

ON A NEW SPECIES OF OCTOCHAETID EARTHWORM FROM MEXICO

G. E. Gates

The earthworm family Octochaetidae is represented in this hemisphere north of Panama by species of four genera. Six indigenes of Washington and Oregon still are in the Australian genus, *Megascolides*, where they do not belong. Ten (or more?) supposed endemics of Mexico, Guatemala, Honduras, El Salvador and Costa Rica were referred to the large, unrevised, African genus, *Dichogaster*, where they may not belong. Seven autochthones currently are recognized in the American genus *Trigaster* that reaches from Mexico into Cuba, Puerto Rico and the Virgin Islands. All other octochaetid natives currently are in an American genus (with a Hindu patronymic!), *Ramiellona*, that extends from the Mexican provinces of Chiapas and Oaxaca (with four species) into Guatemala (with 7), Honduras (1) and El Salvador (3). Not a single oligochaete is known to have been collected anywhere in all of Nicaragua. Indeed, the only record of any kind for that country is of a single individual (of a peregrine moniligastrid) obtained by inspectors of the U.S. Bureau of Plant Quarantine from soil with an avocado plant supposedly from Nicaragua.

Most octochaetid indigenes of America are known only from their original descriptions. Types always are few, sometimes more or less macerated. Some accounts contained grave errors. Even for the best characterized, additional data are needed of their distribution and ecology as well as of their basic anatomy. Hopefully, some of those deficiencies can be rectified before pressures of a rapidly increasing human population, of industrialization, as well as of the competition provided by numerous introduced earthworms, exterminate an interesting fauna.

Octochaetidae

Ramiellona Michaelsen, 1935

Ramiellona lavellei, new species

Material.—México, Chiapas: San Cristóbal de Las Casas, Bosque encino, 2,300 m, 29 August 1977, 0-0-1. W. D. Edmonds per P. Lavelle. Holotype deposited in Tall Timbers Research Station, Tallahassee, Florida.

External characteristics.—Length, 427 mm. Diameter, 13 mm. Segments, 408. Peristomium, with deep longitudinal rugosities throughout all of its circumference and dorsally extending onto the large prostomium. As the latter seems to be demarcated posteriorly by a slight, rather irregular furrow about at level of the anterior margin of segment i, the organ is thought to be prolobous. Segment ii also has marked longitudinal rugosities

in all of its circumference. Segment iii has faint traces of a near-midsegmental, secondary furrow in the dorsum only. Secondary furrows; on each of iv–xii completely circumferential, probably slightly postsetal, nearly as deep as the intersegmental grooves, behind the clitellum recognizable only dorsally and gradually disappearing in region of xxiii–xxx. Tertiary furrows, slight, one in each secondary annulus of the preclitellar region. Setae; small, closely paired, unrecognized in ii–vii, only an occasional ventral couple seen in viii–xii, all of the lumbricid 4 pairs present throughout the clitellar region where every lateral pair is a tiny white area (of unmodified epidermis?) at bottom of a very slight depression, both ventral couples of xviii present, shortly behind the clitellum, $AB = CD$, AA ca. = BC , DD ca. = $\frac{1}{2} C$, near the hind end DD seems to be greater than $\frac{1}{2} C$. First dorsal pore, at 12/13. Nephropores, unrecognized.

Spermathecal pores, obvious transverse slits, probably about in region of AB , just behind 7/8 and 8/9 from which they are separated only by their finely-lobed, anterior margins. Female pores, paired, median to A at eq/xiv. Male pores, not seen. Clitellum, saddle-shaped (except possibly in region of xiii/2–xiv?), about 25 mm long, xiii/2–xxii. Seminal grooves between eq/xvii and eq/xix, unusually deep as each is located between 2 longitudinal ridges, the median of which turns mesially at eq/xvii and eq/xix to unite with the rounded copulatory protuberances of its side that apically bear an obvious aperture from each of which 2 penial setae protrude as much as 2 mm. Slicing off the tip of one copulatory porophore of xvii revealed 2 small, rather slit-like spaces. Removal of another slice then revealed one of those spaces occupied by 2 circular areas, each with a minute central lumen. Close by there eventually was recognized a third circular, perforated disc of similar size but of different appearance and texture. The 2, first-seen porophores probably are cross sections of ectal portions of the penisetal follicles. Yet the central pit does appear to be too small for the shafts that were seen externally. Genital markings, rather small, paired, almost longitudinally elliptical but with pointed ends, across 15/16, 16/17, 19/20 and 20/21, about in region of AB or about in line with the seminal grooves. Each marking comprises a circular, central, slightly tumescent, whitish, opaque area and a translucent, clearly demarcated, band-like rim.

Internal anatomy.—Septa, 4/5 present, transparent and very delicate, 5/6–11/12 thickly muscular, enlarged, funnel-shaped, posteriorly directed and close together, delicate back from 12/13. Special longitudinal muscle band at mD, sharply defined, perforate over site of each dorsal pore. Pigment, unrecognized in sections through body wall. Circular muscle layer, faintly greenish (alcoholic preservation), still translucent but now reddish brown after treatment with picric acid solution. Trans-segmental, strong, muscular cords are present in the first 15 segments. Wider, intrasegmental

and also strong muscular bands in region of the male terminalia are inserted at each end in the parietes, the ventrals near the nerve cord. Each of the anteriormost pair, in xvii, is 2 mm wide and their dorsal insertions are at a level slightly below that of the cords from the penisetal follicles. Narrower bands just behind 17/18 pass up diagonally to their dorsal insertions. Bands just in front of 18/19 are like those of xvii in size and have similar dorsal insertions. The last pair, just behind 19/20, have their dorsal insertions just in front of 20/21.

Pregizzard part of the esophagus in v, wide, anteroposteriorly flattened, reaching well onto the gizzard and beyond it on each side, the anterior wall thinner than the posterior. Gizzard, in v, large and strong. Extramural calciferous glands lacking but white, longitudinal, (calciferous?) lamellae extend back from shortly behind the gizzard to xii. Intestinal origin, in xiv or xv. Whether an intestinal evagination into xvi on each side of the esophagus was normal is unknown. Typhlosole, beginning rather gradually almost in the first intestinal segment, gradually becoming as much as 3 mm high. On each side closely spaced vertical folds extend from the gut roof down almost to a brownish cord on the ventral face of the typhlosole. Between each 2 consecutive ridges is a deep groove. Frequently the distal end of a lateral ridge is flattened so as to have a T-shape. The typhlosole ends abruptly in the 302nd segment, leaving 106 intestinal metameres atyphlosolate. Lateral typhlosoles, not seen. Intestinal caeca, light yellowish and in marked contrast to the intestinal brown color, paired, from a dorsal part of the gut, in xxii-xxx.

Dorsal blood vessel, single, bifurcating under the brain. Ventral blood vessel, also complete, bifurcating over the subpharyngeal ganglion, each branch passing dorsally along with the circumpharyngeal nervous commissures. Supra-esophageal, recognized only in x-xii. Subesophageal trunks, not closely paired, interconnected by a transverse vessel in region of x, reaching back at least into xiii. Extra-esophageals, present. Subneural, not seen and presumably lacking. Hearts, of x lateral, of xi-xii lateroesophageal.

Excretory system, meronephric. One large, horseshoe-shaped mass of nephridial tubules is on the anterior face of 4/5. Postclitellar nephridia, in a single row of ca. 18-20 on each side of each segment, extending from near the nerve cord almost to mD, so close together as often to have the appearance of a single pair of really large organs per segment. The median-most nephridium on each side, at least in the posterior segments, has a small preseptal funnel.

Metandric, no male funnels in x. Funnels of xi large but tightly flattened against the anterior face of 11/12. Male gonoducts, no epididymis, with muscular sheen and an appearance of straight muscular cords on the ventral body wall. Seminal vesicles, large, much lobed, one pair in xii. Prostates, tubular, with central lumen recognizable to the ental end. One

of xvii is ca. 40 mm long, its duct with muscular sheen, 10+ mm long, passing into the parietes behind and close to a copulatory body. The latter is markedly protuberant into the coelom and with muscular sheen. From its conical apex a strong muscular cord passes to the body wall near mD. Penial setae, 2 per follicle, to 5+ mm long, the major part of the shaft band-like, a short terminal part very gradually narrowing almost to a filament. Attempting to dissect off some tissue clinging to the entalmost portion of the shaft, a single filament was accidentally broken apart and then could be separated from the shaft down to the region where the narrowing begins. Thereupon the remainder of the shaft was deliberately separated into its remaining 3 filaments. The narrowed and seemingly solid terminal portion is variously curved or bent.

Spermathecae, erect, in viii and ix. Ampulla, transversely ellipsoidal but with a slight and shallow circumferential groove at its middle, joined asymmetrically by the equally short and thick duct with a central slit-like lumen. Diverticula and seminal chambers, none found. GM glands, none seen.

Etymology.—The species is named for the donor of the type, in the hope that interest in his namesake will impel P. Lavelle, on his return to Mexico, to enable provision of much needed information.

R. lavellei is distinguished from each of its known Mexican congeners, *R. mexicana* Gates, 1962, *setosa* and *wilsoni* Righi, 1972, by its complete metandry. Relationships at present seem to be closest to the Guatemalan *R. americana* Gates, 1957. The latter is known only from a possible posterior amputee intercepted in soil supposedly from Guatemala. Differences between the two specimens, as to size, segments, secondary annulation, setae, septa, calciferous lamellae, typhlosoles, etc., are all small but numerous. Further material may enable subspecies status in *R. americana*.

Remarks.—The tight coiling and strong contraction of an otherwise well-preserved specimen resulted in some asymmetrical distortion and much handicapped its dissection and study.

When first examined the type seemed to have a faint greenish hue that also characterized only the circular musculature of the body wall. Red, blue and brown color in earthworms usually is associated with parietal pigmentary solids. Green color as in *All. chlorotica* and several species of the oriental octochaetid *Eutyphoeus* never was associated with solids that could be recognized with the binocular dissecting microscope.

A whitish, mucus-like substance surrounded the ingesta in an anterior part of the intestine, like a peritrophic membrane. Similar material was found in some of the yellow, intestinal caeca.

The conical copulatory bodies that protrude conspicuously into the coelom were at first suspected of being copulatory chambers, perhaps partially eversible or protrusible to the exterior. Absence of any real lumen seems to rule out eversion. The external porophore, as well as its setae, do seem

too delicate to be allowed to remain outside during ordinary activity, and especially during locomotion. The strong muscularity of the internal body and its apical cord to the parietes suggest that the external penial body must in some way be retracted or folded over into some parietal depression ordinarily.

Systematics.—The taxa now in *Ramiellona* have been in two different families, the Acanthodrilidae and Octochaetidae (or their equivalents). Some once were in an unrelated Hindustan genus, *Ramiella*, that (with its development of rolled-tube, penial setae and calciferous lamellae) may have been evolving similarly. *Ramiellona* cannot be properly defined, with special reference to its somatic rather than its genital anatomy, as now is necessary. Many additional collections, in much better condition than often was available in the past, must be obtained to provide the requisite revision for what may have been important constituents of a poorly known soil fauna.

Literature Cited

- Gates, G. E. 1957. On a new octochaetine earthworm supposedly from Guatemala. *Breviora*, Mus. Comp. Zool. Harvard, No. 75:1–8.
- . 1962. On some earthworms of Eisen's collection. *Proc. California Acad. Sci.* (4)31:185–225.
- Graff, O. 1957. Regenwurmer aus El Salvador (Oligochaeta). *Senckenbergiana (Biol.)* 38:115–143.
- Michaelsen, W. 1911. Zur Kenntnis der Eodrilaceen und ihrer Verbreitungsverhältnisse. *Zool. Jahrb. Syst.* 30:527–572.
- . 1935. Die opisthoporen Oligochaten Westindiens. *Mitt. Zool. Mus. Hamburg*: 45:51–64.
- Righi, G. 1972. On some earthworms from Central America (Oligochaeta). *Stud. Neotropical Fauna* 7:207–228.

Tall Timbers Research Station, Route 1, Box 160, Tallahassee, Florida 32303.

Mailing address of author.—251 Silver Road, Bangor, Maine 04401.



Gates, G. E. 1978. "On A New Species Of Octochaetid Earthworm From Mexico." *Proceedings of the Biological Society of Washington* 91, 439-443.

View This Item Online: <https://www.biodiversitylibrary.org/item/107593>

Permalink: <https://www.biodiversitylibrary.org/partpdf/45671>

Holding Institution

Smithsonian Libraries and Archives

Sponsored by

Biodiversity Heritage Library

Copyright & Reuse

Copyright Status: In copyright. Digitized with the permission of the rights holder.

Rights Holder: Biological Society of Washington

License: <http://creativecommons.org/licenses/by-nc-sa/3.0/>

Rights: <https://biodiversitylibrary.org/permissions>

This document was created from content at the **Biodiversity Heritage Library**, the world's largest open access digital library for biodiversity literature and archives. Visit BHL at <https://www.biodiversitylibrary.org>.