SOME OBSERVATIONS ON ORINOCO BASIN ANNUAL KILLIFISH

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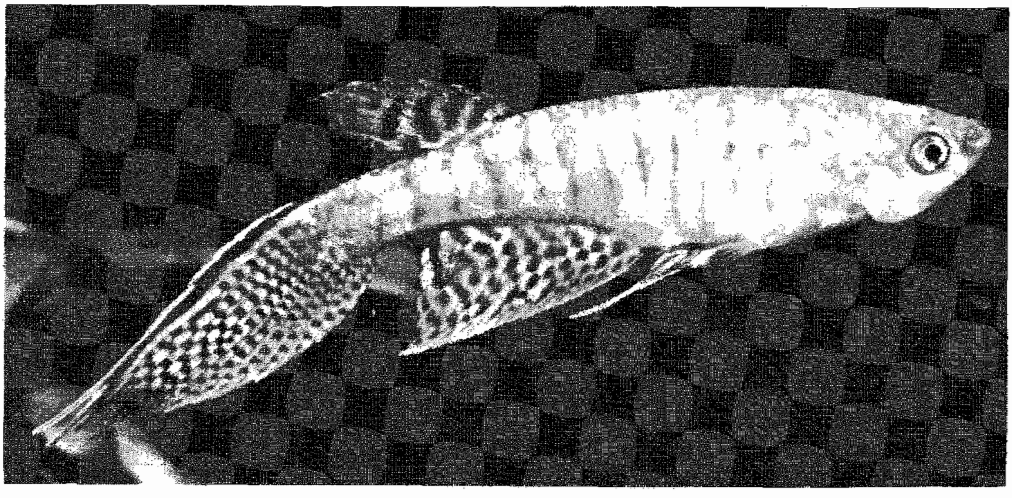

Pterolebias zonatus Photo: A. Terceira

In June 1986, Jim Thomerson made a short trip to Guanare, in the state of Portuguesa, Venezuela, to visit Don Taphorn, Director of the Museum of Zoology at the University of the Llanos (UNELLEZ), and plan future work on Venezuelan fishes. We were able to spend June 17 in the field looking at killifish pools along the Guanare - Guanarito road, a distance of some 76 kilometers. Both towns are on the Guanare River; Guanare in the foothills of the range of the Andes that separates the Orinoco basin from the northern coastal drainages of Venezuela, and Guanarito out in the High Llanos (plains). The area was largely forested before it was cleared for cattle, sugarcane, rice, and the like. Remnants of forest still remain, particularly near Guanarito.

The six known Orinoco Llanos annual killifish: **Pterolebias hoignei, P. zonatus, Rachovia maculipinnis, Austrofundulus transilis, Rivulus stellifer,** and **Terranatos dolichopterus*** all

* *Weitzman and Wourms (1967) described Austrofundulus dolichopterus. Given the state of taxonomy at the time, this was undoubtedly the thing to do with the species. Taphorn and*

have been collected along this road. During this daylong trip we found all but **T. dolichopterus**.

The roadside pools were considerably different from each other as to species of fish present, age of fish, and numbers of fish. The first pool, home to a small caiman as well as the killies, was near the km 28 marker post. It was about knee-deep and extended past the roadside fence out into the adjacent pasture. There was little vegetation except for grass around the pool margins. We caught a few adult **P. zonatus**, **R. maculipinnis**, and **A. transillis**. The **A. transilis** males were actually quite attractive, with a general wine-red cast and green iridescent areas on the flanks. Some had a green iridescent spot taking up most of the dorsal fin.

At km 30 the pool was waist-deep, with flooded thick grass around the margin. There was a stand of **Thalia** that gets up to twelve feet high, out in the pool, with open water underneath. Just sexable **R. maculipinnis** were abundant in the dense grass. They were all caught in the upper foot or so of water. Around the margins of the grass, where it met the open water, there were almost mature **A. transilis** mixed in with the **R. maculipinnis**. We didn't catch any fish out in the open water, nor in the deeper part of the grass. **P. zonatus** had been taken here previously, but we did not catch any. Some students who were with us caught many **R. maculipinnis** and a few **P. hoignei** in a pool across the road. Again, these were fish just sexing out.

On the road toward Guanarito, we checked a number of wet spots along the way and found young **R. maculipinnis** everywhere

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Thomerson (1978) created a new genus, Terranatos, for the species. They recognized it as having a unique combination of characteristics and were unsure which species or group is its closest relative. Parenti (1981) argued that the species shared unique advanced characteristics with species placed in Cynolebias and therefore probably shared a unique common ancestry with them. According to the cladistic philosophy of classification, all species with a unique common ancestry should be classified together at some level, in this case, the genus Cynolebias. Thus, to use Terranatos dolichopterus is to call special attention to its unique combination of characteristics. To use Cynolebias dolichopterus is to state an opinion about its relationship.

and **P. zonatus** most places. We made the next collection from a large, knee-deep pool near km 60. This pool was mostly open water with some patches of coarse grass growing on the surface, and part of the pool ran back into a forest remnant. Here we caught large adult **P. hoignei**, and **R. stellifer**, and somewhat smaller **R. maculipinnis.** Most of the fish were caught in open water out in the deep part of the pool. We were quite surprised to catch **R. stellifer** in deep, open water. Usually, they are found in very shallow, marginal pools in forested areas. There was some of this kind of habitat present but we did not find **R. stellifer** there.

At km 72 we stopped near a creek to look at some pools in the forest where **T. dolichopterus** had been found in the past. The pools had little water and no fish. The creek itself had been channeled to carry off floodwaters, and this may have changed the local pools. We did find a dozen or so young adult **P. hoignei** in a shallow area of the creek under the bridge. A seine haul in the deeper part of the creek brought up a variety of characoids (including piranhas), catfish, and knifefishes. The creek goes completely dry during the dry season, and it will be interesting to see if the **P. hoignei** population can maintain itself in the future.

At km 74, in a borrow pit by the side of the road, we made the most interesting discovery of the day. It was mostly open water and extended out into the adjacent pasture, with a strip of the emergent plant Thalia growing along the fence. In the open water alongside the road we caught good numbers of large juvenile **R. maculipinnis. A. transilis,** and **P. zonatus.** The real excitement came later, as we examined the fish in an aquarium on Don's back porch and discovered that many of the little **P. zonatus** were, in fact, **P. hoignei.** So far as we are aware, this is the first time these two similar species have been taken together in the same pool. The two species appear to be similar in their basic ecological requirements, but observations by Leo Hoigne, and our own observations, have pointed to utilization of somewhat different habitats. Experience with these fishes has led us to think of **T. dolichopterus, R. stellifer,** and **P. hoignei** as occurring most commonly in forested areas, **P. zonatus** and **A. transilis** as occurring most commonly in open savanna pools, and **R. maculipinnis** in a wide range of habitats.

As we said above, the area along the road was once predominately forest, now largely cleared. The pools, ditches, and

borrow pits along the road are also largely man-made. The annual fish fauna is responding to these changes and only time will tell how it all will come out.

The last place we stopped was a damp, shady depression in the forest at km 75 that with a little more rain would become a full-fledged killifish pool. There was, however, only a little shallow water standing in someone's footprints. In this very shallow, muddy water there were some newly hatched fry. We caught a few, which grew up to be **R. maculipinnis.**

A week or so later, as the rains continued, many of the pools were joined and the fishes were more dispersed so that Don and some friends were not able to get large numbers of annual killifish at any of the sites where we found them abundant.

The fact that we were surprised twice during a day's outing to a reasonably well-known killifish area (**R. stellifer** in deep, open water and both **Pterolebias** species in one pool) shows that we don't know as much about them as we thought we did!

For AKA members who may have a chance to keep one or more of the Orinoco basin annuals, we have listed some helpful literature at the end of this article, and will make some additional comments on each species from an aquarist's point of view:

Austrofundulus transilis. This is not the most exciting killifish in the world. We couldn't get the males to look like much in the aquarium. But if they always looked like the wild males from km 28, they would be quite popular. These are small fish. A big male would be only about 1.5 inches long, but they are very active. They defend spawning territories against other males and court females energetically. Pairs will dive into peat if it is present.

Rachovia maculipinnis is an extremely variable fish so far as male coloration goes. Males range from plain brown to very colorful; with white, yellow, orange, red, blue, black or a combination of colors on the fins. Dominant males have some orange on the head, and the iris of the eye lights up when they are courting. Males get larger than females, reaching up to 3 inches or more. If color strains could be fixed, selective breeding of this species would turn out some real beauties. If

you give them peat, they will dive. If they are unable to dive, they just flatten out and lay the egg on the bottom. The eggs are small for killifish eggs.

Pterolebias zonatus is a really impressive fish when full grown and not bad at half size. Males will fight, and a little fin trimming will result. If you want a show-quality male you'll probably have to raise him without other males. You do get dominant males, and the growth and development of the lower-rank males is inhibited by the presence of the dominant male. We got them to spawn in sand, which we didn't think they would do, but they really prefer to dive into deep peat. Given the chance, they go straight in, and three inches of peat is not too much. We used a widemouth gallon jar as a peat container in a 50-gallon aquarium and it worked quite well. The eggs are among the largest of killifish eggs and are not too hard to find in peat. The fish we caught at km 74 included two color forms: the males were about equally divided between males with a jet black border on the anal fin and males with an orange border.

Pterolebias hoignei gets a little larger than the preceding species; a big male, filaments and all, is over 5 inches long, and one of the most elegant sights you'll ever be privileged to see! Don't be disappointed with the male if you get a young pair or trio. He isn't supposed to look like anything at that size. All of the males we caught at the different localities looked about the same. In the aquarium, these fish spent a lot of their time lurking on the bottom. They seem to fight even less than **P. zonatus** males, but since the spectacular filaments on the tail are a big part of what this fish has to offer, pay attention to what's going on in your tanks. Show males probably need to be raised without other males in the tank. Breeding remarks for this species are as for the preceding. If you aren't getting eggs, try reducing the light level in your tanks. This is a fish that deserves to be well displayed. The coloration is really nice but somewhat subtle. You can wash it out to nothing with careless display.

Rivulus stellifer is an attractive fish even when small. The fish we caught at km 60 acted a bit different from ones we had previously caught. Initially they did a lot of fighting, and the bag in which they traveled to the USA was paved with scales, but otherwise they acted like ordinary fish in the aquarium. Specimens we had kept previously, which came from a very shallow

marginal habitat, were very uncomfortable in the usual deep aquarium. They would sit at the surface or on the bottom and go zip in between, spending little time in midwater. Given deep peat, they will dive. The eggs are the size of large rivulus eggs. We spawned them in sand before but didn't try it this time. We put a top mop in with them for several weeks but they showed no interest in it. They get to over 3 inches long, with males a little bigger than females. When they are not eating or breeding, they spend most of their time just sitting around.

Terranatos dolichopterus. Even though we didn't get any of these on this trip, we have collected and bred them in the past. They are unlike the other species in that they are very sensitive to water conditions, shy, and demand live food. In nature, they eat a lot of copepods; in the aquarium they will eat a lot of baby brine shrimp. They seem to like soft water with peat extract. We successfully spawned them in fairly shallow peat, but have not tried them over sand. They need to be handled as a shy fish and not subjected to sudden shocks.

Except for **T. dolichopterus**, all the Orinoco species are hardy fish that thrive on good flake food and frozen brine shrimp. They do need warmer water than you are probably used to giving your fish. A minimum of 78° F is required, and they would be happy if kept a few degrees warmer. They seem to be fairly long-lived as annuals go, and lifespans of over a year should be expected. The eggs should be incubated in the low 180s for best results. As far as incubation time is concerned, it's best to look at the eggs to see when they are ready, as so many factors are involved that it is difficult to predict when eggs of any annual will be ready to hatch. We have handled them in different ways, but this time we seemed to get good results by collecting the peat and leaving it in water with an airstone for a week and then drying it. At least this seems to get rid of any extraneous organic matter in the peat. When we think the eggs are ready, we try to hatch them in shallow distilled or rain water. If nothing happens in 24 hours, we redry and try again in a month.

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