed males chasing female intruders rather than their mates, and pair bonds lasted 1–14 days after egg-laying. In Alaska, pair bonds lasted 1–13 days after the clutch was completed with the female remaining near the nest (Schamel and Tracy, Bird-Banding 48:314–324, 1977). Schamel and Tracy (1977) suggested that the variable pair bond allowed the females to obtain new mates when additional males were available.

In the Red-necked Phalarope in Alaska, Höhn (1968) noted that both parents were present at one of the two nests that produced young (total nests = 11) and responded to the presence of an observer, but in Finland, Hildén and Vuolanto (Ornis Fennica 49:57–85, 1972) thought that those females accompanying newly hatched broods were interested in the males rather than in the chicks.

The pair bonding behavior in phalaropes seems variable and open to several interpretations. This suggests the need for further study, especially with color-marked individuals.

Polyandry in phalaropes.—Although the phalaropes represent the classic example of reversed sexual dimorphism in size and coloration and were long suspected of having polyandrous mating relationships, these have been demonstrated only recently in the Red-necked Phalarope (Raner, *Fauna och Flora* 67:135–138, 1972; Hildén and Vuolanto 1972) and Red Phalarope (Schamel and Tracy 1977) but not at all in Wilson's Phalarope, even though this species shows the greatest sexual dimorphism in the group. Höhn (1967), Johns (1969), Howe (1975a), and I (this study) found that female Wilson's Phalaropes outnumbered males early in the season during pair-formation and egg-laying, giving little opportunity for polyandry to occur. Only Kagarise (1979) found males available for second matings of females, but these were males from failed nests in a population that suffered extraordinarily high rates of predation on the eggs.

The desertion of mates may be advantageous when the deserters have opportunities to obtain additional mates (Pienkowski and Greenwood, *Biol. J. Linnean Soc.* 12:85–94, 1979), but in phalaropes such opportunities seem limited, males being in excess only occasionally in the Red-necked Phalarope (Hildén and Vuolanto 1972) and Red Phalarope (Schamel and Tracy 1977) and seemingly only rarely in Wilson's Phalarope. Because polyandrous species often have high losses of eggs compared with other shorebirds, it may be tempting to suggest that males are often available as potential mates for deserting females. However, the mates of deserting females also suffer high losses, and, thus, a female does not necessarily increase her reproduction by changing mates for her second clutch. Indeed, one can at least hypothesize that in a species with high egg loss, females could increase their probability of successful reproduction by remaining with their mates, not only laying replacement clutches but even providing protection or other assistance in reducing the probability of egg loss. Whether females stay with their mates or desert them would depend upon the probability of having two or more males tending successful clutches. It can be shown (Murray, unpubl.) that this probability is greater when the sex ratio favors males than when first clutches suffer a high loss of eggs. Thus, high egg loss seems an inadequate explanation for desertion of nests by females.

Female Wilson's Phalaropes seem able either to stay with their mates or to desert them. What they do undoubtedly depends upon particular conditions, which are at present unknown. What is known about phalaropes is that males only rarely exceed females in number and that polyandry is infrequent in the populations that have so far been studied. One can only wonder what selective forces have led to the striking reversed sexual dimorphism of these species.

Acknowledgments.—I thank E. O. Höhn and H. F. Mayfield for corresponding with me about aspects of their work on phalaropes, M. Gochfeld for references, and J. R. Jehl, Jr., and the reviewers, M. A. Howe and E. H. Miller, for reading, commenting upon, and improving the manuscript. My work in North Dakota was supported by the Frank M. Chapman Memorial Fund of the American Museum of Natural History.—BERTRAM G. MURRAY, JR., *Dept. Biological Sciences, Livingston Coll., Rutgers Univ., New Brunswick, New Jersey 08903. Accepted 12 Mar. 1983.*

Wilson Bull., 95(3), 1983, pp. 475–477

Nest-site selection by Eastern Kingbirds in a burned forest.—Unlike many species of North American tyrannids, Eastern Kingbirds (*Tyrannus tyrannus*) use a variety of habitats for breeding (Bent, *U.S. Natl. Mus. Bull.* 179, 1942). In seral and riparian communities, nests are generally concealed in the foliage of woody vegetation, but in habitats where