

# OBSERVATIONS ON MATERNAL BEHAVIOR IN THE AMERICAN ALLIGATOR, *ALLIGATOR MISSISSIPPIENSIS*

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**ABSTRACT:** The behavior of a female alligator at her nest was observed in the Everglades of southern Florida. Maternal behavior discussed includes nest guarding, nest opening, and the transport of juveniles by mouth.

THE existence of maternal behavior in the American alligator (*Alligator mississippiensis*) has recently been brought into doubt by Neill (1971) in his summary of the biology of crocodylians. He stated that the nest guarding behavior of the alligator consists only of a highly ritualized bluff and that the female alligator has no association with her young other than guarding the nest and responding to the juvenile distress cry, a reaction shared with all large alligators. This paper reports observations made in July and August 1971 at an alligator nest located near Anhinga Trail in Everglades National Park, Florida. The nest was constructed south of an old elevated roadbed which now serves as a walkway for visitors to the park. The observations reported here demonstrate some aspects of the maternal behavior of the American alligator.

During the day, the female usually remained in a small depression immediately adjacent to the nest or in a small dug-out area in the nearby willows (*Salix caroliniana*). She guarded the nest closely throughout the incubation period and showed no signs of waning interest late in incubation as described by Neill (1971). Neill also stated that nest guarding is a highly ritualized behavior which never results in an attack. There is no doubt that nest guarding has ritualized elements including opened-mouth hissing and lunging which are very effective in discouraging intruders. There is actually much variation in the ferocity of individual alligators at nests; some guard tenaciously while others leave the nest at the least provocation (pers. observ.). This latter reaction is highly adaptive when

hunting pressure is heavy and is explicable by the well documented fact that the boldness of alligators is dependent upon the degree of disturbance and harassment (Allen and Neill, 1949, 1952; Neill, 1971). Nest guarding is certainly a primitive trait in alligators and it seems to be more than a mere bluff. For example, some individuals have climbed aboard airboats in an attempt to reach intruders (J. C. Ogden, pers. comm.). At the site discussed here, visitors were kept 5 m from the nest by barricades. On one occasion, however, a man left the roadbed and went down to the nest. In this instance the guarding female chased him up the bank and 30 m along the road before stopping. Whether this action was an attack or a prolonged bluff could really have been decided only if the man had stopped and opened himself to attack. However the question of biological significance is whether the female alligator guards the nest and whether this serves a protective function. My observations in southern Florida suggest that it does although the study of Joanen (1969) in Louisiana indicates otherwise. It would seem that a careful study of the behavioral components and biological function of nest guarding is clearly needed.

That alligators open the nest to release hatchlings is documented in early literature (Reese, 1915; McIlhenny, 1935) although denied by Neill (1971). J. C. Ogden (pers. comm.) has found in his studies of alligators in the Everglades that the sides of nests are typically bitten off at hatching time. Like nest guarding, nest opening is subject to variation among individual females but that nest opening does occur is

well documented by studies on wild alligators (Joanen, 1969). In addition it is becoming increasingly apparent that nest opening seems to be characteristic of many crocodylians including the American crocodile, *Crocodylus acutus* (Ogden, 1972), the Nile crocodile, *Crocodylus niloticus* (Cott, 1961; Modha, 1967) and the spectacled caiman, *Caiman crocodilus*. In the latter, the male has been reported to open the nest in captivity (Alvarez del Toro, 1969). In the case reported here, the alligator guarding the nest [easily recognizable by its size] was sexed by J. C. Ogden on the morning following hatching and confirmed to be a female.

The mother with most of her young nearby spent several days after hatching in a canal and pond on the opposite side of the roadbed from the nest. On 18 August a number of juveniles still at the nest site were captured and used to test the response of the mother to the juvenile distress cry. While the female was floating in the water next to the roadbed, I held a juvenile 1 m above the ground and elicited distress cries by squeezing it. The mother moved quickly out of the water and climbed up the bank, a distance of about 3 m. At this point I immediately released the juvenile. In direct and deliberate motions, the female then turned her head sideways, opened her jaws, picked up the juvenile with the side of her mouth and with a jerk of her head positioned it on the bottom of her mouth in front of her tongue. The female remained on the roadbed for several minutes holding her mouth agape by about 3 cm and then backed down into the water. She remained there for several minutes more then increased her gape slightly and the juvenile swam out. This test was attempted two more times within the next 10 minutes. Each time the female came out of the water and tried to pick up the juvenile with the side of her mouth, but in both instances the juvenile scampered into the water before being picked up. Young-carrying behavior has not been pre-

viously described in the American alligator. It is notable however that the male spectacled caiman has been reported to crush egg shells with his teeth to aid in hatching (Alvarez del Toro, 1969).

It is clear from these observations that the American alligator possesses an intricate system of parental care, the details of which remain to be elucidated. It is likely that systematic study of wild alligators would reveal a much more complex repertoire of maternal behavior than has been recognized heretofore.

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