

NOTES ON COPULATORY AND PENIAL SETAE IN *HOPLO- CHAETELLA* MICHAELSEN.

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Although the genus *Hoplochaetella* Michaelsen was first established by Beddard in 1890 (under the name of *Hoplochaeta*) and has since been revised by Gates (1940) the quadriprostatic species of this genus are still by no means easily distinguishable and the status of several species is uncertain.

Certain ventral setae of both prostatic segments and those in the vicinity of spermathecal pores are slightly modified, displaced or possibly lost. Gates has referred to the modified ventral setae of xvii and xix as 'penial'

As characteristics of such modified setae have been found to be of considerable taxonomic value in the diagnosis of species in other genera (Pickford, 1937, p. 25), the present work was begun with the idea of discovering if similar setal characteristics are available for identification of species of *Hoplochaetella*. Unfortunately because of war conditions the work had to be abandoned before any satisfactory conclusions could be reached, but it may be noted that in two distinct species, *H. affinis* and *H. kempi*, the size, shape and ornamentation of copulatory setae are practically the same.

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Hoplochaetella affinis Stephenson, 1917.

Material examined.—Setae from specimen No. 2 of the type-series (*vide* Gates, 1940).

The shaft of the copulatory setae is fairly straight except for an abrupt ectal bend. Ectally the shaft is fairly uniform in thickness widening to a nodule at a distance roughly two thirds of the way down the shaft from the ectal margin. The tip is flattened but not widened, terminating in a bluntly-rounded or squared end.

The ornamentation consists of rows of teeth in an almost unbroken, spiral arrangement. The teeth, which are 'saw-like', are absent from the extreme ectal end but continue to between 120 and 160 micra from the ectal margin down the length of the shaft. All measurements are in millimetres except otherwise indicated.

Table of measurements of copulatory setae.

Segment	Length	Distance of nodulus from tip	Width 10 micra from tip	Width through nodulus
viii	0.64	0.46	0.012	0.032
	0.65	0.42	0.014	0.031
	0.66	0.43	0.012	0.028
	0.63	0.42	0.010	0.028
	0.61	0.40	0.020 (broken)	0.033
	0.48	0.39	0.020 („)	0.035
ix	0.65	0.44	0.012	0.027
	0.61	0.41	0.012	0.025
	0.57	0.42	0.011	0.023
	0.014 ¹	0.008	0.012	0.015
	0.60	0.46	0.013	0.030
?	0.54	0.38	0.009	0.025
	0.56	0.40	0.010	0.026
	0.60	0.42	0.011	0.027
	0.56	0.40	0.009	0.026

¹ Reserve.**Hoplochaetella kemp**i Stephenson, 1917*Material examined.*—Setae from type of *H. kemp*i.

The shaft of the copulatory setae is straight except for an ental arc-like curvature ending in a knob. The ectal end is bluntly pointed and has the appearance of a central longitudinal ridge or groove on one side; this, however, may be due to poor preservation of the material.

The ornamentation consists of spirally arranged 'spine-like' teeth present for some distance down the shaft but absent from the extreme tip. The spirals appear to be broken on one side but this seems to be due to the longitudinal ridge as the spiral can be traced as a continuous line by changing the focus of the lens.

Table of measurements of copulatory setae.

Segment	Length	Distance of nodulus from tip	Width 10 micra from tip	Width through nodulus
vii	0.56	0.35	0.009	0.024
	0.55	0.35	tip broken	0.026
	0.58	0.36	tip broken	0.027
	0.57	0.38	0.009	0.026
viii	0.57	0.39	0.010	0.026
	0.57	0.38	blunted	0.030
	0.56	0.40	blunted	0.027
	0.54	0.39	broken	0.022
	0.54	0.38	broken	0.025
ix	0.54	0.39	0.010	0.025
	0.54	0.35	0.009	0.025
	0.52	0.37	0.009	0.024

Hoplochaetella khandalaensis (Stephenson), 1924.

Material examined.—Setae of specimens from Andheri.

Normal setae.—The shaft is curved in a slight arc at the ectal end terminating in a bluntly-pointed tip. A distinct nodulus is visible approximately one third of the length of the shaft from the ectal margin.

Ornamentation is entirely lacking.

Copulatory setae.—The shaft is straight ectally but entally tapers to a very slender curved region at right angles to the rest of the shaft and terminates in a pointed end. The ectal end is either pointed or rounded and there appears to be a slight longitudinal groove running down the shaft in the ental region.

The ornamentation consists of 'saw-like' teeth in the form of broken rows spirally arranged and continuous from the tip to 50 micra down the shaft.

Penial setae.—The shaft is practically straight though a slight ectal and ental curvature is visible and also a distinctly thickened region half way down the shaft. The shaft tapers gradually to within 10 micra of the ectal margin, when the tapering becomes much sharper, the shaft terminating in a bluntly-pointed or rounded end. The tip is rounded on one side, flattened or slightly concave on the other.

The ornamentation consists of small irregular 'saw-like' rows of teeth in broken rows spirally arranged. The teeth are entirely absent from the extreme tip and only continue entally to about 50 micra down the shaft.

Table of measurements of setae.

Segment	Type of setae	Length	Width at widest region	Distance of nodulus from tip	Width, 10 micra from tip
xxi	ordinary	0.33	0.025	0.11	0.010
		0.30	0.026	0.12	0.010
viii	copulatory	0.70	0.023	...	0.010
		0.74	0.028	...	0.010
		0.65	0.025	...	0.009
		0.71	0.028	...	0.010
		0.72	0.025	...	0.010
		0.74	0.027	...	0.010
xix	penial	0.44	0.019	0.23	0.012
		0.12		broken	
xvii	penial	0.29	0.016	0.18	0.007
		0.33	0.016	0.18	0.006
xix	penial	0.43	0.020	0.25	0.010
xix	penial	0.43	0.030	0.25	0.010
		0.35	0.022	0.21	0.006

Hoplochaetella mullani (Stephenson), 1924.

Material examined.—Setae from a type of *H. mullani*.

The ental part of the shaft is curved in a wide arc, tapering to a slender, bluntly-rounded base. Ectally the shaft is straight terminating in a bluntly-rounded or squared end.

The ornamentation consists of teeth in the form of a 'saw-like' jagged edge to deep serrations on the shaft itself. The teeth are in short broken rows, approximately 10 micra long and at a distance of 10-15 micra apart (*i.e.*, rows directly below each other). There is a slight suggestion of spiral arrangement though more probably the rows simply form unbroken circles. Teeth are absent from the extreme tip.

Table of measurements of copulatory setae.

Segment	Length	Distance of nodulus from tip	Width 10 micra from tip	Width through nodulus
viii	0.80	0.53	0.012	0.026
	0.78	0.49	0.010	0.026
	0.76	0.53	0.011	0.026
	0.74	0.53	broken	0.025
	0.74	0.50	0.011	0.023
	0.72	0.50	0.010	0.024
	0.70	0.53	0.010	0.020
	0.68	0.46	blunted	0.022
	0.68	0.50	0.010	0.025
	ix	0.78	0.54	0.011
0.78		0.49	0.010	0.022
0.77		0.52	0.010	0.022
0.77		0.50	0.010	0.022
0.77		0.50	0.010	0.022
0.76		0.50	0.010	0.023
0.72		0.47	blunted	0.023
0.71		0.48	0.010	0.022
0.71		0.49	0.010	0.022
0.45			broken	
0.40			broken	

REFERENCES.

- Pickford, G. E., 1937.—*A Monograph of the Acanthodriline Earthworms of S. America.* (Cambridge).
- Gates, G. E., 1940.—Indian Earthworms XII. The genus *Hoplochaetella*. *Rec. Ind. Mus.* XLII, pp. 199-252.