

THE EXOTIC ISOPOD *SYNIDOTEA* IN THE NETHERLANDS AND EUROPE, A JAPANESE OR AMERICAN INVASION (PANCrustacea: ISOPODA)?

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Synidotea is an invasive isopod genus in European waters. The identification of introduced populations has given rise to much controversy. *Synidotea* recently has been recorded from the Westerschelde estuary on the southern North Sea coast.

Other records from the north Atlantic were attributed to *S. laevidorsalis*; the material from the Westerschelde estuary however is identified as *S. laticauda*.

INTRODUCTION

The genus *Synidotea* has been recorded all over the world and several of these records certainly pertain to introduced populations. It was first recorded from the north Atlantic by Mees & Fockedeij (1993). They identified the species found in the Gironde estuary (France) as *S. laevidorsalis* (Miers, 1881) from the northwest Pacific. Although it must have been collected in the Gironde estuary before 1975 already, Mees & Fockedeij (1993) convincingly demonstrate the species has been introduced to the northeast Atlantic by man. In the early 1990s *S. laevidorsalis* was recorded from the Guadalquivir estuary in southwest Spain (Cuesta et al. 1996). In 2005 *Synidotea* was found in the Westerschelde estuary from Antwerp (Belgium) to the border between Belgium and the Netherlands (Soors et al. 2010). In 2009 several locations in the Westerschelde estuary downstream from the border were visited to establish the presence of *Synidotea* in the Netherlands and to investigate the identity of the species.

NOMENCLATURE

Synidotea laevidorsalis and *Synidotea laticauda* Benedict, 1897 were subject of serious controversy in the literature. *Synidotea laticauda* was described in 1897 from San Francisco Bay and was recorded nowhere else. Chapman & Carlton (1991) concluded that it is an introduced species and after morphological comparison synonymised it with

S. laevidorsalis from the northwest Pacific. They did the same, on similar grounds, with *S. marplatensis* Giambiagi, 1922 from Argentina and *S. brunnea* Pires & Moreira, 1975 from Brazil. Poore & Lew Ton (1993) state that Chapman & Carlton (1991) erroneously synonymised these species and furthermore describe two new *Synidotea* species from Australia: *S. grisea* en *S. keablei*. Chapman & Carlton (1994) state that *S. grisea* en *S. keablei* are synonyms of *S. laevidorsalis* as well and that they have been introduced into Australia by man. According to Poore (1996) Chapman & Carlton (1991, 1994) erroneously assume that *S. laevidorsalis* has been introduced worldwide and has been given several different new names.



Figure 1. *Synidotea laticauda*, 14.VIII.2009, Walsoorden. Photo Marco Faasse.

Figuur 1. *Synidotea laticauda*, 14.VIII.2009, Walsoorden. Foto Marco Faasse.

Table 1. Characters of *Synidotea* from the Westerschelde, compared with *S. laevidorsalis* and *S. laticauda*, according to Poore (1996).

Tabel 1. Kenmerken van *Synidotea* van de Westerschelde, vergeleken met *S. laevidorsalis* en *S. laticauda*, volgens Poore (1996).

	<i>Synidotea</i> Westerschelde	<i>S. laevidorsalis</i>	<i>S. laticauda</i>
length gravid female	16 mm	max. 12.3 mm	max. 13 mm
colour in alcohol	yellowish, greyish middorsal stripe, dark patches	even brownish tan and dark chromatophores	blue grey with middorsal stripe
pereiion margin	p1 evenly curved, p2-3 convex, p4-7 straight	p1 subtle curved angle, p2-7 making continuous margin	p1 evenly curved, p2-3 convex, p4-7 straight
transverse depression in front of eyes	clear	weak	clear
setation lower margin ischium-propodus female	long setae	short setae	long setae

METHODS

Several locations in the eastern part of the Westerschelde estuary were visited in 2009. At locations with drifting seaweeds or hanging ropes samples were taken. On August 14 the harbour of Walsoorden, some 20 km downstream of the border Belgium-Netherlands was visited. On August 21 samples were taken near Hoekenskerke. On October 31 the harbour of Walsoorden was sampled again and the former ferry port of Perkpolder, about 2 km to the northwest, as well. Hanging ropes, pontoons and drifting seaweeds were sampled with a hand net. Isopods of the genus *Synidotea* were identified using Menzies & Miller (1972), Poore (1996) and Moore (2004).

RESULTS

Synidotea was first found in the Netherlands on August 14, 2009 in the harbour of Walsoorden (51°23'N, 04°02'E), some 20 km downstream from the border. Seventeen specimens (one gravid female and 16 juveniles) were caught between drifting seaweeds (*Fucus vesiculosus* L.) and hanging ropes. On October 31 five more juvenile specimens were collected in Walsoorden

from the same seaweed species. Accompanying macrofaunal species on the drifting weed were the native isopods *Eurydice pulchra* Leach, 1815 and *Lekanesphaera rugicauda* (Leach, 1814), the native amphipod *Gammarus salinus* Spooner, 1947 and the introduced shrimp *Palaemon macrodactylus* Rathbun, 1902. In the former ferry port of Perkpolder and near Hoedekenskerke no *Synidotea* were found between drifting seaweed.

IDENTIFICATION

The genus *Synidotea* differs from all other idoteid genera in the following characters: penes completely fused, forming a short penial plate, fifth oostegites absent and sexually dimorphic mouthparts (Poore 2001). The species from the Westerschelde estuary belongs to the *Synidotea hirtipes* species group, species which share the following distinguishing characters: pereion smooth, frontal margin of head entire or slightly excavate and posterior border of pleotelson with median excavation (Menzies & Miller 1972, Moore 2004). This group consists of nine species: *S. laevidorsalis*, six species synonymised with *S. laevidorsalis* by Chapman & Carlton (1991, 1994), *S. harfordi* Benedict, 1897 and *S. oahu* Moore, 2004.

The results of a comparison of characters of the *Synidotea* specimens from Walsoorden with characters presented by Poore (1996, table 1) for *S. laevidorsalis* and *S. laticauda* are given in table 1.

Apparently, the specimens from Walsoorden agree with the characters given for *S. laticauda* by Poore (1996), except for the colour of preserved material and the length of the gravid female. In both these characters the material from Walsoorden is closer to *S. laticauda* than to *S. laevidorsalis*. Differences with other species of the *Synidotea hirtipes* species group were checked with Menzies & Miller (1972) for *S. harfordi*, with Moore (2004) for *S. oahu* and with Poore (1996) for the other species. All these species are different from the specimens from Walsoorden.

DISCUSSION

Apparently the species from the Westerschelde estuary is not *S. laevidorsalis*, but *S. laticauda*. Poore (1996) studied material recorded by Mees & Fockedeij (1993) from the Gironde estuary as *S. laevidorsalis* and concluded it belongs to *S. laticauda*. It has to be confirmed that Cuesta et al. (1996) collected *S. laevidorsalis* from the Guadalquivir estuary to prove whether the latter species occurs in Europe at all. In 1999 *S. laevidorsalis* was recorded for the first time on the Atlantic coast of North America (Bushek & Boyd 2006). Apparently this record refers to *S. laticauda* as well (Boyd 2008). Ballast water or hull fouling is the most likely vector for the introduction of *Synidotea* to the Gironde, Guadalquivir and Schelde estuaries. International ports, Bordeaux, Sevilla and Antwerp, respectively, are located along all three estuaries concerned. Chapman & Carlton (1991, 1994) not without reason suspected *Synidotea* to turn up in several estuarine areas of the world. The phenomenon of introductions of marine and especially estuarine species is still significantly underappreciated.

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SAMENVATTING

Het exotische pissbeddengenus *Synidotea* in Nederland en Europa, een Japanse of Amerikaanse invasie (Pancrustacea: Isopoda)?

Synidotea is een zeepissebeddengeslacht dat geïntroduceerd is in verscheidene estuariene gebieden, zo ook in Europa. Er is een uitgebreide controverse ontstaan over de identiteit van geïntroduceerde populaties. Tot nog toe werd uit Europa *S. laevidorsalis* gemeld. Materiaal uit de Westerschelde is nu gedetermineerd als *S. laticauda*.

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