THE "CHROME MINNOW" OF NORTH AMERICA

KEEPING AND SPAWNING THE RAINBOW SHINER (*NOTROPIS CHROSOMUS*)

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In the aquarium trade when one conjures up the name "rainbow" one is generally referring to the rainbow fishes (Melanotaeniidae) that call Australia and Papua-New Guinea home. In truth, there are a fair number of fishes that are referred to as rainbows and some of these hail from North America. Most notable and commonly heard within native fish circles is the Rainbow Darter (*Etheostoma caeruleum*), and among fishermen, now known as fishers (I thought these were weasel-like mammals from the far north), who seek out the sporting qualities of the Rainbow Trout (*Oncorhynchus mykiss*). A small, rather enigmatic minnow (Family Cyprinidae) that ranges in the Southeastern United States also is referred to as a rainbow, the Rainbow Shiner (*Notropis chrosomus*); the chrome scientific name is in reference to the fantastic shades of powder blue and magenta pink. [*Editor's Note: chrosomus* actually translates to colored-body] I've often suggested that these colorful shiners are the "Neon Tetras" of North America and, in truth, the analogy fits for this exuberant shiner that many aquarists should consider keeping at some point in their lives. This rainbow should not be confused with other minnow species often marketed as "rainbow shiners," minnows which could be Red Shiners (*Cyprinella lutrensis*) or Redbelly Dace (*Chrosomus* spp.), or possibly other species I've seen marketed as such.

While writing this article I found very few good pictures of the Rainbow Shiner. Most images were typically black-and-white illustrations, which revealed little or no color of this magnificent species. It was only recently that I had the opportunity to keep and culture this species and was totally enthralled by the beauty and splendor this species exhibits. In the last decade, publications of art and photos are coming to grips in portraying this "neon" of North America but

Rainbow Shiners: male (top) and female. (Photos by Stephan M. Tanner, Swiss Tropicals)

Modified from the article originally published in the June 2002 issue of *Freshwater and Marine Aquarium*.

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as many aquarists are aware, photographs of their favorite fish, and certainly the case here, never will truly emulate the magnificent colors of their favorite species.

The Rainbow Shiner is a bit of an enigma. It is placed in the genus *Notropis* which, in recent years, is sort of a dumping ground for scientists to place minnow species of North America for which no true or questionable category exists. No one has taken the time to differentiate them enough to be placed within their own genus. To avoid confusion I should state that *Notropis* used to contain nearly all the smaller cyprinids (minnows) of North America but Mayden (1989) revised much of the minnow clan, elevating many of the recognized genera, formerly considered subgenera, to better categorize the groups with shared characteristics to generic status. The Rainbow Shiner at that time was thought to be in the subgenus *Hydrophlox* which also included the Rough Shiner (*N. baileyi*), the Tennessee Shiner (*N. leuciodus*), and the Ozark Minnow (*N. nubilus*) (Swift 1970; Mayden 1989). However Mayden et al. (2006) merged all of the *Hydrophlox* with 11 other species into the genus *Alburnops*. These changes have not been widely accepted and Cashner et al. (2011), using both nuclear and mitochondrial DNA sequences, determined that *Hydrophlox* is restricted to five species: Saffron Shiner (*N. rubricroceus*), Redlip Shiner (*N. chiliticus*), Yellowfin Shiner (*N. lutipinnis*), Greenhead Shiner (*N. chlorocephalus*), and the Rainbow Shiner. The other three species listed earlier are more closely related to other species groups.

The Rainbow Shiner ranges from extreme southeastern Tennessee in the Conasauga River system southward to the Coosa, Black Warrior, and Cahaba River systems in Tennessee, Georgia, and Alabama (Figure 1). The streams they are found in are extremely small, often spring-fed streams but sometimes range into small rivers (Page and Burr 2011). While most of my specimens were sent from northern Alabama, I did venture to Tennessee and collected my own Rainbows on one occasion. It took a while for my host, the amiable Casper Cox, and me to catch specimens. Though Casper had previously caught several at our location, it took quite a while for the stream to yield fish.

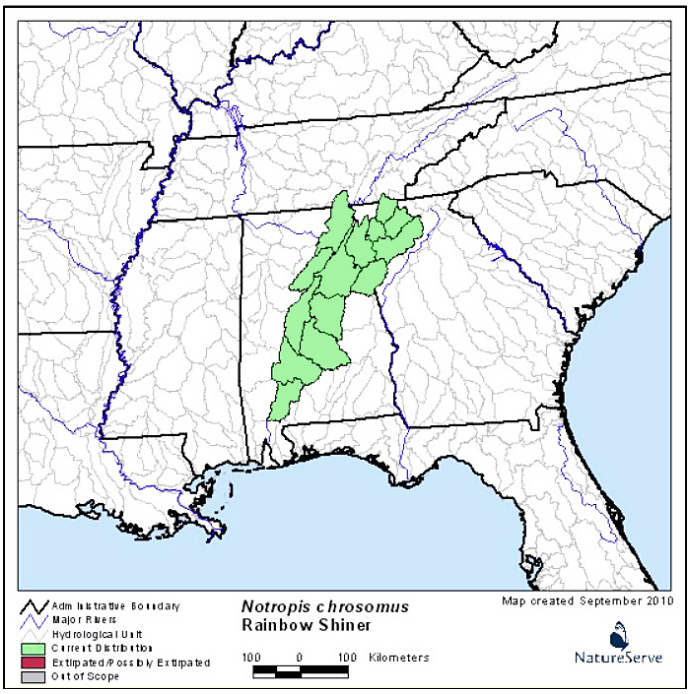

Figure 1. Watersheds where Rainbow Shiner is found (does not imply the species occurs throughout highlighted area).

According to Boschung and Mayden (2004) they like small clear streams with either sand or gravel substrates. They did have a propensity to hang out in pools but were tenacious in seeking out protective cover, such as undercut banks at our first appearance. It took a little while to solve the problem but finally we improvised a method to flush them out of cover and chased them down with our seine nets. Their blue coloration flickered in sunlight and was easy to spot before they pulled their vanishing act. Very small fry preferred to occupy dense moss vegetation and were very delicate in handling. The other factor in catching and keeping this species is that these fish seem to have a built-in light switch. You observe them within their wild environment displaying as colorful as can be, but once you net them, their color vanishes. This is also true within aquaria, albeit they do have to be disturbed drastically (e.g., taken out of the water, etc.).

These Rainbows are pretty much opportunistic feeders and if it fits their mouth, it seems to be considered food. As with any cyprinids I do preach that some vegetable matter should be included in their diet on a regular basis. Many minnows in the wild are known to graze on algae, vegetable matter, and even seeds. Some current seems preferable in the Rainbow Shiner aquarium and temperatures into the upper 70s F are tolerated well, but they reach their peak colors in the lower 70s and upper 60s. Harder water is preferable over soft water.

Typical coloration for this species is blue and silver, with pink or red highlights. Females can possess a good deal of coloration which is unusual for the often sexually dimorphic Cyprinidae family of North America. At about eight months of age they start to assume the colors of adults, initially starting with iridescent blue in the head region. Gradually, bright blue iridescent sparkling occurs around the anterior dorsal portions of the fry, and in adults, more so. In the males this sparkling extends somewhat to the posterior portions of the fish. The dorsal, anal, and pelvic fins typically have a faint mid-lateral red blotch on them. In some cases, this pertains to both sexes, they not only contain the mid-red blotch within those fins along with the pectorals, and there can also be a powder blue coloration within the fins which is just mesmerizing. In some exceptional specimens this powder blue

continues into the caudal fin. There is some variation among specimens atypical of most fishes. Below the blue speckled dorsal area is a thick horizontal stripe which is typically red in females but bright pink, purple, or magenta in males; below this stripe is another mid-lateral stripe that generally is a dull silver with bright blue specks. Below this is the belly region which is highly variable: it can be slightly red blue, bright pink, or just a cream color. Typically the females have the reddish or cream-colored belly, and males have the bright blue, with spawning males displaying the bright pink, almost magenta-like coloration. Some specimens, pertinent to both sexes, will be an orange-red coloration which I call the red-phase version. This is only apparent at spawning time whereas in a normal mode they display coloration typical for the species. In typical specimens the head is a solid powdered blue with the iris of the eyes being a subtle pink. Both sexes also display red lips as if lipstick had been applied to them.

My most recent experiences in culturing Rainbows were in the spring of 2000. I placed four males with eight females into a 29-gallon aquarium. Current was merely supplied via air stones. A pebbled mound was formed to simulate a *Nocomis* chub nest; these mounds are commonly utilized by numerous other minnow species as an egg deposition site. Several patches of spawning grass were also laid out just in case this species might prefer such a site to deposit their eggs or possibly in serving as a catchment for any free-floating eggs that were not placed in the nest properly. Most minnows, including Rainbow Shiners, will consume their own eggs if given a chance. Several rock caves were formed just in case these Rainbows might spawn on a cave ceiling, similar to the common Fathead Minnow (*Pimephales promelas*). Rumors had surfaced that the Rainbow Shiner might be a crevice spawner and that they spawn in driftwood, similar to several other minnow species like the Spotfin Shiner (*Cyprinella spiloptera*) and related species. During this episode I had not provided driftwood; however, in previous years I provided driftwood but did not locate any eggs deposited in them. Up until recently the spawning of Rainbow Shiners has only been described in passing, and few details exist. Descriptions here are taken from viewing video tape I recorded of their spawning sequences.

On April 25, 2000 the first Rainbow Shiner eggs were found in the pebbled mound. Subsequently a camera was set up to record any future spawning events that might take place. Once the temperature reached the lower 60s, it appeared spawning would be imminent. The adults were fed live glassworms and conditioning flake food as well as my homemade formula fish food. Several weeks later the Rainbows were spawning again. Males would take up residence, swimming around the top of the mound of pebbles; the females would primarily swim around the forefront of the mound. Males would attempt to initiate spawning by nudging the females and actively swimming with them side to side. Most of the time the pair would be by themselves, but occasionally other males would join in. The females seemed to prefer to spawn near the forefront of the mound; they seemed to direct and pick the actual egg deposition area. After some pursuit and swimming alongside each other, the pair would swim near the edge of the mound and face down at a 45° angle. They would then vibrate and release the milt and eggs. Other males might join in and any free-floating eggs were quickly consumed by any nearby fish or the breeders themselves. The spawning would either continue or more commonly they would swim off into the mid-water, either to join their own sexes again or sometimes take a quick respite before returning to the mound for more spawning. Stephan Tanner of Swiss Tropicals, who provided the excellent images for this article, also noted he had observed a breeder's operation in Germany. Approximately 500 gravid Rainbow Shiners were put into a roughly square meter pool over a "little box" filled with gravel and with a powerhead that simulated a flowing stream. The shiners exhibited frantic spawning frenzy; very few eggs were eaten before safely settling into the crevices in the gravel.

It was very difficult to determine how many eggs were actually laid per spawning act. When it came time for egg removal it was impossible to determine actual egg counts per female, but overall, egg numbers did not seem extraordinarily high. The eggs did not appear to be adhesive. They hatched in five to seven days. The fry were too small to take freshly hatched *Artemia* and were fed fine-powdered fry food and frozen zooplankton. After about a week of free-swimming they would then take freshly hatched brine shrimp. They grew slowly and, after raising them for several years, it was clear they never matured until after their first year of growth, but females appeared to be depositing eggs late in their second year of life (about one-and-a-half years old). Adults would often spawn in late fall; latest date I have documented so far is November 3, 2000. It is not uncommon for southern spring-inhabiting fishes of North America to spawn year round and such might be the case with the Rainbow Shiner. First prominent colors start to appear after six months of age but become most prominent after two years of age. Their maximum size is just over three inches. In nature, Rainbows are known to hybridize with the Rough Shiner. (Swift 1970).

The Rainbow Shiner is a truly elegant jewel of North America. Overall they hold up and display magnificent colors that any hobbyist would love to possess. They are

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(**Rainbow Shiner,** continued from page 25)

peaceful, very undemanding in terms of care, and should be a presence in the hobby for a long time to come.

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Editor's Note: Just before this issue went to the printer, Evan Poellinger (La Crescent, MN) found a mail order source for the species and locked them in at half price while making a large order with several NANFA members: Imperial Tropicals, http://www.imperialtropicals.com/MiscFish.html