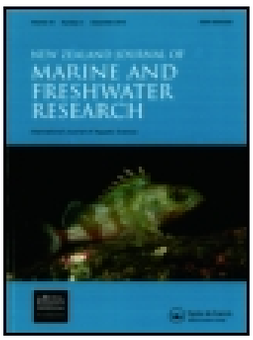

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EGG MASSES AND LARVAE OF THE POLYCHAETE *NEREIS FALCARIA* (NOTE)

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ABSTRACT

Larvae from polychaete egg masses obtained from the south Wellington coast were reared to identifiable juvenile worms and were found to be *Nereis falcaria* (Willey, 1905). Egg masses and larvae closely correspond to those previously recorded by Kirk (1907) from an unknown polychaete.

INTRODUCTION

In January 1906 H. B. Kirk collected several gelatinous, barrel-like egg masses cast up by the tide at Plimmerton Beach, 28 km north of Wellington. Kirk observed the development of the larvae from these masses up to a 13-setiger stage larva (Kirk 1907), but did not identify the polychaete concerned and was unable to obtain material for further examination. From the head structures figured by Kirk the larvae are clearly of a species of the family Nereidae.

As the morphology of egg masses and contained larvae recently obtained by the author corresponded well with those described by Kirk, an attempt was made to determine the species of nereid involved. Larvae were successfully reared to juvenile worms and identified as *Nereis falcaria* (Willey, 1905), an Indo-west-Pacific species previously recorded from New Zealand by Augener (1924), Benham (1927), and Knox (1951).

METHODS

Larvae released from egg masses were reared in the laboratory in 1 litre bowls of sea water, each containing several hundred larvae. The temperature was kept at 21 ± 1°C, and the water was changed every 2 days at first, and later weekly for juvenile worms. Fresh green alga, *Ulva lactuca*, was added for food once the larval yolk reserves were exhausted.

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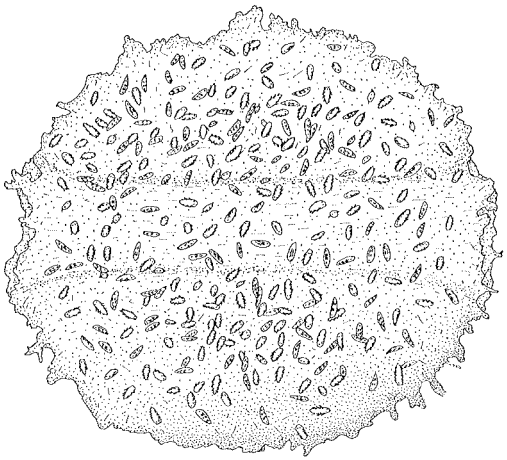

FIG. 1—Egg mass of *Nereis falcaria* in side view; 10 days after collection from Oteranga Bay; larvae at 6-setiger stage. (Length of egg mass about 12 mm.)

OBSERVATIONS

EGG MASSES

In the course of diving at Oteranga Bay, SW Wellington coast, 41° 18.0′ S, 174° 37.6′ E, on 20 November 1973, staff from the Fisheries Research Division, Ministry of Agriculture and Fisheries, found large numbers of egg masses lying on the sea bottom in about 6 m depth. The egg masses in places formed a carpet on the bottom and were also present in mid-water plankton samples. Several of these egg masses were kept under observation in a large container of sea water until, 10 days after collection, it was apparent that the larvae inside had developed polychaete characteristics. The author first examined the egg masses at this time.

Each egg mass (Fig. 1) was barrel-shaped with a central, longitudinal aperture. The length of the barrel ranged from 8 mm to 12 mm, with diameters of 9–11 mm. The central aperture was 2–4 mm in diameter, averaging about 3 mm. Within the gelatinous mass several hundred larvae were evenly distributed. Staining of the jelly mass with a weak Janus Green solution showed that the jelly was not homogeneous but composed of small spheres of jelly, about 850 μm diameter, around each larva.

HATCHING

Ten days after collection, the larvae were all at about the 6-setiger stage of development. Many had hatched and were free swimming and strongly photonegative, but not geopositive.

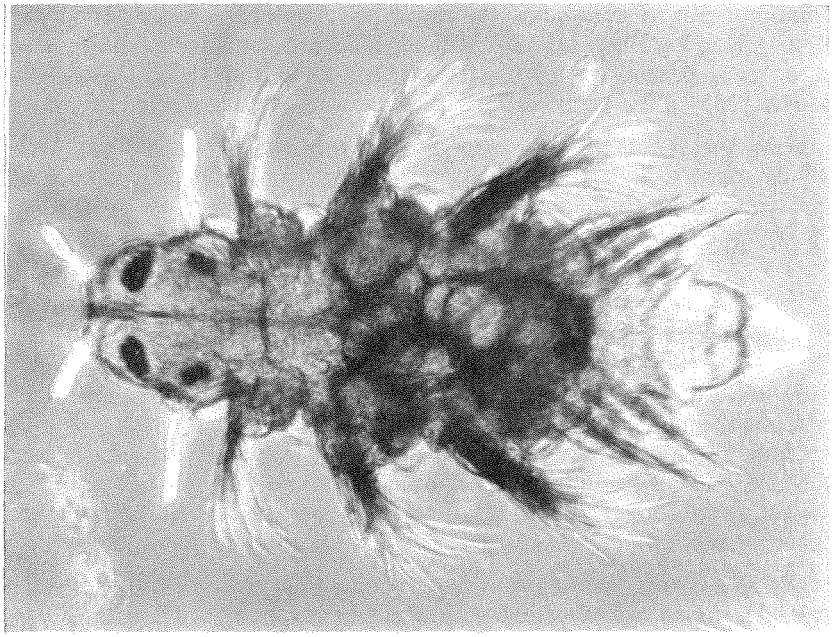

FIG. 2—*Nereis falcaria* 6-setiger larva in dorsal view; phase contrast photomicrograph of live specimen by electronic flash. (Length of larva 640 μm, excluding cirri.)

The hatching process was observed to begin with the enlargement of the space around each larva by its muscular movements so that an opening was made into the small space between individual jelly spheres. The larvae moved through the interconnecting spaces and eventually escaped into the water. Larvae are also released as the outside of the mass gradually abrades.

LARVAE

The main features of the development of the larvae are as follows:

Six-setiger larvae (Fig. 2) were 640 μm in length (excluding cirri) and 160 μm wide in the mid-body. The gut was swollen with yolk material of a greenish colour. Two pairs of close-set, dark red eyes were present, and on the anterior head a pair of dark red patches of surface pigment was prominent; each patch was usually divided into two, or had a central space of less dense pigment. Setae were mostly long larval homogomph spinigers with some shorter setae. The antennae, the first tentacular cirri, and the anal cirri pairs were developing. Cilia trochs were present on the head and the first three setigers.

At the 7–8-setiger stage of development (about 16 days after collection of the masses), the larvae lost the cilia trochs and became benthic,

forming tubes of mucus and bottom debri. Also at this stage the original first setiger lost its setae and became incorporated into the head structure, as is customary amongst the nereids (Wilson 1932, Dales 1950, Reish 1954). The anterior head pigment was lost soon after this stage.

Two and a half months after collection when larvae had developed 16–20 setigers, homogomph notopodial falcigers with bifid tips appeared, two per fascicle from setiger 9 onwards, and identical in form to those of *Nereis falcaria* (*see* Knox 1951). Soon after, at the 25-setiger stage, yellow surface pigmentation developed from mid-body on the dorsal surface.

Three months after collection the most advanced worms had developed 50 setigers (body length 10 mm), and morphological features characteristic of *N. falcaria* were apparent: i.e., prostomium notched between antennae, antennae with tapering pointed tips, an oblique line of three to four paragnaths developing on area II of the proboscis. Jaws were slender with 9 teeth and the homogomph notopodial falcigers now began from setiger 13. Parapodial lobes were as in *N. falcaria* (*see* Knox 1951).

At 55 setigers (three and a half months after collection), paragnaths had developed on other areas of the proboscis: area III with 1 or 2 small paragnaths (Wellington adults with about 7 in line); area IV with an oblique group of 9–12 conicals (Wellington adults with about 20 conicals); area VI with 2 close-set conicals (Wellington adults with a close-set group of up to 10); area VII–VIII with 3 conicals in line, the median largest (Wellington adults with 3 to 7 conicals in line). In *N. falcaria* adults, areas I and V lack paragnaths. Homogomph notopodial falcigers now begin from setigers 13 to 15 (in Wellington adults from setiger 16).

REPRODUCTION

From the author's unpublished studies of the reproduction and heteronereid swarming of the nereids of the Wellington coast, it is known that the *Nereis falcaria* heteronereids are mature between August and January. The available information suggests that abundant swarming of the heteronereids takes place on only a few occasions during this period, but the factors determining this are as yet unknown.

Mating was observed in the laboratory to occur by a form of copulation, with the eggs discharged by the female in a mass immediately after. The central aperture in the mass is caused by the body of the female before she frees herself from the mass. The large oocytes are 380 μm in diameter, and a 850 μm diameter jelly layer is formed shortly after fertilisation.

DISCUSSION

The egg masses and larvae described by Kirk (1907) were probably those of *Nereis falcaria*, as no other known nereid in the Wellington area produces egg masses of this type or such large larvae. The egg masses described in this paper are identical in form with those described by Kirk, although about half the stated size. The larvae correspond to Kirk's descriptions. The large anterior pigment spots correspond to the large pair of anterior 'eyes' mentioned by Kirk. Such pigment spots are present in the larvae of some other nereid species, e.g., *Nereis pelagica* (*see* Wilson 1932) and *Laeonereis culveri* (*see* Klesch 1970).

Larvae of *Nereis falcaria* have not been previously described, but the morphology and development of the larvae is similar to that of other nereids having large, non pelagic, moderately yolky eggs, e.g., *Neanthes diversicolor* (*see* Dales 1950).

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