

**A REDESCRIPTION OF *ASPERSENTIS ZANCHLORHYNCHI*
(JOHNSTON & BEST, 1937) COMB. NOV.
(HETERACANTHOCEPHALIDAE: ACANTHOCEPHALA)**

by LESLEY R. SMALES*

Summary

SMALES, L.R. (1996) A redescription of *Aspersentis zanchlorhynchi* (Johnston & Best, 1937) comb. nov. (Heteracanthocephalidae: Acanthocephala). *Trans. R. Soc. S. Aust.* 120 (4), 167-171, 29 November, 1996.

Aspersentis zanchlorhynchi (Johnston & Best, 1937) comb. nov., occurring in *Zanchlorhynchus spinifer*, is redescribed from specimens collected off-shore from Macquarie and Heard Islands between 1986 and 1990. *Aspersentis zanchlorhynchi* can be distinguished from all other species in the genus by having a cylindrical-shaped trunk, and proboscis armature of 14-16 rows of 10-12 hooks of which both the larger ventral and smaller dorsal hooks have roots. An analysis of the literature indicates that the genus *Aspersentis* comprises four species: *A. australis*, *A. johni*, *A. minor* and *A. zanchlorhynchi*.

Key Words: Acanthocephala, *Aspersentis*, Antarctic, fish hosts.

Introduction

Acanthocephalan material, collected by the Australasian Antarctic Expedition (AAE) of 1911-1914, was the subject of a report by Johnston & Best (1937). In that report they described a new species, *Echinorhynchus zanchlorhynchi*, occurring in the stomach of a scorpaenid fish, *Zanchlorhynchus spinifer* Günther, from Macquarie Island. Since their description was based on a single female with its proboscis not fully everted, Johnston & Best (1937) indicated that the examination of additional specimens would be required to confirm the species, its description and its taxonomic position.

Subsequently, two immature specimens (one male, one female) were found in *Z. spinifer* collected at Macquarie Island during the British Australian and New Zealand Antarctic Research Expedition (BANZARE) of 1929-31, and identified as *E. zanchlorhynchi* by Edmonds (1957).

More acanthocephalans were found when members of the Australian National Antarctic Research Expeditions (ANARE) of 1986 - 1990 collected *Z. spinifer* from Macquarie and Heard Islands. Examination of this material has allowed a more complete description of the acanthocephalan to be prepared. These specimens, whilst conforming to the general descriptions of Johnston & Best (1937) and Edmonds (1957) had asymmetrical proboscis armature and spines on the trunk, features characteristic of the *Aspersentinae*. The significance of these morphological data are considered in this paper and an analysis of the current status of the genus *Aspersentis* is given.

Materials and Methods.

Thirteen *Zanchlorhynchus spinifer* collected from Macquarie Island waters (54° 33' S, 158° 53' E) and one from the Heard Island shelf (trawled between 51° 34' and 53° 30' S, 72° and 78° 00' E) were fixed in 10% formalin buffered with excess sodium tetraborate. Fish were then examined under a dissecting microscope and any acanthocephalans found were stored in 70% ethanol prior to examination, either as temporary wet mounts, after clearing in beechwood creosote, or as permanent preparations, after staining in Grenacher's carmine alum, dehydrating through a graded series of ethanol, clearing in xylene and mounting in Canada balsam.

Measurements of 10 males and 10 females were made with the aid of an ocular micrometer, drawing tube and measuring wheel and are given in μm unless otherwise stated, with the range followed by the mean in parentheses. Figures were drawn with the aid of a drawing tube. All specimens have been deposited in the Queensland Museum (QM).

Systematics

Order Palaeacanthocephala Meyer, 1931

Family Heteracanthocephalidae Petrochenko, 1956

Subfamily Aspersentinae Golvan, 1960

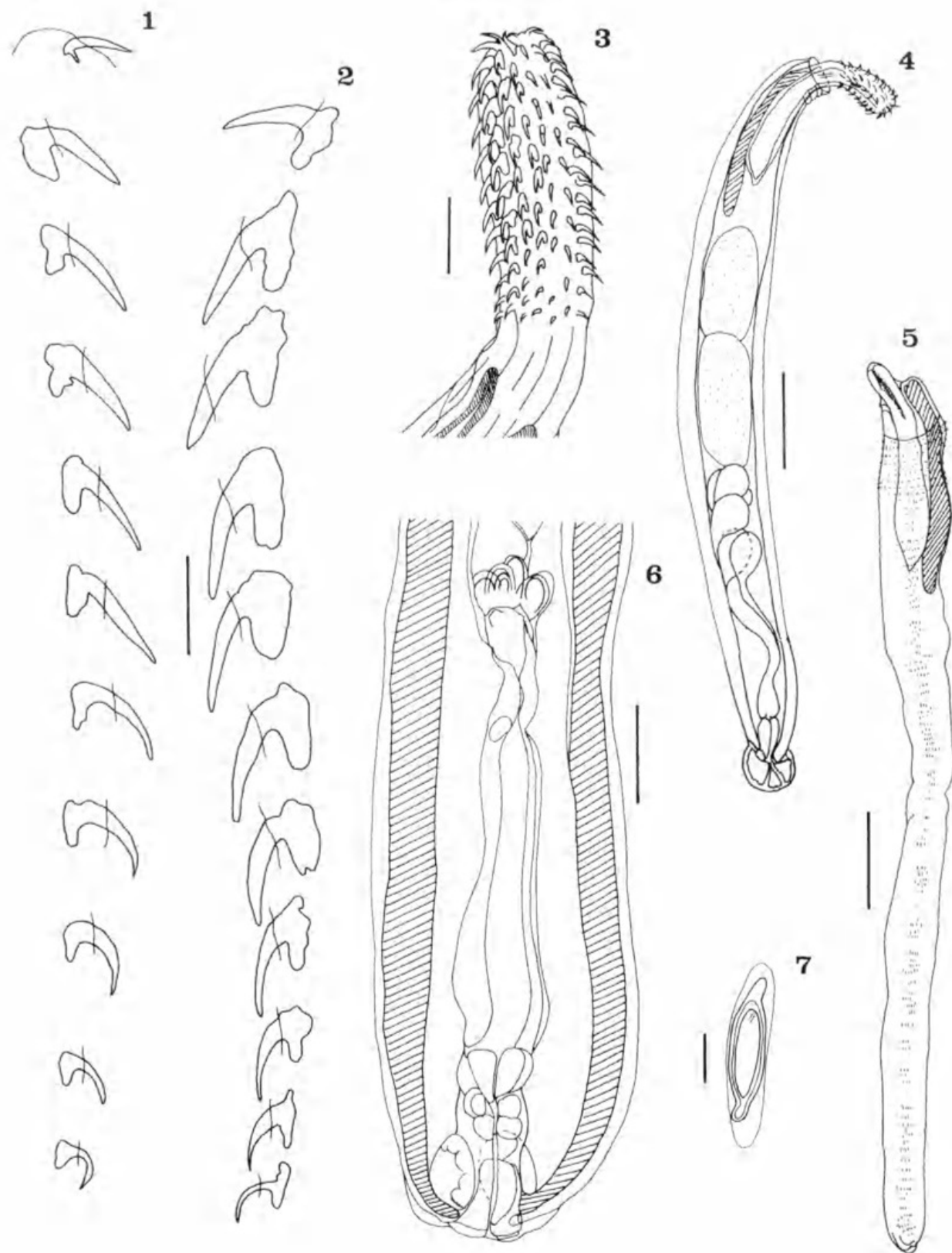
Genus *Aspersentis* van Cleave, 1929

Type species *Aspersentis australis* Van Cleave, 1929.

Aspersentis zanchlorhynchi (Johnston & Best, 1937) comb. nov.
(FIGS 1-7)

Synonym *Echinorhynchus zanchlorhynchi* Johnston & Best, 1937 pp. 12-13; Edmonds, 1957 p. 96, *E.s.l. zanchlorhynchi* Zdzitowiecki, 1986 pp. 89, 102, table 1.

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Figs 1-7 *Aspersentis zunchlorhynchi* comb. nov. Fig. 1. Proboscis armature, one row of dorsal hooks. Fig. 2. Proboscis armature, one row of ventral hooks. Fig. 3. Proboscis, dorsal view. Fig. 4. Male. Fig. 5. Female, proboscis not fully everted, showing distribution of trunk armature. Fig. 6. Posterior end, female. Fig. 7. Egg. Scale bars = 50 μ m, 1, 2; 150 μ m, 3; 100 μ m, 6; 500 μ m, 4, 5; 25 μ m, 7.

Material examined

From *Zanchlorhynchus spinifer*: 126 ♀♀, 170 ♂♂, Macquarie Island, 6.ii.86, 12.vi.86, 6.xii.86; G211324-G211335, 1♀ Heard Island, 11.vi.90; G211323

Revised description

Trunk cylindrical. Proboscis long, cylindrical, set at angle to trunk (Figs 4, 5). Proboscis armature similar in both sexes, 14-16 rows of 10-12 hooks (Fig. 3); dorsal rows of hooks (Fig. 1) somewhat smaller than ventral rows (Fig. 2); all hooks with roots. Neck short unarmed, truncated. Spines tiny, embedded in cuticle in both sexes, encircling anterior end of trunk to a level about halfway down proboscis receptacle, then extending down lateral trunk to posterior (Fig. 5). Proboscis receptacle double-walled, inserted at base of proboscis; ganglion placed near posterior end. Lemnisci flat, longer than proboscis receptacle when fully extended.

Male: Trunk 3.4-6 (4.2) mm long by 360-680 (480) wide. Proboscis, not fully extended in most specimens, 650 long by 215 wide (n=1). Largest dorsal hooks 3rd and 4th in row, 53-63, largest ventral hooks 3rd and 4th in row 76-85. Neck 130-195 (145) long by 140-260 (175) wide. Proboscis receptacle 615-995 (735) long. Lemnisci 740-1300 (930) long. Testes ovoid, tandemly placed; anterior testis 455-985 (675) long by 180-300 (265) wide, posterior testis 490-715 (635) long by 195-445 (280) wide. Cement glands, six, pear-shaped. Male aperture terminal.

Female: Trunk 5.3-16 (10) mm long by 390-765 (500) wide. Proboscis, not fully extended, longer than 900, width 200. Largest dorsal hooks, 3rd and 4th in row, 50-56; largest ventral hooks, 3rd and 4th

in row 80-83. Neck 182-227 (200) long by 175-260 (205) wide. Proboscis receptacle 810-1300 (1160) long; lemnisci 925-1940 long (n=2). Female aperture terminal (Fig. 6). Eggs embryonated, with prolongations of middle shell 75-90 (87) long by 18 wide (Fig. 7).

Host: *Zanchlorhynchus spinifer* Günther.

Location: stomach, intestine.

Locality: Macquarie Island.

Type specimens: Holotype female, South Australian Museum V 2200.

Remarks

Although a large number of specimens was collected, none of them had been relaxed and extended prior to fixation, which made them difficult to study. Comparison of the material from this study with the descriptions of Johnston & Best (1937) and Edmonds (1957) showed that all the material collected from *Z. spinifer* was the same species. In many specimens the lemnisci were as described by Johnston & Best (1937) that is, short and irregular and reaching about one-third the length of the proboscis receptacle but in the more relaxed specimens, the lemnisci were flat and extended beyond the proboscis receptacle. The cylindrical shape of the proboscis and its armature, 14-16 rows of 10-12 hooks, were observed in the three specimens described by Johnston & Best (1937) and Edmonds (1957) but in none of them had the proboscis extended far enough to describe the morphological details of the proboscis hooks. The asymmetry of the armature, ventral hooks being larger than dorsal ones, could be seen only in those

TABLE 1. A comparison of female body measurements of *Aspersentis austrinus* Van Cleave, 1929 (taken from Zdzitowiecki 1981), *A. minor* Edmonds & Smales, 1992 and *A. zanchlorhynchi* (Johnston & Best, 1937). Measurements in mm.

| | <i>A. austrinus</i> | | <i>A. minor</i> | <i>A. zanchlorhynchi</i> |
|-------------------------------|------------------------------|----------------------|--------------------------|-------------------------------|
| | South Shetlands | South Georgia | Tasmania | Macquarie & Heard Is. |
| trunk length | 4.93-6.42 (5.79) | 6.94-8.54 (7.25) | 2.3-4.1 (3.2) | 5.3-16.0 (10.0) |
| trunk width | 1.16-1.79 (1.49) | 1.09-2.09 (1.73) | 0.31-0.95 (0.54) | 0.39-0.76 (0.50) |
| proboscis length | 0.51-0.66 (0.59) | 0.67-0.73 (0.70) | 0.24-0.32 (0.28) | >0.90 |
| proboscis width | 0.29-0.32 (0.30) | 0.29-0.35 (0.32) | 0.10-0.17 (0.14) | 0.20 |
| dorsal hook length (maximum) | 0.054-0.064 (0.060) | 0.060-0.0650 (0.062) | 0.030-0.035 (0.032) | 0.050-0.056 |
| ventral hook length (maximum) | 0.119-0.137 (0.126) | 0.132-0.149 (0.140) | 0.062-0.080 (0.065) | 0.080-0.083 |
| neck length | 0.17-0.23 (0.126) | 0.22-0.31 (0.27) | 0.12-0.25 | 0.18-0.23 (0.20) |
| egg | 0.060-0.088 | 0.071-0.087 | 0.068-0.077 | 0.075-0.090 (0.087) |
| | x 0.019-0.025 | x 0.020-0.025 | x 0.012-0.016 | x 0.018 |
| hook disposition | 13-16 rows of 7-11 hooks/row | | 14 rows of 7-9 hooks/row | 14-16 rows of 10-12 hooks/row |

specimens with the proboscis almost, or completely, everted. This character is indicative of the genus *Aspersentis* rather than the genus *Echinorhynchus* to which the species was originally allotted. Somatic armature, present in this species, is also found on other species of *Aspersentis* (see Zdzitowiecki 1981, 1986) but not *Echinorhynchus*. Since tiny spines are easily overlooked, as has occurred in some collections of *A. austrinus* (see Zdzitowiecki and Rokosz 1986), it is not surprising that they were undetected in the earlier studies.

Aspersentis zanchlorhynchi (Johnston & Best, 1937) comb. nov. can be distinguished from *A. austrinus* Van Cleave, 1929 in having a more cylindrical trunk, a longer proboscis, at least 650 in males and 900 in females, compared with up to 630 in males and 720 in females, in the distribution of trunk spination on the lateral trunk as well as encircling the anterior trunk, and less marked asymmetry of the proboscis armature with both ventral and dorsal hooks having roots. *Aspersentis zanchlorhynchi* has more hooks per row (10-12) than does *A. austrinus* (7-11) on the proboscis (Table 1).

In comparison with *A. minor* Edmonds & Smales, 1992, females 3.2 mm, and *A. johni* (Baylis, 1929) Chandler, 1934, females 3.0 mm, *A. zanchlorhynchi* is much larger, females 10 mm. With 10-12 hooks per row on the proboscis, *A. zanchlorhynchi* has more hooks than *A. minor*, 7-9, and fewer hooks than *A. johni*, 12-14. *Aspersentis minor* occurs in *Rhombosolea tapirina* from Tasmanian waters (Edmonds & Smales 1992) and *A. johni* occurs in *Merluccius* sp. around the Falkland Islands (Yamaguti 1963). By contrast *A. zanchlorhynchi* occurs in *Z. spinifer* from Macquarie and Heard Islands, that is from sub-Antarctic and Antarctic waters.

Discussion

In a redescription of *A. austrinus* Zdzitowiecki (1981) placed *Rhadinorhynchus wheeleri* Baylis, 1929, *Aspersentis wheeleri* Chandler, 1934 and *Aspersentis megarhynchus* (Linstow, 1892) Golvan, 1960 nec *Echinorhynchus megarhynchus* Linstow, 1892 as synonyms of *A. austrinus*. He commented that Linstow (1892) gave the number of proboscis hook rows as 18 and described the trunk as unarmed and that Linstow neither measured, described nor drew the ventral and dorsal rows of hooks as having different shapes and dimensions. All of these characters are inconsistent with the genus *Aspersentis*. Amin (1985), however, in his classification of the Acanthocephala overlooked Zdzitowiecki's paper and followed Golvan (1960) in

listing *A. megarhynchus* (Linstow, 1892) with *A. austrinus* as its synonym and *A. johni* (Baylis 1929) as the only two valid species in the genus.

Zdzitowiecki & Rokosz (1986) re-evaluated the validity of *Heteracanthocephalus hureaui* Dollfus, 1965 and concluded that it was either a synonym of *A. austrinus* or, because of the wide range of number of hooks per row, of *A. johni*. Zdzitowiecki (1986) in his systematic review of Antarctic acanthocephalans reaffirmed his conclusion that *Echinorhynchus megarhynchus* Linstow, 1892 did not belong in the genus *Aspersentis*, and listed *H. hureaui* as a synonym of *A. austrinus*. Then Zdzitowiecki (1990), when re-examining material previously designated *H. hureaui*, stated that, "as was suggested earlier *H. hureaui* is identical with *A. austrinus* = *A. megarhynchus*". Edmonds & Smales (1992) noted the inconsistencies in the designation of *A. austrinus* by Zdzitowiecki (1981, 1986, 1987, 1990) and indicated that *E. megarhynchus* as described by Linstow (1892) lacked body spines and did not have asymmetric proboscis hooks.

Thus, *A. megarhynchus* as redescribed by Golvan (1960), is not the same species as *E. megarhynchus* Linstow, 1892 because it has asymmetric proboscis armature and cuticular spines on the trunk, and is now considered as *A. austrinus*. Since *A. austrinus* was described in 1929 by Van Cleave while *A. megarhynchus* was not established until 1960 by Golvan, *A. austrinus* becomes the type species of the genus *Aspersentis* with *A. megarhynchus* as a synonym. The other synonyms are *A. wheeleri* (Baylis, 1929), *Rhadinorhynchus wheeleri* (Baylis, 1929) and *Heteracanthocephalus hureaui* (Dollfus, 1965).

The genus *Aspersentis* therefore now consists of four valid species *A. austrinus*, *A. johni*, *A. minor* and *A. zanchlorhynchi*.

As to *Echinorhynchus megarhynchus*, Johnston & Best (1937) suggested that it might be identical to *Leptorhynchoides debenhami* (Lieper & Atkinson, 1914) Johnston & Best, 1937 now *Metacanthocephalus rennecki* (Lieper & Atkinson, 1914) Zdzitowiecki, 1983. *Echinorhynchus megarhynchus* occurs in *Notothenia corriceps*, one of the hosts of *Metacanthocephalus johnstoni* Zdzitowiecki, 1983, but not in *Trematomus bernachii* the host of *M. rennecki* (see Zdzitowiecki 1983). Moreover the original description of *E. megarhynchus* by Linstow (1892) resembles that of *M. johnstoni* in having a proboscis armature of 18 rows each of 6 hooks, the proboscis 0.45 mm long, and apparently no neck. Of the other species occurring in Antarctic fish hosts, *Echinorhynchus petroschenkoi* (Rodjuk, 1984) Zdzitowiecki, 1989, is a larger helminth than *E. megarhynchus* with a longer proboscis, proboscis armature of 15-19 rows

of 10-13 hooks, and does not occur in *N. coriiceps* (see Zdzitowiecki 1989). *Heterosentis heteracanthus* (Linstow, 1896) has body spines and proboscis armature of only 10 rows of 4-5 hooks, with a striking difference between the length of the first two and the last three hooks (Zdzitowiecki 1984). These characters suggest that *E. megarhynchus* is closer to *M. johnstoni* than any of the other acanthocephalan species occurring in Antarctic fish. Direct

examination of specimens of *M. johnstoni* is needed before a determination on the status of *E. megarhynchus* can be made.

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