the smaller sagittae. An indistinct anterior colliculum is present.

Large sized sagittae (Fig. 2c, d): Posteriorly, the tip becomes very prominent and 'curls' dorsolaterally. From the lateral side the posterior protrusion is well defined, forming a ridge that runs to the nucleus (Fig. 2d). The dorsal, posterior and ventroposterior margins are coarsely serrated. Ventroanteriorly the margin is more finely serrated and less irregular. The ostium and cauda are clearly divided. Approximately 45% of the sulcus acusticus is occupied by the ostium; the latter flares towards the anterior margin. A prominent crista superior is present, which runs approximately 75% of the length of the sulcus acusticus (anterior to posterior); at the anterior margin it ends at the antirostrum. The ventral aspect of the sulcus acusticus is deeply grooved. The anterior colliculum is more prominent, but still not very distinct. Well defined grooves are present on the lateral side of the sagitta and they radiate from the nucleus to the dorsal and dorsoposterior margins (Fig. 2d).

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References

COETZEE, P.S. 1978. Aspects of the composition of anglers' catches off St Croix Island, with special reference to the biology of *Cheimerius nufar*, Eherenberg 1820 (Teleostei: Sparidae). M.Sc. thesis, University of Port Elizabeth, Cape Province, South Africa.

BAGENAL, T.B. 1974. The ageing of fish (The Proceedings of an International Symposium) Unwin Brothers Ltd., England. pp. 234.

HECHT, T. 1978. A descriptive systematic study of the otoliths of the neopterygean marine fishes of South Africa. Part I. Introduction. *Trans. Roy. Soc. S. Afr.* 43: 191–197.

HECHT, T. & HECHT, A. 1978. A descriptive systematic study of the otoliths of the neopterygean marine fishes of South Africa. Part II. The delimination of teleost orders, some systematic notes and a provisional new phyletic order sequence. *Trans. Roy. Soc. S. Afr.* 43: 199–218.

HECHT, T. & HECHT, A. 1979. A descriptive systematic study of the otoliths of the neopterygean marine fishes of South Africa. Part III. Elopiformes, Gonorhynchiformes, Clupeiformes and Salmoniformes. *Trans. Roy. Soc. S. Afr.* 44: 73–95.

Distribution and tidal rhythmicity of a littoral amphipod

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Amphipods of the genus *Hyale* are nestlers and numerically constitute a large portion of the littoral amphipod fauna of South Africa (Griffiths 1976). A study of the fauna associated with the littoral seaweed *Gelidium pristoides* (Turner) Kützing on St Croix Island in Algoa Bay (Beckley 1977) has shown *Hyale grandicornis* (Kröyer) to be the dominant amphipod in the epifauna.

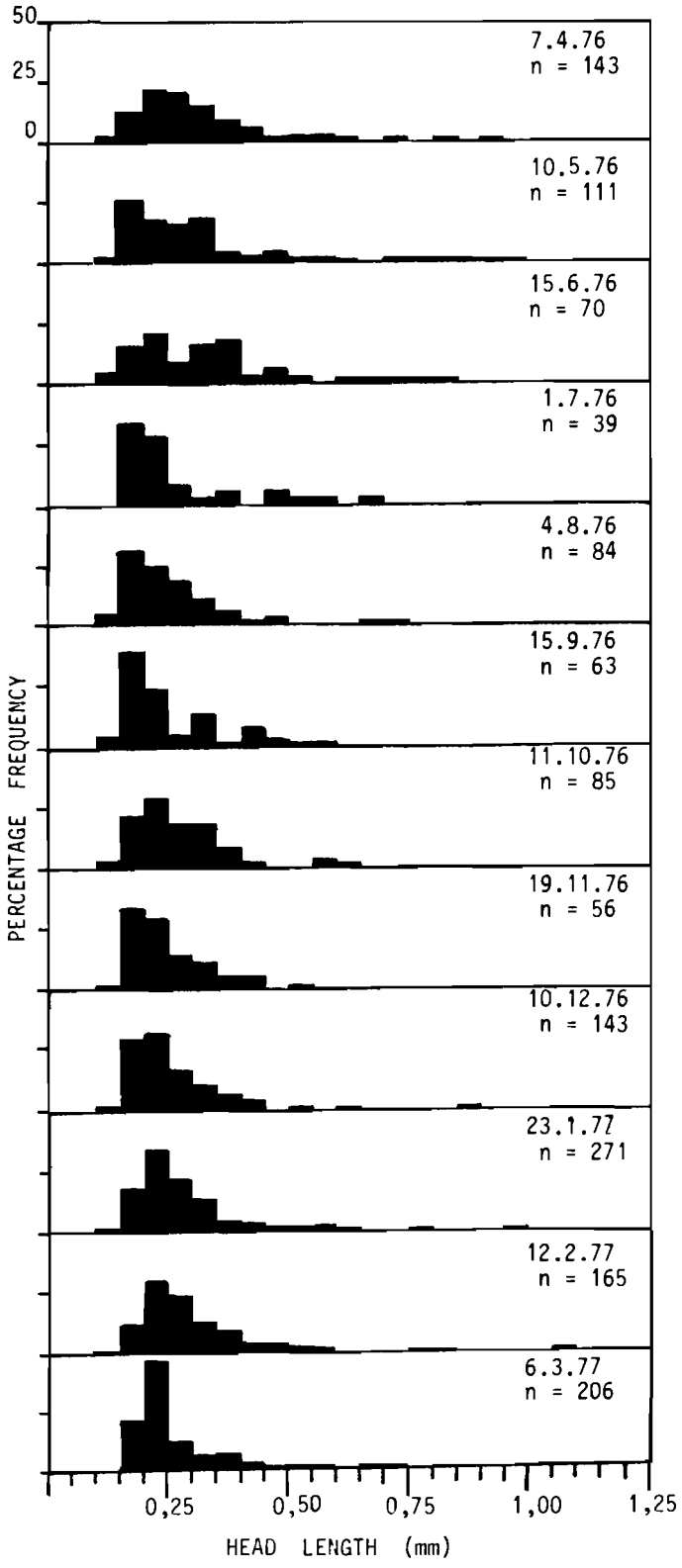

Fig. 1 Combined percentage size frequency histograms for *Hyale grandicornis* collected from *Gelidium pristoides* on St Croix Island.

A monthly sample of six *G. pristoides* tufts from each of three transect sites on St Croix (Beckley & McLachlan 1979) was obtained during the period April 1976 to March 1977. Twenty percent of the *Hyale grandicornis* specimens was subsampled and the head lengths measured along the dorsal midline using a dissecting microscope fitted with an ocular micrometer. The relationship between head length and total body length (head to telson) was determined from

camera lucida scale drawings of 25 specimens and calculated from a linear regression (r = 0,9951) to be:

Head length (mm) = 0,08 total length (mm) + 0,0326

Combined percentage size frequency histograms for *H. grandicornis* associated with *G. pristoides* on St Croix (Fig. 1) show that small size classes dominated throughout the year. On average 82% were less than 4 mm total length and there appears to be continuous recruitment of juveniles to the population. Very few large specimens were found to be associated with *G. pristoides* and of the 1 436 amphipods measured, less than 0,5% were ovigerous females. *G. pristoides* thus appears to be a nursery for juveniles analagous to the case of primary settlement of *Perna perna* (Bivalvia) on littoral seaweeds (Beckley 1979).

Tidal rhythmicity of *G. pristoides* epifauna was investigated at an easily accessible littoral area in close proximity to the field station on the island. A sample of four *G. pristoides* tufts was collected every two hours from 15h00 on 12 February to 17h00 on 13 February 1977 (a neap tide). During the night five inshore plankton tows were made by throwing out a plankton net (30 cm diameter, 250 μm mesh) and pulling it through five metres of inshore surface water.

Much of the fauna associated with *Gelidium* is slow-moving (nematodes, annelids, mites, molluscs) and no obvious tidal rhythmicity was apparent. The amphipod *H. grandicornis* is, however, extremely motile and from Fig. 2 it can be seen that the numbers associated with *Gelidium* decreased during high tide and increased again at low tide. Using Spearman's rank correlation for *H. grandicornis* (numbers per gram dry mass of *Gelidium* against tidal height) this rhythmicity was found to be highly significant ($p < 0,01$; 12 d.f.). Low numbers of *H. grandicornis* were captured in the inshore plankton tows (only four specimens in the five tows) and it thus appears that this amphipod does not compensate for changes in environmental conditions by migrating from the littoral zone as Weiser (1952) found for the seaweed-associated amphipod *Stenothöe monoculoides*. Instead, observations on the behaviour of *H. grandicornis* revealed that the amphipods remain in the littoral zone. As the tide rises and water splashes into the *Gelidium* belt the amphipods become active and move about on the shore only to take shelter again as the tide recedes. Glynn (1965) noted a similar behaviour pattern for *Hyale* sp. associated with *Endocladia muricata* in California and at high tide observed some individuals moving to barnacles for extended periods of time. Morton & Miller (1968) have also reported similar tide-correlated activity for amphipods associated with seaweed on New Zealand rocky shores.

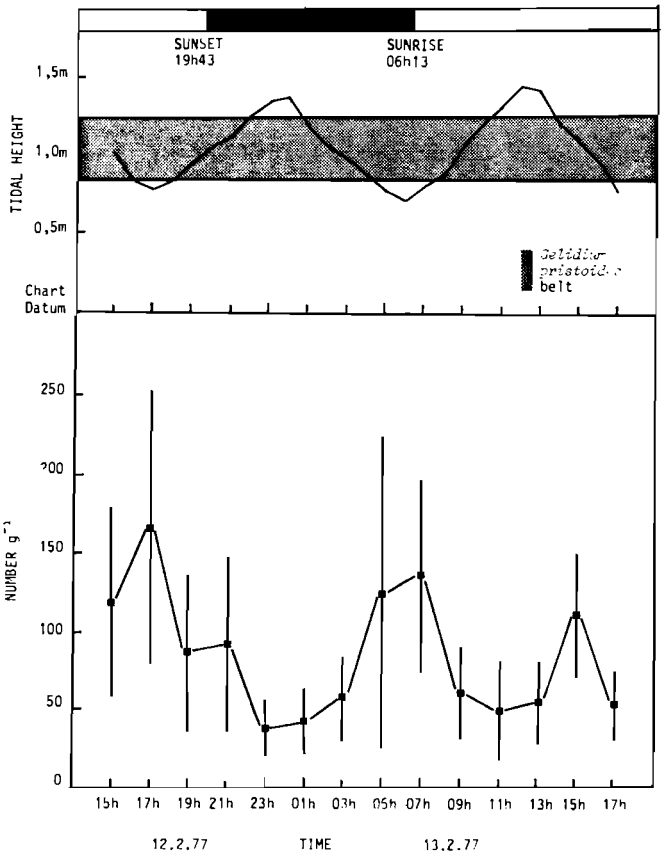

Fig. 2 Tidal rhythmicity of *Hyale grandicornis* associated with *Gelidium pristoides* on St Croix Island. Tidal height in metres above Chart Datum and amphipod numbers per gram dry mass of seaweed (mean and S E).

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References

BECKLEY, L.E. 1977. A study of the littoral seaweed epifauna of St Croix Island, Algoa Bay. M.Sc. Thesis, University of Port Elizabeth.

BECKLEY, L.E. 1979. Primary settlement of *Perna perna* (L.) on littoral seaweeds on St Croix Island. *S. Afr. J. Zool.* 14: 171.

BECKLEY, L.E. & McLACHLAN, A. 1979. The littoral seaweed epifauna of St Croix Island. 1. Physical and biological features. *S. Afr. J. Zool.* 14: 175–182.

GLYNN, P.W. 1965. Community composition, structure and interrelationships in the marine intertidal *Endocladia muricata* — *Balanus glandula* association in Monterey Bay, California. *Beaufortia* 12: 1–198.

GRIFFITHS, C.L. 1976. Guide to the benthic marine amphipods of Southern Africa. Trustees of the S.A. Museum, Cape Town.

MORTON, J. & MILLER, M. 1968. The New Zealand sea shore. Wilson Collins Ltd., Glasgow.

WIESER, W. 1952. Investigations on the micro fauna inhabiting seaweeds on rocky coasts. IV. Studies on the vertical distribution of the fauna inhabiting seaweeds below the Plymouth Laboratory. *J. mar. biol. Ass. U.K.* 31: 145–174.