

**On flight pursuits in wintering Dark-eyed Juncos.**—This paper presents information on the nature of flight pursuits in wintering Dark-eyed Juncos (*Junco hyemalis*), based primarily upon an incident that occurred while the senior author was studying this species' winter social behavior.

Flight pursuits were one of several forms of agonistic behavior documented in free-living and penned junco flocks from 1972–75 in northern Utah (Balph MS). These aerial chases appeared to correspond in general form, although not in context, to Sabine's (1952, Auk 69: 313) "undulating flight" as performed by juncos in April. Winter flight pursuits were characterized by sudden, erratic changes in direction, performed synchronously by both participants. The chases were accompanied by conspicuous tail-flashing and sometimes (36 of 100 instances recorded among captives) by agonistic calls. The pursuer maintained a distance of 60 cm or less from the pursued bird and occasionally made physical contact with it. Although in most instances the chasing bird did not overtake its opponent, its flight appeared to be normal rather than impeded as detailed by Hinde (1955, Ibis 97: 706; 1956, Ibis 98: 1).

Flight pursuits differed from other forms of agonistic behavior seen in wintering juncos in that they appeared to be initiated only by males. Among captive juncos, 23 of 24 males initiated a combined total of over 1600 recorded flight pursuits, whereas none of 15 females chased other birds (Balph MS). Those individuals that were chased in flight were of either sex and in most cases were subordinate to their pursuers in other types of encounter. Marler (1956, Behav. Suppl. 5: 1) observed that winter chasing in Chaffinches (*Fringilla coelebs*) was usually by males and suggested that the behavior might have a sexual origin. Unlike Chaffinches, wintering juncos sometimes engaged in flight pursuits immediately following a pecking attack, fight, or agonistic display, which suggests that in juncos the behavior was aggressive.

The incident upon which this report is based involved flight pursuits by a captive male junco that lost its rectrices. This bird, an aggressive individual dominant to all but one junco in a six-member flock, initiated 140 observed encounters during December 1973 in its 3.05 × 9.14 × 2.44 m home aviary. Of these encounters, 48% were flight pursuits (Table 1). On 15 January 1974, the rectrices were pulled out accidentally when the bird was captured for transfer to an identical flight pen containing a resident flock of five juncos. Without its tail feathers, the bird was fully capable of flight but lacked some of its usual agility. When introduced into the pen containing the five-member resident flock, it became dominant to several members of that flock. However, of 117 encounters it was seen to initiate during the day, beginning immediately after its introduction, none were flight pursuits. The bird initiated a disproportionately high number of pecking attacks (41% of the recorded encounters, as compared to 14% of encounters it initiated in December), suggesting that it substituted this form of behavior for flight pursuits. One could hypothesize that the transfer per se was responsible for the observed modification of behavior; however, other males used in transfer experiments, including individuals that dominated some members of the resident flocks into which they were introduced, showed no such change.

Upon return to its home pen the following day, the tailless junco maintained its previous dominance-subordination relationships with members of the home flock. Nevertheless, although the junco participated as the pursued bird in flight chases with a higher-ranking male, it did not chase other juncos in flight. This behavior persisted until early February, when the bird showed partially grown rectrices and for the first time was seen chasing a flockmate in flight. By mid-February, the rectrices were fully grown; and during the ensuing month, the bird showed a gradual increase in the relative number of flight pursuits it initiated. By mid-March, when observations of

TABLE 1  
RELATIVE FREQUENCY OF FLIGHT PURSUITS AMONG RECORDED ENCOUNTERS INITIATED  
BY A CAPTIVE MALE JUNCO WITH AND WITHOUT ITS RECTRICES

Date(s)	Condition of rectrices	Encounters initiated (n)	Flight pursuits (%)
1-29 December	Normal	140	48
15 January	No rectrices	117	0
16 January	No rectrices	5	0
26-27 January	No rectrices	50	0
4 February	New rectrices partly grown	71	1
15-28 February	New rectrices fully grown	127	6
1-14 March	New rectrices fully grown	137	35

the captive flocks were terminated, the bird approached its initial relative frequency of chasing.

If this incident is representative, it appears that chasing in flight is not necessary for individual juncos to establish or maintain dominance in winter flocks, and that juncos will readily use another high intensity form of agonistic behavior (i.e. pecking attack) as a substitute for flight pursuits. Furthermore, a male without rectrices will participate in aerial chases as the pursued bird but will not chase other juncos.

The results reported herein raise a conceptual question as to why a junco immediately should have ceased initiating flight pursuits upon losing a morphological structure which, although used in association with the behavior, was not obviously necessary for performance of the behavior. If pursuit in flight were a relatively stereotypic response, one would expect the bird to have persisted in chasing other juncos or in attempting to do so after it lost its rectrices. Alternatively, if the behavior pattern were maintained through experience, one would expect that had the tailless bird ceased chasing other juncos, it should have done so over a period of time. Neither of these expectations was borne out. The bird did not pursue other juncos at all from the time it lost its tail feathers until new rectrices were partly grown; then, after the rectrices were fully grown, the bird gradually increased its relative frequency of chasing. It seems possible that proprioceptive feedback coupled with experience may be important in the development and maintenance of this behavior pattern in juncos.—MARTHA HATCH BALPH and DAVID F. BALPH, *Department of Wildlife Science, Utah State University, Logan, Utah 84322*. Accepted 28 Oct. 75. This paper was subsidized by the authors.

**Additional records of Mountain White-crowned Sparrows parasitized by the Brown-headed Cowbird.**—The White-crowned Sparrow (*Zonotrichia leucophrys*) is an uncommon victim of the Brown-headed Cowbird (*Molothrus ater*). Friedmann (1963, U.S. Nat. Mus. Bull. 233) lists only five records referable to *Z. l. leucophrys* (1), *Z. l. oriantha* (3), or an unknown race (1). Lewis (1973, Auk 90: 429) and Lavers (1974, Auk 91: 829) supply five additional records for *Z. l. pugetensis*. To these we can add seven cases of parasitism of *Z. l. oriantha* by *M. a. artemisiae* on the eastern slope of Hart Mountain, Lake Co., Oregon (42° 26' N, 119° 44' W) about 1900 m above sea level.

On 22 July 1974 a cowbird nestling weighing 15.8 g was banded in a nest also containing two unhatched eggs of the host White-crowned Sparrow. The cowbird fledged a few days later and the eggs were abandoned.

Cowbird eggs or nestlings were found in 6 of 42 White-crowned Sparrow nests in which incubation began within the span 29 May-27 June 1975. In addition to 3-4