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GENERAL NOTES

Sexual similarity of Red-headed Woodpeckers and possible explanations based on fall territorial behavior.—As discussed by Goodwin (Bull. Br. Mus. Zool. 17:1–44, 1968) the sexes are alike or nearly so in only 5 species of woodpeckers. In none of these are the sexes more exactly alike than in Red-headed Woodpeckers (*Melanerpes erythrocephalus*). This presents a challenging problem that has received little attention.

As narrated elsewhere, (Kilham, Wilson Bull. 70:347–358, 1959) 12 Red-headed Woodpeckers settled in one small wood of 1.7 ha in Maryland attracted by pin oak (*Quercus palustris*) acorns. The wood was divided into 12 sharply defined territories, each woodpecker defending its stores, chiefly against interspecific intruders.

In such situations, I suggest that the monomorphism of Red-headed Woodpeckers aids females in establishing and maintaining individual winter territories. If males dominated, the females would be crowded into less favorable habitats. This in turn might mean a poorer winter survival. If, however, as may have happened in their evolutionary past, females were selected to resemble males in plumage and hence have the same display colors, they would have a more equal chance in border contests.

The best parallel that I have been able to find for the sexual similarities in color of *M. erythrocephalus* is that described by Lack (Life of the Robin, H. F. and G. Witherby Ltd., London, 1943) for the British Robin (*Erithacus rubecola*). These birds form small, individual fall territories and the sexes have identical coloration.

One might ask how do juveniles before molting to adult plumage fare in competition with adults? As noted elsewhere (Kilham, op. cit.), among the 12 closely adjacent winter territories observed, the 3 held by juveniles were all peripheral and appeared to be the least desirable. The juveniles, therefore, without red heads, appeared to have fared less well, but lack of experience may also have been a factor.

It would appear from descriptions by Bock (Univ. of Calif. Publ. Zool. 92:1–100, 1970) that the Lewis Woodpecker (*Asyndesmus lewis*) resembles *M. erythrocephalus* in being irregularly migratory in relation to fall storage territories. This may account for the similarity in plumage between the sexes of this species. Acorn Woodpeckers (*M. formicivorus*), which are sexually dichromic, also store mast in the fall. Living in social groups, however, and being to a considerable extent resident on the same territories the year around (MacRoberts, Condor 72:196–204, 1970) they are not exposed to the same selection pressures as are *A. lewis* and *M. erythrocephalus*.

Among sapsuckers, as well presented by Howell (Condor 54:237–282, 1952; Auk 70:118–126, 1953), the eastern Yellow-bellied (*Sphyrapicus v. varius*) is dichromic and highly migratory whereas the western race, *S. v. ruber*, is monochromic and essentially non-migratory. Are there any parallels to the situation encountered in *M. erythrocephalus*? In the absence of information as to whether *S. v. ruber* maintains fall and winter territories, I find it difficult to draw conclusions. It seems likely that monochromatism in birds can arise from more than one kind of selection pressure and that which I have described for an acorn-storing species of woodpecker may not apply, necessarily, to other Picines with other habits.—LAWRENCE KILHAM, *Dept. of Microbiology, Dartmouth Medical School, Hanover, NH 03755.* *Accepted 5 Feb. 1977.*

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Notes on the courtship behavior of Brown-capped Rosy Finches.—Published observations on the life history of the Brown-capped Rosy Finch (*Leucosticte australis*)

are scanty, the most comprehensive being those of Bailey and Niedrach (Birds of Colorado, Denver Mus. Nat. Hist., Denver, 1965), and Packard (*in* Bent, U.S. Natl. Mus. Bull. 237, part 1, 1968). These authors point to the lack of data on early breeding season activities and the courtship behavior of this species. In order to help fill the hiatus in our knowledge of the biology of these interesting birds, I offer the following notes on their courtship behavior.

Courtship display.—On 11 July 1977 I was looking for rosy finches in the upper portion of Navajo Basin (3700 m elev.) in the San Miguel Range, Dolores County, southwestern Colorado. At 10:45 a female finch landed in the fellfield near me and began to forage. Less than a minute later a male finch landed on a rock near the female and began to court her. His body was held low, feathers fluffed, tail held high above the back, head and neck stretched slightly forward and level with the back, throat swollen as he emitted a continuous chirping and rapidly fluttered his wings at his sides. He displayed for about 2 min then hopped off the rock and walked across the tundra toward the female. He continued to display as he followed her. His wing-fluttering became more pronounced, and he held his wings partly unfolded and away from his sides so that they caught the wind, making him appear off balance. The female then moved closer to the male, whereupon he flew at her and chased her in a horizontal straight line 1 m above the ground for 100 m before they disappeared behind some boulders, terminating the observations.

On 21 July 1977, I encountered many rosy finches around the base (3500 m elev.) of a prominent buttress above Stillwater Reservoir on the northeast edge of the White River Flattops in the Flattops Wilderness Area, Garfield County, northwestern Colorado. At 10:10 a male began to display before a female in the basalt talus about 10 m below me. The appearance of the display was like that described above with one major addition; the male picked up several long pieces of dried grass in his beak and held the material as he chirped and fluttered his wings like a begging juvenile. This display lasted about 2 min before the female showed her disinterest in the male's efforts by flying off.

On 22 July 1977, I visited Medicine Bow Peak in the Snowy Range, Albany County, southeastern Wyoming, and found Brown-capped Rosy Finches along the base of the south face (3300 m elev.). At 16:45 a male followed a female into the boulders and began to display while perched atop a 2 m diameter rock as the female foraged below him. Again, his physical appearance and actions were similar to those described above. He picked up a piece of dried grass as he moved among rocks in rapid pursuit of the female. He dropped the grass when he reached another boulder, ceasing to display about 5 sec later when the female moved rapidly to the far side of the boulder out of his vision. At 17:00 I saw another male follow a female into the boulders and begin to display, but he barely had opportunity to begin when she apparently eluded him. He ceased to display immediately and sat silently for several minutes atop the boulder with his feathers fluffed.

The courtship display of the Brown-capped Rosy Finch seems to be similar to that of the Black Rosy Finch (*L. atrata*). The description provided by French (Auk 76:159–180, 1959) varies from what I saw in the Brown-capped males only in the elevated position of the beak. I saw nothing suggesting a female display. No coition was seen, and the late dates of these observations coupled with the lack of response shown by the females (except in the first case) may indicate that these males were courting already-mated females making foraging trips for their young (I saw fledged juveniles being attended by their parents at the last 2 localities). The persistent nature of un-

mated male rosy finches is well documented (French, op. cit.; Johnson, Auk 82:190–205, 1965; Twining, Condor 40:246–247, 1938).

An analysis of the courtship display described above seems premature, therefore I wish only to suggest a possible origin of the display based on my first impression. Hinde (Ibis 97:706–745, 1955; 98:1–23, 1956) summarizes an analysis he made of the courtship behavior of several species of finches, in which he concludes the male courtship displays are modified forms of the head-forward threat posture. My impression of the display of the male rosy finches is its similarity to the juvenile begging response, particularly the fluffed feathers, wing fluttering, and constant chirping. Morris (Behaviour 9:75–113, 156) mentions that in Estrildine finches feather postures are used as social signals, and a fluffed body posture can eliminate normal individual distances maintained by conspecifics, thus allowing individuals to approach one another until touching, without fear of attack. It seems possible that the display used by a male rosy finch acts to neutralize the expected agonistic response of the female upon his approach, and may even invite her closer approach. Male aggressiveness during courtship attempts, which Hinde (op. cit.) documents in a variety of Fringillids, may be more readily apparent earlier in the season.

Flight display.—Packard (op. cit.) includes observations by R. J. Niedrach of a "conspicuous song flight" that occurs during the mating season. I have observed this "song flight" perhaps a dozen times. In undulating fashion the male Brown-capped Rosy Finch flies a large horizontal arc or circle traveling several hundred meters, chirping (described in my field notes as a guttural *churk*) as he flaps his wings. During the breeding season rosy finches are often scattered throughout a cirque or basin making it difficult to visually locate conspecifics for courtship. The "song flight" of rosy finches may have the same function as the advertising song of other species (see Tinbergen, Trans. Linn. Soc. N.Y. 5:1–94, 1939) in that it serves to attract or locate potential mates. Finches on the ground often respond vocally to others flying overhead or nearby.

The vocal flight display of Brown-capped Rosy Finches may have evolved due to other selective parameters of the alpine environment. Morton (Am. Nat. 108:17–34, 1975) presents an argument for the ecological selection of non-ground song displays used by many grassland and tundra birds based on the effects of wind turbulence and solar radiation on sound propagation from the ground. It seems possible that the acoustic properties of an alpine environment, subjected to similar wind and temperature effects as grasslands and tundra, may have a similar selectivity for aerial song displays in alpine nesting birds. It is interesting to note that Horned Larks (*Eremophila alpestris*) and Water Pipits (*Anthus spinoletta*), both of which nest in alpine areas where rosy finches are found, also have flight displays (Verbeek, Wilson Bull. 79:208–218, 1967; Verbeek, Auk 87:425–451, 1970).

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Effects of nest removal on Starling populations.—Starlings (*Sturnus vulgaris*) commonly compete with Wood Ducks (*Aix sponsa*) for nesting boxes. Bellrose and McGilvrey (Wood Duck Management and Research: A Symposium, pp. 125–131, Wildl.