

- HARTLEY, P. H. T. 1953. An ecological study of the feeding habits of the English titmice. *J. Anim. Ecol.* 22:261-288.
- HERTZ, P. E., J. V. REMSEN, JR., AND S. I. ZONES. 1976. Ecological complementarity of three sympatric parids in a California oak woodland. *Condor* 78:307-316.
- MORSE, D. H. 1970. Ecological aspects of some mixed-species foraging flocks of birds. *Ecol. Monogr.* 40:119-168.
- ROOT, R. B. 1967. The niche exploitation pattern of the Blue-gray Gnatcatcher. *Ecol. Monogr.* 37:317-350.
- SOKOL, R. R., AND F. J. ROHLF. 1969. *Biometry*. W. H. Freeman, San Francisco.
- STURMAN, W. A. 1968. The foraging ecology of *Parus atricapillus* and *P. rufescens* in the breeding season, with comparisons with other species of *Parus*. *Condor* 70:309-322.
- WIENS, J. A., S. G. MARTIN, W. R. HOLTHAUS, AND F. A. IWEN. 1970. Metronome timing in behavioral ecology studies. *Ecology* 51:350-352.

Department of Biological Sciences, Stanford University, Stanford, California 94305. Present address: Department of Biological Sciences, California State University-Hayward, Hayward, California 94542. Accepted for publication 3 November 1980.

Condor 83:264-265

© The Cooper Ornithological Society 1981

GROWTH OF A NESTLING MARBLED MURRELET

KATHERINE V. HIRSCH

DOUGLAS A. WOODBY

AND

LEE B. ASTHEIMER

On 6 July 1979, we found a nest of a Marbled Murrelet (*Brachyramphus marmoratus*) on East Amatuli Island in the Barren Islands, south of Cook Inlet, Alaska. The nest was 10 m south of the 1978 nest site described by Simons (*Condor* 82:1, 1980). We provide additional observations on the nest site, chick growth and fledging.

The shallow nest cup was located beneath a 1.5-m high rock ledge, which afforded more protection from inclement weather than the 1978 nest. The nest was on a northeast-facing heath and grass-covered slope overlooking a sheltered cove about 75 m away from the nest. New observations of the Marbled Murrelet's breeding biology are provided in Table 1. We noted chiefly: 1) confirmation of a 28-day nestling period; 2) indication of variability in growth and in hatching and fledging dates for this species; 3) both adults feeding the chick during one evening, and 4) behavior on the night of nest departure.

The chick's weight and wing length were measured on all but three days until it left the nest on the night of 16 August (Fig. 1). Comparing our data with Simons', the following differences are apparent. The hatching weight of the chick in 1978 was 34.5 g, in 1979 it was 32 g. This probably corresponds to the 2.5-g difference in egg weights between the two years. During the first seven days of growth, weights of the 1979 chick were significantly lower than 1978 weights recorded over the same period. In 1979 a significant growth spurt occurred between days 7 and 9 while early weight increase was more regular in 1978. A pre-fledging weight recession was seen in 1979; the chick lost 16 g during the last four days before fledging. Overall, the growth rate was slower ($k = 0.144$) during 1979, and the as-

ymptote of the growth curve was greater (166 g). These values were calculated using the same computer methods employed by Simons. Wing lengths recorded in 1979 were consistently 10 mm less than those recorded

TABLE 1. Additional features of Marbled Murrelet breeding biology.

	1978 ¹	1979
Egg weight	41.0 g	38.5 g
Egg length	61.2 mm	58.9 mm
Egg width	36.3 mm	36.3 mm
Hatching date	1 August	20 July
Hatching weight	ca. 35 g	32 g
Flapping response present		Day 18
Egg tooth present		Day 23
Loss of down	Day 26	Day 26
Nestling period	ca. 27 days	28 days
Nestling food		
Feeding frequency	1 or perhaps 2 trips/day	2 trips/day
Length of feeding bouts	3 min 8 min	1 min 43 s 2 min 34 s
Feeding arrival times	21:02 20:45 20:49	21:24 21:28 21:54 21:33
Load size	15 g 20 g 8 g	13 g 5 g
Nestling growth		
Asymptote (a)	144 g	166 g
$R = a/\text{adult weight}$ ($W = 222$ g)	0.65	0.75
Fledging weight (FW)	ca. 150 g	140 g
FW/W (%)	68	63
K	0.230	0.144
Fledging wing length	ca. 114 mm	103 mm
Fledging date	ca. 27 August	16 August

¹ Simons 1980.

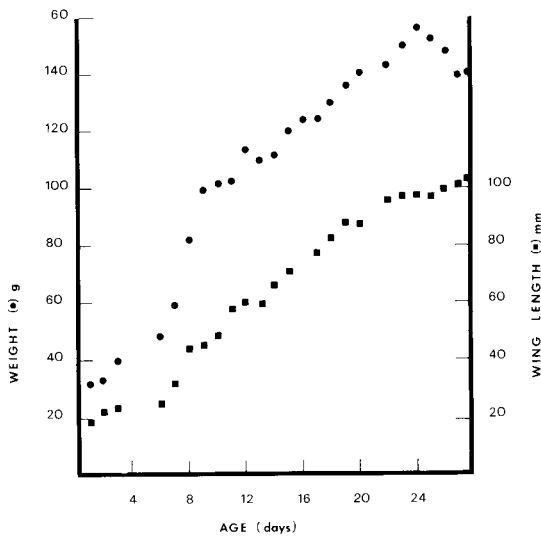


FIGURE 1. Weight and wing measurements of a nestling Marbled Murrelet, East Amatuli Island, 1979.

by Simons. This probably reflects a real difference in size of the two chicks. The wing length plateaus seen in Figure 1 were possibly a result of different measuring techniques of the three observers in 1979. In 1979, wing length was measured to the end of the down, and

to the end of the longest primary. The initial plateau and sudden gain in length parallels the same trend in weight gain, and may be due to underfeeding.

Observations of the chick and adults were made on the night of nest departure. On 16 August both parents came to the nest at twilight and called with the chick. It became very active, left the nest, and walked about on the ledge. All three murrelets remained at least as long as light permitted observation (22:00). The next day the nest site was deserted, suggesting that the chick had departed in the night or early morning.

On 19 August we saw an adult with a juvenile in the cove within 0.5 km of the nest site. On 22 August six adults and four juveniles were on the ocean within 1 km of the same area, indicating the recent fledging of a small local population of ground-nesting murrelets.

We thank the Office of Biological Services, U.S. Fish and Wildlife Service and the University of Washington Wildlife Science Group for supporting this study. We are also grateful to George Divoky and an anonymous reviewer for their critiques of this note.

Nongame Program, Section of Wildlife, Minnesota Department of Natural Resources, Box 7 Centennial Building, St. Paul, Minnesota 55155. Address of second author: Point Reyes Bird Observatory, 4990 State Route 1, Stinson Beach, California 94970. Address of third author: Department of Avian Sciences, University of California, Davis, California 95616. Accepted for publication 7 November 1980.

Condor 83:265-267
© The Cooper Ornithological Society 1981

NEIGHBOR/STRANGER SONG DISCRIMINATION IN WHITE-CROWNED SPARROWS

MYRON CHARLES BAKER

DANIEL B. THOMPSON

AND

GREGORY L. SHERMAN

Studies have demonstrated that male songbirds respond more strongly to the playback of the song of a conspecific stranger than to that of a neighboring territorial individual (Weeden and Falls 1959, Brooks and Falls 1975, Harris and Lemon 1976, Wunderle 1978). Milligan and Verner (1971) showed that male Nuttall's White-crowned Sparrows (*Zonotrichia leucophrys nuttalli*) responded weakly to playback of a foreign dialect compared to the stronger response given to the dialect representing the population of the tested individuals. Thus the results of neighbor/stranger experiments on other species in comparison to the own/foreign dialect results from these sparrows seem paradoxical. The foreign dialect is that of a conspecific stranger yet the response is weaker; if neighbor/stranger discrimination follows the same pattern as dialect discrimination, one might expect results from Nuttall's White-crowned Sparrows opposite those of neighbor/stranger experiments with other species.

We carried out a playback study to determine if Nuttall's White-crowned Sparrow exhibits neighbor/stranger discrimination in a direction different from that predicted by studies on other species.

METHODS

The study was conducted in the Point Reyes National Seashore, Marin County, California. Nuttall's White-crowned Sparrow breeds primarily as monogamous pairs in this coastal scrub habitat. Territories average from 0.5 to 1.0 ha (Ralph and Pearson 1971, Chamberlain 1972) during a 125-day breeding season commencing in late March (Mewaldt and King 1977).

We color-banded four pairs of neighboring males in two adjacent song dialect populations. Here we report data on four males that received playback of their neighbor's song followed by playback of a distant (>1 km) stranger's song of the same dialect on one day, and then, two weeks or more later, each received these stimuli in reverse order. The experiments took place during late May to early June at a time of intense reproductive activity. In a session, 5 min of stimulus at a rate of one song every 15 s was followed by 10 min of silence, then 5 min of the other stimulus, followed by 10 min of silence.

Playback was accomplished by one observer placing the speaker (Perma Power S-610) near the border between the neighboring territories, retreating to the tape recorder (Uher 4200 Report Stereo IC), starting the tape (9.5 cm/s) and recording data while another observer narrated the behavior of the target bird. The songs had been recorded previously using the same recorder with a Uher microphone mounted in a 61-cm parabolic reflector (Torgren Co., North Billerica, MA).