

PILEOLARIA BERKELEYANA, A SPIRORBIN POLYCHAETE WORM

INTRODUCED TO THE NETHERLANDS (POLYCHAETA: SERPULIDAE: SPIRORBINAE)

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The spirorbin polychaete worm *Pileolaria berkeleyana*, new for the fauna of the Netherlands, was found at different localities in the Oosterschelde area in the province of Zeeland. They were found on empty shells and on boulders, which confirms their preference for hard substrates. The introduction of the species is discussed, together with the three other species of Spirorbinae recorded as living on the coast of the Netherlands.

INTRODUCTION

The spirorbin polychaete worm *Pileolaria berkeleyana* (Rioja, 1942) has been described from Mexico. Thorp et al. (1986) state that *P. rosepigmentata* (Uchida, 1971), described from Japan, is a junior synonym. Thorp et al. (1986) could not find morphological differences. In the absence of molecular comparisons *P. rosepigmentata* is treated as a synonym by serpulid workers for the time being (e.g. Rzhavsky 2010). *Pileolaria berkeleyana* has an almost cosmopolitan distribution. Introductions are held responsible for this, but it has also been suggested that *P. berkeleyana* is in fact a species complex (Rzhavsky & Nishi 2011).

Pileolaria berkeleyana has firmly established itself in the Canary Isles, but seems to have arrived in the Mediterranean Sea (Marseille) relatively recently (Thorp et al. 1986). Hitherto the species had been found in northwestern Europe only on the south coast of England (Critchley & Thorp 1985, Thorp et al. 1986, Zibrowius & Thorp 1989). *Pileolaria berkeleyana* had not yet been recorded from the Netherlands (Ten Hove & Lucas 1996, Wolff 2005). A survey of a number of selected localities around the marine inlet Oosterschelde in the southwest of the Netherlands, particularly aimed at the detection of serpulid tubeworms, revealed the presence of the species at five localities.



Figure 1. *Pileolaria berkeleyana*, Kanaal van Goes, 13.III.2010. Photo Marianne Lighthart.
Figuur 1. *Pileolaria berkeleyana*, Kanaal van Goes, 13.III.2010. Foto Marianne Lighthart.

Table 1. Specimens of *Pileolaria berkeleyana* found in the current study.

Tabel 1. Exemplaren van *Pileolaria berkeleyana* aangetroffen in het huidige onderzoek.

Number of specimens	Locality	Date	Coordinates
2	Kanaal van Goes	13.III.2010	51°32'14.05"N 3°55'28.65"E
> 50	Burghsluis	17.IV.2010	51°40'28.15"N 3°45'28.41"E
> 20	Yerseke	15.V.2010	51°29'35.80"N 4°03'16.82"E
1	Goesse Sas, tidal pool	11.XII.2010	51°32'37.19"N 3°55'36.83"E
> 50	Goesse Sas, tidal pool	08.I.2011	51°32'37.19"N 3°55'36.83"E
> 10	Plompetoren	19.II.2011	51°40'35.65"N 3°46'20.29"E

METHODS

During low-tide algae, oysters and the undersides of boulders were inspected for serpulid tubes. Substrates with dextrally coiled spirorbins were collected for identification with a stereomicroscope. The massive occurrence of the sinistrally coiled *Neodexiospira brasiliensis* (Grube, 1872) made identification of all sinistrally coiled spirorbins impossible. Larger serpulid tubes were either detached or collected with small parts of substrate. Spirorbins were identified with Nelson-Smith et al. (1990), who treat all alien spirorbins currently known from northwestern Europe. *Pileolaria berkeleyana* may easily be distinguished from other spirorbins in northwestern Europe by the always asymmetrically bilobed brooding operculum (fig. 1).

RESULTS

All specimens were found on the underside of boulders or on empty shells of the Pacific oyster *Crassostrea gigas* Thunberg, 1793 (table 1). In the Kanaal van Goes and at the Goesse Sas *P. berkeleyana* was found together with the serpulid tube-worm *Apomatus* cf. *similis* (Marion & Bobretzky, 1875), a species not recorded from the Netherlands before the present survey. At Yerseke *P. berkeleyana* was found in the company of *Vermiliopsis striaticeps* (Grube, 1862), another serpulid not previously recorded from the Netherlands (Ligthart et al. 2011).

The underside of the boulders with *P. berkeleyana* was largely bare, with few sessile invertebrates. The spirorbini *Neodexiospira brasiliensis* was abundant at all localities investigated.

DISCUSSION

Two spirorbini species have been recorded from the Netherlands as native. Korringa (1951) found *Janua* (*Dexiospira*) *pagenstecheri* (de Quatrefages, 1865) (as *Spirorbis Pagenstecheri* Quatrefages) on oysters near Yerseke. This seems to be the only record for the Netherlands. It seems likely that it was introduced with imported oysters and not a truly native species, with a self-sustaining population. Lewis et al. (2005) mention *Spirorbis* (*Spirorbis*) *tridentatus* Levinsen, 1883 from Zeeland (south-west Netherlands), based on records from NIOO-CEME. Native spirorbins were not found during the present survey.

The spirorbini *Neodexiospira brasiliensis* has been introduced to the Netherlands in or prior to 1982 (Critchley & Thorp 1985). In 1982 its occurrence seemed to be very localised, but very dense. Since then it has dispersed all over the delta area in the southwest of the Netherlands (Wolff 2005). At many localities it is extremely abundant. This makes it difficult to detect other spirorbini species.

The vector of introduction of *Pileolaria berkeleyana* to the Netherlands is not known with cer-

tainty. It was found near marinas (Burghsluis and Goesse Sas), as well as near the centre of shellfish trade (Yerseke), which has a marina itself. The most likely vector therefore are recreational vessels crossing the English Channel, although shellfish imports cannot be ruled out. Critchley & Thorp (1985) found a settlement preference of *N. brasiliensis* for the alga *Sargassum muticum* (Yendo) Fensholt and suggest it has been introduced rafting on fragments of the alga rather than by boat traffic. They explained the absence of *P. berkeleyana* in the Netherlands by its settlement preference for hard substrates over algae. However, the great majority of detached algae originating from the Channel coasts and reaching coastal waters of the Netherlands wash ashore on North Sea coasts and are not expected to reach the Oosterschelde. Therefore, for both species of spirorbins the chance of transport from England to marinas located well inshore in the Netherlands (Goesse Sas, Yerseke) by detached or fragmented algae is much lower than the chance of transport by boats.

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SAMENVATTING

Pileolaria berkeleyana, een spiraalkalkkokerworm geïntroduceerd in Nederland (Polychaeta: Serpulidae: Spirorbinae)

Pileolaria berkeleyana, een spiraalkalkkokerworm met een rechtsgewonden koker, is geïntroduceerd in Nederland. De introductievector is waarschijnlijk pleziervaart of schelpdierimport. Exemplaren werden gevonden rondom een groot deel van de Oosterschelde, in de nabijheid van jachthavens en ook bij Yerseke. Het substraat bestond steeds uit oesters of de onderzijde van stenen. De tot nu toe dichtstbijzijnde regio waar de soort voorkomt is Zuid-Engeland. De geïntroduceerde linksgewonden spiraalkalkkokerworm *Neodexiospira brasiliensis* is nog steeds verreweg de meest voorkomende spirorbine worm in Nederland. *Pileolaria berkeleyana* is mogelijk een complex van soorten, dat nog diepgaand nader onderzoek verdient. *Pileolaria rosepigmentata* wordt momenteel als een synoniem beschouwd.

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