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A Short Note on a Recent Collection of Rivulus species (Cyprinodontidae; Pisces) from the Brazilian Coastal Plain

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Introduction

Knowledge of the genus Rivulus is in its infancy, just as that of the West African rivulins was in the 1950s. This unfortunate fact stems from the paucity of collections over time, and the relative disinterest shown by aquarists for these fishes. Nearly half of the species in the genus had been described before 1915, based solely on preserved material. Frequently, species are known from a single sample, and the locality is not precisely stated. Such drawbacks all contribute to the difficulty in studying Rivulus, especially when one considers that the distinguishing characters used to separate species are not always easy to demonstrate, even using living specimens. Those characters used in delineating the systematics of Rivulus' Old World relatives (e.g., Aphyosemion species) are here to be viewed with caution. We may be unable to appreciate the true value of these characters yet, or we may have to find different characters in which to place our confidence. Males' color patterns give only an indication of relatedness (with many exceptions -- see the urophthalmus group). Head scales and frontal neuromast pattern can be tricky and vary within a population. Karyotypes and protein patterns have been poorly recorded, although we know they vary considerably.

Certain basic questions will have to be sorted out. For example, what will be the practical

conception of the biological species in Rivulus? How do we explain certain polymorphisms? How do we deal with the huge, flat Amazon basin, which accounted for the majority of available niches for Rivulus? Obviously, work on Rivulus is going to require time and patience. To begin on solid ground, it has been our intention to examine (thanks to the various curators) the Rivulus represented in museum collections. Any other help or new material is also welcome.

There is at least one reliable characteristic which Rivulus shares with Aphyosemion: These fishes are poor swimmers, and their dispersal is limited by virtually any geographic barrier. The fishes that inhabit the corridor plain are distinctive from those of the inland plateau in West Africa. This is also the case for the Brazilian coast south of Natal and up to Porto Allegre on the east coast, and probably even more so for the Columbian-Peruvian-Ecudorian coast on the western side.

Three new collecting localities

My short trip to Brazil in July and August, 1981, enabled me the sampling of three locations near the coast, in addition to the collection of Cynolebias species and subsequent description of C. heloplites from the "lagoa" area of Fortaleza in Nordeste (Huber, 1981). Rivulus collected at these three new locations are discussed below.

1) Olinda, a suburb of Recife, capital city of the state of Pernambuco. A Rivulus of the ocellatus group was collected from a brackish pond, together with numerous poeciliids. Only a few specimens were found, all hermaphrodites. No secondary males were found. This fish is identical in morphology, color pattern, and behavior to living hermaphrodites of R. marmoratus Poey, 1880, from Florida, USA, that I studied several years ago. Moreover, the material from Recife cannot be separated from that from Rio de Janeiro (terra typica of ocellatus) and names may be lumped in the future. But because more material is needed for a conclusive taxonomic evaluation, for the present I

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follow Seegers (1984) who has synonymized marmoratus with ocellatus, and who conservatively proposes to maintain three subspecies: R. o. ocellatus, from the east coast of South America; R. o. marmoratus, from Florida, Cuba, Bahamas, Yucatan, Jamaica; R. o. bonairensis, from the southern Caribbean islands (San Martin, Barbados, Guadaloupe, Curacao, Bonaire, Gran Roque), and northern Venezuela. The fish from Olinda should then be labeled Rivulus ocellatus ocellatus Hensel, 1868, according to Seegers. Because of its tolerance of brackish water, R. ocellatus s. l. has an extensive coastal distribution from Florida to Rio de Janeiro, much as the monotypic Aplocheilichthys spilauchen[1] has in West Africa. Many records are

Rivulus m. marmoratus

(Drawing: R. Wildekamp)

Rivulus m. bonairensis

(Drawing: R. Wildekamp)

cited by Seegers (1984): 1) Florida; 2) Caribbean Islands, including Cuba (marmoratus and garciai (?), from the existing literature only), Guadaloupe, and Marininique: 3) Mexico in Cozumel and Yucatan (mysersi), and Honduras; 4) Venezuela (bonairensis); 5) Guianas 6) Brazil (Rio de Janeiro (ocellatus)).

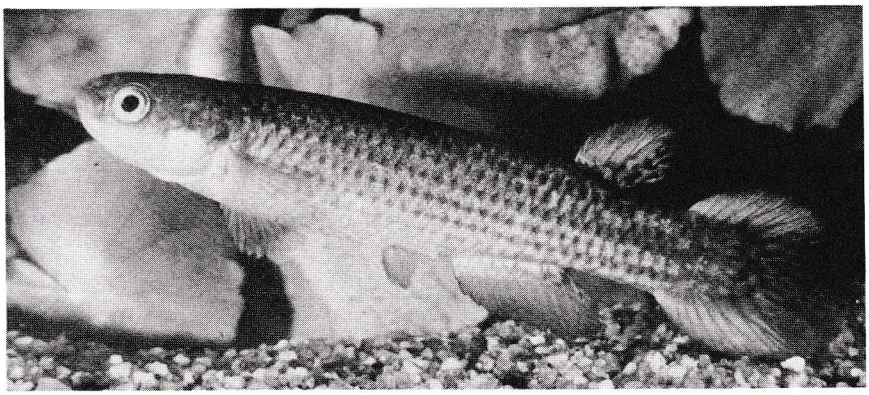
2) Near Silva Jardim (5km south of the village) in the state of Rio de Janeiro. Rivulus brasiliensis (Humboldt and Valenciennes, 1821[2] was taken in a very small, nearly dry stream. The fish were numerous

[1,2] For the sake of consistency, I typically follow the nomenclature as given in Lazara, 1984, Killifish Master Index, 3rd Edition, unless the author expresses a strong opinion to the contrary. Here, the spelling of "spilauchen," and authorship of R. brasiliensis reflect the author's preferences, not the editor's. (Ed.)

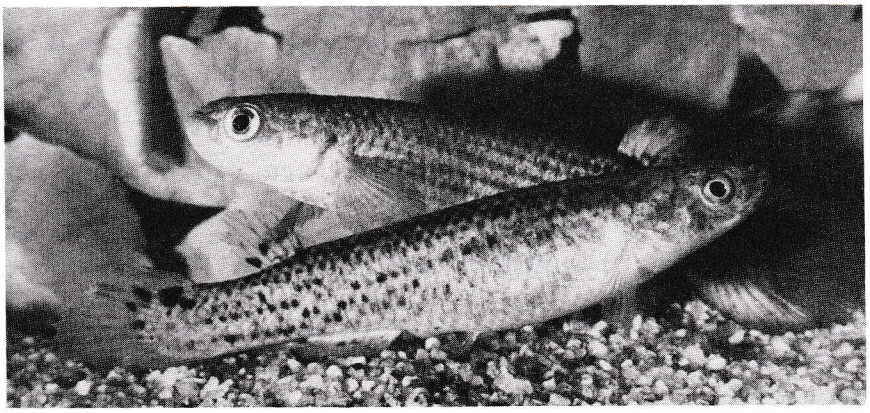
and starving. I have seen the types of this species (Paris, MNHN), and agree fully with Seegers (1984) in relegating R. dorni Myers, 1924, to the synonymy of R. brasiliensis. This medium-sized Rivulus (c. 6cm) has a unique pattern of bars in the posterior portion of the body, a somewhat deeper body than the unidentified species discussed below, and fewer scales in the lateral series than R. caudomarginatus.

3) Itapoa, near the airport of Salvador de Bahia, in the state of Bahia. An unidentified Rivulus (presently under study) was collected in a ditch one meter long and less than thirty centimeters deep, together with poeciliids. A medium-sized (less than 5.5cm) species, it exhibits a typical lineated pattern of red spots, yellow or white submarginal bands, with black marginal lines on the unpaired fins. The male's pelvic fins are orange. The female is peppered with black dots (except in the abdominal area), and has a caudal ocellus (see accompanying photographs by J.F. Fels, who has bred this fish and distributed it in Holland under the name "Rivulus sp. Brazil no 1"). From its morphology, color pattern (in preserved material), the e-type frontal scale pattern, and the number of lateral line scales, this species may be linked with the southern ones: R. santensis Köhler, 1906; R. rachovii Ahl, 1925; R. luelingi Seegers, 1984; and R. haraldsiolii Berkenkamp, 1984. However, collections of these slender fishes between Bahia and south of Rio de Janeiro are badly needed. A link -- though improbable because of distance and physical barriers -- with the urophthalmus group (which has a similar color pattern) cannot be ruled out.

The last of the eight known Rivulus species from this Brazilian coastal plain is isolated. R. caudomarginatus Segers, 1984, exhibits a unique marbled pattern on the body of both sexes, a black wound mark immediately posterior to the pectoral fin, no ocellus in the female, and a very large number (47 to 61) of lateral line scales for a medium-sized (less than 6.5cm) Rivulus.



Rivulus sp. Bahia, male (Photo: J.F. Fels)



Rivulus sp. Bahia, female foreground (Photo: J.F. Fels)

Summary

From our present basic knowledge of the coastal band in Brazil, between Natal and Porto Allegre, we have reported eight species of Rivulus in four groups. These all appear to be distinctive from species outside of this area. All have the e-type frontal scale pattern.

-- The opportunistic R. ocellatus from brackish waters. Predominantly hermaphrodites; secondary males very rare. Approximate size, 5cm. LL=48-56. All specimens ocellated.

-- Two isolated, distinct species from the same area (Rio de Janeiro). R. brasiliensis (synonym: R. dorni) with black bars on the posterior portion of the body of both sexes. Approximate size, 6cm. LL=29-34. Neither sex ocellated. R. caudomarginatus, with a marbled pattern in both sexes, and a black wound mark immediately posterior to the pectoral fin. Approximate size, 6.5cm. LL=47-61. No ocellus in the female, but a black spot in the male.

-- A group (?) of slender species of medium size (c. 6cm) with highly variable color patterns -- regular red spots to irregular dark areas in males, and an overall gray body color with irregular black dots in females. LL=27-38 Females ocellated. R. sp. Bahia, R. santensis, R. rachovii, R. luelingi, and R. haraldsiolii, the last four located between Rio de Janeiro and Florianopolis.

That a total of only eight species has so far been reported from this 3000km band of Brazilian coastal plain, containing much suitable habitat, is an undesirable situation. Wishes are here expressed that a general effort will soon be made to improve this record.

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