
Notes on the Pine Grosbeaks of Anchorage, Alaska

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ABSTRACT

The field biology of Pine Grosbeaks (Pinicola enucleator) is little studied due in part to the remoteness of their range relative to human habitation. I banded 160 Pine Grosbeaks in Anchorage, Alaska, primarily during winters between May 1990 and April 1995 from which I was able to obtain weights, morphological measurements, and age and sex ratios. Adults comprised 33% of the population. Adult females slightly outnumbered adult males. Adult males weighed significantly more than adult females, and adults weighed significantly more than juveniles. Mean monthly weights showed a slight but steady decline through the darkest months of the winter. During daylight feeding periods, weight gain was 0.42 g/hr based on measurements from all birds captured. Wing lengths measured larger than published averages, and suggest the population wintering in Anchorage are primarily composed of the boreal interior species, P. e. leucurus.

INTRODUCTION

Two subspecies of Pine Grosbeak (*Pinicola enucleator*) occur in Alaska, the boreal subspecies *P. e. leucurus*, and the coastal temperate rainforest subspecies, *P. e. flammula*. *Pinicola e. leucurus* breeds in the northern boreal forest area (e.g., Fairbanks), while *P. e. flammula* breeds from the Anchorage area south to the Kenai Peninsula and the Alaska Panhandle (e.g., Juneau; Adkisson 1999). Both subspecies are poorly studied in the wild, primarily due to the remoteness of their ranges. For example, only 20 weight measurements are available for *P. e. leucurus* and 4 for *P. e. flammula* (Adkisson 1999). Hines (1963) also provided a mean summer weight of 59.8 g for 12 adults (range 54.5 - 62.8 g) collected from the Noatak River valley, 1960-1961. I banded 160 Pine Grosbeaks in Anchorage, Alaska, between May 1990 and Apr 1995 from which I obtained weights,

morphological measurements, and age and sex ratios. All but one of the captures occurred during the extended winter season (starting in October and extending into April).

METHODS

Pine Grosbeaks were opportunistically captured in one or two 12-m, 36-mm mesh mist nets and homemade walk-in and drop-door traps at my banding station on the lower hillside of Anchorage (see North 2018) for a description of the study area). Banding was done as a sub-permittee of K.C. Jensen (permit 21408). During winter when all but one of the captures occurred, banding was conducted on weekends and holidays. Mist nets were operated during light wind conditions, during little or no precipitation, and when temperatures exceeded 0° F. Traps continued to be operated during more extreme conditions.

For each bird captured or recaptured, I typically recorded wing chord, tail length, mass, age and sex, fat and molt condition, and plumage coloration, although some measurements were not taken depending on numbers of other birds needing banding, or in the case of equipment failures. For example, I did not weigh nine birds captured between 22 Dec 1990 and 5 Jan 1991. Data were also collected from one injured and two dead birds.

For this paper I grouped birds as either "juvenile" (HY) [Hatching Year] or second year (SY)[Second Year] through to Mar) or "adult" (Second Year after Nov or AHY [After Hatching Year]). Ages were determined by rectrix shape and wear according to Pyle et al. (1987), with additional consideration of plumage coloration based on personal experience. However, although I was able to identify some HY and SY birds as males (n = 22), until further study confirms juvenile male/female plumage differences by following individuals into adulthood, I combined all juvenile birds into one category (juvenile unknowns) for most analyses, even those with wing lengths attributable to males.

From 21 Mar 1990 to 27 Oct 1992 birds were weighed with a 100-g Pesola scale to the nearest 1 g and thereafter with an Ohaus 300-g digital electronic scale to the nearest 0.1 g.

Mean wing length and mass (weight) and their standard deviations (mean \pm SD) were calculated using Excel statistical programs AVERAGE and STDEVA. Diurnal changes in mass were assessed with Excel statistical programs INTERCEPT, SLOPE, and CORREL. I hypothesized slopes would be positive during the daylight hours, reflecting weight gains necessary to carry the birds through the coming night. The intercept provided by Excel would represent the birds' theoretical body mass at midnight, but that is biologically untenable. Maximum body mass would be the bird's mass when it went to roost in the evening and minimum weight would occur approximately when it awoke the next day and began to feed. The biological importance of the intercept is to predict morning body mass of birds. The earliest mass I have was from 0800 (in Mar), however during the three winter months from which I collected the most data (Dec-Feb) the earliest weight time I have was 0950, so the intercept for all birds was scaled to 1000 by the equation: $M_{10} = M_0 + 10 m$, where M_{10} is estimated body mass at 1000, M_0 is body mass at midnight, and m is slope of hourly weight gain.

Significant differences in body mass between sexes, ages and sex-age groupings were explored using Excel statistical program T.TEST and using one-way analysis of variance in program JMP (SAS). Paired groupings were tested with t-tests, while multiple groups were tested using the Tukey-Kramer HSD test in program JMP. Significance was set at $\alpha < 0.05$.

RESULTS

I captured 163 and banded 160 Pine Grosbeaks at my station on the lower Anchorage hillside. All captures occurred between 17 Oct and 20 Mar, with 1 exception (12 May), suggesting these birds represented winter migrants rather than residents. Most captures occurred December through February (Table 1). Recoveries included

11 recaptures (nine within the same winter season, two in different winters) of 10 different birds at my station, and 1 distant recovery by another individual.

Age and Sex Composition: Adults accounted for 33.7% of the birds banded (Table 1). Known juveniles comprised 49.1% of the population, and unknown-aged birds accounted for 17.2% of the population. Known females comprised 52.7% of the adult population, however, some of the unknown-aged birds may have been adult females.

Wing Length: Adult female wing lengths averaged 116.42 ± 2.08 mm ($n = 31$, range 112 - 120 mm) in Anchorage (Table 1), while adult male wing lengths averaged 119.78 ± 2.68 mm ($n = 27$, range 113 - 124 mm). The wing lengths of juveniles provisionally identified as males averaged 118.65 ± 2.82 mm ($n = 23$, range 114 - 124 mm).

Wing lengths of juvenile birds ($n = 88$) averaged 116.26 mm (± 3.10 mm). Wing lengths of birds of unknown age and sex ($n = 28$) averaged 115.93 mm ± 2.55 mm. These wing lengths also suggest juveniles and birds of unknown age are primarily *P. e. leucurus*.

Weight: Avian weights may, or may not, vary between ages, sexes, month (or season) and time of day. Weight by age and sex of Pine Grosbeaks captured in Anchorage are given in Table 1. Adult males weighed slightly more (mean 69.2 g) than females and juveniles and unknowns (64.4 - 66.1 g). Differences between adult males and adult females were significant ($p = 0.036$). Differences between adults and juveniles (sexes combined) were significant ($p = 0.044$).

In order to increase sample sizes, all sex and age categories were combined for further weight analyses by month and time of day. Weights by month are shown in Table 1. Weights peaked in November and showed a steady slight decline through February before increasing again in March. Results of the analysis of weight change by time of day are presented in Table 2. Results were generally weak with low correlations. I attribute this to low sample sizes and widely fluctuating day

lengths during late winter. Adult females gained an average of 0.522 g/hr during daylight feeding times, all juveniles combined gained an average of 0.496 g/hr, and all juveniles and unknown aged birds combined gained an average of 0.403 g/hr. Adult males gained an average of 0.259 g/hr, while all birds combined gained an average of 0.420 g/hr.

In January, Pine Grosbeaks averaged weight gains of 1.02 g/hr, starting out at a calculated average weight of 62.4 g at 1000. In December and February, average weight gains were 0.29 and 0.02 g/hr, respectively, starting out at average weights of 65.4 and 64.4 g at 1000, respectively.

Inter-seasonal Recoveries.— Three banded Pine Grosbeaks were recovered following the winter in which they were banded. Grosbeak 8011-92418 was banded as a juvenile male on 8 Jan 1994 (wing 117 mm, weight 67.4 g). It was found dead after a lapse of > 763 days along the Kasilof River on Kenai National Wildlife Refuge in April 1996 as an adult (4th year) male by unknown persons and turned in to refuge staff. This recovery location is 110-120 km south of Anchorage. Grosbeak 8011-92806 was banded as a juvenile of unknown sex 16 Dec 1990 (wing 116 mm, weight 64 g). It was recaptured 804 days later on 27 Feb 1993 as an adult (4th year) male (wing 118 mm, weight 67.6 g). Grosbeak 8011-92868 was banded as a juvenile of unknown sex 19 Jan 1992 (wing 113 mm, weight 75 g at 1350 hours). It was first recaptured 17 Feb 1992 (wing 114 mm; weight 66 g at 1340 hours); and again 665 days after being banded on 14 Nov 1993 as an adult (3rd year) female (wing 120 mm, weight 82 g at 1530 hours).

DISCUSSION

Two subspecies of Pine Grosbeak could theoretically occur in Anchorage. Wing measurements and temporal periodicity of occurrence suggest most of the population consists of *P. e. leucurus*. Adkisson (1999) gives mean female wing length as 112.7 ± 3.37 mm in Alaska, while Pyle (1997) gives a wing length range of 105 - 120 mm for *P. e. leucurus*. For *P. e. flammea*, the values are 110.5 ± 1.41 mm and 106 - 116 mm, respectively. I found adult

female wing lengths to average 116.42 ± 2.08 mm, suggesting the majority of the population may be *P. e. leucurus* moving in from the boreal north.

Adkisson (1999) gives mean male wing length as 117.6 ± 3.14 mm in Alaska, while Pyle et al (1997) gives a wing length range of 108 - 125 mm for *P. e. leucurus*. For *P. e. flammea*, the values are 111.8 ± 2.55 mm and 109 - 119 mm, respectively. I found adult male wing lengths to average 119.78 ± 2.68 mm, also suggesting the majority of the population may be *P. e. leucurus*. However, the recovery of banded grosbeak 8011-92418 in April on the Kenai Peninsula suggests this individual was *P. e. flammula*.

Banders working in Anchorage in the future should attempt to elucidate the subspecies occurring there, through carefully noting plumage patterns, and perhaps by collecting blood sample or feather samples for genetic and isotope analyses. Banders should also attempt to document plumage differences that may allow the identification of juvenile birds as female or male.

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Table 1. Initial captures by age, sex and month (plus dead or injured in parentheses) of Pine Grosbeaks at Anchorage, Alaska. Mean body mass (g) by month, age and sex categories combined, listed below monthly captures; mean wing chord (mm) and body mass (g) for age and sex categories listed to right of monthly captures.

Age	Sex	Captures						Wing			Mass					
		Oct	Nov	Dec	Jan	Feb	Mar	May	mean	sd	n	range	mean	sd	n	range
Adult	F	1	4	7	7	8(1)	1		116.4	2.1	31	112 - 120	66.1	4.7	30	60.5-73
Adult	M	1	3(1)	5	8(1)	5	2		119.8	2.7	27	113 - 124	69.2	5.7	23	51-77.1
Juvenile	U		4	26	19	21	9	1	116.3	3.1	88	109 - 124	65	5.9	84	53-91.6
Unknown	U		1	6	12	8	1		115.9	2.6	28	111 - 120	64.4	5.8	23	57-80.1
Mass	mean	61.5	67.72	66.3	65.68	64.44	67.56	58								
	SD	---	9.36	4.68	4.52	4.98	9.24	---								
	n	2	12	40	46	43	16	1								
	range	61-62	51-82	53-77.1	57.9-73.8	53.3-79.2	55.6-91.6	---								

Table 2. Rates of hourly gain of body mass (indicated by slope *m*) and estimated initial morning weights (M_{10}) of Pine Grosbeaks in Anchorage during winter.

Age-Sex	n	M_0	M_{10}	m	r	R ²
Adult females	30	59.3	64.5	0.52275	0.196	0.038
Adult males	23	65.8	68.4	0.25949	0.079	0.006
All juveniles	84	58.6	63.6	0.49603	0.159	0.025
Unknown age and sex	23	62.9	64.1	0.12415	0.046	0.002
All juveniles and unknowns	107	59.7	63.7	0.40340	0.134	0.018
All grosbeaks	160	60.3	64.5	0.41989	0.136	0.018
All Dec	40	62.5	65.4	0.29124	0.098	0.010
All Jan	46	52.3	62.4	1.01677	0.396	0.157
All Feb	43	64.2	64.4	0.02078	0.007	0.000