

POST-BREEDING AVIFAUNA AND MIXED INSECTIVOROUS FLOCKS IN A COLORADO SPRUCE-FIR FOREST

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Few data are available on post-breeding behavior and migration dates for birds of many geographic areas, especially for mountainous regions like western Colorado whose avifaunas are poorly known in general (Bailey and Niedrach 1965, Davis 1969). This paper presents information on the late-summer birds of a high-altitude forest in western Colorado, with particular attention to the foraging and flocking behavior of small foliage- and bark-gleaners. The study site is of special interest because it is thought to be virgin forest, in a region much of which has been heavily logged.

STUDY AREA AND METHODS

My study site was part of the Gothic Natural Area, located at almost 3000 m elevation near the confluence of Quigley Creek and the East River, 5 km NW of the Rocky Mountain Biological Laboratory (RMBL) at Gothic, Gunnison County, Colorado. The site supports a forest of Engelmann Spruce (*Picea engelmannii*) and Douglas-fir (*Pseudotsuga menziesii*) reaching 20 m in height, with a diverse herbaceous understory which becomes dense and waist-high in openings near water. There are few shrubs except for small individuals of the currant *Ribes montigenum*. There are many dead trees and fallen logs on the site.

Bird species known to have occurred in the Gothic area are summarized in Keeler-Wolf et al. (1973), but few observations have been made later in the year than early August.

I collected the data summarized here while making one or two complete circuits of a marked path (requiring about 1.5 hr per circuit) each morning from 10 August through 3 September 1976, except for 11, 15, 20, 21 and 23 August. All bird species seen or heard on the plot were recorded; in addition, perch sizes and heights and group sizes were noted for small foliage- and bark-gleaning species. Wagner (1977, 1981) provides further detail on methods.

Weather data were not available for the site, but rain fell on about half the days in the study period, often alternating quickly with bright sunshine; many of the nights were frosty.

RESULTS

SHARP-SHINNED HAWK (*Accipiter striatus*). Considered very rare in the Gothic area (Keeler-Wolf et al. 1973), this hawk was seen once on 25 August, when it was mobbed by Gray Jays.

BROAD-TAILED HUMMINGBIRD (*Selasphorus platycercus*). Observed twice, on 17 and 19 Aug. Fed at *Delphinium barbeyi*, a tall herb of moist openings.

RUFIOUS HUMMINGBIRD (*S. rufus*). Observed twice, on 12 and 14 Aug. Also fed at *Delphinium*.

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NORTHERN FLICKER (*Colaptes auratus*). Seen once, on 10 Aug.

YELLOW-BELLIED SAPSUCKER (*Sphyrapicus varius*). Seen on four occasions between 19 and 26 Aug.

WILLIAMSON'S SAPSUCKER (*S. thyroideus*). An adult male was observed on 19 Aug. This species is rare in the Gothic area (Keeler-Wolf et al. 1973).

STELLER'S JAY (*Cyanocitta stelleri*). Seen once, on 19 Aug. A rare species in the Gothic area (Keeler-Wolf et al. 1973).

GRAY JAY (*Perisoreus canadensis*). Observed throughout the study, on 16 of the 20 observation days.

MOUNTAIN CHICKADEE (*Parus gambeli*). Observed on every day of the study. Foraged almost entirely at heights of 3-12 m from perches on twigs <1 cm in diameter (38% of the observations) or on small branches 1-5 cm (56%). These results are similar to those of Manolis (1977) for pine-juniper woodland, although collected differently. Of 89 individuals recorded, 6 were alone; the remainder were seen in 20 single-species and 9 mixed groups. Mixed flocks (except one whose members were not all identified) always included kinglets and sometimes other species (see below).

RED-BREASTED NUTHATCH (*Sitta canadensis*). More often heard than seen, only five individuals of this species were observed, although the species was recorded on 9 days between 10 and 25 Aug. Four of the birds seen were alone and one was with a flock of chickadees and Ruby-crowned Kinglets. This species is considered rare in the RMBL area (Keeler-Wolf et al. 1973) and the ones I observed may have been post-breeding wanderers.

BROWN CREEPER (*Certhia americana*). Recorded on 10 days between 12 Aug and 1 Sep. The 12 observations were of five single birds, one pair, and five members of four mixed flocks of chickadees and kinglets.

GOLDEN-CROWNED KINGLET (*Regulus satrapa*). Flocks of this kinglet were seen on 12 of the 16 observation days from 14 Aug-2 Sep, but not before. These were very likely post-breeding wanderers. The 49 individuals recorded were observed in nine single-species groups, four mixed flocks with chickadees and sometimes other species, and one flock whose members were not all identified. This species perched almost exclusively on conifer twigs <1 cm in diameter.

RUBY-CROWNED KINGLET (*R. calendula*). Apparently bred on or near the site: A male was observed feeding fledglings on 10 Aug. Eighteen individuals were seen during this study, on 8 days between 10 and 27 Aug. Of these, four were alone, eight were as pairs, and six were in four mixed flocks with chickadees and sometimes other species; one flock also included Golden-crowned Kinglets. As in California oak woodland (Wagner 1977, 1981), Ruby-crowned Kinglets perched almost entirely on twigs <1 cm in diameter.

AMERICAN ROBIN (*Turdus migratorius*). Recorded on four days between 10 and 16 Aug.

HERMIT THRUSH (*Catharus guttatus*). Observed once, on 13 Aug.

YELLOW-RUMPED WARBLER (*Dendroica coronata*). Seen on only four occasions, on 12, 25, 28 and 30 Aug. In each case single-species groups of at least two birds were observed.

TOWNSEND'S WARBLER (*D. townsendi*). Single individuals of this species were identified on 10 and 18 Aug. Not recorded by Keeler-Wolf et al. (1973).

WILSON'S WARBLER (*Wilsonia pusilla*). Observed on 4 days between 10 and 14 Aug and on 3 days between 30 Aug and 3 Sep. The later birds may have been migrants from outside the Gothic area. All observations were of single birds, although one appeared to be associated with a flock of chickadees and Ruby-crowned Kinglets.

DARK-EYED JUNCO (*Junco hyemalis*). The Gray-headed (*caniceps*) form of this species was observed on 15 days throughout the study, in single-species flocks which never associated with chickadees or kinglets.

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PINE GROSBEAK (*Pinicola enucleator*). Seen on 12 days throughout the study, generally in small flocks which were always of this species alone. Observed feeding fledglings on 10 Aug.

PINE SISKIN (*Carduelis pinus*). Observed only on 10 and 12 Aug, though large flocks were seen almost daily throughout the study period in weedy fields on the RMBL property 5 km away.

DISCUSSION

Although this study documented a period of turnover in the avian community, the most common and conspicuous species were probably all resident: Gray Jay, Mountain Chickadee and Dark-eyed Junco. There was no period of very high species diversity during the study; no large flocks of migrants were observed, although apparent migrant flocks have been seen at the same time of year on the forested slopes and ridges above the study area (R. L. Willey pers. comm.).

In a detailed study of late-summer flocks, Morse (1970) reported a high diversity and rapid turnover of migrant species, especially paruline warblers, associated with flocks of Black-capped Chickadees (*Parus atricapillus*) in Maine spruce forest and mixed forest. In that study Red-breasted Nuthatches were more common flock members than in my observations in Colorado. Golden-crowned Kinglets were apparently more usually seen in mixed flocks with chickadees than in separate, single-species flocks, again in contrast with my observations. It is not known what differences between Maine and Colorado forests or between Black-capped and Mountain chickadees might account for the predominance of single-species flocking in the Colorado study. In winter in California, where the high diversity of parulines is also lacking, Manolis (1977) observed the Mountain Chickadee most commonly in mixed flocks with highly gregarious species like Bushtits (*Psaltriparus minimus*) and Pygmy Nuthatches (*Sitta pygmaea*).

The scarcity of woodpeckers in my observations is surprising, especially since there were many dead trees on the site. Three species considered common or very common in the Gothic area (Northern Flicker, Yellow-bellied Sapsucker, and Downy Woodpecker *Picoides pubescens*; Keeler-Wolf et al. 1973) were recorded rarely or not at all on my site. The distribution and possible migration of woodpeckers in the Gothic area would make an interesting study. Other groups missing from my data (e.g., flycatchers) are likely to be early migrants. Some common breeding species (e.g., Ruby-crowned Kinglet and Yellow-rumped Warbler) were seen in August but in small numbers; many individuals apparently leave the Gothic area soon after breeding and do not join late-summer mixed flocks. We need more information on altitudinal migration and post-breeding wandering for many species of mountainous regions like western Colorado.

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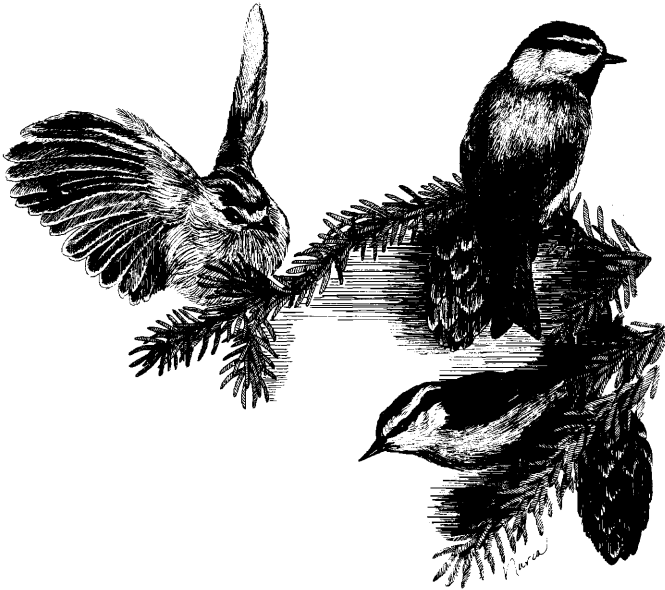
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Mountain Chickadee, Red-breasted Nuthatch and Golden-crowned Kinglet

Sketch by Narca Moore-Craig