

**Spawning and Production of the
Serpae Tetra, *Hyphessobrycon serpae***

**Brian Cole and Michael Haring
Sea Grant Extension Service
School of Ocean and Earth Science and Technology**

April 1999

Center for Tropical and Subtropical Aquaculture Publication Number 138

Acknowledgments

The authors wish to extend a sincere thank you to all who contributed to the completion of this manual. The production of this fact sheet is the combined effort of three institutions:

1. The United States Department of Agriculture Center for Tropical and Subtropical Aquaculture (CTSA) through a grant from the U.S. Department of Agriculture Cooperative State Research, Education and Extension Service (USDA grants # 96-38500-2743 and #97-38500-4042).
2. The University of Hawaii Sea Grant Extension Service (SGES) through the National Oceanic and Atmospheric Administration (NOAA), project # A/AS-1. Which is sponsored by the University of Hawaii Sea Grant College Program, School of Ocean Earth Science and Technology (SOEST), under Institutional Grant No.NA86RG0041 from NOAA Office of Sea Grant, Department of Commerce, UNIH-SEAGRANT- TR-99-01.
3. The Aquaculture Development Program, Department of Agriculture State of Hawaii, as part of the Aquaculture Extension Project with the University of Hawaii Sea Grant Extension Contract # 44576 .

The views expressed herein are those of the authors and do not necessarily reflect the views of the funding agencies or their sub-agencies.



Introduction

The Tetras are one of the more popular groups of fishes that are kept in modern aquaria. They are generally colorful and small and most only grow to an inch or two and can be kept in small tanks more suitable for the beginning hobbyist. Many of them are schooling fish that do better in groups of five or more individuals. When small schools are kept in a larger tank they add an eye catching splash of movement and color to any type of aquaria.

All varieties of tetra are highly marketable and constantly in demand. The Neon Tetra, *Paracheirodon innesi*, is the second highest fish imported into the U.S in both numbers of individuals and total value, second only to the Guppy, *Poecillia reticulata*. The Serpae Tetra is imported in volumes in excess of 60,000 pieces per month even though it is widely bred in the United States (Chapman, 1995).

The historical estimated farm gate prices producers could expect for a group of various one inch *Hyphessobrycon sp.* is summarized in Figure 1.

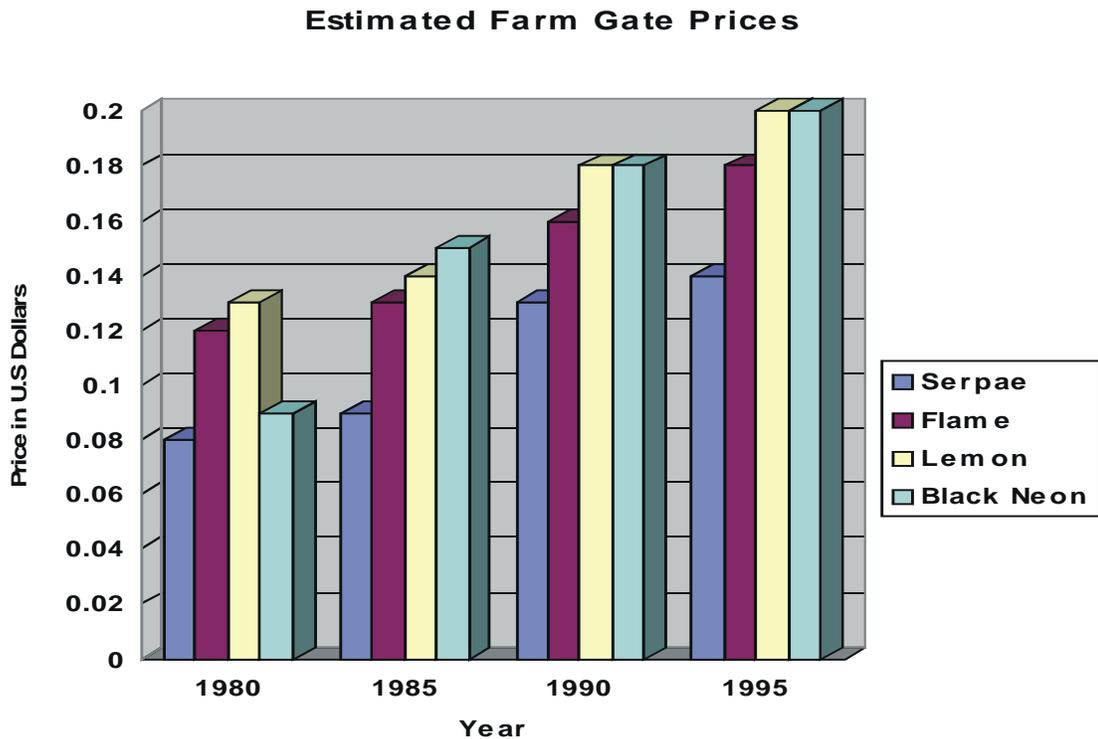


Figure 1. Estimated average farm gate prices for selected one inch *Hyphessobrycon sp.*

Taxonomy

Like many of the fish in the aquarium industry the Serpae Tetra has gone through several taxonomic revisions over the years. Much of the general literature reflects this confusion and many authors view this fish as one of many subspecies grouped under the genus and species name of *Hyphessobrycon callistus*. In the past it has been referred to as *Hyphessobrycon callistus serpae*, *H. callistus minor*, *H. callistus serpae* and in some cases *H. callistus rosaceus* (Axelrod et.al.1977). As late as 1995 it has been suggested that each is a species in the Genus *Hyphessobrycon*. Many of the above species names are systematically assigned to fish that are considered distinct subspecies at this point in time. In reality however, it can be very difficult to distinguish between these different species just by looking at the fish and would require examination by an expert (Tavares 1977). The subtle distinctions in markings and shape that the closely related species exhibit are presented in Figure 2. In addition, most of the fish available on the market at the wholesale-retail level are certainly hybrids with pure wild strains being very rare.

The current taxonomic classification is; Family: *Characidae*, Subfamily: *Tetragonopterinae*, Genus: *Hyphessobrycon*, Species: *serpae*.

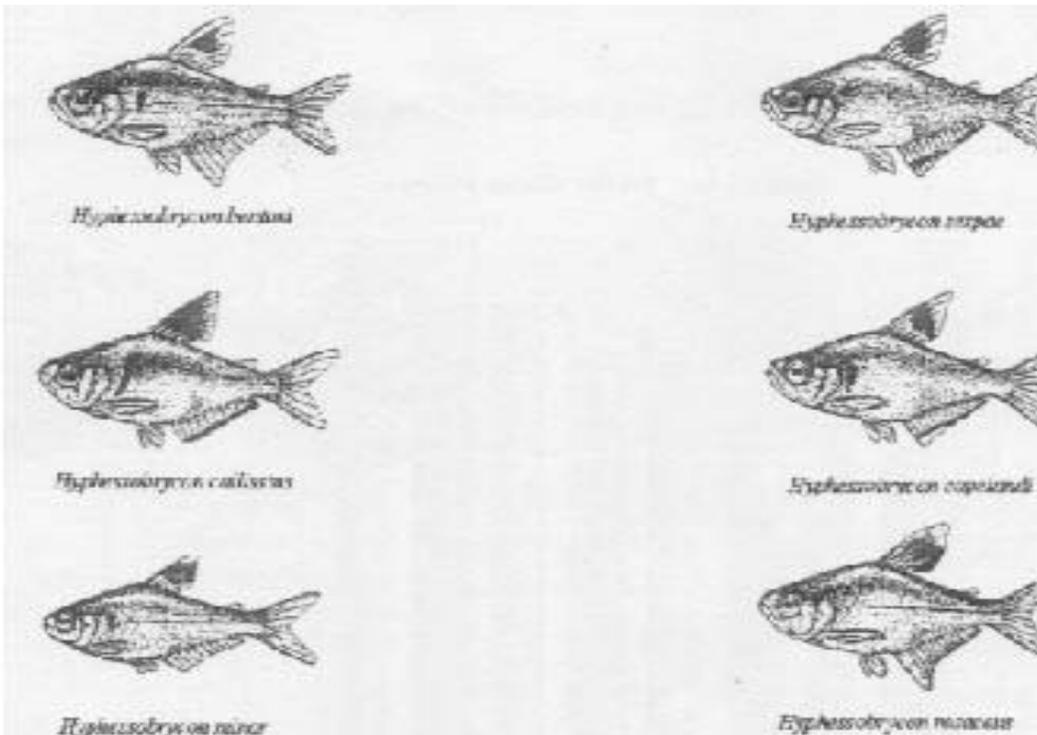


Figure 2. Various *Hyphessobrycon* species similar to *Hyphessobrycon serpae*.
(Modified from W. Van der Jeught and D. Rupel-Vaartland, 1995)

Distribution

The Serpae Tetra is indigenous to the southern Amazon basin and the Paraguay basin (Baensch 1991). It is bred widely in Europe, Asia and North America and may have established wild populations in areas with suitable environments.

Morphology

Hyphessobrycon serpae usually grow to between 4 - 6 centimeters in total length. The body color, as shown in Figure 3., can be anything from a light reddish brown to a dark red depending on the condition of the fish, and may reflect some of the hybridization and genetic background of the fish. The body is deep and compressed, juvenile specimens have no distinguishing sexual characteristics but mature females are broader and plumper in the pelvic region. The pelvic and anal fins are dark red with white on the outermost edge while the caudal fin is solid red. The dorsal fin is red and black and may have some white on the outer edge. Classically there is a black bar behind the gill covers but this may not be present in many specimens available to the hobbyist.

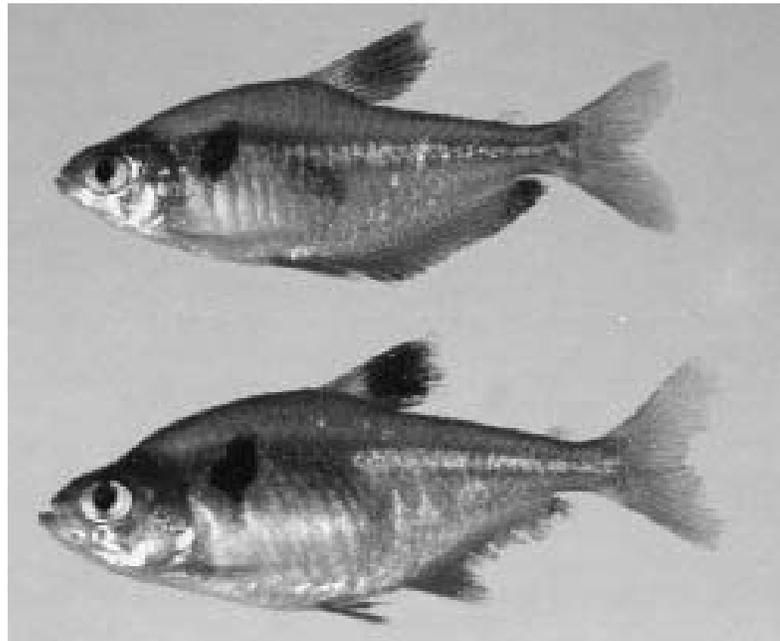


Figure 3. Photograph of *Hyphessobrycon serpae* male (top) and female (bottom).

Reproduction

Generally Tetras prefer soft, slightly acid water . Serpae Tetras prefer water temperatures between 23 - 26 C with total hardness of 40 mg/l CaCo₃, a pH between 5.8 - to 7.6 with the ideal being about pH 6.8 (Baensch 1991, Axelrod and Schultz 1983). Spawning at the Windward Community College site took place in late October under the following water conditions, Temperature 24- 27 C, Total hardness of 35 mg/L CaCo₃ and a pH of 8.0. The sex of the juveniles is difficult to distinguish so they should be raised together until you can sex the females by the plumpness in the abdomen. Prior to spawning the fish should be segregated according to sex for a period of one to four weeks and fed three times a day with a wide variety of foods including frozen or live brine shrimp, tubifex or blood worms, beef heart and a good quality commercial diet. This will insure the females come into reproductive condition in as short of time as possible.

Pairs are placed into the tank late in the afternoon, although some of the literature suggests that up to six pairs can be placed into a 10 gallon tank. Tanks as small as three gallons can be used and certainly tanks no larger than ten gallons are needed. Spawning will begin the next day around dawn and last from one to four hours (Baensch 1991). The pairs should be removed immediately after spawning is completed. Two to three hundred eggs can be produced from a single female (Scheurman 1989), and spawns at Windward Community College have produced clutches of fry in excess of three hundred.

If possible a tight fitting screen should be placed an inch or two off the bottom of the tank with a spawning substrate such as java moss, nylon knitting yarn or a spawning brush placed on top of the screen. Several types of suitable spawning substrate are shown in Figure 4. If a screen can't be fitted to the bottom of the tank, a stiff spawning brush will prevent some cannibalism as shown in Figure 5. This type of set up will help insure that the adults will not eat spawned eggs, otherwise remove the adults immediately after spawning to prevent egg cannibalism. Serpae Tetra eggs can be classified as slightly adhesive and sinking.

Once spawning has been completed the eggs hatch in about 24 hours and look like slivers of glass clinging to the spawning substrate. In about five days the fry will have absorbed the yolk sack and are ready to feed. Although they will look very small, the fry will be able to take newly hatched brine shrimp. Caution should be taken during this time so that the tank is not over fed. The fry are very delicate and cannot be moved without high mortality for the next seven to ten days. After this period they can be siphoned out and consolidated for grow out. Once they are placed in the grow out container you can wean them from the brine shrimp and onto a powdered commercial diet. In the next four to five weeks growth will be steady and they begin to look like the adults in shape and color.

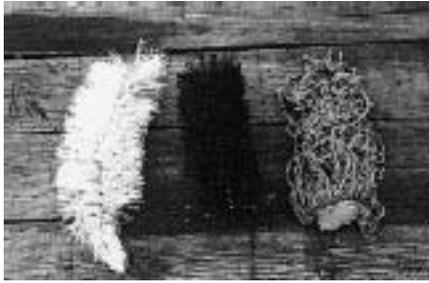


Figure 4. Several types of spawning substrate suitable for *Hyphessobrycon sp.*

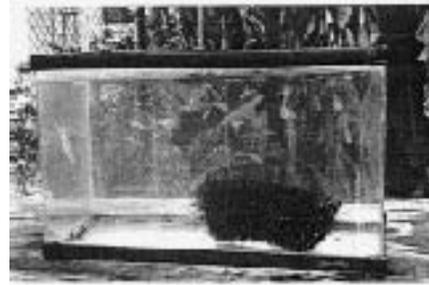


Figure 5. Tank set up for spawning *Hyphessobrycon sp.*

Growth

Serpae Tetras were stocked into above ground tanks, twelve feet in diameter tanks at a density of six per gallon (1.6/ liter). Fish were weaned for the first two weeks using a combination of live brine shrimp and a fine powdered commercial trout swim up diet containing fifty five percent crude protein, sixteen percent crude fat, three percent crude fiber, twelve percent ash and one percent phosphorus. After the initial two week weaning period the fish were fed strictly on the commercial diet. During the trial grow out period, mid November through February, the water temperatures were less than optimum and ranged between 20 and 24 degrees centigrade as shown in Figure 6.

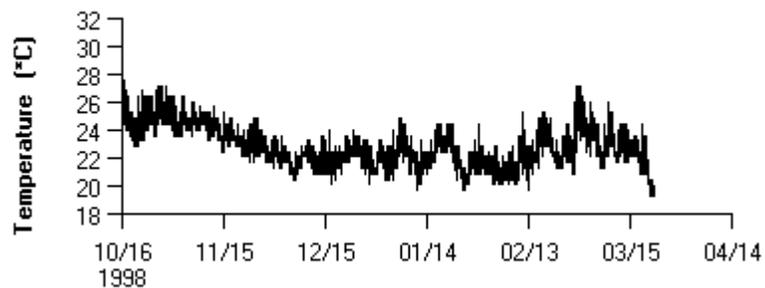


Figure 6. Temperature range at Windward Community College during the spawning and growout period for *Hyphessobrycon serpae*.

Figure 7 represents the growth of *Hyphessobrycon serpae* cultured over a 118 day period during the winter months in Hawaii. Serpae Tetras are sold at a variety of sizes through Far East markets starting as small as 1/2 inch (12.5 mm) and ranging up to 1.25 inches (31.25 mm). Domestic price lists from Florida rarely list sizes available and usually ship Serpae in the 3/4 to one inch size. In this grow out trial, 1/2 inch fish (12.5 mm) were obtained in less than 40 days, 3/4 inch (18.75 mm) in about 62 days and one inch fish (25 mm) in 100 days. The regression formula in Figure 7 applies to growth at 15 days and beyond at the temperature regime given previously in Figure 6. Although the total growth of Serpae over the 118 day period seems slight to many growers, Serpae are sold at relatively small sizes, and marketable fish can be grown in under twelve weeks.

Growth of *Hyphessobrycon serpae*

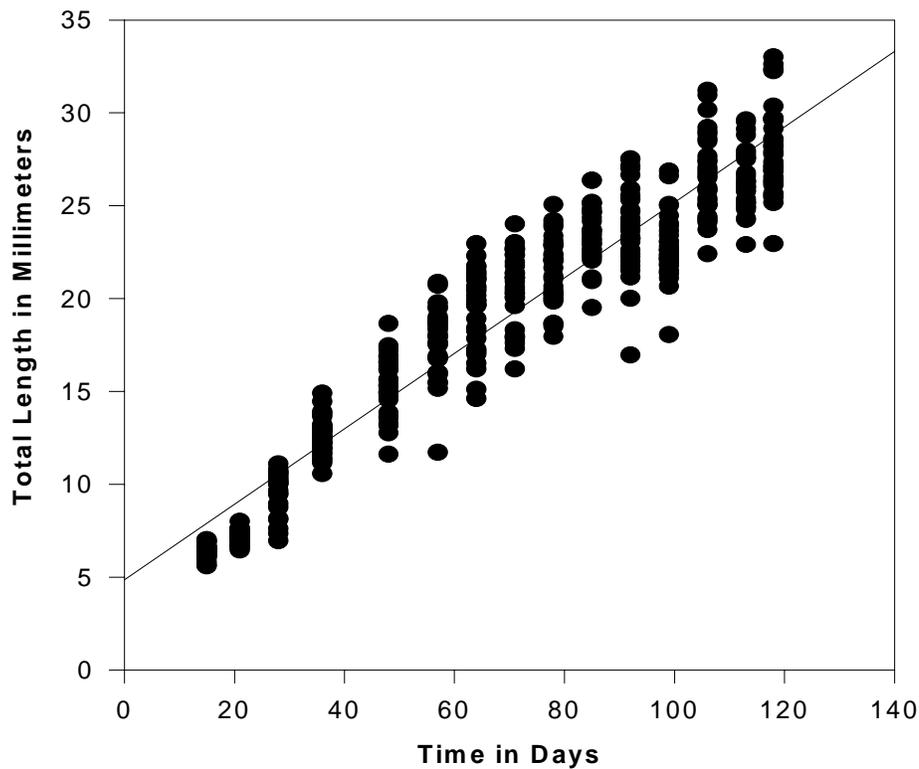


Figure 7. Growth of *Hyphessobrycon serpae* cultured in tanks. Total length in millimeters = 4.85 + (0.203 x time in days). $R^2 = 0.90$, $p < 0.05$, $n = 432$.

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