

- AND T. E. HAMER. 1992. Nest-site characteristics of Marbled Murrelets in the Pacific Northwest. *Pacific Seabird Group Bull.* 19(1):52.
- PALMER, R. S. (ed.). 1988. *Handbook of North American birds*. Vol. 4. Yale Univ. Press, New Haven, Connecticut.
- PATON, P. W. C., C. J. RALPH, H. R. CARTER, AND S. K. NELSON. 1990. Surveying Marbled Murrelets at inland forested sites: a guide. Pacific Southwest Research Station, For. Serv., U.S. Dep. Agric., Gen. Tech. Rep. PSW-120.
- QUINLAN, S. E. AND J. H. HUGHES. 1990. Location and description of a Marbled Murrelet tree nest site in Alaska. *Condor* 92:1068–1073.
- AND ———. 1992. Techniques for capture and radio tagging of Marbled Murrelets. Pp. 117–121 in *Status and conservation of the Marbled Murrelet in North America* (H. R. Carter and M. L. Morrison, eds.). *Proc. Western Foundation of Vert. Zool.* 5(1).
- REYNOLDS, R. T., E. C. MESLOW, AND H. M. WIGHT. 1982. Nesting habitat of coexisting *Accipiter* in Oregon. *J. Wildl. Manage.* 46:124–138.
- SEALY, S. G. 1974a. Adaptive differences in breeding biology in the marine family Alcidae. Ph.D. diss., Univ. Michigan, Ann Arbor, Michigan.
- . 1974b. Breeding phenology and clutch size in the Marbled Murrelet. *Auk* 91: 10–23.
- . 1975. Aspects of the breeding biology of the Marbled Murrelet in British Columbia. *Bird Banding* 46:141–154.
- SINGER, S. W., N. L. NASLUND, S. A. SINGER, AND C. J. RALPH. 1991. Discovery and observations of two tree nests of the Marbled Murrelet. *Condor* 93:330–339.

DENNIS K. MARKS AND NANCY L. NASLUND, *Migratory Bird Management, U.S. Fish and Wildlife Service, 1011 E. Tudor Road, Anchorage, Alaska 99503. Received 20 Sept. 1993, accepted 17 Jan. 1994.*

Wilson Bull., 106(3), 1994, pp. 567–569

Use of bait and lures by Green-backed Herons in Amazonian Peru.—Use of bait and lures by Green-backed Herons (*Butorides striatus*) has been documented in Africa (Boswall 1983, Walsh et al. 1985), the southeastern United States (Lovell 1958, Sisson 1974, Keenan 1981, Preston et al. 1986, Higuchi 1988a), Cuba (Boswall 1983), and Japan (Higuchi 1986, 1988b). Green-backed Herons have been observed using both lures (e.g., feathers, fruit, flowers) and potential food items (e.g., insects and crackers) as bait to attract fish (reviewed in Higuchi 1986). Sisson (1974) photographically documented the use of bait in Florida. The use of bait and lures is an apparent case of true tool use (Higuchi 1986, 1988b). In this note, I document the use of bait and lures by Green-backed Herons at a site in the western Amazon basin of Peru.

The observations reported here were made in the vicinity of the Cocha Cashu Biological Station in the lowland (300–350 m) section of the Manu National Park of southeastern Peru (11°55'S, 77°18'W). Cocha Cashu is an oxbow lake of the Manu River in an extensive area of undisturbed floodplain forest (see Bolster and Robinson 1990 for a description and map of the study area). All observations of bait fishing occurred during an eight-day period, 3–10 November 1988. Observations were made from boats through 10× binoculars. The first bird observed using bait was photographed using a 500-mm lens (photographs available upon request from the author). On 10 November 1988, I paddled the canoe slowly around the margins of the lake in an effort to determine how many individuals were using lures

and baits. I repeated this process five more times in September, 1989, to search for possible bait fishing. Willard (1985) presented data on foraging of Green-backed Herons in the same oxbow lake, 1975–1976, although none was observed using bait (see below). Two of the individual Green-backed Herons observed using bait and lures were individually color banded.

The first observation of the possible use of lures was on 3 November 1988 when an unmarked adult was observed foraging on exposed branches of a fallen tree 10–15 m from the edge of the lake. The heron was first observed at 16:54 when it was holding a small (ca 1 cm diameter) round winged seed in its bill roughly 20 cm above the water. The heron picked up and dropped the seed in the water 27 times during the next five minutes after which it caught a small fish of approximately 4 cm. Each time the heron dropped the seed at least 10–15 cm above the water. The heron adopted a crouched position and pointed its bill and neck at the seed each time it dropped it in the water. After catching the fish, the heron flew approximately 10 m to a new perch roughly 15 cm above the water and picked up a small (<1 cm) pink flower and dropped it in the water six times, using the same postures it used with the seed. After three min of using the flower, it switched to a small green leaf fragment. During the next nine minutes, it used two more leaf fragments and a twig, after which it flew into dense lake-margin vines where I lost sight of it. During 18 total min of foraging (including one min to handle the fish), the heron caught one fish using five different bait items.

During a census of the entire lake on the afternoon (14:30–17:30) of 10 November 1988, I observed Green-backed Herons foraging seven times. Four of these observations were of herons using bait and/or lures, whereas the other three did not involve the use of bait during 3–10 min observation periods. Two of the individuals using bait were individually marked; therefore, at least three individuals used bait. One observation was of a bird twice dropping a small (ca 2 cm) twig into the water, another dropped a small (1–2 cm) unidentified object at least twice, and the third dropped a small (one cm) white flower into the water three times. None caught a fish. The individual that used a twig obtained it by breaking it off a hanging branch approximately 40 cm above the water after which it flew about two m and began to drop it in the water. The fourth record was of a color-marked individual that placed a living tabanid fly (ca 1.5 cm) four times in the water. The fly swam around in circles as the heron watched. During a period of approximately five minutes, the heron failed to catch a fish and carried the fly to a new perch.

In 1989, I conducted four censuses of Cocha Cashu during September and failed to observe a single case of bait fishing among 39 observations (at least one min of hunting each) of at least eight individual Green-backed Herons. During the previous nine field seasons, I had never noticed bait fishing in Green-backed Herons, although I was not studying them. Willard (1985) also observed no bait fishing in Green-backed Herons during his study of fish-eating birds on Cocha Cashu, 1975–1976. These observations support Higuchi's (1988a) suggestion that bait fishing may be sporadic in time and place.

These observations appear to be the first documented case of the use of bait by Green-backed Herons in South America. There are now records from Asia, Africa, North and South America, and the West Indies (reviewed in Higuchi 1986). Bait fishing in Amazonian Peru was similar to that reported in Japan (Higuchi 1988b) where the herons also used objects that were floating on the lake surface and were broken from dead branches. The use of the live tabanid was similar to the use of mayflies (Ephemeroptera) in North America (Keenan 1981, Preston et al. 1986). There were no man-made objects floating in Cocha Cashu; for this reason, all objects were natural. I could not determine if the objects were being used to attract particular fish or if they waited for any fish to approach the bait. The water of Cocha Cashu is murky with poor visibility; it is therefore possible that the herons

were not baiting particular fish as they do in Japan (Higuchi 1988a, b). The individual that broke a small twig from a dead fallen branch manipulated a substrate, possibly to make a lure.

Acknowledgments.—I thank the Peruvian Ministry of Agriculture for permission to work in the Manu National Park. E. Heske and J. Brawn provided helpful comments on the manuscript. Partial support was provided by the Chapman Fund, NSF grants DEB82-07002, DEB80-25975, and DEB85-14333.

LITERATURE CITED

- BOLSTER, D. C. AND S. K. ROBINSON. 1990. Habitat use and relative abundance of migrant shorebirds in a western Amazonian site. *Condor* 92:239–242.
- BOSWALL, J. 1983. Tool-using and related behavior in birds: more notes. *Avicult. Mag.* 89: 94–108.
- HIGUCHI, H. 1986. Bait-fishing by the Green-backed Heron *Ardeola striata* in Japan. *Ibis* 128:285–290.
- . 1988a. Bait-fishing by Green-backed Herons in South Florida. *Florida Field Nat.* 16:8–9.
- . 1988b. Individual differences in bait-fishing by the Green-backed Heron *Ardeola striata* associated with territory quality. *Ibis* 130:39–44.
- KEENAN, W. J. 1981. Green Heron fishing with mayflies. *Chat.* 45:41.
- LOVELL, H. B. 1958. Baiting of fish by a Green Heron. *Wilson Bull.* 70:280–281.
- NORRIS, D. 1975. Green Heron (*Butorides virescens*) uses feather lure for fishing. *Am. Birds* 29:652–654.
- PRESTON, C. R., H. MOSELEY, AND C. MOSELEY. 1986. Green-backed Heron baits fish with insects. *Wilson Bull.* 98:613–614.
- SISSON, R. F. 1974. Aha! It really works! *Nat. Geogr.* 144:142–147.
- WALSH, J. F., J. GRUNEWALD, AND B. GRUNEWALD. 1985. Green-backed Herons (*Butorides striatus*) possibly using a lure and using apparent bait. *J. Orn.* 126:439–442.
- WILLARD, D. E. 1985. Comparative feeding ecology of twenty-two tropical piscivores. Pp. 788–797 in *Neotropical ornithology* (P. A. Buckley, M. S. Foster, E. S. Morton, R. S. Ridgely, and F. G. Buckley, eds.). American Ornithologist's Union, Ornithol. Monogr. No. 36, Washington, D.C.

SCOTT K. ROBINSON, *Illinois Natural History Survey, 607 East Peabody Drive, Champaign, Illinois 61820. Received 29 Sept. 1993, accepted 20 Jan. 1994.*

Wilson Bull., 106(3), 1994, pp. 569–571

Carolina Chickadee lays and incubates eggs in two separate nest cups within the same nest box.—From 22 April until 10 June 1993, we observed an unusual Carolina Chickadee (*Parus carolinensis*) breeding attempt in a cedar nest box located directly under a 765,000-volt transmission line in Alum Creek State Park, Delaware County, Ohio (40°11'5"N 82°57'20"W). On 2 May, there were two eggs in a nest cup constructed on one side of the nest chamber. Over the next three days, three additional eggs were laid in a separate cup located on the other side of the box (Fig. 1A). On 9 May, we caught and banded a female chickadee as she incubated two eggs in the first nest cup. On 16 May we caught the same chickadee as she incubated a set of three eggs in the second nest cup. All