ONTOPHAGIC DIMORPHISMIN LITHOGLYPTES (CIRRIPEPADA, ACROTHORACICA) ¹)

BY

WILLIAM A. NEWMAN
Scripps Institution of Oceanography, La Jolla, Calif. 92037, U.S.A.

and

JACK T. TOMLINSON
Division of Biological Sciences, California State University, San Francisco, Calif. 94132, U.S.A.

INTRODUCTION

Burrowing barnacles or Acrothoracica are relatively small forms restricted to calcareous substrata. The vast majority are found in the coralline seas burrowing in limestone, corals and mollusk shells. While some species are widely distributed in a given oceanic province, only one (Lithoglyptes spinatus Tomlinson & Newman 1960) is presently reported from both the Indo-Pacific and Caribbean (Tomlinson, 1969).

Some years ago we described Lithoglyptes spinatus, a coral-burrowing barnacle from Jamaica (Tomlinson & Newman, 1960). The genus had been previously known by three species from the Indo-Pacific and L. spinatus was the first representative to turn up in the Caribbean Sea. The Caribbean species was most similar to L. ampulla known from a single specimen described by C. W. S. Aurivillius in 1892 from the Java Sea. There were what we consider diagnostic anatomical differences, and, in consideration of the biogeographical situation, we did not hesitate to propose L. spinatus as a new species.

Subsequently, however, material referable to the Caribbean form, L. spinatus, began to appear from widely scattered localities in the Indo-Pacific (the Red Sea, Australia, the Marshall Islands, the Line Islands, Japan and so forth), so that the question arose as to whether it was indeed distinct from L. ampulla from the Java Sea, as we thought we had originally demonstrated.

A sample of numerous specimens from Fanning Island in the Line Islands further complicated the problem. Individuals taken from a single block of coral limestone were predominantly of two types. One, representing about 70% of the sample, was the L. spinatus-L. ampulla type; the other represented what appeared to be a third species, (L. bicornis), previously described by Aurivillius (1892) from the Java Sea. Study of a large series of specimens from this sample...

¹) Contribution of the Scripps Institution of Oceanography, new series. Supported in part by grant number GB-30908X from the National Science Foundation.
revealed that *L. bicornis* was in fact a young stage of *L. spinatus-L. ampulla*; it was generally smaller and the characteristics used by Aurivillius to distinguish between them intergraded (figs. 1, 2). Thus we are compelled on morphological grounds to consider these three forms to be the same species and the anatomical details supporting this conclusion should be taken up before discussing the perplexing biogeographical situation. The formal synonymy appears as follows:

**Lithoglyptes bicornis** Aurivillius, 1892

*Lithoglyptes bicornis* Aurivillius, 1892: 134; 1894: 70.

The synonymy of *Lithoglyptes spinatus* with *L. ampulla.* — In 1960 we stated that, "*L. spinatus* can be separated from *L. ampulla* by its proportionately larger aperture, its more numerous small hooks and spinules on the surface of the mantle, and by the lesser number of articles composing the rami of the mouth cirri and the caudal appendages. *L. ampulla* is twice as large as *L. spinatus.*" It should be pointed out that Aurivillius utilized but one specimen in his study and his drawings appear to be freehand. Therefore the proportionately larger aperture is not a trustworthy characteristic. The remaining characteristics are even more suspect. The small hooks and spinules on the surface of the mantle are evidently involved in excavation of the burrow and their number and condition depends on how recently the individual molted. Furthermore they are not easily seen except by transmitted light and Aurivillius did not treat his specimens with KOH. Therefore the relative number of hooks and spinules is not a good character unless the specimens are at the same stage in the molt cycle and are studied by the same method.

The differences in the number of articles composing the appendages in *L. ampulla* and *L. spinatus* is not great (five and six vs. four and five for the mouth cirri; four vs. two or three for the caudal appendages). Estimating the number of articles making up a caudal appendage has certain difficulties. First, Aurivillius said that the caudal appendage of *L. ampulla* has four segments but then mentions that the suture between the second and third segment is indistinct. We stated that the caudal appendage of *L. spinatus* was of two segments but mentioned that the proximal segment bears a faint indentation suggesting a third articulation. Using the same criterion as Aurivillius, *L. spinatus* would have a three-segmented caudal appendage, and if one counted the basal protuberance (we have no assurance that Aurivillius didn’t do so), it would have four segments like *L. ampulla*. These considerations lead us to conclude that *L. spinatus* and *L. ampulla* are the same species.

The synonymy of *L. ampulla* with *L. bicornis.* — According to Aurivillius (1892), *Lithoglyptes ampulla* differs from *L. bicornis* in two conspicuous ways; the rostral apertural projections are two strongly curved and chitinized hooks rather than straight spines (fig. 1a, b), and the caudal appendages are one-half