Reprinted from “Copeia” Volume 1967, number 1, 1967, pp. 240-241, White and Angelovic: Feeding behavior of a young stargazer, Astroscopus y-graecum. With permission from the American Society of Ichthyologists and Herpetologists.

species treated. Benzocaine lacks the solubility of MS 222; one gram dissolves in 2.5 liters of water (Stecher, 1960). Solubility may be increased slightly by first suspending the powder in a few ml of ethyl alcohol or by ageing concentrated aqueous solutions.

Amphibia have also been anesthetized with this drug. Compared to ether, benzocaine requires a longer contact period to induce total immobility in *Rana pipiens* but anesthesia lasts longer.

The desired dose level required for a particular species must be determined by trial and error. Since the chemical is quite insoluble, it is difficult to make concentrated solutions capable of causing mortality. The author has controlled the depth of anesthesia by employing saturated solutions (after skimming off undissolved powder) and removing specimens when the desired state of narcosis was produced. In practice, the loss of hydrostatic ability has been taken as a critical point and the control of anesthesia level has been accurately determined by how long a specimen is permitted to remain in the solution after the loss of equilibrium.

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FEEDING BEHAVIOR OF A YOUNG STARGAZER, *ASTROSCOPUS Y-GRAECUM*.—Certain relatively sedentary marine fishes use specialized appendages as "fishing gear" to attract prey. The Lophiidae and Antennariidae, for example, use modified dorsal spines. The Mediterranean stargazer, *Uranoscopus scaber* (Uranoscopidae), extends a red tongue-like projection from its mouth to attract small fish (Andriashev, 1944). We observed the use of a different type of "fishing gear" in the feeding behavior of an immature stargazer of the genus *Astroscopus*. This behavior included movements of the eye or dorsal fin, or both, as lures.

A young stargazer, *Astroscopus y-graecum* Cuvier, 28 mm SL, was caught in the daytime in a surface plankton tow in Gallants Channel near Beaufort, North Carolina. It was placed in an aquarium containing sea water and a layer of sand about one inch thick and was fed post-larval Atlantic croaker, *Micropogon undulatus* (12–20 mm SL), and post-larval pinfish, *Lagodon rhomboides* (10–15 mm SL). (It is now cataloged as U. S. National Museum 200561.)

When the stargazer was buried in the sand, it used eye movements to attract post-larval fish. The eyes and mouth of our specimen closely resembled the overall appearance of the bottom of the aquarium, and thus were well camouflaged. When a small fish came within 40–50 mm of one side of its head, the stargazer moved the eye on the opposite side in a rapid semicircular motion one to five times, while the eye nearest the prey remained motionless. The moving eye apparently simulated a minute organism burrowing in the sand and decoyed the curious prey to a position directly over the stargazer's mouth. Eye movements were repeated until the prey approached within range or moved away.

A rapid intermittent ripple of the posterior half of the soft dorsal fin also appeared to be used to attract food. The ripple, which was similar to a larger burrowing organism, was used only when potential food approached from the front or the rear. As soon as the prey was attracted within "eye range" of the stargazer, the intermittent fin movement ceased and the eye movements began. When a potential meal came into range, the stargazer lunged upward from its resting position in the sand. These lunges usually occurred when the prey was no more than 10–15 mm away, directly above the mouth, and were so sudden that few fish escaped. Our specimen captured 5–10 post-larvae per day by these movements.

The eyes and fin were used to lure prey only when the stargazer was buried in the sand. When it had not been fed for 24–48 hr, it actively pursued prey that were introduced into the aquarium. After eating several post-larval fish in rapid succession, it returned to its resting place in the sand. During periods when its appetite was apparently appeased, no eye movements were observed and prey swam freely directly over its mouth.

The outward flow of water over the gills and under the curved pectoral fins of the stargazer served as a third mechanism for attracting prey. Small fish were occasionally attracted to the area which Dahlgren (1927) described as "two tiny craters in the sand . . . showing the sand grains dancing up and down continuously as they do in the sand bottom of many springs where the water is welling up."

Our observations revealed that the young of this genus, like the adults, usually feed only in daylight. Our specimen began to feed actively when the lights were turned on in the morning. The number of post-larval fish present in the morning was usually the same as had been present the previous evening. Pickens and McFarland (1964) observed that adult stargazers also do not feed in the dark or when their eyes are covered.

Dahlgren (1927) suggested that adults of this genus are buried in the sand during the day and move about mainly at night. Our immature specimen also remained buried during the day and emerged from the sand only to feed. Much of the movement at night apparently occurred while the fish was buried under the sand. Every morning trails were visible in the sand, and the stargazer was buried at the end of one of the trails.

The adult of this genus shows an association between the eyes, electric organ, and feeding behavior. White (1918) suggested that the electric organ, which was not fully developed in our specimen, is probably operated from the optic centers, since the electroplaxes are derived from certain eye muscles. Pickens and McFarland (1964) demonstrated that an electric discharge occurs when adult stargazers feed, although its function is still unknown. Visual perception of moving prey is needed, however, before the electric discharge occurs. Our observation that immature stargazers use their eyes as decoys demonstrates a further association between the eyes and feeding behavior in this genus.

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THE SACCUS VASCULOSUS OF THE TUNA BRAIN.—During investigations on the distribution of oxytetracycline in the body tissues of the southern bluefin tuna (*Thunnus maccoyii*) the required dissections provided an opportunity to examine the brain for the presence and size of the saccus vasculosus. This organ occurs in elasmobranchs and teleosts; it forms a ventral projection of the infundibular wall and is situated just caudal from the pituitary (Bargman, 1954; Kamer, *et al.*, 1960).

Since no saccus vasculosus was found upon macroscopic inspection of the brain of a number of bluefin tuna, dissections were also carried out on the skipjack (*Katsuwonus pelamis*), bonito (*Sarda chiliensis australis*), yellowfin tuna (*Thunnus albacares*), and albacore (*Thunnus alalunga*). None of these species proved to have a visible saccus vasculosus.

Some of the brains were processed histologically by serial sectioning at 5 and 10 μ and stained with hematoxyline-erythrosine, aldehyde thionine-light green, and P.A.S.-luxol fast blue. A saccus vasculosus was found situated in an unusual position—hidden in the fold between the caudoventral area of the hypothalamus and the rostrodorsal area of the lobi inferiores. In most