

Zooplankton

Sheet 113

POLYCHAETA

Family: Syllidae

Sub-family: Autolytinae

(By R. HAMOND)

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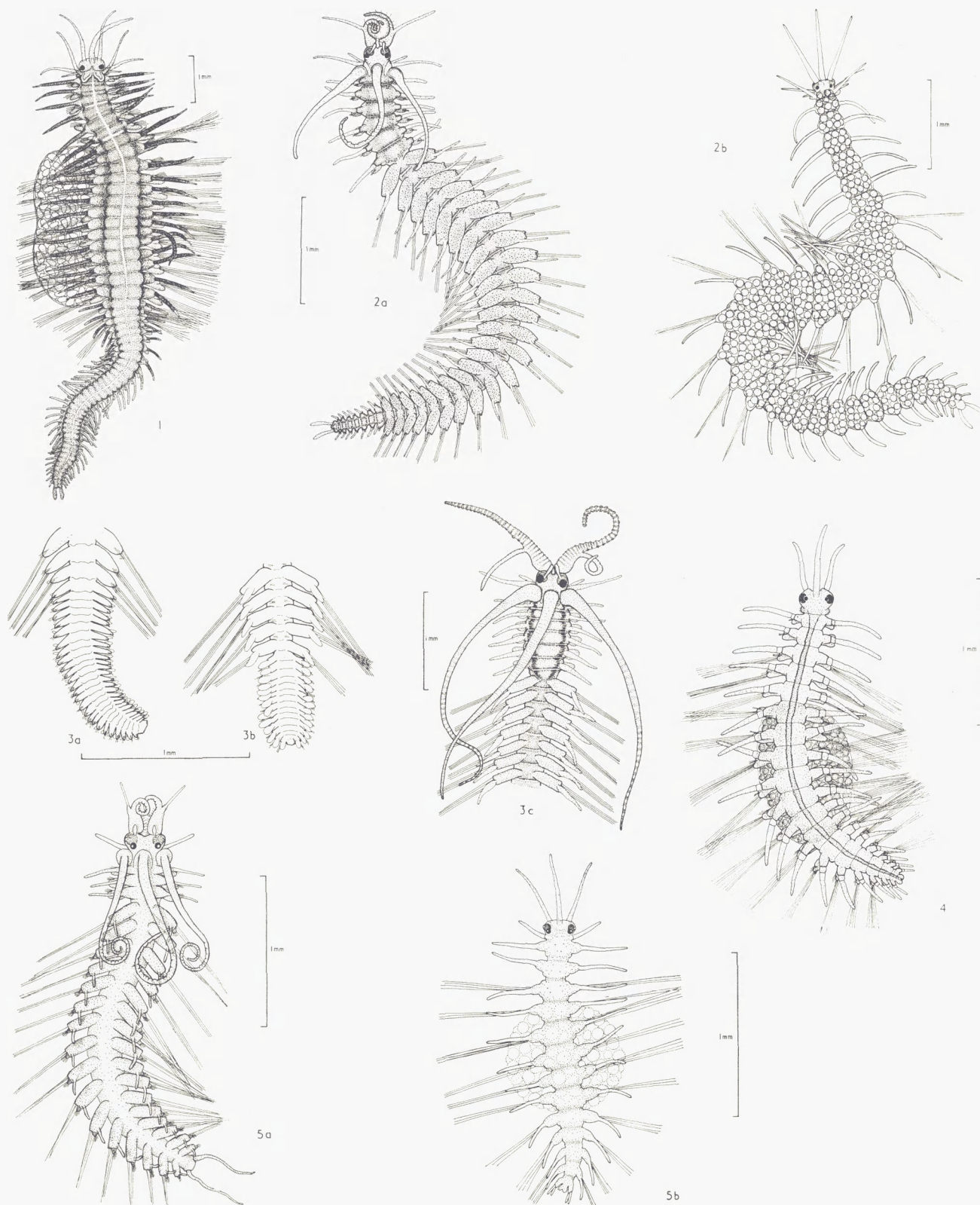


Figure 1. *Proceraea picta* ♀. - Figure 2. *Proceraea cornuta* a, ♂; b, ♀ preovulatory stolon. - Figure 3. *Proceraea prismatica* a, ♂ tail from below; b, ♂ tail from above; c ♂ anterior region. - Figure 4. *Autolytus edwardsi* ♀. - Figure 5. *Autolytus brachycephalus* a, ♂; b, ♀. - Figures 2a, 2b, 5a and 5b are from cultured specimens.

Sub-family: Autolytinae

Introduction

The family and sub-family are basically as defined by FAUVEL (1923); autolytoids are rarely taken in the plankton (nearly always as stolons), and the largest species in European waters, *A. alexandri*, attains a length of 10 to 12 mm approximately.

The life cycle is metagenetic, as follows.

The *stock*, the only phase capable of feeding (on hydroid polyps, and perhaps on other things), lives benthonically among hydroids and is incapable of swimming, being found in the plankton only very seldom among floating hydroids and other objects.

At a certain size the stock forms a secondary head on a segment lying usually well back from its own head, and the new head together with the tail posterior to it becomes a second phase, the *stolon*, which develops attached to the parent stock until, at maturity, it breaks loose and swims in the plankton. Stolons are budded off singly (OKADA, 1933, Figure 3) or in a chain, of which the oldest is terminal, and they break off singly (THORSON, 1946, Figure 10). Mating causes the female to ovulate (to pass the eggs from her body-cavity into her eggbag; GIDHOLM, 1965); the young hatch from the eggbag as ciliated larvae, and descend to the seafloor to grow into stocks, while the female, incapable of feeding or of further reproduction, goes on swimming till she dies. An individual stock produces stolons all of the same sex, the gonads being located in the posterior part of the stock, from which the gametes are passed caudally into the stolon (GIDHOLM, 1963).

The male stolon (formerly "Polybostrichus") is distinguished by the bifid antennae on the front of the head, the three "horns" (the "long appendages" of GIDHOLM) just behind it, and the tapering body with heavily muscled swimming parapodia. The female (formerly "Sacconereis") has head appendages which are all simply filiform, and may be in any of the following three states: - a) pre-ovulatory (= virgin, with eggs still filling the body cavity, Figure 2b); b) post-ovulatory (the body cavity emptied of eggs, as a result of mating) sub-divided into b1) pre-hatching (the brood still contained in the ventral eggbag), and b2) post-hatching (both brood and eggbag have disappeared although sometimes a few eggs are retained by accident in the body cavity).

A. alexandri is exceptional in that the Polybostrichus and Sacconereis stages are formed, not by stolonisation, but by the entire stock becoming epitokeous as in nereids (GIDHOLM, 1966a). At present this is the only epitokeous autolytoid known in European waters.

Whereas the taxonomy of the stocks is well known (GIDHOLM, 1966b), that of the stolons has not so far been dealt with thoroughly. The author's unpublished results deal mostly with *P. cornuta* and *A. brachycephalus*; other species were less common in Norfolk waters (where most of the work was done) and less amenable to culture, but a few specimens of each have been studied. Paragraphs 5 and 6 of the key are tentative owing to scarcity of material. In para. 2 the specific characters of *Procerastea* spp. are known for their stocks (GIDHOLM, 1966b) but not yet for their stolons. The species of the *A. prolifer*-group (GIDHOLM, 1966b) are very difficult to separate, and the "*A. prolifer*" of previous authors is a myth compounded of members of this group and of various other species, many of them as yet unidentifiable. The identity of *A. alexandri* with *A. longeferiens*, formerly suspected (GIDHOLM, 1966b), is now almost certain.

Stolons should be taken living from the plankton catch, their colours noted, and narcotised individually on a glass slide to prevent them curling up; satisfactory narcotics are chloretone (GIDHOLM), MS 222, or benzamine hydrochloride (2% in distilled water). During narcotisation the appendages should be gently straightened so as to lie clear of one another, in order that their relative lengths can be seen. The stolons should be fixed on the slide in Bouin or Zenker, and preserved in these fluids or in 70% alcohol. Magnesium chloride and formalin both cause severe maceration, often to the point of unidentifiability.

Specimens taken from plankton, and preserved in formalin in the usual way, will lose not only their colour but much of their form, and may therefore be very difficult to identify.

KEY TO AUTOLYTID STOLONS SO FAR KNOWN TO OCCUR IN NORTH EUROPEAN PLANKTON

The expression a + b + c refers to the numbers of setigers in the front, middle (swimming), and tail regions of the stolon, respectively.

1. a usually 14, rarely 12 or 13 (female, OKADA (1933) Figure 1; WESENBERG-LUND (1947) Figure 15 male; *ibid.* Figure 14, tail missing)...
Autolytus alexandri 2
a 6, rarely 5
a is 3 or fewer (*Autolytus*, other than *A. alexandri*) 5
2. In the front region of the male, the dorsal cirri are rounded or pearshaped stumps not exceeding their own parapodia in length (ALLEN, 1921); in that of the female, the dorsal cirri may be entirely absent, or may vary in length from a short stumpy cirrus on the first setiger to a filiform cirrus on the sixth setiger, the latter being about as long as the width of the body. Colour usually bright red, orange or yellow; eggs in up to 10 or 12 separate eggbags (OKADA, 1929) *Procerastea* spp. (*P. halleziana* and *P. nematodes*)
All dorsal cirri of front regions of both sexes filiform and in length at least equal to, though never much longer than, the width of their own setigers (*Procerastea*) 3
3. Dorsal cirri of setigers of front region burnt-amber brown, except for the colourless tip which is drawn out into a point; c = 33 in the only female available; body colour a rich chocolate brown due to epidermal pigment in which a longitudinal mid-dorsal gap, and two transverse gaps that intersect it, all show as white lines (Figure 1) *P. picta*
Dorsal cirri of front setigers bluntly rounded, colourless throughout, tip not differentiated in any way; body colour very variable in either sex, especially the female, but if brown a rusty brown never chocolate and never with white lines. 4

4. In the male, the horns are only slightly longer than the front region (OKADA, 1933); forked antennae of moderate size; c ranges from 5 to 10, usually 8 or 9 (Figure 2a). Head of female on distinct short "neck"; nuchal organs at about 45° or less to long axis, when looked at from above *P. cornuta*
Horns of male (Figure 3c) about twice as long as the front region, very graceful and often curled spirally (WESENBERG-LUND (1947) Figure 12); forked antennae also very long, set with transverse rows of gland cells (MALMGREN (1867) Figure 38); c ranges from 10 (MALMGREN (1867) Figure 38B) to about 25. Female (Figures 3a and b) with short deep-set head (WESENBERG-LUND (1947) Figure 11); nuchal organs set more transversely, at about 60° to long axis (MALMGREN (1867) Figure 40), and tail with possibly rather more segments in it, on the whole, than in the preceding species.....*P. prismatica*
5. Dorsal surface of gut thickly covered with cream-coloured granules, giving the effect of a white mid-dorsal stripe running the length of the body (Figure 4); this stripe may be faint, or interrupted, or both; length about 3.0 mm.....*A. edwardsi*
Dorsal surface of gut with at most a very few scattered creamy granules, which are by no means organised to form a stripe..... 6
6. Neither sex usually more than about 3.0 mm in length, the gut rudiment apparent but not conspicuous by reflected light, and not much different in colour from the rest of the body; females (Figure 5b) transparent or translucent, glassy sometimes faintly brownish or greenish, eggs bright orange-brown or tan, sometimes buff; males (Figure 5a) vary from emerald-green to nearly colourless, very rarely faint watery brown *A. brachycephalus*
Either sex can attain a length of 3.5 mm, and is translucent, colourless, straw-yellow or amber-coloured, with a conspicuous pink, deep red, or dark brown gut rudiment; eggs mauve or yellow; head appendages slightly longer and slimmer than those of the last species (types E and Ø, HAMOND, unpubl.) *A. ?langerhansi*

DISTRIBUTION

The distribution is very poorly known, due to sparse and frequently erroneous identifications. *A. alexandri* appears to range from Arctic waters to the English Channel, but little can be said of the others. It is hoped that this sheet will cause planktologists to make their own records of distribution and occurrence. There is a possibility that other species, which are not yet adequately known, may occur in the plankton of North European waters; this sheet must therefore be regarded as an interim issue based on present knowledge only.

References

- ALLEN, E. J., 1921. "Regeneration and reproduction of the syllid *Procerastea*". Phil. Trans. R. Soc. London B, **211**: 131-77.
- FAUVEL, P., 1923. "Polychètes errantes". Faune Fr., **5**: 1-488.
- GIDHOLM, L., 1963. "The sexual organs in the budding form of *Autolytus* (Syllidae, Polychaeta)". Zool. Bidr. Upps., **35**: 529-43.
- GIDHOLM, L., 1965. "On the morphology of the sexual stages, mating, and egg-laying in *Autolytus* (Polychaeta)". Zool. Bidr. Upps., **37**: 1-44.
- GIDHOLM, L., 1966a. "On epigamy in *Autolytus* (Polychaeta), and non-stolonic Sacconereis and Polybostrichus stages". Ark. Zool. Ser. 2, **19**: (4) 135-42.
- GIDHOLM, L., 1966b. "A revision of Autolytinae (Syllidae, Polychaeta) with special reference to Scandinavian species, and with notes on external and internal morphology, reproduction and ecology". Ark. Zool. ser. 2, **19**: (7) 157-213.
- MALMGREN, A. J., 1867. "Annulata polychaeta Spitsbergiae, Grønlandiae, Islandiae et Scandinaviae hactenus cognita". K. svenska Vetensk. Akad. Handl., **1867**: (4) 127-235.
- OKADA, Y., 1929. "Sacconereis of *Procerastea*". J. mar. biol. Ass. U.K., **16**: 325-28.
- OKADA, Y., 1933. "Syllidian miscellany". J. mar. biol. Ass. U.K., **18**: 641-53.
- THORSON, G., 1946. "Reproduction and larval development of Danish marine invertebrates, with special reference to the planktonic larvae in the Sound (Øresund)". Meddr. Kommn. Danmarks Fisk. Havundersøg., Ser. Plankton, **4**: (1) 1-523.
- WESENBERG-LUND, E., 1947. "Syllidae (Polychaeta) from Greenland waters". Meddr. Grønland, **134**: (6) 1-38.