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RESEARCH NOTES:

SOME EMBRYOLOGICAL STAGES OF THE MARINE TURTLE, *CHELONIA MYDAS*

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ABSTRACT

Different developmental stages, based on the number of days of embryological development of the green turtle *Chelonia mydas*, are described using morphological characters and some embryo measurements. Embryos examined were obtained from turtle eggs collected in Taganak Island of the Turtle Islands Group, Sulu, Philippines.

INTRODUCTION

Studies on the embryological development of sea turtles are quite limited. Crastz (1982) presented a detailed report on the embryological development of the olive ridley *Lepidochelys olivacea*, while Witzell (1983) described that of the hawksbill turtle *Eretmochelys imbricata* in six stages. In the Philippines, Domantay (1961) reported his personal observations on the development of the green turtle *Chelonia mydas*, the only record in the country dealing on that particular subject matter. Sea turtle embryonic development, therefore, has yet to be thoroughly investigated.

This report consists of a catalogue of six stages of embryological development of the green turtle, adding to the meager information available on sea turtle biology, most significantly in the Philippines.

MATERIALS AND METHODS

Turtle eggs were obtained in mid 1987 from Taganak Island, the largest of seven islands comprising the Turtle Islands Group in the northwestern part of the Sulu Archipelago. The island is one mile long with an elevation of 450 ft above sea level.

The eggs were collected from a marked nest a few hours after they were laid, and transported to six nests within the vicinity of the original nesting site for incubation. Each nest represented the predetermined ages of embryonic development, as 6, 13, 21, 28, 38, and 48 days. Samples of four eggs from each of the nests were collected at the

preselected developmental days, placed in plastic bags with proper labels, and preserved in 10% formalin solution. The egg samples were then shipped to Manila.

The embryos were examined in the laboratory (with the aid of a stereoscope) for morphological information. Carapace measurements were made using a Vernier caliper. Each developmental stage was documented with photographs.

A sample of a neonate from a preserved laboratory specimen was added for morphological comparison.

This study was limited to a few samples due to difficulty in transporting specimens from the source to laboratory, and time constraint.

RESULTS AND DISCUSSION

The general aspects of green turtle embryological development are described in the following six selected stages:

- a) **Age = 6 days** (Plate 1). The head is formed with the brain divisions defined as telencephalon, diencephalon, mesencephalon and myelencephalon. However, the embryo is without facial characteristics. Optic cup and otic invagination are discernible. Tail bud present.



Plate 1. Age = 6 days.

- b) **Age = 13 days** (Plate 2). Limb buds paddle-shaped with two interdigital grooves on fore limbs. Thick dermis forms on the dorso-posterior part of the embryo. This primordial carapace, the curved length of which measures 5 mm, does not possess clearly defined borders. Maxillary process reaching anterior border of eye. Eye is characterized by a black dot while otic invagination is more evident.

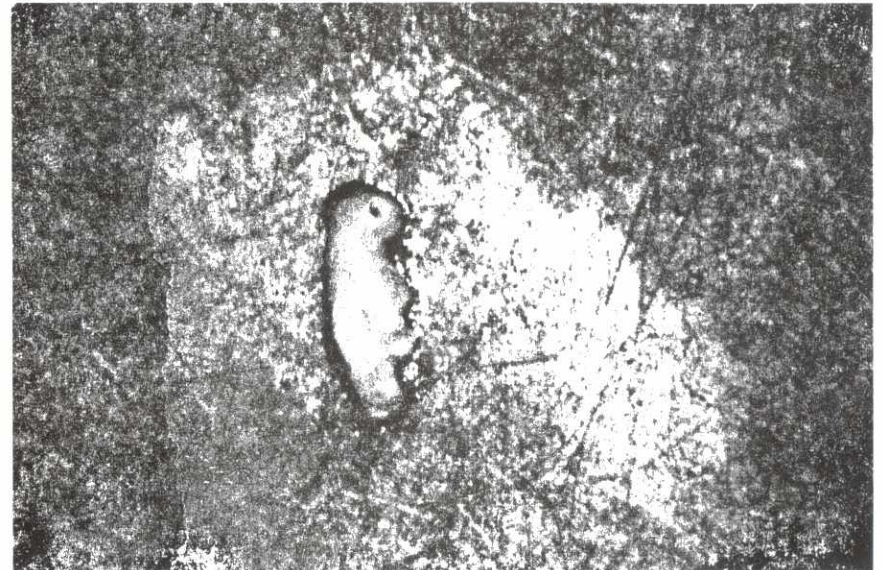


Plate 2. Age = 13 days.

- c) **Age = 21 days** (Plates 3 and 4). There are five phalanges on the fore limbs and hind limbs. A free claw is present on each of the foreflippers. The carapace is clearly defined, measuring 18 mm. Ribs and spinal column are evident. At close examination the carapace has thin divisions which eventually give rise to the scutes. Mandibular process reaches anterior border of the eye. The eye has developed from a mere black dot to one with distinct iris and pupil. The egg-tooth appears as a white dot on the tip of the snout. At this stage, only the diencephalon and mesencephalon brain divisions remain.

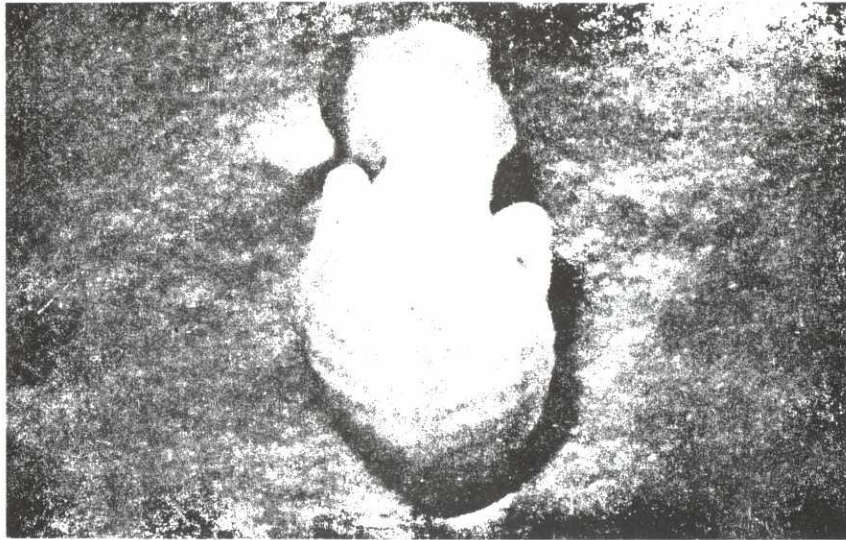


Plate 3. Age = 21 days.

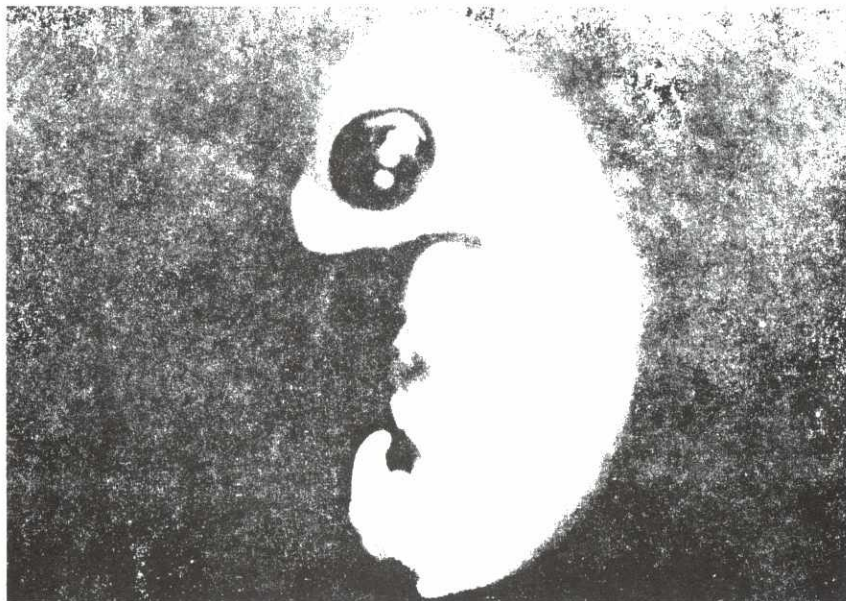


Plate 4. Age = 21 days.

- d) **Age = 28 days** (Plates 5, 6 and 7). Presence of pigment on the head, neck, dorso-anterior portion of the foreflippers and carapace. Curved length of carapace is 22 mm. Scutes (neural, lateral and marginal) are discernible. Also, the pre-frontal scutes are formed. Scales present on neck, lower eyelids, throat and limbs. Mandibular process exceeds the anterior limit or border of the eye. The egg-tooth thickens.

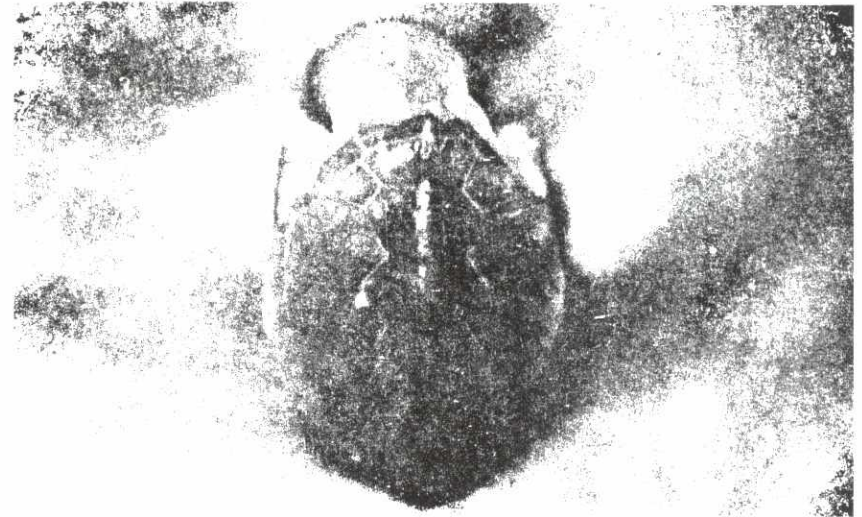


Plate 5. Age = 28 days.

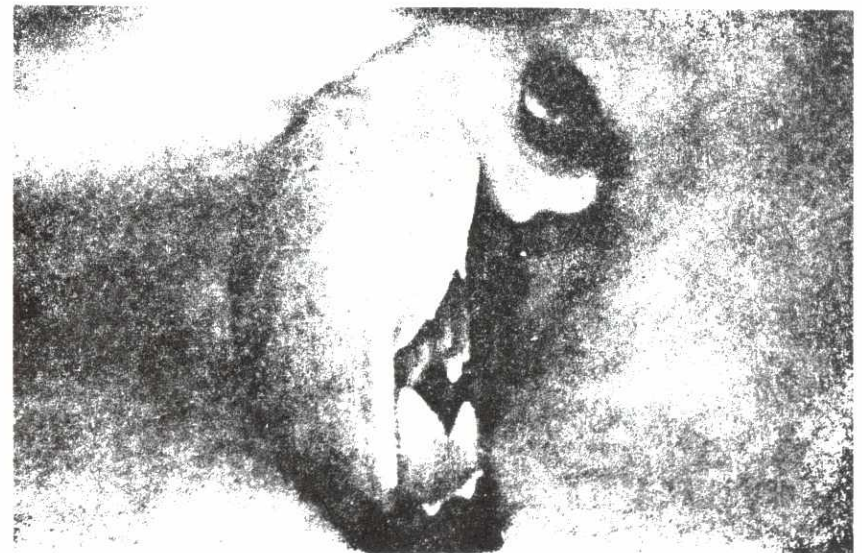


Plate 6. Age = 28 days.

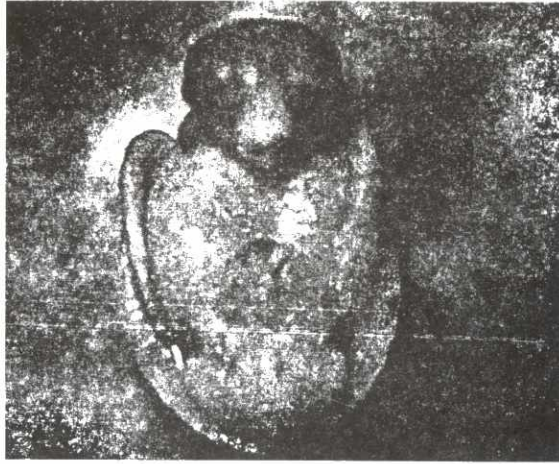


Plate 7. Age = 28 days.

- e) **Age = 38 days** (Plates 8, 9 and 10). More pigmentation of head, dorsal portion of fore and hind flippers, ventro-posterior portion of flippers, dorsal portion of tail, and carapace. Pigmentation is such that the neural or central scutes are lighter than the rest. There is slight pigmentation of the dorsal portion of the neck and lower eyelid. This stage is characterized with the hardening of the scutes. Scutes on the plastron are evident. Carapace length is 37 mm. Presence of mandibular scutes. Egg-tooth thickening and widening. Scales evident on throat, eyelids, and skin of pectoral and pelvic regions.



Plate 8. Age = 38 days.



Plate 9. Age = 38 days.

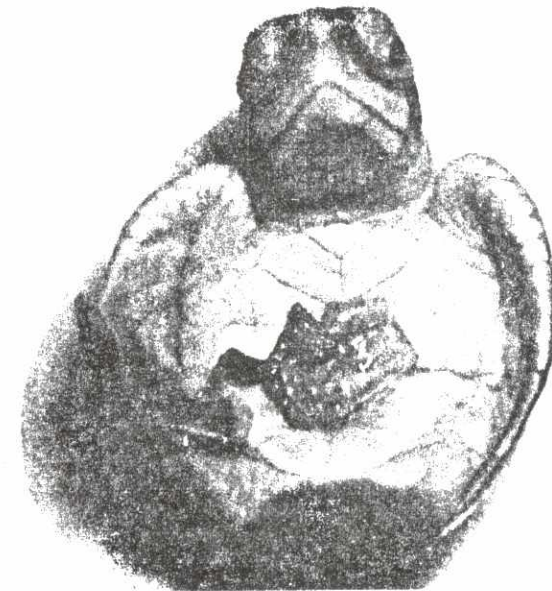


Plate 10. Age = 38 days.

- f) **Age = 48 days** (Plates 11 and 12). Hardened or sclerotic scutes. Neural scutes are darker, with lighter color still evident, but concentrated towards the center. Egg-tooth pointed and pigmented. Pigmentation of neck darker than previous stage. Upper and lower eyelids pigmented.



Plate 11. Age = 48 days.

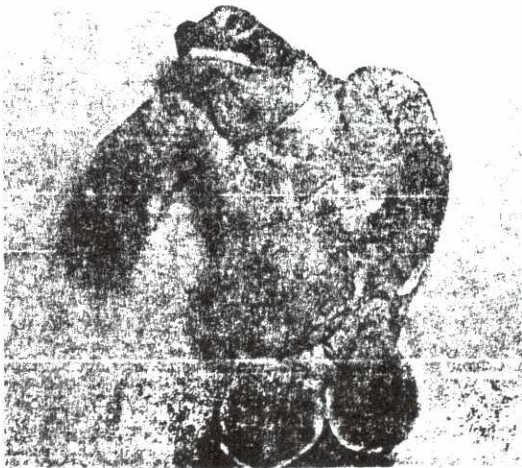
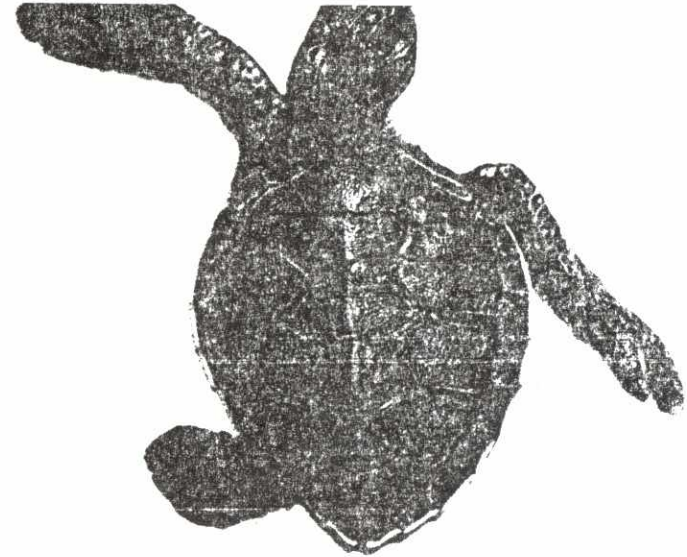
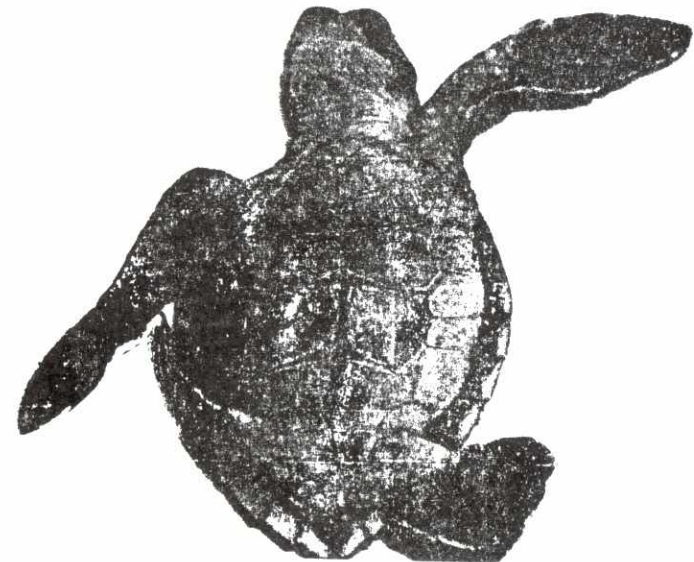


Plate 12. Age = 48 days.

- g) **Neonate = 2 weeks old** (Plates 13A and B). The eyelids are completely pigmented. Dorsal portion of neck, fore limbs and hind limbs are darkly pigmented. Egg-tooth absent.



Plates 13A. Neonate = 2 weeks old. (Dorsal view).



Plates 13B. Neonate = 2 weeks old. (Ventral view).

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