

## Cichlids of the Americas - Wild Discus

### Information on the raising and breeding of wild discus.

By Wayne Leibel

The raising and breeding of discus — particularly the varieties developed for aesthetic purposes — has been covered many times and in many formats (eg., Wattley 1985, Schulze 1988, Degen 1990 — to mention just three). These aquarists are far more experienced than myself in this aspect of the hobby, and readers are directed there for more information about the commercial propagation of these fish. However, if you wish to learn about discus as true cichlids, this is the place to be.

#### How Many Discus?

This is a tricky question that has plagued scientists and aquarists alike. The simple answer is two: *Symphysodon aequifasciatus* and *Symphysodon discus*. The latter species, *S. discus*, was described by the German ichthyologist Heckel in 1840 and has therefore been saddled with the common name Heckel discus ever since. This is also the name under which it is sold in the hobby.

The specific name *discus* refers to its discoid shape, whereas the generic name *Symphysodon* has as its Greek roots, "odonto" = tooth and "symphyso" = growing together, referring to the jaws of the fish and the positioning of their teeth only on the symphysis (point of fusion) of the jaw (bones) resulting in reduced dentition relative to other cichlids (Borror 1971, Kullander 1986).

*Symphysodon discus* is found in the lower Negro, Trombetas and Abacaxis rivers of Brazil (Kullander 1986). The Heckel discus is immediately recognizable and distinguishable from the other species (*S. aequifasciatus*), which was first described by Pellegrin in 1904 as a subspecies (*S. discus* var. *aequifasciatus*), but was later elevated to full species status. *S. aequifasciatus* is found chiefly along the Brazilian Amazon, and west into Peru (Rios Solimoes and Putumayo), and east to Belem into the Rio Xingu system (Kullander 1986).

Both species are characterized by their discoid-shaped, strongly compressed bodies — the "dinner-plate" look being accentuated by the long and curving dorsal and anal fins. *Symphysodon aequifasciatus* has nine dark vertical bars of equal intensity — one on the head, one on the caudal fin base and seven equally spaced on the flanks (*aequifasciatus* means equal stripes). In *S. discus* only the head, caudal fin and middle flank bars are intense. This is apparently true of preserved *S. discus* as well (Kullander 1986), as noted below.

*S. discus* is also characterized by extensive iridescent vermiculations ("wormlike" lines and streaks) that extend horizontally from the head back to the tail and into the dorsal and caudal fins. As we will see below, certain populations of *S. sp. aff. aequifasciatus* have varying degrees of iridescent body vermiculation, and may even express only the three "Heckel" stripes. One discus expert, at least, Marc Weiss (Weiss 1995, Mazeroll and Weiss 1995), believes that we may be dealing with one species of *Symphysodon* after all!

Before we go there, however, let's examine the taxonomic splitting that has occurred to *S. aequifasciatus*. Schultz (1960) separated *S. aequifasciatus* into three subspecies by coloration and scale pattern.

*Symphysodon aequifasciatus aequifasciatus*, the green discus, notable for its solid-green body color, is distinguished by a patch of isolated scales that occurs just above and behind the eye. *Symphysodon aequifasciatus haraldi*, the blue discus, notable for the iridescent blue streaking (vermiculation) on its light-brown body, also sports the patch of eye scales. *Symphysodon aequifasciatus axelrodi*, the brown discus, which is particularly devoid of blue streaking (except as it occurs occasionally on the head and into the anal fin), lacks the suborbital scalation of the other two subspecies (Schultz 1960). Burgess (1981) offers the very color photos of the holotypes of these subspecies (the photos were sent to him by the photographer, Herbert R. Axelrod), which apparently were used by Schultz to describe his three subspecies. A holotype is the single specimen from which the description of a species is derived.

Interestingly, Kullander (1986), who examined the preserved type specimens (the fish in the photos were dumped into formalin after being photographed), did not find any significant colorational differences among them in preservative, nor did he find the scales around the eye noted by Schultz particularly useful. There seems to be some differences between young and adult specimens of each subspecies in this regard (Burgess 1991).

Furthermore, Kullander noted that the small scales in question are easily rubbed off when live specimens are handled (or netted!). Finally, he suggests that the fish in the Axelrod/Schultz photos were in various states of behavioral stress, which affected their coloration at the time of photography (see these actual photos in Burgess 1981).

In fairness, however, most discus fans, including myself, are impressed by the wide apparent geographic variation in discus coloration even as displayed by the limited sample of wild discus occasionally available in stores. Given the rather wide distribution of *S. aequifasciatus* along the Amazon from Peru east to its mouth near Belem in Brazil (and south into the Rios Tocantins and Xingu), this is not surprising.

Some effort has been expended in trying to photographically document all of the geographic "races" of wild discus. This has culminated in a recent looseleaf book by Heiko Bleher and Manfred Göbel (1992) entitled *Discus, Wild-Caught and Captive-Bred Forms* (Aquaprint Verlag, Germany — available from specialty aquatic book dealers and the American Cichlid Association for about \$50). It is the intent of the authors to update this compendium regularly, and, in fact, one supplement appeared in 1993.

Although I do not own this book I have browsed through a copy (see Finley's 1993 review). Bleher has recently published an article entitled "Rare Discus Discoveries" in the American Cichlid Association's *Buntbarsche Bulletin* (#172, February 1996) that captures the intent of this project.

For example, Bleher has documented 17 races of Heckel discus (*S. discus*) as of that writing, and even suggests that he has discovered a new (third) species of *Symphysodon* (his race #9) from the whitewaters of the Rio Branco. One of the races of *S. discus* was given subspecific status earlier by Burgess in 1981 (eg., *S. discus willschwartzii*), who further suggested (Burgess 1991) that this "intermediate form" might be a naturally occurring hybrid of *S. discus* and *S. aequifasciatus*. More on this intriguing possibility below.

One person who has seen tons of discus from many geographic locations, but who believes there is but a single species, is Marc Weiss, proprietor of World Wide Fish Farms in Florida, which specializes in both wild and cultivated discus. In his recent article (Weiss 1995) he suggests that wild discus not only exhibit dramatic populational variation, but additional variation of a different sort.

Discus live in family groups of about 400 individuals (Bleher 1995b) typically clustered around submerged wood, and are unlikely to cross open water. Thus, they have a rather disjointed, patchy distribution along the river. It is not surprising, therefore, that in the absence of much exchange of individuals among family groups — and the resulting lack of interbreeding — genetic drift and/or selection causes many of these sub-populations to diverge markedly from each other in coloration and other details. Moreover, each sub-population demonstrates its own range of colorational variation amongst its individuals, which may be considerable (Weiss 1995).

Weiss suggests that commercial collectors in the past have artificially categorized and sorted the various color "morphs," often in an attempt to protect the identities of prime collecting spots. In particular, he (Weiss 1995, Mazeroll and Weiss 1995) asserts that the very fish Schultz (1960) based his description of the subspecies *S. aequifasciatus haraldi* (blue discus) on is not typical of the fish usually collected from that site provided in the description as the type-locality.

Even *S. discus*, the Heckel discus (as defined above), is highly variable according to Weiss. Some lack the central vertical stripe. Moreover, *S. aequifasciatus* with prominent Heckel-like central stripes (and with very faded bars — two through four and six through eight) are not uncommon. Check out the color photos that accompany his articles (Weiss 1995; Mazeroll and Weiss 1995).

I've seen a videotape of some of these fish (courtesy of Weiss) and, yes, they look like "browns" or "blues" with Heckel bars. Are these hybrids? Perhaps. Interbreedings between Heckels and blues have been reported in the literature (Silva and Kotlar 1980, Burgess 1991, Mazeroll and Weiss 1995) and occasionally advertised for sale by commercial breeders.

Or perhaps there is but a single species: *S. discus*. Weiss (Mazeroll and Weiss 1995) notes that only one specimen of *S. discus* was examined by Schultz (1960), whereas more than 50 specimens of *S. aequifasciatus* were examined when Schultz (1960) reevaluated the genus. While Schultz (according to Weiss) examined 10 physical characters (diagnostic numbers of scales and fin rays), only one of these — the number of scale rows from the operculum to the base of the caudal fin — clearly distinguished the two species. Perhaps, as Weiss suggests, if more specimens of *S. discus* had been examined by Schultz, the two "species" might have shown overlap in this characteristic as well. Clearly more work is needed, some of which has been suggested by Mazeroll and Weiss 1995 (e.g., DNA sequencing and chromosomal typing) and is currently underway. Scientists and hobbyists who care to resolve this taxonomic question eagerly await the results, as do I.

#### Wild Discus at Home (Native Habitat)

As is true for other aquarium fish, knowledge of where and how discus live in the wild is the key to their successful maintenance and spawning in captivity. I have not yet had the opportunity to collect discus, so the following information is secondhand and is taken primarily from Keller (1976) based on observations by Dr. Rolf Geisler. Another good and recent source is Mayland (199X), but I have not yet had the pleasure of reading his apparently excellent travelogue-style account.

According to Keller, discus are not found in the main river but in smaller tributaries, backwaters and lakes. These biotopes are all characterized by a relatively slow current, low water depth (but at least 3 feet deep) and relatively steep banks with overhanging and partially submersed branches and roots.

Bleher (1995b) reports that discus hide during the daytime in deeper waters, about 10 to 15 feet below the surface, along a vertical underwater slope. The fish are oriented, as a group, toward the open water in order to see incoming predators. There is usually a dominant "group leader" — a larger, more brightly colored fish that remains in the open water ahead of the group (and is often sold as "royal" discus; Bleher 1995b).

Discus, as noted before, have a close association to submersed wood, and when disturbed the whole group takes shelter among the branches and roots. As you might guess, this makes catching them quite difficult.

One laborious and often low-yield method is to completely surround the submersed wood with a seine net and then remove the wood (which often necessitates cutting it and removing it in pieces). The fish that remain in the net are then brought to shore. However, the fish are often injured either by dashing about or by other predator fishes trapped with them in the net corral.

Another method is one that is used for angelfish — night lighting. Like angels, discus hang just under the surface near logs or driftwood and can be seen and blinded with the light from a strong flashlight. Bleher (1995b) suggests that the discus come up at night because the temperature in the deeper water drops, but remains warmer near the surface.

Discus are found in all three types of Amazonian water: clear, white and blackwater. And while the pH may vary drastically from 4 to 7.4, waters harboring discus have one thing in common — they are very soft (less than 1 dKH).

With respect to water temperature, Keller suggests that temperatures of about 86 degrees Fahrenheit are frequently encountered in discus habitats, with very little day-night fluctuation (about 2 degrees Fahrenheit). However, Bleher (1996a), in contrast, writes that no discus are found in waters with temperatures above about 83 degrees Fahrenheit, and more like 77 to 81 degrees Fahrenheit. Nevertheless, this is warmer than most hobbyists who don't specialize in discus keep their tanks.

Gut analyses suggest that discus feed primarily on ephemeropterid insect larvae (*Campsurus* sp.) and freshwater shrimp (*Macrobrachium* sp.) that they find in the leaf litter. These prey items are located when a discus creates a jet of water, spat out with considerable pressure, that dislodges or uncovers the critters (Keller 1976). This behavior can be seen in the aquarium as well, even with frozen or prepared foods. It's quite entertaining to watch the discus pick food off a sandy bottom.

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