

# The deep sea isopod genus *Echinozone* Sars, 1897 and its occurrence on the continental shelf of Antarctica

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**Summary:** *Echinozone quadrispinosa* (Beddard, 1886) is reduced to synonymy with *E. spicata* (Hodgson, 1910). A key is given to the four Antarctic species together with biogeographical information.

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## Introduction

The isopod genus *Echinozone* is defined by a row of spines on the anterior margins of the pereonites, mainly pereonites 1–4. Some species of this genus for instance *Echinozone quadrispinosa* (Beddard, 1886), *E. spinosa* Hodgson, 1902 and *E. spicata* (Hodgson, 1910), appear quite similar at first glance, especially in the pattern of the spines on the dorsum of the body. The variability of this character has led to *E. spinosa* being regarded as *E. spicata*, and *E. quadrispinosa* being synonymized with *E. spinosa* (Amar & Roman, 1973). A study of the type material has shown this latter attribution to be incorrect. The occurrence of this genus in Antarctica is summarized for the first time and a key to the Antarctic species is presented.

## Material and Methods

Material of *Echinozone* was collected during cruises of the *RV Polarstern* and the *RV Walter Herwig* around the South Shetland Islands and in the Weddell Sea in the Antarctic summers 1983–85 by means of an Agassiz trawl or a box corer. After sorting on deck the animals were immediately fixed in 4% formalin solution. Some specimens were caught by scuba-diving in front of the Brazilian Antarctic station Commandante Ferraz, King George Island, in a depth of 18m.

The following type material has kindly been made available by the British Museum (Natural History):

*Eurycope spinosa* Beddard, 1885: 1889.4.27: 69 (1 holotype)

*Echinozone spinosa* Hodgson, 1902: 1901.12.13: 7  
(1 syntype)

*Ilyarachna quadrispinosa* (Beddard, 1886): 1889.4.27: 73  
(3 syntypes).

The dorsal drawings were prepared using a dissecting microscope (Wild M5) and the drawings of the appendages

using a Leitz Dialux microscope, both equipped with a camera lucida. Terminology of chaetotaxy is according to Hessler (1970) and Wilson (1989).

## Results

### Morphology

Among some species of this genus the outer morphology of the dorsal spination varies, and this is most obvious within the species *Echinozone quadrispinosa* (Beddard, 1886) [= *Echinozone spicata* (Hodgson, 1910)] and *E. spinosa* Hodgson, 1902. These differences are mainly due to allometry of the animals (smaller animals bear smaller and shorter spines on the dorsum than adult specimens) and are also related to the stage after the moult (directly after moult the spines of the animals are a little longer, stronger and more acute, than just before a moult). For this reason specimens are sometimes difficult to identify accurately. The illustrations of some authors look quite different [cf. *E. spinosa* in Hodgson (1902) and Schultz (1976), *E. spicata* in Hale (1937) and Schultz (1977)], but none of the authors ever discuss why the spination of their illustrations differs from those of other authors. Due to the variability of this character *E. quadrispinosa* [= *E. spicata*] and *E. spinosa* have to be determined by characters other than simply body spination.

A comparison of the material from the *Polarstern* and *Walter Herwig* collections, type material, and the illustrations in Beddard (1886), Hodgson (1902 and 1910), Monod (1926), Hale (1937), Kussakin (1967), Amar & Roman (1973), Schultz (1976 & 1977), Kensley (1980), and Kussakin & Vasina (1982), revealed that *Echinozone quadrispinosa* (Beddard, 1886) is not synonymous with *E. spinosa* as accepted by Stephensen (1947) and Amar & Roman (1973).

The morphological differences between *E. quadrispinosa* and *E. spinosa* (Figs. 1 & 2) and the similarities with *E. spicata* show that *E. quadrispinosa* is synonymous with *E. spicata* (Table I).

Table I. Comparative morphological features in three species of *Echinozone*

Character	<i>E. spinosa</i>	<i>E. spicata</i>	<i>E. quadrispinosa</i>
Spines on the dorsum of the body	strong and long, slightly bent anteriorly	dorsal spines slender more fragile, little anteriorly bent	dorsal spines slender, fragile, bent anteriorly
A1	with lateral row of strong sensory setae and long whip setae	laterally only two sensory setae and 1 simple setae	laterally few setae
A2	fourth and fifth articles with short and stout sensory setae	long sensory setae laterally	long lateral sensory setae
P1	carpus and propodus broad with a dense row of ventral long setae	carpus and propodus long and slender with a few whip setae	carpus and propodus long and slender with a few setae
P4	ischium with many dorsal long sensory setae, carpus with long ventral sensory, propodus with long whip setae	ischium with few setae, carpus with many long whip setae, propodus with many shorter sensory setae all round	ischium with few setae, carpus with many long whip setae, propodus with many shorter sensory setae all round
P5-7	bases with many strong ventral sensory setae; long and strong sensory setae ventrally on merus, carpus and propodus	bases without ventral row of strong sensory setae, plumose setae on ventral sides of merus, carpus and propodus	plumose setae on ventral sides of merus, carpus and propodus (cf. figs. of Beddard, 1886)

## Key

The four Antarctic species can be separated as follows:

- 1a Pereonites with more than two frontomedial small acute spines.  
..... 2
- 1b Pereonites 1–3 with two frontomedial small acute spines.  
.....*Echinozone bispinosa* Kussakin & Vasina, 1982
- 2a Pereonites 2–4 with four frontomedial spines.  
..... 3
- 2b Pereonites 2–4 with at least six small acute frontomedial spines, bent over the preceding pereonites.  
.....*E. magnifica* Vanhöffen, 1914
- 3a First antennular article laterally with a dense row of sensory setae and articles 4 and 5 of antenna with short and stout setae all around the article.  
.....*E. spinosa* Hodgson, 1902
- 3b First antennular article laterally with few setae and antennal articles 4 and 5 with long and slender sensory setae, mainly laterally.  
.....*E. quadrispinosa* (Beddard, 1886)

Biogeography of species of *Echinozone* and localities from *RV Polarstern* and *RV Walter Herwig* collections (see Fig. 1).

## Biogeography and synonymy

The distribution of all four species is shown in Fig. 3.

*Echinozone spinosa* Hodgson, 1902

Type material: BM(NH) 1901.12.13: 7 Syntypes.

This species has been reported from Cape Adare, Anvers Island and the Bellinghousen Sea in depths ranging from 47–569 m. During cruises of the *RV Polarstern* it was found at stations A 4, A 29, AIII/19, PS06/158, PS06/203, PS06/207, 04/428, 68WH/148, 68WH/149, 68WH/160, 68WH/165, 68WH/166, and 68WH/171 at depths of 66–536 m and in front of the Brazilian Station Commandante Ferraz (62°05'S, 58°23.5'W) in a depth of 18 m.

*Echinozone quadrispinosa* (Beddard, 1886)

Type material: BM(NH) 1889.4.73 Syntypes.

- = *Ilyarachna quadrispinosa* Beddard, 1886  
 = *Notopais spicatus* Hodgson, 1910  
 = *Pseudarachna spicata* Vanhöffen, 1914  
 = *Echinozone spicata* (Hodgson, 1910) (after Schultz, 1979)  
 = *Ilyarachna spicata* (after Wolff, 1962; Amar & Roman, 1973)

non *Echinozone spinosa* Hodgson, 1902

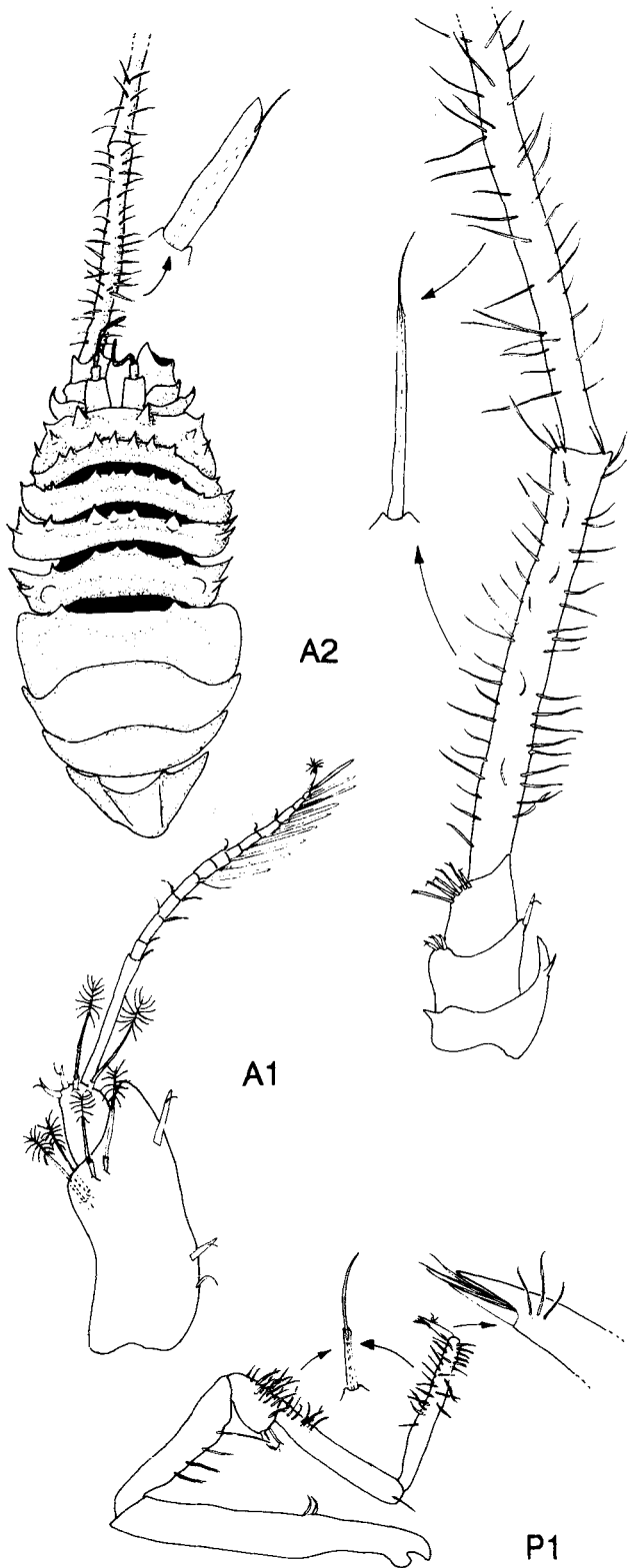


Fig. 1. *Echinozone quadrispinosa* (Beddard, 1886). (station AIII/44). Dorsal view of female (10 mm). Antennula (A1), antenna (A2) and pereopod 1 (P1)

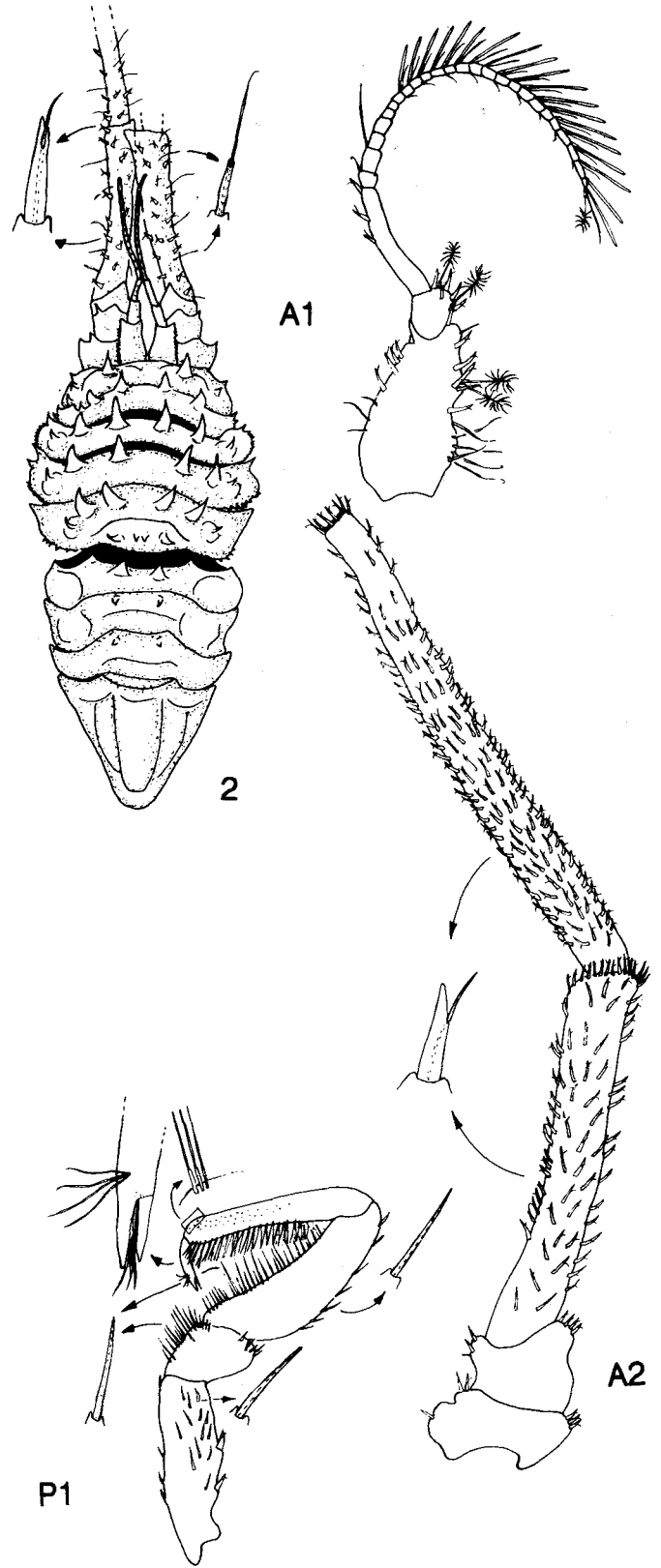


Fig. 2. *Echinozone spinosa* (Hodgson, 1902). Dorsal view of female (10 mm), (collected by diving in front of Ferraz, King George Island). Notation as in Fig.1

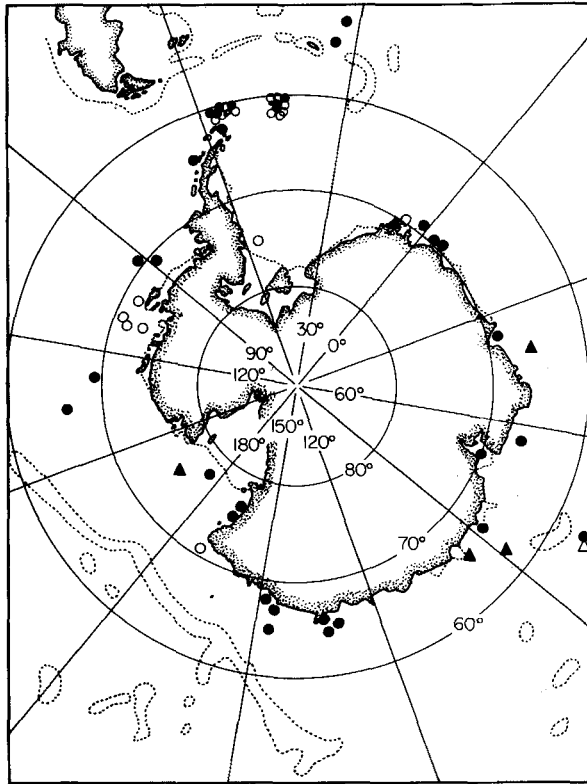


Fig. 3. Distribution of the Antarctic species *Echinozone*. White triangle: *E. bispinosa*; black triangle: *E. magnifica*; white circle: *E. spinosa*; black circle: *E. quadrispinosa*.

*E. quadrispinosa* has been reported from the Ross Sea around to the Antarctic Peninsula, as well as from South Georgia, Crozet Region, Peter I Island, and Kerguelen in depths of 10–1500 m (Pfeffer, 1890; Nierstrasz, 1941; Stephensen, 1947; Kussakin, 1967; Amar & Roman, 1977; Schultz, 1976; Carvacho, 1977; Kussakin & Vasina, 1980, 1982; Hodgson, 1902, 1910; Hale, 1937; Schultz, 1979; Kussakin, 1982). During *RV Polarstern* and *RV Walter Herwig* cruises it was collected at stations A29, AIII/11, AIII/17, PS06/158, PS06/208, 68WH/142 and 68WH/155 at depths of 97–300m.

#### *Echinozone magnifica* Vanhöffen, 1914

*E. magnifica* has been recorded from the Gauss Station, the Davis Sea, Kosmonauten Sea and Mirny Station in depths ranging from 20–385 m (Vanhöffen 1914, Schultz 1976 and Kussakin 1982). The *RVPolarstern* collected a single ovigerous female of 4 mm in length in the Weddell Sea at station AIII/44.

#### *Echinozone bispinosa* Kussakin & Vasina, 1982

This species has only been recorded from Kerguelen Island in a depth of 460 m. It was not collected by the *RVPolarstern* or the *RV Walter Herwig*.

## Discussion

The reasons for the synonymy of *E. quadrispinosa* (Beddard, 1886) with *E. spicata* (Hodgson, 1910) have been summarized in Table I.

*E. magnifica* can be distinguished from *E. quadrispinosa* by size (it is much smaller) and on spine differences (spines on the frontal margins of pereonites 1–4 are very small, more numerous and always frontally bent over the preceding pereonite). *E. bispinosa* bears only two small acute spines frontomedially of pereonites 1–3 and is characterized by very short cuticular hairs on and around the body, a feature which does not occur on any other Antarctic species of *Echinozone*.

The variability in morphology due to size and moult stages means that distinguishing characters of the appendages should always be used to determine new material. All species are now adequately illustrated and with the key to the Antarctic species and a table of the differences between the species in the present paper it should be possible to determine Antarctic *Echinozone* more precisely in the future.

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