

- STINSON, C. H. 1976. On the recognition of offspring by raptors. *Raptor Res.* 10: 30-32.
- . 1977. Familial longevity in Ospreys. *Bird-Banding* 48: 72-73.
- WILSON, E. O. 1975. *Sociobiology*. Cambridge, Massachusetts, Belnap Press.
- VEHERENCAMP, S. L. 1977. Relative fecundity and parental effort in communally nesting Anis (*Crotophaga sulcirostris*). *Science* 197: 403-405.

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Notes on the Breeding of the Chestnut-bellied Heron (*Agamia agami*) in Venezuela

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Although some information on the breeding of the Chestnut-bellied Heron (*Agamia agami*) in other countries has been published (Michener et al. 1964, Haverschmidt 1968, J. Hancock and H. Elliot 1978), no previous breeding records have been reported for Venezuela. On 26 July 1980, we located three nests of this heron, each with two nestlings, in a seasonal marsh surrounded by forest close to the village of Santa Rosa, Estado Barinas. The surface area of the marsh was about 2 ha, and its depth was 60 cm. The vegetation was dominated by *Rhandia aculeata* (Rubiaceae), a shrub about 3 m high, and by *Thalia geniculata* (Maranthaceae), a typical marsh perennial. A number of small trees under 6 m tall were sparsely distributed over the marsh. The nests were found in a small area containing *R. aculeata* and were approximately 1.5-2 m above the water level.

At our second visit on 31 July, we discovered six nests, each with two downy chicks. There were nine adults in the immediate area. In later observations at the same site, we found no more nests or nestlings, and thus we believe that there were but six breeding pairs. Each nest was placed in a separate bush.

In this same heronry we also found active nests of Black-crowned Night-Herons (*Nycticorax nycticorax*), Yellow-crowned Night-Herons (*Nyctanassa violacea*), Boat-billed Herons (*Cochlearius cochlearius*), and Bare-faced Ibis (*Phimosus infuscatus*). When the Chestnut-bellied Herons abandoned the colony, it was occupied by breeding Cattle Egrets (*Bubulcus ibis*).

This small colony (80 breeding pairs) was about 75 m from a much larger heronry (2,000 pairs) that contained the following breeding species: Great Egret (*Casmerodius albus*), Snowy Egret (*Egretta thula*), Little Blue Heron (*Florida caerulea*), Cattle Egret, and Bare-faced Ibis. Michener et al. (1964) found a colony of *Agamia agami* with about 12 nests in Veracruz, México near some nests of Great Egrets and Anhingas (*Anhinga anhinga*).

On 9 August the young Chestnut-bellied Herons were able to climb into the branches of their nest bushes, and on 18 September they were completely feathered and found in the canopy of the bushes. Our last visit to the colony was on 23 September, at which time we were not able to find any *Agamia agami*. Therefore, the period of nesting at this site in Venezuela was from June to September, the time of maximum annual rainfall in this area.

We thank Betsy Trent Thomas for translating this note into English.

LITERATURE CITED

- HANCOCK, J., & H. ELLIOT. 1978. *The herons of the world*. New York, Harper and Row.
- HAVERSCHMIDT, F. 1968. *Birds of Surinam*. London, Oliver and Boyd.
- MICHENER, M. C., J. S. WESKE, & R. B. CLAPP. 1964. A breeding colony of Agami Herons in Veracruz. *Condor* 66: 77-78.

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Nesting by One-year-old Black-crowned Night Herons on Hope Island, Rhode Island

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There have been few consistent reports concerning the frequency and success of nesting attempts by im-

mature night herons of the genus *Nycticorax*. One-year-old Black-crowned Night Herons (*Nycticorax*

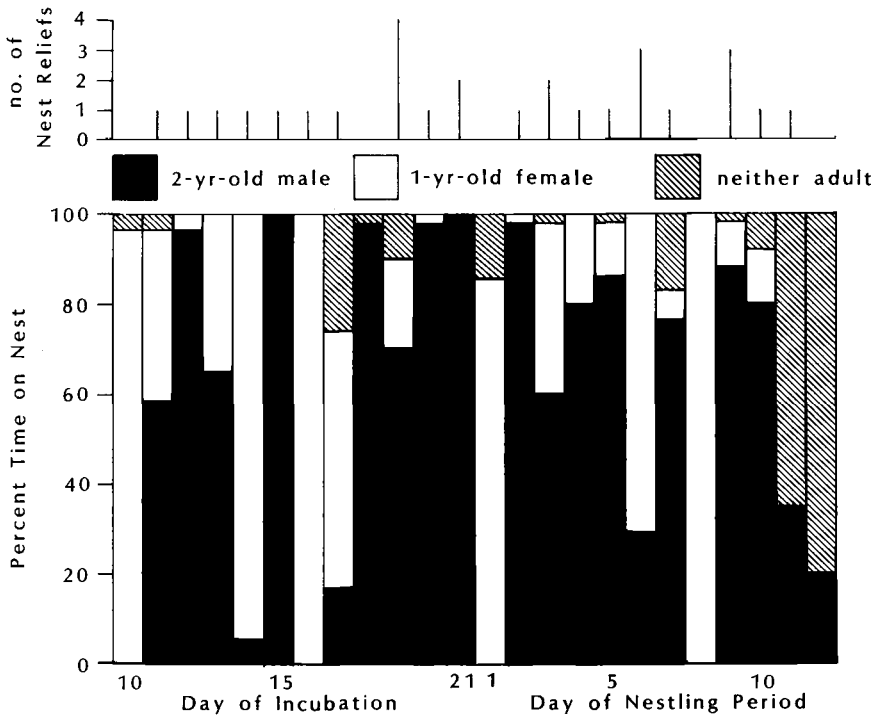


Fig. 1. Percentage time on the nest and number of nest reliefs by a 1-yr-old female and 2-yr-old male Black-crowned Night Heron during the incubation and nestling period.

nycticorax) mated to 2-yr-old or older birds built nests and incubated eggs in the wild (Gross 1923). In a captive colony, many 1-yr-old pairs of night herons courted and built nests, and one pair successfully raised four young (Noble and Wurm 1942). One pair of 1-yr-old night herons laid eggs but did not produce young in a captive colony at Patuxent Wildlife Research Center (H. Ohlendorf pers. comm.). Breeding among 1-yr-old birds of the closely related Nanken Night Heron (*Nycticorax caledonicus*) is apparently common (Braithwaite and Clayton 1976). In contrast, in a 3-yr study of a colony of about 350 Black-crowned Night Heron pairs on Long Island, New York, no 1-yr-old breeders were observed (Allen and Mangels 1940).

While involved in studies of environmental contaminants and success in night herons (TC) and of heron vocalizations (WD), we had the opportunity to observe two instances of nesting by 1-yr-old night herons. We report here the first documentation of a 1-yr-old mated pair breeding in the wild, along with more detailed observations of the incubation behavior and nesting success of a 1- and 2-yr-old mated pair.

Nesting behavior of Black-crowned Night Herons was recorded from an observation blind within the Hope Island, Rhode Island heron colony (colony

number 352004, Osborn and Custer 1978) on 30 May, 9 June, and 19 June 1979. The blind was set up on 10 May 1979 in an area where nests were not being studied for reproductive success. From 1 to 24 June 1979, a time-lapse Canon 814 super-8 movie camera set to take one photograph every minute recorded diurnal incubation and brooding behavior of a mixed-age pair of young night herons nesting near the blind. A clock was attached below the nest so that the time of each exposed frame was recorded. The film was analyzed with a Kodak Ektagraphic MFS-8 projector. Herons were aged by plumage coloration (Gross 1923, Palmer 1962) and sexed by cranial plume length (Noble et al. 1938). The criteria for age and sex identification appear to be adequate, because plumage coloration of known-age birds in the Patuxent colony was consistent with the categories identified by Gross (1923) and Palmer (1962) (J. Spann pers. comm.) and plume length was longer in males than females in 52 pairs, the same in 3 pairs, and shorter in only 1 pair in a night heron colony at Great Neck, Long Island, New York (Noble et al. 1938). Also, cranial plumes were significantly longer in male than female night herons in the Patuxent colony (J. Spann pers. comm.).

On 30 May 1981 a pair of 1-yr-old night herons with eggs was observed and photographed from the blind. Neither individual had cranial plumes. Nest-

lings of 2–5 days of age were observed in this nest on 19 June. Because our emphasis was on the mixed-age pair, we did not determine the exact number of eggs or young produced in this nest. This is the first documentation of a 1-yr-old mated pair of Black-crowned Night Herons nesting in the wild. Mixed-age breeding pairs have been observed in the wild (Gross 1923), but 1-yr-old mated pairs have been observed only in captivity (Noble and Wurm 1942).

A second pair, observed from the blind and recorded on film, consisted of a 1-yr-old female and 2-yr-old male. Both of these birds had cranial plumes. The cranial plumes of the 1-yr-old bird were about two-thirds the length of those of the 2-yr-old, and, on that basis, we suspect that the younger bird was the female. Two of the three eggs in this nest hatched, and the nestlings survived to at least 12 days of age.

The mixed-age pair was filmed from 1–24 June, a period that included the last 12 days of incubation and 12 days after hatching of the first egg (Fig. 1). During that time, there were 5 days with no nest exchanges, 14 with 1 exchange, 2 with 2 exchanges, 2 with 3 exchanges, and 1 with 4. Infrequent nest exchanges observed in our study are consistent with observations made while studying heron vocalizations from blinds in this and another colony (W. Davis pers. obs.). Lowe (1954) reported that nest exchanges occurred every 4–6 h in the Grey Heron (*Ardea cinerea*). In contrast, Milstein et al. (1970) found incubation spells greater than 9 h. In the Patuxent colony, a male night heron incubated for 5 consecutive days following the escape of the female. The female was recaptured, and the nest was successful (J. Spann pers. comm.). We suspect that the long periods of incubation and brooding by each adult may lower the risk of predation. Wading birds, with long growth periods and exposed nests, guard chicks well past the brooding period (Milstein et al. 1970). Black-crowned Night Herons have been observed to prey on eggs and young of other wading bird species (see Kushlan 1981); we are unaware, however, of any documented cases of cannibalism.

The 1-yr-old female incubated and brooded about one-half the time of the 2-yr-old male (94 h 37 min vs. 189 h 38 min). It may be, as found by Kushlan (1976) for the White Ibis (*Eudocimus albus*) and by Lowe (1954) for the Grey Heron, that the female attends the nest mainly at night. Milstein et al. (1970), however, found no relationship between sex and time of day for incubating Grey Herons. It is also possible that there is an age difference in incubating and brooding behavior. Given that we observed the daytime behavior of only one pair, our data can not address these questions.

These two instances of 1-yr-olds nesting occurred late in the season. By allowing 25 days between laying and hatching (Gross 1923), the first egg was estimated to be laid later than 20 May in both cases. The data for first egg dates for 157 nests of pairs of unknown age from another area on Hope Island in

1979 (Custer in prep.) are as follows: first clutch 7 April, median clutch 25 April, last clutch 4 June. These results support earlier studies of night herons (Braithwaite and Clayton 1976, Gross 1923) and colonial nesting seabirds (Ryder 1980) that revealed that younger individuals nest later in the season than older ones.

We do not know the frequency of 1-yr-old nesting on Hope Island in 1979, but we suspect that it was not rare. The two instances we observed 1-yr-old night herons nesting were in an area where only a small fraction (less than 1%) of the colony could be observed.

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LITERATURE CITED

- ALLEN, R. P., & F. P. MANGELS. 1940. Studies of the nesting behavior of the Black-crowned Night Heron. Proc. Linnean Soc. New York. Nos. 50–51: 1–28.
- BRAITHWAITE, L. W., & M. CLAYTON. 1976. Breeding of the Nankeen Night Heron *Nycticorax caledonicus* while in juvenile plumage. Ibis 118: 584–586.
- GROSS, A. O. 1923. The Black-crowned Night Heron (*Nycticorax nycticorax naevius*) of Sandy Neck. Auk 40: 1–30, 191–214.
- KUSHLAN, J. A. 1976. Feeding rhythm in nestling White Ibis. Wilson Bull. 88: 656–658.
- . 1981. Resource use strategies of wading birds. Wilson Bull. 88: 145–163.
- LOWE, F. A. 1954. The heron. The new naturalist series. London, Collins.
- MILSTEIN, P. LE S., I. PRESTT, & A. A. BELL. 1970. The breeding cycle of the Grey Heron. Ardea 58: 171–257.
- NOBLE, G. K., & M. WURM. 1942. Further analysis of the social behavior of the Black-crowned Night Heron. Auk 59: 205–224.
- , ———, & A. SCHMIDT. 1938. Social behavior of the Black-crowned Night Heron. Auk 55: 7–40.
- OSBORN, R. G., & T. W. CUSTER. 1978. Herons and their allies: atlas of Atlantic coast colonies: 1975 and 1976. U.S. Fish Wildl. Serv. FWS/OBS-77/08.
- PALMER, R. S. 1962. Handbook of North American birds 1. New Haven, Connecticut, Yale Univ. Press.
- RYDER, J. P. 1980. The influence of age on the breeding biology of colonial nesting seabirds. Pp. 153–168 in Behavior of marine animals. (J. Burger, B. L. Olla, and H. E. Winn. Eds.). New York, Plenum Press.

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