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RAPID AND WIDESPREAD APPEARANCE OF BAIT-FISHING, A FORM OF TOOL USE, BY BLACK-CROWNED NIGHT HERONS IN HAWAII

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The use of a tool, in this paper the placing of a "bait" item, to attract fish is extremely rare among birds (Ruxton et al. 2011). The Green Heron *Butorides virescens* and its sister species the Striated Heron *B. striatus* have, however, become notorious for it (Boswall 1977, 1983; Wood 1986; English 1987; Foxall & Drury 1987; Davis and Kushlan 1994; McCullough & Beasley 1996; Kushlan & Hancock 2005), and have been the subject of photo montages in several popular publications (Sisson 1974, Norris 1975, Birder's World staff 1989) as well as video posted on the internet (<http://ibc.lynxeds.com/species/green-backed-heron-butorides-striatus>; <http://xmb.stuffucanuse.com/xmb/viewthread.php?tid=5914>). The first report of baiting by Black-crowned Night Herons *Nycticorax nycticorax* was that of R. J. Beasley, who observed and photographed them using bread as bait in Heritage Park in Irvine, California (McCullough and Beasley 1996). Riehl (2001) later observed similar behavior by wild night herons on the grounds of Audubon Park Zoo in New Orleans, Louisiana. Until recently, these were the only reports of baiting by this species anywhere in its cosmopolitan range, which includes the Hawaiian Islands where it is the only indigenous heron. Although *auku'u*, as they are known locally, belong to the North American subspecies *N. n. hoactli*, and unpublished studies found no morphological differences (P. L. Bruner, pers. comm.), Hawaiian birds differ behaviorally in being more active throughout the day (pers. obs.), undoubtedly because they are the only heron normally present.

In July 2008, several golfers reported to Denny that Black-crowned Night Herons at the Wailua Golf Course on Kaua'i were baiting for fish. L. Miyamoto (pers. comm.) stated that golfers had been placing seeds near a water hazard midway along the fairway of the 11th hole to attract human-habituated Red-crested Cardinals *Paroaria coronata*. The heron reportedly often picked up some of the seeds, carried them to the edge of the water, dropped them in, and waited for small fish, probably introduced tilapia (sp.?) to swim in to feed on the seeds, whereupon the fish were caught by the heron. N. Nakamatsu and G. Fujioka (pers. comms.) also reported the unusual behavior, but they saw 2 birds baiting with bread tossed by people. Over the next few months, the golfers, who play 3 days per week, often tossed bread to the herons and continually observed them bait-fishing. On 9 and 10 February 2009, Fujioka (pers. comm.) obtained

several video clips, now archived in the Macaulay Library (ML) of the Cornell Laboratory of Ornithology, documenting this distinctive behavior. He threw a piece of bread on the ground near the bird, and the bird then picked up the bread and tossed it into the water with a quick side motion of the head (ML 474). The bird sometimes carried the bread in its bill (ML 446-447), but usually tossed it sideways, and often repositioned it in the water, where it was often eaten by koi (Japanese ornamental carp) *Cyprinus carpio* that were much too large for the heron to eat (ML 757). On one occasion (ML 476), the bird appeared to "rescue" the bait by tossing it back onto the bank when a koi appeared, and another time lifted the bread out of the water as a koi approached (ML 447), and once literally snatched it from the jaws of the big fish (ML 477). Eventually, the heron caught a medium-size fish attracted to the bait (ML 449). In several instances, when the bread in the water had all been eaten, the heron returned to the bread source in a grassy area a few feet away and tossed in another piece. If the bread fell short, the bird tossed it again toward the water. On one occasion (ML 478), the heron ate some of the bread, which is not inconsistent with this species's opportunistic and varied food habits (Davis 1993). The first bird was later joined by a second adult (ML 478) that watched the first bird intently, but did not place any bait in the water. It may have been engaging in passive bait-fishing, wherein the bird positions itself near bait but does not place or manipulate it. On 14 February 2009, Denny, assisted by Fujioka and Nakamatsu who tossed bread, obtained a sequence of still photographs documenting most of the aforementioned behaviors (Fig. 1).

Seeking further information, Denny posted the golfers' report on the HawaiiBirding listserv (<http://groups.yahoo.com/group/HawaiiBirding/>; Message 3917) on 14 July 2008. The report prompted M. Walther to recall a newscast by Carol Cox on Honolulu television station KITV in September 2007 (KITV.com 2007) that had reported similar behavior by a Black-crowned Night Heron on O'ahu. The TV spot had shown an adult bird at Roy's Restaurant at the Ko 'Olina Golf Club on the western, or Wai'anae, coast of O'ahu using pieces of bread offered by patrons as food for ornamental waterfowl, to attract small fish in much the same manner as the bird on

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