

kindly informed us that the species has not been recorded off Plymouth.

The species was found again in November 1947 at a station where it had not been present in October; in December no specimens were found. At neither of the two positions were any other unusual animals found. In July 1948 the position of the original record was revisited; but neither at this nor at two further stations at 10-mile intervals in a direction 276° was *P. avirostris* found. The relevant hydrographic and other data are shown in the accompanying table.

Date	Position	Depth (m.)	Surface temp. (° C.)	Salinity	No. <i>Penilia</i> per cub. m.
Oct. 4, 1947	52°22'N. 04°20'E.	12-0	16.68	34.99-35.00	225
Nov. 19, 1947	52°09'N. 03°39'E.	22-0	—	34.72-34.78	7.5
July 27, 1948	52°22'N. 04°20'E.	12-0	18.3	—	0

*Penilia* is one of the three marine genera of Cladocera which is an order of Crustacea the great majority of which inhabit fresh water. It is much more closely related to the freshwater genus *Sida* than to the other marine genera *Podon* and *Evadne*. In the Bay of Naples and other coastal regions of the Mediterranean and Black Seas, swarms of parthenogenetic females appear in the summer and persist until the autumn, when males and sexual females arise and resting eggs are produced before the winter<sup>1</sup>. This habit of producing eggs which persist through the winter to give rise to rapidly reproducing parthenogenetic generations in the summer is a legacy from the freshwater ancestry and may account for the sporadic and rather dramatic appearance of the species in new localities. It was not known in the Bay of Naples until 1922<sup>4</sup>; but as Dr. Dohrn has kindly informed us, it has appeared there regularly and in great abundance every summer since that year.

It is too early to say definitely that the species has failed to establish itself in the North Sea; but that it should succeed in doing so is unlikely since the area is well outside the 18° C. mean annual surface isotherm which, as Calman noted<sup>5</sup>, usually limits the species; even the July isotherm for this temperature runs as far south as the Bay of Biscay.

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<sup>1</sup> Dana, J. D., *Proc. Amer. Acad. Arts Sci.*, **2**, 9 (1849).

<sup>2</sup> Caporiacco, L. di, *Bull. Inst. Oceanogr. Monaco*, No. 740, 1 (1938).

<sup>3</sup> Steuer, A., *Thalassia, Jena*, **1**, No. 4, 9 (1932).

<sup>4</sup> Caroli, E., *Boll. Soc. Nat. Napoli*, **35**, 96 (1924).

<sup>5</sup> Calman, W. T., *Brit. Antarct. ("Terra Nova") Exp. 1910*, Nat. Hist. Rep., Zool., **3**, 137 (1917).

### Morphological Characters of *Myriochele heeri* Malmgren

*Myriochele heeri* Malmgren is a widely distributed polychaete, particularly in northern seas, where it frequently occurs in large masses of tubes at considerable depths. I recorded its occurrence off the coast of British Columbia in 1930<sup>1</sup>, and it has been confirmed several times since. It was first described by Malmgren in 1867<sup>2</sup> from Greenland, Spitsbergen, and other northern localities, and his description and

figures have since served for its recognition. The figures have been generally copied in text-books.

It may be worth noting that the particulars of the extremities of the body as they are recorded give a correct picture only when they are in the contracted condition, which is usual in preserved material. In extension, the anterior region of the head forms a cylindrical, funnel-like projection deeply notched on the ventral side. A ventral lobe (*lippen-organ*), probably concerned in tube building, as has been shown to be the case with the homologous organ in the nearly allied species *Anmochares fusiformis* (Delle Chiaje) by Watson<sup>3</sup>, can be seen at the base of the notch. It is probable, also, that the tubular anterior region of the head corresponds to the elaborately lobed 'branchial' region in the latter species, particularly since a similar collared condition is said to occur anteriorly in its very young forms. The pygidium of *Myriochele heeri* in extension terminates in a low, wide, dorsal lobe and two longer ventral lobes partially joined.

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<sup>1</sup> Berkeley, E., *Contrib. Can. Biol.*, **6**, 67 (1930).

<sup>2</sup> Malmgren, A. J., *Ofv. Kgl. Svenska Vetenskapsakad. Forhandl.*, No. 4, 211 (1867).

<sup>3</sup> Watson, A. T., *J. Linn. Soc. (Zool.)*, **28**, 230 (1901).

### Life-Cycle of *Puccinia Gladioli* Cast.

*Puccinia Gladioli* Cast. has hitherto been described as a microcyclic rust, producing only teleutospores on hosts of the genera *Gladiolus* and *Romulea*. However, and in spite of good germination of the teleutospores after a resting period, all attempts to induce infection with them on the natural host gave negative results. On the other hand, frequent field observations showed that the distribution of this rust does not always follow that of *Gladiolus segetum*, its commonest host. These facts pointed to the possibility of this being a heteroecious rust.

A detailed survey of the places where *Puccinia Gladioli* is normally found showed the occurrence of *Aecidium Valerianellæ* Biv. on *Valerianella discoidea* and *V. carinata* more or less closely associated with the infected gladioli. Inoculations made with aecidiospores of this material, on leaves of potted plants of *Gladiolus segetum*, gave rise after ten days to yellow pustules, which later became dark brown and finally black by the development of teleuto-sori.

The heteroecious condition of *Puccinia Gladioli* being demonstrated in 1946, attempts have since been made to determine the host ranges for both stages of the rust. Of the species inoculated with teleutospore material, the following proved to be susceptible to infection: *Valerianella auricula*, *V. coronata*, *V. dentata*, *V. discoidea*, *V. eriocarpa*, *V. rimosa* and *V. trichocarpa*, producing spermogonia and aecidia; *Valerianella echinata*, *V. olitoria*, *V. truncata*, *Centranthus Calcitrapa*, *C. ruber*, *C. ruber* var. *albus*. *Fedia Cornucopiae*, *Valeriana officinalis*, *V. Phu* and *V. pyrenaica* proved to be immune to this rust. By keeping some plants bearing single infections under insect-proof conditions, it was further shown that the rust is heterothallic. The extension of infection seems to be controlled either by environmental conditions or the rate of growth of the host: it is systemic during winter and early