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A New Genus of Poeciliid Fishes from Hispaniola, with Notes on Genera Allied to *Poecilia* and *Mollienesia* [1]

By LUIS RENÉ RIVAS and GEORGE S. MYERS

IN a recent paper on cyprinodont fishes of the Island of Hispaniola, Trewavas (1948) described a new species of poeciliid fish which she assigned to the genus *Mollienesia* (*elegans*) on the basis of gonopodial characters. The material upon which this and other species in the same paper were based came from a German aquarist, Mr. E. Roloff, who also had sent a series of the same collection to one of us (Myers). We had studied an adult male and female of this species before Dr. Trewavas published on it, had determined that it was new, and had come to certain conclusions about its generic position.

During the month of April, 1949, one of us (Rivas) had the opportunity to spend several days in the Dominican Republic collecting freshwater fishes, especially poeciliids, and the type locality of *M. elegans* was visited. Study of a fine series of topotypes shows that this species constitutes a remarkable new genus of the tribe Poeciliini that is apparently confined to the Island of Hispaniola.

Parenthetically, it should be pointed out that the new *Rivulus* (*R. roloffi*) described by Trewavas was in fact named, figured, and described by Roloff ten years earlier (1938: 597). He credited the name *Rivulus roloffi* to "Trewavas, 1938" but since no previous description had been published, and Trewavas evidently took no part in the preparation of Roloff's paper, it would seem that Roloff must be responsible for (in the words of the International Rules) "the name and its indication, definition or description." Roloff gave a

[1] Results of the University of Miami—University of Santo Domingo Ichthyological Expedition to the Dominican Republic, April, 1949.

good color description, photos of both male and female, and a type locality (Villa Altagracia). These seem sufficient to distinguish the species from its close relatives.

We are very grateful to Drs. Carlos Conzález and Burton P. Hunt, of the Universities of Santo Domingo and Miami, respectively, for their valuable assistance during field work in the Dominican Republic.

Curtipenis, gen. nov.

GENOTYPE.—*Mollienesia elegans* Trewavas (1948: 409).[2]

In *Curtipenis,* the gonopodium (Trewavas, 1948, Fig. 2) is of the *Mollienesia* type. The membranous hook at tip of ray 3 is obsolescent as in *Mollienesia* (*Allopoecilia*) *caucana* and in certain subspecies of *M. sphenops* (*cuneata, vandepolli*). The elongate, retrorse, terminal segment of the posterior branch of ray 5 is present and well developed, as in *M. latipinna, M. velifera, M. petenensis,* and *M.* (*Psychropoecilia*) *dominicensis.* The subterminal segment of ray 3 and posterior branch of ray 4 bear retrorse spines as in the other species of *Mollienesia,* with the exception of *dominicensis,* in which the spines of ray 3 are broadly T-shaped and somewhat bifurcate.

The most distinctive feature of the gonopodium of *Curtipenis* is the structure of the membranous swelling of the anterior margin of ray 3, which is not modified into a movable prepuce-like hood as in the other genera of the tribe Poeciliini. In this character, the gonopodium of *Curtipenis* resembles that of *Platypoecilus* and *Xiphophorus* to which *Curtipenis* is not closely related, since it is obviously a member of the tribe Poeciliini. Consequently the statement, "Membranous swelling on front of gonopodium not forming a definite prepuce-like hood," in Hubbs' diagnosis of the tribe Xiphophorini (1924: 10), can no longer be used as a diagnostic character for that group. Likewise, the diagnosis of the tribe Poeciliini, as proposed by Hubbs (1924: 11; 1926: 72) should be modified by adding parenthetically, "(except in *Curtipenis*)" to the statement, "Membranous swelling along anterior margin of gonopodium modified into a prepuce-like hood." If this modification is adopted, the diagnosis for the tribe Xiphophorini need not be changed.

There is a shallow, longitudinal recess or groove along the midline of the belly where the gonopodium is partially concealed when depressed against the body in swimming.

The pelvic fins of the male are typical of the tribe Poeciliini. The first ray is much shorter than the elongate second ray, and its tip is membranous and swollen. The inner rays are abruptly shorter than the second ray but longer than the first, especially the third.

The maxillary is partially overlapped by the preorbital, which has its lower border slightly raised but not free. The preorbital area is scaleless.

The jaws are strong and firmly united, and the upper is somewhat shorter than the lower. In front view the upper lip is arched and broad enough to

[2] The basis for the spelling *Mollienesia* (rather than *Mollienisia*) is presented by Bailey and Miller in this issue of COPEIA.

be distinctly visible (Fig. 1B). The teeth of the outer row (Fig. 1) in both jaws are movable, narrowly and acutely spear-shaped, elliptical in cross-section, and with brownish tips curved inwards. They are arranged uniserially in a single arc, rather widely spaced, and never in contact with each other. The teeth of the inner row (Fig. 1), similar in shape to those of the outer, are much smaller and arranged biserially, those of the innermost series somewhat displaced in alternating pattern. In the lower jaw the inner row is about as long as the outer, but in the upper, it is longer and extends back-

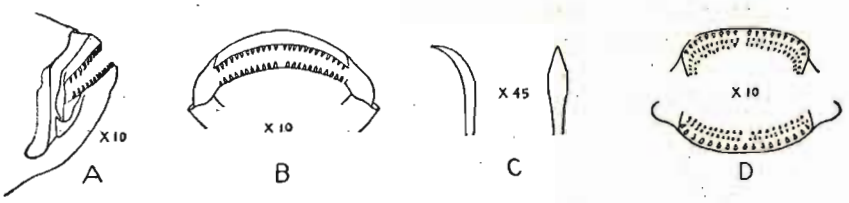
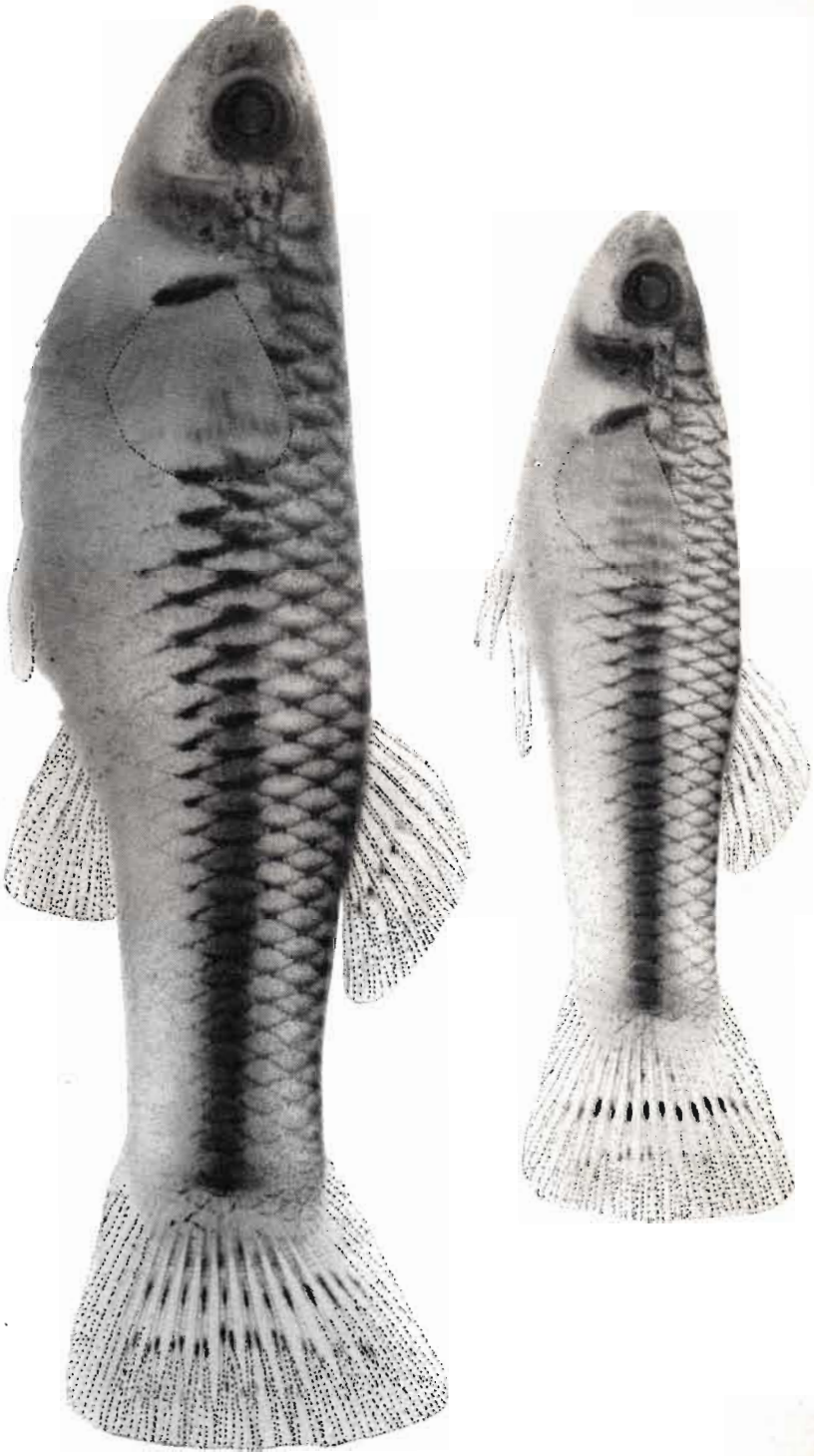


Fig. 1. Mouth structure and dentition of *Curtipenis elegans*. A. Mouth in side view. B. Mouth in front view. C. Tooth of outer row in side and front views. D. Upper and lower jaws showing arrangement of teeth. Semidiagrammatic drawings by L. R. Rivas, based on an adult female 44.6 mm. in standard length.

wards for a distance at each end. In both jaws, the inner row is interrupted at the symphysis by an edentulous midsection.

That the new genus is a member of the subfamily Poeciliinae and the tribe Poeciliini is indicated by the structure of the gonopodium and of the pelvic fins. However, in working out the relationships of *C. elegans*, it has become apparent that complete reliance cannot be placed on gonopodial structure alone in the definition of genera within the Poeciliini. A similar conclusion was reached in the Cuban tribe Girardinini, in which the chief generic characters are centered in the structure of the jaws and teeth (Howell-Rivero and Rivas, 1944). The gonopodium has proven to be so useful in classification that great attention has been paid to it, but it seems to us that the minor quantitative structures of this organ have been overemphasized in generic segregation in the entire family. As knowledge increased, intermediate types were found, lessening many of the apparently sharp gonopodial differences based on these minor characteristics. We conclude that these finer gonopodial differences should not be accorded more than specific value unless they are clearly correlated with other structural differences, leaving the major qualitative characters of the gonopodium (such as those used by Hubbs (1924) to separate subfamilies and tribes) as general indications of major phylogenetic lines. It is, indeed, in these major gonopodial features that we find definite correlations between gonopodial and other structural characters, and this correlation strongly supports the conclusion that the microscopic structure of the gonopodium is, if used with circumspection, one of the most useful indicators of both relationships and divergence known among poeciliid fishes.



Curtipenis elegans (Trewavas). Adult male (top) and female topotypes, 33 mm. and 47.3 mm. in standard length, respectively. (Photographs from the Smithsonian Institution; retouched by L. R. Rivas.)

Although the gonopodial structure indicates relationship to *Mollienesia,* the mouth structure, dentition and basic features of coloration are very different from that genus. There is no other member of the tribe Poeciliini to which *Curtipenis* shows close relationship. It seems possible that this genus represents a survival of the ancestral stock of the *Mollienesia* group, which has retained more primitive jaw and tooth characters than the other existing forms. But whether the absence of a definite prepuce-like hood is primitive or specialized is difficult to decide. If, as we believe, this is a primitive characteristic, then *Curtipenis* may be considered the most primitive member of the tribe Poeciliini.

On this basis, it would appear reasonable to assume that *Curtipenis* or its ancestor colonized Hispaniola at a time when fishes of this type existed in Central America. Later, its relatives evolved into more specialized forms or became extinct, leaving *elegans* a relict preserved by geological and ecological accident, and perhaps also by its rheophilic nature and differing feeding habits.

Since the original and only available description of *Curtipenis elegans* was based on only two specimens, a more detailed description of the topotypic material recently collected is hereby offered.

Curtipenis: In reference to the very short gonopodium.

Curtipenis elegans (Trewavas)

Plate I

Mollienisia elegans Trewavas, 1948: 409 (original description, Jarabacoa, Dominican Republic), Fig. 2 (gonopodium), Pl. 1, Fig. 4 (photograph: male and female).

The following description is based on 5 adult males 28.4 to 33 mm. in standard length, and 19 young to adult females 15.1 to 47.3 mm. long, from a series of 53 topotypes collected in Rio Yaque del Norte at Jarabacoa (about 1700 feet above sea level), Province of La Vega, Dominican Republic, by Luis René Rivas and Burton P. Hunt on April 24, 1949. This material is deposited in the fish collections of the University of Miami, Department of Zoology. Specimens have also been deposited in the U. S. National Museum, the Museum of Zoology of the University of Michigan, and the Natural History Museum of Stanford University.

Proportions are expressed in hundredths of the standard length. Proportions and counts for the males are given first, followed by those of the females in parentheses. For the methods of measuring and counting used herein, see Rivas (1944: 41). All measurements and counts were made under the low power of a binocular microscope.

Body compressed, more strongly in males and posteriorly in females, the axis straight. Predorsal contour uniformly convex between tip of snout and occiput, more or less straight, or even somewhat concave, between occiput and origin of dorsal fin in the larger females; transversely convex in both sexes, the head not depressed.

Predorsal length 55.01 to 56.20 (58.30 to 61.60); postdorsal length 46.35 to 47.15 (41.22 to 43.55); preanal length 44.85 to 46.65 (54.90 to 64.10); postanal length 58.15 to 60.30 (41.00 to 45.05). Length of caudal peduncle 52.40 to 53.30 (31.49 to 34.30); its least depth 17.54 to 18.18

(14.57 to 16.92). Greatest depth of body 25.60 to 27.28 (23.18 to 28.64). A study of the original data on which these proportions are based, shows that neither the predorsal nor the postdorsal comparative lengths vary with age, and that therefore the dorsal fin remains constant in relative position throughout development. In the females, the preanal length increases somewhat with age with a corresponding decrease in the postanal length. This apparent posterior migration of the anal fin is actually an outward displacement, with the base of the last anal ray as pivoting point, caused by gradual distention of the abdomen in reaching maturity, as shown by the increase of body depth with age. This is further confirmed by the fact that the comparative length of the caudal peduncle does not vary with age. The caudal peduncle shows no increase in depth with age.

Head length 25.43 to 26.06 (24.12 to 29.40); its greatest width 16.02 to 16.68 (18.11 to 20.00), somewhat less than least depth of caudal peduncle in males, greater in females. There is a relative decrease with age in head length and a very slight decrease with age in head width. Overall width of mouth 10.00 to 10.58 (10.30 to 12.61), decreasing with age. Least fleshy interorbital width 11.22 to 12.11 (12.90 to 15.24), decreasing with age, greater than overall width of mouth. Postorbital length 8.78 to 9.70 (9.15 to 11.95), decreasing with age, less than overall width of mouth. Diameter of orbit 9.08 to 9.30 (7.41 to 11.92), decreasing with age, about equal to postorbital in males and young females up to about 20 mm. in standard length, somewhat less in subadult and adult females; less than interorbital and overall width of mouth. Snout 8.08 to 8.79 (8.00 to 9.93), less than postorbital.

Dorsal base 15.49 to 16.50 (14.12 to 15.41), not varying in length with age, about equal to greatest width of head in males, much less in females. Anal base 9.25 to 13.24 in females, decreasing in length with age, shorter than dorsal base. Dorsal fin convex in outline, rounded posteriorly at the tips of the last rays, much longer than high; its length 28.77 to 29.78 (23.18 to 27.20), not varying with age, greater than head in males, about equal to or less than head in females. Gonopodium 22.73 to 23.64, shorter than head, reaching somewhat beyond a vertical from middle of dorsal base, but not to its end; distance between distal end of membranous swelling on ray 3 and tip of gonopodium about equal to diameter of pupil. The structure of the gonopodium has been discussed under the generic description. Anal fin of females smaller than the dorsal, longer than high, triangular in outline, rounded at the apex and posteriorly at the tips of the last rays, its length 18.80 to 22.46, decreasing with age, its posteriormost tip not reaching to a vertical from posteriormost tip of dorsal. Pectoral fin broadly rounded, asymmetrical, the upper rays longer than the lower, its length 21.40 to 22.42 (19.45 to 24.12), decreasing with age in females, about equal to or somewhat longer than anal in females; its posteriormost tip reaching to or beyond vertical from insertion of pelvics in females, beyond origin of gonopodium in males; its base less than diameter of orbit but much greater than diameter of pupil. Pelvic fin 20.60 to 21.81 (14.04 to 16.34), reaching beyond middle of gonopodium in males, to or beyond anus in females, and to origin of anal in young females up to about 30 mm. in standard length. Pelvic fin of females rounded at tip,

asymmetrical, the inner rays gradually decreasing in size. The structure of the pelvic fin of males has been discussed above, under the genus. Caudal fin broader than long, its greatest width when fully spread about equal to or greater than head or depth of body, its posterior margin uniformly convex (especially in females), the upper and lower posterior angles rounded; middle caudal rays 26.92 to 28.86 (24.12 to 30.10), decreasing in length with age, about equal to head.

Origin of dorsal fin about midway between middle of caudal base and center of eye in males; midway between middle of caudal base and a point on postorbital area (at level of upper end of pectoral base) in females; closer to eye in young or to posterior border of opercle in adults. Origin of gonopodium somewhat nearer tip of mandible than posterior tip of dorsal fin. Origin of anal fin of females nearer caudal base than center of eye; in advance of origin of dorsal in young up to about 35 mm. long, below or somewhat behind in adults (see discussion above). Upper end of pectoral base nearer tip of snout than origin of dorsal in males and females. Insertion of pelvic fin about midway between tip of gonopodium and center of eye in males; nearer upper end of pectoral base than end of anal base in females.

Dorsal rays 8 to 10, usually 9; anal 9; pectoral 14 to 16, usually 15; pelvic 6; branched caudal rays 14 to 16. Scales in 28 or 29 (usually 28) transverse rows.

Basic coloration (in 10 per cent formalin) light pearl gray, tinged with brownish yellow in some of the larger females. A conspicuous midlateral longitudinal dusky band, about as wide as diameter of pupil, on sides of body, originating at middle of caudal base and breaking up into dark brown, elongate, vertical dots below origin of dorsal fin. Below this band, there is a longitudinal row of dark brown spots gradually decreasing in size towards the tail and disappearing behind the end of the anal base in females and the tip of the gonopodium in males. These spots are similar to but smaller than those forming the anterior portion of the main lateral band with which they alternate. The spots of each row are connected by dusky lines along the scale-pocket margins, forming a zig-zag pattern; both rows converge forward and unite at the axil. There are two longitudinal rows of brown spots above the lateral band, gradually becoming fainter posteriorly and disappearing behind end of dorsal base. Preorbital area and top of head dusky, especially on the interorbital and occipital regions. A middorsal dusky streak, extending from the dark occipital area to origin of dorsal fin, gradually becoming wider at a distance about equal to postorbital from dorsal origin. A very fine, somewhat faint, black line along the lower edge of the caudal peduncle. Scale pockets margined with brown, producing a reticulate pattern fainter posteriorly and undeveloped on the lower portions of the body below the lateral band complex. A sharply defined, oblong, dark brown spot on pectoral base. Belly colorless. Caudal fin with a vertical row of black, horizontally elongate spots (on rays), about midway between base and margin of fin; a similar but less conspicuous row is present on either side of the main one, especially in the larger females. Dorsal fin with a broad, but faint, dusky margin distally, crossed by a row of black spots (on membranes) not extending forward to anterior margin of fin. Anal, pectoral and pelvic fins colorless. Gonopodium

colorless. There is no apparent sexual dimorphism in the coloration.

In addition to those from Jarabacoa, numerous examples of *Curtipenis elegans* were obtained in the Río Camú, of the Yuna system, at a point on the road from Jarabacoa to La Vega, about 5 km. west of La Vega.

Although seemingly confined to a highland habitat, the temperature tolerance of this species appears to be rather great. At Jarabacoa, the water temperature during collecting time (9–10 A.M.) was 68° F., whereas later in the day (1–2 P.M.), in Río Camú, the water was 80° F. It is doubtful, however, if the species can live in much warmer waters. On the other hand, there is reason to believe that *C. elegans* occurs on the Yaque del Norte, well above Jarabacoa, where the water, especially during the winter, reaches temperatures much lower than 68° F.

While collecting at Jarabacoa, it was learned that *C. elegans* apparently avoids very fast water by staying close to the banks of the stream; it was most abundant in places where the banks were overgrown with thick aquatic vegetation. In general, however, the waters where the species was obtained were fast and clear.

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