

**NEW RECORDS OF *MALACOCEROS FULIGINOSUS*  
(CLAPARÈDE, 1869) (POLYCHAETA, SPIONIDAE) FROM THE  
NETHERLANDS**

by

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INTRODUCTION

During a preliminary investigation in 1977 and the beginning of 1978 on the benthic infauna of the seagrass communities formed by *Zostera marina* L. and *Zostera noltii* Hornem. in The Netherlands, the polychaete *Malacoceros fuliginosus* (Claparède, 1869) was found. In Europe this spionid has been recorded earlier from Sweden (Hannerz, 1956), Denmark (Rasmussen, 1956, 1973), Germany (Westheide, 1966; Giere, 1968), England (Day, 1934), France (Bellan, 1964; Guérin, 1975) and The Netherlands (Wolff, 1973). In The Netherlands only two specimens had been found, viz. one in the mouth of the Oosterschelde and another one in the North Sea.

During our investigation many animals were collected, mainly in Lake Grevelingen, a stagnant salt-water lake in the SW of The Netherlands, which was separated from the influences of the river Rhine in 1964 and from the North Sea in 1971. In the seagrass communities in the Oosterschelde no specimens and in the Dutch Wadden Sea two specimens have been found near the salt marsh "De Ans", south of the island Terschelling. This paper deals with the morphological characters of *M. fuliginosus* in Lake Grevelingen and provides some data on the ecology.

METHODS

The benthic infauna was collected with a sediment core ( $\phi$  9 cm). The samples were taken randomly in a *Zostera* bed. The cores were driven to a depth of 10 cm below the sediment surface. Each sample was sieved through 0.5 mm mesh size and preserved in 70% alcohol.

The four sampling sites were:

1. Lake Grevelingen (close to Herkingen). From May 1977 till April 1978 every two months 6 samples were taken at places with a water depth

of 40 cm. During the months May till November the substrate was covered with *Z. marina* (Nienhuis & De Bree, 1977).

2. A *Z. noltii* vegetation near the salt marsh "De Ans", south of the island Terschelling in the Dutch Wadden Sea (see Polderman & Den Hartog, 1975). From May till November 1977 every month two samples were taken.

3. A *Z. noltii* vegetation on the tidal flats south of Terschelling (see Den Hartog & Polderman, 1975). From May till November 1977 every month 8 samples were taken.

4. Five different seagrass beds on the tidal mud-flats distributed over the Oosterschelde in the SW of The Netherlands. From May 1977 till April 1978 every two months six samples were taken in every bed (mainly *Z. noltii*, with sometimes relatively many *Z. marina*).

#### RESULTS

Many specimens of *Malacoceros fuliginosus* have been found in Lake Grevelingen at the following data: 1 November 1977, 72 specimens in 6 samples; 13 December 1977, 44 specimens in 6 samples; 31 January 1978, 55 specimens in 6 samples; 14 March 1978, 20 specimens in 6 samples. Two specimens occurred in one sample from "De Ans" at 5 July 1977. At the other sites no specimens of *M. fuliginosus* were found.

#### Morphology

The identification of the animals was difficult, because the characters used in literature to distinguish them are questionable. Therefore a brief description of the animals and a discussion on the characters of the species are given here.

In reviewing the Spionidae Pettibone (1963) has given the following diagnosis of the genus *Malacoceros*: prostomium with distinct frontal horns, with a slightly projecting crest posteriorly. Branchiae beginning on setiger 1 or 2, continuing posteriorly to last few segments; branchiae more or less free from notopodial lamellae. Middle and posterior neuropodia with hooded hooks. According to Hartmann-Schröder (1971) *Malacoceros* possesses usually 4 eyes. She described three species, which are known from the European coasts, viz. *M. vulgaris* (Johnston, 1827) with 20-25 neuropodial hooded hooks, which are tridentate in lateral view and 15-30 anal cirri, *M. tetracerus* (Schmarda, 1861) with 7-12 bidentate neuropodial hooded hooks, without prostomial incision and less than 10 anal cirri, and *M. fuliginosus* (Claparède, 1869) with 4-5 neuropodial hooded hooks, which are bidentate, with a slight prostomial incision and a pygid with less than 10 anal cirri.

Our specimens were very small and tender. As the majority of them was

not complete, exact length and segment number of most specimens could not be determined. Out of the total of 193 examined specimens only 10 were complete: they were 4-7 mm long possessing 50-80 segments. The number of anal cirri varied from 6-8. The prostomium had no or an indistinct incision and no or sometimes two eyes. According to Hartmann-Schröder (personal communication) the characteristics concerning the prostomium are unclear, as the incision can be more or less deep, mostly however weak, depending greatly on the contraction of the whole animal or its prostomium; the number of eyes is not definitely settled as within one population specimens can be found with and without eyes.

The notopodial postsetal lamellae of the parapodia in the anterior region were integrated with the branchiae; in the middle and posterior region they were almost free. The notosetae were similar but longer than the neurosetae. The neuropodial hooks were hooded, bidentate and there were 4-7 hooks per row. The number of hooks increased with the length of the animals, so that the differences between *M. fuliginosus* and *M. tetracerus* stated by Hartmann-Schröder (1971) become uncertain. The parapodia and the shape of the hooded hooks of our specimens are, however, characteristic of *M. fuliginosus* (cf. Fauvel, 1927, fig. 9). It is clear that this genus needs more investigation.

### Ecology

The mature specimens in Lake Grevelingen appeared in the period with decaying *Z. marina* and algae, as also mentioned by Hannerz (1956) and Rasmussen (1973). The sudden occurrence may have been influenced by the water temperature conditions: an increase of the maximum values in the summer during the last years: 18° C in 1974, 21° C in 1975, 23° C in 1976 and 21° C in 1977. According to Rasmussen (1973) this pronouncedly southern species (see also Casanova, 1953; Rullier & Cornet, 1951; Bellan, 1964) occurs only at places with high summer temperatures and a decline in temperature reduces the ability to survive and reproduce.

Day (1934) described the whole larval life history of *M. fuliginosus*. When the larvae are about 24 hours old the trochophores are 200  $\mu$  long. The larvae with 14 segments, length 1000  $\mu$ , and from 34-36 days old, are the largest free-swimming stage of the species, and normally metamorphosis will take place at this size and age. Then they make their way to the bottom and begin to burrow as soon as suitable ground is found. In Sweden pelagic larvae have been found from July-December (Hannerz, 1956), in Denmark from June-August (Rasmussen, 1956) and in Germany from June-Oktober (Giere, 1968). Our first records of *M. fuliginosus* are from 1 November. So

the reproduction and the development of the larvae took place during summer.

According to Day & Wilson (1934) the species prefers for metamorphosis sandy mud with a high organic content. However, not only the organic content and the size of the sandgrains seem to be essential, as Gray (1971) states that the bacteria in the bottom are more important than the size of the grains itself. Wolff (1973) found *M. fuliginosus* in a sediment of fine sand (Md = 2.17  $\phi$ ) with a chlorinity of about 17<sup>0</sup>/<sub>00</sub>. In Lake Grevelingen the specimens lived in muddy sand (Md = 3.2  $\phi$ ) with an organic content of 0.6%. The chlorinities of the lake in July, September and December were 13.5<sup>0</sup>/<sub>00</sub>, 12.6<sup>0</sup>/<sub>00</sub> and 13.2<sup>0</sup>/<sub>00</sub> respectively. Rasmussen (1956), however, found *M. fuliginosus* under circumstances with a rather constant annual chlorinity of about 11<sup>0</sup>/<sub>00</sub>.

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