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FEMALE DOMINANCE AMONG PURPLE FINCHES (*CARPODACUS PURPUREUS*) IN WINTER FLOCKS

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ABSTRACT

The dominance of females over males in winter flocks is rare. In this paper, I report on female dominance over males in winter flocks of Purple Finches (*Carpodacus purpureus*). Females won nearly all observed intersexual encounters and also differed from males in their use of agonistic displays. Female dominance has been reported for other species in the genus *Carpodacus*, but reasons for the occurrence of female dominance in this genus are unknown.

INTRODUCTION

The dominance of females over males in winter flocks appears to be unusual among North American species of birds (Smith, 1980). Female dominance, however, has been reported in the genus *Carpodacus*. In winter flocks of Cassin's Finch (*C. cassinii*) females are clearly dominant to males (Samson, 1977), while among House Finches (*C. mexicanus*) females, as a group, are at least equal in dominance to males (Thompson, 1960). In this paper, I report on the dominance of females over males in the third North American member of this genus, the Purple Finch (*C. purpureus*) and examine how males and females differ in their use of aggressive displays.

The Purple Finch breeds from the mountains in western North America, across boreal Canada and north-central United States (including northern Wisconsin), into the northeastern United States. During the winter, Purple Finches can be found in small flocks in wooded areas. Their movements are often irregular, as they presumably follow available food sources.

METHODS

I observed aggressive interactions among Purple Finches at a feeder at Elkhart Lake, Sheboygan County, Wisconsin. The Purple Finch is an irregular winter visitor to the study site. The finches would come to the feeder in flocks of from two to twenty birds. The feeder held a maximum of three finches; finches not on the feeder remained in nearby bushes. Aggressive encounters occurred frequently over access to the feeder. Observations were made between January and April 1985 and between November 1986 and March 1987. For each encounter the sex of the winner and loser were noted. During 1985, the finches were videotaped and the displays used by each contestant were noted. The loser of an encounter was the bird that either fled from the feeder or gave a submissive posture (Popp,

1987); the winner was the bird that held its position on the feeder. The finches were observed using three display types (Figure 1) which have been described by Popp (1987):

Low Head Forward (LHF) - The individual is in a horizontal position, with its neck extended and bill pointed at opponent.

High Head Forward (HHF) - The finch is in a more upright posture with the neck extended towards its opponent; the bill is often open in a gape.

Bill Display (BD) - The bird stands vertically, its body extended to its full height, pointing its bill downward at the opponent.

These displays are listed in order of both increasing effectiveness (probability of causing an opponent to flee) and increasing risk (probability of opponent attacking) (Popp 1987).

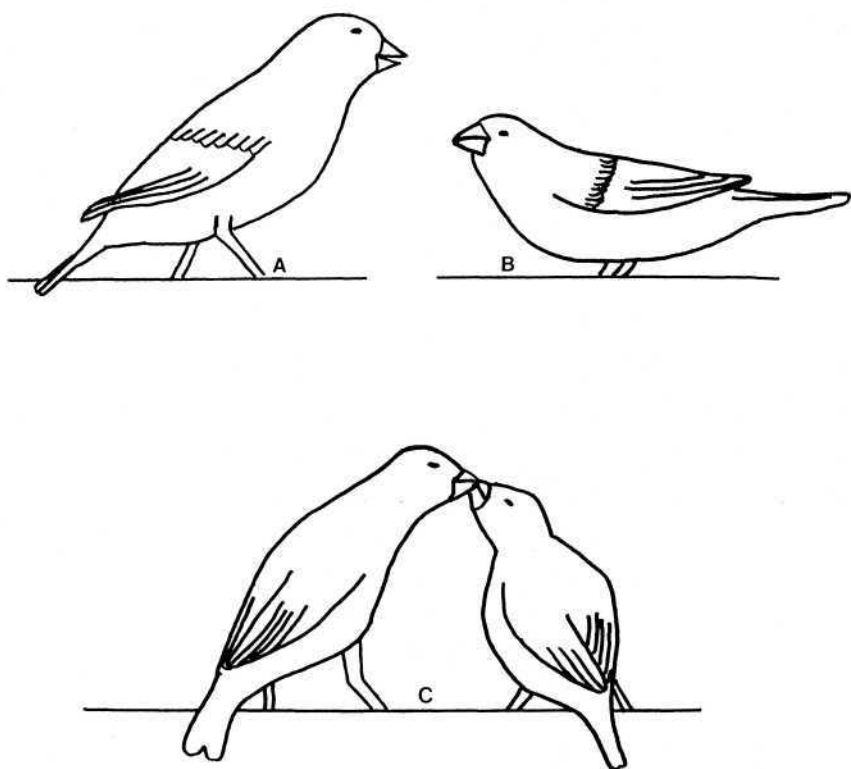


Figure 1. The three display types used by the Purple Finch are shown: A) The High Head Forward, B) The Low Head Forward and C) The bird on the left is directing Bill Display at its opponent.

Purple Finches are sexually dimorphic in plumage coloration, but are similar in size. Adult males have a rosy color which females lack, while females have streaked breasts. Juvenile males, however, have a female-like plumage. For this paper, I categorized Purple Finches as either adult males or female-like (females and juvenile males). Some of the implications of this division will be discussed below.

RESULTS AND DISCUSSION

During 1985, female-like birds won 63 of the 64 observed encounters between female-like birds and adult males. In the winter of 1986-87 female-like birds were observed winning 52 of 54 of these encounters. Female-like birds were, thus, clearly dominant to adult males.

In addition to winning most intersexual encounters in 1985, female-like birds also initiated most encounters with adult males (92.2%). Males and females differed in their use of displays during intersexual encounters (Table 1). Female-like birds used the LHF most frequently, while adult males used the HHF most. Females were apparently able to cause flight in male opponents by using the LHF display, without resorting to higher risk displays. The Bill Display was used only once by adult males. The Bill Display is the display most likely to elicit an attack by one's opponent (Popp, 1987), which may account for its low frequency of use by adult males against the dominant females. The only time a Bill Display was directed at a female-like bird was, however, the only instance in which a female-like bird retreated from an adult male.

Table 1. Frequency of display use by adult males and female-like birds during intersexual encounters ($G = 24.1$, $P < 0.001$).

Signaler	Recipient	Display		
		LHF	HHF	BD
Adult Male	Female-like	6	18	1
Female-like	Adult Male	41	12	16

The dominance of females over males makes the Purple Finch similar to the Cassin's Finch and different from most other North American species that form winter flocks. Why members of the genus Carpodacus should show female dominance is not clear. The ecology and population structure of winter flocks for these species is not well known and there may be some unique aspect of these flocks that favors female dominance. The fact that juvenile males have female-like plumage suggests that they may also be dominant to adult males. Adult males rarely defeated birds with female-like plumage, so either juvenile males were defeating adult males or adult and juvenile males were never involved in aggressive encounters. The latter explanation seems unlikely as encounters occurred quite frequently at the feeder. Juvenile males may have been gaining an advantage over adult males by resembling females, as has been recently suggested for numerous other avian species (Rohwer et al., 1980).

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