

Collecting and Maintaining the Mud Sunfish, *Acantharchus pomotis*

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Photos by the author.

It may be hard for many people to imagine, but safely tucked away (for the moment, at least) in the most densely populated state in the nation is a vast area of wilderness unmatched on the middle Atlantic seaboard. It is an area that is largely uninhabited by man while being less than 40 miles from both Philadelphia and New York City. It is an area that, while comprising fully one quarter to one third of the state's entire landmass, is still largely unknown to many native New Jerseyans. This area, occupying about a million acres in the southeastern portion of New Jersey, is commonly known as the New Jersey Pine Barrens.

The Pine Barrens are of interest to workers in many and varied disciplines, in both the physical and biological sciences. Inasmuch as the geological history of the Pine Barrens is central to an understanding of the flora and fauna found there, the dichotomy alluded to above is quite an artificial one; for just as the physical and biological phenomena are all intricately intertwined, so the study of such interrelationships must follow a correspondingly eclectic path. One aspect of particular interest to students of botany and zoology is that the Pine Barrens defines the northern boundary for many southern species of plants and animals, while being the southerly limit of many northern species. While there are a few endemics from this area, there are many species of plants and animals that are abundant within the Pine Barrens but rare outside of it.

Although the number of plant and animal species in the Pine Barrens is quite large, its fish fauna is rather limited. As McCormick (1970) points out, all Pine Barrens streams originate from within the area, and no through-flowing streams traverse it. Combined, these two conditions impose limitations

on the fish fauna found there. Thus, only about two dozen or so species are found in the waters of the Pine Barrens.

Although not overwhelming in number, the fishes of the Pine Barrens, collectively, form a diverse and interesting group. Included are such engaging creatures as the anatomically peculiar pirate perch (*Aphredoderus sayanus*), a fish whose anus is situated under its throat; the catadromous American eel (*Anguilla rostrata*), a fish whose life history almost boggles the mind; and the swamp darter (*Etheostoma fusiforme*), one of the few representatives of its subfamily to occur in warm, standing waters. There are also fishes of striking beauty to be found in the Pine Barrens. Few people who have seen an adult male banded sunfish (*Enneacanthus obesus*) or bluespotted sunfish (*E. gloriosus*) remain unimpressed with their beauty. While there are also sport fishes such as the chain pickerel (*Esox niger*) and largemouth bass (*Micropterus salmoides*), these invariably take a back seat to the more popular saltwater species found only a few miles away on the Jersey coast.

However, there is at least one species of fish found in the Pine Barrens that is not well known for any of the above reasons and, in fact, is not well known at all. This fish, and the subject of this article, is the mud sunfish, *Acantharchus pomotis* (Fig. 1).

Very somberly, yet pleasingly, colored, the mud sunfish is an obscure and secretive fish that grows to about eight inches in total length. Ground body color is greenish-golden to brown with several dark longitudinal bands running the length of the body. These bands are typically faint, albeit noticeable, under most conditions. However, under conditions of emotional excitement (e.g., during aggressive encounters, etc.), these markings become very distinct (Fig. 2). By contrast, two similar and parallel bands on the operculum are at least fairly distinct at all times. As is the case with many centrarchids, a dark opercular spot is prominent. All fins approximate the



Fig. 1.

A young, 3" specimen of *Acantharchus pomotis*, collected in Toms River, New Jersey. Even very small individuals of *A. pomotis* are quite distinctive and are not easily confused with the young of other species.

same basic color of the body, with the dorsal, anal, and pelvic fins exhibiting a light blue iridescence, particularly noticeable under strong directional lighting. The mouth is quite large, as is the entire head. The eyes are situated far forward on the head, evidently affecting full frontal vision, possibly an adaptation in line with the species' predatory nature. The body is laterally compressed, although not to the same extent as in certain other genera (e.g., *Lepomis*). The body is also less deep than that of many other sunfishes. Particularly distinctive within the family is the presence of cycloid scales.

Within the family Centrarchidae, the monotypic genus *Acantharchus* is placed in the subfamily Centrarchinae and in the tribe Ambloplitini, along with the genera *Ambloplites* and *Archoplites* (Avisé et al., 1977). Since, these authors point out, *Acantharchus* appears to be taxonomically closest to *Archoplites*, and since these two species have been separated geographically for a considerable period of time, the retention of certain similar

traits may account more for their apparent taxonomic affinities than any recent shared ancestry. In light of this and other studies, it is apparent that *Acantharchus* is quite distinctive in a taxonomic as well as morphological sense.

The above introduction notwithstanding, it should be understood that the mud sunfish is not, by any means, endemic to the New Jersey Pine Barrens. (In fact, the Pine Barrens can boast no endemic species of fish.) Rather, it ranges over the entire eastern coastal plain from southern New York to northern Florida. Here *A. pomotis* may be found in sluggish, low-gradient coastal streams, ponds, and bogs. It has a definite predilection for muddy bottoms with adequate cover (submerged branches, vegetation, etc.). It is safe to say that the species actively avoids open water and would normally be absent from habitats without sufficient cover.

Although the range of this species is fairly extensive, it is, at best, only locally abundant, and may be characterized as a relatively rare fish. Moreover, its secretive nature and probable nocturnal (or at least crepuscular) habits do not predispose it toward capture by conventional means. Its secretive nature is well-attested to by the few existing reports in the literature. In

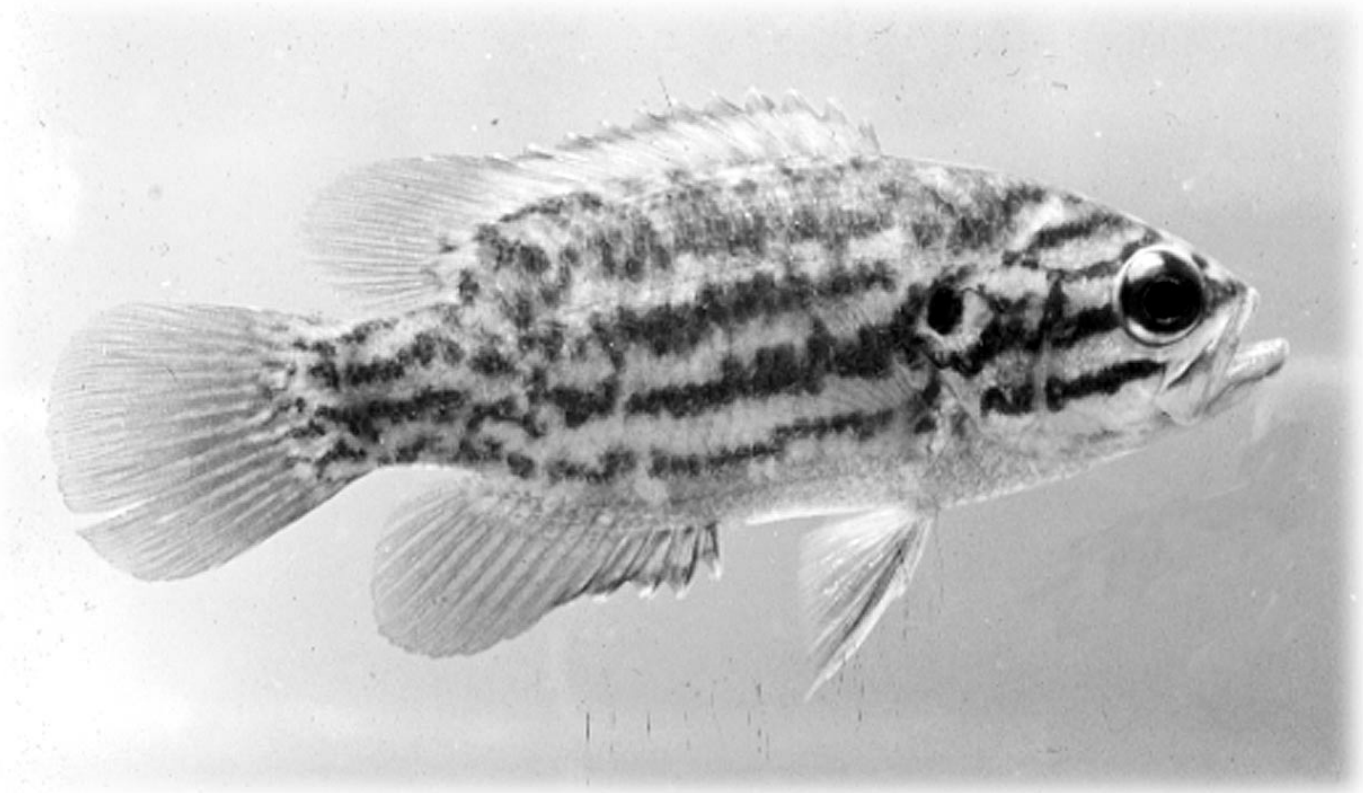


Fig. 2.

The "fright pattern" of *A. pomotis*. Merely placing the fish in a photographing tank is sufficient in evoking such a response.

To obtain photographs depicting the species' normal coloration, it is necessary to place the fish in a more natural (i.e., less stressful) setting.

a fishery survey report of Chamber's Lake in Maryland, for example, Mansueti and Elser (1953) relate that local residents who during their lifetimes had fished in this body of water where 14 specimens were taken by these authors, "did not recognize the fish, nor did they have a name for it." Similar observations may be made by casual collectors such as myself, and local fishermen who express complete ignorance of the existence of such a fish when confronted with a specimen.

Paradoxically, these same habits which preclude capture by conventional means (i.e., angling) render the fish somewhat susceptible to the methods of fish collectors. Since *A. pomotis* spends much of its time (during daylight hours at least) under banks, in dense stands of vegetation, and/or partially buried in mud and detritus, it is most readily collectable with long-handled dip nets. Two-man seines are often unfeasible over the mud substrates typical of *A. pomotis* habitat. Best results are obtained by netting *through* the mud substrate (not *over* it), and then sifting through the resulting netful of mud (Fig. 3). This species is very closely associated with the mud and, like

the sympatric pirate perch and eastern mudminnow (*Umbra pygmaea*), is rarely netted without an accompanying netful of mud (Brill, 1977). Those specimens taken over sandy bottoms are invariably obtained only by netting or seining through dense patches of submerged vegetation.

When collecting mud sunfish in the Pine Barrens, the water which one encounters is quite distinctive in several respects. For one, the groundwater in the Pine Barrens is extremely pure, so pure, in fact, that it has been described as being "bacterially sterile, odorless, clear, its chemical purity approaching that of uncontaminated rainwater or melted glacier ice" (USDI, 1976). Since, as mentioned above, all Pine Barrens streams originate from within the Pine Barrens, the water which flows therein is of similar purity. The water from any Pine Barrens stream is considered potable, discounting rare instances of local pollution. Moreover, the water is in virtual unlimited supply. An underground reservoir containing nearly 18 trillion gallons of water supplies the various streams at a fairly constant rate irrespective of periodic fluctuations in precipitation (USDI, 1976).

During the summer months, the water in the streams and bogs becomes quite brown in color, somewhat like strong tea. Such coloration is produced by the combined effects of the iron present in the water and from organic materials



Fig. 3.

The author sifting through a netful of mud in search of *A. pomotis*. Although not an especially pleasant task on a hot summer's day, the reward of capturing the fish you are after readily compensates for such indignities.

leached from decaying timber and other vegetation. This "cedar water," as it is often referred to, is still quite drinkable. The most important characteristic of this cedar water, as concerns aquarists at least, is that it is naturally soft and acid, with very low levels of dissolved calcium and magnesium (McCormick, 1970). I have recorded pH levels of less than 4.8 in certain habitats at certain times of the year. It is interesting to note that the cedar water, as described above, is very similar to that found in many of the areas from which tropical fishes come: discus, cardinal tetras, and certain killifishes are only a few examples of such fishes. Accordingly, many of the "old timers" among aquarists, before the advent of commercial water conditioners, collected their own cedar water to enhance coloration and spawning behavior in many of their tropical fishes. Some hobbyists still collect their own cedar water, albeit on a much smaller scale.

Despite the unusually pure quality of the water in addition to the often extreme pH values encountered in representative

biotopes, *A. pomotis* (like virtually all other Pine Barrens inhabitants) is surprisingly undemanding with regard to water characteristics in the aquarium. Although such handling is not to be recommended, I have transferred mud sunfish directly from their natural acid waters to aquaria with pH values in the alkaline range, with no apparent detrimental effect to the fish. Moreover, they may be kept for extended periods in water of vastly different chemical quality, again without apparent harm. For those wishing to duplicate natural conditions to some extent, the addition of boiled peat moss to the filtering medium (or directly into the tank) should prove beneficial.

Potential collectors should take note that, as with most wild-caught fishes, a critical period exists between the time of capture and ultimate adjustment to aquarium conditions. During this time efforts should be made to keep the fishes unstressed, i.e., they should be kept cool, dark, and isolated until they show signs of adjusting to life in the aquarium (i.e., feeding, etc.). A detailed list of methodological considerations is given elsewhere (Brill, 1978).

Potential collectors should also take note that it is illegal to collect *A. pomotis* (as well as many other species) in New Jersey without a proper permit. In New Jersey or anywhere else, the respective state agencies should be queried for laws pertaining to capture before any collecting commences.

Feeding *A. pomotis* is probably the least difficult aspect of maintenance. Any meaty food is eagerly accepted. Live *Tubifex* worms, brine shrimp, mealworms, live or frozen fish, chunks of beefheart, and earthworms are only a few of the foods the species will greedily devour in the aquarium. When hungry, they have been observed to leap clear out of the water to take large pieces of food dangled over the water's surface. In nature, the diet is known to include insect larvae and crayfish, as well as fish. Despite the mud sunfish's seemingly carnivorous nature, I have also observed them to devour whole cooked peas and chopped spinach, initially thrown into their tank for the benefit of their herbivorous or omnivorous tankmates.

So voracious are mud sunfish that any fish half their size or less may be considered a potential meal (Fig. 4). I once observed a 2-1/2" specimen of *A. pomotis* ingest a 1-1/2" johnny darter (*Etheostoma nigrum*). Whole! A 4" specimen was observed to eat a 1-1/2" pirate perch and a 2-1/2" salamander, both within 20 minutes. Fishes too large to be swallowed, however, are usually not molested. Aggression not related to feeding is directly mainly toward conspecifics, although exceptions exist for no apparent reason. Since the entire sunfish family is characteristically very territorial, a large tank should be provided, particularly when conspecifics are kept together.

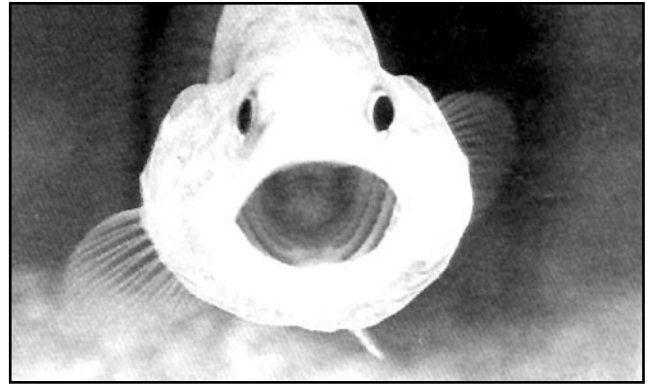
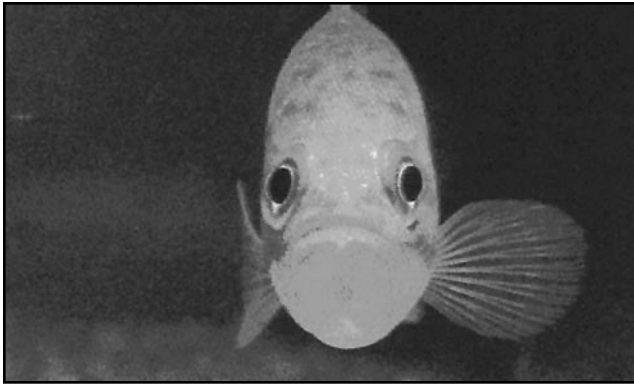


Fig. 4. A “prey’s eye view” of *A. pomotis*. The photograph on the right well illustrates the species’ qualifications as a voracious predator.

Unfortunately, there does not appear to be a wealth of information regarding reproduction in this species. Fowler, as reported in Breder and Rosen (1966), in late spring observed a nest guarded by a male *A. pomotis* in one foot of water over a sand and mud bottom surrounded by vegetation, in a shaded area close to shore. I could find no reports of actual spawnings in the existing literature, nor have I taken the time to keep adults under conditions which would have facilitated such behavior. Neither have I observed noticeable sexual distinctions in any of my specimens, aside from pronounced territoriality in specimens I had assumed to be males.

Endeavors to bring about spawning activity in this and other centrarchid species from similar latitudes should include recreating, as closely as possible, seasonal variations encountered by the fishes in the wild. Specifically, they should allow for a cold wintering period under the influence of a short-day photoperiod with only occasional or (at least at low temperatures) no feedings. Such a period need not last for more than two or three months, with temperatures in the high 30s to high 50s and 10 hours or less of daily light sufficing in the above regard. When bringing fishes out of this “artificial” wintering period, *both* photoperiod *and* temperature should be increased to at least 15 or more hours of daily light and about 70°F, respectively. Concomitant with the rise in temperature and photoperiod, the availability of food should be increased to the point of saturation.

As regards growth, age and size were correlated for Maryland specimens by Mansueti and Elser (1953). Reported were standard lengths of 25mm at one year of age, 50mm/2yrs, 80mm/3yrs, 100mm/4yrs, 125mm/5yrs, 140mm/6yrs, and 155mm/7yrs. Small (ca. 1-1/2”) specimens in my own ambient temperature aquaria have doubled in size in three or four months, given the diet discussed above. Proportionally slower rates of growth have been observed for larger specimens.

In conclusion, I’d like to state what has been implicit in this entire article: specifically, that the mud sunfish is an excellent beginner’s fish for those interested in keeping native fishes. In addition to possessing a distinctive “personality,” the species is also highly prized by native fish enthusiasts because of its rarity.

I have always found it interesting to keep species that are considered rare and/or about which little is known. Such is the reason for my interest in this obscure representative of an otherwise well-known family. Unfortunately, it is often these fishes that we find so close to home that are conspicuously absent from reports in the aquarium literature.

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