

## Redescription of *Parophryotrocha isochaeta* (Eliason, 1962) and a new species of *Parophryotrocha* (Polychaeta: Dorvilleidae) from the Skagerrak and North Sea

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**SUMMARY:** The original description of *Parophryotrocha isochaeta* (Eliason, 1962; as *Ophryotrocha* (?) *isochaeta*) was based on three specimens collected in the deepest part of the Skagerrak in 1933. The species is here redescribed from new material collected at the type locality in 1990. Its most characteristic features pertain to jaw morphology and the presence of only one type of simple chaeta in all parapodia. Several structures, such as prostomial appendages, parapodia and parapodial cirri, were not depicted in the original description, but were found to be present and are here characterised. A new species, *Parophryotrocha rhadina* n. sp., is described from material collected from the northern North Sea. It differs from *P. isochaeta* by being smaller and of slimmer size, by lacking ventral cirri and by the shape of the mandibles and maxillae. The genus *Parophryotrocha* Hartmann-Schröder, 1971 was originally erected for *O. (?) isochaeta* with lack of antennae, palps, parapodia and composite chaetae as diagnostic features. The generic definition is here emended. The status of the genus is discussed with regard to related genera. The presence of prostomial and parapodial structures implies that the difference between *P. isochaeta* and the species currently placed in *Ophryotrocha* is not as great as had previously been considered.

**Keywords:** Polychaeta, *Parophryotrocha*, redescription, new species, Skagerrak, North Sea.

**RESUMEN:** REDESCRIPCIÓN DE *PAROPHRYOTROCHA ISOCHAETA* (ELIASON, 1962) Y UNA NUEVA ESPECIE DE *PAROPHRYOTROCHA* (POLYCHAETA:DORVILLEIDAE) DEL SKAGERRAK Y EL MAR DEL NORTE. – La descripción original de *Parophryotrocha isochaeta* (Eliason, 1962; como *Ophryotrocha* (?) *isochaeta*) estaba basada en tres ejemplares recogidos en la parte más profunda del Skagerrak en 1933. Esta especie es redescrita en este trabajo en base a nuevo material recogido en su localidad tipo en 1990. Sus características más peculiares son la morfología de las mandíbulas y la presencia únicamente de un tipo de sedas simples en los parápodos. Otras estructuras como los apéndices del prostómio, los parápodos y sus cirros parapodiales, no fueron incluidas en la descripción original y son ahora descritas. Una nueva especie, *Parophryotrocha rhadina* n. sp., se describe en base a material obtenido en el Mar del Norte. Esta especie difiere de *P. isochaeta* en ser más pequeña y esbelta, en la falta de cirros ventrales y en la morfología de las mandíbulas y maxilas. El género *Parophryotrocha* Hartmann-Schröder, 1971 fue originalmente creado para *O. (?) isochaeta* con ausencia de antenas, palpos, parápodos y sedas compuestas como características en su diagnosis. Esta definición genérica es enmendada. El nuevo estado del género se discute en relación a otros géneros afines. La presencia de prostómio y estructuras parapodiales implica que las diferencias entre *P. isochaeta* y otras especies de *Ophryotrocha* no son tan grandes como habían sido consideradas.

**Palabras clave:** Polychaeta, *Parophryotrocha*, redescrpción, nueva especie, Skagerrak, Mar del Norte.

### INTRODUCTION

The genus *Parophryotrocha* Hartmann-Schröder, 1971 comprises a small group of

dorvilleid polychaetes with rather simple external morphology. The main characterising feature is that all chaetae are simple. Presently only two species are included in the genus, *P. isochaeta* (Eliason,

1962) from the Norwegian part of the Skagerrak, and *P. gesae* Hilbig and Blake, 1991 from the US Atlantic slope. Recently, a third species of *Parophryotrocha* was collected during environmental monitoring in the northern North Sea.

The original description of *Parophryotrocha isochaeta* (as *Ophryotrocha* (?) *isochaeta*) was based on three specimens collected in 1933 from the deepest part of the Skagerrak (Eliason, 1962). The description is brief, and several characteristics, such as prostomial appendages, parapodia and parapodial cirri, are not depicted. In 1990, numerous specimens were collected during sampling at the type locality. The new material shows that several of these structures are present. Some of the characters are important for the diagnosis of the genus.

In this study, *Parophryotrocha isochaeta* is redescribed and an emended diagnosis of *Parophryotrocha* is given. The new species from the North Sea is described and compared with the other species in the genus.

## MATERIAL AND METHODS

The new material of *Parophryotrocha isochaeta* was collected during a reinvestigation of the epibenthic fauna in the Skagerrak reported from Swedish expeditions in 1933-37. Several stations were revisited using a modified Rothlisberg-Percy epibenthic sledge. Samples were sieved on 0.5 mm screens and preserved in 4 % buffered formaldehyde solution. Details of the sampling, the equipment used, and the results for amphipod crustaceans have been given by Miskov-Nodland *et al.* (1999).

The new species was collected during environmental monitoring in the vicinity of oil installations in the northern North Sea. Quantitative samples were taken using a 0.1 m<sup>2</sup> van Veen grab, sieved through 1 mm round-holed screens, and preserved in 4 % buffered formaldehyde solution. Specimens were rinsed in freshwater and transferred to alcohol during sorting. Details of the sampling and results have been given by Mannvik *et al.* (2003).

Specimens were examined in alcohol or glycerol under a stereomicroscope or a compound microscope with phase contrast. To inspect maxillary structures and mandibles, a dorsal incision was made and muscular tissue removed using a pair of fine needles. Drawings were prepared with the aid of an eyepiece measurement graticule.

The material is deposited at the Museum of Evolution, Uppsala University, Sweden (UUZM) and the Bergen Museum, Bergen, Norway (ZMUB).

## SYSTEMATICS

Genus *Parophryotrocha* Hartmann-Schröder, 1971

*Type species: Ophryotrocha* (?) *isochaeta* Eliason, 1962.

*Emended diagnosis.* Body cylindrical and slender, completely ciliated. Prostomium with simple antennae, with or without palps. Parapodia uniramous, with or without dorsal and ventral cirri. Chaetae all simple, gently curved with obtuse tips only, or fine capillaries and gently curved with obtuse tips. Maxillae composed of p-type or K-type forceps and 5-7 pairs of free denticles in four rows. Mandibles anteriorly flared, with or without an indented cutting edge.

*Remarks.* Hartmann-Schröder (1971) considered the lack of antennae, palps, parapodia and composite chaetae as diagnostic features of *Parophryotrocha*. Hilbig and Blake (1991) emended the diagnosis to encompass *P. gesae* which has antennae and distinct parapodia. The present redescription of *P. isochaeta* shows that palps and parapodial cirri are also present. The diagnosis is here emended in accordance with the new information on morphological features of *P. isochaeta*.

### *Parophryotrocha isochaeta* (Eliason, 1962) (Fig. 1)

*Ophryotrocha* (?) *isochaeta* Eliason, 1962: 260-261, fig. 16a-e.  
*Parophryotrocha isochaeta*. – Hartmann-Schröder 1971: 260; 1996: 285-286. – Eibye-Jacobsen and Kristensen 1994: 117-128.  
*Paraophryotrocha isochaeta*. – Kirkegaard 1992: 398-399.

*Material examined.* Skagerrak stn 13, 58°9'N, 9°17'E, 650 m, dark brown sediment, 1 July 1933 (station data from Eliason, 1962), holotype and 2 paratypes (UUZM 2297). – Skagerrak expedition 1990, stn 7 (= stn 82 in Enequist, 1949), 58°15'N, 9°39'E, 670 m, 14 March 1990, 10 specimens (UUZM), 10 specimens (ZMUB 76310).

*Description.* Complete specimens (preserved) 18-19 mm long, 0.8-0.9 mm wide at chaetiger 10, with 130-135 chaetigers. Body becoming gradually slimmer posteriorly, width 0.4-0.5 mm at about chaetiger 100. Segments short, dorsally strongly convex, ventrally flat (Fig. 1A). Segments in middle

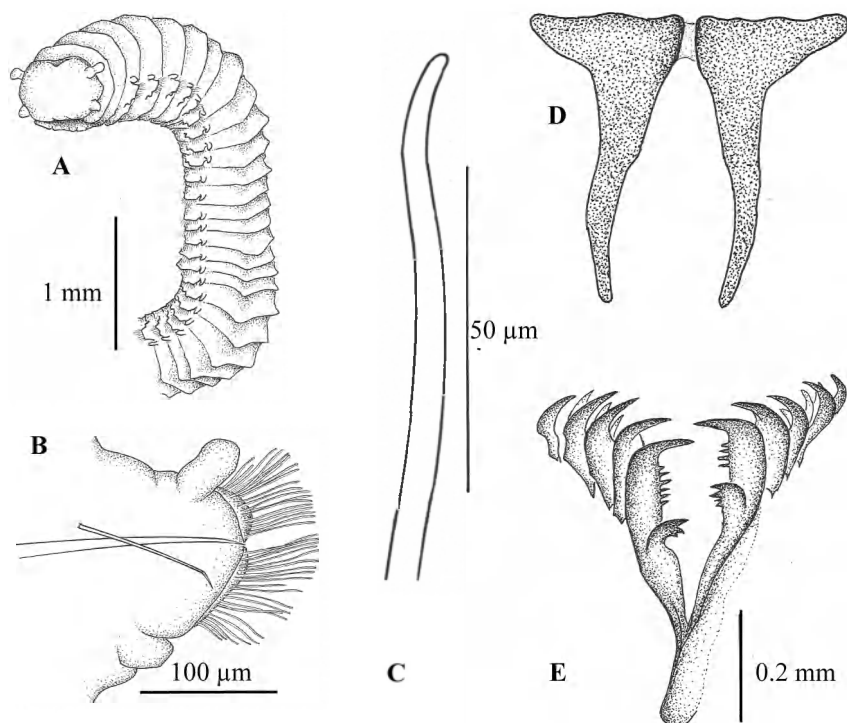


FIG. 1. – *Parophryotrocha isochaeta* (Eliason, 1962). A, anterior part of body; B, left parapodium 26, anterior view; C, chaeta, chaetiger 26; D, mandibles; E, maxillae. (All from specimens from Skagerrak, stn 7, 1990, UUZM).

and posterior body with a more or less recognisable transverse ridge, often drawn out into dorsolateral flaps or lobes. Segments ringed by ciliary bands, dorsally and laterally running on the transversal ridge. Pygidium simple, gradually tapering, without cirri. Prostomium (Fig. 1A) short, anteriorly flattened, wider than long. Antennae dorsolateral, short digitiform, weakly bi-articulate. Palps ventrolateral, simple papilliform. A pit or depression (in some specimens appearing as a retracted papilla) situated dorsally on the prostomium may be a nuchal organ. Eyes not visible. Peristomium wider than prostomium, in two achaetous and apodous sections. Mouth ventral with wide opening, often with mandibles and anterior maxillae clearly visible and partly protruded. Chaetigers with simple uniramous parapodia, of similar size throughout. Parapodia lateral in most anterior chaetigers, ventrolateral in middle and posterior body, with a low rounded prechaetal lobe and a low weakly bilobed postchaetal lobe (Fig. 1B). Dorsal cirri papilliform to short digitiform. Ventral cirri short papillate, often partly retracted and hardly visible. Parapodia supported by one strong medial acicula and one ventrally directed thin acicula with a curved distal end. All chaetae simple, slightly curved, with obtuse tips, without teeth or serrations (Fig. 1C). Chaetae grouped in supra-acicular

and sub-acicular fascicles, 15-30 chaetae in each fascicle. Jaws situated in pharynx within peristomium and anterior chaetigers. Mandibles (Fig. 1D) composed of two triangular plates, anterior margin gently undulate, without defined teeth. Mandibles connected by a thin ligament. Maxillae (Fig. 1E) composed of strong forceps and anterior denticles in two partly coalesced rows on each side. Prongs of forceps fused with the most posterior denticle on each side, each prong forming a structure with a medially-directed branch with strong teeth followed by a cutting edge with 4-6 small teeth and an incurved hook. Prongs asymmetrical, medial branch of left prong situated posterior to the branch of right prong. Occasionally two most posterior denticles fused with forceps. Seven free denticles on each side, each denticle with an inward directed strong hook. Most posterior free denticle with small teeth or serration along inner margin. Sexual products (eggs) observed in middle and posterior chaetigers in some specimens.

*Remarks.* The original material consists of the holotype and two paratypes, which have been selected by Eliason according to information on the labels. The designation of types was not reported in the original description, however. The holotype is

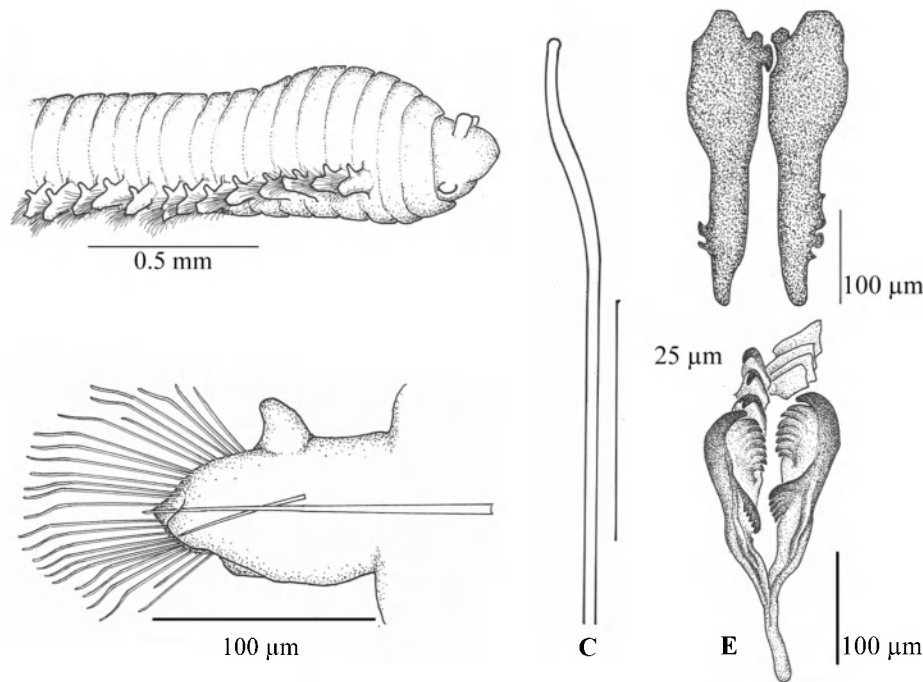


FIG. 2. – *Parophryotrocha rhadina* n. sp. A, anterior part of body; B, right parapodium 9, anterior view; C, chaeta, chaetiger 9; D, mandibles; E, maxillae, forceps and left row of denticles. (A from paratype, ZMUB 76308; B–E from paratype, ZMUB 76309).

illustrated by Eliason (1962) as figure 16a. The material is in generally poor condition. Palps, antennae and parapodia are hardly discernible. The jaws are partly exposed by dissection in the holotype and one of the paratypes. The shape of the visible parts, especially the forceps, agrees with the structures in the specimens in the new material.

The new material comprises about 100 specimens, of which many are complete. The main new information pertains to the presence and shape of prostomial appendages, parapodia and parapodial cirri. The original description is confirmed with regard to chaetae, mandibles and maxillary denticles, but the forceps of the maxillae have a more complicated structure than originally illustrated.

**Distribution.** Only known from the deepest part of the Skagerrak, Norway.

***Parophryotrocha rhadina* n. sp.**  
(Fig. 2)

**Material examined.** Northern North Sea; Snorre B oil field, stn SNB-16R, 61°35'15"N, 2°4'30"E, 341 m, fine silt, 29 May 2002, holotype (ZMUB 76307), 2 paratypes (ZMUB 76308); Snorre TLP oil field, stn SRP-10R, 61°30'45"N, 2°0'30"E, 312 m, silty sand, 29 May 2002, 1 specimen; Visund Nord oil field, stn VIN-9, 61°26'21"N, 2°33'36"E, 378 m, silt overlying clay, 24 May 2002, 2 paratypes (ZMUB 76309); Visund Nord oil field, stn VIN-16, 61°26'36"N, 2°33'25"E, 379 m, silt overlying clay, 24 May 2002, 1 specimen.

**Description.** All specimens are incomplete. Largest specimen (holotype) measures 6.0 mm for 58 chaetigers, width 0.45 mm at chaetigers 10–20. Segments short, dorsally convex, ventrally flat (Fig. 2A). Body slender, peristomium and most anterior segments containing pharyngeal structures partly swollen, posterior part slightly tapering. Segments ringed by ciliary bands. Prostomium (Fig. 2A) short, anteriorly flattened, wider than long. Antennae dorsolateral, short digitiform. Palps ventrolateral, simple papilliform, difficult to see. Eyes not visible. Peristomium wider than prostomium, in two achaetous and apodous sections. Mouth ventral with wide opening, often with mandibles partly visible. Chaetigers with simple uniramous parapodia, of similar size throughout. Parapodia lateral in most anterior chaetigers, ventrolateral in the middle and posterior body. Parapodia distally with a broadly triangular acicular lobe and a low prechaetal lobe (Fig. 2B). Dorsal cirri papilliform to short digitiform. Ventral cirri lacking. Parapodia supported by one strong medial acicula and one ventrally-directed thin acicula. All chaetae simple, distally sigmoid, slightly dilated in curved part, with obtuse knob-like tip, without teeth or serrations (Fig. 2C). Chaetae grouped in supra-acicular and sub-acicular fascicles, 12–25 chaetae in each fascicle. Jaws situated within peristomium and anterior chaetigers. Mandibles



(Fig. 2D) composed of two anteriorly-flared rods, each with a marked tooth on inner border of anterior margin. Mandibles have a process on left piece fitting into a socket on right piece. Several more or less irregular hook-shaped or globular processes situated posteriorly on the rods. Maxillae (Fig. 2E) of p-type, composed of the forceps and anterior denticles in two rows on each side. Prongs of forceps with anterior hook and inner cutting edge with 6-8 teeth. Medially on prongs a raised ridge with about 6 teeth. Seven free denticles on each side, outer row denticles with a strong tooth and serrated inner margin, inner row denticles with fine teeth along inner margin. Sexual products (eggs) observed in middle and posterior chaetigers in some specimens (holotype, paratypes).

*Etymology.* The species name is from the Greek *rhadinos*, slender, slim, delicate.

*Remarks.* *Parophryotrocha rhadina* differs from *P. isochaeta* by being smaller and slimmer in size, by the shape and dentition of mandibles and maxillary structures, and by lacking ventral cirri. The chaetae are slimmer and more distinctly curved distally. *Parophryotrocha gesae* is distinguished by having simple chaetae of three types and mandibles with a serrated anterior margin (Hilbig and Blake, 1991).

*Distribution.* Only known from the northern North Sea.

## DISCUSSION

The presence of prostomial and parapodial structures implies that the difference between *Parophryotrocha* and species currently placed in *Ophryotrocha* is less than previously had been considered. Essentially, *Parophryotrocha* differs from *Ophryotrocha* mainly in the lack of composite chaetae. *Ophryotrocha*, however, represents a large genus with high interspecific variability. At the present state of knowledge, it has not been possible to split the genus into more homogeneous subgroups (Hilbig and Blake, 1991; Eibye-Jacobsen and Kristensen, 1994). The generic separation among *Ophryotrocha*-like species in the wide sense is therefore unclear. Hilbig and Blake (1991) noted

that the lack of composite chaetae in *Parophryotrocha* separated it from *Ophryotrocha*. This view was largely confirmed by Eibye-Jacobsen and Kristensen (1994) in a phylogenetic analysis of the Dorvilleidae. Using the present characters for *P. isochaeta*, they found that *Parophryotrocha* formed a subgroup together with the parasitic genus *Veneriserva*, which also lacks composite chaetae, in a polytomic group (clade) of *Ophryotrocha* and allied genera. Based on the analysis, they preferred to keep the present genera separate, a view which is also adopted here.

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