

# Development of larvae and juveniles in *Marphysa fauchaldi* (Polychaeta: Eunicidae)



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## 1. Habitat and spawning

The barra bloodworm, *Marphysa fauchaldi* Glasby & Hutchings, 2010 occurs in muddy coastal regions of northern Australia. It is particularly abundant in certain fish farms, where it builds an extensive network of burrows in nutrient-rich sediment. *Marphysa fauchaldi* belongs to a group of morphologically-similar forms that encapsulate their young in gelatinous masses (jelly cocoons). We describe the development of larvae and juveniles of this species using both light- and scanning electron microscopy and illustrate graphically its life history.

Spawning behaviour has yet to be determined in detail, but it appears as though eggs are fertilised and deposited into the jelly cocoons in a process involving aeration. After a short period of time the cocoons take on the appearance of pear-shaped, translucent balloons about 10 cm long and 8 cm maximum width. The jelly cocoons are anchored by a stalk to the burrow entrance.



## 2. Larval development (see life history graph)

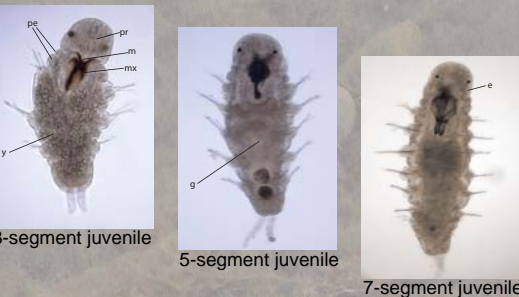
Larval development occurs mostly inside the jelly cocoon over 3 or 4 days. The earliest observed stage, the 300µm long early metatrochophore, has three well-developed ciliary bands and a pair of eyespots. Two chaetigerous segments are added in rapid succession but the cilia continue to propel the larvae. The 400µm long 2-segment stage has a pharyngeal bulb and a pair of small dorsal anal cirri. Once the stalk breaks the cocoon wall degenerates rapidly sinking to the bottom and releasing the larvae and juveniles.



## 3. Juvenile development (see life history graph)

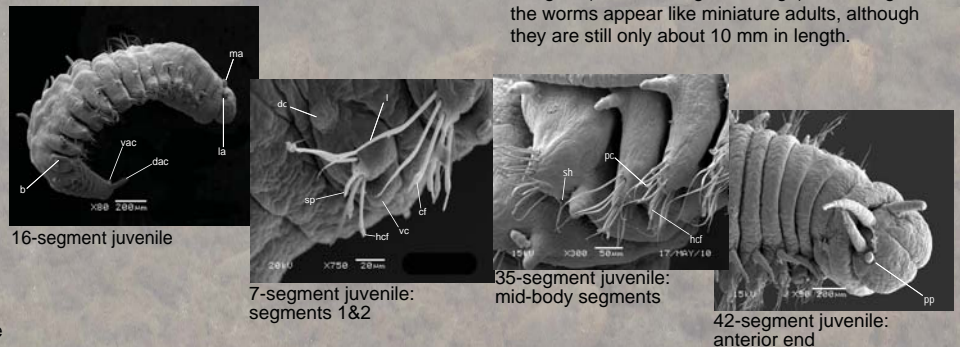
### 3-9 Segments

Larval ciliation disappears once the third segment is added and worms are about 570µm long. Egg yolk is gradually expanded as the gut and jaws develop. By the 5-segment stage the juveniles are fully benthic and mucous tube construction begins. By the 7 segment stage, the almost 1 mm long juveniles have fully formed jaws comprising maxillae and mandibles.



### 10-19 Segments

The prostomium develops a median antenna followed by a lateral pair and its anterior margin becomes cleft. Parapodia gain dorsal and ventral cirri, branchiae, and the characteristic compound spinigers. Juvenile chaetae, spines and compound falcigers, disappear.

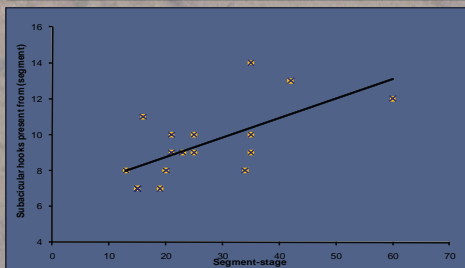
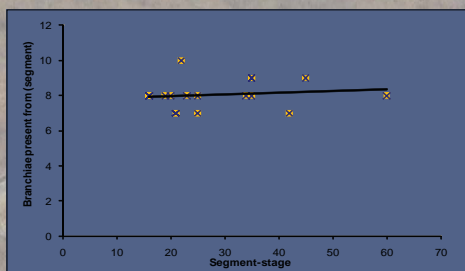


### 20-60 Segments

The posterior body becomes dorsoventrally compressed and dorsal pigmentation and pectinate chaetae appear. Palps appear between the 35- and 45-segment stages. The final two juvenile features are lost: larval eyes which persist up to about 45-segments; and hooded compound falcigers (about 58-segment stage). At 60 segments the worms appear like miniature adults, although they are still only about 10 mm in length.

## 4. Post-juvenile development

Beyond 60 segments development involves the addition of segments (up to 420) and an increase in body size (up to 190mm<sup>1</sup>). The start of the branchiae progressively shifts posteriorly from 7-10 in juveniles to 22-32 in adults<sup>1</sup>; the start of the subacicular hooks shifts posteriorly from 7-14 in juveniles to 31-51 in adults<sup>1</sup>.



## 5. Summary

- Marphysa fauchaldi* is one of only a few species in the genus known to incubate its larvae in jelly cocoons;
- Development involves a fixed sequence of additions and losses of features;
- Adulthood is attained by the 60 segment-stage;
- Post juvenile development involves allometric growth including a shift posteriorly in the start of both branchiae and subacicular hooks.

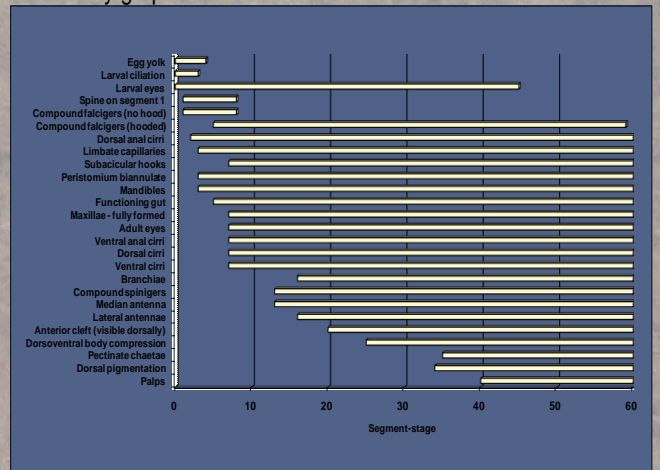
### Reference

<sup>1</sup>Glasby, C.J. & Hutchings, P.A. 2010. A new species of *Marphysa* Quatrefages, 1965 (Polychaeta: Eunicidae) from northern Australia and a review of similar taxa from the Indo-west pacific, including the genus *Nauphanta* Kinberg, 1865. *Zootaxa* 2352:29-45.

### Acknowledgments

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## Life history graph



### Abbreviations

b=branchia, cb=ciliary bands, dac=dorsal anal cirrus, dc=dorsal cirrus, e=eye, g=gut, hcf=hooded compound falciger, l=limbate capillary, la=lateral antenna, le=larval eye, m=mandibles, ma=median antenna, mx=maxillae, p=parapodium, pb=pharyngeal bulb, pc=pectinate chaeta, pe=peristomium, pp=palp, pr=prostomium, sh=subacicular hook, sp=spine, vac=ventral anal cirrus, vc=ventral cirrus, y=egg yolk.