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## THE GENUS *MACROPODIA* LEACH, 1814 IN THE NORTH SEA AND ADJACENT WATERS, WITH THE DESCRIPTION OF A NEW SPECIES

by

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and

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Key words: Spidercrabs, Majidae, *Macropodia*; key; distribution, North Sea.

*Macropodia parva* spec. nov.; designation of a neotype of *Macropodia rostrata* (Linnaeus) and *Macropodia tenuirostris* (Leach), with a redescription of both species. A key to the Northwest European species is presented.

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### INTRODUCTION

Since april 1972 an ecological trawl survey has been undertaken by the Netherlands Institute for Sea Research (NIOZ), Texel, in the southern North sea (Creutzberg, 1979; Van Noort et al., 1979a, 1979b, 1979c, 1979d, 1981, 1982, 1983, 1984). When examining the collected material, much new information concerning the distribution of some lesser known species of crustaceans was obtained (Adema, Creutzberg & Van Noort, 1982; Adema & Huwae, 1982).

Identification of the spidercrabs of the genus *Macropodia* Leach, 1814, however, proved to be difficult, due to the fact that it was assumed that only

two species of this genus, viz. *Macropodia rostrata* (Linnaeus, 1761) and *Macropodia tenuirostris* (Leach, 1814) occurred in the north-eastern Atlantic (Christiansen, 1969; Holthuis & Heerebout, 1976; Ingle, 1980). Many of the specimens collected did not fit into the description of these two species; some could be identified as *Macropodia linaresi* Forest & Zariquiey Alvarez, 1964. Thurston (1968) and Forest (1978) found this species in the Channel region. Therefore it could be expected to be found in the southern North Sea. Other specimens of the spidercrabs collected appeared to be new to science and are described here as a new species. A fourth species, *Macropodia deflexa* Forest, 1978 has been found in the Channel area and therefore may also be expected in the North Sea. For this reason it is included here.

The taxonomy of the genus *Macropodia* is complicated. To establish some order in this chaos, we decided to select a neotype for both *Macropodia rostrata* and *Macropodia tenuirostris*. The original material used to describe *Cancer rostrata* and *Leptopodia tenuirostris*, probably is lost (Christiansen, 1969; Ingle, 1981 in litt).

## DESCRIPTION OF THE SPECIES

Family Majidae Samouelle, 1819

### ***Macropodia rostrata* (Linnaeus, 1761)** (figs. 1-4)

*Cancer rostratus* Linnaeus, 1761: 493.

*Cancer phalangium* auct., non Fabricius, 1775: 408.

Neotype, by present designation: male, Strömmarma Fjord, SW. of Grasholmen, E. of Fiskebäckskil, Sweden, 58°14'N 11°32'E. Depth 5 m, between shell debris and *Laminaria*, Agassiz-trawl, 9.ix.1965. Excursion Leiden biologists, Sta. 144. Neotype in RMNH collection, Leiden, The Netherlands, no. D 21840.

Description of neotype. — Dorsal surface of carapace slightly granular, with numerous hook-shaped setae, especially on rostrum. Rostrum short, slightly curved upwards, reaching to middle of 5th segment of antennal peduncle. Basal antennal segment smooth; no spines on ventral surface. Length of segment 5 about 3 × total length of segments 3 and 4.

Orbital region smooth. Protogastrical region slightly swollen, with blunt tubercle. Mesogastrical region smooth, metagastrical region with small spine. Cardiac region slightly swollen, with spine. Subhepatic region with small spine. Epibranchial region swollen, with spine. Spine on ventral margin be-

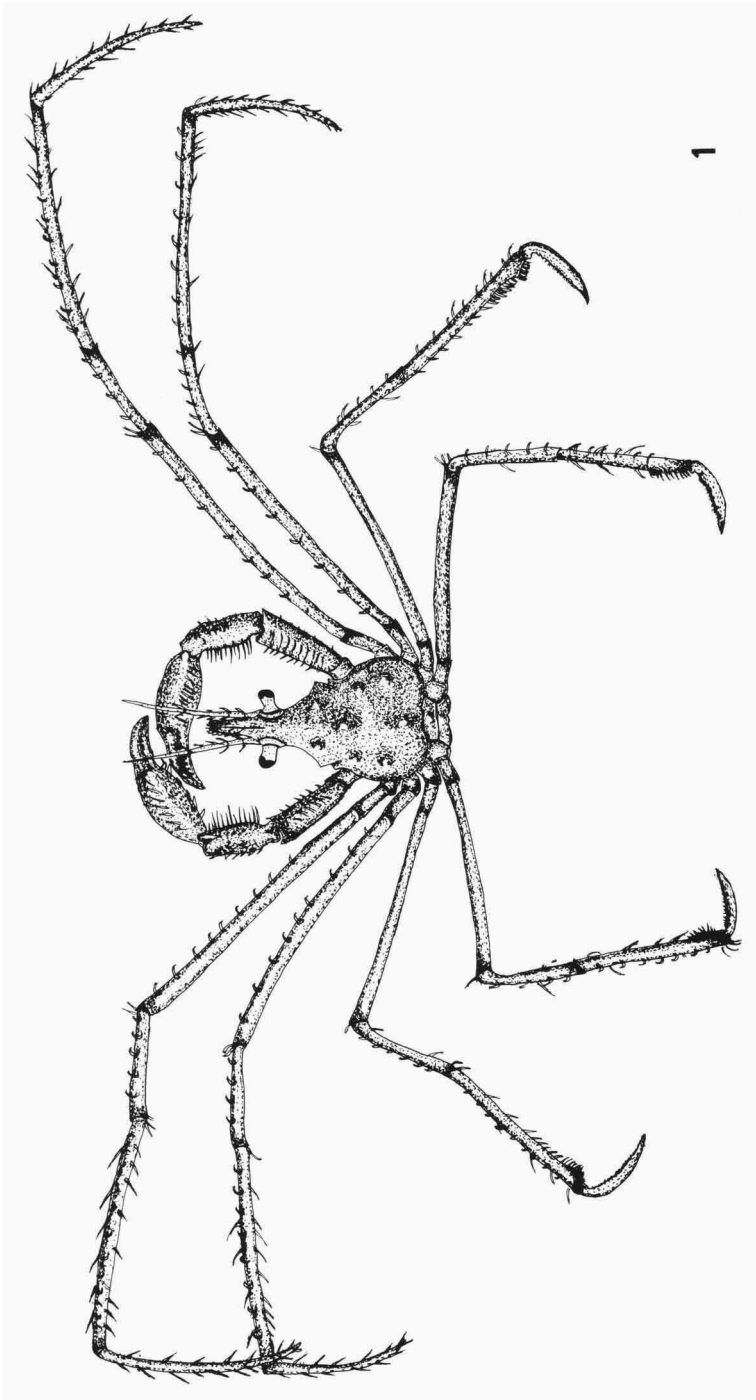


Fig. 1. *Macropodia rostrata* (Linnaeus), neotype, ♂, length of carapace 14.3 mm.

tween epi- and mesobranchial region. Dorsal surface of mesobranchial region slightly swollen, with blunt tubercle. Metabranchial region slightly swollen, also with blunt tubercle.

Chelipeds hairy; row of spines on ventral surface of all segments, except movable finger. Row of blunt spines on inner margin of merus. Inner surface of palm with small tubercles; no tubercles on fixed finger. Cutting edge of fingers gaping, proximal one with blunt spine.

Walking legs with setae. Length of merus of P2-3 longer than total length of carapace and rostrum. Distal margin of merus of P2 with 2-3 spines; distal margin of merus of P3 with four spines; spines pointing outwards. Length of merus of P4-5 as long as total length of carapace and rostrum. Dactylus of P4 with small spines on inner margin, not extending beyond distal third of margin. Dactylus of P5 almost straight, with small spines, spines not extending beyond distal third of margin (fig. 3).

Abdomen with setae along edge of segments. Distal segments more or less invaginated.

First pair of pleopods of male with distinct torsion, S-shaped; base swollen, with sharp and strongly curved tip (fig. 4).

Length of carapace: 14.3 mm (incl. rostrum); breadth of carapace: 8.5 mm.

### ***Macropodia tenuirostris* (Leach, 1814)**

(fig. 5)

*Leptopodia tenuirostris* Leach, 1814: 431.

*Stenorhynchus tenuirostris*; Bell, 1844: 6, fig.

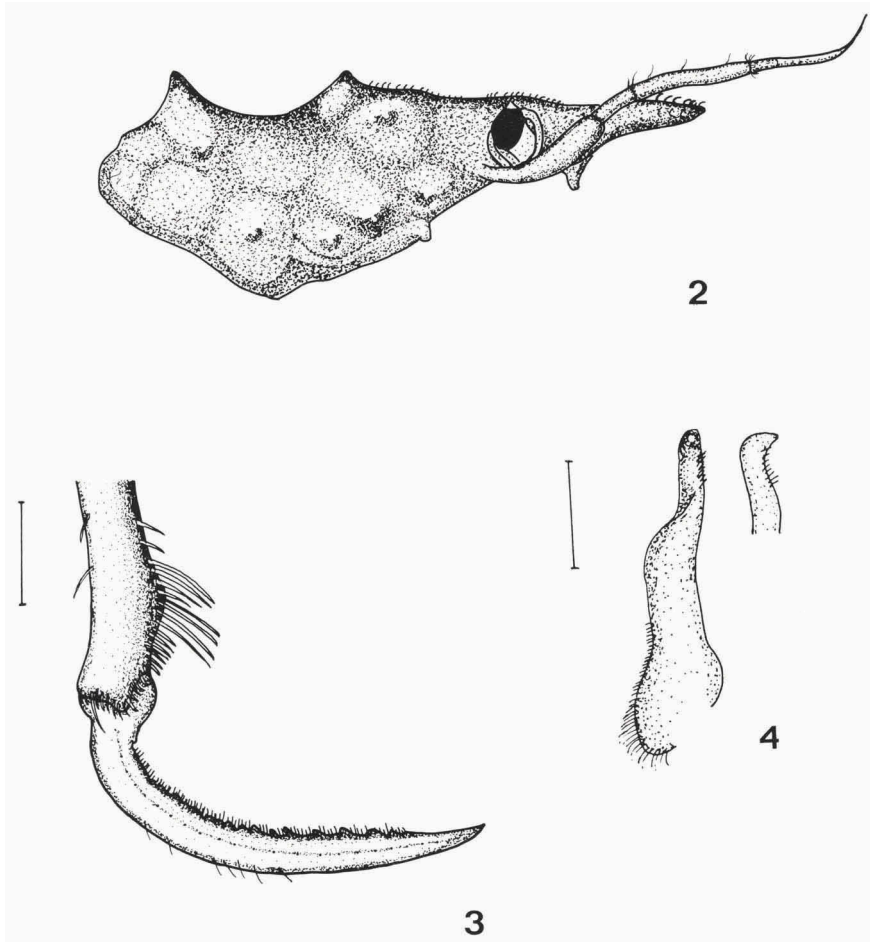
*Macropodia longirostris* auct., non Fabricius, 1775: 408.

*Macropodia tenuirostris tenuirostris*; Forest, 1978: 333, figs. 4, 8, 15, 21.

Neotype, by present designation: male, off Plymouth, Great Britain, 50°06'N 03°56'W. Depth 63 m, on sand, 21.viii.1982. Leg. M.S.S. Lavaleye. Neotype in British Museum (Natural History), London, Great Britain.

Description of neotype. Dorsal surface of carapace moderately smooth, with numerous hook-shaped setae, especially on rostrum. Rostrum long, slightly deflected upwards, reaching beyond 5th segment of antennal peduncle. Basal segment of antennal peduncle with three distinct spines, the middle one being the most prominent. Small spine on distal end of antennal peduncle.

Protogastric region of carapace swollen and with prominent spine. Metagastric region with very large spine. Cardiac region swollen, with distinct spine. Intestinal region slightly swollen; small spine at base of antennal pedun-



Figs. 2-4. *Macropodia rostrata* (Linnaeus), neotype, ♂. 2, lateral view of the carapace, length of carapace 14.3 mm; 3, dactylus of 5th pereiopod, length of scale 1 mm; 4, 1st pleopod, length of scale 1 mm.

cle. Spine between antennal peduncle and (sub)hepatic region. Behind this spine, two spines on epibranchial region. Ventral region of carapace with conical tubercle. Spine on margin and in centre of mesobranchial region. Spine between meso- and metabranchial region, near ventral margin. Metabranchial region slightly swollen, with small tubercle in central part.

Chelipeds hairy; on ischium two spines, the distal one being the largest.

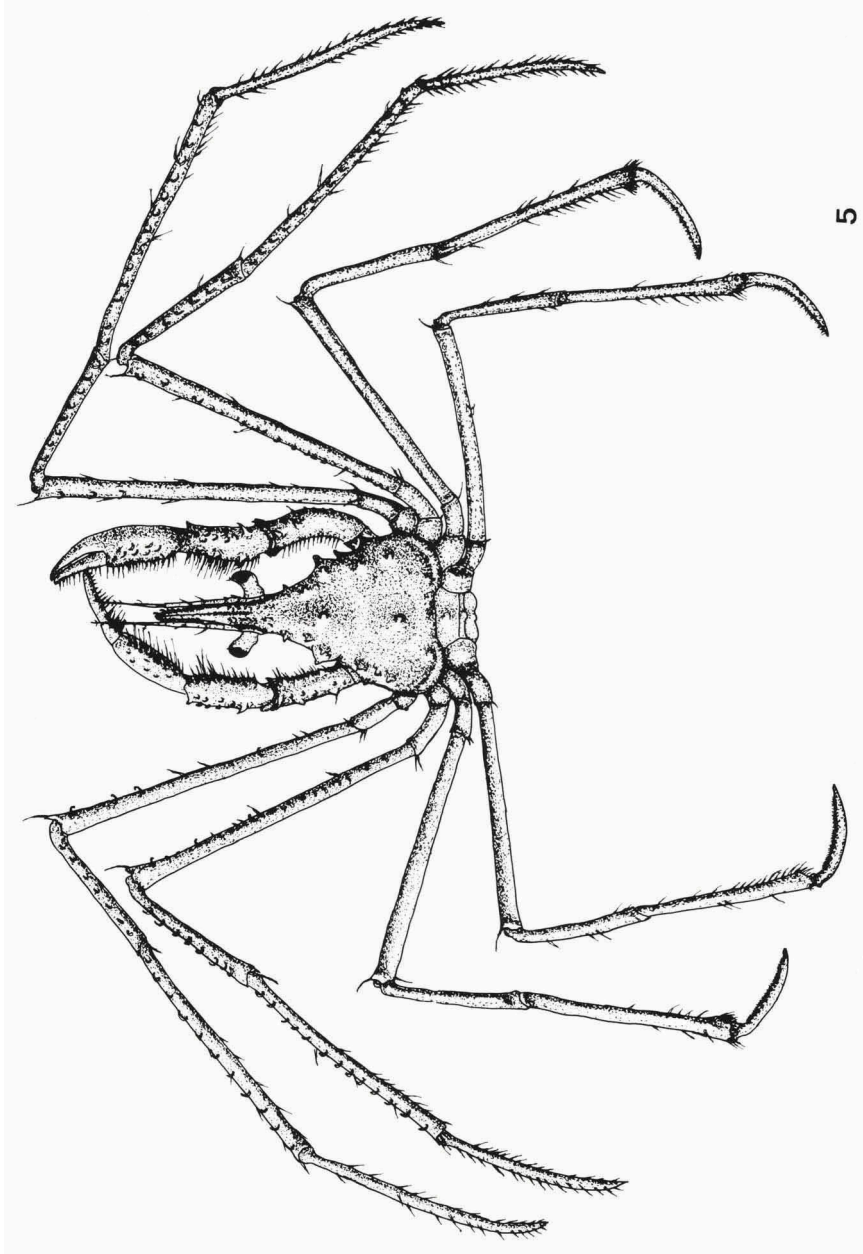


Fig. 5. *Macropodia tenuirostris* (Leach), neotype, ♂, length of carapace 16.0 mm.

Row of small tubercles on inner surface of merus. Ventral margin of merus with row of alternate smaller and larger spines. Carpus with three spines on dorsal-inner surface, the middle one being the largest. Distinct spine on upper surface, near articulation with merus. Spine on ventral margin of carpus; inner surface of propodus with row of spines. Also row of small spines on dorsal and ventral margin of propodus, the ventral row extending on fixed finger. Cutting edge of fingers slightly toothed; sides of movable finger smooth.

Merus of P2-3 longer than total length of carapace and rostrum. Distal margin of merus of P2-3 with 4-5 large spines; spines pointing straight ahead. Dactylus long and unarmed. Merus of P4-5 shorter than total length of carapace and rostrum. Distal margin of merus with three small spines. Dactylus of P4 straight. Dactylus of P5 slightly curved, with small spines over the whole length.

Abdomen with setae on outer margin. Distal segment rounded.

Length of carapace: 16.0 mm (incl. rostrum); breadth of carapace: 9.6 mm.

**Macropodia linaresi** Forest & Zariquiey Alvarez, 1964  
(fig. 6)

For a detailed description, see Forest & Zariquiey Alvarez, 1964: 233, figs. 5, 11, 16. — Forest, 1978: 3, figs. 1, 5, 10, 17. — Ingle, 1980: 133, figs. 93, 97, 101, pl. 30a.

Short description of material collected in the southern North Sea. —

Rostrum short, curved upwards, not reaching beyond distal half of 5th segment of antennal peduncle. Ventral surface of peduncle with three small spines. Small spine between subhepatic region and antennal peduncle. Spines on dorsal surface moderate, smaller than those of *Macropodia parva*. Dactylus of P4-5 strongly sickle-shaped curved, with long spines over the whole length. Cutting edge of fingers smooth, not gaping.

*Macropodia linaresi* had not been recorded from the North Sea before.

**Macropodia deflexa** Forest, 1978

*Macropodia aegyptia* auct.

For a detailed description, see Forest, 1978: 329, figs. 3, 7, 11, 12, 19, 20. — Ingle, 1980: 134, figs. 94, 98, 102, pl. 30b.

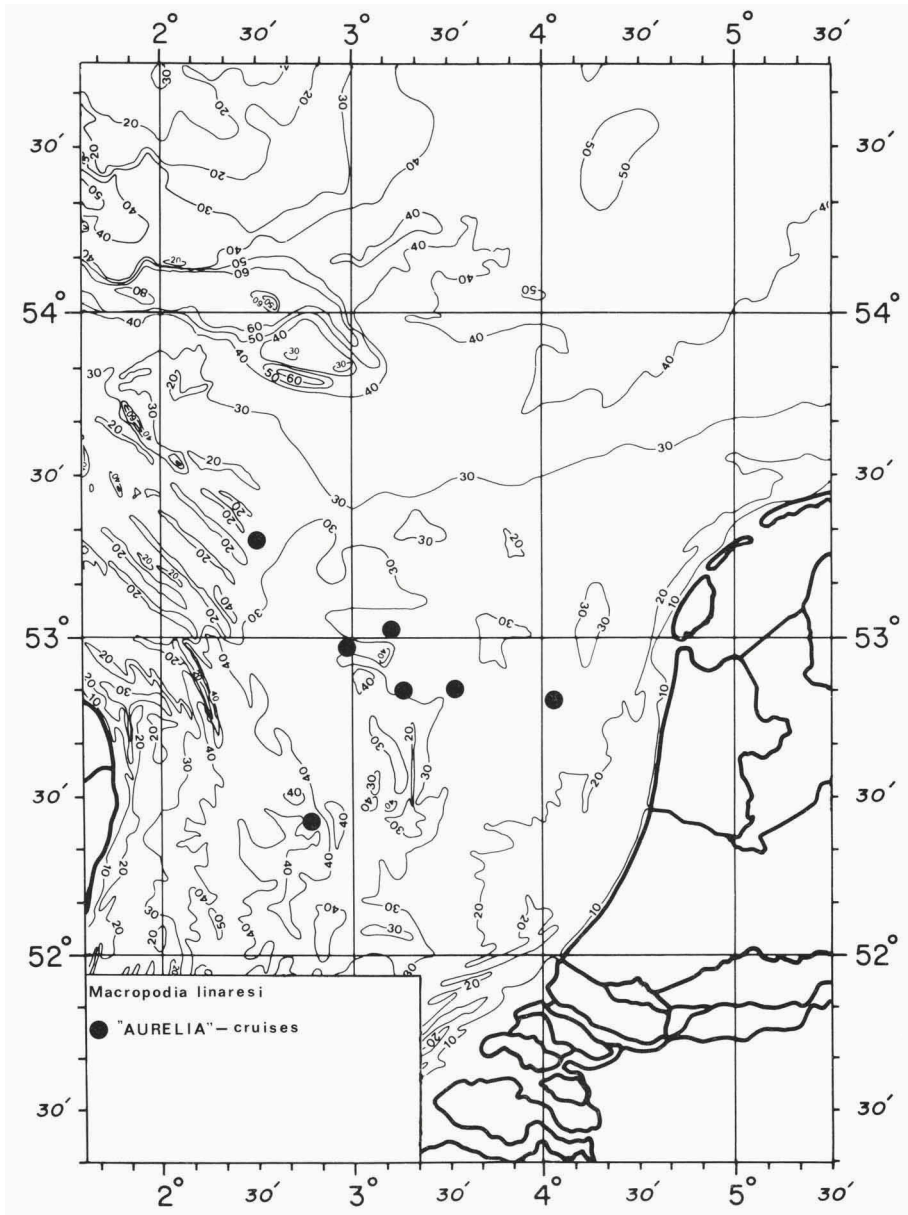


Fig. 6. Distribution of *Macropodia linearesi* Forest & Zariquely Alvarez in the southern North Sea.



Rostrum straight or curved downwards, reaching to three-fourths of 5th segment of antennal peduncle. Ventral surface of antennal peduncle with two distinct spines. Spines on dorsal surface of carapace longer than those of *Macropodia rostrata*. Dactylus of P5 moderately curved, with two rows of very small spines over the whole length.

*Macropodia deflexa* has not yet been recorded from the North Sea; it is known from the Channel area (Forest, 1978: 7; Ingle, 1980: 134), so the species is to be expected in the southern North Sea.

***Macropodia parva* spec. nov.**  
(figs. 7-12)

*Macropodia rostrata* auct., pro parte.

Material examined. — See table 1.

Holotype: male. Gullmar Fjord, N. of Blåbergholmen near Lysekil, Sweden, 58°15'N 11°26'E. Depth 4-5 m, dragnet, 3/9.ix.1963. Excursion Leiden biologists, sta. 29. Holotype in RMNH collection, Leiden, The Netherlands, no. D 20068.

For list of paratypes (material examined), see table 1. Paratypes in RMNH collection, Leiden, The Netherlands, except 1♂, 54°30'N 02°45'E (University of Oslo, Norway); 2♂, 52°47'N 04°31'E (British Museum (Natural History), London, Great Britain); 1♀, 53°42'N 04°13'E (Smithsonian Institution, Washington DC, United States of America).

Of the paratypes, two specimens were infested by the rhizocephalan parasite *Drepanorhynchus neglecta* (Fraisse, 1877), see table 1.

Description of holotype (♂). — Dorsal surface of carapace smooth, slightly granular; only a few setae on dorsal surface. Rostrum short, reaching to less than half of 5th segment of antennal peduncle. Length of 5th segment of antennal peduncle 2× total length of segments 3 + 4. Ventral surface of antennal base smooth, no spines present.

Protogastric region swollen, with faint tubercle in central area. Metagastric region with distinct spine. Cardiac region swollen, with large spine. Intestinal region smooth. Ventral surface of epibranchial region with conical tubercle which ends in a spine. Dorsal surface of epibranchial region swollen, without a spine. Spine on ventral edge of mesobranchial region. Dorsal surface of mesobranchial region swollen, with low tubercle in the middle. Metabranial region slightly swollen, with blunt tubercle.

Ischium of chelipeds with spines on inner-ventral surface. Ventral surface of merus with row of spines; ventral surface of carpus with spine at proximal and distal edge. Propodus with row of spines on inner surface; spines not extending on fixed finger. Dorsal surface of propodus and carpus with row of spines; dorsal surface of merus with row of blunt tubercles. Dorsal surface of movable finger smooth. Cutting edge of fingers with small, irregularly placed

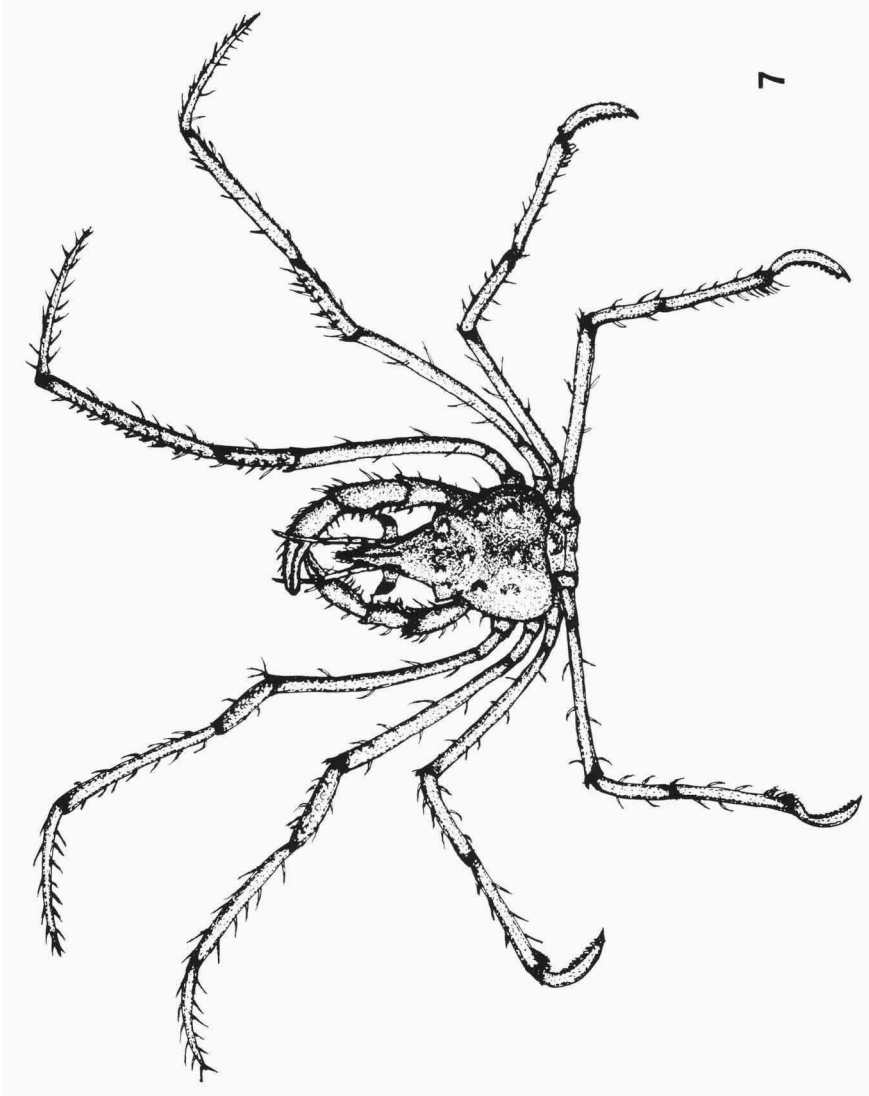
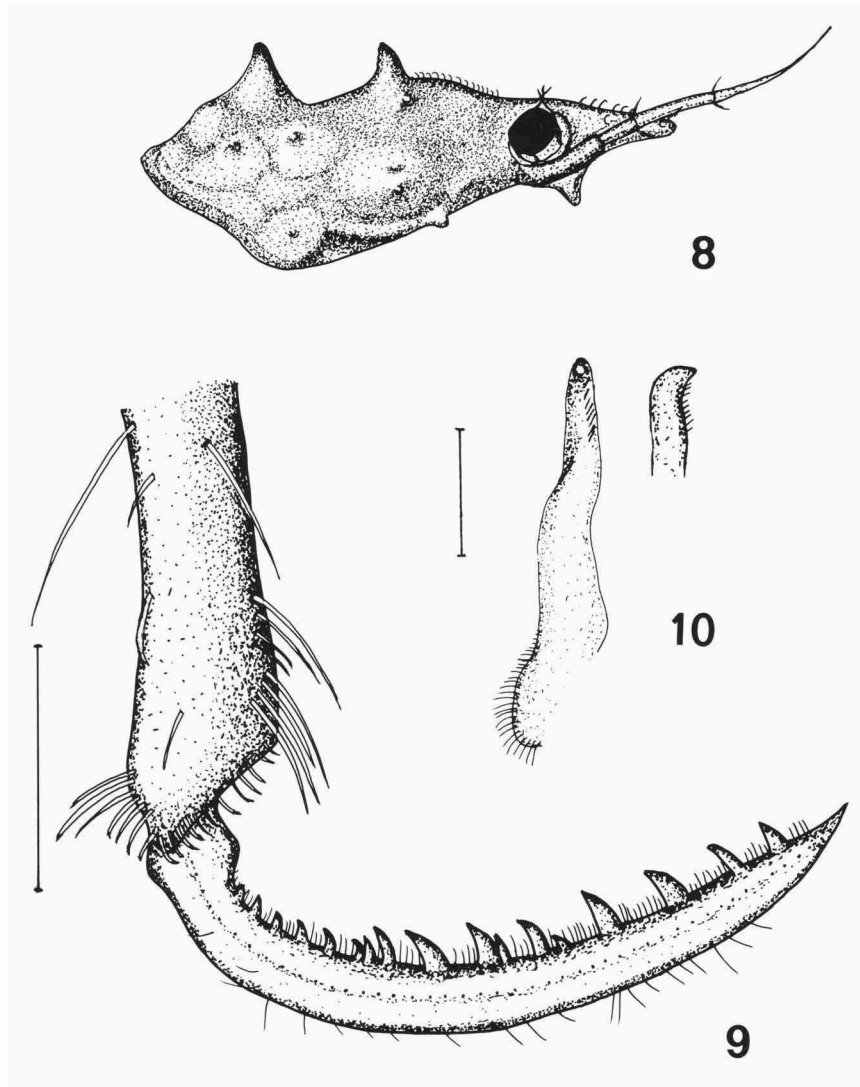


Fig. 7. *Macropodia parva* spec. nov., holotype, ♂, length of carapace 10.9 mm.



Figs. 8-10. *Macropodia parva* spec. nov., holotype, ♂. 8, lateral view of the carapace, length of carapace 10.9 mm; 9, dactylus of 5th pereopod, length of scale 1 mm; 10, 1st pleopod, length of scale 1 mm.

spines. No tubercle on base of cutting edge of fingers.

Pereiopods P2-5 with setae. Merus of P2-3 as long as total length of carapace and rostrum, or slightly shorter. Distal edge of merus with 3-4 spines. Dactylus of P2-3 long and straight. Merus of P4-5 shorter than total length of carapace and rostrum. Distal edge of merus with two small spines. Dactylus of P4-5 strongly curved, with large spines over the whole length (fig. 9).

Distal segment of abdomen almost rounded.

First pair of pleopods of male with faint torsion, weakly S-shaped. Base not swollen; tip sharp and strongly curved (fig. 10).

Length of carapace: 10.9 mm (incl. rostrum); breadth of carapace: 6.9 mm.

Description of paratype (♀). — For main characters, see description of holotype. Rostrum short, not reaching the middle of antennal peduncle. Merus of P2-5 shorter than total length of carapace and rostrum. No spines on distal edges of merus of P2-5. Dactylus of P4-5 strongly curved, with large spines over the whole length. Abdomen rounded, edges of abdomen with numerous setae.

*Macropodia parva* is obviously closely related to *M. linaresi* and *M. rostrata*. It can be distinguished from *M. rostrata* by the length of the carapace, the shape of the dactylus of P4-5, and the length of the antennal segments 3-4 and 5. In *M. parva* the length of the 5th antennal segment is 2.0-2.3 times the length of segments 3 and 4. In *M. rostrata* the length of the 5th antennal segment is 2.8-3.0 times the length of segments 3 and 4. The dactylus of *M. rostrata* is slightly curved, with small spines not extending beyond the distal third of the margin. *M. parva* has strongly curved dactyli, with large spines over the whole length. The first pair of pleopods of the male of *M. rostrata* has a swollen base, a distinct torsion, and is clearly S-shaped; the first pair of pleopods of *M. parva* has a thin base, a faint torsion, and is less S-shaped than in *M. rostrata*.

From *M. linaresi* it can be distinguished by the fact that there are no spines on the ventral surface of the antennal peduncle. The dactylus of P4-5 of *M. parva* is less curved than the strongly sickle-shaped dactylus of P4-5 of *M. linaresi*. *M. linaresi* has a small spine on the subhepatal region; this spine is lacking in *M. parva*.

Etymology. — From *parva* (Latin) meaning "small"; the species has a relatively short rostrum, and the adult is relatively small.

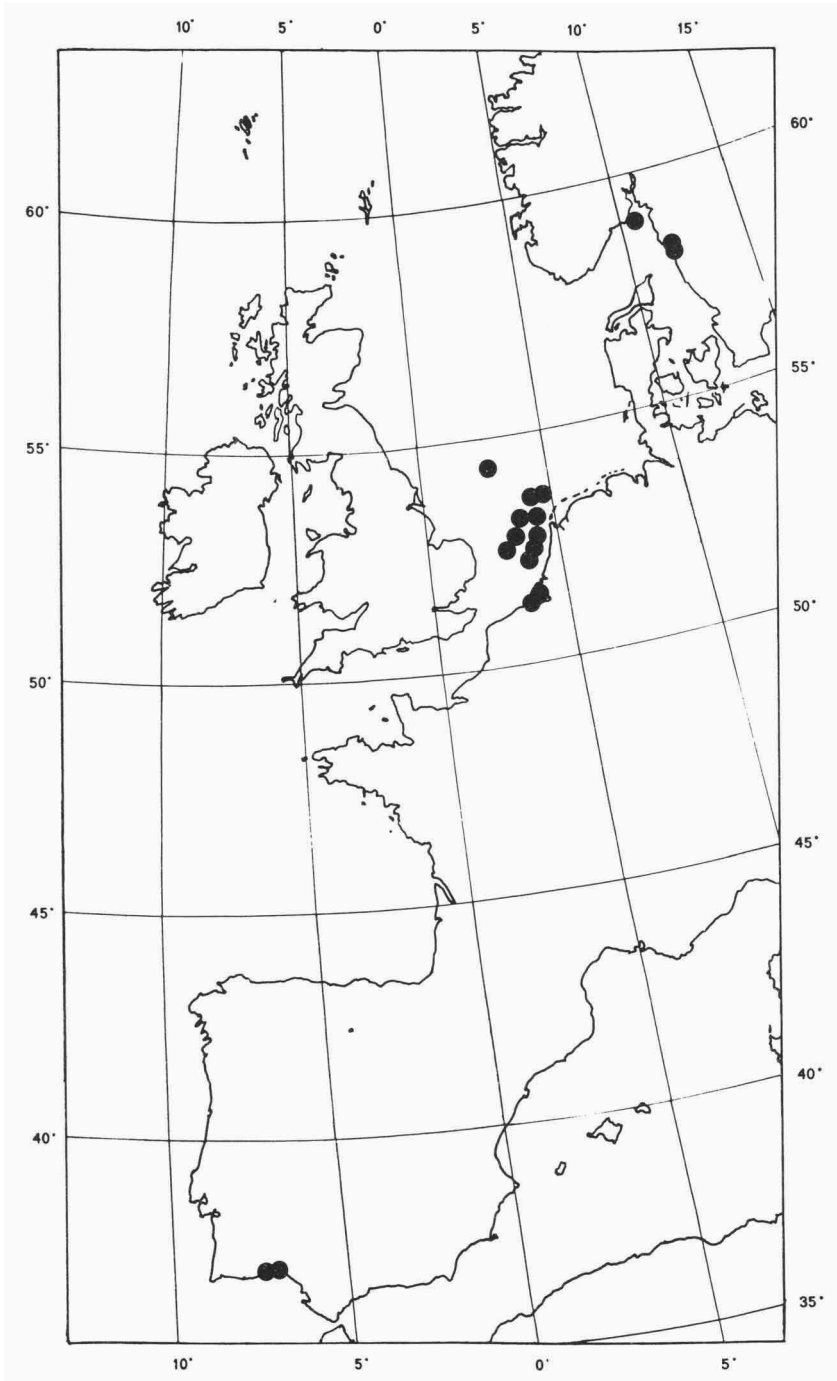


Fig. 11. Distribution of *Macropodia parva* spec. nov.

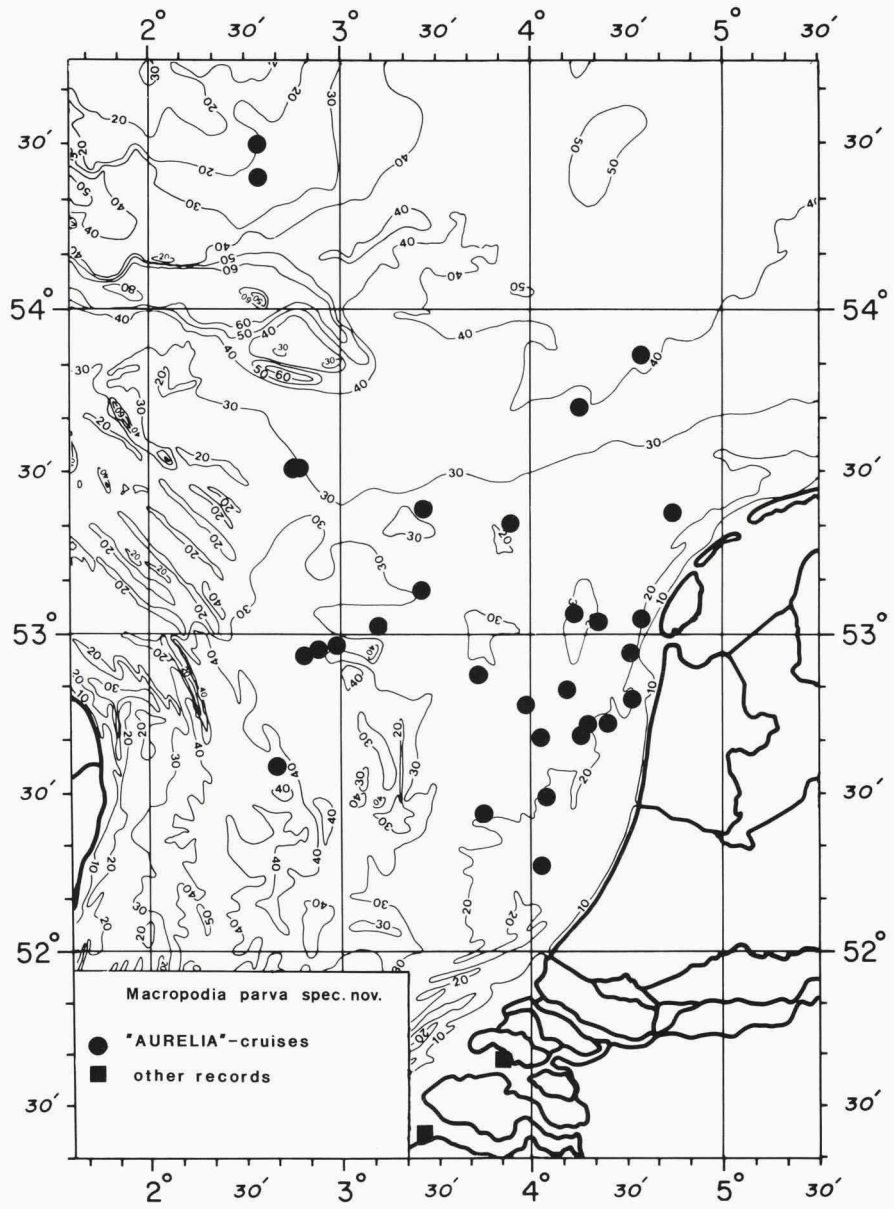


Fig. 12. Distribution of *Macropodia parva* spec. nov. in the southern North Sea

Table 1

Material examined of *Macropodia parva* spec. nov.

Number	Date	Locality	Legit
1♀ (ovigerous)	27.vii.1982	Albufeira, Algarve, Portugal	H.P. Wagner & E. van Zijp
1♂	24.vii.1982	Calanes, Algarve, Portugal	H.P. Wagner & E. van Zijp
4♂, 3♀	26.ix.1981	Tokeneskilen, Nøtterøy, outer Oslofjord, Norway	P. Pethon (don. M.E. Christiansen)
1♂, 1juv.	2.ix.1984	1-2 km W. of Zierikzee, Schouwen, The Netherlands	R. Dekker
2♂	9.i.1969	W. of Nieuwe Sluis, Zeeuws-Vlaanderen, The Netherlands	L. Braber (Delta Instituut, Yerseke)
2 (parasitized)	9.ix.1981	58°12'N 11°20'E Bonden near Uddevalla, Sweden	Exc. RMNH
1♀	9.ix.1981	58°18'N 11°17'E Malmöfjord near Uddevalla, Sweden	Exc. RMNH
11♀ (3 ovigerous), 13♂ (1 paras.)	14.ix.1961	58°16'N 11°26'E Gullmarfjord near Fiskebäckskil, Sweden	Exc. RMNH
1♀	5.ix.1963	58°12'N 11°19'E E. of Bonden near Grundsund, Sweden	Exc. RMNH
1♀	3/9.ix.1963	58°15'N 11°26'E Gullmarfjord, N. of Blåbergsholmen near Lysekil, Sweden	Exc. RMNH
2♂, 1♀, 3 juv.	24.x.1972	52°52'N 03°44'E	NIOZ
1 juv.	26.x.1972	52°42'N 04°25'E	NIOZ
1♀	29.ix.1975	53°42'N 04°13'E	NIOZ
1♂, 1♀	29.ix.1975	53°24'N 04°42'E	NIOZ
1♀	30.ix.1975	54°30'N 02°46'E	NIOZ
1♂	30.ix.1975	54°30'N 02°45'E	NIOZ
1♂	30.ix.1975	54°30'N 02°32'E	NIOZ
1♂	7.x.1975	54°23'N 02°32'E	NIOZ
1♀	9.x.1975	53°01'N 04°36'E	NIOZ
1♂	9.x.1975	53°03'N 04°20'E	NIOZ
1 juv.	9.x.1975	53°07'N 04°11'E	NIOZ
2♂	10.x.1975	52°47'N 04°31'E	NIOZ
1♀	10.x.1975	52°42'N 04°27'E	NIOZ
3♂, 1♀	10.xi.1975	52°28'N 04°06'E	NIOZ
1♀	11.xi.1975	52°15'N 04°05'E	NIOZ
1♂	11.xi.1975	52°26'N 03°41'E	NIOZ
1♀ (ovigerous)	12.xi.1975	52°32'N 02°42'E	NIOZ
1♂	12.xi.1975	53°01'N 03°11'E	NIOZ
1♂	12.xi.1975	53°07'N 03°26'E	NIOZ
1♂, 1♀	1.iii.1976	52°40'N 04°15'E	NIOZ
1♂	1.iii.1976	52°40'N 04°01'E	NIOZ
1♀	20.x.1976	52°22'N 03°25'E	NIOZ
2♂, 1♀	26.x.1976	52°57'N 02°59'E	NIOZ
1♂	24.i.1980	52°55'N 04°30'E	NIOZ
1♂, 4♀	8.ix.1981	53°52'N 04°31'E	NIOZ
2♂, 5♀	10.ix.1981	53°20'N 03°56'E	NIOZ
1♂, 1♀	22.ix.1981	52°58'N 04°11'E	NIOZ
1♀	22.ix.1981	52°47'N 03°59'E	NIOZ

KEY TO THE NORTH EUROPEAN SPECIES OF *Macropodia*

1. Ventral surface of antennal peduncle smooth, without spines. No spines or spinules between swollen subhepatal region of carapace and basal segments of antennal peduncle ..... 2
  - One or more spines on ventral surface of second and third segment of antennal peduncle. Spine or spinules present approximately mid-way between swollen subhepatal region of carapace and basal segments of antennal peduncle ..... 3
2. Spines on inner margin of dactylus of fifth pereopod not extending beyond distal third of margin; spines small. Dactylus of fifth pereopod weakly curved. Rostrum horizontal, not extending distally beyond proximal half of fifth segment of antennal peduncle. Merus of P2 longer than total length of carapace and rostrum ..... *M. rostrata*
  - Spines on inner margin of dactylus of fifth pereopod over the whole length; spines large. Dactylus of fifth pereopod strongly curved. Rostrum horizontal or slightly curved upwards, not extending distally beyond proximal quarter of fifth segment of antennal peduncle. Merus of P2 as long as total length of carapace and rostrum ..... *M. parva*
3. Rostrum very short, curved upwards, not extending beyond proximal quarter of fifth segment of antennal peduncle. Dactylus of fifth pereopod sickle-shaped curved, with long spines over the whole inner margin ...
  - ..... *M. linaresi*
  - Rostrum long, horizontal or deflexed downwards, extending beyond middle of fifth segment of antennal peduncle. Dactylus of fifth pereopod weakly curved or nearly straight, with small spines ..... 4
4. Rostrum horizontal, very long, reaching beyond fifth segment of antennal peduncle. Dactylus of fifth pereopod with small spines, usually widely spaced ..... *M. tenuirostris*
  - Rostrum deflexed downwards, moderately long, reaching to distal end of fifth segment of antennal peduncle (but never reaching beyond this segment). Dactylus of fifth pereopod with two rows of very small and closely grouped spines on inner margin ..... *M. deflexa*

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## REFERENCES

- Adema, J.P.H.M., F. Creutzberg & G.J. van Noort, 1982. Notes on the occurrence of some poorly known Decapoda (Crustacea) in the southern North Sea. — *Zool. Bijdr. Leiden* 28: 9-32.
- Adema, J.P.H.M. & P.H.M. Huwae, 1982. New and supplementary records of marine Isopods for The Netherlands and the southern North Sea since 1956, with a note on *Peltogaster paguri* (Crustacea, Cirripedia). — *Zool. Bijdr. Leiden* 28: 33-57.
- Bell, T., 1844-1852. History of the British stalk-eyed Crustacea: i-lxv, 1-386. London.
- Christiansen, M.E., 1969. Marine invertebrates of Scandinavia. No. 2. Crustacea, Decapoda Brachyura: 1-143. Oslo.
- Creutzberg, F., 1979. "Aurelia"-cruise reports on the benthic fauna of the southern North Sea. Introductory Report. — *Int. Versl. NIOZ* 1979-4: 1-31.
- Fabricius, J.C., 1775. *Systema entomologiae sistens insectorum classes, ordines, genera, species, adjectis synonymis, locis, descriptionibus, observationibus*: 1-832. Flensburgi et Lipsiae.
- Forest, J., 1978. Le genre *Macropodia* Leach dans les eaux atlantiques européens (Crustacea Brachyura Majidae). — *Cah. Biol. mar.* 19: 323-342.
- Forest, J. & R. Zariquiey Alvarez, 1964. Le genre *Macopodia* Leach en Méditerranée. I. Description et étude comparative des espèces (Crustacea Brachyura Majidae). — *Bull. Mus. natn. Hist. nat. Paris* 36: 222-244.
- Holthuis, L.B. & G.R. Heerebout, 1976. Crustacea-kreeftachtigen. De Nederlandse Decapoda (garnalen, kreeften en krabben). — *Wet. Meded. K. Ned. Natuurh. Veren.* 111: 1-56.
- Ingle, R.W., 1980. British crabs: 1-222. London.
- Leach, W.E., 1814. Crustaceology. In: Brewster, Sir D. (ed.). *The Edinburgh encyclopedia*; conducted by D. Brewster, Vol. 7 (2): 385-437. Edinburgh.
- Linnaeus, C., 1761. *Fauna Svecica*: i-xlvi, 1-578. Stockholmiae.
- Noort, G.J. van, F. van Leeuwen & F. Creutzberg, 1979a. "Aurelia"-cruise reports on the benthic fauna of the southern North Sea. Report 1: trawl survey April-May 1972. — *Int. Versl. NIOZ* 1979-5: 1-104.
- Noort, G.J. van, F. van Leeuwen & F. Creutzberg, 1979b. "Aurelia"-cruise reports on the benthic fauna of the southern North Sea. Report 2: trawl survey June-July 1972. — *Int. Versl. NIOZ* 1979-6: 1-107.
- Noort, G.J. van, F. van Leeuwen & F. Creutzberg, 1979c. "Aurelia"-cruise reports on the benthic fauna of the southern North Sea. Report 3: trawl survey October-November 1972. — *Int. Versl. NIOZ* 1979-7: 1-115.
- Noort, G.J. van, F. van Leeuwen & F. Creutzberg, 1979d. "Aurelia"-cruise reports on the benthic fauna of the southern North Sea. Report 4: trawl survey January-February 1973. — *Int. Versl. NIOZ* 1979-8: 1-99.
- Noort, G.J. van & F. Creutzberg, 1981. "Aurelia"-cruise reports on the benthic fauna of the southern North Sea. Report 5: trawl survey October-November 1974. — *Int. Versl. NIOZ* 1981-1: 1-116.
- Noort, G.J. van, F. Creutzberg & R. Dapper, 1982. "Aurelia"-cruise reports on the benthic fauna of the southern North Sea. Report 6: trawl survey September-November 1975. — *Int. Versl. NIOZ* 1982-7: 1-68.
- Noort, G.J. van, F. Creutzberg & R. Dapper, 1983. "Aurelia"-cruise reports on the benthic fauna of the southern North Sea. Report 7: trawl survey February-March 1976. — *Int. Versl. NIOZ* 1983-3: 1-76.
- Noort, G.J. van, F. Creutzberg & R. Dapper, 1984. "Aurelia"-cruise reports on the benthic fauna of the southern North Sea. Report 8: trawl survey October 1976. — *Int. Versl. NIOZ* 1984-1: 1-72.
- Samouelle, G., 1819. *The entomologist's useful compendium; or an introduction to the knowledge of British insects*: 1-496. London.
- Thurston, M.H., 1968. A spider crab new to Britain. — *Crustaceana* 14: 223-224.