

NOTES ON THE TAXONOMY AND ECOLOGY OF  
*ALIAPORCELLANA TELESTOPHILA* (JOHNSON, 1958)  
(DECAPODA, ANOMURA, PORCELLANIDAE),  
A CRAB COMMENSAL ON THE GORGONIAN *SOLENOCAULON*

BY

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ABSTRACT

The taxonomy and ecology of the porcellanid crab, *Aliaporcellana telestophila*, is elaborated upon. Variations in the structure of the carapace and chelipeds are documented and figured. The species, previously thought to be a commensal of *Telesto* (Clavulariidae), is shown to be actually associated with another octocoral, *Solenocaulon* (Anthothelidae).

RÉSUMÉ

La taxonomie et l'écologie du Porcellanide *Aliaporcellana telestophila* sont traitées en détail. Les variations dans la structure de la carapace et des chélicèdes sont examinées et figurées. L'espèce, que l'on pensait précédemment commensale de *Telesto* (Clavulariidae), apparaît en fait associée à un autre Octocoralliaire, *Solenocaulon* (Anthothelidae).

INTRODUCTION

Johnson (1958) described a new species of *Polyonyx*, *P. telestophilus*, associated with the alcyonarian (= octocoral) *Telesto* from Singapore. Nakasone & Miyake (1969) subsequently referred *P. telestophilus* to a new genus, *Aliaporcellana*. In recent years, we have obtained and/or observed a good number of specimens of *Aliaporcellana telestophila* from dredges and scuba diving, and opportunity is taken here to elaborate on the taxonomy of this commensal species, providing a redescription and detailed figures. The species demonstrates considerable variation in the form of the carapace, as well as in the chelipedal carpus and merus. The host species noted by Johnson (1958, 1963, 1970) is incorrect as *A. telestophila* has always been found associated with the octocoral *Soleno-*

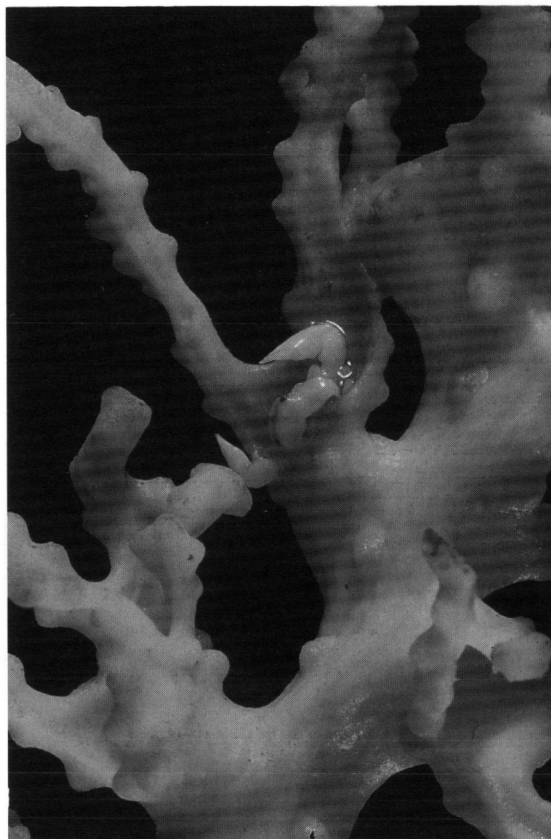


Fig. 1. A specimen of *Aliaporcellana telestophila* (Johnson, 1958) on its host colony of *Solenocaulon* sp. B.

*caulon* (order Gorgonacea, family Anthothelidae) (fig. 1). Notes on the ecology and habits of *A. telestophila* are also provided.

Measurements are of the carapace width and length respectively. All specimens examined are deposited in the Zoological Reference Collection (ZRC), Department of Zoology, National University of Singapore.

#### ***Aliaporcellana telestophila* (Johnson, 1958) (figs. 1-4)**

*Polyonyx telestophilus* Johnson, 1958: 103, fig. 2; Johnson, 1963: 285, 288; Johnson, 1970: 34; Haig, 1964: 376, fig. 4; Haig, 1965: 112.

*Aliaporcellana telestophila* Nakasone & Miyake, 1969: 19; Haig, 1978: 709; Yang & Xu, 1994: 119, fig. 6.

Material examined. — 2 males, 2 females (1 ex. ovigerous) (ZRC 1994.4363-4366), Johore Shoals, southeastern Singapore, by dredge, coll. D. Chia et al., 12.ix.1994. — 1 male (with

bopyrid), 1 female (ZRC 1989.2945-2946), Southern Islands, about 10 minutes from Jurong Port, Singapore, host *Solenocaulon* sp., by dredge, coll. P. Ng, 13.i.1984. — 1 female (ex. ovigerous), 1 damaged specimen (ZRC 1994.4291, 1994.4292), Terumbu Pempang Tengah, Singapore, host *Solenocaulon* sp. A, by SCUBA, coll. N. Goh, 24.ix.1991. — 1 male (ZRC 1994.4293), Terumbu Pempang Tengah, Singapore, host *Solenocaulon* sp. A, by SCUBA, coll. N. Goh, x.1991. — 1 male, 1 female (ex. ovigerous), (ZRC 1994.4294-5), Terumbu Pempang Tengah, Singapore, host *Solenocaulon* sp. B, by SCUBA, coll. N. Goh, 13.i.1992. (shrimp *Synalpheus*, found in same colony). — 1 male, 2 females (both ex. ovigerous) (ZRC 1994.4296-4298), Terumbu Pempang Tengah, Singapore, host *Solenocaulon* sp. A, by SCUBA, coll. N. Goh, 8.iv.1992. — 2 juveniles (ZRC 1994.4299-4300), Terumbu Pempang Tengah, Singapore, host *Solenocaulon* sp. B, by SCUBA, coll. N. Goh, 29.iv.1992. — 1 male, 1 juvenile (ZRC 1994.4301-4302), Terumbu Pempang Tengah, Singapore, host *Solenocaulon* sp. B, by SCUBA, coll. N. Goh, 23.ii.1994.

**Description.** — Carapace round to oval (figs. 2A, 3A, C, E), dorsal surfaces very smooth, glabrous, without trace of setae; median grooves shallow, poorly defined. Frontal margin trilobed, strongly deflexed downwards, margin appears gently sinuous and not lobed from dorsal view if carapace angled slightly forwards; tip of median lobe may extend slightly forwards of those of lateral lobes. Anterolateral margin divided into 2 parts by short, shallow fissure; anterior part lined with up to 4 small teeth; posterior part arcuate, lined with up to 7 sharp teeth; posterolateral margin gently convex to almost straight (fig. 2A, B). Basal antennular segment with 3 low, granulated teeth on inner margin (fig. 2E). Third maxilliped narrow, inner margins with long stiff setae; merus longer than ischium; inner margin of ischium strongly auriculiform; merus narrow, proximal inner margin dilated; exopod relatively broad, reaching to about half length of merus, with well developed flagellum (fig. 2F). Anterior margin of sternum sinuous, appears vaguely trilobed (fig. 2G).

Surfaces and margins of palm, merus, carpus and fingers of chelipeds smooth. Outer and lower surfaces of merus and carpus convex; inner surfaces concave. Posterior margin of merus smooth to imbricate; anterior margin cristate, distal part expanded to form flap-like lamellar structure, margin smooth to serrated. Posterior margin of carpus not cristate, unarmed; anterior margin cristate, proximal two-thirds smooth, lobiform or armed with up to 3 sharp teeth (fig. 3B, D, F). Chelae asymmetrical, asymmetry more pronounced in males; larger chela differing from smaller only by size, otherwise similar in structure (figs. 2C, D, J, K, 4A, B, C, D); outer surfaces of palm smooth, except for short, shallow longitudinal sulcus at base of pollex, with margin just below sulcus very weakly granulated, almost indiscernible but more prominent in smaller chela. Fingers shorter than palm; cutting edge of dactylus with one large subproximal tooth and numerous denticles on proximal half; cutting edge of pollex with one large submedian tooth and several denticles on proximal half.

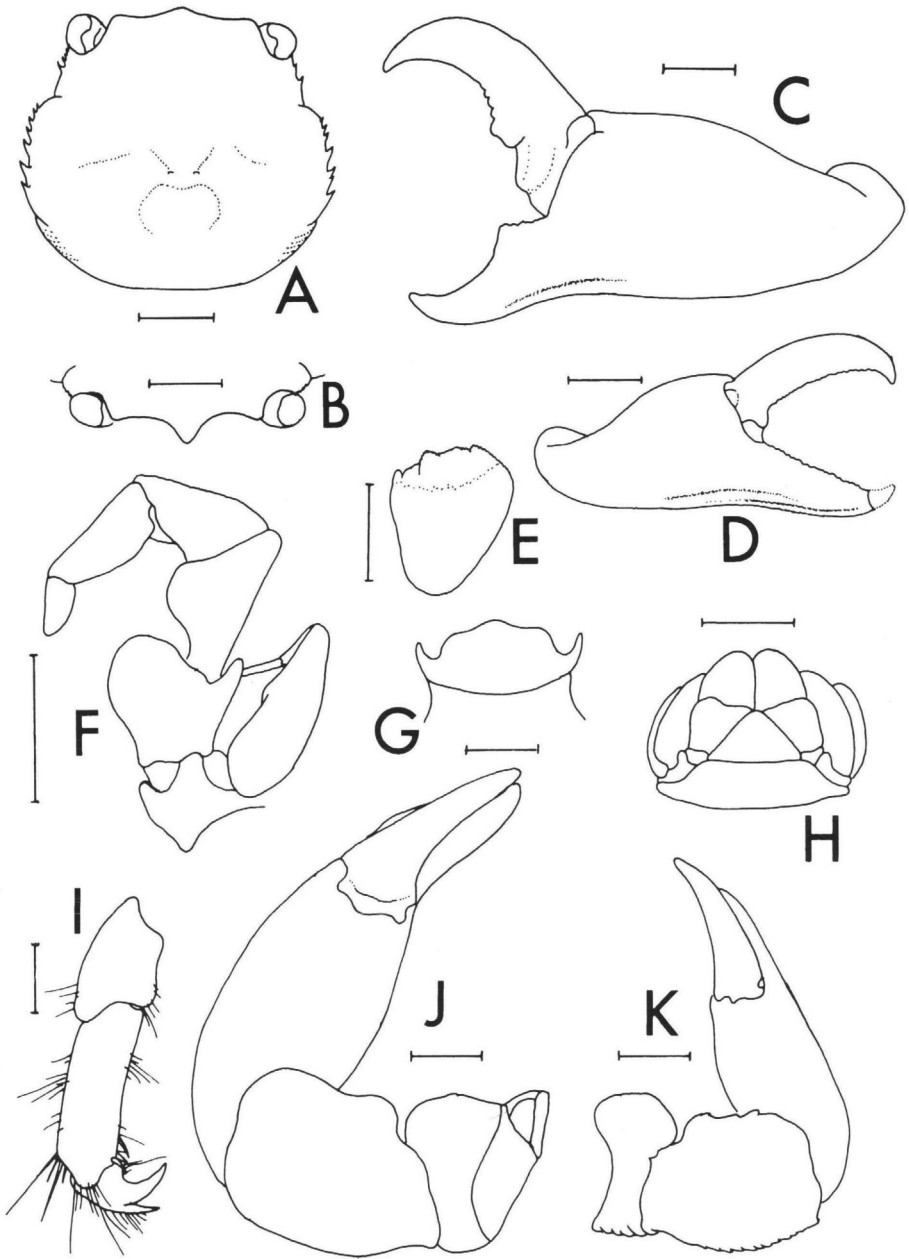


Fig. 2. *Aliaporcellana telestophila* (Johnson, 1958), male, 4.4 by 4.1 mm (ZRC). A, dorsal view of carapace; B, frontal view showing trilobate front; C, left chela; D, right chela; E, left basal antennular segment; F, left third maxilliped; G, anterior sternal segment; H, telson and segment 6; I, dactylus, propodus and carpus of left third ambulatory leg; J, left cheliped (anterior view); K, right cheliped (anterior view). Scales: A-D, F, H, J, K = 1.0 mm; E, G, I = 0.5 mm.

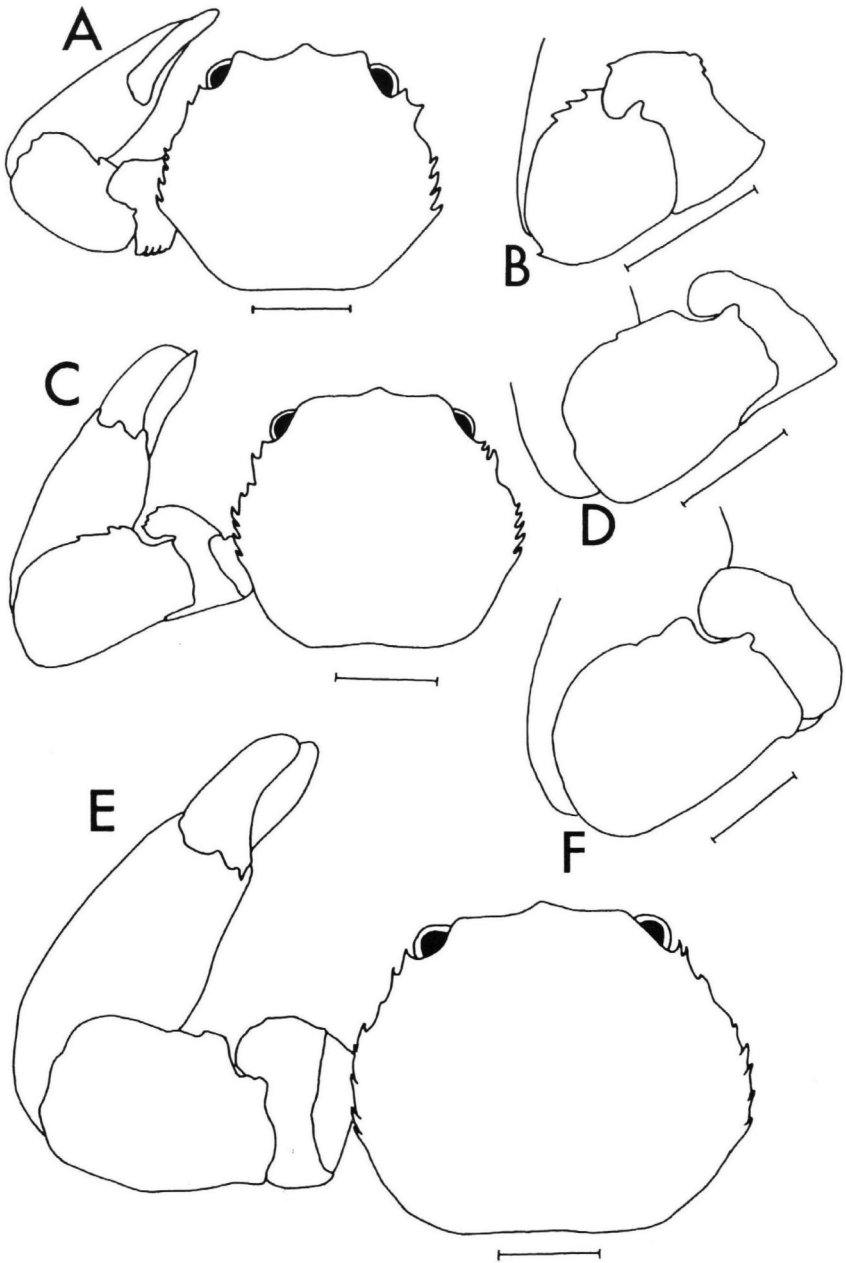


Fig. 3. *Aliaporcellana telestophila* (Johnson, 1958), schematic drawing of 3 specimens showing variation in carapace and chelipedal merus and carpus. A, B, female, 2.4 by 2.0 mm (ZRC 1994.4296); C, D, male, 2.6 by 2.5 mm (ZRC 1994.4297); E, F, female, 3.6 by 3.1 mm (ZRC 1994.4298). A, C, E, dorsal view of carapace; B, D, F, merus and carpus of left cheliped. Scales: A-F = 1.0 mm.

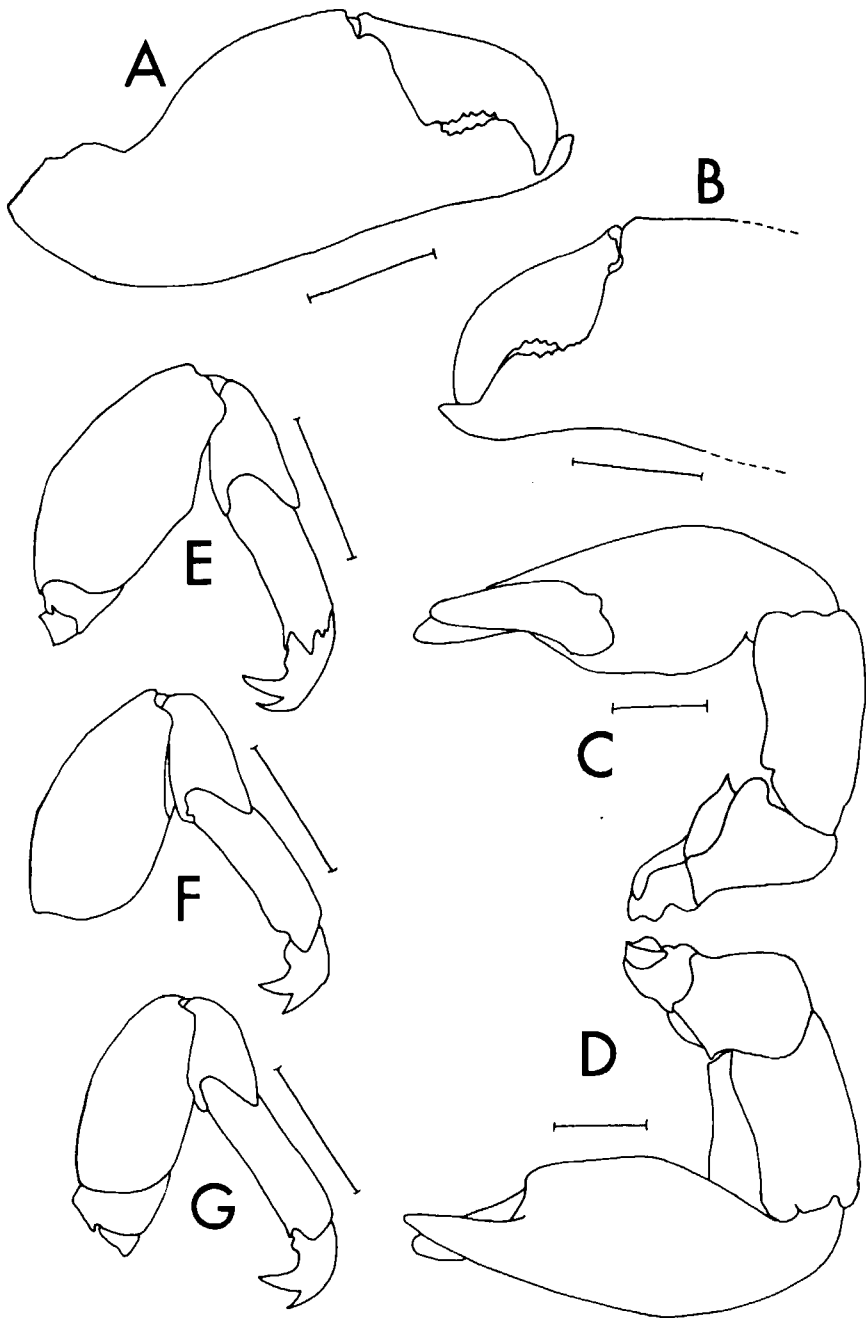


Fig. 4. *Aliaporcellana telestophila* (Johnson, 1958). A, right chela (outer view); B, right chela (inner view); C, right chela (dorsal view); D, right chela (ventral view); E, first right ambulatory leg; F, second right ambulatory leg; G, third right ambulatory leg. Scales: A-G = 1.0 mm.

Ambulatory legs relatively short, stout, first leg longest (fig. 4E, F, G). Margins of merus and carpus without any spines or teeth. Propodus without teeth, with 3 subterminal movable spinules, 2 of which bracket dactylus. Dactylus short, biunguiculate; bent sharply inwards; subdistal spine smaller than main spine; proximal posterior margin with low but distinct rounded knob (fig. 2H, I).

Abdomen 7-segmented (including telson), broad, covering most of thoracic sternum; telson with 7 elements (fig. 2H). Male with a pair of distinct pleopods on abdominal segment 3.

Colour. — The colour of *A. telestophila* varies with the host species. When the host is *Solenocaulon* sp. A (orangish-red), the crabs are a uniform reddish-pink to pinkish-white, whilst on *Solenocaulon* sp. B (white), the animals are almost ivory-white. In one small colony of *Solenocaulon* sp. B (white) however, we have observed two specimens, one of which is white, the other pale pink.

Taxonomic remarks. — Opportunity is taken here to provide a more detailed description of the species as well as to figure most of the structures. The carapace of smaller specimens tends to be more squarish, with the carapaces becoming somewhat more laterally oval when they are large. The spines lining the anterolateral margin are also stronger and sharper in small specimens (fig. 3A, C, E). The anterior margin of the merus of the cheliped occasionally has a small sharp subdistal tooth, but this is usually absent in larger specimens. The distal part of the anterior chelipedal meral margin is usually entire and rounded, but in some specimens, the margin is serrated. The number of lobes/spines on the anterior margin of the carpus varies a great deal, from possessing a low lobe to having up to three spines (fig. 3B, D, F). The dactyli of the ambulatory legs are quite uniform in structure, with the subdistal tooth always being larger than the terminal one, and the sub-basal part of the ventral margin having a low, broad, rounded knob (fig. 4E, F, G).

The specimen figured by Yang & Xu (1994) from Nansha Islands (= Spratly Islands) (a female) is interesting as it shows more dimorphic chelae, with the minor cheliped appearing more rugose. Also, the posterior margin of the major chela (just below the sulcus at the base of the pollex) is distinctly granulated. In the Singapore specimens, the ventral margin below the pollex is only feebly granulated and not clearly visible. These differences might well be associated with size — the Nansha female being very large, measuring 5.8 by 4.6 mm. In all other aspects, however, (especially in the distinctively shaped dactylus), there is no reason not to regard the Nansha specimens as conspecific with *A. telestophila*.

Distribution. — In addition to Singapore, *A. telestophila* has been reported from the Gulf of Thailand, Ambon and from the Nansha Islands (South China Sea) (Haig, 1964; Yang & Xu, 1994).

Ecological notes. — *Aliaporcellana telestophila* is known only from the gorgonian octocoral *Solenocaulon*. It lives inside the system of hollow chambers found within the exposed part of the stem and branches of the colony, communicating with the outside by means of openings. There are usually several larger openings on each colony, with each opening just slightly larger than the crab. We believe that the crab actually influences the growth of the *Solenocaulon* in order to ensure that it is not trapped inside the colony. The crab is a filter feeder, and it will position itself at the openings where water from the outside, i.e., containing food particles, enters the colony. It is also possible that the action of the third maxillipeds will help to actively drive a current through the colony via the openings and bring in plankton. In the present study, based on collections throughout the year, most of the adult females obtained were ovigerous. The habits of *A. telestophila* agree quite well with what is known for many other commensal porcellanids (see Johnson, 1963; Ng & Nakasone, 1993, 1994).

Each *Solenocaulon* colony (ca. 10-15 cm height) normally has at least one heterogeneous pair of crabs, although several colonies had up to two pairs. The smallest colony in which *A. telestophila* has so far been found is about 5 cm in height. When brought back to aquaria from the field, some specimens of *A. telestophila* have been observed to occasionally leave their host. Whether such behaviour is normal in the wild is not known. We certainly have never collected or observed *A. telestophila* other than from *Solenocaulon*.

Two other porcellanid species have been found to be commensal with *Solenocaulon*, but are probably accidental symbionts. In one colony of *Solenocaulon* sp. A collected from Terumbu Pempang Laut (Singapore, coll. N. Goh, 3.v.1993), 7 specimens (1 male, 3 ovigerous females, 3 juveniles, ZRC 1994.4420-4426) of *Lissoporcellana spinuligera* (Dana) (= *Porcellana latifrons* Stimpson) were obtained. In another colony of *Solenocaulon* sp. A collected from Terumbu Pempang Tengah (Singapore, coll. N. Goh, x.1991), one non-ovigerous female specimen of *Lissoporcellana quadrilobata* Miers (ZRC 1994.4419) were obtained. Interestingly, no specimens of *A. telestophila* were found on either of these colonies. Two other macrosymbionts, ophiuroid brittlestars (mostly *Ophiothela danae*, Echinodermata) and the snapping shrimp (*Synalpheus* sp., Alpheidae) have, however, been observed to share the same host colony with *A. telestophila*.



Notes on the host species. — The two *Solenocaulon* species host to the crab, tentatively named *Solenocaulon* spp. A and B (Goh & Chou, 1994) cannot be precisely identified at present, but they are easily differentiated in the field by their colours, the former being orangish-red and the latter, white, but sometimes with a tinge of orange. Both are normally found in areas with good flushing, and in a sandy/rocky substrate, never in a silty substrate. *Solenocaulon* sp. A can grow to more than 30 cm in height while *Solenocaulon* sp. B tends to be smaller, rarely attaining a height of more than 20 cm. The stem and main branches of both species of *Solenocaulon* are closed and tubular, with several openings to the outside, or expanded and gutter-like. Distal branches are more flattened or spatulate. The base of each colony is a solid cylinder, it extends a few centimetres into the substrate and acts as a support.

Johnson's (1958, 1963, 1970) record of *A. telestophila* from *Telesto* (order Alcyonacea, family Clavulariidae) must have been based on a misidentification of the host. While *Telesto* does occur in Singapore, we have never found any commensal porcellanids on it. Unlike *Solenocaulon*, *Telesto* does not have hollow stems and branches and is structurally unsuited for specialised porcellanid commensals of the genera *Polyonyx*, *Aliaporcellana* and *Euleniaios* (see Johnson, 1958; Ng & Nakasone, 1993; Ng & Sasekumar, 1993). It is thus rather unfortunate that the porcellanid species commensal on *Solenocaulon* has been named "telestophilus".

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