

Belyaevostella hyugaensis, a New Species of Deep-sea Asteroid
(Asteroidea, Caymanostellidae) Found on a Sunken Wood
from off Southern Japan

By

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Abstract A new species of asteroid belonging to the family Caymanostellidae is described from a single specimen collected at 1,650 m depth in the Hyuga Basin off southern Japan under the name of *Belyaevostella hyugaensis*. This is the sixth described species of the Caymanostellidae and the second species of the genus *Belyaevostella*.

A new species of asteroid belonging to the genus *Belyaevostella* (Caymanostellidae) is described from a specimen found on a piece of sunken wood collected at 1,650 m depth in the Hyuga Basin, southern Japan, during a cruise of R. V. *Tansei Maru* of the Ocean Research Institute, University of Tokyo. This is the first record of a caymanostellid starfish from the North Pacific.

The family Caymanostellidae was erected by BELYAEV (1974). It was recently reviewed by ROWE (1989) who recognized four species belonging to two genera, viz. *Caymanostella* BELYAEV, 1974 and *Belyaevostella* ROWE, 1989. A fifth species, *Caymanostella madagascarensis*, was described by BELYAEV and LITVINOVA (1991). The new species described below belongs to the genus *Belyaevostella*.

Family Caymanostellidae BELYAEV, 1974

[New Japanese name: Keiman-hitode ka]

Genus *Belyaevostella* ROWE, 1989

[New Japanese name: Beriyaefu-hitode zoku]

Belyaevostella hyugaensis sp. nov.

[New Japanese name: Hyuga-keiman-hitode]

(Figs. 1 A–B, 2)

Material examined. One specimen from the Hyuga Basin, off southern Japan, western North Pacific (at Station D2 of KT-86–16 cruise of R. V. *Tansei Maru*, 32° 21.1'N; 132° 28.5'E–32° 19.1'N; 132° 28.6'E, 1,650–1,653 m deep, on 2 November 1986). The holotype (dried specimen) is preserved in the National Science Museum, Tokyo (NSMT–E 3001).

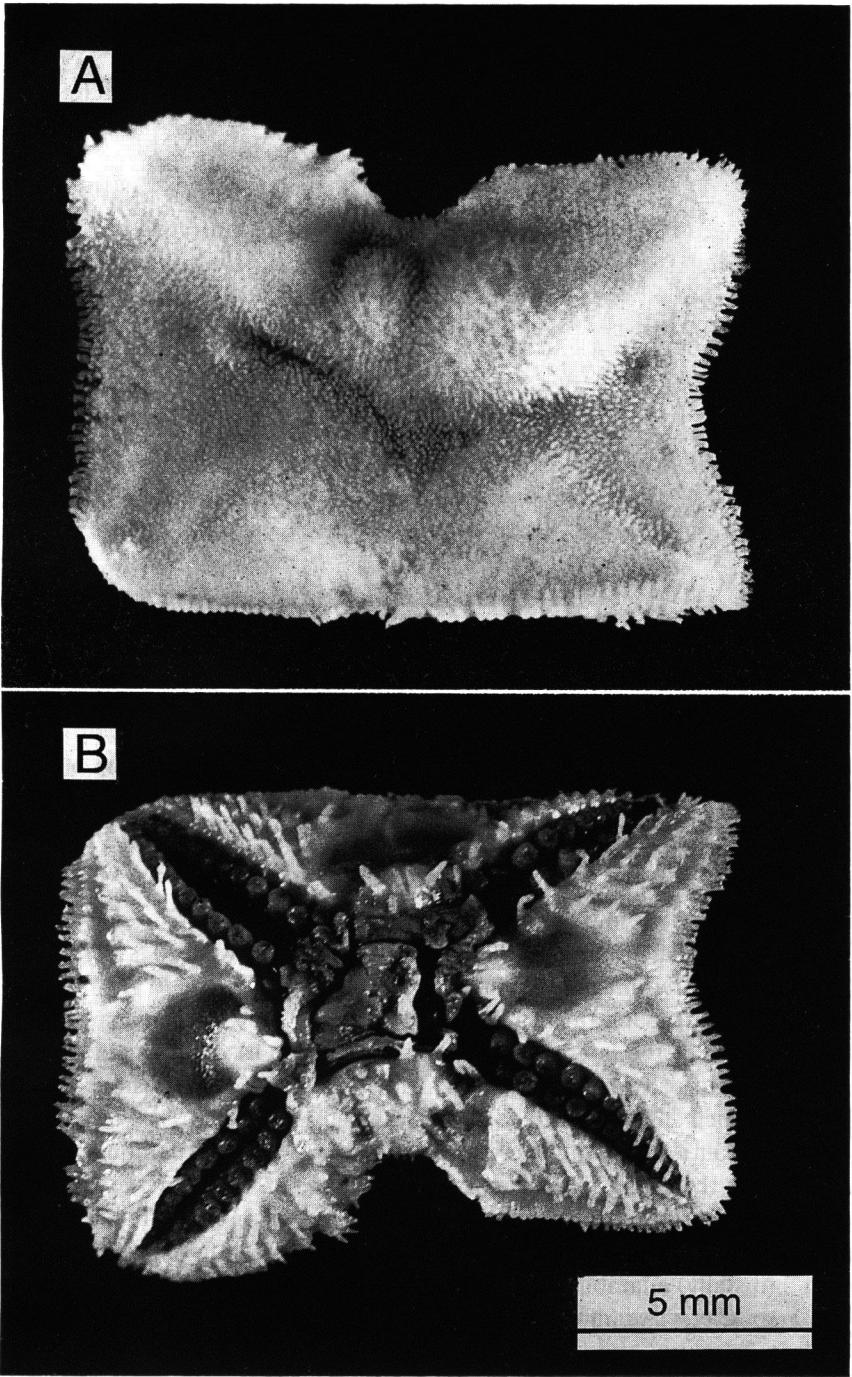
Etymology. Named after the Hyuga Basin where the specimen was collected.

Diagnosis. A species of *Belyaevostella* whose abactinal skeleton is made of imbricate subcircular plates bearing slightly sacculated spinelets. Inferomarginals bar-like except for the first plate of each series which is grossly subrhomboidal in shape. Adambulacral plates each with a single transverse row of 4–2 spinelets. Oral plates each with 3 furrow spinelets and one subambulacral spinelet.

Description of the holotype. $R=10$ mm, $r=8$ mm, $R=1.2r$. Five arms (one was regenerating), disc large, body subpentagonal. Aboral surface slightly convex; oral surface flat. Abactinal skeleton made of subcircular translucent plates. Abactinal plates imbricate and arranged rather irregularly except for the carinals which form a well-defined longitudinal row. A thick skin covering the whole abactinal surface obscuring the limits of the plates and the base of their armament. Each abactinal plate with 1–4 vitreous spinelets of ca. 0.4 mm length. Abactinal spinelets slightly sacculated at their bases and tapered apically. Terminal plate visible aborally and surrounded by ca. 7 spinelets somewhat larger than the abactinal spinelets. Madreporite inconspicuous. Papulae single and numerous, occurring all over the abactinal surface.

Two rows of marginals, the inferomarginals defining the ambitus. Eleven superomarginals per series, the first plate of each series being separated from its equivalent in the adjoining series by a small uncalcified abactinal area to which the gonopores open. Superomarginals squarish to circular, measuring ca. 0.6 mm in length and 0.5 mm in width, and bearing spinelets similar to those of the abactinal plates. Eleven inferomarginals per series. Inferomarginals bar-like (ca. 0.6 mm in length and 2 mm in width) except for the first plate of each series which is slightly swollen in its proximal part and is grossly subrhomboidal in shape (see Fig. 2). Abactinal surfaces of infero-

Fig. 1. *Belyaevostella hyugaensis* sp. nov., holotype (NSMT–E 3001). A: Abactinal surface. B: Actinal surface.



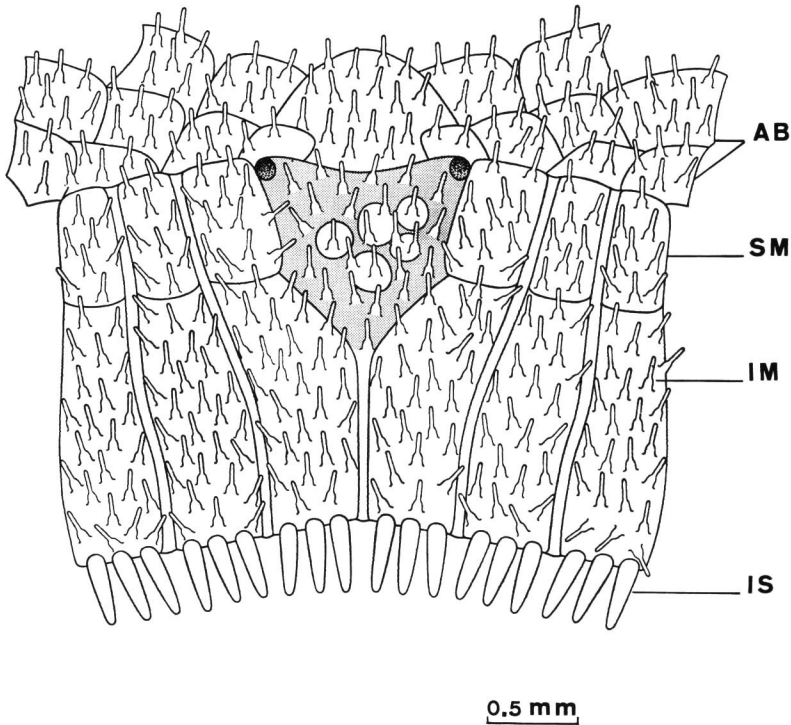


Fig. 2. *Belyaevostella hyugaensis* sp. nov., holotype (NSMT-E 3001). Drawing of an interradius (abactinal surface) showing the membraneous area (gray zone) and the location of the gonopores (black spots). AB: abactinal plates; IM: inferomarginal plates; IS: inferomarginal (ambital) spines; SM: superomarginal plates.

marginals with spinelets similar to those of the superomarginals. Each inferomarginal with an additional group of 2–3 stouter and basally webbed ambital spinelets. Actinal surface of inferomarginals spineless.

No actinolateral plate, the actinal skeleton being made of the adambulacra and the actinal surface of the inferomarginals. A triangular to oval-shaped actinal membrane covering the proximal part of each interradius. Gonads visible through this membrane in which small plate-like spicules occur by place.

Twelve to fourteen adambulacral plates in each series. Adambulacra bar-like and much wider than long (ca. 2.5 mm wide and 0.5 mm long for the largest plates), the first adambulacral in each series being conspicuously reduced (at least five times smaller than the second one). Each adambulacral with a transverse series of 4 (proximally) to 2 (distally) adambulacral spinelets, except for the most proximal plate which has only 1 spinelet. Adambulacral groove large with two rows of suckered podia. Mouth plates relatively large, each bearing 3 furrow spinelets and 1 longer and stouter subambulacral spinelet.

Remarks. The family Caymanostellidae was established by BELYAEV (1974). Since then two genera and five species have been described (ROWE, 1989 and BELYAEV & LITVINOVA, 1991). Of these species, four belong to the genus *Caymanostella*: *C. spinimarginata* BELYAEV, 1974, collected at a depth of 6,740–6,780 m in the Cayman Trench, Caribbean Sea; *C. admiranda* BELYAEV et LITVINOVA, 1977, collected at a depth of 5,220 m from the Coral Sea; *C. phorcynis* ROWE, 1989, collected in the Tasman Sea at 736–1,208 m depth; and *C. madagascarensis* BELYAEV et LITVINOVA, 1991, collected at 1,500 m depth off the west coast of Madagascar. The other species belongs to the genus *Belyaevostella*: *B. hispida* (AZIZ et JANGOUX, 1984) collected at a depth of 1,301–2,350 m in the Macassar Straits. Most specimens of these species as well as the holotype of *B. hyugaensis* were found associated with sunken wood fragments in the deep sea.

The occurrence of a thick skin and of abactinal and marginal plates both armed with spinelets, the presence of abactinal papulae and of five actinal membranes with perforated plate-like spicules, and the position of the gonopores adjacent to the first superomarginal plate of each series, accord well with ROWE's (1991) definition of the genus *Belyaevostella*. *Belyaevostella hyugaensis* can be separated from *B. hispida* by the armament of the abactinal surface which is much denser, and by the shape and arrangement of the proximal-most marginal plates in each series (Fig. 2).

Affinities of the family Caymanostellidae have not yet been clearly understood. According to BELYAEV (1974), it should be included in the former Order Phanerozonia because of the well-developed marginal outline. AZIZ and JANGOUX (1984) suggested that its position might be near to the family Asterinidae (Order Valvatida) because of the structure of the abactinal and marginal skeletons. BLAKE (1987) reported that only the Korethasteridae (Order Velatida) share the complete absence of actinal plates, and regarded it as being closely related to the Caymanostellidae. Finally, CLARK (in CLARK & DOWNEY, 1992) pointed out some similarities between the families Caymanostellidae and Sphaerasteridae (Order Valvatida) though she did not plead for a close relationship.

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