A New Species of Autolytus (Polychaeta: Syllidae)
Commensal on a California Hydrocoral

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Abstract.—A new species of polychaete of the genus *Autolytus* is described from the hydrocoral *Allopora californica*. The atokous stage lives on the surface of the hydrocoral within a blister of host origin. This type of host association was not previously known in the genus *Autolytus*.

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A new species of *Autolytus*, a syllid polychaete of the subfamily Autolytinae, was found in the hydrocoral *Allopora californica* Verrill. Only two other species of *Autolytus*, *A. ?cornutus* Agassiz and *A. varius* Treadwell, have been reported from California (Hartman, 1968). Hartman (1955) also reported an *Autolytus* sp.


Materials and Methods

Specimens utilized in this study occurred in separate collections of hydrocoral from Farnsworth Bank off Santa Catalina Island and Gull Island off Santa Cruz Island, California. The Farnsworth Bank specimens were taken at a depth of over 18.4 m while the Gull Island material was from about 6.1 m.

All of the material examined for the descriptive portion of the present study was collected by the senior author at Gull Island and fixed in formaldehyde at the collecting site. Following fixation the material was transferred to 70% ethanol for examination and storage. Portions of hydrocoral with polychaete blisters were decalcified in dilute HNO$_3$, washed, post-fixed in osmium tetroxide, and then dehydrated by an ethanol series followed by propylene oxide. The material was then embedded in Spurr’s epoxy-resin (Spurr, 1969). Sections (0.75 μm) were cut with glass knives on an LKB Ultratome III, transferred in a drop of water to a microscope slide, dried down on a hotplate, and hot-stained with Paragon epoxy tissue stain (Spurlock et al. 1966). A few thin sections were also cut from the same specimens, section-stained with uranyl acetate followed by lead citrate and examined with a Philips EM 300. Scanning electron microscopy was performed on specimens which had been dehydrated in ethanol, critical-point dried, shadowed with carbon followed by gold or gold-paladium, and examined with a Cambridge Stereoscan SEM.

Illustrations of setae are composites based on both phase-contrast and scanning electron microscopy. The trepan illustration is a composite from a through-focus series of light micrographs of an excised pharynx.
**Fig. 1.** Photomicrograph of the vermiform mound or blister of *Autolytus penetrans* on *Allopora californica*. Arrow indicates entrance to blister.

*Autolytus (Regulatus) penetrans*, n. sp.

*Type material.*—Holotype (Poly 1176), complete atokous specimen along with coral sample from which it came; Paratype (Poly 1241), male epitoke described below. Both deposited in the collections of the Allan Hancock Foundation, University of Southern California, Los Angeles.

*Diagnosis.*—*Autolytus penetrans* can be separated from other species by the following combination of characteristics: (1) trepan with nine regular teeth, (2) S-shaped pharynx, (3) generally smaller size (less than 3.0 mm), and (4) association with *Allopora californica*.

*Description of atokous stage.*—Atokous stage forming a blister on surface of hydrocoral; blister vermiform in exterior appearance with average length 3.0–4.0 mm, width 0.8 mm (Fig. 1); blister provided with pore or opening through which (it is assumed) worm feeds and releases stolonic buds (Fig. 1, arrow). Prostomium broader than long, possessing two pairs of red lenticular eyes, trapezoidally arranged, with anterior pair slightly larger and farther apart: size and length of antennae, tentacles, and cirri variable due to preservation (but some generalizations are appropriate): median antenna, located just forward of and between anterior pair of eyes, longer than lateral antennae; lateral antennae arising from anterior margin of prostomium; antennae irregularly annulate (Fig. 2).

Two pairs of anteriorly directed, tentacular cirri arising from anterolateral margin of peristomium: dorsal tentacular cirrus slightly shorter than lateral antennae, not annulate; ventral tentacular cirrus as long as or longer than median antenna, irregularly annulate (Fig. 2); ventral segmental cirri absent; dorsal segmental cirri
Fig. 2. Scanning electron micrograph of anterior view of Autolytus penetrans.

short, generally not articulated, and showing tendency for reduction in size in posterior region of body; nuchal epaulettes not observed in preserved material (even after otherwise obscuring antennae or cirri had been removed); S-shaped pharynx leading to proventriculus of about four segments long, normally located within setigers 4-8 (in one specimen the proventriculus had about 26 rows of muscle bands, and a cross section of another had 25 radially arranged muscle bundles); pharynx terminating distally in a ring of five rather blunt papillae (in several preserved specimens the trepan was located at the posterior edge of the first setiger, but in others at the posterior margin of the peristomium or within the second setiger); dorsal epidermal gland of Gidholm's (1967a) sphaerulate A-type observed in peristomium.

Each setigerous segment with pair of dorsoventrally aligned setal fasicles consisting of 4-9 setae per side; single dorsalmost bayonet-type setae (of the thick type following terminology of Gidholm, 1967a) often present in each bundle (Fig. 3B); remainder of setae compound bidentate (Fig. 3D).
A complete non-stolonic atokous specimen measured 2.5 mm long by about 0.5 mm wide and consisted of 38 setigerous followed by 5 non-setigerous segments. The color of the specimens preserved in formaldehyde and stored in 70% alcohol is white, but the eyes retain a reddish pigmentation.

Description of epitokous stage.—Several apparently immature epitokes of *Aulolytus penetrans* were found within coral blisters. One of these possessed swimming setae. Except for enlargement of the anterior pair of eyes, the presence of swimming setae, no obvious proventriculus, and sperm duct glands in segments two through five, they differed little in general appearance from the atokous form. A more mature male or "Polybostrichus" stolon obtained from a blister which also contained an atokous individual is described as follows: specimen about 2.0 mm in length, consisting of prostomium, peristomium, and 36 setigerous segments, plus terminal non-setigerous segment; prostomium with 2 bifid antennae arising from anterior ventrolateral angles and 2 enlarged anterior eyes; other dorsal prostomial appendages broken off or absent; tentacular cirri of peristomium of undetermined length; setiger 1 with fasicle of compound setae including bayonet seta similar to atokous variety; setigers 2–5 with same setal arrangement but also containing sperm duct glands; setigers 7–25 with larger but normally-shaped atokous seta on neuropodia and long swimming setae on enlarged notopodia; setigers 26–35 distinctly smaller, bearing only normal atokous fasicles; worm terminating in a nonsetigerous segment with two blunt ovoid appendages.

Discussion

*Aulolytus* sp. (Hartman, 1955) was dredged from fine mud material at a depth of 732 m and from mud and sand at 31 m in the San Pedro Basin, California. *Aulolytus cornutus* and *A. varius* were collected intertidally as epitokes. Pettibone
Fig. 4. Transmission electronmicrograph of the inner lining of the coral blister demonstrating its cellular make-up. A = Autolytus penetrans, H = hydrocoral.

(1963) reported that Autolytus cornutus constructs cylindrical tubes attached to algae and branches of hydroids, but she mentioned no species of Autolytus associated with hydrocorals. Hartman (1954) reported Autolytus sp. from the lagoon side of Rigili Island, Eniwetok Atoll from blocks on the reef flat close to the beach rock belt. The type of association with living coral, if any, was not mentioned.

The present species forms a blister on the hydrocoral. Although this habitat is unusual for Autolytus forms, blister forming polychaetes are not unique. Some polychaeterids and other polychaetes actually drill the shell. Blake and Evans (1973) reported on the burrowing activities on polychaeterid worms (Spionidae) and have described what they call polychaeterid "mud-blisters" on the surface of mollusks to which the mollusk reacts by secreting over the mud a roof of concholin and later a layer of nacreous material. The worms live within the mud-filled blister which communicates with the surface. The burrow eventually becomes U-shaped or modified U-shaped. Blake and Evans (1973) also stated that the method of burrow formation is independent of setal structure or position in Polydora. They suggested that chemical methods are most likely involved. While they mentioned the boring or blistering activities of Polydora and related forms into corals and hydrocorals, they also stated that there has been no research on the biology of coral infesting polychaeterids.

Ostarello (1973), in her study of the natural history of the hydrocoral Allopora californica, listed three obligate commensals including the following: Balanus
A NEW COMMENSAL POLYCHAETE FROM CALIFORNIA

Imajima (1966) made extensive use of trepan teeth in *Autolytus* taxonomy. Following the pattern suggested by Imajima (1966) *Autolytus penetrans* has been assigned to the subgenus *Regulatus* on the basis of a trepan of nine regular teeth (Fig. 3A). *Autolytus (*R.*) *convolutus* is the only other species in which only nine regular teeth are known. *Autolytus penetrans* differs in pharyngeal configuration having an S-shaped pharynx in contrast to the irregularly coiled pharynx of *A. convolutus*.

Because of its repeated collection from the hydrocoral *Allopora californica* from more than one locale and in different years, it is suggested that *Autolytus penetrans* is a well established species in this one habitat in California waters.

One additional general note is suggested by the appearance of the main seta in Fig. 3C. This seta could serve as the progenitor of the bayonet seta by loss of the distal, bidentate compound portion and of the compound bidentate by erosion of the bayonet portion. It would be interesting to determine if this is the actual pattern in *Autolytus penetrans* and, if so, whether it is characteristic of other more inclusive taxonomic groups.

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Literature Cited


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