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Parental Behavior of a Replacement Male Dark-eyed Junco

THOMAS A. ALLAN¹

Department of Forestry, Michigan Technological University, Houghton, Michigan 49931 USA

While studying the breeding biology of the Dark-eyed Junco (*Junco hyemalis*) in the jack pine (*Pinus banksiana*) forests of Baraga County, Michigan, I observed the pair formation and parental behavior of a male Dark-eyed Junco that replaced the resident male of a territory after it was killed. I describe here the parental behavior of the male junco to the nestling of its new mate and the sexual behavior of the female junco toward her replacement mate.

On the morning of 27 June 1977 one of three eggs hatched in the junco nest under observation (the remaining two eggs were infertile and were later removed). On that same morning the male holding that territory was found dead in a partially opened mist net nearby. During the 6 h of observation that day, the female brooded the nestling regularly that morning and was observed in the company of a new unbanded male that afternoon. On the next day the new male occasionally followed the female to a tree adjacent to the nest site. The female left the nestling unattended for longer periods of time as she spent increasing amounts of time with the male. Four copulation attempts were observed during 8 h of observation that day. On the second day after hatching, I observed the male in the nest area often and saw it following the female to the nest area as she delivered food to the nestling. Six copulations were observed during 6 h of observation. Such copulatory behavior by the female stands in contrast to the view that sexual behavior in parent birds is usually suspended during the nestling stage (Emlen 1955). On the following day inclement weather appeared to be responsible for an increase in nest attentiveness by the female and a decrease in the feeding rate of the nestling, as I saw the female feed the nestling only twice during 6 h of observation. The male was seen regularly in the area, and two copulations were observed that day, but the male made no effort to feed the nestling. On the fourth day of the male's presence, he began to feed the nestling, contributing 5 of 6 feedings observed during 4 h that day. The male continued to perform more than half of the observed feedings for the following 5 days that the nestling remained in the nest. This is contrary to the normal junco parental behavior that I observed at other nests, where the female assumed a greater proportion of the feeding responsibility as the young increased in age and less time was spent in brooding (Allan 1978). The female in the present case engaged in unusually long brooding periods as the nestling increased in age, leaving the nest when the male returned to feed the nestling and often returning without food. Both parents actively defended the nest with alarm calls and distraction displays when the nest was disturbed. The nestling left the nest 9 days after hatching, and both parents were last observed feeding the nestling when it was 14 days old.

Such behavior by the male junco can be considered maladaptive, as he increases his parental investment by the raising of an unrelated young (Trivers 1972) with no opportunity to increase his fitness. Barash (1977) stated that species that require considerable care for their young should evolve mechanisms that

¹ Present address: Route 1, Box 85B, Calumet, Michigan 49913 USA.

prevent individuals from wasting time and energy on the rearing of unrelated young. In his test for altruism, Power (1975) found consort male Mountain Bluebirds (*Sialia currucoides*) offering little parental assistance to the unrelated young associated with their female partners. Emlen (1977) noted the need for accelerated physiological adjustment by a replacement mate in order to attain the appropriate hormonal condition to exhibit parental behavior to a new nestling. The male junco that I observed required 4 days from his initial appearance until he began feeding the nestling. Kilham (1977) found a replacement male Yellow-bellied Sapsucker (*Sphyrapicus varius*) feeding the nestlings of its new mate after 2 days of courtship behavior. These may be examples of the "foreshortened" hormonal adjustments discussed by Emlen.

As Dark-eyed Juncos are considered multibrooded in this area, with active nests being found as late as mid-August (Allan 1978), the male may have been increasing his potential fitness through the acquisition of a breeding territory and the possibility of future reproduction with this mate at the cost of raising an unrelated nestling. Selection may favor a hormonal regulatory system with enough flexibility to permit such behavioral adjustments if conditions occur at an appropriate time.

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