

Bait-fishing by Green-backed Herons in south Florida.—Bait-fishing (i.e. fishing with the use of some bait) has been reported for Green-backed Herons (*Butorides striatus*) in Florida (Lovell 1958, Sisson 1974, Norris 1975a,b), South Carolina (Keenan 1981), Arkansas (Preston et al. 1986), Japan (Higuchi 1986, 1987), and western and southern Africa (Walsh et al. 1985, Wood 1986). In early December of 1986, I received information from R. Christensen and O. T. Owre that a Green-backed Heron was baiting fish at a canal at Port Everglades, Broward County, Florida. In as much as I have studied the bait-fishing behavior at the park in Kumamoto, Japan (Higuchi 1986, 1987; Higuchi, in press), I visited Port Everglades on 10-12 December to compare the behavior in the two areas.

The canal is a cooling channel for Florida Power and Light Company, and many people were watching and feeding the tropical fishes which gather in great abundance in the warm waters discharged from the power plant. The adult Green-backed Heron was bait-fishing using bread and popcorn which were thrown by the people watching the fish. I spent a total of 11.43 hrs observing the heron, which I concluded was the same bird because of its similar plumage and behavior throughout the observation period. The heron almost always tried to fish with bait dropped by people. Although most fish attracted to the bait were too big for the heron to catch, I observed seven successful catches with 45 pieces of bait (15.6% success) during the observation period.

Bait-fishing differed in three aspects between Green-backed Herons in Japan and Florida. First, the Florida heron used only man-made objects such as bread and popcorn as bait, while the Japanese herons used almost anything available as bait, including twigs, leaves, berries, mushrooms, insects, earthworms, feathers, plastic foam, and crackers. The Florida heron never picked up twigs, leaves, or feathers from the surface of the water. Second, the Florida heron quickly approached the bread and popcorn thrown by people, and picked up the bait swiftly. The Japanese herons did not show special interest in bread and crackers thrown by people. They obtained various objects for themselves from the surface of the water or from trees. And third, the time needed to catch a fish after throwing a bait was longer for the Florida heron ($\bar{x} = 5.53 \pm 3.23$ (s.d.) sec, $N = 7$) than in the Japanese herons (2.00 ± 3.01 sec, $N = 21$; Higuchi in press). The Japanese herons usually cast bait very close to the fish they intended to catch, and snatched the fish reacting to the dropping of bait. The Florida heron did not show such a tendency, but waited for fish to approach the bait. The difference may be related to the kinds of bait used by the herons. "Lures" such as twigs and leaves often used by the Japanese herons (Higuchi 1986; Higuchi, in press) are not as attractive to fish as are bread and popcorn that were used by the Florida heron. Hence, the Japanese herons probably had to take advantage of the high sensitivity of fish to the dropping of bait on the surface of the water.

The above three features of bait-fishing by a Green-backed Heron at Port Everglades appear to be shared by other individuals of the same species observed at the Miami Seaquarium (Sisson 1974) and at Miami-Dade Community College (G. Cashin and R. Christensen, pers. comm.). It is not yet known why the Florida and Japanese Green-backed Herons use different kinds of bait materials. Mayflies (Keenan 1981, Preston et al. 1986) and feathers (Norris 1975a,b) are used as baits by Green-backed Herons in other areas of the U.S.A.

I also spent a total of 20.71 hrs observing ten Green-backed Herons at the Miami Seaquarium, Parrot Jungle, and Fairchild Tropical Garden during 24-29 September 1986. These herons caught a total of 138 small fishes, but no bait-fishing was observed. At the Lost Island of the Miami Seaquarium, where bait-fishing by the species were previously observed (Sisson 1974), I dropped baits of fish-food pellets and bread in front of a tame heron. The heron watched intently the fishes gathering around the baits, and it caught many of these fishes. Although I dropped bait more than 50 times, the heron never picked up the bait for itself. These observations suggest that bait-fishing by Green-backed Herons

may be a learned or culturally transmitted behavior that occurs sporadically in time and place.

I thank Miami's Fairchild Tropical Garden, Seaquarium and Parrot Jungle for graciously extending me use of their premises for my observations. I am grateful to D. R. Griffin, O. T. Owre, R. B. Payne, K. L. Bildstein, J. Kushlan, and C. R. Preston for commenting on the draft, and to R. Christensen, V. Oesterle, L. and O. T. Owre, and M. Wheeler for guiding me and providing transportation. R. Kelley procured a video tape related to the subject and G. Cashin had 8 mm film duplicated for my use. The University of Miami afforded me courtesies and use of facilities.

LITERATURE CITED

- HIGUCHI, H. 1986. Bait-fishing by the Green-backed Heron *Ardeola striata* in Japan. *Ibis* 128: 285-290.
- HIGUCHI, H. 1987. Cast master. *Nat. Hist.* 96(8): 40-41.
- HIGUCHI, H. In press. Individual differences in bait-fishing by the Green-backed Heron *Ardeola striata* associated with territory quality. *Ibis*.
- 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. 1975a. Green Heron (*Butorides virescens*) uses feather lure for fishing. *Amer. Birds* 29: 652-654.
- NORRIS, D. 1975b. Green Heron goes fishing. *Florida Wildlife* 29: 16-17.
- 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! *Natl. 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.
- WOOD, P. 1986. Fishing Greenbacked Heron. *Bokmakierie* 38: 105.

Hiroyoshi Higuchi, Museum of Zoology, The University of Michigan, Ann Arbor, Michigan 48109, and Laboratory of Forest Zoology, Faculty of Agriculture, The University of Tokyo, Tokyo 113, Japan.

Florida Field Naturalist 16: 8-9, 1988.

Paired American Goldfinches from Jefferson County, Florida in June.—On 20 June 1987 I saw a male and female, apparently paired, American Goldfinches (*Carduelis tristis*) in northwestern Jefferson County, Florida. I was walking along a railroad right-of-way that crosses Ward's Creek, a large, dense swamp. At about 09:10 hr, a small, bright yellow bird flew across the right-of-way and perched conspicuously in a short tree; through binoculars (8x40), I saw a brilliant definitive alternate-plumaged male American Goldfinch at 10 m in full sunlight. The bird preened a short time and then flew down to perch on a dead stalk of last year's dogfennel (*Eupatorium compositifolium*). When I approached, the goldfinch flew away down the railway and was joined in flight by another bird its size; they flew side-by-side about 4 m off the ground and about 2 m apart with a deeply undulating flight. After going about 40 m, the pair veered off and perched in the open. Upon my approach I concentrated on the second bird and saw it was a female goldfinch. The female lacked the bright color and black cap of the male but was obviously of the same species: it had the same morphology, with a yellow breast, an olive-yellow back, and black wings and tail. The female was brighter than the winter birds I am used to seeing and, overall, seemed slightly more greenish than usually illustrated. Together, the birds dropped down