

Notes on the Lancers of the genus *Bagrichthys* (Teleostei, Bagridae)

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The genus *Bagrichthys* is a small genus of highly specialized bagrid catfishes found in large rivers throughout Southeast Asia. The genus is primarily known to the aquarium hobby through the occasional import of the black lancer catfish, a common name applied to *Bagrichthys macracanthus*. Members of *Bagrichthys* are characterized by their elongate and laterally compressed caudal peduncle, the dorsally-directed serrations on the posterior edge of the dorsal-fin spine, gill membranes united at the isthmus, and a long adipose fin without a free posterior margin. At present, there are seven recognized species:

B. hyselopterus (Bleeker, 1852) Borneo and Sumatra

B. macracanthus (Bleeker, 1854) Borneo, Java, and Sumatra

B. macropterus (Bleeker, 1854) Borneo, and Sumatra

B. majusculus Ng, 2002 Mekong and Chao Phraya River drainages, Indochina

B. micranodus Roberts, 1989 Kapuas drainage, western Borneo

B. obscurus Ng, 1999 Mekong, Chao Phya, and Bang Pakong drainages, Indochina

B. vaillantii (Poey, 1906) Mahakam River drainage, eastern Borneo

Although commonly referred to as the lancers, only *B. hyselopterus*, *B. macracanthus*, *B. majusculus*, and *B. vaillantii* possess the elongated dorsal spine from which the genus gets its common name. Coloration amongst the members of the genus runs from tan to black, usually with some white or cream-colored markings. However, the exact coloration of any *Bagrichthys* can be difficult to describe because the overall color, and pattern of the lighter markings, can change in response to such factors as the substrate's color, daylight or darkness, and the fish's mood. All *Bagrichthys* species are sexually dimorphic with males possessing a genital papilla slightly fore of the anal fin. It has also been noted that the nasal barbels of male *B. majusculus*, *B. obscurus*, and *B. vaillantii* are twice as long as those of females. This observation may hold true for the entire genus.

Systematics

Bagrichthys is most closely related to *Bagroides* (the harlequin lancer), and these two genera in turn are most closely related to *Leiocassis* (refer to Mo, 1991). All three genera share characters unique to the Bagridae, including a very prominent bulbous snout, the lateral line pores produced into a long canal projecting above the body surface, and the presence of numerous hair-like projections on the skin. In fact, these three genera are so distinct that they have been placed within their own family (Bagriichthyidae) by de Pinna (1993). However, current evidence indicates that this placement may be unwarranted, as the lancers still show some osteological characters unique to the Bagridae.

Although no phylogenetic studies have been performed within the genus, a brief study of the morphology of *Bagrichthys* species suggests that *B. macracanthus*, *B. majusculus*, and *B. vaillantii* are most closely related to each other and that these three species are in turn most closely related to *B. hyselopterus*. *Bagrichthys macropterus*, *B. micranodus* and *B. obscurus* are most closely related to each other and they are considered to be the less derived members of the genus, meaning that they are possibly more closely related to *Bagroides*.

Diet

In nature, *Bagrichthys* are found in large muddy rivers. Roberts (1989) reported that gut content analysis conducted on five species revealed that the intestines normally held the detritus of higher plants, although one specimen had recently consumed a large winged insect. In contrast to Roberts' observations, Zakaria-Ismail noted that all of his specimens of *B. majusculus* (identified in his paper as

B. macracanthus) were caught on hook and line using earthworms for bait. Members of the genus have a small narrow mouth and moderately elongate convoluted intestines. This would suggest that these fish normally feed along the mud substrate consuming plant detritus and small benthic animals and could also explain why some members of the genus have greatly reduced oral dentition. Compared to other members of the genus, *B. hypselopterus*, *B. macracanthus*, *B. majusculus*, and *B. vaillantii* have a large and wide mouth opening with well-developed oral dentition which would suggest that these species consume larger animal prey than their congeners.

Gut content analysis of *B. hypselopterus* by the second author (Tan & Ng, 2000) in Sumatra found the guts distended with fine silt from the riverbed, although chironomid larvae and pupae were also found in small quantities. This finding seems to suggest that *B. hypselopterus* feeds by ingesting large amounts of silt from the riverbed while targeting aquatic arthropods. The same study found the guts *B. macropterus* to contain large numbers of freshwater gastropods of the genus *Rivomarginella*, indicating that this species may be molluscivorous.

Natural Habitat

Bagrichthys species are primarily inhabitants of large rivers, although juveniles may be found in smaller streams and flooded forests during the rainy season, where spawning presumably has taken place. Although a few specimens have been found in low pH (3-4) blackwater areas, the normal habitats of *Bagrichthys* species are large, slow-flowing rivers, generally of less acidity (pH 5-6) and with turbid water and a muddy substrate. In western Borneo, Roberts (1989) recorded *B. hypselopterus* from a collecting site near Danau Pengembung where the water was turbid (the color of coffee with milk) and had a slow current with a temperature of 26c and pH 6. Other fishes captured at the site included *Mystus micracanthus*, two *Kryptopterus* species, two *Ompok* species, two *Pseudeutropius* species, and *Trichogaster leerii*, the pearl gourami. The holotype location of *B. micranodus* was a forest stream 5-10 meters wide and 3-4 meters deep. The current was swift, colored clear and dark brown, with a pH of 6 and temperature of 30c.

Reproduction

Bagrichthys species spawn at the beginning of the rainy season in flooded riparian forests, with juveniles appearing in August (Rainbooth 1996). The beginning of the rainy season in the tropics initiates a number of radical environmental changes. Heavy rains typically cool the large rivers, the water becomes softer (having hardened after months of evaporation), and oxygen levels are greatly elevated both by the rain hitting the water's surface and the increased current as the new waters move towards the ocean. Additionally, the flooding of the surrounding forest opens up new territories and new food sources. Two secondary protein food sources during the rainy season are the huge numbers of insects swept into the water by the rains and the increased number of larvae as mosquitoes, and other insects with aquatic larvae, increase their reproductive tempos. Some, or all, of these factors may serve as spawning triggers to *Bagrichthys*. While no *Bagrichthys* species have been spawned in aquaria, other members of the Bagridae (most notably *Mystus*) have spawned following large volume water changes with cool fresh water.

Captive Husbandry

Of the seven species, only *Bagrichthys macracanthus* has been regularly exported for the aquarium trade, with most of the material coming from Sumatra (and a smaller number from Borneo), although *B. macropterus* and *B. obscurus* have occasionally shown up as contaminants. Newly imported lancers are usually in rough shape and require an extended quarantine in isolation. It has also been suggested (Finley, 1995) that higher temperatures, 85F or more, for a few days can help with the initial acclimation. During this acclimation process, stress should be kept to a minimum. To minimize stress, the fish should not be moved between tanks, water quality must be kept pristine, and foods high in protein should be fed regularly. Once beyond this initial break-in, lancers prove to be hardy aquarium residents.

A single lancer can make a fine addition to the community aquarium provided that it is not kept with particularly aggressive tankmates. *Bagrichthys* will fight with other species, especially for choice hiding spots, but their small mouths make them poor combatants and they usually end up on the losing end of a confrontation. Lancer's small mouths also make them ineffective predators, but they will still attempt to consume small fishes if given the opportunity. Once acclimated, water hardness and pH are

unimportant as long as extremes are avoided. Groups of the same species of *Bagrichthys* can be kept together provided that there is only one male per tank. Ideally, one male should be kept with three or four females so that the male's aggressiveness is spread out over his harem. Keeping two males together, even in a large tank, can be a recipe for disaster.

Their captive diet should reflect, as well as possible, their natural diet and consist of both animal and vegetable material. The black lancer, *Bagrichthys macracanthus*, shows a strong preference for meaty foods such as bloodworms, but algae-based foods should make up a significant portion of any lancer's diet. Black lancers will also consume fresh vegetables such as cucumber, so these should not be overlooked as an occasional food.

For the serious hobbyist that would like to maintain their *Bagrichthys* under ideal conditions, a Southeast Asian theme tank is recommended. When setting up the theme tank, lay down a substrate of about one inch of peat. This is then covered by about one and a half inches of fine sand. The peat provides a rich substrate for live plants while helping to keep the aquarium's water soft and acidic. Given their shy nature, lancers seem more at ease in a planted aquarium with numerous hiding places. Several pieces of driftwood can then be arranged so as to provide hiding spots and both Java moss and Java fern can be attached to the driftwood pieces for a more natural look. Once the driftwood is arranged, plant about two thirds of the aquarium with various species of *Cryptocoryne*. Last but not least, cover about one third of the aquarium's water surface with floating Indian fern (*Ceratophyllum submersum*). The Indian fern not only looks great with its long roots trailing in the water, but also adds a very interesting visual effect to the tank's lighting. As the plants change position with the current, different portions of the tank are exposed to light while others are left in the shadow. The theme tank's water should be soft and acidic with a golden brown coloration. *Bagrichthys* also seem to enjoy a fair amount of current and this is easily replicated with the addition of a submersed powerhead.

Identification

To help with the identification of the members of *Bagrichthys* a key to the genus is provided below. This key is based solely on external characteristics so that it may be useful to hobbyists. Lengths are taken from the largest fish of the species to have been collected and measured by scientists. All lengths are given in Standard Length (SL), a measurement from the tip of the snout to the caudal peduncle. The notation %SL means "as a percentage of standard length."

External Characteristics Key to *Bagrichthys*

1. All barbels straight2
 Inner and/or outer mental barbels crenulated.....4
 Dorsal profile gently sloping, dorsal spine longer (24.4–32.9 %SL)3
 Dorsal profile moderately steep, dorsal spine shorter (18.2–21.9 %SL), length to 7.5 inches *B. vaillantii*
2. Pectoral spine longer (15.8–20.7 %SL), adipose fin longer (38.8–45.8 %SL), and caudal peduncle deeper (5.6–7.0 %SL), length to 8 inches
 B. majusculus
3. Pectoral spine shorter (13.3–16.2 %SL), adipose fin shorter (46.0–58.0 %SL), and caudal peduncle more slender (7.1–7.5 %SL), length to 11.5 inches*B. macracanthus*
4. Caudal peduncle extremely elongate, dorsal-fin spine extending to or beyond base of caudal fin when depressed, nape and dorsal-fin base extremely elevated, giving a hump-backed appearance, oral dentition well-developed, length to just over 10 inches *B. hypselopterus*
5. Caudal peduncle not as elongate, dorsal-fin spine not reaching caudal peduncle when depressed, nape and dorsal-fin base not greatly elevated, oral dentition reduced.....5
 Body uniformly brown with no pale midlateral stripe or pale blotches, length to 10 inches *B. obscurus*
6. Body with pale midlateral stripe and pale blotches6
 Both inner and outer mental barbels crenulated, body pale brownish or tan with whitish to cream-coloured markings, length to 9.5 inches *B. macropterus*
7. Outer mental barbel simple but inner mental barbel crenulated, body dark brown to black with pale markings, length to 5 inches*B. micranodus*

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