

NOTES ON THE DIDEMNIDAE (ASCIDIACEA)

IV. THE INCREASE OF *TRIDIDEMNUM NIVEUM* (GIARD) IN THE PLYMOUTH AREA, AND THE STRUCTURE OF ITS LARVA

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(Text-fig. 1)

Since I first found *Trididemnum niveum* (Giard) at Salcombe in the autumn of 1951 (Carlisle, 1953) this species has spread and increased greatly in the Plymouth area. I have found it in abundance at Salcombe (Castle rocks and the Salstone), Wembury, and especially at Looe around the Island. The favourite habitat at all these places is the same as that at Roscoff, on the fronds of *Cystoseira*. It occurs rather less frequently on the holdfasts of *Laminaria ochroleuca* and occasionally on other species of *Laminaria*, but very little on any other substrate. It is not truly intertidal; the majority of specimens are to be found just below low-water mark of spring tides, and very rarely are any seen above low-water mark of even the lowest tides of the year.

In March 1952 a few specimens of *Trididemnum niveum* were found at each of the localities listed above. By June the numbers were greatly increased and by October still further. The following March (1953) the numbers were about the same as in the previous June, greater, that is, than the previous March by a factor of about three times. By midsummer *T. niveum* was the most abundant didemnid, and possibly the most abundant ascidian, at Looe in the neighbourhood of the island. At Salcombe it lagged behind *T. tenerum* and *Didemnum candidum* in abundance; at Wembury it was between *D. candidum* and *Trididemnum tenerum* in numbers, but was perhaps more conspicuous than either. In September 1953 it was still the most abundant didemnid at Looe, the second most abundant at Wembury and the third at Salcombe. In March 1954 it is by far the most abundant ascidian at Looe, forming at least 75% of the total ascidian fauna at low-water mark.

The association with *Laminaria ochroleuca*, which species was first observed in Britain in the Plymouth area in 1946 (Parke, 1948), and which is still spreading steadily, might suggest perhaps that *Trididemnum niveum* has arrived from Brittany with this oar-weed and is spreading along with it, perhaps at a distance of 2 or 3 years behind.

Salensky (1895) described the embryology and the larva of a species which he called *Didemnum niveum* in the title of his paper. On the second page

(p. 289) he states, 'Nach meiner früheren Bestimmung glaubte ich, dass diese dem *D. cereum* angehörten; es waren zwar in der That einige Exemplare von dieser Species dabei, aber die Hauptmasse der Colonien, die ich studiert habe, gehören einer anderen Species an und stehen dem *D. niveum* am nächsten'. Apparently he was not altogether sure of his identification. Whatever his species was it was evidently the most abundant didemnid at Villefranche. Harant & Vernières (1933) state that *Trididemnum niveum* has only once been recorded in the Mediterranean, thus implicitly doubting Salensky's identification. Berrill (1950) includes Salensky's species under the synonyms

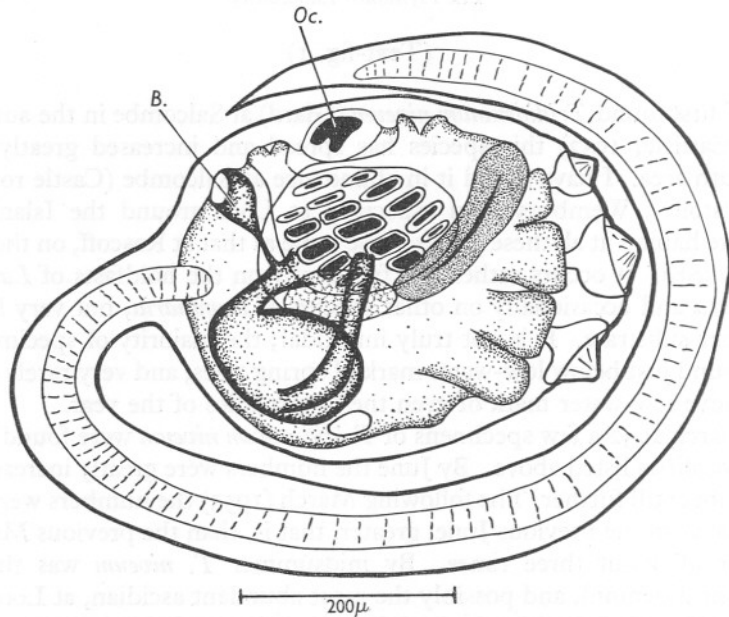


Fig. 1. Drawing from the left side of the larva of *Trididemnum niveum*. Note precocious budding and lack of otolith. B., bud; Oc., ocellus.

of *T. tenerum* (= *T.* or *Didemnum cereum*), but also gives it as a reference for *Trididemnum niveum* with a note (p. 141) suggesting that Salensky may be mistaken in his identification. The larva which Salensky describes is in fact unmistakably that of *T. tenerum* and differs in many points from that of *T. niveum*. Presumably he had two different colour varieties or forms of *T. tenerum*, one of which he recognized as such ('*Didemnum cereum*') while the other he failed to ascribe to its correct species.

Accordingly, the larva of *Trididemnum niveum* has not been described, an omission that can now be remedied.

The length of the body of the larva of *T. niveum* is slightly greater than that of *T. tenerum*, averaging about 480μ , while that of *T. tenerum* averages about

430 μ . Mediterranean specimens of *T. tenerum* tend to have a smaller larva than northern ones, in my experience, and Salensky's figures indicate a length of about 400 μ . The tail is comparatively longer in *T. niveum*, extending round even past the sensory vesicle as far as the atrial siphon, whereas in *T. tenerum* it rarely passes the branchial siphon, when coiled around the body just before hatching. At the time of hatching the stomach of *T. tenerum* is hardly swollen beyond the thickness of the rest of the gut; in *T. niveum* it is globular. On the other hand, the gut of *T. tenerum* already has its lumen developed by the time of hatching, whereas that of *T. niveum* is solid even up to metamorphosis. There are three suckers in both species. The ampullae number about four pairs, but departures from this number are to three pairs in *T. tenerum* and to five pairs in *T. niveum*. I have been unable to distinguish any signs of the existence of an otolith in the *T. niveum*, a feature which is shared, so far as I know, only with *Pycnoclavella* (Berrill, 1947) and has not been observed in any other didemnid. Quite a number of specimens of larvae of *T. niveum* show precocious budding from the oesophageal region. The precocity is not nearly so pronounced as in *Diplosoma*.

The free-swimming period is about 20 min.

SUMMARY

Trididemnum niveum has increased in numbers at Plymouth between spring, 1951, and March 1954, until in some localities, the species is the most abundant of ascidians. The larva is described and figured; it lacks an otolith and shows precocious budding, but otherwise is typical for the family.

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