Biol. Jb. Dodonaea, 49, 1981, 200-209 (10/12/1981).

BOREOPONTIA HEIPI N.G., N.SP. AN INTERSTITIAL HARPACTICOID (COPEPODA) FROM THE SOUTHERN BIGHT OF THE NORTH SEA

by

K. A. WILLEMS

RÉSUMÉ. – Description de *Boreopontia heipi* n.g. n.sp., une forme de copépode harpacticoide appartenant à la famille des Cylindropsyllidae Sars (sensu LANG, 1948) provenant de la Mer du Nord. L'espèce décrite montre des caractères de deux sub-familles Cylindropsyllinae et Leptopontiinae, dont la plupart révèlent une relation proche des Cylindropsyllinae, plus précise *Stenocaris*.

INTRODUCTION

During a comprehensive investigation of the meiofauna of the Kwinte Bank, a sandbank in the Southern Bight of the North Sea, several specimens were collected of an interstitial harpacticoid of the family Cylindropsyllidae, representing a new genus. These specimens, referred to as *Arenopontia* sp. A by Willems *et al.* (in press), occurred in two stations with a pure, very well sorted coarse sand. The physical characteristics were : median grain size : 402-517 µm ; sorting : 0.30-0.24 ∅ ; mud (< 63 µm) content : 0.05-0 % ; gravel (> 2000 µm) content : 1.13-0.24 %. The copepod association was dominated by *Interleptomesochra eulitoralis* NOODT, 1952), *Leptastacus laticaudatus intermedius* KUNZ, 1938, *Metacyclopina brevisetosa* HERBST, 1974 and *Ectinosoma reductum* BOZIC, 1954.

DESCRIPTION

Boreopontia n.g.

Cylindropsyllidae. Body slender, elongated and cylindrical ; rostrum defined at base ; antennule seven-segmented in female, in male haplocer,

fourth segment with aesthetasc ; antenna with allobasis, exopodite one-segmented with two terminal setae ; mandible with two-segmented palp ; maxillule without exo- and endopolite ; syncoxa of maxilla with two endites ; maxillipeds normally built, prehensile, a terminal claw without an accessory seta ; first leg with a three-segmented exopodite, middle segment without an outer spine and with a two-segmented endopodite, shorter than the exopodite ; second, third and fourth legs with three-segmented exopodites and with two-, one- and two-segmented endopodites, respectively ; fifth legs with baseoendopodite and exopodite fused ; sexual dimorphism in second and third legs ; urosome four-segmented in the female ; anal operculum bare ; furcal rami with one well-developed terminal seta.

Type an only species : *Boreopontia heipi* n.g. n.sp.

Etymology : *Boreos* from north, *pontos* from sea.

Boreopontia heipi n.sp.

Type material. – 12 ♀♀, 11 ♂♂.

The following description is based on the dissection of one female (holotype), one male (allotype) with additional observations from four paratypes (3 ♀ ; 1 ♂). All specimens have been deposited at the "Koninklijk Belgisch Instituut voor Natuurwetenschappen", under n° I.G. 26291.

Type locality. – The Kwinte Bank (Southern Bight of the North Sea) ; sample sites n° 4 and n° 5 with the following coordinates : 51°18'40" N, 2°40'45" E ; 51°18'00" N, 2°40'10" E, respectively.

Female. – n = 7 ; length : 0.61-0.77 mm (with rostrum and caudal rami) ; 0.55-0.72 mm (without).

Body cylindrical, slender, vermiform and ten times as long as the broadest part (fig. 1A). Rostrum large ; defined at base, triangular with a minute sensory seta on either side at some distance from the tip (fig. 1B). Cephalothorax, rostrum excluded, one fifth of the total body length and longer than two successive somites combined ; bare. Genital double somite without any trace of subdivision. Except for the first and second abdominal segments, each bearing a pair of small laterodorsal sensillae (fig. 1A), thoracic and abdominal segments without ornamentation. Anal operculum bare. Caudal rami (fig. 1D ; 1E) divergent, three times as long as broad, with one well-developed terminal seta of which the proximal part is spinous-like enlarged over one-third of the total length and merging with a small outer seta at its base. Inner distal corner with a minute seta. Dorsal surface ornamented with three setae, one articulated at base and inserted at the base of a tubercle-like hook.

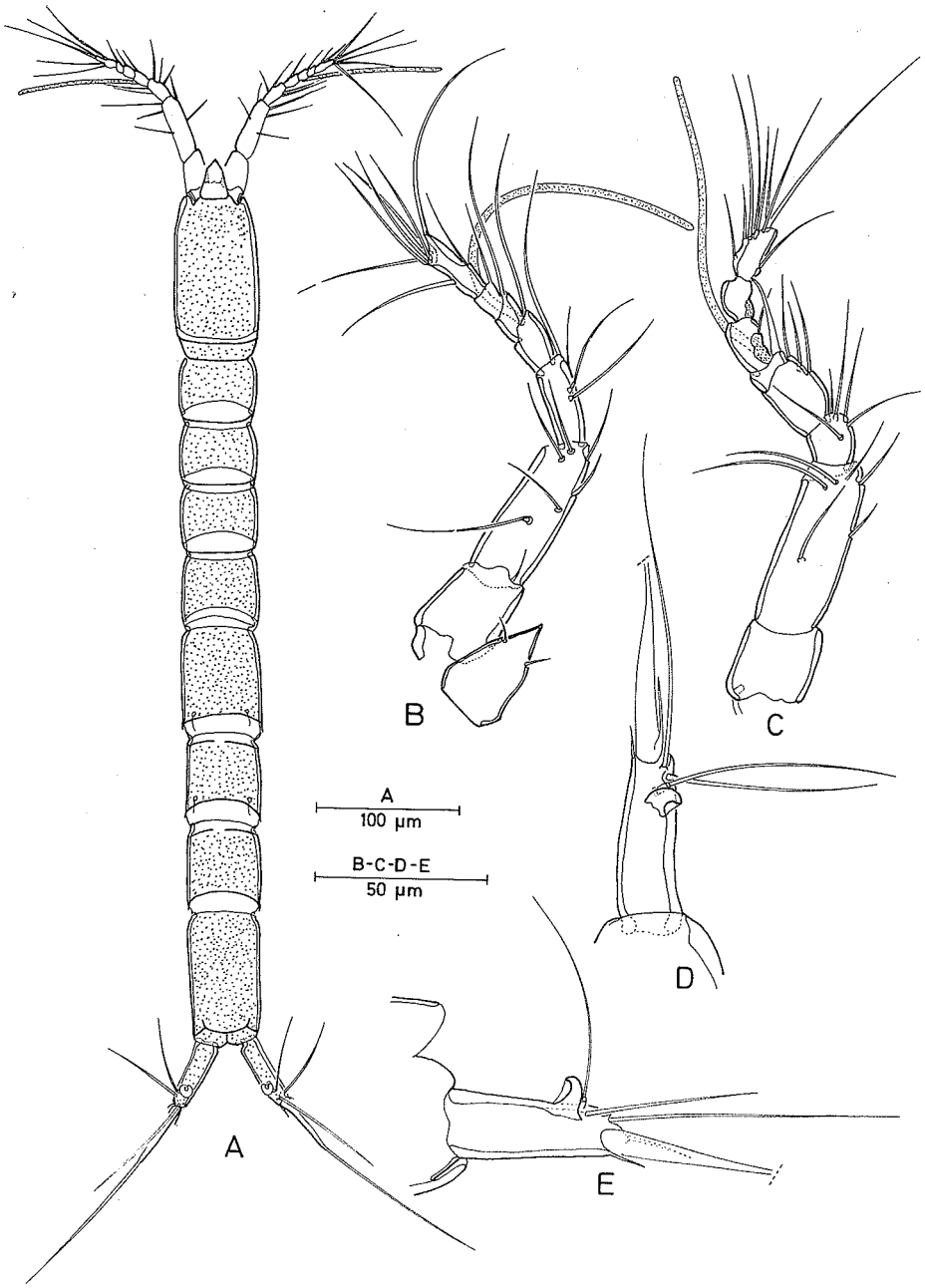

FIG. 1. – *Boreopontia heipi* n.g. n.sp.

A. General habitus, female ; B. Rostrum, antennule, female ; C. Antennule, male ; D. Furca, dorsal ; E. Furca, lateral.

Antennule (fig. 1B). – Seven-segmented ; second segment longest, slightly more than twice the length of the first and fully twice as long as the third segment ; fourth segment elongate, slightly longer than two preceeding segments combined and almost three times as long as penultimate (ratio of lengths – 17 : 32 : 18 : 10 : 5 : 5 : 13 = 100).

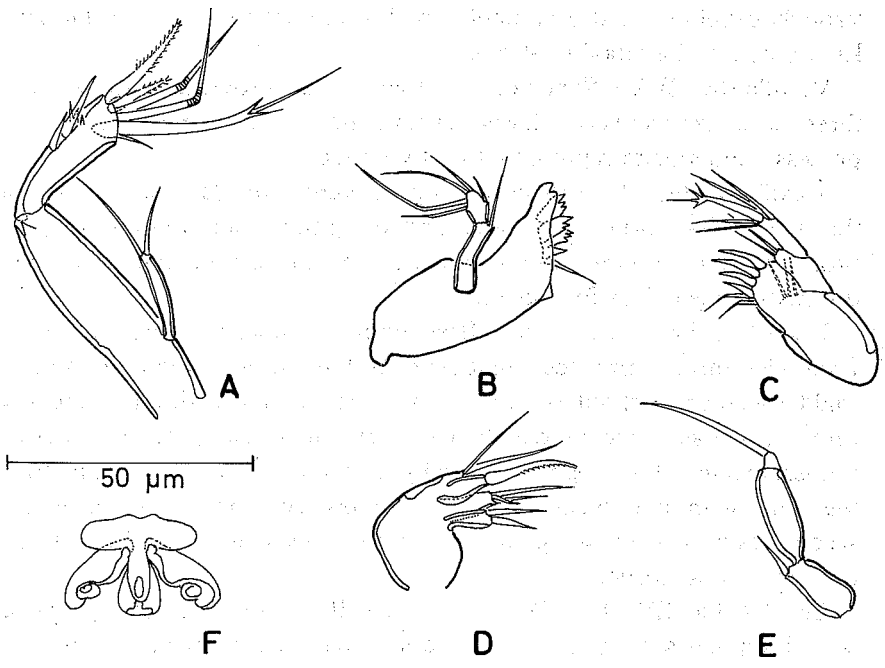

FIG. 2. – *Boreopontia heipi* n.g. n.sp.
Female : A. Antenna ; B. Mandible ; C. Maxillule ; D. Maxilla ; E. Maxilliped ; F. Genital field.

Antenna (fig. 2A). – Two-segmented ; allobasis with a one-segmented exopodite, provided with two apical setae. Last endopodite segment with two lateral spines ; a row of spinules on the distal part ; two terminal spines and three terminal geniculate setae : one of the latter more developed, irregularly ornamented with some spinules at the two thirds of its length and merging with a straight, thin seta at its base.

Mandible (fig. 2B). – Praecoxa with bidentate pars incisiva ; lacinia mobilis well-developed ; a single seta and pars molaris present. Coxabasis twice as long as endopodite, with one seta in the outer distal corner. Endopodite with four well-developed setae and one small seta at the outer edge.

Maxillula (fig. 2C). – Praecoxal arthrite with four terminal spines and two terminal setae ; three setae present on surface (dotted lines in fig. 2C). Coxa with two setae. Basis with five terminal setae one of which is strongly developed and ornamented with spinnules close to its distal part. Endopodite and exopodite absent.

Maxilla (fig. 2D). – Syncoxa with two endites, provided with two and three setae respectively ; basis terminating in an elongate claw-like process ; endopodite represented by two setae.

Maxilliped (fig. 2E). – Wel-developed, prehensile. Basis with a seta at the inner distal corner ; first endopodite segment four times as long as broad, without ornamentation ; second segment terminating in a claw, distinctly longer than first segment.

Leg 1 (fig. 3A). – Coxa bare. Basis with one inner and one outer seta. Exopodite three-segmented ; first segment longest with one outer spine ; middle segment without an outer spine ; last segment with one spine and three geniculate setae of which one is extremely elongate. Endopodite two-segmented ; both segments equally long and as long as first exopodite segment, with one well-developed plumose seta on the inner edge ; second segment with two geniculate terminal setae and a smaller seta on the inner distal corner.

Leg 2-4 (fig. 3B1 ; C1 ; D). – Coxa bare. Basis with one inner plumose seta. Exopodites consisting of three segments, each segment with one outer spine ; outer distal corner of the first and second segments dentiform, with a row of spinules at the base of the outer spines in the fourth leg (fig. 3D). Last segments with two well-developed terminal setae, a row of spinules on the distal edge and one inner seta in the third and fourth leg. Outer edge of second and third segments spinulose, except for the fourth leg. Endopodites two-segmented in the second and fourth legs ; endopodite of third leg one-segmented. First segment of second leg with one long, serrated lateral seta ; last segment with one terminal spine. Third legs with one terminal spine. First segment of fourth legs twice as long as last segment, bare ; last segment with one well-developed spine and a minute lateral seta. Seta and spine formula in Table 1.

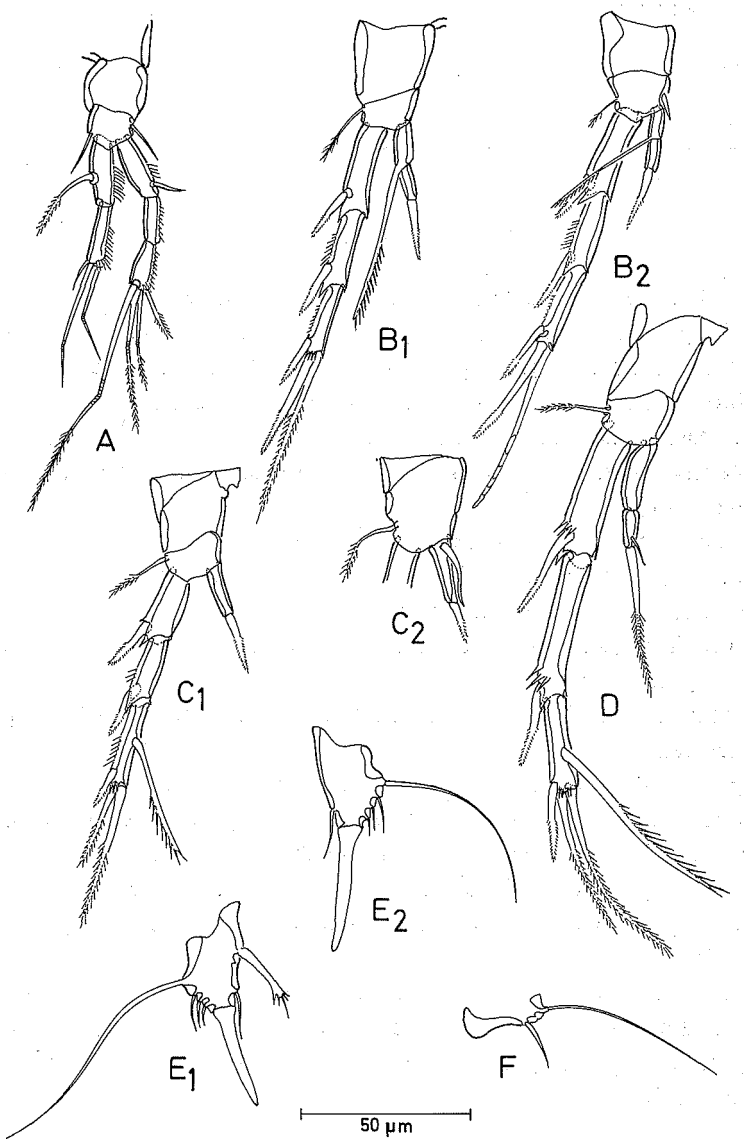

FIG. 3. – *Boreopontia heipi* n.g. n.sp.

Legs : A. P_1, female ; $B_1.P_2$, female ; $B_2.P_2$, male ; $C_1.P_3$, female ; $C_2.P_3$, male ; $D.P_4$, female ; $E_1.P_5$, female ; $E_2.P_5$, male ; $F.P_6$, male. A, E_2 and F, right side = outer side ; others reverse.

Table 1

Boreopontia heipi *n.g. n.sp. Female : Seta and spine formula*

P_1		P_2		P_3		P_4	
Exp.	Enp.	Exp.	Enp.	Exp.	Enp.	Exp.	Enp.
1 2 3	1 2	1 2 3	1 2	1 2 3	1	1 2 3	1 2
0 0 1.2.1	1 1.2.0	0 0 0.2.1	1 0.1.0	0 0 1.2.1	0.1.0	0 0 1.2.1	0 1.1.0

Leg 5 (fig. 3E1). – Baseoendopodite and exopodite forming a common plate ; longer than broad ; tapering distally ; with a strong terminal spine, as long as the plate. Outer edge provided with three small setae and a long flagelliform seta about halfway, most probably representing the outer seta of the baseoendopodite ; inner side with one strong seta terminally ornamented with spinules and one minute seta near the base of the terminal spine.

Ovisac with 4-6 eggs, arranged in one row.

Male. – n = 9 ; smaller, length : 0.51-0.64 mm (with rostrum and caudal rami) ; 0.46-0.58 mm (without).

Sexual dimorphism in antennule, second, third, fifth leg and sixth leg ; genital segmentation.

Antennule (fig. 1C). – Eight-segmented ; haplocer ; fourth segment with aesthetasc.

Leg 1-5. – Basis of second leg with additional spine on inner distal edge and inner seta of terminal exopodite segment slightly modified as shown in fig. 3B2. Proximal part of the endopodite of the third legs with long curved seta (fig. 3C2). Outer edge of the fifth leg armed as in female, terminal spine stronger ; proximal seta on the inner margin absent (fig. 3E2).

Leg. 6 (fig. 3F). – Forming broad common plate with two setae.

Variability : No differences were found among the dissected specimens.

Etymology. – The species is named in honour of Dr. C. Heip, head of the Marine Biology Section.

Discussion

Boreopontia heipi n.g., n.sp. belongs to the family Cylindropsyllidae on the basis of the following characters : small elongated body, genital double segment in female without subdivisions ; antennule of the female with 6-7

segments, aesthetasc on the fourth segment, exopodite of the antenna at most one-segmented ; reduced endopodites of legs 2-4.

Fifteen genera are at present assigned to the Cylindropsyllidae (BODIN, 1979) : *Cylindropsyllus* BRADY, 1880 ; *Evansula* T. SCOTT, 1906 ; *Stenocaris* SARS, 1909 ; *Leptastacus* T. SCOTT, 1906 ; *Paraleptastacus* WILSON, 1952 ; *Psammastacus* NICHOLLS, 1935 ; *Arenocaris* NICHOLLS, 1935 ; *Leptopontia* T. SCOTT, 1902 ; *Arenopontia* KUNZ, 1937 ; *Psammopsyllus* NICHOLLS, 1945 ; *Sewellina* KRISHNASWAMY, 1956 ; *Cylinula* COULL, 1981 ; *Ichnusella* COTTARELLI, 1971 ; *Notopontia* BODIOU, 1977 and a genus proposed by Willems & Claeys (in press).

In LANG (1968) and WELLS (1976) our specimens key out to *Arenopontia* because of the three-segmented exopodite of the first leg, the absence of an outer spine on its middle segment and the fused character of the fifth legs. This structure of the first leg is further only found in *Leptopontia* with which *Arenopontia* form the sub-family Leptopontiinae. However, the combination of the following characters differentiate *B. heipi* n.g. n.sp. from all known *Arenopontia*-species : the sexual dimorphism in legs 2 and 3 ; the seven-segmented antennule ; the structure of the antenna and the mandibular palp, the segmentation and setation of the legs 1-4 ; the structure of legs 5 and the caudal rami.

Within the Cylindropsyllidae, the sexual dimorphism in legs 2 and 3 only occurs in the genera of the sub-family Cylindropsyllinae i.e. *Cylindropsyllus*, *Evansula*, *Stenocaris* and *Cylinula*. Although the sexual dimorphism in leg 2 of *B. heipi* n.g. n.sp. is not as developed as in these genera, its presence clearly relates *B. heipi* to the Cylindropsyllinae.

Furthermore, other characters also fit the Cylindropsyllinae. A seven-segmented antennule of which the first segment is much shorter than the second, is found in *Cylindropsyllus*, *Stenocaris* and *Cylinula*. The maxilliped is normally build and distinguishes *B. heipi* n.g. n.sp. from all genera in the sub-family of Leptastacinae i.e. : *Leptastacus*, *Paraleptastacus*, *Psammastacus* and *Arenocaris* which are characterised by a maxilliped with a long and slender terminal claw and a accessory long slender seta.

The structure of the antenna and the mandibular palp fit with *Stenocaris* and *Cylinula* e.g. : *Stenocaris gracilis* SARS, 1909 ; *S. profundus* BECKER, 1979 ; *S. abyssalis* BECKER, 1979 and *Cylinula proxima* COULL, 1971.

The segmentation of the legs, particularly the endopodites is very variable within the different genera of the Cylindropsyllidae. The three-segmented exopodite and the two-segmented, not-prehensile endopodite

of the first leg, distinguishes *B. heipi* n.g. n.sp. from all genera with a reduced exopodite i.e. *Psammopsyllus*, *Sewellina*, *Ichnusella*, *Psammastacus*, *Arenocaris* or with a prehensile endopodite i.e. *Evansula*, *Notopontia*, *Cylinula*, some species of *Arenopontia*, and the new genus by Willems & Claeys (in press). The setation of the endopodite of the first leg (1 inner and 2 terminal setae on the second segment) is only found in *Cylindropsyllus* and *Stenocaris*. The segmentation of the endopodites is different from all Cylindropsyllid-species except for *Arenopontia australis* CHAPPUIS, 1952 and *Stenocaris pontica* CHAPPUIS & SERBAN, 1953.

The setation of the endopodite of legs 2 distinguish *B. heipi* from all known *Arenopontia*-species having a seta on the first segment but is similar in *Cylindropsyllus*, *S. pontica* and *Leptastacus*.

The structure of the fifth leg is used to subdivide *Arenopontia* in the subgenera *Arenopontia s.str.* and *Neoleptastacus* (WELLS, 1967). But both clearly differ from the fifth leg in *B. heipi* n.g. n.sp. i.e. no inner armature (apart from a very fine spinulation) occurs along the inner margin in *Arenopontia*. The fifth leg in *B. heipi* n.g. n.sp. resembles more that in *Evansula* and *Stenocaris*.

The furca of *B. heipi* n.g. n.sp. also differs from the common plan in *Arenopontia* in the absence of a terminal spiniform process. However, there is a similar plan with the Cylindropsyllinae, but only *Stenocaris kliei* KUNZ, 1936 has a hook on the dorsal surface of the caudal rami. It is clear that *B. heipi* n.g. n.sp. shows a combination of characters of considerable interest, indicating that some revision in the family Cylindropsyllidae is needed. In most aspects the new genus is very closely related to the Cylindropsyllinae more exactly *Stenocaris*. However the structure of the exopolite, which further only occurs in the Leptopontiinae i.e. *Arenopontia* and *Leptopontia*, distinguishes *Boreopontia* n.g. from all other genera in the Cylindropsyllidae.

ACKNOWLEDGMENTS

The author gratefully acknowledges Dr. L. G. Moore, Prof. Dr. J. B. J. Wells and Prof. Dr. B. C. Coull for advise, Prof. Dr. A Coomans and J. Sharma for critical review of the manuscript. Special gratitude is extended to Rudy Herman and Dirk Van Gansbeke for sampling in the field and to Anita Van Bost for sorting the samples.

The study was supported by the 'Beheerseenheid Mathematisch Model Noordzee' of the Ministry or Public Health.

Summary

Boreopontia heipi n.g. n.sp. belonging to the family Cylindropsyllidae Sars (sensu Lang, 1948) is described from a sandbank in the Southern Bight of the North Sea. The species shows an interesting combination of characters of the subfamilies Leptopontiinae and Cylindropsyllinae, but is in most aspects related to the latter subfamily, more exactly *Stenocaris*.

References

Bodin, P., 1979. Catalogue des nouveaux Copépodes Harpacticoides marins. Brest (Publ. Univ. Bretagne occidentale), 1979 : 1-228.

Lang, K., 1965. Copepoda Harpacticoidea from the Californian coast. *K. svenska vetensk. Akad. Handl.* **10** (2) : 1-566.

Wells, J. B. J., 1967. The littoral Copepoda (Crustacea) of Inhaca Island, Mozambique. *Trans. Roy. Soc. Edinb.* **67** (7) : 189-358.

—, 1976. Keys to the aid in the identification of marine harpacticoid copepods. Aberdeen (The Aberdeen University Press), 1976 : 1-215.

Willems, K. A. & D. Claeys (in press). *Syrticola flandrica* n.g. n.sp. a harpacticoid copepod from the Southern Bight of the North Sea. *Crustaceana*, in press.

Willems, K. A., Vincx, M., Claeys, D., Vanosmael, C. & C. Heip (in press). Meiobenthos of a sublittoral sandbank in the Southern Bight of the North Sea. *J. mar. Biol. Ass. U.K.*, in press.

Marine Biology Section
Instituut voor Dierkunde
Rijksuniversiteit Gent
Ledeganckstraat 35
B-9000 Gent (Belgium).