

NOTES ON THE SPOTTED TURTLE IN NORTHERN INDIANA

With Special Reference to Secondary Sexual Differences

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The spotted turtle is the most likable of the Indiana pond turtles. It is slow and methodical, cannot be induced to bite, feeds readily on raw beef in captivity, allows its legs to be extended, and will project its head and neck in a trusting manner when newly captured. If hurt it can draw the head completely out of sight. It inhabits small streams and ditches in company with Blanding's turtle and young painted turtles. When surprised in shallow water it will usually try to burrow in the mud or leaves, but on land it merely awaits developments and slightly retracts its members. It is occasionally severely injured by rodents which gnaw away the scutes and frequently large areas of bone of the plastron. Shells in the woods near swamps shew where some have been destroyed in this manner. The tooth marks show on living and dead alike. Some animal preys on the young of this, the painted, and Blanding's turtles by devouring the head and forefeet and leaving the bodies piled on banks along ditches. Specimens are frequently seen with healed-over stubs of forefeet. They are seen mating on moist land in April.

Secondary sexual differences in turtles are chromatic and morphological.

Differences in color have been misconstrued by study of preserved instead of living specimens and by failure to scale off the variously colored coatings that sometimes adhere to the shell like lacquer. Thus Blake states (1) "It is a curious fact that not one of the fairly conspicuous and constant sexual differences in coloration of *Clemmys guttata* has previously been recorded . . ." Blake collected and preserved eighteen specimens himself and studied forty-three preserved in the National Museum. Thus he overlooked the constant sexual difference of the eye in this turtle, which is dark brown in the male and bright orange in the female. Agassiz states of *C. guttata* that he has "seen old specimens that were entirely black" (2). This remark should be amplified by the detail as to whether or not any coating had been scraped from these specimens if they are as subject to discoloration in the East as in Indiana. Yerkes, speaking of the yellow dots, says (3): "With age the number of spots increases; they appear on the marginal plates also, and their arrangement becomes irregular." Blake points out that both Yerkes and Agassiz were in error in believing that the young were hatched without marginal spots (1). As to the arrangement of spots, it is definite. Beginning with the original large spot in the rough part of the scute, which represents the extent of the scute when the turtle

emerges from the egg, additional spots, appearing at the edges of growth, radiate from this center with more or less regularity and similarly to the rays and radiating spots of *Terrapene* and *Emys* respectively.

Differences in form are noted by several authors, but they confine themselves to the differences in the tails noted by Agassiz and to a difference in size.

Study of a series of seventy-eight adults, young, and juveniles, taken in Jasper, Pulaski, Starke and Porter counties, Indiana, confirms or challenges the characters mentioned by previous authors and adds a few unmentioned ones. These specimens were studied alive after scraping the lacquer-like discoloration, when present, from their shells thereby revealing the true spots and colors. Doubtless other secondary sexual characters remain to be pointed out by future writers.

Color Variations

The number and size of the yellow dots varies greatly with individuals and is therefore of doubtful diagnostic use. Yerkes found 15% more spots on the females than on males (3). My series averages about 33 spots equilaterally distributed on neurals and costals in each sex. Yerkes also states (3): "Statistics indicate a greater number of spots on the left side of the carapace than on the right in both males and females. It is possible that this is to be correlated with right handedness and right-eyedness." My experience in the field is that these turtles are oblivious to one another except at certain times which seem to be determined entirely by the sense of smell and call for ambidexterity. Since this contact is invariably from the rear, right- or left-eyedness seems subservient to good balance.

The spots on the specimens at the Ohio State Museum are larger, on the average, than those on the Indiana specimens.

The color of the heads is most strikingly different and is well described and illustrated by Blake.

Male.—Jaws always dusky; mandibular yellow stripe nearly or quite lacking; throat black, finely specked with orange; supra-auricular yellow streak little developed.

Female.—Jaws always pale yellow; mandibular yellow stripe always conspicuous; throat always spotted and streaked with yellow; supra-auricular orange line usually well developed.

Blake found the crown of the male anterior to orbits usually immaculate and the female bearing several yellow spots. The Indiana males are gayer, averaging 1.5, while the females average 2.0 yellow crown spots.

The colors of the plastron vary considerably in proportion and arrangement, but no sexual significance was noted. As stated above, the eyes of the males are always deep brown; of the females always bright orange, even in juveniles.

Variations in Form

Hay was the first to mention the relative position of the vent in regard to the edge of the marginals (4). The vent of the female barely reaches the edge of the marginals, whereas that of the male extends

about 5 mm. beyond them. The tail tip is so subject to mutilation that measurements beyond the vent are of little diagnostic value.

The plastron of the male is about 2 mm. concave toward the anterior margin of the femorals; that of the female, flat or slightly convex. The posterior edge of the plastron is nearer the edge of the marginals in the females than in the males, because the plastron averages about 5 mm. longer in the females.

The Indiana males and females average about the same length of carapace. Yerkes states: "The females are slightly smaller than the males . . .", but he gives no figures; and Blake is also silent on the subject, although he obtained data on 24 males and 36 females. The largest male found measured 10.6 cm. and the largest female, 11.1 cm. The Ohio series of 29 specimens shows the females larger than the males, one female measuring 11.75 cm.

The head of the male is slightly wider and deeper than that of the female. The vertical distance between carapace and plastron at neck and tail is slightly greater in the male. No constant difference was noted in the shape of the carapace although there was considerable variation. No constant difference was noted in the length of the nails of the forefeet as is mentioned by DeSola (5).

Scute abnormalities are .154 in females and .059 in males. The Ohio series contained no abnormal females and one abnormal male. This tends to carry out the general findings of Coker in regard to *G. geographica*, but he did not give the percentage as quoted by Risley (6).

Changes During Growth

Color.—The young are hatched with one or more yellow dots on each scute and usually on all marginals, but I have not seen one on the nuchal. The entire center of the plastron is black. Head, throat and eyes are as in the adult. There are no yellow spots on legs or tail. As growth proceeds more yellow dots appear, usually including one on the nuchal. The black center of the plastron migrates radially leaving a flesh-pink center. Yellow dots appear on legs, tail and head. The orange and black on the legs become vivid.

Proportion.—The tail of the juvenile, measured from plastron to tip, is about one half the length of the carapace. With age this proportion is reduced to about two-fifths. The nearly circular juvenile with breadth about 95% of length changes to an elongated adult with breadth about 77% of length. The projection of the marginals beyond the femorals is contained four and a half times in the plastron in juveniles and is reduced to eight and a half times in adults. The growth rings on the carapace tend to disappear with age, but can usually be made out on the plastron except in apparently very old individuals. A six-ringed individual seems to be mature. It is difficult to make out rings more than ten in number. I know of no proof of age being exactly represented by rings, nor of the way to read the reduced rings that seem to be produced after maturity. DeSola says: "By counting the rings on several shields and taking an average a figure will appear that may be used to indicate the age of a specimen" (5).

Literature Cited

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