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A Few Turbellarians from Trinidad and the Canal Zone, with Corrective Remarks

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A main objective of a recent tour was to recover on Trinidad the two species of planarians described from there by Kennel (1888): *Planaria aurita* and *Planaria fissipara*. I especially desired to recover the former because de Beauchamp (1939) made the large North American planarian, *Dugesia dorotocephala*, a synonym of *aurita*. While I believe this synonymy to be quite impossible, a restudy of *aurita* is indicated. Unfortunately I failed to refind either of Kennel's species.

As the type locality Kennel gave a stone basin on the Savanne at Trinidad used for watering cattle. The Savanne is now a large public park in Port-of-Spain, used for horse-racing and other sports. Naturally I did not find on it any stone basin or in fact any fresh-water habitats except two small artificial ornamental ponds that did not contain any planarians. Planarians, however, were found in the hill streams several miles away from Port-of-Spain and are here reported, together with some other data. Kennel also took planarians in pools and brooks in the vicinity of Port-of-Spain and in the Arima River.

Part of my stay at Trinidad was spent at Simla, the beautiful tropical station of the New York Zoological Society in the hills of Trinidad. I am grateful to Dr. William Beebe and Miss Jocelyn Crane for the privilege of staying at this delightful place and for their kindness and consideration.

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ORDER TRICLADIDA
SUBORDER PALUDICOLA
FAMILY PLANARIIDAE
Dugesia arimana, new species

Figures 1-2

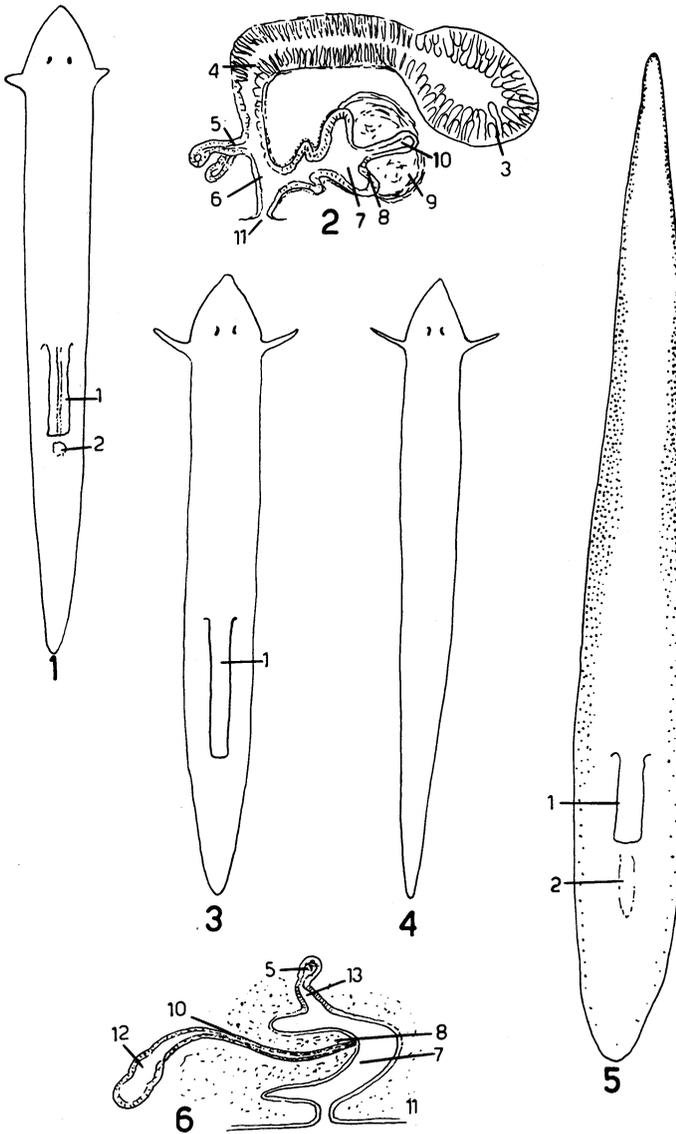
A number of planarians were taken under stones in the Arima River along the road between Simla and the town of Arima. These externally resemble *P. aurita* but proved not to be this species. The worms were in active asexual reproduction as shown by the truncate posterior end of many of them, and only one sexual specimen was procured. The collecting date was February 14, 1956.

The worms were grayish brown in color, about 10 mm. long, with the typical appearance of the genus *Dugesia*, that is, with a triangular head with prominent auricles and elongated body tapering to the posterior end (fig. 1). The auricles are broad and of moderate length.

The one sexual specimen was sectioned sagittally and found in full sexual activity. As typical of the genus the numerous testes occur in a lateral band on each side throughout the body length. They are situated dorsally between the intestinal diverticula, whereas those of *aurita* were reported as ventrally located. The ovaries are simple. The copulatory apparatus is small and weakly muscular (fig. 2). The rounded copulatory sac continues above the male apparatus as a wide bursal canal that bends sharply downward to join the female antrum. Just before this junction the bursal canal receives into its posterior wall a short common ovovitelline duct, formed by the union of the two ovovitelline ducts which course to either side of the male apparatus and swing behind the bursal canal. This point of entrance of the ovovitelline ducts near the antrum agrees with what was reported for *aurita* by Kennel and differs from that of most other species of *Dugesia* in which the ovovitelline ducts enter the bursal canal where it makes its sharp downward turn.

The male apparatus is notable for its weak muscularity and poor development of the penis papilla, which is a very low elevation borne on the weakly muscular penis bulb. Bulb and penis papilla are traversed by a single ejaculatory duct which at its proximal end receives separately the two sperms ducts, ascending from below.

Dugesia arimana differs from other species of *Dugesia* except *D. aurita* (Kennel, 1888) and *D. polyorchis* and *cameliae* (Fuhrmann, 1914), from Colombia, in the entrance of the ovovitelline ducts at or near the antrum, much ventral to the usual point of entrance. In these



FIGS. 1, 2. *Dugesia arimana*. 1. Entire worm from life. 2. Sagittal view of the copulatory apparatus.

FIGS. 3, 4. Long-auricled *Dugesia*. 3. From Barro Colorado Island. 4. From Trinidad.

FIGS. 5, 6. *Geoplana cameliae*. 5. Entire worm, from life, eyes added after clearing. 6. Sagittal view of the copulatory apparatus.

1, Pharynx; 2, copulatory region; 3, copulatory sac; 4, bursal canal; 5, common ovovitelline duct; 6, female antrum; 7, male antrum; 8, penis papilla; 9, penis bulb; 10, ejaculatory duct; 11, common gonopore; 12, seminal vesicle; 13, vagina.

other species with this feature, the sperm ducts traverse the penis bulb separately and expand therein into vesicles, something that is not the case in *D. arimana*. It would seem that there is in the general Caribbean region a group of *Dugesia* species with the mentioned peculiarity of the ovovitelline ducts.

The finding on Trinidad of another species of *Dugesia* in which the course of the oviducts agrees with that described by Kennel (1888) for *Dugesia aurita* is strong evidence for the accuracy of that description and against the synonymy for *aurita* given by de Beauchamp (1939). It is further certain that de Beauchamp's identification of the *Dugesia* of Lake Titicaca as *D. aurita* is erroneous and that the Lake Titicaca species is in fact *Dugesia festai* (Borelli, 1898) (Hyman, 1951; Eveline Marcus, 1953).

The holotype as serial sagittal sections (two slides) is deposited in the invertebrate section of the American Museum of Natural History.

Dugesia sp.

Figures 3-4

Under the stones in the two rocky streams that descend the hill, one to each side of the station on Barro Colorado Island, Canal Zone, there were found (December 31, 1955) fair numbers of a species of *Dugesia* remarkable for the exceedingly long, slender auricles (fig. 3). The specimens were about 10 mm. long, of the usual grayish brown color. Both the head and the auricles were very mobile. The head was often extended into a point, and the auricles often pointed forward. Unfortunately no sexual specimens were found. The worms appeared to be in active asexual multiplication as shown by the short postpharyngeal regions of most of them.

One specimen of what seems to be the same species was taken in a small stream near Simla in the hills of Trinidad on February 15, 1956 (fig. 4). This was 7 mm. long, of the same grayish brown color, and with the same very mobile, long, slender auricles. Unfortunately it also proved to be in the asexual state.

This long-auricled *Dugesia* could possibly be *Dugesia cameliae* (Fuhrmann, 1914) from Colombia or *D. antillana* Kenk, 1941, from Puerto Rico, but in the absence of sexual material an identification is impossible.

Planaria fissipara Kennel, 1888

This species is unique among triclads in that prior to fission a post-pharyngeal fission plane appears, and brain, eyes, and pharynx are differentiated in the new zoid before it constricts from the parent ani-

mal. The only other comparable case in triclads is that of *Dugesia paramensis* (Fuhrmann, 1914) from Colombia in which, in both young and sexually mature individuals, there was noticed in sections a small pharynx anterior to the regular pharynx. This condition was presumed to antedate fission, although no observations were made on living animals. Fission prior to the pharynx is rather unusual in *Dugesia*.

Planaria fissipara has not been seen alive since Kennel's finding. Ernesto Marcus (1948) found a number of preserved specimens in material sent to him from the Amazon and other rivers of northern Brazil; all were in the asexual state. As already indicated I failed to re-find this planarian on Trinidad, but after return to New York I was consulted about a small planarian that had appeared in numbers in tanks of fresh-water fishes from Mexico in Dr. C. M. Breder's experimental fish laboratory in the American Museum. On microscopic examination of these worms, I was dumbfounded to recognize them as *Planaria fissipara*. They were flourishing and multiplying in the fish tanks on the tubificid oligochaetes being fed to the fish. As these tanks contain plants and other material of varied sources and are fed with food from varied sources, it is impossible to state with certainty that the planarians came from Mexico, but this is highly probable. It would appear that *Planaria fissipara* is widely spread in tropical and subtropical America.

The planarian has been so accurately described and depicted by Kennel that further description and illustration appear superfluous. In its small size, rounded anterior end without auricles, and triangular adhesive area in the center of the anterior margin, the worm resembles one of the lower Turbellaria rather than a triclad. I saw only two-zoid chains, but Kennel and Marcus had three-zoid specimens.

In the absence of sexual specimens, this interesting species cannot be placed taxonomically. I am cultivating some specimens in the hope that sexual specimens may appear, but I consider this eventuality remote. The species, however, so closely resembles *Rhodax evelinae* Marcus, 1946, that one may suppose it belongs close to that species. *Rhodax evelinae* divides by fragmenting from the posterior end forward and does not form fission planes.

SUBORDER TERRICOLA

FAMILY GEOPLANIDAE

Geoplana cameliae Fuhrmann, 1912

Figures 5-6

During my stay on Trinidad there was brought to me by Miss Rosemary Kenedy a geoplanid that she had taken at night on wet moss at

Simla, February 17, 1956. After examining sections of the copulatory apparatus, I consider this to be *Geoplana cameliae* Fuhrmann, 1912.

Alive, extended, the worm was 25 mm. long, with the typical appearance of a geoplanid (fig. 5), that is, narrowed anteriorly, widening posteriorly, then narrowing slightly to a rounded posterior end, flat below, with the entire ventral surface employed as creeping sole, convex above. The color in life was reddish brown, more reddish on the anterior tip, dotted with darker brown spots. The median light line described by Fuhrmann was not evident in the living specimen but was faintly indicated after preservation. Fuhrmann worked with preserved specimens only. After preservation the length of my specimen was 17 mm., with the root of the pharynx at 12 mm. The eye arrangement is shown in figure 5, as well as in Hyman (1941). At the anterior tip the eyes are arranged in single file, but increase rapidly to a band several eyes deep, then at about the level of the pharynx suddenly decline in numbers, and die away posteriorly.

The previous specimens that I ascribed to this species (Hyman, 1941) were immature. Sagittal sections of the postpharyngeal region of the present specimen show that it is not quite mature but when this fact is taken into consideration the copulatory apparatus agrees well with Fuhrmann's figure. No testes, sperm, or sperm ducts were present in the postpharyngeal region sectioned. The copulatory apparatus is very simple (fig. 6). From an oval expanded seminal vesicle, of which the glandular investment described by Fuhrmann is presumably not yet developed, a simple ejaculatory duct traverses the center of the conical penis papilla. This is but slightly muscular. It projects freely into the antrum, from the roof of which the funnel-like vagina lined by a tall epithelium ascends and at once receives the ovovitelline duct, not traceable.

On the assumption that my identifications are correct, this species appears common in the Caribbean region, having been taken on Colombia, Trinidad, and Barro Colorado Island, Canal Zone.

FAMILY RHYNCHODEMIDAE

Rhynchodemus angustus (Hyman, 1941)

During a week's stay on Barro Colorado Islands, land planarians were constantly sought while I was walking the trails but were found only once. On January 1, 1956, four specimens of *Rhynchodemus angustus* were discovered huddled together under the bark of a large rotting log near the Tower on the Snyder Molino Trail. The worms were grayish black above, shading to white below, with the creeping

sole occupying about one-third of the ventral surface. They proved to be very active and amazingly extensile, stretching out to a long thread-like shape. Especially the anterior end is extremely mobile, waving about and stretching out. The worms were also very adhesive, sticking to the hands. The sexual anatomy of this species was recently described (Hyman, 1955).

CORRECTIVE REMARKS ON GEOPLANIDS

In a recent article (Hyman, 1955) I identified as *Geoplana plana* Schirch, 1929, a specimen that came from the province of Santa Catharina, Brazil. This province contains a Therezopolis (also spelled Tereopolis), and as Schirch obtained his specimens from Therezopolis I assumed they came from the same locality as my specimen, hence this seemed additional evidence for my identification. During a recent visit to Brazil I learned, however, that the Therezopolis referred to by Schirch is situated in the province of Rio de Janeiro. Froehlich (1955) has described what she identifies as *G. plana* from the latter locality. Her specimens are quite different from mine as regards sexual anatomy, and, as hers came from the type locality, I will grant their probable identity with Schirch's species, although in fact the identification of these species must always remain uncertain because Schirch gave only external characters and his specimens cannot be recovered. If one ascribes the name *G. plana* to Froehlich's description, it becomes necessary to propose a new name for the worm that I identified as *G. plana*, and I suggest *G. catharina*.

Now that the sexual anatomy of what may be presumed to be *G. plana* is known, it is evident that my suggestion (Hyman, 1941) of a possible identity of *G. cameliae* Fuhrmann, 1912, with *G. plana* was mistaken.

In the same article Froehlich (1955) declares that my identification of Yucatan land planarians (Hyman, 1938) as *Geoplana multipunctata* Fuhrmann, 1912, is erroneous. While I do not insist on the correctness of my identification as I did not have fully sexual specimens, the grounds of Froehlich's objection are fallacious. She claims my statement that the testes occur along the entire body length is discordant with Fuhrmann's account. But Fuhrmann did not describe the *distribution* of the testes; he merely said the testes are relatively few in number, as I also stated. Fuhrmann's remark that two or three testes are seen on every transverse section certainly indicates an extensive distribution along the body axis. I see no reason as yet to doubt my identification.

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