

Seaside Tiger Herons

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Abstract.—Tiger Herons (*Tigrisoma*) are little studied and generally characterized in the literature as being relatively uncommon birds of forested streams and wetlands. Contrary to these expectations, we found Bare-throated Tiger Herons (*Tigrisoma lineatum*) on the Pearl Islands of the Gulf of Panama to be birds of open, wave-exposed rocky seashores. We also found them to be common birds, inhabiting most shoreline coves. They fed over much of the tidal cycle along beaches and rocky shores, especially on and near surf-washed rocks. They caught crabs and fish by standing and walking slowly and methodically. Feeding efficiency was low, averaging about one prey item per hour. Plumage coloration is highly cryptic against shore rocks; but, in contrast, the bird becomes quite obvious when it expands its bare yellow throat, especially when accentuating a distinctive stretch display used to claim shoreline territory and for within-pair interactions. Tiger herons in the Pearls nested high in trees on ocean-facing cliffs. The habitat choice and behavior of this population of tiger herons that we report extend understanding of the biological scope of the subfamily of tiger herons. Received 20 July 2006, accepted 31 October 2006.

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Tiger herons (*Tigrisoma*), as a group, are characterized in the literature as birds of river edges within topical and subtropical forests and other wetlands (Kushlan and Hancock 2005). They occur only in New Guinea, West Africa and the New World tropics. The two Old World species are cryptically-colored, uncommon, shy, seldom observed, and nearly unstudied. The Fasciated Tiger Heron (*Tigrisoma fasciatus*) is a bird of mid- to high-altitude rivers. The Rufescent Tiger Heron (*Tigrisoma lineatum*) is a bird of savanna marshes and lowland forests. The Bare-throated Tiger Heron (*Tigrisoma mexicanum*) is considered a bird of coastal streams and wet meadows, but it also has been reported from other situations such as mangrove swamps, coastal lagoons, coastal freshwater marsh and swamps and even roadside swales (Ridgley and Gwynne 1989; Kushlan and Hancock 2005; G. Alvarado, pers. comm.). We too have seen them in mangrove swamps and shores along the coast of mainland Panama. Many years ago, Wetmore (1965) found them on the coastline of the Pearl Islands within the Gulf of Panama. The diversity of habitat use suggested by the existing literature for this species is unusual among extant tiger herons.

Despite Wetmore's (1965) early notice, it has not been sufficiently appreciated how this species can be, in fact, a bird of the open seacoast. During seabird surveys in the Pearl Islands of the Gulf of Panama, we found the Bare-throated Tiger Heron occurring typically and commonly along rocky shores and beaches. We found it to be not overly shy, easily observed, and rather regularly distributed along the coastline. In this paper we describe how this little-reported species uses a seaside habitat and further document its distinctive displays. These observations of the Bare-throated Tiger Heron extend what is understood about the biological scope of tiger herons as a group. Tiger herons are coming to be appreciated as representing a distinctive early radiation of herons, making observations of their biology of value to understanding behavioral diversity within the Ardeidae (Kushlan and Hancock 2005).

STUDY AREA AND METHODS

We studied tiger herons in the Pearl Islands (Gulf of Panama, eastern Pacific Ocean) in the Republic of Panama, southeast of Panama City. The Pearls include over 220 islands lying between about 9° and 8°10' N and between 78°50' and 79°50' W. The islands are geologically complex, consisting of both igneous and metamorphic bedrock. Most are relatively high, typically having head-

land cliffs 20 m or more tall, intermixed with shallow coves (Fig. 1). A typical cove used by tiger herons had a sand or cobblestone beach at its center, rocky cliffs on both sides, and numerous intertidal rocks. Sandy beaches were typically fronted by an intertidal reef of rock. Less protected beaches were composed of rounded cobblestones 5-20 cm diameter, size depending on the beach's exposure. The larger of the Pearl Islands are covered with tropical forests and have small streams, seeps and waterfalls. Intermediate-sized islands vary from being tree covered to having dry scrubby vegetation. The smallest, lowest islands are periodically wave-swept, and so are more sparsely vegetated. Local tidal fluctuation is impressive, 3-7 m depending on season, changing the exposed rocky shore by 100 m or more twice per day. Despite a storied past, the Pearl Islands now support only about 1,000 people living on twelve of the islands, where they fish, tend garden patches, hunt small game, and service the few settlements and tourist resorts. The herons are well known to residents, who appear not to bother them.

We made our observations in April and May 2005 and in February 2006, encompassing the reported nesting season, the end of the dry season, and beginning of the wet season. We observed the coastlines of over 30 islands within the Archipelago recording every tiger heron observed and the habitat being used when the bird was first observed ($N = 53$). In May 2005 and February 2006, we made extended observations of tiger heron habitat use and behavior on Isla San José. Observing from shore or a boat, we quantified behavior by recording feeding and interactions for 30 minute intervals, covering 18 hours of observations. We also videotaped behavior, which we used to enhance our descriptions.

RESULTS

Coloration

Bare-throated Tiger Herons are distinguished by their black cap and their featherless throat, variously reported as green, greenish-yellow, yellow, and orange (Kushlan and Hancock 2005). Both the cryptic



Figure 1. A cove on the shore of the Pearl Islands, Gulf of Panama, typical of habitat used by Bare-throated Tiger Herons.

plumage and featherless throat feature in their behavior.

Because of the extensive specimen collecting of Alexander Wetmore in the first half of the 20th century, plumage colors of Pearl Island tiger herons are well described in the literature. Adults have a black crown, light grey sides of head, grey vermiculated dorsal neck, and more coarsely vermiculated grey back. The lower neck is vertically lineated with a center of chestnut bordered on each side by white, the white bordered in turn by black. The remaining undersides are chestnut, a color that also extends laterally across the bend of the wing and around a white alular patch. Juveniles are broadly barred buff.

What has not been fully appreciated is how perfectly the black-grey-chestnut plumage blends with the seashore rocks. These birds are nearly invisible as they crouch on intertidal and supertidal rocks. The lineated ventral coloration of the throat and white alular patches break up the bird's outline from below, a crypsis likely of value to a stealthy open-habitat feeder. Juveniles, in contrast, were very visible along a rocky shore whereas adults, cryptic on rocks, were quite visible on sandy beaches.

The tiger heron's bare yellow throat patch became visible when it was deliberately expanded, especially during distinctive stretch displays. Describing soft part color in the field is always rather subjective, and we have seen all the colors reported in the literature on birds in the Pearl Islands. The most common throat color was chartreuse, but the most obvious was the bright mustard yellow and orange of birds we saw in February. In the most colorful individuals, the lower part of the throat was orange, tending to bright yellow under the bill, the upper proximal base of the bill, lores, superciliary line and eye ring. Birds in this coloration displayed actively and usually seemed paired with another bird, which typically was somewhat duller-throated (yellow to yellow-green), appeared smaller, and behaved more subserviently. It seems likely, although certainly not proven, that birds with the more dramatically yellow throats and lores were males and that this was more prominent in February because it was early in the breeding season.

Feeding Habitat

On the hilly Pearl Islands, tiger herons tended to center their activity in and adjacent to shoreline coves. Most frequently (63% of 53 observations) birds were on rocks, such as cliffs faces and exposed rocks below the cliff face (36%), shore rocks in front of beaches (19%), and cobblestone beach rocks (8%). They also occurred on sandy beaches (28%). We saw one flying along an inland freshwater stream (2%). Although they fed mostly on the water's edge, we suspect that they might feed on crabs within the tangle of shore bushes. The most intriguing feeding sites were atop mooring buoys and anchored boats (8%) (Fig. 2). They used bushes, driftwood, and trees for perching during high tide and sand beaches for display and for transiting from the waterline to shore vegetation.

On the shore, they consistently fed just inland of the water edge standing on rocks or in the water between rocks. The rocks broke the surf, and birds spent much of their time examining water gently flowing around, pooling behind, or passing through gaps in the rocks. We never observed the birds standing in persistent water or the numerous tide pools, although they stood on the edge. They changed feeding sites frequently, clearly in response to the rapid tidal flux. On beaches they stood high up in the wave action, which would cover their feet shallowly.

Feeding Behavior and Prey

Tiger herons fed by standing and by walking slowly (terminology from Kushlan and Hancock 2005). They stood in place for up to several minutes. When walking, they took slow deliberate steps all the while searching about with their head. Occasionally they walked quickly a few steps and at times walked between sites without foraging or, more commonly, flew between sites. They used various postures while feeding. They fed from a deep crouch, with their head either withdrawn or extended. They also stood with body half-angled, head out at various attitudes or stood tall with head high, bill horizontal. Transitioning slowly among these postures and head positions, such as from



Figure 2. Bare-throated Tiger Heron feeding from a mooring buoy.

withdrawn crouch to fully extended neck craning, they would look about, peer under and around rocks or into the water or examine cracks in boulders including those above their heads. They, at times, extended their neck exceptionally far out horizontally with bill vertical or aiming back towards their legs looking into the water below.

Tiger herons we observed ate crabs and fish ($N = 14$) as well as very small items we could not identify ($N = 21$). Of the items we could identify, half were fish 2-5 cm long and half were crabs 1-4 cm carapace length. They captured prey after a slow, deliberate, short jab. We also saw them probe in wet sand, peck toward rocks, and make quick stabs in rapid succession. The usual jab was not a lunge nor thrust, and usually did not involve significant neck movement. Rather it was short movement, mostly of head and bill. Frequently, a bird would jab and peck several times at a spot, apparently to dislodge prey. Small items were pecked from rocks, including from rocks above the bird's head. Prey were captured in a tweezers-grasp. Small items were immediately ingested; small fish were held and sometimes bitten for a few seconds; small crabs were held briefly then ingested; larger crabs were bitten hard several times, some crabs bitten into pieces before consumption. Fish also were captured above the tide line where they had become stranded. Although almost all observed prey were small, we saw an intriguing bit of prey handling by a heron feeding from a mooring

buoy. It stabbed and captured a blowfish, which immediately inflated itself. The heron dropped and stabbed it several times, deflating the fish before swallowing it. We were told by local residents that these herons come to tanks where baby sea turtles are being raised and stab at them in a similar way.

Hérons fed rather continuously during rising and falling tides for most of the day from first light to dusk. Despite looking, we did not find them feeding at night. Herons we observed were not very productive in their foraging. In 34 half hour periods, birds observed averaged about 1 prey item per hour (0.53 prey items per 30 min). The highest take was 3 items in a half hour, and in 21 of the half hour observation periods herons caught no prey.

Although not shy, feeding tiger herons were wary. Even when feeding near seaside towns and from anchored boats and buoys, they removed themselves if approached closely or quickly by people. When approached on a shore they walked slowly away, behind a rock, up the cliff, or into the bushes, or they fly away. Their local name in the Pearls is *Juan-Voló*, or Johnny-flew-away.

Also feeding at the same sites were American Oystercatchers (*Haemotopus palliatus*), Spotted Sandpipers (*Actitis macularia*), Great Egrets (*Ardea alba*), Snowy Egrets (*Egretta thula*), White Ibis (*Eudocimus albus*), Turkey Vultures (*Cathartes aura*) and Great-tailed Grackles (*Quiscalus mexicanus*). Oystercatchers fed on high energy headlands. Great and Snowy Egrets fed in or near the water along the rock shores and beaches. White Ibis worked the rocky shores in loose flocks. We observed a tiger heron within an aggregation of 13 White Ibis and a Great Egret. As the aggregation moved through, the tiger heron stayed in its place, generally in an upright posture. After the aggregation's departure, the tiger heron resumed its foraging.

Displays

Bare-throated Tiger Herons have a distinctive stretch-type display: starting from a horizontal posture, a bird (or each of two together) assumes an upright posture stretch-

ing the head high, bill angled up to near vertical exposing the colored throat, which is expanded; the neck is fluffed out; a soft, hoarse, throaty, growling, hiss is given (Sutton *et al.* 1950; Wetmore 1965; Kushlan and Hancock 2005). We rendered the call, 'kskhshskh'. The display is held for several seconds and is gradually released. There does not seem to be a dramatic head lowering component. The display was most exaggerated and obvious when used by birds in high soft-part color.

We observed this display many times and in several contexts. Single birds used it, especially from an obvious perch on a cliff or large rock. In many cases it seemed to us that it was given in response to one bird seeing another bird nearby. If the intruding bird were within the cove or had landed there, the displaying bird would fly toward the intruding bird, and if the intruder did not fly away, the defending bird landed close and continued to display. The intruding bird might return the display but more usually retreated slowly, walking or flying away. We also saw the display used by birds standing, feeding, or otherwise spending time together. In this case, both birds gave the stretch, but one then assumed a submissive crouch while the other continued to give the display. Such birds might stay together or move slowly off, but in no instance of such mutual display did one of such displaying birds immediately fly away as did intruding birds. When three birds were involved, two would display to each other while the third would stand aside in a crouched posture. The stretch display was given by both birds at the nest site during nest relief.

The display appears to be used as a territorial claim, by a bird alone or by a pair especially in response to an intruder. The display was sufficient to control the encounter without further engagement. These herons seemed nonviolent and put a great deal of effort into their display, which was usually honored by the intruder. Observations of individual birds showed that they defended a stretch of shoreline usually including a cove but sometimes extending to more than one cove or to smaller offshore islets. Intrusion seemed frequent (4 of 34 half hour observa-

tions). One intrusion was observed immediately under a nest site. Both nests we found were situated within coves, which a bird was in both cases seen defending.

Although herons clearly defended their shoreline, it was also frequent that two herons fed amicably in the same cove. At times we saw these birds move together, display together and spend time foraging near each other. When three birds were observed in a single cove, one was eventually driven off. Once we observed a fourth bird, noting the eviction of a third bird across the cove, walked 50 m toward the dispute, stopped (perhaps at the territory boundary), and displayed there for a time after the confrontation ended. All our observations are consistent with a land-holding system in which pairs occupy a linear territory defended primarily by the slightly larger, more yellow-throated individual, likely the male.

In addition to the stretch and dismissive crouch displays, herons used other displays and postures, most of which have not previously been described for the species (Kushlan and Hancock 2005). The most common was the upright display in which the bird stood straight with body and neck angled above the horizontal, usually with neck feathers sleeked down. Another characteristic display was a more aggressive variation of an upright, in which the bird stood tall, but with its neck fluffed out either straight or in an exaggerated S-shape. The S-neck variation was used individually and in pairs, both of which would walk slowly about while maintaining their puffy S-shaped necks. A heron would often go into an erect display, in which the head and neck were held straight up, nearly vertical. This was an alert behavior, given in response to a disturbance nearby. Another distinctive display was given by two birds which both assumed a low crouch display, with bodies horizontal, bills outstretched, facing each other. During one such observation, both birds maintained this posture facing each other, while one moved around the other. In addition to a mutual stretch, paired birds on the nest gave a mutual bowing display. Forward displays, ending in jabs (but no contact), were observed three times, once of

an adult towards a juvenile, once to a Great Egret and once to a White Ibis.

Nesting

The breeding season is reported to be February-April (Kushlan and Hancock 2005). We found two nests in February (24th and 25th). Both were in fully-leafed trees (whereas many trees were bare in the dry season), 6 m high from the base of the trees which stood 5 and 7 m, respectively, above the high tide mark. So both of the nests were about 12 m above high water, on the cliff face over land. Nests were about 30 cm across made of sticks and nearly invisible from the water or ground owing to the heavy cover of leaves and branches. One change-over display was recorded. The brightly more colored bird approached giving a stretch. Then the sitting bird arose and also gave a stretch. The two then bowed deeply and gave another mutual stretch. One bird continued to give solo stretches, while standing a bit away from the nest.

DISCUSSION

Although tiger herons are typically understood to be birds of swamps and water courses with wet forests, in the Pearl Islands of the Gulf of Panama, Bare-throated Tiger Herons are birds of the rocky seashore. Most birds we observed feeding were in the open, on seaside rocks where their coloration blended perfectly with the rock. Birds used beaches for display and transit and less frequently for foraging. The occurrence of tiger herons on the shore was reported by Wetmore (1965) and we have since learned that they are found in a similar habitat in Costa Rica (G. Alvarado, pers. comm.).

Tiger herons have a completely stealthy approach to feeding. They fed only by standing or by walking slowly, looking attentively into tidally moving water, picking fish and crabs from the water or rocks. Long toes enabled them to clamber over the rocks. The long necks and bills are used to scan carefully for prey while holding the body inconspicuously still. The ventral striping of the throat and neck likely adds to the camouflage from

beneath, the yellow throat skin being contracted while feeding. They peer, look, stare, crane the neck, peer over the bill, point, peck, grab, and gently jab at prey. Although these bill movements would not be effective against fleeing fish or scurrying crabs, they seem adequate for more sedentary prey such as crabs lodged under or within rocks, fish stranded by retreating water, and other potential edibles carried past them by the flowing water. The relatively thick bill (contrasted for example with that of the Rufescent Tiger Heron) is likely suitable for crustacean-eating, as it is in other herons.

Previously, the function of the distinctive stretch display has not been clear, since it had been reported in several contexts (Kushlan and Hancock 2005). It appears from our observations that the display, or perhaps subtly different sorts of the display, does indeed function in several contexts—territorial advertising, territorial defense, pair maintenance, and nest exchange. The Bare-throated Tiger Heron is an exceptionally cryptic bird on its rock shore, but when it raises its neck and head vertically, inflates and flutters its pouch, and calls, it instantly becomes extremely obvious, to either mate or potential intruder. A repertoire of erect, upright, and crouching postures is used to signal other herons. Birds being displayed to may display in return, assume a submissive crouch, or leave.

The Bare-throated Tiger Heron is a common bird in the Pearl Islands. If sufficient time were spent, one would, it seems, find one or two herons in residence in every shoreline cove. The frequency of intrusion by single adults and defense of territory holders against older juveniles suggests that the habitat, at least on Isla San José, could be saturated with resident herons. What makes this shore desirable habitat is not clear. The intertidal rocky shore does not appear particularly rich with potential prey; and, enduring such a low capture rate, the herons have to devote considerable proportion of their day to feeding. Herons seem not to be deliberately bothered by humans or other animals, and so their only extra-foraging expenditures are in con-specific territory defense, which consists of display but not much fighting.

Bare-throated Tiger Herons stand quietly and walk about slowly for many hours of the day following the ever-changing tide line, eating infrequently, flying intermittently among feeding sites, and defending their shoreline. It seems likely their strategy is low energy expenditure—low risk—low return. They likely have long-term territory occupancy and form long-term pair bonds. Their territorial defense is effective and notably non-violent, contrasted with that of many other herons. Maintenance of territorial integrity is likely important to assure access to limited, and slowly replenished food supplies in a intimately familiar setting. However unlikely this rocky shoreline habitat is for a tiger heron, it seems well suited to the Bare-throated Tiger Herons on the Pearl Islands.

These observations suggest that the scope of habitat choice, foraging behavior, and intra-species interactions used by tiger herons is broader than previously appreciated. Although three species do appear to be birds of forested mountain streams, one (the Rufescent Tiger Heron) is a bird of savanna marshes, and one (the Bare-throated Tiger Heron) now seems to be a bird of diverse coastal habitats. All feed stealthily, making full use of their cryptic plumage. But the Bare-throated Tiger Heron has a much wider repertoire of behaviors than previously reported for any tiger heron. No doubt much more of interest can be learned about this group of herons.

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LITERATURE CITED

- Kushlan, J. A. and J. A. Hancock. 2005. *The Herons*. Oxford University Press, Oxford, UK.
- Ridgely, R. S. and J. A. Gwynne, Jr. 1989. *A Guide to the Birds of Panama*. Second Edition. Princeton University Press, Princeton, NJ.
- Sutton, G. M., R. B. Lea and E. R. Edwards. 1950. Notes on the ranges and breeding habits of certain Mexican birds. *Bird-Banding* 21:45-59.
- Wetmore, A. 1965. *Birds of the Republic of Panama*. Part 1. Tinamidae (Tinamous) to Rynchopidae (Skimmers). *Smithsonian Miscellaneous Collections* 150:1-483.