

On Two Interesting Species of Epizoic Barnacle  
*Acasta* from Japan

By

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I have already pointed out (HIRO, 1937 b), that *Acasta* among the Cirripedia is a rather large genus showing adaptive changes of structures consequent upon life in sponges or coelenterates. In this respect the following two species of *Acasta* may provide interesting examples to show the tendencies of modification divergent to the extreme. The material consists of two species, one of which *Acasta coriobasis* BROCH was obtained by Mr. Tukizi SATO from a tetraxon sponge and the other *Acasta alcyonicola* n. sp. obtained by Mr. Torao YAMAMOTO from Nephtheid alcyonarians.

I am greatly indebted to the gentlemen mentioned above for placing the material at my disposal.

*Acasta coriobasis* BROCH

(Fig. 1)

*Acasta coriobasis*, BROCH, 1947, pp. 25-29, figs. 6 & 7.

*Acasta satoi* (MS), UTINOMI, 1949, p. 69. (*nomen nudum*)

*Locality*. Nômi-sima, Hiroshima Bay. Shore. Six specimens embedded in a tetraxon sponge. October 1934, T. SATO *leg.*

BROCH (1947) has described from the mouth of Bassac, at Indochinese coast, a barnacle living in a large and soft sponge and named it *Acasta coriobasis* on account of the leathery texture of the basal cup. The present specimens, which I had intended to describe as a new species, before I saw BROCH's paper, evidently belong to the same species, although some insignificant differences are found in minor details.

All the specimens are very large, measuring in millimeters as follows :

Carino-rostral diameter	12.7	10.0	9.4	9.0	10.0
Height	17.7	16.2	12.2	14.2	—

The first one is probably of the largest size among all known species of *Acasta*, as can be deduced from earlier records.

The compartments are white and tinged with reddish purple hue towards the apices and their surface is delicately striped horizontally; this is also the

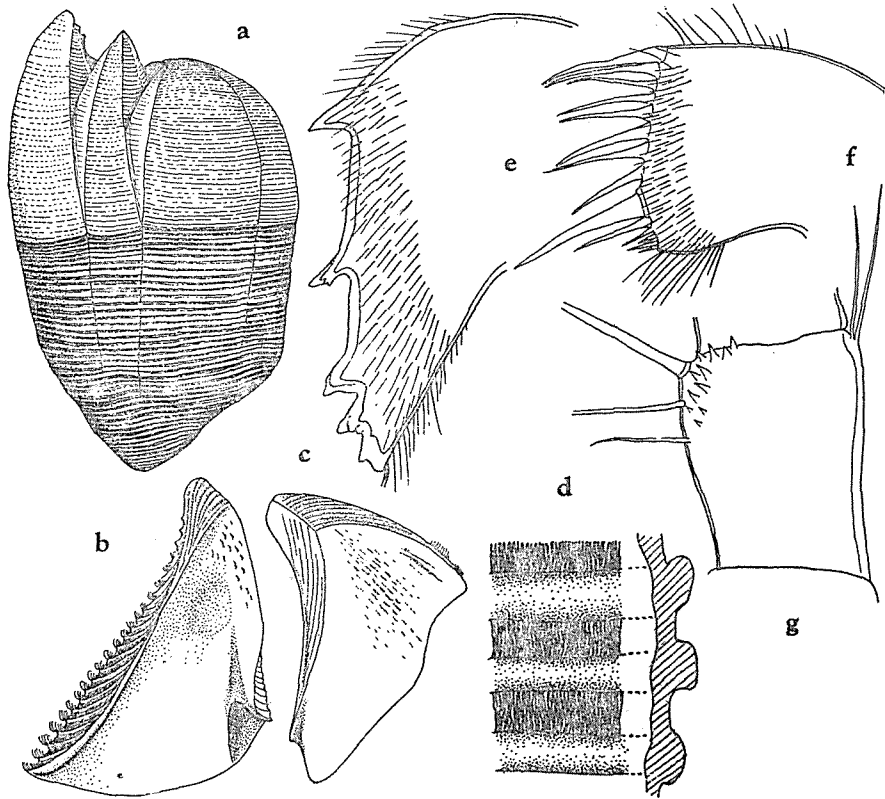


Fig. 1. *Acasta coriobasis* BROCH. *a* perfect specimen.  $\times 4$ ; *b* inner side of scutum.  $\times 8$ ; *c* inner side of tergum.  $\times 8$ ; *d* a portion of basal cup and its cross section.  $\times 55$ ; *e* mandible.  $\times 65$ ; *f* maxilla I.  $\times 65$ ; *g* median segment of anterior ramus of cirrus IV.  $\times 150$ .

case with the radii and alae. All the plates are completely calcified and rather loosely connected to one another. Carinal latus is about 1 to 2 mm wide and  $1/3$  to  $1/4$  as broad as lateral compartment. The former plate has well-developed radii and alae, while the latter has narrower alae which are almost concealed under the very narrow radii of strongly arched rostrum. In this respect my specimens differ greatly from BROCH's type, a difference which may be due to condition of embedding in the host. The sheath occupies the area a little more than half as long as the wall and its basal edge is free from the wall by a deep excavation. There is no longitudinal rib on the inside of the wall. The orifice is roughly triangular in outline because of almost concrescence of the apices of rostrum and lateral compartments on the same level.

The basal cup, which is deeper than the height of compartments in my specimens, is yellowish white, feebly calcified and rather leathery in texture, as mentioned by BROCH. It shows a peculiar basket-like structure with alternating fully calcified ridges and delicate weave-like depressions parallel with the edge of the cup (Fig. 1d). In addition six radiating stripes run downwards from the points, where the six different compartments adjoin each other.

Scutum very thick, concave outside, having close growth ridges traversed by more than six conspicuous radiating grooves. Outside it is covered by the cuticle fringed with yellow hairs along the growth ridges. Inside there is a distinct adductor ridge separated from the articular ridge by a longitudinal shallow groove. The pit for adductor muscle is distinct, though not deep; the pit for lateral depressor muscle is very deep and distinctly circumscribed.

Tergum thinner and wider than scutum, peaked, flat and marked with plain, indistinct growth ridges. The spur is short and truncated, about two-thirds as broad as the plate. The inside is feebly sculptured but roughened with many small tubercles. Crests for depressor muscles are indistinct.

Mouth-parts: Labrum with a minute tooth on each side of a median deep notch, although BROCH does not recognize its presence.

Mandible with five teeth, the second to fourth are bifid, and the fifth rudimentary.

Maxilla I with almost straight frontal edge without any notch. A row of six spines of almost the same length is arranged below the upper two larger spines, and on the lower part again a conspicuously large and a small spines. The lower angle is armed with about five spinules but not acute.

Cirri of a dissected specimen show the following numbers of segments:

I	II	III	IV	V	VI
19 9	10 8	16 14	31 29	30 31	36 34

The armature of cirrus IV is peculiar as illustrated by BROCH. Each of the median segments of the anterior ramus bears only a few small, erect spines scattered on the frontal face. On this point BROCH emphasized that this species holds the intermediate position between his *Eu-Acasta* group and *Inarmata* group of the genus. If we follow BROCH (1931) regarding the armature of the fourth cirri, the following species of *Acasta* may be regarded as a special section of his *Eu-Acasta* (or *Armata*) group. They are: *A. laevigata* GRAY, *A. semota* HIRO and the present *A. coriobasis* BROCH. As I (HIRO, 1937b, pp. 448-449) have already pointed out, however, such peculiar armature is often found also in some species of *Conopea*, a subgenus of *Balanus*, such as *B. cornutus*, *B. proripiens* (НОЕК, 1913) and *B. granulatus* (HIRO, 1937b). Accordingly, these *Acasta*-species seem to represent the unique example indicating a close affinity with the group of *Conopea*, although they are in all essentials the member of the genus *Acasta*.

*Acasta alcyonicola* n. sp.

(Fig. 2)

*Locality.* Kusimoto, Prov. Kii. Four specimens embedded in the barren stalk of *Capnella* sp. January 29, 1952, T. YAMAMOTO leg.

Ezura, Tanabe Bay, Prov. Kii. One specimen embedded in the barren stalk of *Nephthea* sp. April 30, 1951, T. YAMAMOTO leg.

So far as I am aware, only two species of *Acasta* are known living in alcyonaceans: One is *Acasta echinata* recorded from Tomioka, Kyusyu (HIRO, 1937a) and also from Condor Is., Indochina (BROCH, 1947), and the other is *A. sculpturata* recorded from Jave Sea (BROCH, 1931). The latter

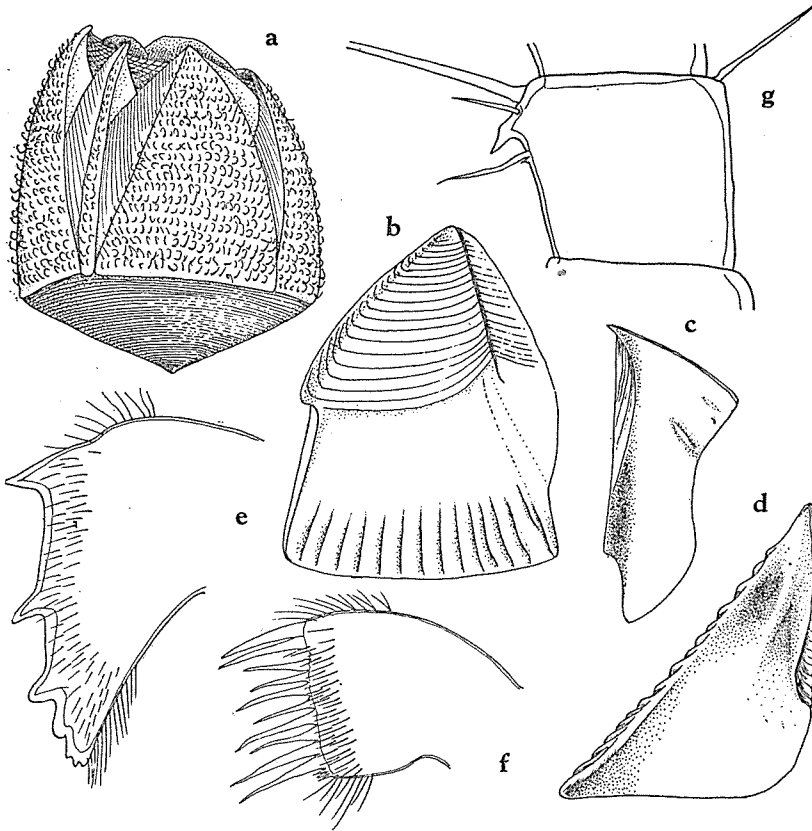


Fig. 2. *Acasta alcyonicola* n. sp. a type specimen.  $\times 8$ ; b inner side of the lateral plate.  $\times 10$ ; c inner side of tergum.  $\times 10$ ; d inner side of scutum.  $\times 10$ ; e mandible.  $\times 65$ ; f maxilla I.  $\times 65$ ; g lower segment of anterior ramus of cirrus IV.  $\times 210$ .

is, however, according to BROCH, found also in sponges as usual. As another example of the association I here add to the above list a new species of *Acasta*.

The present curious specimens are likewise found embedded in the tissue of the sterile stalk of Nephtheid alcyonarians, which are referred to both the genera *Capnella* and *Nephthea*. Their oblong splits on the surface of the alcyonarian colony are very small, so buried that they can only be detected with careful examination under the binocular microscope. It is impossible to dissect out intact specimens owing to the very intimate adherence to the tough alcyonarian tissues and the brittleness of shell plates.

The entire shell, when complete, is white, round like a globe, and the largest one measures about 9 mm in height and 6 mm in carinorostral diameter. The compartments are thin and solid, their surface provided with numerous short, flexible but mostly upturned, hairs which are very small and invisible to a naked eye; by these hairs the shell is in close contact with the extremely hard tissues of alcyonarians. On removal these hairs leave behind them only small round marks on the compartments but no pores.

The inside of the compartments below the sheath is smooth except for the lower half where distinct but short ribs are present; the basal edge of the sheath is not free from the inner face of the wall. Carinal latus is the narrowest of all compartments; in one specimen they measure in basal width: Carina 3 mm, carinal latus 1/2 mm, lateral 5 mm and rostrum 5 mm. The radii and alae are broad; the outer face of the radii is finely striated transversely and obliquely, while that of the alae not striated. The basal cup is rather shallow and saucer-shaped. It shows no trace of canaliculation nor special structure.

Scutum about as long as wide, rather flat externally and has an almost straight basal margin. The outside has prominent growth ridges crossed by slight radiating ridges. Inside there is a distinct pit for the adductor muscle at the upper position, where it corresponds to the middle of the articular ridge. The adductor ridge is also prominent but short, and separated by a triangular depression from the articular ridge, which is about half the height of the plate. The basitergal corner is rounded, without any indication of a pit for the depressor muscle.

Tergum nearly flat, somewhat beaked and slender with an almost straight scutal margin. The outer side exhibits the widely separated plain growth ridges and a shallow depression representing the spur furrow. The spur has a truncated end which is about half the width of the plate. The inside is almost smooth, but one or two faint indications of crests for the depressor muscles can hardly be traced.

Mouth-parts: Labrum with 2 or 3 tiny teeth on either side of a deep median notch.

Mandible with four main teeth and a bifid or trifid lower angle.

Maxilla I has a straight frontal edge with a faint indication of a notch between two large upper spines and a median row of six smaller spines, and on the lower part again two large spines followed by a few stiff spinules at its corner.

The number of segments of the cirri in a dissected specimen is as follows :

I	II	III	IV	V	VI
20 7	12 8	14 13	18 20	25 25	27 27

In cirrus I, the anterior ramus is a little longer than twice the posterior. Both of cirri II and III have the anterior ramus a little longer than the posterior. In cirrus IV, each segment of the anterior ramus bears two pairs of bristles, a hook and a rudimentary tiny spine on the basal segments only; such hooks or spines are lacking in the distal and median segments of the ramus.

Penis is long and finely annulated; no basi-dorsal process is present.

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### Addendum

Recently I have found a large barnacle laid bare on a hard silicious sponge from off the cape Sio-no-misaki, collected by Mr. F. OGAWA. The specimen is of a rosy hue, about 9 mm in carinorostral diameter and 13 mm in height. The parietes are profusely spinose, with numerous sharp calcareous spines directed downward and the basal cup is shallow, saucer-shaped, 3 mm high. The opercular valves as well as the external features conform well with earlier descriptions of *Acasta cyathus* DARWIN which has hitherto been not recorded from Japan. Thus we can now note fourteen species of *Acasta* from the coastal waters of Japan proper.