

A new species of *Neotanais* Beddard (Crustacea: Tanaidacea) from the Subantarctic, off the Falkland Islands

KIM LARSEN¹ & MAGDALENA BLAZEWICZ-PASZKOWYCZ²

¹Department of Marine Biology, Texas A & M University, Galveston, Fort Crockett Campus, Galveston 77551, Texas, USA; tanais@hotmail.com

²Laboratory of Polar Biology and Oceanobiology, University of Lodz, Banacha 12/16, 90-237 Lodz, Poland; magdab@biol.uni.lodz.pl

Abstract

The male and female of *Neotanais krappschickelae* n.sp., from the Subantarctic off the Falkland Islands are described from the RV *Eltanin* deep-water cruises of 1962. Both male and female of the new species can be separated from other species by the combination of characters including: a densely setose dorsal margin of the cheliped carpus, dactylus and fixed finger of subequal length; cheliped sclerite, all pereopodal bases, and posterior-lateral edges of pereonites with numerous plumose setae. The recent activity within tanaidacean taxonomy including neotanaid taxonomy has made it necessary to re-diagnose *Neotanais*.

Key words: Tanaidacea, Neotanaidae, Subantarctic, deep sea, *Neotanais*

Introduction

The suborder Neotanaidomorpha consists of one family of four genera. *Neotanais* is by far the largest genus in the suborder with 35 recognized species. The family Neotanaidae Norman & Stebbing, 1886 was revised by Gardiner (1975) and again briefly by Larsen (1999) but papers concerning *Neotanais* or even the family are few and far between. However, recently there has been a renaissance in the study of tanaidacean taxonomy including the Neotanaidae (e.g. see Larsen & Hansknecht 2003 and references therein).

Neotanaidae species live freely on the surface of the seafloor and do not burrow like the Apseudomorpha or dwell in tubes like the Tanaidomorpha. Neotanaids are common in deep-sea samples although never present in great numbers. They are relatively easy to recognize by their comparative large size, uniramous but multiarticulated antennae (antennule with seven articles, antenna with nine articles) and their long uropods. The species are,

despite their relative large size compared to other tanaidaceans, difficult to identify and multiple character combinations and morphometric characters are often needed for identification (Gardiner 1975; Larsen 1999).

Identifying male Neotanaidae is often difficult owing to strong sexual polymorphism with few, if any, species-specific characters shared by both sexes, and the presence of protogynous hermaphroditism (Larsen 2001). In *N. krappschickelae* n. sp., however, the males do share the characters of setose cheliped carpus and the plumose setation on the pereopod bases, cheliped sclerite, and lateral edges of pereonites. The description of the male and female *N. krappschickelae* is the purpose of this report.

Type material has been deposited at the National Museum of Natural History, Smithsonian Institution, Washington, D.C., USA (USNM).

Neotanaidomorpha Sieg, 1980
Neotanaidae Norman & Stebbing, 1886
Neotanais Beddard, 1886

Diagnosis: Female. Eye lobes present, never with visual elements. Pleonites never fused always bearing pleopods. Pleotelson not acorn-shaped. Antennule uniramous with seven articles. Antenna without squama and with nine articles. Mandibles without palp, with strong, heavily calcified molars. Labium consisting of two setose lobes and setose palp (more-or-less fused). Maxillule with two endites, with simple and specialized setae, without palp. Maxilla well-developed with multiple specialized setae. Maxilliped with unfused coxa and basis; endites always separate, with several simple and specialized setae. Epignath strongly developed, divided into two almost equally sized lobes, with setose terminal seta. Chelipeds attached to cephalothorax by large sclerite, frequently larger than cheliped basis; small ischium present. Pereopods all more-or-less similar, all of unspecialized 'walking' type; coxae present on all pereopods; all without spinning glands. Pleopods biramous, with plumose setae, endopod biarticulated in most species. Uropods biramous, endopod multiarticulated, exopod with one or (normally) two articles.

Male: Sexual dimorphism considerable. Antennae narrower than those of female but with same number of articles; antennule with numerous aesthetascs, particularly on article 4. Mouthparts reduced, non-functional. Cheliped carpus, dactylus and fixed finger greatly enlarged in male.

Remarks: Males usually display more characters that can be used in determination than do the females, especially with regard to cheliped shape, but since protogynous hermaphroditism occurs in *Neotanais* and since males are uncommon, one cannot rely on male characters alone. Identification of females should not be attempted on any single character, but rather by an extensive list of character combinations as seen in the diagnosis of the species described below, including careful measurements of morphometric characters.

***Neotanais krappschickelae* n. sp. (Figs 1–4)**

Material examined.— Holotype, non-ovigerous female (USNM 1017062), Body length 8.8 mm, RV *Eltanin* Sta. 36/339, 53°05'S, 59°31'W to 53°08'S, 59°24'W, 03 December 1962, depth 500–570 meters. Paratype: 1 male, (USNM 1017063), body length 8.9 mm, same locality.

Additional material: 1 non-ovigerous female (dissected), 2 non-ovigerous females (badly damaged), same locality (USNM 1017065).

Diagnosis: Female: Body six times longer than broad. Pereonites all wider than long. Pereonite shoulders poorly defined without lateral epimera. Pleonites declining slightly in width in posterior direction, with very small midventral keel. Pleotelson posterior margin straight. Pleotelson lateral margins almost straight, as wide as pleonites, with sparse distal setation. Antennular article 1 short and broad (length/width ratio <3), article 4 shorter than combined length of articles 5–7. Cheliped carpus with several long dorsal setae, dactylus and fixed finger of subequal length, fixed finger bearing two conspicuous denticles on inner margin. Cheliped sclerite, all pereopodal bases, and posterior-lateral edges of pereonites with numerous plumose setae. Uropod as long as pleon. Uropodal exopod with two articles, almost as long as endopod article 1. Uropod attachment anterior to midlength on pleotelson and at 25° angle. Pereopod and uropod attachment in more ventral position than in most other *Neotanais*.

Male: Cephalothorax in dorsal view more sharply divided into narrow anterior part and broad posterior part, than in female. Antennule longer than that of female, article 4 greatly expanded and densely packed with aesthetascs. Cheliped carpus as long as carapace, with many simple setae on dorsal margin. Propodus (including fixed finger) shorter than carpus. Fixed finger as long as dactylus. Dactylus attached parallel to fixed finger. Cheliped sclerite, pereopod basis, and posterior-lateral edges of pereonites with numerous plumose setae.

Description: Adult non-ovigerous female. *Body* (Figs. 1A, 1B): 5.8 times as long as broad. Body length 8.8 mm.

Cephalothorax: longer than pereonites 1 and 2 combined, longer than broad, with small blunt rostrum, lateral margins smooth.

Pereonites: all rectangular, wider than long, lateral edges straight, posterior-lateral edges with numerous plumose setae. Pereonite 1 longer than half of pereonite 2. Pereonite 5 longest.

Pleon: midventral keel present but small and difficult to observe. Pleonites declining in width in posterior direction, without lateral epimera.

Pleotelson: wider than long (0.4 times), with parallel lateral margins and straight posterior margin, with sparse distal setation. Uropod attachment anterior to midlength on pleotelson and at 25° angle to pleotelson.

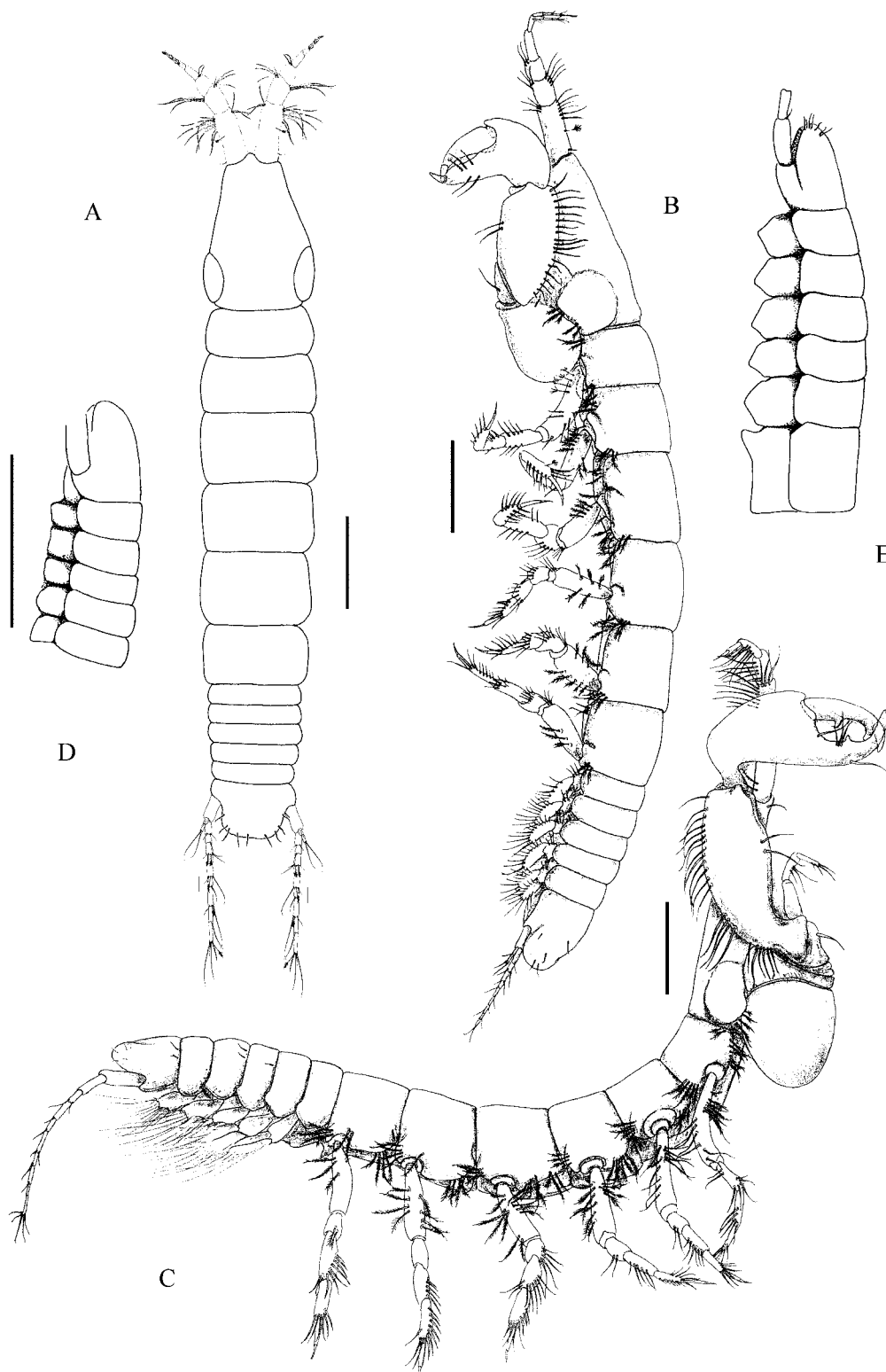
Antennule (Fig. 2A): marginally shorter than cephalothorax. Article 1 short and broad (length/width ratio <3), with several distally bipinnate distal setae and one short setulated

seta. Article 2 half as long as article 1, with several distally bipinnate distal setae. Article 3 length 0.7 times article 2, with two distal setae. Article 4 less than twice as long as combined length of articles 5–7, naked. Article 5 length 0.4 times article 4, with two small setae and multiarticulated aesthetasc. Article 6 shorter than article 5, with two small setae and multiarticulated aesthetasc. Article 7 as long as article 5 with at least three small distal setae.

Antenna (Fig. 2B): almost as long as antennule but more slender. Article 1 as long as article 5, twice as wide as succeeding articles, naked. Article 2 longer than article 1, with three distal simple setae. Article 3 length 0.3 times article 2, with one distal seta. Article 4 shorter than article 2, naked. Article 5 slightly shorter than article 4, with two simple and three distally bipinnate distal setae. Article 6 longer than article 3, with four simple distal setae. Article 7 shorter than article 6, with one simple distal seta. Article 8 longer than article 7, with two simple distal setae. Article 9 half as long as article 8, with five simple distal setae.

Mouthparts: labrum not recovered. Mandibular molar as long as incisor, with numerous blunt distal denticles. Left mandible (Fig. 2D): incisor blunt, setal row with two finely-setulose blunt spiniform setae, lacinia mobilis well-developed with anterior denticles. Right mandible (Fig. 2C): incisor broader than on left mandible, setal row with three spiniform setae of which two are finely-setulose, one is naked and heavy. Labium (Fig. 2G): palp elongated with several setules, without thick terminal seta, lobes with distal and medial setulose projection. Maxillule (Fig. 2E): outer endite with nine spiniform distal setae as well as several setules on outer margin, inner endite with one long setulose seta and three stout setulose setae as well as several setules on outer margin. Maxilla (Fig. 2F): inner lobe of fixed endite with several distally bifurcate setae. Outer lobe of fixed endite with two bifurcated spiniform setae, two simple setae, one distally bipinnate seta, and one medially setose seta. Inner lobe of movable endite with four setae of which one is pinnate. Outer lobe of movable endite with three long simple setae. Maxilliped (Fig. 3A): endite almost naked, with one bipinnate seta on distal edge. Basis broad, with one medial bipinnate seta. Conspicuous process for palp attachment with long bipinnate seta, giving the impression of an extra proximal article. Palp article 1 naked and widening distally; article 2 widening distally, with seven bipinnate setae on inner and one simple seta on outer margin; article 3 widest medially with four bipinnate setae and two simple setae on inner margin; article 4 with eight bipinnate distal setae. Epignath (Fig. 2H): apex with several fine and long setules.

FIGURE 1. *Neotanais krappschickelae* n. sp. A–B, female holotype dorsal and lateral view; C, male paratype lateral view; D, female pleon, pleopods omitted; E, male pleon, pleopods omitted. Scale bars: 1 mm.



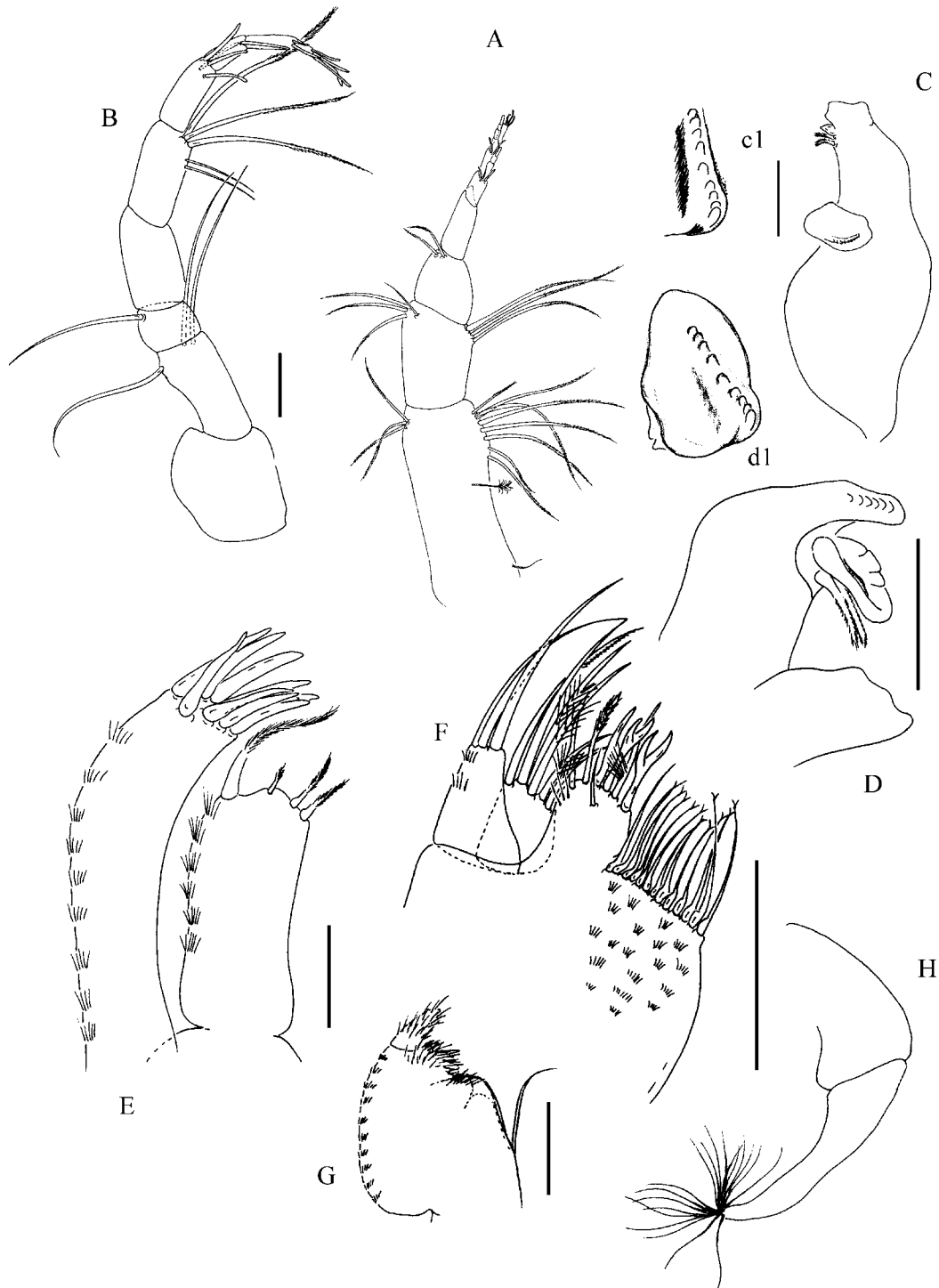


FIGURE 2. *Neotanais krappschickelae* n. sp. Female. A, antennule; B, antenna; C, right mandible, c1 blow-up of right molar denticles; D, left mandible, d1 blow-up of left molar denticles; E, maxillule; F, maxilla; G, labium; H, epignath. Scale bars: 0.1 mm for A, B; 0.01 mm for C–H.

Cheliped (Fig. 3B): sclerite almost circular, with numerous plumose setae. Basis tapering distally, with one small dorso-distal seta. Ischium shaped as a narrow incomplete band extending from under the basis. Merus triangular with one simple seta. Carpus elongate with many long dorsal setae and one ventral seta. Propodus naked other than fixed finger with two conspicuous denticles on inner margin, three setae on inner and two on ventral margin. Dactylus as long as fixed finger.

Pereopod 1 (Fig. 3C): coxa small but distinct. Basis with several plumose setae. Ischium with one simple seta. Merus longer than carpus, with several bipinnate distal setae. Carpus with six distal bipinnate setae and one spiniform setae. Propodus longer than carpus, with one dorsal setulose setae midlength, three dorsal bipinnate distal setae, seven on ventral margin, and with one small hook-like three-serrated subdistal seta. Dactylus without spine ring at insertion of unguis, unguis curved.

Pereopod 2 (Fig. 3D): similar to pereopod 1 except: ischium with several bipinnate setae. Merus as long as carpus, apparently with simple setae. Carpus with diagonal row of simple setae and ventral simple setae.

Pereopod 3 (Fig. 4A): similar to pereopod 2 except; merus shorter than carpus. Carpus with bipinnate setae

Pereopod 4 (Fig. 4B): similar to pereopod 3 except: dactylus with spine ring at insertion of unguis.

Pereopod 5 (Fig. 4C): similar to pereopod 4.

Pereopod 6 (Fig. 4D): similar to pereopod 4 except: propodus with distal row of short curved spiniform setae.

Pleopods (Fig. 4E): all five pairs similar. Basal article widening distally, with five plumose setae. Exopod without obvious articulation, with 11 plumose setae outer margin. Endopod with three plumose setae on inner margin and nine on outer margin.

Uropod (Fig. 4F): as long as pleon. Basal article twice as long as exopod. Endopod with nine articles of different length, most articles bearing simple or setulose setae, last article with distal setae longer than article itself. Exopod with two articles, almost as long as endopod article 1.

Male: not dissected (Fig. 1C) Body length 8.9 mm.

Cephalothorax: in dorsal view more sharply divided into a narrow anterior part and broad posterior part, than in female.

Pereonites: posterior-lateral edges with numerous plumose setae.

Antennule: longer than that of female, article 4 greatly expanded and densely packed with aesthetascs.

Cheliped: sclerite with numerous plumose setae. Carpus as long as carapace, with multiple simple setae on dorsal margin. Propodus (inclusive of fixed finger) shorter than carpus. Fixed finger as long as dactylus. Dactylus attached parallel to fixed finger. Cheliped sclerite less than half as large as basis.

Pereopods: bases with numerous plumose setae.

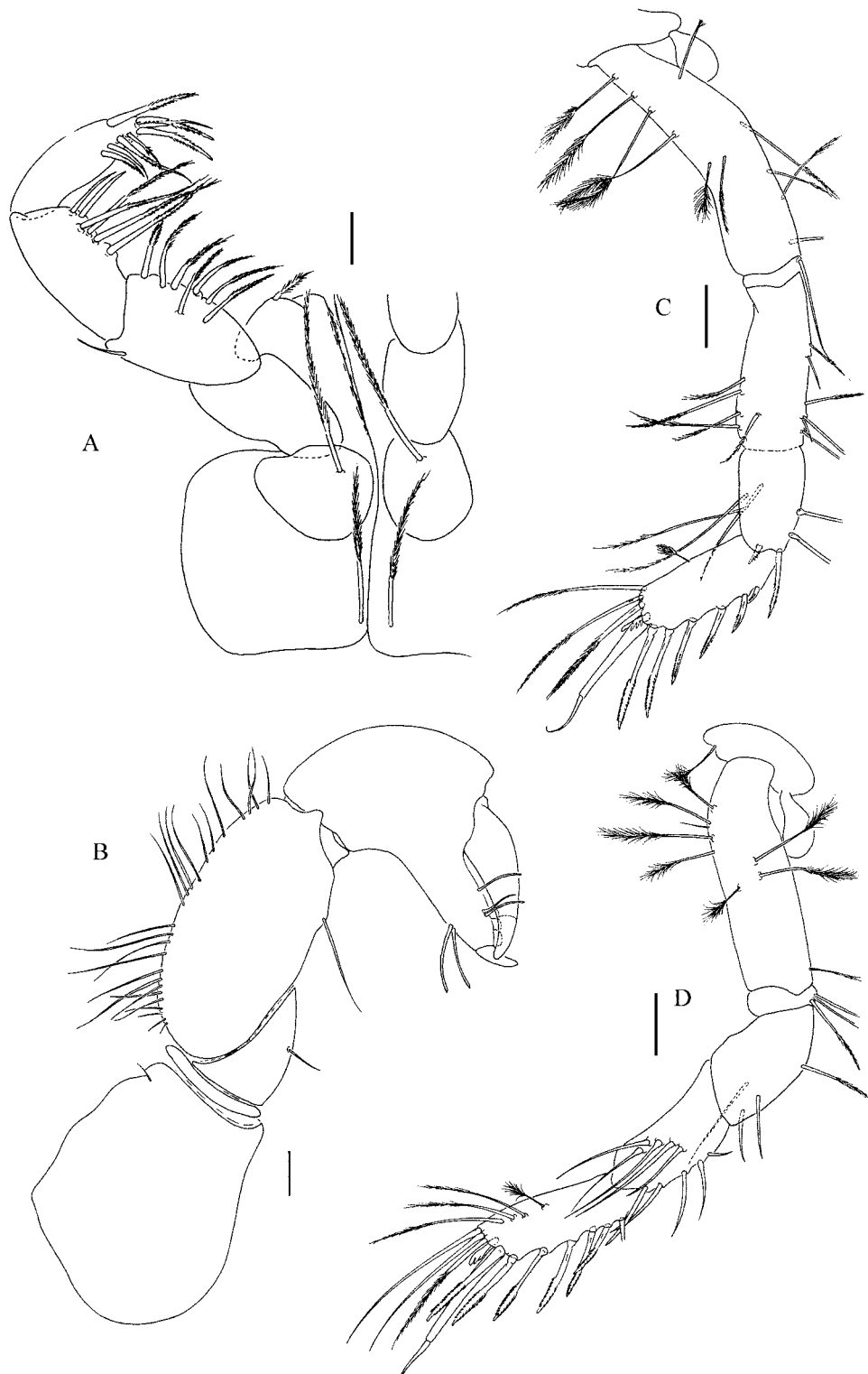


FIGURE 3. *Neotanais krappschickelae* n. sp. Female. A, maxilliped; B, cheliped; C, pereopod 1; D, pereopod 2. Scale bars: 0.01 mm for A; 0.1 mm for B–D.



FIGURE 4. *Neotanaïs krappschickelae* n. sp. Female. A, pereopod 3; B, pereopod 4; C, pereopod 5; D, pereopod 6; E, pleopod; F, uropod. Scale bars: 0.1 mm for A, B; 0.01 mm for C–H.

Etymology: Named in honour of 60th birthday and the scientific achievements of our friend and colleague Dr. Traudl Krapp Schickel,

Remarks: *Neotanais krappschickelae* n. sp. can be distinguished from all other *Neotanais* by the combination of characters of: a densely setose dorsal margin of the cheliped carpus, dactylus and fixed finger of subequal length; cheliped sclerite, all pereopodal bases and posterior-lateral edges of pereonites with numerous plumose setae. A further character combination which will separate this species from Gardiner's 'micromopher' group is: pereonite shoulders poorly defined and the pleotelson not fused with pleonites. A character combination which will separate this species from Gardiner's 'americanus' group is: pereonites clearly wider than long, and only two prominent denticles (teeth in Gardiner's terminology) on the cheliped fixed finger. A character combination which will separate this species from Gardiner's 'robustus' group is: uropodal exopod about as long as first endopod article, and male cheliped fixed finger without large proximal process. The character which will separate this species from Gardiner's 'affinis' group is the cheliped dactylus being as long as fixed finger. Character combinations which will separate this species from Gardiner's 'pfaffi' group are: pereonite shoulders poorly defined, the absence of lateral pleonite epimera, and the fourth antennule article not twice as long as articles 5–7 combined. A character which will separate this species from Gardiner's 'hastiger' group is the cheliped chela not being of the typical 'fist-shape' found in the 'hastiger' group.

The species most closely resembling *N. krappschickelae* is *N. kurchatovi* Kudinova-Pasternak, 1975 which shares the characters of the pleotelson and cheliped carpus setation but lacks the plumose setation of the cheliped sclerite, pereopodal bases and somites.

The ventral attachment of the pereopods, pleopods, and uropods, along with the heavy plumose setation of the pereopodal bases are also characters seen in *Venusticrus* and may imply a linkage between the two genera. *Neotanais krappschickelae*, however, cannot be assigned to *Venusticrus* since it lacks the characteristic acorn-shaped pleotelson.

The unusual multiarticulated aesthetascs are reported from a number of other *Neotanais* species: *N. giganteus* Hansen, 1913; *N. bacescui* Lang, 1968; *N. peculiaris* Lang, 1968; *N. pfaffioides* Lang, 1968, *N. armiger* Gardiner, 1975; *N. hastiger* Gardiner, 1975; *N. micromopher* Gardiner, 1975; *N. dinotomer* Gardiner, 1975, *N. hamatus* Kudinova-Pasternak, 1990, and *N. sp.* Larsen & Hansknecht, 2003 but the function of these is unknown.

No other species of Neotanaidae was identified from the *Eltanin* material and the literature mentions only a few Antarctic or Subantarctic species (*N. affinis* Wolff, 1966; *N. antarcticus* Kussakin, 1967; *N. americanus* Beddard, 1886; *N. magnificus* Kudinova-Pasternak, 1972).

Distribution: Off the Falkland islands, depth 500–570 m.

Acknowledgments

The senior author was funded by the BP Deep-sea Biodiversity Program. The junior author was funded by the State Committee for Scientific Research, Poland via grant 3 PO4F 037 23 and the US Antarctic Research Program funded by the Natural Science Foundation contract OPP 9509761. We extend our thanks to Tom Hansknecht for critical reading of earlier versions of the manuscript.

Literature cited

- Beddard, F.E. (1886) Report on the Isopoda collected by HMS Challenger during the years 1873–1876.– Second part. *Challenger Report (Zoology)*, 17(1), 1–178.
- Gardiner, L.F. (1975) The systematics, postmarsupial development, and ecology of the deep-sea family Neotanaidae (Crustacea: Tanaidacea). *Smithsonian Contributions to Zoology*, 170, 1–265.
- Hansen, H.J. (1913) Crustacea, Malacostraca. II. *Danish Ingolf Expedition*, 3(3), 1–127.
- Kudinova-Pasternak, R.K. (1972). New species of the genus *Neotanais* (Crustacea, Tanaidacea). *N. magnificus* n. sp from the Antarctic. *Complex Research of the Nature of the Ocean. Publications of Moscow University*, 3, 259–263.
- Kudinova-Pasternak, R.K. (1975). Tanaidacea (Crustacea, Malacostraca) from the Atlantic sector of the Antarctic and Subantarctic. *Trudy Instituta Okeanologii*, 103, 194–228.
- Kudinova-Pasternak, R.K. (1990) Tanaidacea (Crustacea, Malacostraca) of the underwater Ridge Naska in the Pacific. *Zoologicheskij Zhurnal*, 69(12), 135–140.
- Lang, K. (1968) Deep-sea Tanaidacea. *Galathea Reports*, 9, 23–209.
- Larsen, K. (1999) Deep-sea tanaidaceans (Crustacea: Peracarida) from the Albatross cruises 1885–86, with keys to the suborder Neotanaidomorpha. *Journal of Natural History*, 33(8), 1107–1132.
- Larsen, K. (2001) Morphological and molecular investigation of polymorphism and cryptic species in tanaid crustaceans: Implications for tanaid systematics and biodiversity estimates. *Zoological Journal of the Linnean Society*, 131, 353–379.
- Larsen K. & Hansknecht, T. (2003) Three new species of the genus *Neotanais* Beddard. *Journal of Natural History*, in press.
- Norman, A.M. & Stebbing, T.R.R. (1886) On the Crustacea Isopoda of the Lightning, Porcupine, and Valorous Expeditions. *Transactions of the Zoological Society of London*, 12(4), 77–141.
- Sieg, J. (1980). Sind die Dikonophora eine polyphyletische Gruppe? *Zoologischer Anzeiger*, 205, 401–416.
- Wolff, T. (1956). Six new abyssal species of *Neotanais* (Crustacea, Tanaidacea). *Videnskabelige meddelelser fra Dansk Naturhistorisk Forening i København*, 118, 41–52.