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NOTES ON THE EGG LAYING HABITS OF THE SOFT SHELL TURTLES

WILLIAM M. GOLDSMITH

During the summer of 1940 the writer with six students had an opportunity to study in the vicinity of Dubuque, certain nesting habits of the smooth, brown, soft-shell turtle *Amyda mutica*.

The river was low during June and early July, offering ideal conditions for study when the sandbars and sandy shore lines were exposed. These are the most favorable nesting grounds of *Amyda mutica*. Since the conditions for field study were so favorable in this locality, it was decided that before the close of the next breeding season more thorough observations would be made. Unfortunately the river remained high until after the close of the 1941 nesting season. With the aid of a grant from the Iowa Academy and a like sum from the University of Dubuque, plans were made for a continuation of the observations during the season of 1942. An assistant was employed and observation stations set up with convenient blinds. However, the Mississippi again remained out of its banks covering most of the more favorable observation grounds. The same unfortunate river condition existed in June of 1943, but sufficient material has been assembled during the three seasons to justify a brief report on these observations.

Choice of Nesting Grounds—The soft-shell turtle has much preference for clean, somewhat level sandbars and sandy shores, free from trash, weeds, oil, or sediment markings, and exposed to open view. Sandy inlets with growths of trees, weeds, and shrubs forming an up and down stream blind were seldom used as nesting places, while adjoining clean sandy prominences giving plain up and down river view, were honeycombed with nests. The turtle seems to depend largely upon its clear vision, keen sight and quick responses for protection.

Also, of great importance is the protective coloration. When *Amyda mutica* with its sand-brown spotted covering is flattened out on a sandbar or sandy beach, it is quite impossible for the untrained observer to locate. When the river was low, and clean sandy bar surfaces were exposed nests were very numerous on the exposed places. This offered favorable conditions for one to record numerous observations. However, when the river is high, covering the sandy plots, the normal egg laying habits seem to be disturbed. The females then scatter and make unsatisfactory nests here and there in any place they can find sand, even in the weeds and bushes along and some distance beyond the bank. The fact that eggs were found among the weeds would indicate that they are sometimes laid without the normal nest preparations.

Specific Observations—June 18, 1940, beginning about dawn was a typical observation period on the nesting habits of *Amyda*. A large number of turtles were found on the sandy shore on the west bank of the river near the Biology Camp some eight miles south of Dubuque. The turtles, though busily engaged in nest building or in survey work, were easily frightened and would quickly scamper into the water for protection. By close observation a sharp nose might be seen here and there in the water and now and then a complete head exposed. After the turtles felt safe they would return to their nesting duties, but seldom if ever returning to complete the original nest.

Many small holes were observed dug to varying depths, usually from three to five inches. These were the partly completed nests, left when the builder was frightened away, or gave up the task because of unsatisfactory moisture or sand conditions. When completed the hole generally reached a depth of from six to nine inches. During the digging of the nests it was observed that the turtles were nervous and very easily frightened away from their work. This partially accounted for the presence of so many uncompleted holes. Also, the turtles seemed to seek out conditions proper for construction and incubation, namely; proper dampness, free from rocks, sticks and other debris.

Later, when the water level was lower, the nests were dug nearer the stream and on the exposed sandbars that had been previously covered with water. These nests were often submerged later by a rise in the water level. Under normal conditions the nests were found only in sand, usually on a slight slope and in areas reasonably free from vegetation—seldom nearer than six feet or more than twenty-five feet from water.

When the time for the actual laying of the eggs came, the turtles seemed to have overcome their nervousness and were not easily frightened from their nests until they had completed the laying of the eggs. This was demonstrated in that they could be approached and even touched without making any effort to leave their nests. The turtle shown illustrates the point. Three of us made a close-up examination, taking photographs, and then found that she would not move when we excavated a hole under the edge of her carapace to see the eggs being placed in the nest. Shortly after the last egg was deposited, the turtle made one quick lunge in the direction of the water. At no time did we ever see a turtle cover her eggs while she knew she was being watched. It is questionable if a turtle thus disturbed before covering her eggs ever returns to complete her task. Many open or partially covered nests were found, but at no time did we see a turtle returning to complete an unfinished nest or to cover the eggs or complete the process.

After the eggs are all deposited, the turtle uses her hind feet to cover them, using the moist sand she previously removed from the hole. By certain twisting movements with all four legs, she drags the plastron around over the sand, making a perfect **camouflage**. In a few moments the freshly disturbed sand is dry, leaving no marker to reveal the location of the eggs.

Number of Eggs--As a further specific check on the question as to the number of eggs the soft shell turtle lays at one time in a single nest, we set out one morning to count the first sixteen nests (four nests each for four observers) excavated during that specific study period. Eggs from the first five nests (A, B, C, D, and E) were pooled in one bucket. The count showed ninety-three or an average of a fraction less than nineteen per nest. Eggs from the remaining eleven nests (F to P inclusive) were recorded as follows: F-31; G-10; H-17; I-17; J-22; K-22; L-16; M-10; N-21; O-19; P-21; a total of 206 eggs for the eleven nests. Often times the nests are so close together, one spade full of sand might unearth three or four nests, thus giving the popular impression that one turtle lays almost a hundred eggs.

The round eggs of *Amyda* are moderately hard shelled resembling ping-pong balls, showing an air space and, in most cases, at one end a very pronounced white area. The eggs varied in size, the smaller being slightly less than an inch in diameter. The largest eggs were about one and three eighths of an inch in diameter.

Raccoons Handicap Observations—From the first day of observation we noted that many of the nests which we had staked for repeated observation were excavated during the night and the eggs devoured. Tracks showed that the raccoon was an enemy of the turtle. Morning after morning the tracks on one nesting beach were noted to be the same size, indicating that one large raccoon was feasting regularly on the eggs from that one nesting plot. The size of the area was about sixty feet along the shore and about twenty feet shoreward. During one night this animal excavated nine small holes and unearthed seven nests. Since the most careful examination of the sand surface would not reveal the location of the perfectly camouflaged nest, the nest robbing sense of the raccoon is quite remarkable.

It was obvious by the many heavy imprints of the left foot in the sand on the left side of the excavated nests and the almost trackless right side that the raccoon had used his right "hand" to excavate and to remove the eggs from the nest. The shells were usually placed in one pile four or five inches from the hole on the right side. These eggs seemed to be equally appetizing whether they contained embryos or turtles about ready to hatch.

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