GENERAL NOTES

Winter abundance patterns of North American kinglets.—The Golden-crowned (*Regulus satrapa*) and Ruby-crowned kinglets (*R. calendula*) are morphologically similar, small, insectivorous birds. They are widely sympatric in the nesting season in northern coniferous forests, although the Ruby-crowned Kinglet breeds considerably farther north. They winter together across much of the United States (Am. Ornithol. Union, Checklist, 1957). An interesting aspect of their distributions is that the Ruby-crowned Kinglet breeds farther north but winters farther south (to Guatemala) than the Golden-crowned Kinglet.

In this study, winter abundance patterns for the species were obtained from Audubon Society Christmas count data, and the correlations of these patterns with climatic variables were examined. From these we attempted to determine what factors of climate and (by inference) habitat were important to each species in the United States and southern Canada.

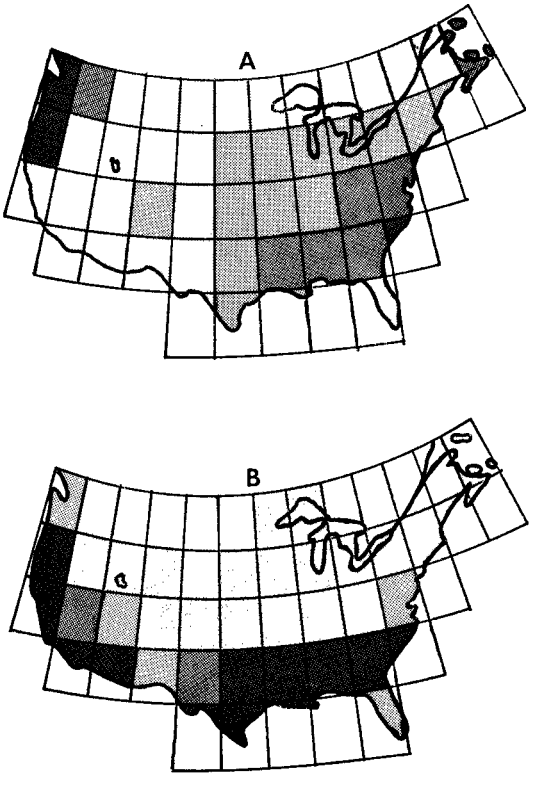

FIG. 1. Winter abundance patterns of (A) Golden-crowned and (B) Ruby-crowned kinglets, based upon Christmas count data for 1969, 1970, and 1971. Open blocks = no birds observed; four degrees of shading represent ≤ 1, >1–3, >3–7, and >7 birds per 10 party-hours, respectively.

TABLE 1

CORRELATION COEFFICIENTS BETWEEN WINTER DENSITIES OF KINGLETS AND 50-YEAR MEANS OF CERTAIN CLIMATIC VARIABLES[1]

Variable	Correlation coefficients	
	Golden-crowned Kinglet	Ruby-crowned Kinglet
Mean annual temperature	.215	.677**
Minimum temperature	.309*	.659**
Mean January temperature	.255	.681**
Number of frost-free days	.283*	.688**
Annual precipitation	.642**	.216
Winter precipitation	.801**	.216
Golden-crowned Kinglet	1.000	.327*

[1] Data are from 47 latitude-longitude blocks at least partially in the U.S.
* $P < .05$.
** $P < .01$.

Details of computerized data storage, retrieval, and analysis have been described elsewhere (Bock and Lepthien, Am. Birds 28:556–562, 1974). In this case we analyzed those Christmas counts which occurred south of 50° N latitude in 1969, 1970, and 1971 ($n = 2680$), published in *American Birds* (vols. 24–26). Counts were grouped by geographic blocks of 5 degrees of latitude and longitude, and the mean number of birds observed per party-hour of count effort was computed for each block (Fig. 1). The number of censuses falling in each block was highly variable, ranging from 3 to 280. However, 46 of the 51 blocks had 10 or more counts. Measures of climatic variables were adapted from maps published by the U.S. Dept. Agriculture (Climate and Man, Washington, D.C., 1941). The statistics program BMD 02R was used to determine the correlations of all the variables in a pairwise manner (Dixon, Univ. Calif. Publ. in Automatic Computations no. 2, 1971). Stepwise regressions also were run in an attempt to explain variation in the kinglet abundance patterns as they correlated with combinations of the climatic variables; see Bock and Lepthien (op. cit.) for a description of this technique.

Figures 1a and 1b show the winter abundance patterns of the Golden-crowned and Ruby-crowned kinglets based upon Christmas count data. It is apparent that the Ruby-crowned Kinglet predominated in the southern 2 tiers of blocks, in parts of the Great Basin, and in central California. The Golden-crowned Kinglet was more widely distributed, but centers of abundance were the northwest and southeast.

The table of correlations of kinglet densities with climatic variables (Table 1) shows a rather striking contrast between the species. Golden-crowned densities were more highly correlated with precipitation variables, particularly winter precipitation, while Ruby-crowned densities were related more to temperature variables, especially winter temperature regime. It also is interesting to note that the species' abundance patterns were not complementary; in fact, there was a slight but significant ($p < .05$) positive correlation between them. Stepwise regression was not especially illuminating, as there were no

significant increases in the multiple *R* value after step 1 for the Golden-crowned Kinglet or after step 2 for the Ruby-crowned Kinglet. For the Golden-crowned Kinglet winter precipitation alone resulted in an *R* of .80 (see Table 1), while for the Ruby-crowned Kinglet number of frost-free days and mean January temperature gave a multiple *R* of .70.

The results of this study indicate that in spite of extensive sympatry, there is a major difference in selection of winter climate regime by the 2 kinglet species. Golden-crowned Kinglets evidently prefer areas with significant levels of winter precipitation (Table 1); from Fig. 1 it can be seen that these areas are the moist forests of the Pacific Northwest and the mixed hardwood-pine communities of the coastal plain in the southeast. By contrast, the Ruby-crowned Kinglet winters most abundantly in areas with warm winter temperatures (Table 1), regardless of the amount of precipitation; the habitats involved appear more variable than those where the Golden-crowned Kinglet is common. Ruby-crowned Kinglets occupy forest understory, open or "edge" situations, desert scrub, xeric oak woodland, and chaparral (e.g., Jewett et al., Birds of Washington State, Univ. Wash. Press, Seattle, 1953; Burleigh, Georgia birds, Univ. Okla. Press, Norman, 1958; Miller and Stebbins, The lives of desert animals in Joshua Tree National Monument, Univ. Calif. Press, Berkeley, 1964).

These species provide an interesting example of the ways in which migratory birds may respond to suitable habitats. During the breeding season the Golden-crowned Kinglet usually is associated with dense and substantial conifer forests—especially of spruce (*Picea*)—and it breeds north only to the limits of the closed boreal forest (Bent, U.S. Natl. Mus. Bull. 196:382–418, 1949). In winter it migrates to warmer, moist, conifer forests, or less frequently (Fig. 1) to hardwood forests. The structural configurations of breeding and preferred winter habitats therefore are generally similar. The Ruby-crowned Kinglet also breeds across boreal Canada in conifers, but unlike the Golden-crowned Kinglet it occurs north to the very edge of the taiga (Bent, op. cit.), revealing a tolerance of, or perhaps even a preference for, open or edge habitats. This tolerance or preference also manifests itself in winter, when Ruby-crowned Kinglets are common in such habitats as desert scrub and chaparral.

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Vocal mimicry in the Thick-billed Euphonia.—Snow (Wilson Bull. 86:179, 1974) recently discussed vocal mimicry in the Violaceous Euphonia (*Euphonia violacea*) on Trinidad. In this species only males are known to mimic and they have their own song in addition to imitations. The imitations are probably learned from models living nearby, and nearly all the calls imitated are unmusical and staccato. Many of them are alarm or contact calls (Snow, op. cit.).

Here I report on mimicking in the Thick-billed Euphonia (*Euphonia laniirostris*), a species largely allopatric to the Violaceous, which occurs from southern Costa Rica to northern Bolivia and the western Amazon basin in Brazil (De Schauensee, Birds of South America, Livingston Publ. Co., Narbeth, Pa., 1966:465). My observations are from the Panama Canal Zone and were made in 1970, 1971, and January and March, 1974.

Both sexes of the Thick-bill use an imitation as a call note when they are inactive, usually solitary, and sitting high up in a tree crown. One female was collected to make