

NORTHWARD DISPERSAL OF THE TANAID *ZEUXO HOLDICHI* TO THE NETHERLANDS (CRUSTACEA: TANAIDAE)

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The tanaid *Zeuxo holdichi*, described in 1990 from Arcachon Bay in southwest France, has since then been recorded from west Portugal to northern Brittany and southwest England. The species is recorded here from the Netherlands, a further northward expansion of the range. It is hypothesised that *Z. holdichi* may be non-native to Europe.

INTRODUCTION

From July to October 2012 samples were taken in the Oosterschelde embayment in the southwestern delta area of the Netherlands, near Zierikzee. Shells, sandy mud with shells and red seaweeds were sampled during scuba dives. All crustaceans except copepods were identified. One species of tanaidacean was found. Identification with the regional key of Holdich & Jones (1983) was impossible. The species differs from the recently introduced tanaid *Sinelobus stanfordi* (Richardson, 1909) (Van Haaren & Soors 2009) as well. The material was compared with the description of *Zeuxo holdichi* Bamber, 1990, a recently described tanaid from Europe. Our specimens belong to *Z. holdichi*.

MATERIAL AND METHODS

Samples of empty shells, shelly bottom sediment and red seaweeds were taken by scuba diving, at depths between 3 and 15 m below the low water mark near Zierikzee. Near Wissenkerke, where

scuba diving is prohibited, two Japanese oysters were collected from just below the low water mark. Shells and seaweed fronds were studied individually under a dissection microscope. Organisms were separated from the sediment samples by decantation and studied after sieving of the decanted seawater. For identification to genus Sieg & Winn (1981) was used. The species was identified with Bamber (1990). Species of the genus *Zeuxo* described after 1990 have been checked with Bamber (2005) and Edgar (2008). Specimens have been deposited in the collections of the author and R. Bamber, and in the collection of Naturalis Biodiversity Center with No. RMNH. Crus. 1. 7515 (table 1).

RESULTS

Tanaids were found at three different locations, at the Zeelandbrug near Zierikzee and about 1 km to the west of this location and along the Anna Frisopolder near Wissenkerke (table 1). Specimens were found on and between shells, on sediment



Figure 1. *Zeuxo holdichi*.
Zierikzee, 22.ix.2012.
Figuur 1. *Zeuxo holdichi*.
Zierikzee, 22.ix.2012.



Figure 2. *Zeuxo holdichi*, left coxa I, medial view. Zierikzee, 27.x.2012.

Figuur 2. *Zeuxo holdichi*, linker coxa I, mediaal aanzicht. Zierikzee, 27.x.2012.



Figure 3. *Zeuxo holdichi*, right mandible. Zierikzee, 27.x.2012.

Figuur 3. *Zeuxo holdichi*, rechter mandibel. Zierikzee, 27.x.2012.

and between red seaweeds. The tanaids collected are easily distinguished from the other tanaids native to northwest Europe *Tanais dulongii* (Adouin, 1826) and *Parasinelobus chevreuxi* (Dolfuss, 1898) and from the introduced *Sinelobus stanfordi* by the presence of five free pleon segments without a dorsal fringe of erect setae and the 7-articled uropod (fig. 1). According to the key published by Sieg & Winn (1981) the specimens belong to the genus *Zeuxo*, although

length of the 4th to 6th uropod articles in adults is more than two times its width. The stout protuberance on the first coxa (fig. 2) indicates that the species belongs to the nominal subgenus *Zeuxo* (*Zeuxo*). The only *Zeuxo* species recorded from Atlantic coasts of Europe is *Z. holdichi*. This species differs from all its described congeners by the combination of a 7-articled uropod (basis and 6-articled endopod, with elongate articles in the adult) and a conspicuous lacinia

Table 1. Specimens of *Zeuxo holdichi* collected from the Oosterschelde.

Tabel 1. Exemplaren van *Zeuxo holdichi* verzameld in de Oosterschelde.

Date	Number	Location	Co-ordinates	Substrate	Collection
07.VII.2012	1	Zierikzee	51°37'46"N 003°54'27"E	Shells	Faasse
07.IX.2012	1	Zierikzee	51°37'46"N 003°54'27"E	Sand/mud/shell	Faasse
22.IX.2012	2	Zierikzee	51°37'44"N 003°54'44"E	Sand/mud/shell	Bamber
13.X.2012	3	Zierikzee	51°37'44"N 003°54'44"E	Red seaweeds	RMNH
27.X.2012	6	Zierikzee	51°37'44"N 003°54'44"E	Red seaweeds	Faasse
15.XII.2012	7	Wissenkerke	51°36'02"N 003°41'58"E	Japanese oysters	Faasse

- Bamber 2011
- ✱ 2012



Figure 4. Map of western Europe with indication of the northward dispersal of *Zeuxo holdichi*.

Figuur 4. Kaart van west Europa met aanduiding van de noordwaardse uitbreiding van *Zeuxo holdichi*.

mobilis (fig. 3) on the right mandible (Bamber 1990).

DISCUSSION

Zeuxo holdichi was originally described from the Bay of Arcachon (sw France), an area of shellfish culture. Subsequently the species was recorded from several locations in northern Brittany, from Galicia in northwest Spain, the Ria de Aveiro in west Portugal and Plymouth and the Scilly Isles in the southwest of the UK (Bamber 2011).

In April 2012 about ten specimens were found on the northeast coast of the Cotentin (Normandy): on 05.IV.2012 about five specimens in the Anse de Brévy (49°38'53"N 001°14'20"W) between red seaweeds in the intertidal zone and on 06.IV.2012 about five specimens near Saint-Vaast-la-Hougue (49°35'05"N 001°15'30"W) between red seaweeds

in the intertidal zone (pers. comm. C. d'Udekem d'Acoz). These records, together with the records from the Netherlands, are indicated in figure 4.

Together with other arguments this series of records suggests that *Z. holdichi* may not be native to Europe. The NE Atlantic belongs to the regions where investigation of crustacean fauna, including tanaids, started early and where nowadays new native macrocrustacean species are very rarely found in well-investigated habitats. *Zeuxo holdichi* has no congeners in the NW Atlantic, which suggests its origin may be elsewhere.

Arcachon Bay is an important shellfish culture area, where several non-native species have been introduced, presumably with imported shellfish (De Blauwe 2005), and *Z. holdichi* may be another one. Tanaids are sedentary animals without a dispersive larval stage. Dispersal within Europe with shellfish transports and/or recreational vessels may account for subsequent records far to the south and north. The records from Normandy are from an area with extensive shellfish culture and marinas. The present records in the Netherlands are from the Oosterschelde, another area of shellfish culture and with many visiting recreational vessels from the south.

The samples of *Z. holdichi* from the Bay of Arcachon were collected intertidally and to a depth of approximately 5 m below the waterline, with a preference for the nearshore sublittoral (Bamber 1990). Several other records describe the occurrence in sediment accumulated between red seaweeds in the lower intertidal (Bamber 2011, pers. comm. C. d'Udekem d'Acoz).

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REFERENCES

- Bamber, R.N. 1990. A new species of *Zeuxo* (Crustacea: Tanaidacea) from the French Atlantic coast. – *Journal of Natural History* 24: 1587-1596.
- Bamber, R.N. 2005. The tanaidaceans (Arthropoda: Crustacea: Peracarida: Tanaidacea) of Esperance, Western Australia, Australia. – In: Wells, F.E., Walker, D.I. & G.A. Kendrick (Eds.), *The Marine Flora and Fauna of Esperance, Western Australia*. Western Australian Museum, Perth: 613-728.
- Bamber, R.N. 2011. The marine fauna and flora of the Isles of Scilly. Tanaidacea (Crustacea: Peracarida). – *Journal of Natural History* 45(29-30): 1801-1815.
- Blauwe, H. De 2005. A new species of *Caulibugula* (Bryozoa: Cheilostomatida) from France. – *Bulletin van het Koninklijk Belgisch Instituut voor Natuurwetenschappen, Biologie* 75: 81-87.
- Edgar, G.J. 2008. Shallow water Tanaidae (Crustacea: Tanaidacea) of Australia. – *Zootaxa* 1836: 1-92.
- Haaren, T. van & J. Soors 2009. *Sinelobus stanfordi* (Richardson, 1901): a new crustacean invader in Europe. – *Aquatic Invasions* 4(4): 703-711.
- Holdich, D.M. & J.A. Jones 1983. Tanaiids. – Cambridge University Press, Cambridge. [Synopsis of the British Fauna no. 27]
- Sieg, J. & R.N. Winn 1981. The Tanaidae (Crustacea: Tanaidacea) of California, with a key to the world genera. – *Proceedings of the Biological Society of Washington* 94: 315-343.

SAMENVATTING

Noordwaartse uitbreiding van de schaarpijsebed *Zeuxo holdichi* naar Nederland (Crustacea: Tanaidae)

Beschreven in 1990 van de Baai van Aachen (Zuidwest-Frankrijk) werd *Z. holdichi* vervolgensesignaleerd van west Portugal tot Noord-Bretagne en Zuidwest-Engeland. In 2012 werd de soort verzameld in Normandië en Nederland. Gezien de late ontdekking, de afwezigheid van genusgenoten in Europa en de vondsten in schelpdierkweekgebieden lijkt het mogelijk dat het een exotische soort betreft, nog niet beschreven van het oorspronkelijke verspreidingsgebied.

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