# NOTES ON THE POLYCHAETE *PSEUDOPOLYDORA PULCHRA* (CARAZZI) FROM BRITISH WATERS

by

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## Résumé

Au cours de recherches benthiques le long des côtes de l'Ecosse, plusieurs spécimens mûrs de l'Annélide Polychète *Pseudopolydora pulchra* (Carazzi) ont été récoltés. L'adulte benthique, qui est une nouvelle espèce pour les côtes britanniques, est décrit et comparé aux descriptions préalables de l'espèce données dans la littérature.

Quelques renseignements supplémentaires sur sa biologie et ses exigences écologiques sont fournis. La distribution de l'espèce et sa dissémination dans les eaux septentrionales européennes est discutée.

## Introduction

The genus *Pseudopolydora* Czerniavsky 1881, includes several species which have mainly a Pacific distribution. In European waters, the genus is represented by two species only; the cosmopolitan *Pseudopolydora antennata* (Claparède) 1870, and the rather restricted *Pseudopolydora pulchra* (Carazzi) 1895, with which the present paper deals.

The species was first described by Carazzi (1895) as a variety of another species (*Polydora antennata* var. *pulchra*). More recently, Hannerz (1956) raised it to specific level and called it *Polydora pulchra*. In 1959, Hartman, adopting Czerniavsky's classification (1881) (in which the genus *Polydora* is split into *Polydora* sensu stricto and *Pseudopolydora*) also recognised it as a distinct species. Thus, the species became *Pseudopolydora pulchra* (Carazzi) and as such is accepted in the present paper.

Previous work on the species includes a detailed description of the developmental stages of the planktonic larva in temperate waters (Hannerz 1956, 1961 ; Rullier 1963). Distribution records of larvae in the plankton are quite frequent (Hannerz 1956, 1961; Ranade 1956; Rullier 1963; Bhaud 1966; Cabioch *et al.* 1967) but only a few records of adult specimens from various latitudes are available since Carazzi's original description (1895) of the species, and those are mostly single specimens (Rioja 1923; Wesenberg-Lund 1938, 1951; Fauvel 1946; Hannerz 1956; Cabioch *et al.* 1967). Moreover, very little information has been produced on the ecology of the species.

Cahiers de Biologie Marine
Tome XI - 1970 - pp. 459-474

During bottom fauna studies on the west coast of Scotland, a small benthic population of *P. pulchra* was discovered, and general benthic surveys of inshore Scottish waters produced additionnal material, including some atypical specimens of *Pseudopolydora*. There are no previous records of adult *P. pulchra* in British waters and the new material provided an opportunity to study the morphological features of the British specimens and to examine its distribution and its ecological requirements.

### Distribution

For almost 30 years after Carazzi (1895) described *P. pulchra* (as *Polydora antennata* var. *pulchra*) from the Bay of Naples, records of its distribution were confined to the Mediterranean.

In 1923, Rioja obtained a single specimen of *P. pulchra* from the Galician coast of Spain. Since then a few isolated records by various authors suggest extension of the formerly restricted distribution of the species into the temperate and sub-arctic waters (Fig. 1). Thus it was recorded at the Trøndelag coast, Norway (Wesenberg-Lund 1938), Faroe Islands (Fauvel 1946), Iceland (Wesenberg-Lund 1951 (1)), Gullmarsfjord, Sweden (Hannerz 1956) and more recently at Roscoff, France (Cabioch *et al.* 1967).

The finding of larvae in an experimental pont at Port Erin (Irish Sea, Ranade 1956) is not concrete evidence of the existence of an adult population of the species in British waters. But the new records, collected by grab and diver revealed the presence of the species in several Scottish localities; the Outer Hebrides (Loch Ourin); Linne Mhuirich, a branch of Loch Sween; the Shetlands (South Nesting Bay); the Inverness Firth, and Aberdeen Bay (Fig. 1, Table I) Furthermore, a small population of *P. pulchra* was discovered in an experimental sea pond at Ardtoe, Argyll (W.F.A. 1968). The material used in the present study is derived from all these surveys. Often the various sampling and sorting techniques employed tended to damage the fragile specimens, which would lose both tentacles and pygidium. Nevertheless, a number of complete specimens was secured from several localities, allowing a full identification and examination.

## NOTES ON SCOTTISH SPECIMENS

### Morphology

Most of the previous descriptions (Rullier 1963; Carazzi 1895; Hannerz 1956) were concentrated on the larval development and there is no fully illustrated description of the mature stage. Because the Scottish specimens differed in size and maturity from those

(1) Specimens from Iceland were identified by Wesenberg-Lund as *P. antennata*; but reference to previous records (i.e. Fauvel 1946; Wesenberg-Lund 1938), where they were clearly identified as *P. pulchra*, creates a certain confusion and suggests the possibility of theses specimens also being *P. pulchra*.

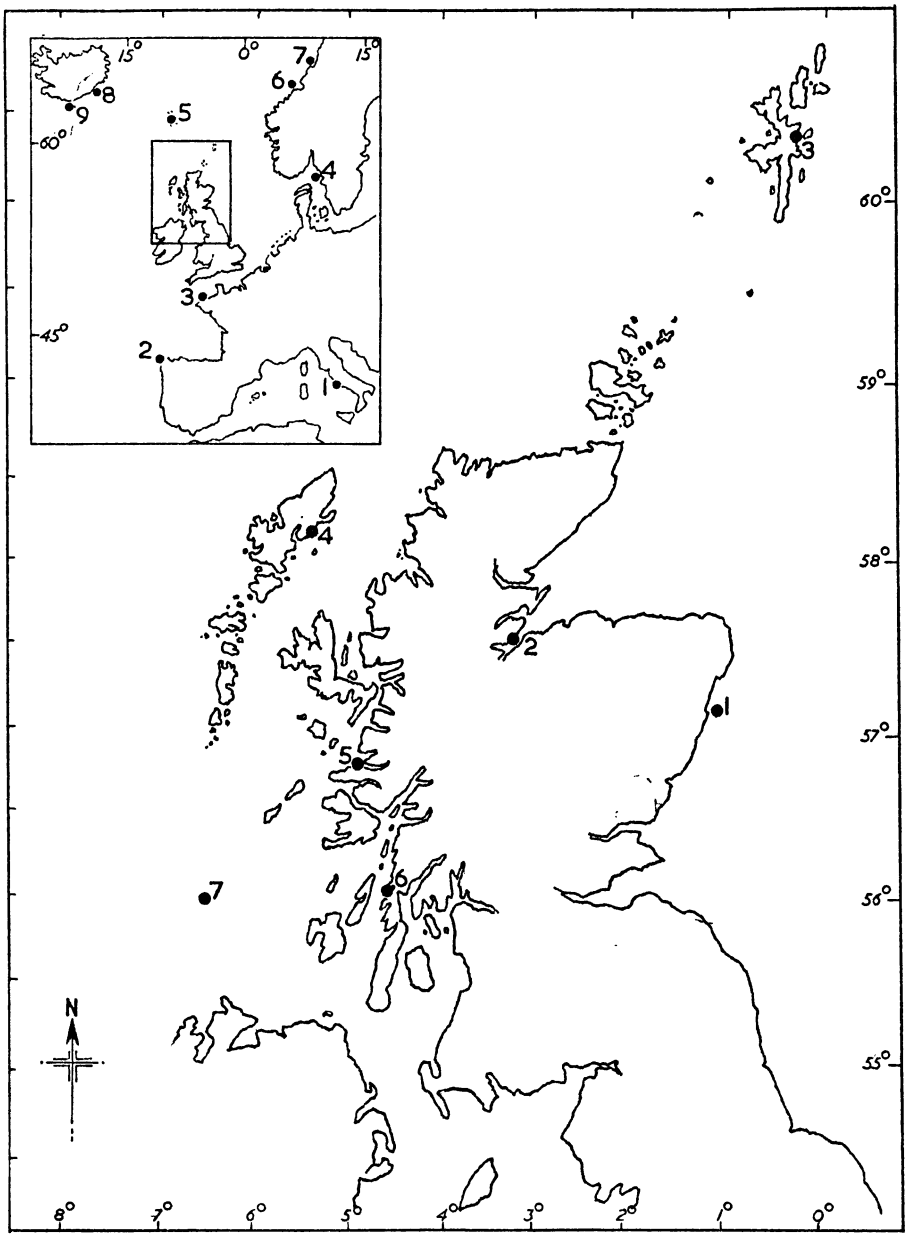


**Fig. 1**

**Distribution of *Pseudopolydora* in Scottish waters.**

1. Aberdeen Bay; 2. Inverness Firth; 3. South Nesting Bay, Shetland; 4. Loch Ourin, Lewis*; 5. Ardtoe; 6. Loch Sween; 7. Dubh Artach*.

Insert: Distribution in European waters.

1. Bay of Naples, Italy (Carazzi, 1893); 2. Galician Coast, Spain (Rioja, 1923); 3. Roscoff, France (Cabioch *et al.*, 1967); 4. Gullmarsfjord area, Sweden (Hannerz, 1956); 5. Faroes (Faûvel, 1946); 6 and 7. Trøndelag area, Norway (Wesenberg-Lund, 1938); 8 and 9. South Coast of Iceland (Wesenberg-Lund, 1951).

*Localities where atypical specimens of *Pseudopolydora* sp. were also found.

TABLE I
Material examined

A

| Locality | N° of spécimens | Size range (mm) | N° of segments (range | State of maturity | Time of susvey | Type of botton (depth in fathoms) |
|---|---|---|---|---|---|---|
| Ardtoe | 68 | 4.4-40.0 | 27-80 | Mainly mature in autumn-spring | Spring-autumn 1965-1968 | mud and gravel - 0.5-2 |
| Inverness Firth | 1 | 17.3 | 53 | Mature female | 4. 9.63 | black firm mud - 5 |
| Loch Ourin (Outer Hebrides) | 1 | 16.8 | 50 | Mature male | 5.10.58 | clay mud and shell - 10 |
| Aberdeen Bay | 1 | 10.0 | 38-40 | Immature | 7. 8.59 | sand - 5 |
| South Nesting Bay (Shetland) | 3 | 13.5-32.8 | 50-66 | Mature female | 12.10.62 | fine shell gravel - 10 |
| Linne Mhuirich (Loch Sween) | 2 | 9.0-9.3 | 30-36 | Immature | 2. 7.69 | thick mud - 1.2 |

B

| | | | | | | |
|---|---|---|---|---|---|---|
| Loch Ourin | 1 | 9.3 | 42 | Mature male | 5.10.58 | clay, mud and shell - 10 |
| Dubh Arth | 3 | 7.5-7.7 | 34-37 | Mature female | 20. 7.60 | fine grey sand - 42 |

described by other authors and had additional small variations, it was thought useful to provide a brief description of the adults from Scottish waters. Furthermore, the individuals from Loch Ourin (Outer Hebrides) and Dubh Artach (Atlantic Ocean) showed features essentially different from those of the species type.

a **Anterior part of the body** (Fig. 2). The prostomium, which is

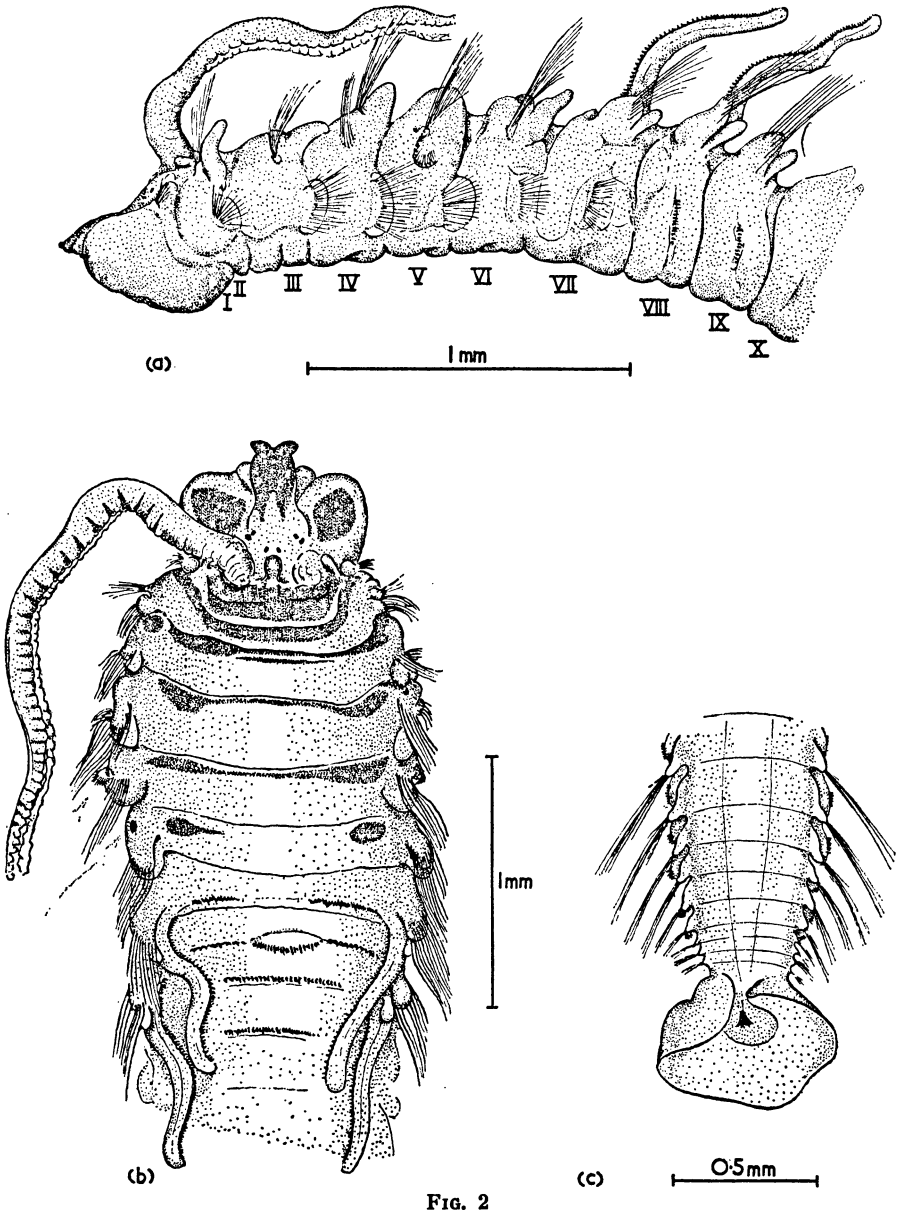


FIG. 2

Morphology of *Pseudopolydora pulchra*.

(a): lateral view of anterior part of body; (b): view from above of anterior end (with right palp removed); (c): pygidium.

prolonged posteriorly to the level of the second setiger, has anteriorly a pair of small not deeply notched horns. A small prostomial ridge is present. There are three pairs of red eyes, each of the two anterior pairs having the individual eyes lying so close to one another as to appear one. A small occipital lobe is situated between a pair of contractile palps. The palps have two rows of papillae which fringe a groove.

The anterior part of the body is normally pigmented. The brown pigment is distributed on prostomium anterior horns, peristomium, occipital tentacle and, variably, on the anterior border of the first six to eight setigerous segments. The long palps are also pigmented with regular rings of pigmentation, extending at a variable distance from the body.

b **Setae** (Table II, Fig. 3). The setae of the anterior dorsal parapodia are all of the limbate type, with the exception of the first segment which is devoid of any dorsal setae. Moreover, the 3rd, 4th and 6th notopodia include a number of winged setae and their arrangement is essentially similar to that one observed in segment 5.

Beyond the 6th segment, all dorsal setae are of the capillary type, their number decreasing towards the posterior end of the body. Dorsal

TABLE II

Arrangement of setae in *P. pulchra*

| Segment | Setae | |
|---|---|---|
| | dorsal | ventral |
| I | — | Limbate (approx. 15 in two rows) |
| II | Limbate (approx. 12 in two rows) | Limbate (approx. 24 in two rows) |
| III | Limbate (approx. 24-26 in two rows) + 4-6 winged | Limbate (approx. 24 in two rows) — |
| IV | Limbate (approx. 20-24 in two rows) + 6-8 winged | Limbate (approx. 24 in two rows) — |
| V | Horseshoe = upper = limbate (10-12) lower inner = spines (19) outer = winged (17) | Limbate (approx. 22-24 in two rows) |
| VI | Limbate (approx. 18-19 in two rows) + 6-8 winged | Limbate (appr. 20-22 in a single row) |
| VII | Limbate (approx. 18-19 in two rows) | Limbate (approx. 16 in a single row) |
| VIII | Limbate (approx. 18-19 in two rows) | Hooded crotchets (12-14 in a single row) |
| IX-XIII | Limbate (approx. 15-18 in two rows) | Hooded crotchets (12-14 in a single row) |
| XIII → post. end | Limbate (approx. 5-10 in two rows) | Hooded crotchets (12-14 in a single row) |

setae are arranged in two rows, fusing into one at the posterior segments.

The modified setae of the 5th segment characteristic of the genus and the species are arranged in a horseshoe fashion, with its main axis facing postero-dorsally. These setae which are of three kinds, are arranged in two rows. The inner row consists of stout spines with a cavity facing outwards, the outer row is composed of winged limbate setae replaced by unilimbate setae at the antero-dorsal apex of the horseshoe formation.

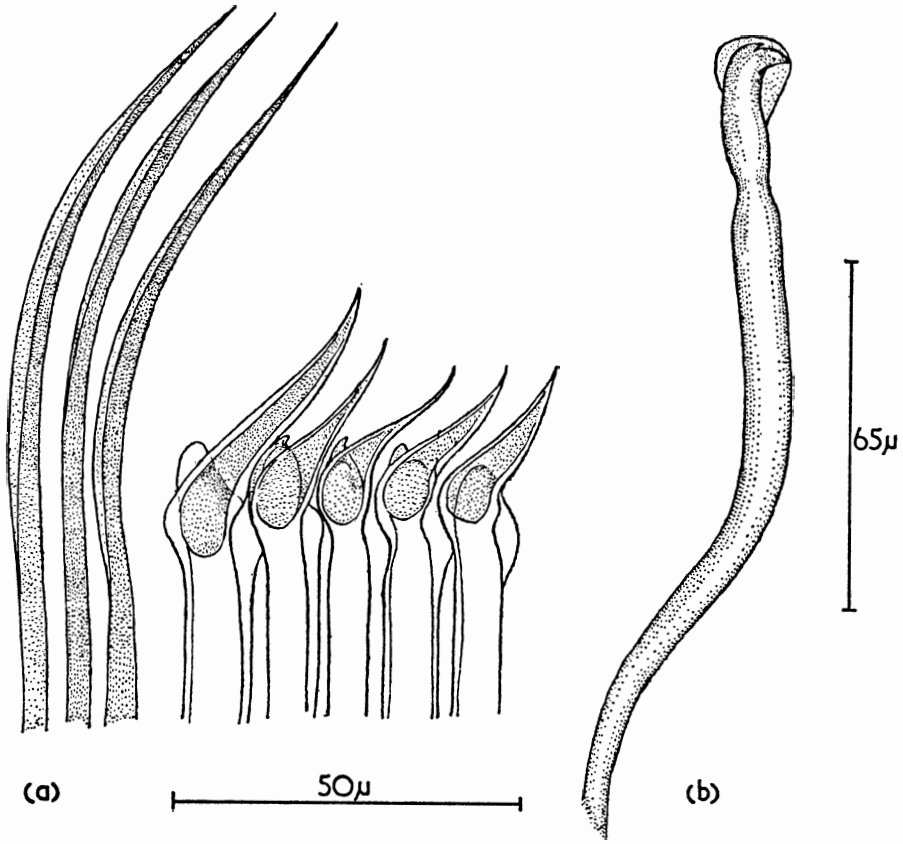


FIG. 3
Setae of *Pseudopolydora pulchra*.
(a): modified setae of 5th setigerous segment; (b): hooded crotchet of 15th setigerous segment.

Ventral setae of the anterior segments, all of the limbate type, are arranged in two parallel rows. They are fused into one on segment 6 and 7. From segment 8 to the end of the body they are replaced by a single row of hooded bidentate crotchets.

c **Gills.** The gills appear on the 8th segment and the first 3-4 pairs are long and ciliated. The cilia extend to the dorsal part of the body forming transverse ciliary bands.

The number of gills varies with the age and consequently with the number of segments. In the older specimens (53-66 setigerous segments), the number of gills varied between 19 and 22 pairs, becoming progressively indistinguishable and confused with the small lobes of the notopodia, towards the posterior part of the body.

d **Posterior part of the body.** The segments are long and cylindrical and the parapodia become noticeably reduced. The pygidium consists of a well developed anal cup, notched dorsally only (Fig. 2).

## Maturity

The mature specimens are easily recognisable from the opaque and granular consistency of the segments (from the 13th segment

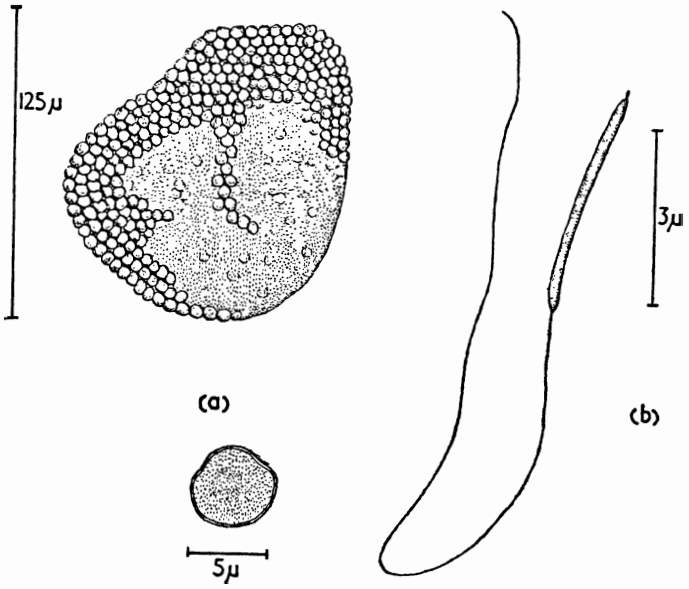


FIG. 4
Gonads of *Pseudopolydora pulchra.*
(a): egg mass and single egg (× 400); (b): spermatozoid (× 400).

onwards) which carry the gonads. The females carry a large number of spherical or elliptical eggs of 5 μ mean diameter arranged in polyhedral egg masses of an average diameter of 110-120 μ (Fig. 4, a). The male gonad is less well defined, including large numbers of spermatozoids and spermatids in various stages of development. The spermatozoid has an elongated head (ca 2 μ long) ending in a point (Fig. 4, b). The tail outside the head is long (ca 6-7 μ) and filamentous. The middle piece is barely visible at a magnification of × 400; the general appearance, however, was very similar to Franzen's description (1956) of spermatozoids of *Polydora ciliata.*

## Atypical specimens

Specimens obtained from Loch Ourin and Dubh Artach, showed the diagnostic features of the genus *Pseudopolydora* Czerniavsky 1881 but diverged from the features of *P. pulchra* on several points. Details concerning size and morphology can be seen from Table I.B. and Fig. 5. The specimens were fragile and had their tentacles damaged or missing.

They are small and devoid of pigment. The prostomium is rounded and extended posteriorly by a ridge which reaches the

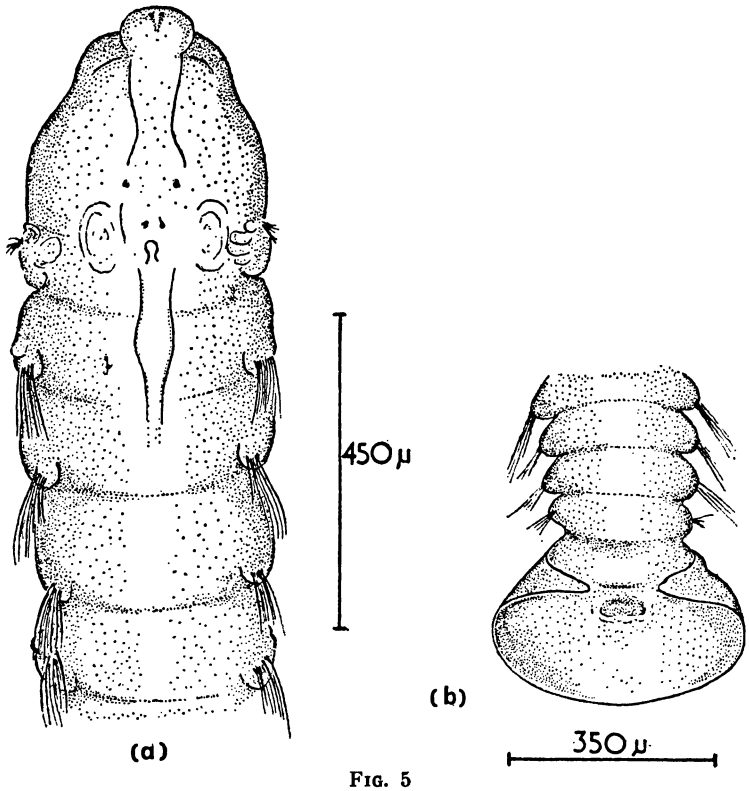


FIG. 5
Atypical specimens of *Pseudopolydora* sp.
(a): anterior part of the body; (b): pygidium.

3rd setigerous segment. There are 2-3 pairs of eyes. The type and arrangement of setae are essentially the same as in *P. pulchra*. Their number however is noticeably smaller. The anterior dorsal and ventral parapodia carry limbate setae (5-8), which decrease slightly (4-8) at the dorsal parapodia of the posterior segments. Bifid hooded crotcheds (7-9) start from the 8th setigerous segment and continue to the end of the body. The modified setae of the 5th segment are

arranged in the usual manner; an outer ring of 9-10 winged setae, an inner ring of 6-7 spines, and a variable number of limbate setae.

The body has a milky opacity. There are 9-10 pairs of gills which start from the 7th setigerous segment.

The pygidium has a typical anal cup with a broad notch (Fig. 5). All specimens were mature individuals; those from Dubh Artach were mature females carrying eggs, the one from Loch Ourin was a sperm-carrying male.

These small though mature specimens show an unfamiliar combination of features: small size, rounded prostomium, small number of gills, lack of pigmentation, and a pygidium only dorsally notched. This configuration is strangely reminiscent of the features of *Pseudopolydora paucibranchiata* as described and illustrated by Okuda (1937) from Japanese waters. Rullier (1963), in his work on *P. pulchra*, wondered about the validity of *P. paucibranchiata* as a species considering the possibility that Okuda's specimens were only juveniles of *P. pulchra.*

However, these atypical Scottish specimens are genuinely small and mature; and without drawing parallels or thinking in terms of hybrids [as Carazzi (1895), speculated while describing *P. pulchra* for the first time] one should not discard the possibility of varieties. On the other hand, one might be dealing with either precocious maturity or juvenile characteristics being carried forward into the adult phase.

Yet while considering such possibilities, one should not overlook the striking similarity of these Scottish specimens with Okuda's *P. paucibranchiata.*

## Population and breeding

A great deal is known about the planktonic phase and the developmental stages of *P. pulchra* but very little about its biology and ecology.

In their work on the larvae of the species, both Hannerz (1956) and Rullier (1963) included information on the metamorphosis and early benthic phase of the species, the former from isolated specimens, the latter from laboratory observations.

*P. pulchra* was found in the pond at Ardtoe for the first time in June 1967. A true subtidal species, apparently absent from the area during the pre-impoundment phase, it obviously colonised the pond, by means of planktonic larvae which were introduced during the opening of the sluice gates.

The structure, maturation and evolution of the population in the pond area can be seen from Table III. Serious seasonal numerical depletion could be the result of natural or induced mortality (predation, interference with the environment, etc.) ; or it is possible that very young stages were too small to be taken in the coarse sieves (1.00 mm square mesh) used.

Nevertheless, recruitment as deduced from the population structure is fairly constant and could derive either from a self-perpetuating population in the pond, or from a recruitment of larvae from outside.

Examination of the mean size of animals and their maturity, shows that the Scottish specimens compare quite well with the specimens found by Hannerz (1956) at Gullmarsfjord. However, the Scottish specimens are considerably bigger in size than Rullier's specimens from Roscoff (1963) for the same number of segments (e.g. specimens of 48 segments measured 12.8 mm in Scotland, but only 6 mm at Roscoff); furthermore, these Scottish specimens were fully mature at a much earlier setigerous complement (43-46 setigers) than the Roscoff animals (from 65 setigers).

This comparatively stunted growth and delayed maturity of the Roscoff specimens could be an artefact due to laboratory environmental conditions. Examination of the mean size of animals and their maturity, shows a progressive increase of the mean size of the population, from summer (when the smallest individuals were found) to autumn and the following spring, although the winter 1967-1968 population mortality could be explained only tentatively. Furthermore, there is a concomitant increase in the percentage of mature individuals in the population, reaching a maximum in November and March.

TABLE III

Population characteristics of *P. pulchra* at Ardtoe

| Time of survey | N° of specimens | Size (mm) | | Segments | | N° of mature specimens | percentage of mature population | Sex Ratio male : female | Mean N° of specimens /m² |
|---|---|---|---|---|---|---|---|---|---|
| | | Range | Mean | Range | Mean | | | | |
| June 1967 . | 18 | 5.6-11.6 | 9.0 | 31-42 | 38.1 | 0 | 0 | — | 7 |
| September 1967 .... | 14 | 11.9-17.9 | 15.2 | 42-61 | 53.8 | 13 | 93 | 1.1-1.0 | 5 |
| February 1968 .... | 1 | 13 | — | 50 | — | 1 | — | — | — |
| June 1968 . | 14 | 4.4-13.2 | 8.4 | 27-54 | 39.7 | 8 | 57 | 1.6-1.0 | 7 |
| November 1968 .... | 13 | 25.0-35.0 | 31.0 | 66-73 | 68.3 | 13 | 100 | 1.7-1.0 | 6 |
| March 1969 | 8 | 25.0-40.0 | 32.0 | 66-80 | 70.0 | 8 | 100 | 1.0-1.7 | 3.6 |

Examination of the animals from Ardtoe and other localities (Tables I and III) in various stages of maturity, reveals a prolonged reproductive period from summer to spring. Although it is well known that many polychaetes can retain their genital products for prolonged periods before releasing them, nevertheless, the presence of a number of empty mature individuals, which had obviously spawned recently, both in November and in March, suggests the presence of larvae in the plankton for at least part of this period. Plankton data are not available to confirm this in Scottish waters, but the suggested pattern of a reproductive activity extending from summer to the following spring, with a maximum in late autumn or winter, is in general agreement with Hannerz's conclusions (1956) based on planktonic observations. As suggested by the presence of

reproductive individuals in the spring, this period of activity in British waters must be considerably longer than described by authors referring to other latitudes (Table IV) and would explain the heavy incidence of immature worms in the early summer. This would also provide an explanation for the findings of Ranade (1956) and Ranade and Coleman (1957) who obtained, at Port Erin, a heavy incidence of larvae from April to June, with a maximum in May.

The reproductivity activity of *P. pulchra* in various latitudes determined by the quantitative distribution of the larvae (Table IV)—making allowance for plankonic life and delayed metamorphosis—shows an overlapping in time. The pattern of reproductive activity based on observations from various authors (Table IV) and the data of the present paper suggest a latitudinal influence (possibly temperature, Bhaud 1967a) upon the reproduction of the species.

TABLE IV

Seasonal presence of planktonic larvae in waters of various latitudes

| | Presence of planktonic larves | Location |
|---|---|---|
| Bhaud (1967) | December-April | Mediterranean: Banyuls |
| Cabioch *et al.* (1967) | March-October maximum incidence in September | English Channel: Roscoff |
| Rullier (1963) | June-September maximum incidence in July | English Channel: Roscoff |
| Hannerz (1956) | June-December maximum incidence in September-November | Sweden: Gullmarsfjord |
| Ranade and Coleman (1957) | April-June maximum incidence in May | Irish Sea: Port Erin |

## Biology and habitat

According to Hannerz (1956), metamorphosis of the larvae depends only slightly on the nature of the substratum. Adult *P. pulchra* have been taken from sandy bottoms (Aberdeen Bay, Norwegian coast, Gullmarsfjord) and from coarser substrata of shell gravel (Shetland Islands) (Table I), but study of the situations where specimens were found shows a definite preference for a predominantly muddy bottom.

Tubes are built in later stages of the benthic life. Nevertheless, worms with 48 setigerous segments have been retrieved from inside tubes. The consistency of the tube often reflects the nature of the bottom, including various amounts of sand grains, algal debris and fine detritus, cemented together with mucus.

Examination of the stomach contents revealed a consistent diet of naviculoid diatoms (approximately 230 μ) and fragments of algae (180-220 μ) but mostly organic detritus particles up to 13 μ regardless of the type of bottom. A small amount of sand grains (quartz) was often present (30-200 μ). It seems that like most spionids, *P. pulchra*

is a selective detritus and suspension feeder. However, some deposit feeding should not be ruled out, as is the case with many polychaetes, which although specialised feeders, often combine several methods of feeding in order to supplement their diet.

The geographic and bathymetric distribution (from the Mediterranean to Iceland in depths from 3 ft to 10 fathoms) indicate its ability to colonize different habitats under different environmental conditions.

The study of the environmental factors in the pond at Ardtoe, summarised in Table V, shows that the species is essentially eurythermal, euryhaline and possibly tolerant of a certain degree of deoxygenation. This wide tolerance exhibited by *P. pulchra* has been known also in other species of the genus *Pseudopolydora*. Thus specimens of *Pseudopolydora kempi* and *P. kempi californica*, both with an Indo-Pacific distribution, have been recorded from estuarine waters, or from marine areas liable to undergo seasonal reduction in salinity (Southern 1921, Reish and Barnard 1967, Light 1969).

TABLE V
Physical factors at Ardtoe

| | Temperature (0° C) | Salinity p. 1000 | Oxygen (ppm) | Substratum |
|---|---|---|---|---|
| 1967 July | 15.8 | 28.4 | 9.02 | Badly sorted deposits; |
| August | 16.0 | 26.5 | 8.64 | a mixture of mud, |
| September | 13.3 | 26.4 | 8.46 | coarse sand and small |
| October | 10.4 | 23.8 | 7.95 | stones. |
| November | 6.7 | 25.6 | 9.45 | Median diam. = 618-1180 μ |
| December | 5.5 | 23.3 | 9.08 | Sorting coefficient = 1.55-2.63 |
| 1968 January | 3.5 | 22.0 | 11.67 | Progressive sedimentation |
| February | 3.5 | 26.7 | 12.28 | increased percentage |
| March | 5.8 | 27.9 | 10.37 | of finer grades. |
| May | 11.4 | 31.0 | 9.42 | |
| June | 16.3 | 32.5 | 9.29 | |

However, fluctuating environmental factors and especially salinity, although tolerated by the benthic stages of *P. pulchra*, could be critical in the survival of the larvae and the maintenance of the present population. Although larvae of many marine invertebrates and especially polychaetes, are tolerant of a certain salinity variation, this is not the case with the larvae of *P. pulchra* which are readily killed by low salinity (less than 30 p. 1000 Ranade 1957).

Moreover, Ranade (1957) showed that low salinity affected larval behaviour (Thorson, 1946, 1950), manifested as negative phototaxis and he concluded that this could have a survival value by excluding the larvae from the diluted upper layers. In this respect, if no other mechanism is involved, it seems that exclusion of the larvae from the frequently diluted surface layers of the pond could not only be important for the survival of the larvae but also probably in the ready colonisation of the pond, precipitating settlement and metamorphosis.

## DISCUSSION

From the surveys it appears that *P. pulchra,* as a component of the benthic fauna, is widely distributed though not abundant. Where conditions are favourable, *P. pulchra* could become established and form small localised colonies; these breeding populations would form the centre of larval dispersion.

Yet frequent records of larvae of the species in plankton might provide a false impression as to the abundance and distribution of the benthic population because, as has been pointed out (Hannerz 1956, Bhaud 1967b), there is no correlation between the quantitative distribution of larvae and adults. While larvae dispersed by the currents (Ekman 1953, Thorson 1961) can be present in large numbers, adults can be relatively rare, localised or even absent from the area.

Regardless, however, of the difficulties of its detection, it seems that emigration outside the Mediterranean and colonization of the temperate waters of the North hemisphere is a comparatively recent event. This would seem to be shown by the chronological sequence of records of *P. pulchra* outside the Mediterranean area.

In such a case—without knowing the conditions and facts of this event—and in view of the geographical distribution pattern of the species, a tentative explanation is suggested, based on the complex current system of the North-East Atlantic. Planktonic larvae of *P. pulchra,* leaving the Mediterranean with the North Mediterranean current, would fall under the influence of the north bound Lusitanian stream (Fraser 1961). The stream, which moves northward along the continental shelf, mixes gradually with the waters of the Atlantic, finally merging with the North Atlantic drift in the West Scottish areas.

The importance of the Lusitanian stream, as a carrier of sub-tropical and Mediterranean species, has been stressed adequately by Fraser (1955, 1961, 1967). Thus, the lecithotropic larvae of *P. pulchra,* partly independent of plankton, caught in the Lusitanian stream and able to delay metamorphosis and settlement (Rullier 1963, Hannerz 1956), could sink and metamorphose at any suitable point along its course. Small breeding populations, established in this way, could further expand their northward distribution. Moreover, once in the North Atlantic drift, larvae would know few barriers in their dispersal in the North Atlantic, the North Sea and Skagerrak. The geographic distribution of *P. pulchra* and its chronological appearance in various localities, reinforce the above argued mechanism of dispersion.

### Acknowledgements

I should like to thank the White Fish Authority for the laboratory and sampling facilities provided at the experimental fish pond at Ardtoe. I am also indebted to Mr. A. D. McIntyre for reading the manuscript and for putting samples from various benthic surveys at my disposition.

## Summary

Numerous benthic surveys in Scottish waters have produced evidence of a reproductive population of the polychaete *Pseudopolydora pulchra* (Carazzi). The benthic adult, new in British waters, is described and compared with existing descriptions from previous literature on the species.

Notes on the biology of the species and additional information on its ecological requirements are included. Its distribution and possible pathways of dispersal in Northern temperature waters are discussed.

## Zusammenfassung

Zahlreiche benthonische Schätzungen im schottischen Gewässer haben spuren einer reproduktionsfähigen Bevolkerung des Polychaeten *Pseudopolydora pulchra* (Carazzi) ergeben. Der ausgewachsene Benthos — ungewohnt für britisches gewässer-wird beschrieben und mit den vorhandenen Beschreibungen der bisherigen Literatur über die Art verglichen.

Anmerkungen zu der Biologie der Art und zusätzliche information über seine ökologischen Bedingungen sind auch darin enthalten. Seine möglichen Verbreitungswere im nördlichen mässigen Gewässer wird auch erörtert.

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