

ARCTODRILUS WULIKENSIS, NEW GENUS,
NEW SPECIES (OLIGOCHAETA: TUBIFICIDAE)
FROM ALASKA

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Abstract.—*Arctodrilus* is a new tubificine tubificid genus with hair and pectinate setae but no genital setae, male ducts with vasa deferentia about as long as the atria and penes plus ejaculatory ducts, and atria spindle-shaped with median prostates. The type (and only) species *A. wulikensis* from the Wulik River system in Alaska has all the postclitellar setae with long upper teeth. In the bifid anterior ventrals and in the pectinate dorsals the teeth are more nearly equal; the hair and pectinate setae occur from II to XIV. *Psammoryctides hadzii* Karaman has male ducts like those of *Arctodrilus* (which are very general in form) but it does have spermathecal setae. While it is not (as described) a typical member of *Psammoryctides*, *P. hadzii* is left *incertae sedis* in that genus pending a revision of the species based on examination of the type-material.

During an environmental investigation into natural mineral seepages into the Wulik River system headwaters, a new tubificine tubificid was discovered that cannot be attributed to any known genus. The species was only found at locations not affected by the seepages.

Arctodrilus, new genus

Definition.—Tubificine tubificid with male ducts having vas deferens little longer than atrium and ejaculatory duct combined, entering atrium apically, atrium spindle-shaped with median prostate, ejaculatory duct 1.5 times the length of the atrium, of one width and histological composition throughout. Penis present, with thin cuticular sheath no thicker than cuticularized penis sac wall. No modified genital setae. Hair and pectinate setae present in at least some species.

Type-species.—*Arctodrilus wulikensis*, new species, by monotypy.

Etymology.—Found in Alaska north of the Arctic circle.

Discussion.—The male ducts of the single new species are simple unspecialized structures. The most similar male ducts are those of *Limnodrilus* Claparède and *Spirosperma* Eisen species (*sensu* Brinkhurst 1981) but there are no other similarities, and the body wall, setae, prostomium, spermathecae and penes differ from those of both genera. The genus *Tubifex* Lamarck lacks ejaculatory ducts, and while some species currently included within the genus have the vas deferens entering the atrium apically and unassociated with the prostate stalk (see *T. superiorenensis* (Brinkhurst and Cook) *sensu* Brinkhurst 1981), the type and other characteristic *Tubifex sensu strictu* species have the vas deferens and prostate stalk close together under the curved head of a broad, comma-shaped atrium. All species in the genus *Isochaetides* Hrabě emm. Brinkhurst 1981, have very long vasa deferentia, and lack hair and pectinate setae, but most have modified genital setae.

While it seems surprising at first glance that an animal with such a simple male duct cannot be attributed to an existing genus, this new species cannot even be attributed to the genus *Tubifex sensu latu*, and to do so would simply defer the decision that is taken here.

Distribution.—Alaska, Wulik River watershed, DeLong Mountains above Kivalina (see species description).

Arctodrilus wulikensis, new species

Fig. 1

Description.—Up to 43 segments, length 8.0 mm, width 0.2 mm. Dorsal setae anteriorly 2–4 or even 5 long serrate hairs, with serrations probably on one side; thin and as long as body width; 2–4 or 5 pectinate setae which, under lower power magnification, appear to have long, thin outer teeth and thin intermediate teeth arranged in a broad, semi-palmate form but which appear more typically pectinate under oil immersion lens (Fig. 1). Hair setae and pectinate setae absent beyond XIV, where they are replaced by 2–3 bifid setae resembling the ventral setae. Ventral anterior setae 3–5 per bundle, bifid with upper teeth thinner than but only a little longer than the lower, behind XIV with upper tooth thinner but twice as long as the lower; no modified genital setae. Reproductive system as for the Tubificinae, with all organs paired. Spermatheca with short stout duct, voluminous and thin-walled ampulla and lateral pore. Spermatzeugmata present, broad. Male duct with thin vas deferens which widens distally but narrows immediately prior to insertion at apex of atrium; atrium tubular, widest just above the mid-point where a substantial stalked prostate enters. A substantial ejaculatory duct connects the atrium with the penis sac; the penis sac is ovoid-oblong with cuticular walls, the contained penis is of similar shape and has a thin cuticular sheath no thicker than the cuticle on the penis sac wall. The penis sac may be eversible, but there is a true penis within the sac (Fig. 1).

Type-locality.—Red Dog Creek and Ikalukrok Creek, part of Wulik River system, DeLong Mountains, Brooks Range, Alaska (68°05'N, 162°45'W), in areas not affected by seepages containing large amounts of zinc, cadmium, iron, or manganese. July–August 1982.

Etymology.—From the Wulik River drainage.

Holotype.—USNM 80444, a dissected whole mount in Canada Balsam.

Paratypes.—USNM 80445–80453, 7 whole mounts and 70 specimens in fluid. Brinkhurst collection 5 whole mounts, Kathman collection 2 whole mounts.

Discussion.—As with the generic diagnosis, there is little of a specialized nature to comment upon in the species description. The setation is somewhat unusual in that the upper teeth of the dorsal and ventral postclitellar setae are longer than the lower teeth, whereas the opposite trend is more usual. A similar tendency to elongation of the upper tooth posteriad is seen in the naidid genus *Amphichaeta* Tauber, but in the new taxon considered here the change from one form to the other is abrupt and coincides with the loss of hair and pectinate setae dorsally. The tendency to loss of hair and pectinate setae posteriad is common in tubificids but is usually progressive, with replacement of pectinates by bifids of essentially similar shape occurring before shortening and reduction in number or total loss of hair setae.

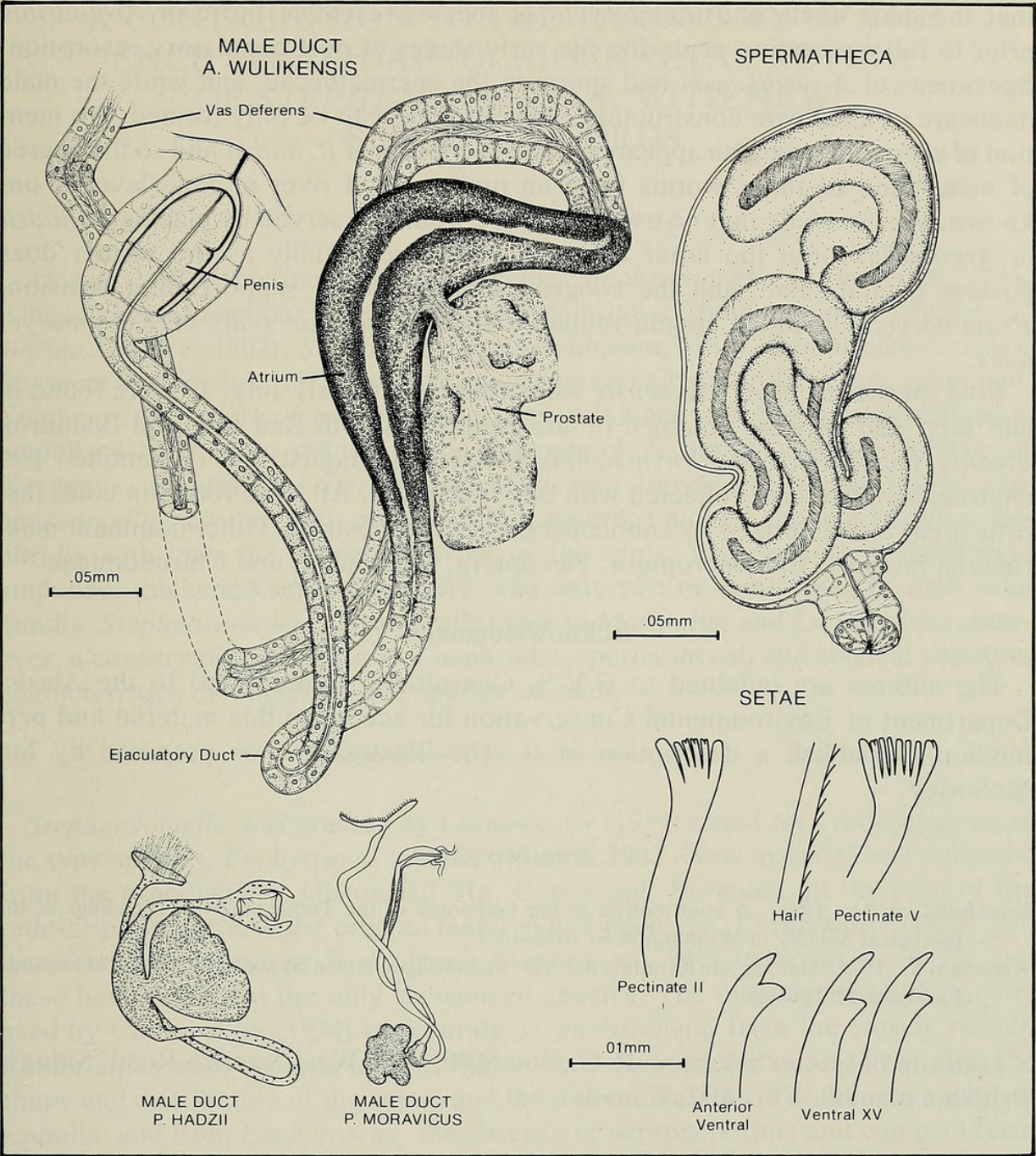


Fig. 1. *A. wulikensis*, reproductive structures and setae, from holotype and paratype respectively; *Psammoryctides hadzii* and *P. moravicus*, male ducts, redrawn from literature in comparable position.

We are aware of only one other species with male ducts that are supposed to resemble those of *A. wulikensis* to some extent, and that is *Psammoryctides hadzii*, described by Karaman (1974). According to the illustration (Fig. 1), that species cannot be attributed to *Psammoryctides* as there is no enlargement of the ejaculatory duct and the atrium is not the usual small globular body, both essential characteristics of that genus. *Psammoryctides hadzii* is discussed by its author in relation to *P. ochridanus* (Hrabě), although that species has male ducts and spermathecal setae of the form typical of the genus and *P. hadzii* has only the latter. Similar spermathecal setae are found in other genera, however, so this character by itself is not diagnostic. There remains the very unlikely possibility

that the male ducts of *Psammoryctides* species resemble those of *Arctodrilus* prior to full maturation or during the early stages of post copulatory resorption. Specimens of *A. wulikensis* had sperm in the spermathecae, and while the male ducts are of a delicate construction, they do appear to be fully formed. No mention of spermatozeugmata appears in the description of *P. hadzii* and so the degree of maturation of these worms from an underground river in Yugoslavia is unknown. We conclude that no useful purpose would be served by placing *P. hadzii* in *Arctodrilus* until the latter is better known, especially as the former does possess genital setae, and the zoogeographic evidence supports that decision. *Psammoryctides hadzii* should remain a species *incertae sedis* of *Psammoryctides*.

Five specimens of *A. wulikensis* were collected in early July, 12 were found in late July, and 68 were obtained in late August, in both Red Dog and Ikalukrok creeks. The lumbriculid *Rhynchelmis brooksi* Holmquist and unidentified Enchytraeidae were also collected with our specimens. All were found in cold, fast riffle areas characterized by cobble/pebble/gravel substrate. Other dominant macrofauna included Ephemeroptera, Plecoptera, Simuliidae, and Chironomidae.

Acknowledgments

The authors are indebted to E.V.S. Consultants Limited and to the Alaska Department of Environmental Conservation for access to this material and permission to publish a description of it. The illustration was prepared by Ian McSorley.

Literature Cited

- Brinkhurst, R. O. 1981. A contribution to the taxonomy of the Tubificinae.—Proceedings of the Biological Society of Washington 94:1048–1067.
- Karaman, S. 1974. Beitrag zur Kenntnis der Süßwasseroligochaeten Sloweniens.—Bioloski vestnik Ljubljana 22:223–228.

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Brinkhurst, Ralph O. and Kathman, R Deedee. 1983. "Arctodrilus wulikenses, new genus, new species (Oligochaeta: Tubificidae) from Alaska." *Proceedings of the Biological Society of Washington* 96, 407–410.

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