

# ZOOLOGISCHE MEDEDELINGEN

UITGEGEVEN DOOR HET

RIJKSMUSEUM VAN NATUURLIJKE HISTORIE TE LEIDEN  
(MINISTERIE VAN CULTUUR, RECREATIE EN MAATSCHAPPELIJK WERK)

Deel 41 no. 14

27 juli 1966

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## NOTES ON EURYDICE (ISOPODA, FLABELLIFERA) FROM THE NETHERLANDS

by

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### INTRODUCTION

During his investigation of the amphipod fauna of the sandy beaches of the Netherlands, Mr. W. J. M. Vader, formerly of this institute, met with two species of *Eurydice* Leach, 1815. Besides the common *Eurydice pulchra* Leach, 1815, he found a second species in smaller numbers. Because Giordani Soika (1955) as well as Renaud-Debyser & Salvat (1963) recorded *Eurydice affinis* Hansen, 1905, and *E. pulchra* from comparable beaches in northern France, Mr. Vader asked Dr. B. Salvat for some specimens of the former species for comparison.

When these specimens arrived, Mr. Vader had left our laboratory. He was kind enough to entrust me with the further study of the *Eurydice* problem, for which I am most indebted to him. Further I want to thank Dr. L. B. Holthuis, Rijksmuseum van Natuurlijke Historie, Leiden, and Dr. B. Salvat, Muséum National d'Histoire Naturelle, Paris, for material, and Messrs. A. J. J. Sandee and L. de Wolf for their help in the field-work.

The genus *Eurydice* is well known from the southern part of the North Sea. As early as 1778 Slabber described his "Agaat Pissebed" from the Dutch island of Walcheren. From the figure that he gave we can conclude with certainty that his animal belongs to *E. pulchra*. Holthuis (1956) still mentioned this as the only species of the genus from the coast of the Netherlands. In another publication Holthuis (1950) reported the occurrence of *Eurydice spinigera* Hansen, 1890, in the southern North Sea. *E. affinis* is here recorded for the first time from the Netherlands and the North Sea. The species was already known from Wissant (Pas de Calais) in France,

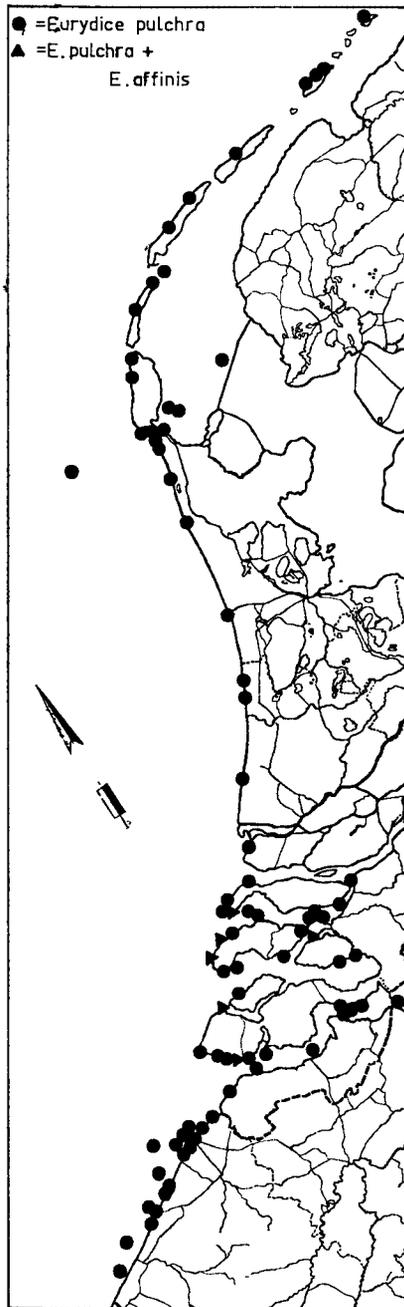


Fig. 1. Occurrence of *Eurydice pulchra* Leach and *E. affinis* Hansen along the coasts of the Netherlands and Belgium.

just at the southern entrance of the North Sea (Giordani Soika, 1955; Renaud-Debyser & Salvat, 1963).

**Eurydice affinis** Hansen, 1905 (fig. 1, 2a, 3a)

Monod (1930: 172) remarked: "La détermination des *Eurydice* à 4 épines telsoniques présente de très sérieuses difficultés". Indeed, the characters of the telson, as Monod rightly wrote, cannot be used to distinguish between *E. pulchra* and *E. affinis*. According to our experiences the following characters are more trustworthy:

(1) the shape of the posterior edge of the sixth free thoracic somite (fig. 3a, b);

(2) the length of the antennae; these reach as far as the first or second abdominal somite in *E. pulchra* (fig. 2b), but only as far as the fifth free thoracic somite in *E. affinis* (fig. 2a);

(3) the length of the endopods of the uropods: in *E. pulchra* (fig. 3b) they exceed the telson in length, whereas in *E. affinis* (fig. 3a) they are shorter than the telson.

Especially when one has to identify a large number of specimens, e.g. for ecological research, the characters mentioned above are not very convenient and their use takes a lot of time. Therefore the discovery that each species has its own typical arrangement of chromatophores is of some importance. We determined the arrangement of the chromatophores in those species that may be expected to occur in the sandy beaches of the Dutch coast, viz., *E. pulchra*, *E. affinis* and *E. spinigera*.

For distinguishing between *E. pulchra* and *E. affinis* we used the morphological characters mentioned above. We found that the arrangement of the chromatophores is perfectly constant within each species; no aberrant patterns were found although we investigated about 600 specimens of *E. pulchra* and about 80 of *E. affinis*. The differences are clearly shown in the figures, and therefore we will only mention here the most striking characters.

*E. affinis* (fig. 2a) is the species with the smallest number of chromatophores. The absence of chromatophores from the epimera of the thoracic somites and the ventral side of the abdomen (fig. 3a) distinguishes it at once from the two other species.

*E. affinis* was discovered in samples originating from the following six localities within the Dutch provinces of Zuid-Holland and Zeeland (see also fig. 1):

Zuid-Holland: Ouddorp, island of Goeree.

Zeeland: Vlissingen (= Flushing), and Vrouwenpolder, island of

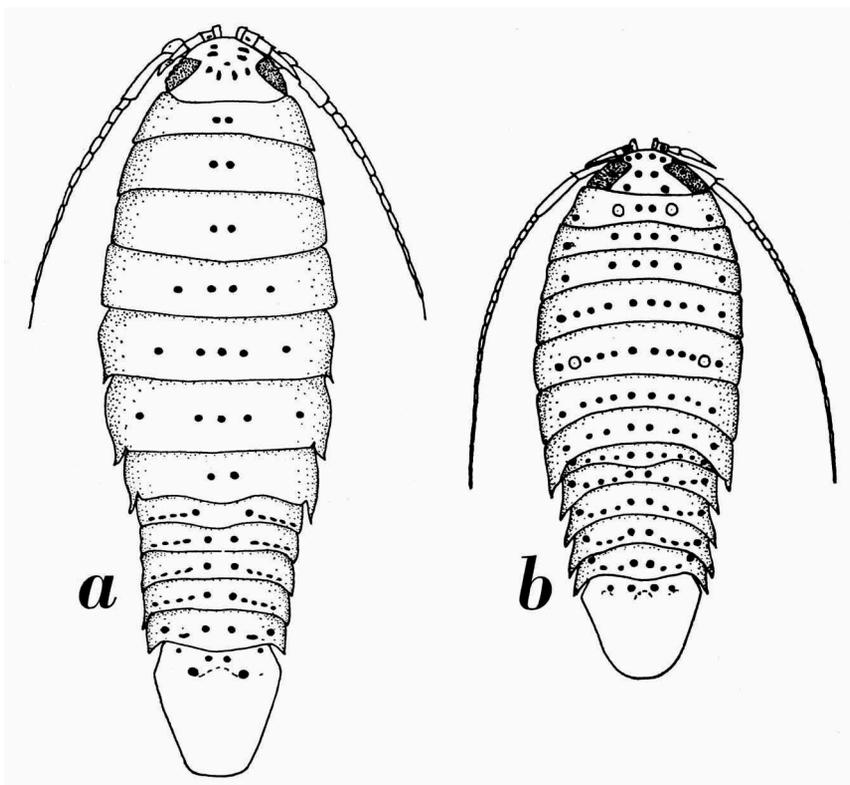


Fig. 2. a, *Eurydice affinis* Hansen, dorsal view; b, *Eurydice pulchra* Leach, dorsal view.

Walcheren; Haamstede, and Renesse, island of Schouwen; Krabbekreek near the island of St. Philipsland.

Although we spent some time in search of *E. affinis* in Belgium and in localities further north along the coast of the Netherlands, we have not been able to discover the species there. In the material of *Eurydice* belonging to the Rijksmuseum van Natuurlijke Historie, Leiden, we likewise failed to discover *E. affinis* north of the localities mentioned above. Especially from the surroundings of Den Helder and from the island of Schiermonnikoog we saw large numbers of *Eurydice*, so that it is probable that *E. affinis* actually does not occur there.

In the Netherlands *E. affinis* is only found in the littoral part of clean, sandy beaches, always together with *E. pulchra*. The exposure to the waves at the sites where they were found varies from very sheltered to rather exposed. In sheltered localities the sand is kept clean by strong tidal currents. It seems that the species avoids brackish water, because it only has been found in areas with a salinity higher than 16 ‰ Cl'.

*E. affinis* ranges from the Atlantic coast of Morocco to the southern North Sea. It also occurs in the Mediterranean (Giordani Soika, 1955).

***Eurydice pulchra* Leach, 1815 (fig. 1, 2b, 3b)**

*E. pulchra* is distinguished from *E. affinis* by the above mentioned characters and from *E. spinigera* by the shape of the telson and the absence of

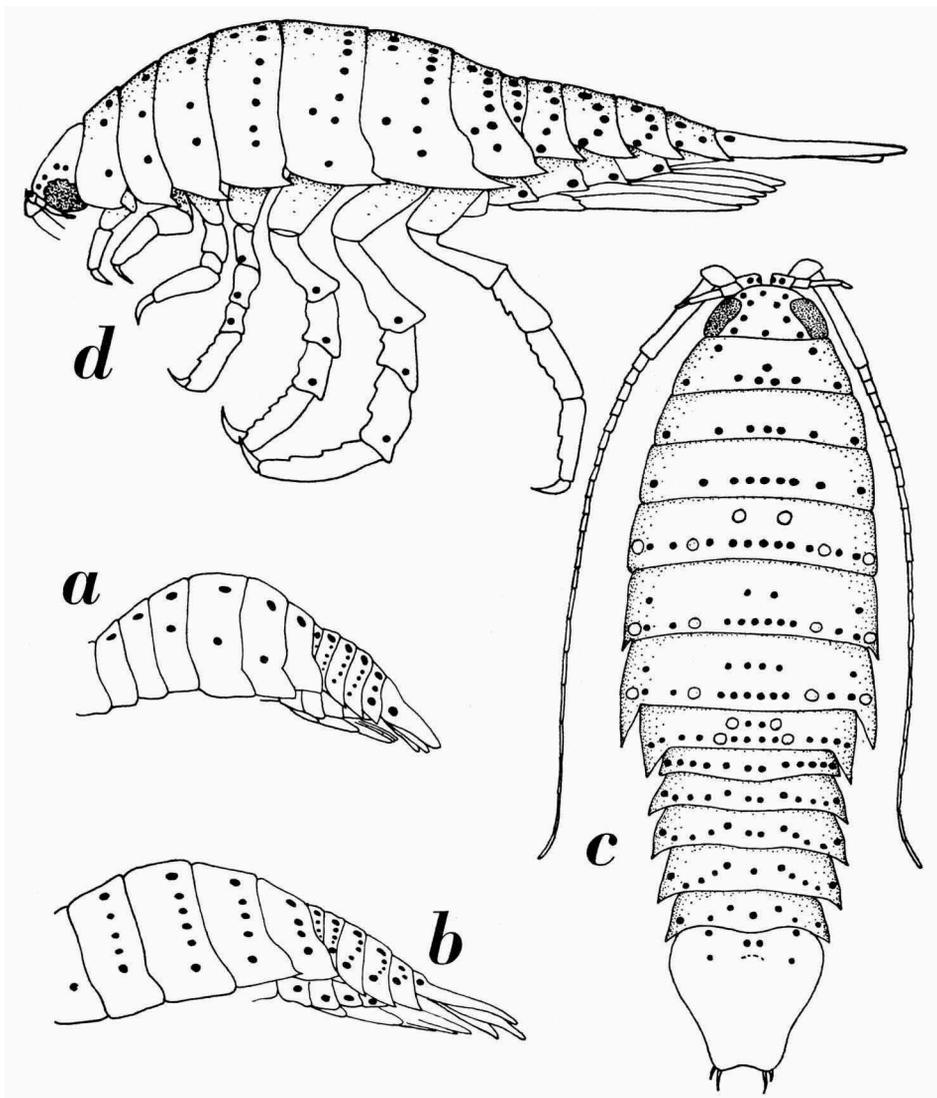


Fig. 3. a, *Eurydice affinis* Hansen, posterior part of body in lateral view; b, *Eurydice pulchra* Leach, posterior part of body in lateral view; c, *Eurydice spinigera* Hansen, dorsal view; d, *Eurydice spinigera* Hansen, lateral view.

chromatophores from the pereopods. From the arrangement of the chromatophores shown in Slabber's figure of his "Agaat Pissebed" we were able to identify that with certainty as representing *E. pulchra*.

*E. pulchra* is a very common species everywhere on the sandy beaches along the coasts of the Netherlands (Holthuis, 1956), Belgium (Holthuis, 1950), northern France (Giordani Soika, 1955; Renaud-Debyser & Salvat, 1963; own observations), and north-western Germany (Gruner, 1965). Its occurrence in the Netherlands and Belgium is mapped in fig. 1. The data are derived from some of the publications cited above, from the collection of the Rijksmuseum van Natuurlijke Historie, Leiden, and from own observations.

In the Netherlands *E. pulchra* is found on the same kind of sandy beaches as *E. affinis*. In most of the localities where both species occur, the former is five to ten times more numerous than the latter. *E. pulchra* may be found in nearly every stretch of sandy beaches along the Dutch coast. In the estuaries it penetrates to about the isohaline of 10 ‰ Cl' at high tide.

Although the species reaches its greatest density in the littoral, it is regularly encountered in the sublittoral, down to a depth of 15 m. We have also many observations of pelagic specimens.

The range of *E. pulchra* extends from the Atlantic coast of Morocco to Norway. It also occurs in the western part of the Baltic, but presumably not in the Mediterranean (Giordani Soika, 1955).

### **Eurydice spinigera** Hansen, 1890 (fig. 3 c, d)

Although *E. spinigera* has not yet actually been observed on the Dutch coast, it may be expected to occur there, because there is a fair number of records from the southern North Sea and even from the Belgian coast (Holthuis, 1950). For this reason we describe here also the arrangement of the chromatophores of this species.

*E. spinigera* is always well characterised by the concave edge of the telson (fig. 3c). The species is peculiar by having chromatophores on the fourth, fifth and sixth pereopods and double rows of chromatophores on the fourth (in most specimens), fifth, sixth and seventh free thoracic somites (fig. 3 c, d). The many other minor differences are evident from fig. 2 and 3, in which chromatophores present in some specimens but lacking in others are denoted by open circles.

*E. spinigera* is known from the Mediterranean, from the Atlantic coasts of France and from the southern North Sea (Giordani Soika, 1955).

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