

## NOTES ON *VARICHAETADRILUS* BRINKHURST AND KATHMAN, 1983 (OLIGOCHAETA: TUBIFICIDAE)

Ralph O. Brinkhurst

*Abstract.*—*Varichaetadrilus nevadanus* (Brinkhurst, 1965) is regarded as a synonym of *V. minutus* (Brinkhurst 1965), and an earlier record of *V. minutus* from Alberta, Canada is recognized as pertaining to *V. pacificus* (Brinkhurst, 1986).

During the construction of a key to North American freshwater aquatic oligochaetes (Brinkhurst 1986) it was recognized that *Isochaetides nevadanus* (Brinkhurst, 1965) and *Psammoryctides* (?) *minutus* Brinkhurst, 1965, were congeneric with *Varichaetadrilus* Brinkhurst and Kathman, 1983. When an opportunity to acquire fresh material from the type locality common to both species (Lake Tahoe, Nevada/California) arose, the type material of both species was subsequently reexamined along with specimens from Alberta, Canada, originally identified as *V. minutus*.

*Material examined.*—*Varichaetadrilus nevadanus*: Holotype USNM 32642, 6 paratypes of which 3 immature 32643; 6 paratypes on 3 slides, 2 immature, AMNH 3670; 6 paratypes, 3 immature BMNH 1964.15.10; 5 paratypes all immature, Brinkhurst collection, all Lake Tahoe.—*V. minutus*: Holotype USNM 32639, 6 paratypes 3 immature, 32640; 6 paratypes 3 immature AMNH 3669; 4 paratypes immature BMNH 1964.15.16-19; 7 paratypes, 3 immature Brinkhurst collection, all Lake Tahoe.—*V. pacificus*: 5 paratypes Mowich Lake, Mount Rainier, Washington, 5 specimens Toolik Lake, Alaska, 4 specimens, 1 immature, Sturgeon Lake, Alberta, formerly identified as *V. minutus*. Other material: 1 mature and 14 immature specimens, Pope Beach, littoral, Lake Tahoe, coll. R. O. Schuster and E. C. Toftner, 31 Aug 1976.

### Comparison of *V. minutus* and *V. nevadanus* Fig. 1

When *V. minutus* and *V. nevadanus* were first described, slightly modified penial chaetae of a type unknown to the Tubificinae were noticed on mature specimens of *V. minutus*. A careful search for genital chaetae had followed a tentative identification of this species as a possible member of the genus *Psammoryctides* based on observation of fragments of the male ducts including the penes. Most species in that genus possess typical tubificine spermathecal chaetae. *Varichaetadrilus minutus* has penial chaetae that are wider than the normal ventrals, with foreshortened distal ends but they are otherwise recognizable as bifid chaetae. These penials are now known to be characteristic of *Varichaetadrilus* species. The second species, *V. nevadanus*, was originally placed in *Isochaeta*, but both generic assignments were clearly stated to be tentative (Brinkhurst 1965). No genital chaetae were reported for *V. nevadanus*.

The first observation made here is that penial chaetae are present on the holotype and all other specimens of *V. nevadanus*. Careful comparison of the number and variations of chaetal shape for all the somatic chaetae suggest that these two sympatric congeners are in fact synonymous. The variations in chaetal number and form that were



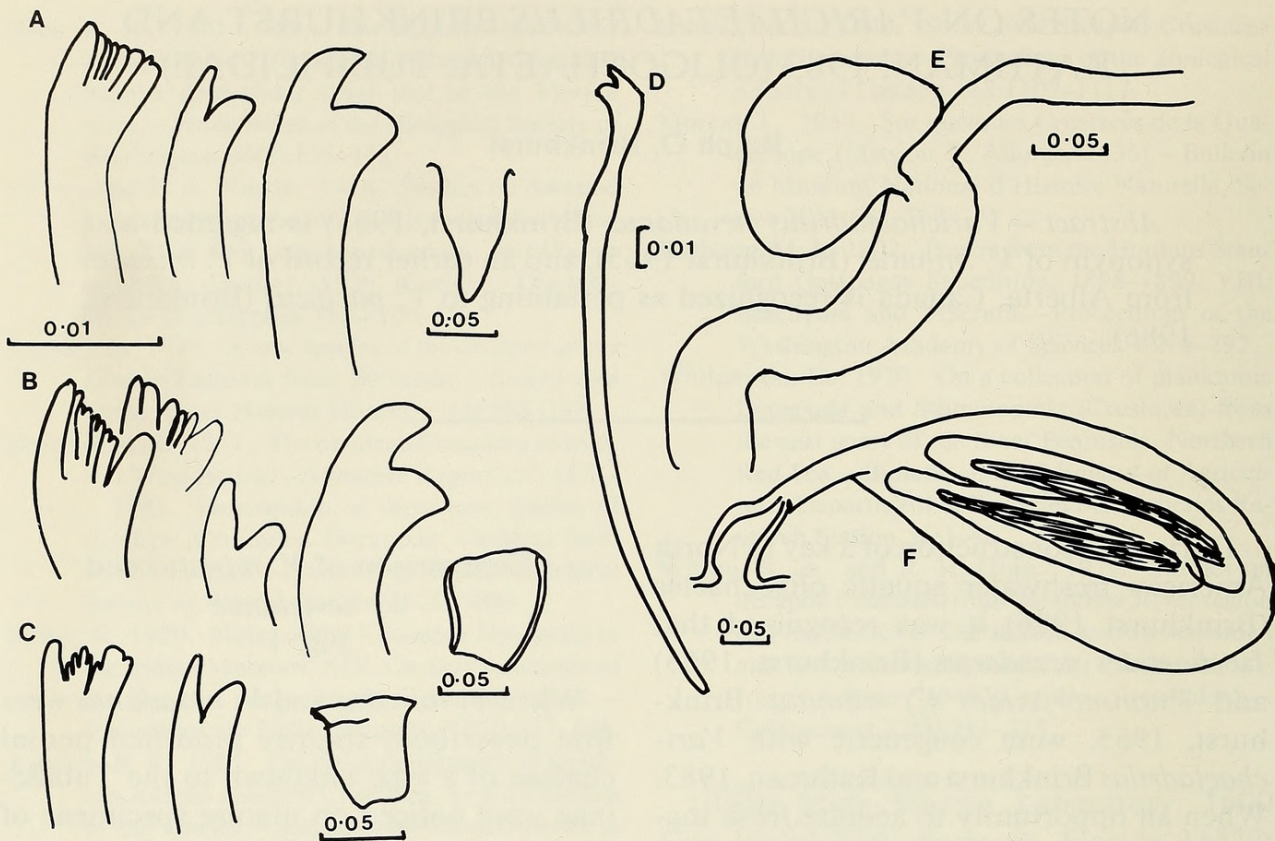


Fig. 1. *Varichaetadrilus* spp.: A, *V. minutus*, from *nevadanus* type series, left to right, pectinate, anterior ventral, and penial chaetae, penis sheath; B, Same, from *minutus* type series; C, *V. pacificus*, Alberta material, pectinate and anterior ventral chaetae, penis sheath; D–F, *V. minutus* type series: D, Penial chaetae; E, Prostate-atrium-vas deferens union; F, Spermatheca with spermatozeugmata.

supposed to separate these two species turn out to have been based on the inclusion of immature specimens in both type series. All mature specimens possess mostly 3–4 hairs and 3–4 pectinates (up to 5 of each in a few bundles) in anterior dorsal bundles but only 1–2 hairs and 1–3 bifids posteriorly. The ventral bundles contain up to 6, rarely 7, chaetae per bundle with only 2–3 posteriorly. These chaetae have upper teeth that are thinner than but not much longer than the lower when viewed laterally. Earlier illustrations by the author and by Loden (1978) suggest that the upper teeth of the ventral chaetae in *V. minutus* are considerably longer than the lower, but this cannot be confirmed from mature specimens. Both sets of types have 3–5 penial chaetae in each ventral bundle of XI, each chaeta being about 1.5 times the breadth of the normal ventrals, with short distal and long proximal

ends, the teeth being somewhat inflated in contrast to normal ventrals. The large penes bear small cuticular sheaths at the distal ends. Now that the genus *Varichaetadrilus* has been established, the parts of the male ducts dissected out of the types of this material can be clearly recognized. The holotype of *V. nevadanus* has quite recognizable atria, one of the USNM paratypes has a good penis sheath, and those from the BMNH have traces of recognizable male ducts and clear penes. One of the mature specimens (labelled #3) has no penial chaetae and the fragments of male duct seem atypical. The specimen, as well as several of the immatures, may well not be conspecific and this is now indicated on the labels. Among the paratypes of *V. minutus* one specimen (#2) has good visible spermathecae, and the parts of the male duct showing the characteristic vas deferens/atrium/pros-



tate junction are clearly visible. All of the mature specimens have penial chaetae, as do all but the single *V. nevadanus*.

The large volume of new material from very shallow water at Popes Beach, Lake Tahoe, provided only a single mature specimen. This has short, almost cube-shaped cuticular penis sheaths and the usual penial chaetae. The dorsal chaetal bundles contain 2–4 hairs and 2–4 pectinates with thin, fairly long lateral teeth anteriorly and 1 hair and 1–2 bifids posteriorly. There are 5 ventrals in each anterior bundle, diminishing to 2 posteriorly.

*Varichaetadrilus pacificus*  
(Brinkhurst, 1981)

Examination of the material of this species revealed that there may be as many as 7 penial chaetae in a bundle, not just 3–4 as originally described. The maximum number of somatic ventrals is increased from 6 to 7. None of the available specimens had the maximum number of hair and pectinate chaetae reported for this species (4–7 instead of up to 10). Penes with conical cuticular penis sheaths were observed in several, and in a specimen from the type locality the spermathecae were observed to have a small vestibule or swelling of the duct close to the external pore.

### Discussion

All three of these species were described from very small sets of material and their status cannot be considered to be completely resolved. Both the Lake Tahoe material and the Toolik Lake collections were submitted for identification by biologists involved in ecological studies of particularly interesting sites. The Lake Tahoe set contained several species that were unknown,

raising the possibility of a center of endemism in the lake or at least in the Great Basin, and tubificids are unusual as far north as Toolik Lake in Alaska. The material available now clearly suggests that there is a single species limited to Lake Tahoe so far as we know, and as both of the names and descriptions now thought to be synonymous were published at the same time, the name *V. minutus* is retained with *V. nevadanus* as its synonym because the former appeared on an earlier page in the publication than the latter. The second species, *V. pacificus*, will be retained for the moment, with its distribution including the record from Alberta as well as those from Alaska, Oregon, and Washington. While this is based on the anatomical evidence, the distribution pattern is also sensible.

### Acknowledgments

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Institute of Ocean Sciences, P.O. Box 6000, Sidney, British Columbia V8L 4B2, Canada.



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