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THE INFLUENCE OF TEMPERATURE ON THE INCUBATION OF BOX TURTLE EGGS. C. H. Dodge, M. T. Dimond* and C. C. Wunder. Library of Congress, Trinity College (Washington, D. C.), and University of Iowa, Iowa City, Iowa.

Over the past eight years, research has been conducted on eggs and newly hatched young of eastern box turtles (Terrapene carolina carolina Linne). Eggs were incubated at temperatures ranging from 24°C to 34°C. Eggs incubated at 24, 30, and 32°C have mean incubation times of 60, 52, and 54 days respectively. Eggs incubated at 34°C failed to hatch. Hatchling growth from eggs incubated at 24 and 30°C is nearly equivalent and is nearly four times faster than normal. A temperature of 30°C appears to be optimal both for incubation of eggs and development of the hatchling. However, hatchlings reared under laboratory conditions do not appear to adapt well to field conditions. Therefore, different approaches to head-starting hatchling box turtles are being examined.

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INCUBATION TEMPERATURE AND SEX DIFFERENTIATION IN A SEA TURTLE. M. T. Dimond and P. Mohanty-Hejmadi*. Trinity College, Washington, DC, and Utkal Univ., Bhubaneswar, India.

A clutch of eggs was removed from a new nest of the olive ridley turtle, Lepidochelys olivacea (Eschscholtz), and brought to the laboratory for incubation. The eggs were buried in moist sand or kept between two layers of moist cotton at three temperatures until hatching. Sex was determined post mortem by gross morphology of the gonads. Results as to temperature of incubation / time to hatching / sex are as follows: 31-32° / 45-46 d / female // 29-30° / 53-55 d / female // 26-27° / 75-78 d / male. Embryonic mortality was highest in the coolest group. Several female hatchlings were reared for a month in 50% sea water and fed with freshwater clams (Unio sp.). The olive ridley is like most other turtle species that have been studied in that high incubation temperature gives rise to females and low, to males. The work was supported in part by a grant from the American Philosophical Society.

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SEX DIFFERENTIATION AND INCUBATION TEMPERATURE IN TURTLES. M. T. Dimond. Trinity College, Washington, DC.

Eggs from Chrysemys picta picta and Chelydra serpentina were incubated at constant temperatures of 28.5° or 31° C. Gross examination of gonads and gonoducts revealed no males at either temperature for C. p. picta. Chelydra serpentina, however, produced both sexes at the lower temperature; out of five hatchlings at 31° C, four were females and one, an "intersex," thus supporting Yntema's findings with that species. The temperature of natural nests of Terrapene carolina carolina eggs has been monitored during the unusually cool summer of 1970. The sex of the hatchlings will be reported. There are apparently species-specific critical temperatures for sex differentiation in turtles.

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EFFECT ON SEX DIFFERENTIATION OF DAILY TEMPERATURE FLUCTUATIONS DURING INCUBATION OF THE OLIVE RIDLEY SEA TURTLE (Lepidochelys olivacea): CONSERVATION OF AN ADAPTATIONAL PHYSIOLOGICAL MECHANISM. M. T. Dimond, P. Mohanty-Hejmadi and M. Behera. Dept. Biol., Trinity Coll., Washington, DC 20017 and Dept. Zool., Utkal Univ., Bhubaneswar 751004, India.

In nature sea turtle eggs, buried beneath 18 or more cm of sand, do not experience day and night temperature shifts as do those of shallow-nesting forms. In a laboratory setup, olive ridley eggs subjected to daily fluctuations of up to 5 C developed normally. During the critical middle third of development, the experimental daily mean temperature, like the stable temperature in natural nests, is correlated with sex differentiation, a characteristic also reported for shallow-nesting turtles. In fact, most turtles so far studied, of different sizes and from different habitats, exemplify the same phenomenon, viz., sex differentiation according to incubation temperature, whether constant or fluctuating. Conservation of lability in basic physiological mechanisms such as temperature-controlled sex differentiation may help to explain the long evolutionary success of chelonians. (Supported in part by a grant from the American Philosophical Society.)

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