Black-crowned Night Heron (*Nycticorax nycticorax*) bait-fishes with an inedible lure in Vietnam

Blanton Paul Combs[1*] and Michel Antoine Réglade[2]

[1] *193 Glen Dale Drive, Woodland Park, Colorado, U.S.A.; combsbp@gmail.com*
[2] *18 rue de Garin, 31500, Toulouse, France; reglade@hotmail.fr*

*Primary contact

Abstract

Since 1996, Black-crowned Night Herons (*Nycticorax nycticorax*) have been noted to bait-fish on several continents and islands, but always with edible baits, such as insects or bread. After a careful search of the literature, this paper asserts that it is the first report, with photographs, of any member of this species bait-fishing with an inedible lure, namely, a short twig.

Key words: active bait-fishing, animal tool use, inedible lure, *Nycticorax nycticorax*.

Introduction

Tool use in animals has been defined as "actually wielding some external object as an implement" (Thomson 1964), but it has only been documented in fewer than 1% of animal genera (Visalberghi *et al.* 2017). This makes bait-fishing by birds highly interesting for animal behaviorists because, for some of them, it fits the established criteria for tool use (Crain *et al.* 2013). Ruxton and Hansell (2011) established useful criteria for bait-fishing when they wrote that active bait-fishing occurs when a bird places an edible (bait) or inedible (lure) item within its striking range in order to attract or distract potential prey fish. Passive bait-fishing, on the other hand, occurs when a bird forages near bait that is already on the water and without manipulating it, such as bread tossed by humans. Despite numerous reports that cite both active and passive bait-fishing with edible bait by Black-crowned Night Herons, there have been no reports of bait-fishing with an inedible lure. This paper asserts that it is the first to report, with photographic evidence, bait-fishing by a subadult Black-crowned Night Heron (*Nycticorax nycticorax*) with an inedible lure.

Observation

On 14 November 2019, BPC was visiting the Saigon Botanical Gardens in Ho Chi Minh City, Thanh Pho Ho Chi Minh Province, Vietnam, 10° 47′ 10″ N, 106° 42′ 25″ E. The gardens have a large pond with goldfish (probably *Carassius au-*

ratus). The pond surrounds a wooded island that several species of piscivorous birds use for foraging, resting and breeding, including Common Kingfishers (*Alcedo atthis*), Black-headed Ibises (*Threskiornis melanocephalus*), Great Egrets (*Ardea alba*), Lesser Adjutant Storks (*Leptoptilos javanicus*), Painted Storks (*Mycteria leucocephala*), an unidentified Pond Heron (*Ardeola* sp.) and Black-crowned Night Herons.

The birds also nest, rest and preen on the nearby buildings and trees. Except for a few injured and non-volant storks, the bird population at the pond is wild.

At about 10:00 hr, BPC began to photograph a subadult Black-crowned Night Heron that was foraging by Slow-Wading (Meyerriecks 1960) around the perimeter of the island. The heron used its beak to pick up a twig about 8 cm long and nearly 1 cm thick, or about the size of an average cigarette (Fig. 1). The heron did not attempt to modify the twig.

BPC continued to photograph the heron while it stepped out of the water and onto the bank, turned around, and dropped or tossed the twig onto the surface of the pond. (Fig. 2). The heron retrieved the twig and dropped it into the water several more times (Fig. 3). Each time the heron dropped the twig into the water, it stood motionless and watched the twig closely for up to 30 seconds. Ripples and swirls appeared on the calm surface of the pond near the twig, indicating that fish had begun to investigate it.

This activity continued for about three minutes. An examination of the attached photographs

Figure 1. Subadult Black-crowned Night Heron is foraging by Slow Wading. Seconds later, it picked up the twig at the edge of the water and began to use it for active bait-fishing. Saigon Botanical Gardens, Vietnam, 14 November 2019.

Figure 2. Subadult Black-crowned Night Heron has seized the twig in its beak, climbed the bank, turned around, and is preparing to drop it into the water for active bait-fishing. Saigon Botanical Gardens, Vietnam, 14 November 2019.

Figure 3. Subadult Black-crowned Night Heron has dropped its twig lure into the water to use it for active bait-fishing (note ripples). Saigon Botanical Gardens, Vietnam, 14 November 2019.

shows that the heron did not move either foot during the entire time it stood on the bank. The heron only moved its head briefly when it needed to reposition the lure because it had begun to drift beyond striking range. The heron struck once at a fish and held it briefly, but could not subdue it. The struggling fish created splashes which were audible to BPC, who was approximately 30 m away. After the failed strike, and after the heron had dropped the twig lure onto the water several more times (Figs. 4 and 5), it reentered the water, retrieved the lure in its beak, and carried it about 10 m around the shore of the island (Fig. 6). This portion of the shore is concealed by leafy, overhanging branches. Once the heron had positioned itself behind the foliage, it appeared to resume bait-fishing, but it was impossible to obtain clear photographs of the heron's activity from any angle.

Discussion

McCullough and Beasley (1996) were the first to report a Black-crowned Night Heron foraging by active bait-fishing with bread in California, USA, followed by Riehl (2001) in Louisiana, USA, and three reports from Hawaii, USA: Gavin and Solomon (2009), Walther (2009) and Pratt *et al.* (2011). These reports have been followed by others and they describe Black-crowned Night Herons using both passive and active bait-fishing with bread or other food that had been supplied by humans. Réglade *et al.* (2014) were the first to report, with video footage, a subadult Black-crowned Night Heron in Chile foraging by active bait-fishing with dragonflies as edible bait and without any apparent interaction with humans. During their observation, the heron successfully caught and consumed several small fish after it

Figure 4. Subadult Black-crowned Night Heron has retrieved its twig lure from the water's surface (note ripples) and is preparing to drop it again to resume active bait-fishing. Saigon Botanical Gardens, Vietnam, 14 November 2019.

Figure 5. Sub-adult Black-crowned Night Heron tosses its twig lure in a new direction. Saigon Botanical Gardens, Vietnam, 14 November 2019.

Figure 6. After a few minutes of bait-fishing and an unsuccessful strike at a large fish, the heron re-enters the water, retrieves its twig lure, and carries it to a new location to resume active bait-fishing. Saigon Botanical Gardens, Vietnam, 14 November 2019.

had caught dragonflies and placed them on the water's surface, one at a time. Our report is the first to document a subadult Black-crowned Night Heron engaging in active bait-fishing with an inedible lure, namely a short stick. This report makes the Black-crowned Night Heron the third most well-documented species of active bait-fishing ardeid after the Green Heron (Norris 1975, Higuchi 1988) and the Striated Heron (Higuchi 1986).

But because the subject is a subadult bird, there could be an alternative explanation, which is "play," sometimes called "play-learning" behavior.

In his detailed paper, Sazima (2008) writes that play is widespread among juvenile and subadult members of Ardeidae and that it is commonly "regarded as having an important role in general motor development and for practice of particular skills, mostly foraging and breeding." Sazima goes on to describe how juvenile members of Ardeidae play with small pieces of wood, fruit and other floating objects, which they repeatedly toss into water. This activity contributes to the development of the skills required for bait-fishing, which is common among ardeids (Ruxton and Hansell 2011). Sazima includes the following behavioral criteria within play:

(1) - Play is repetitive, awkward, or exaggerated.
(2) - Play lacks a final consummatory act.
(3) - Play is incomplete or in reordered sequences.
(4) - Play has no obvious immediate function.
(5) - Play is quick and energetically expensive.

Without justifying precisely each of them, it is easy to admit that none of these five criteria can be applied to our observation.

Two examples of play-learning that fit Sazima's criteria:

(1) – Early play-learning stage. On 14 April 2019, at Lac du Val de Saune, Sainte Foy d'Aigrefeuille, France (43° 32′ 50″ N, 1° 36′ 30″ E), Ghislain Riou, a professional ornithologist, observed an immature Black-crowned Night Heron playing on a pond edge. In his description, "The excited bird appeared to be briskly chasing twigs and small branches on the surface of the water, grabbing them and sometimes pushing them a few feet away but without any other aspect of the bait fishing sequence." (G. Riou, pers. comm., 14 April 2019). This description contains all five of Sazima's criteria for play.

(2) – More advanced play-learning stage. It can be difficult to determine whether an activity constitutes play-learning behavior, a serious attempt at bait-fishing, or an intermediate stage. There is an 85-second video from Hong Kong, showing an adult Black-crowned Night Heron at an intermediate learning stage (birdvideo123 2014). It shows the bird stopping to retrieve a floating stick about 20 cm long. It picked up and dropped the stick six times in rapid succession in what could be a poorly-developed bait-fishing technique. It is tempting, since the heron in the video is an adult, to assume that it is bait-fishing, especially because its behavior is fairly deliberate, and not exuberant or random. But it is obviously unclear about where to place the stick, or for how long. No clear strike occurs and no fish is caught. This sequence resembles the idea that we have, a priori, of an intermediate learning stage, but this interesting sequence is too brief to definitively decide the precise category of the behavior. It might be an example of an intermediate learning stage or just play with a stick.

It appears to be important that field ornithologists should acquaint themselves with these different behaviors in order to be able to distinguish among play, intermediate learning stages, and well-characterized bait-fishing behavior. We suggest that continued reporting of such observations is the

best method to improve our knowledge of this intriguing behavior. The roles of innate and acquired knowledge and the evolution of the underlying cognitive abilities implicated in this remarkable behavior remain interesting topics to explore.

Literature Cited

birdvideo123. 2014. Black-crowned Night Heron playing with stick (in Hong Kong). YouTube. [online] youtu.be/zt-gn3CckYU. Accessed 22 October 2021.

Crain, B. J., T. Giray and C. I. Abramson. 2013. A tool for every job: assessing the need for a universal definition of tool use. International Journal of Comparative Psychology 26: 281-303.

Gavin, M. C. and J. N. Solomon. 2009. Active and passive bait-fishing by Black-crowned Night Herons. Wilson Journal of Ornithology 121: 844-845.

Higuchi, H. 1986. Bait fishing by the Green-backed Heron *Ardeola striata* in Japan. Ibis 128: 285-290.

Higuchi, H. 1988. Bait-fishing by Green-backed Herons in south Florida. Florida Field Naturalist 16: 8-9.

McCullough, D. D. and R. J. Beasley. 1996. Bait fishing herons: have some birds learned to use tools? Bird Watcher's Digest 18: 49-51.

Meyerriecks, A. J. 1960. Comparative breeding behavior of four species of North American herons. Publications of the Nuttall Ornithological Club 2: 1-158.

Norris, D. 1975. Green Heron (*Butorides virescens*) using feather lure for fishing. American Birds 29: 652-654.

Pratt, H. D., J. Denis, M. Walther and C. Walther. 2011. Rapid and widespread appearance of bait-fishing, a form of tool use, by Black-Crowned Night Herons in Hawai'i. 'Elepaio 71: 24-28.

Réglade, M. A., D. Siel and M. Uribe. 2014. Bait-fishing black-crowned night heron (*Nycticorax nycticorax*) in Chile. Ornitologia Neotropical 25: 465-468.

Riehl, C. 2001. Black-crowned Night Heron fishes with bait. Waterbirds 24: 285-286.

Ruxton, G. D. and H. H. Hansell. 2011. Fishing with a bait or lure: a brief review of the cognitive issues. Ethology 117: 1-9.

Sazima, I. 2008. Playful birds: cormorants and herons play with objects and practice their skills. Biota Neotropical 8(2). [online]. doi.org/10.1590/S1676-06032008000200025.

Thomson, A. L. (ed.). 1964. A new dictionary of birds. Nelson, London, U.K.

Visalberghi, E., G. Sabbatini, A. H. Taylor and G. R. Hunt. 2017. Cognitive insights from tool use in nonhuman animals. Pages 673-701 in APA Handbook of Comparative Psychology: Perception, Learning, and Cognition, Volume 2 (J. Call, G. M. Burghardt, I. M. Pepperberg. C. T. Snowdon and T. Zentall, eds.). American Psychological Association, Washington, D.C, U.S.A.

Walther, C. 2009. Black-crowned Night Heron (American) *Nycticorax nycticorax hoactli*. The Cornell Lab of Ornithology Macaulay Library. [online] macaulaylibrary.org/video/462523. Accessed 14 September 2021.