

Phylum Cnathostomulida –in Greek ‘jawed mouth’

Gnathostomulids are triploblastic acoelomate bilaterians, free living, interstitial and vermiform.

Circular in cross section, with a muscular pharynx containing 2 jaws, and one basal plate. Rarely > 3mm in size, usually 0.5-1mm. (A)

Usually with head, neck and trunk, which tapers to a tail.

Gnathostomulids have no cuticle, 1-layer epidermis one cilia per epithelial cell. Parenchyma is probably absent

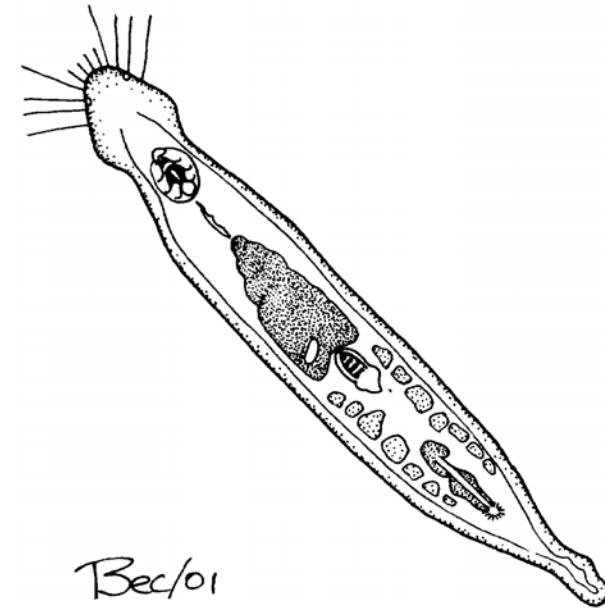
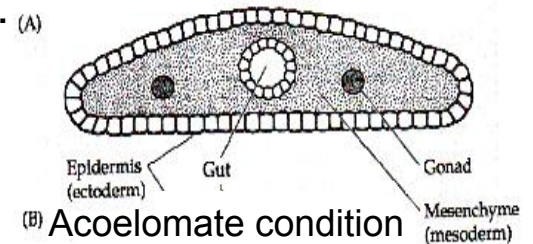
Exclusively cross-striated muscles

No circulatory system with no or rudimentary anus. The gut is a simple tube or sac.

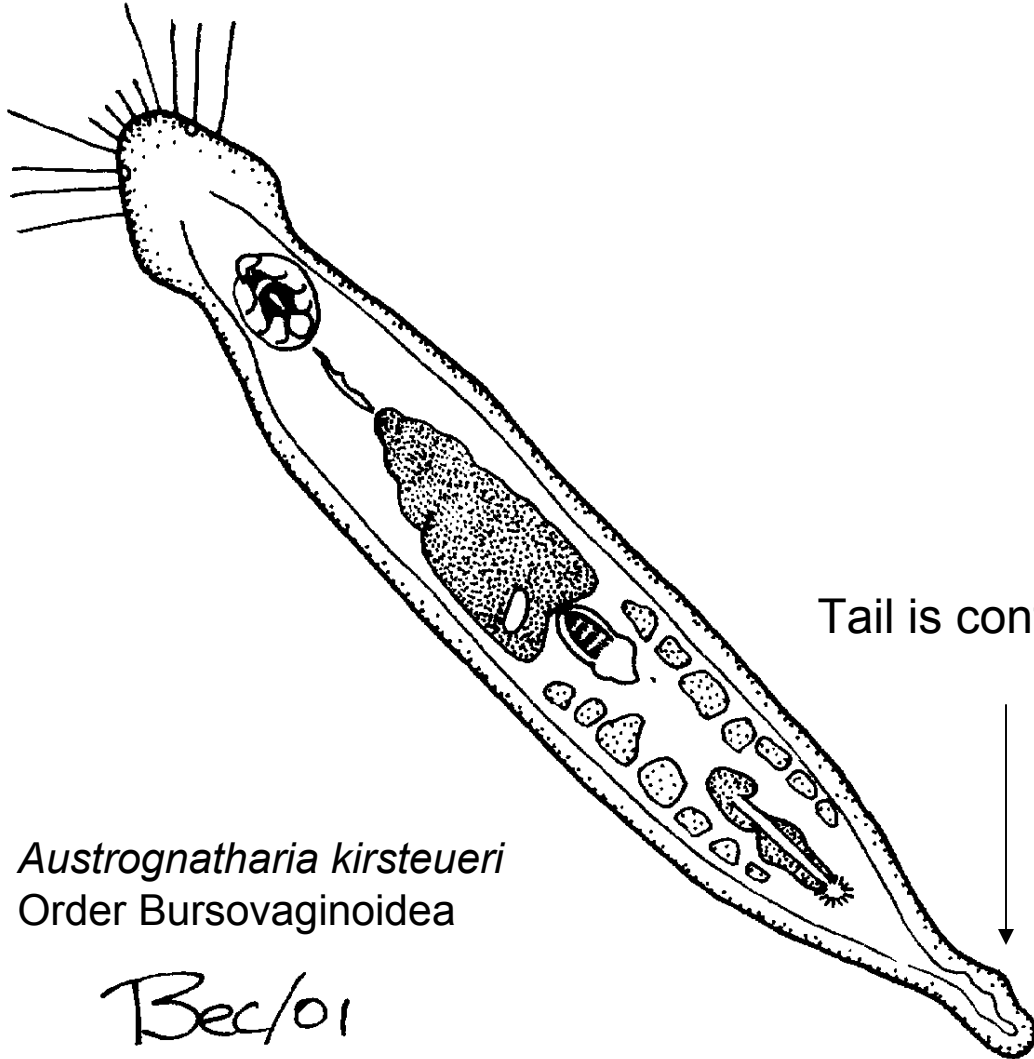
The head with sensory projections and pits of cilia on the epidermis

Nervous tissue concentrated in cephalic and buccal ganglia.

Oral apparatus lies on the ventral surface of the head.



Haplognathia simplex
Order Filospermoidea

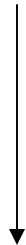


Austrognatharia kirsteueri
Order Bursovaginoidea

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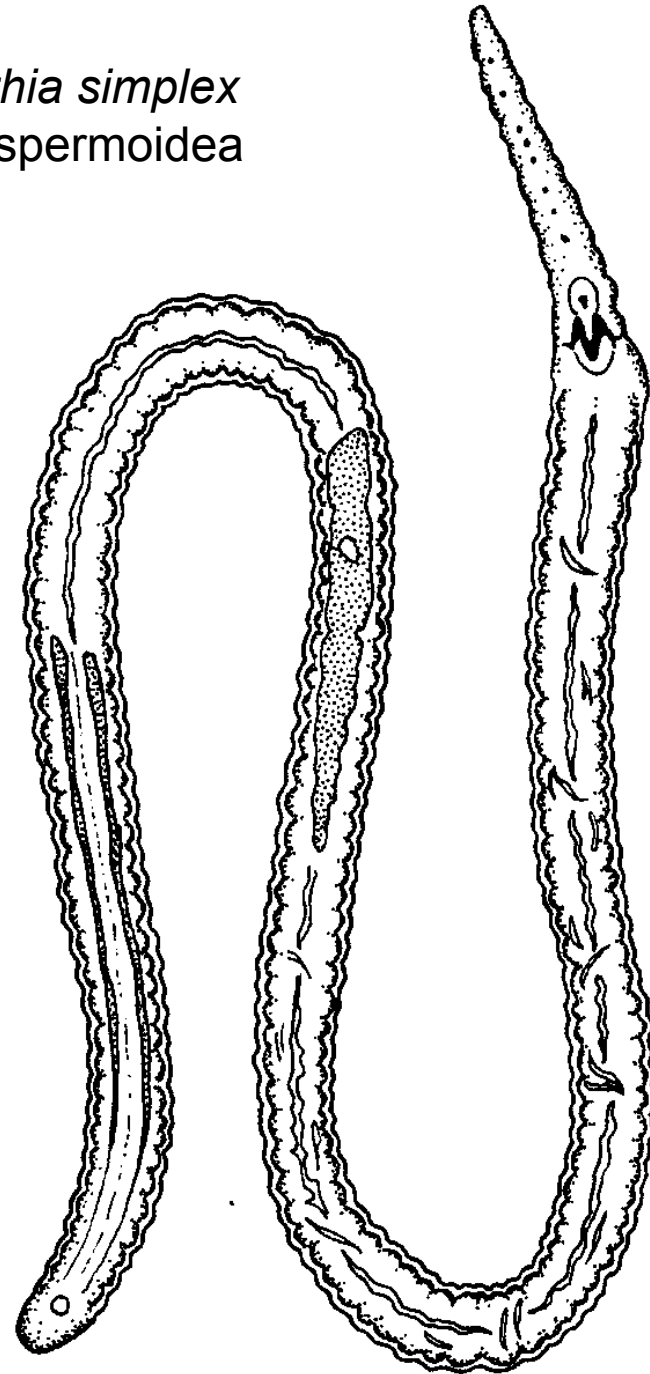
Stritch, © BIODIDAC

Tail is contractile

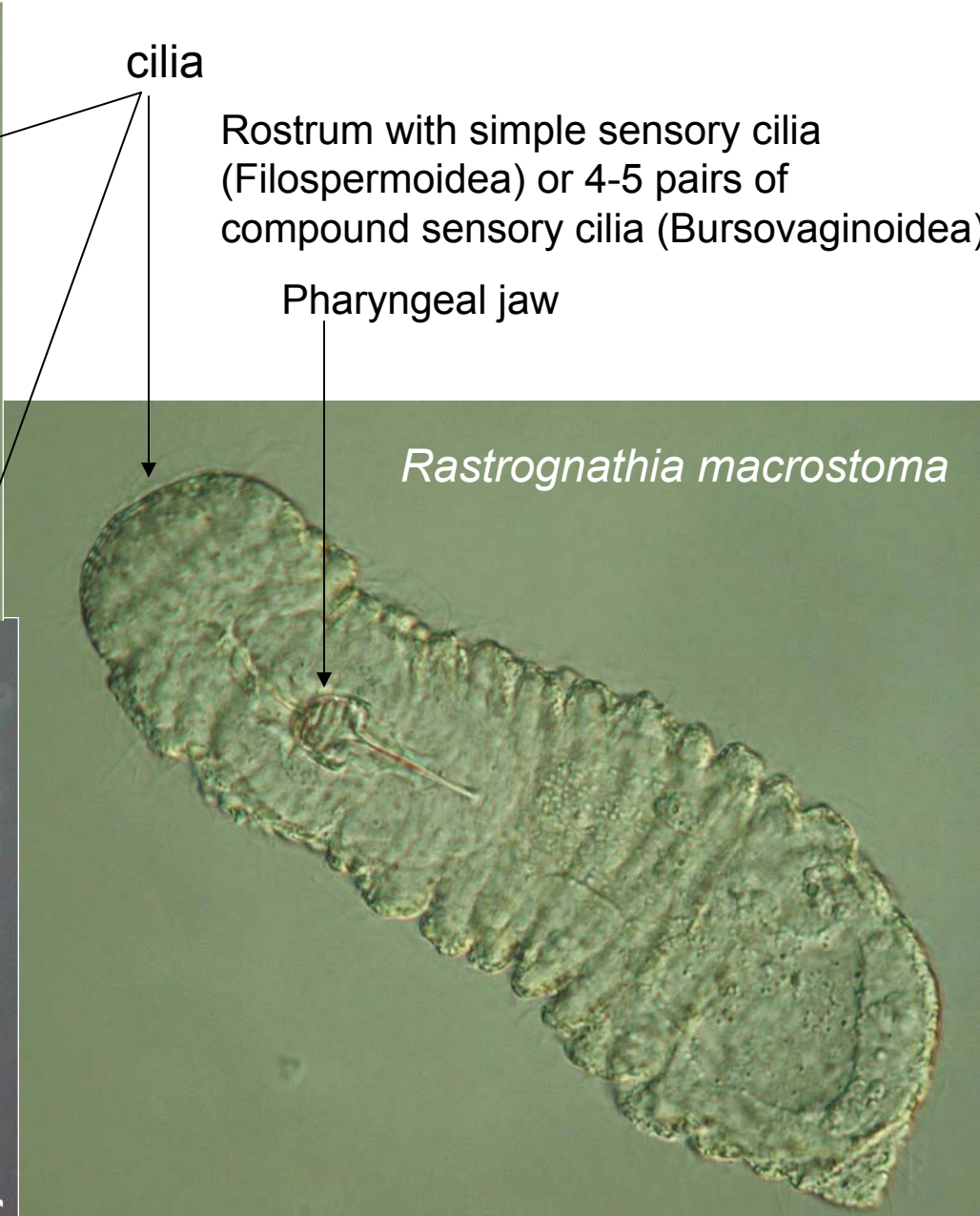
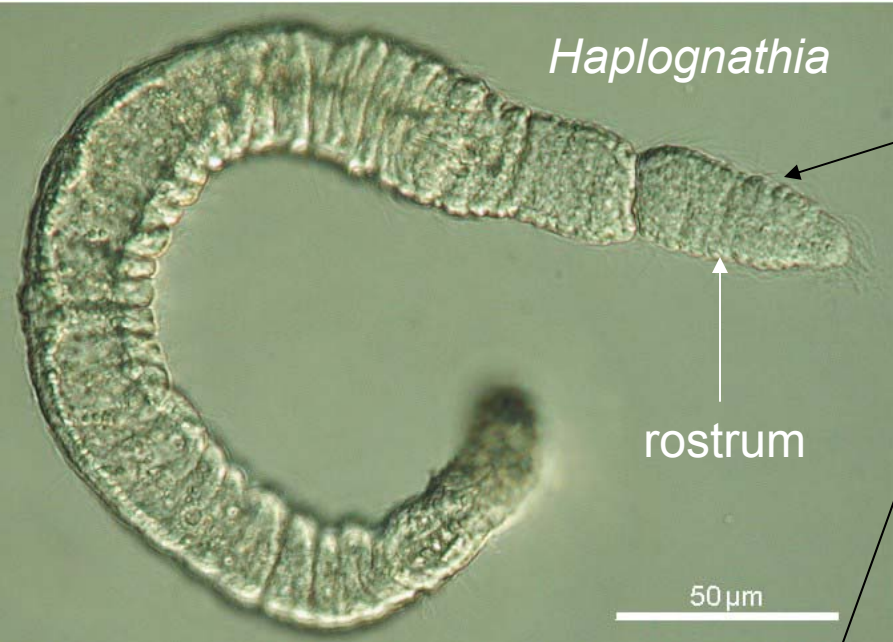


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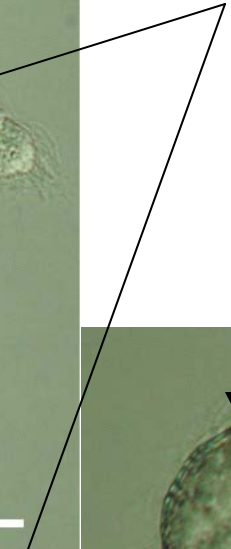
Gnathostomulids



cilia

Rostrum with simple sensory cilia (Filospermoidea) or 4-5 pairs of compound sensory cilia (Bursovaginoidea)

Pharyngeal jaw



Mouth ventral behind rostrum

Bilaterally symmetric, muscular pharyngeal bulb situated posteriorly in ectodermally-derived buccal cavity

Hard parts secreted in situ in ectodermal folds; no growth zone

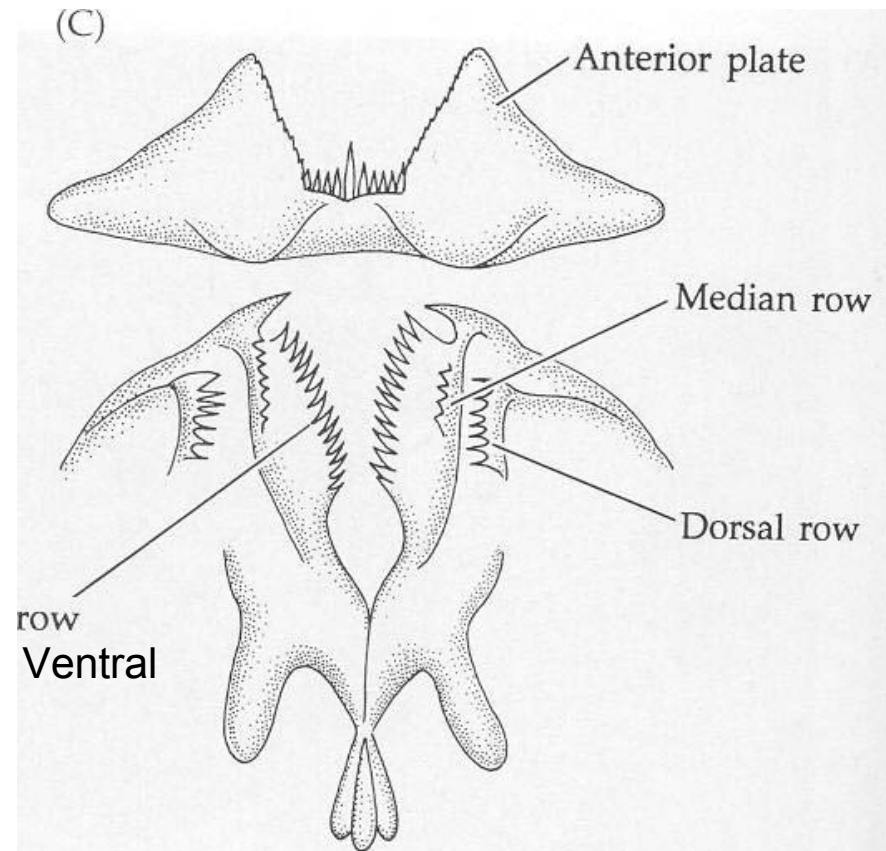


Gnathostomulid Jaws

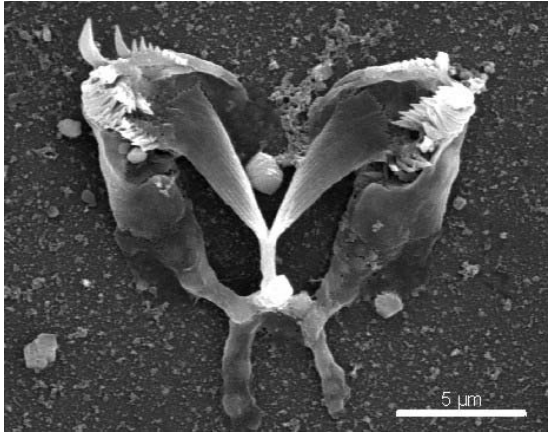
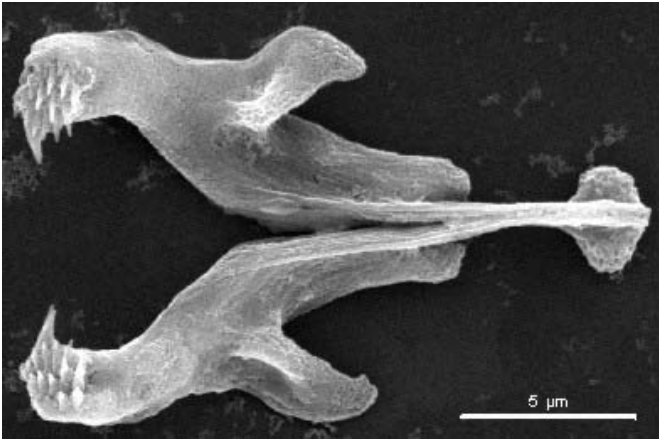
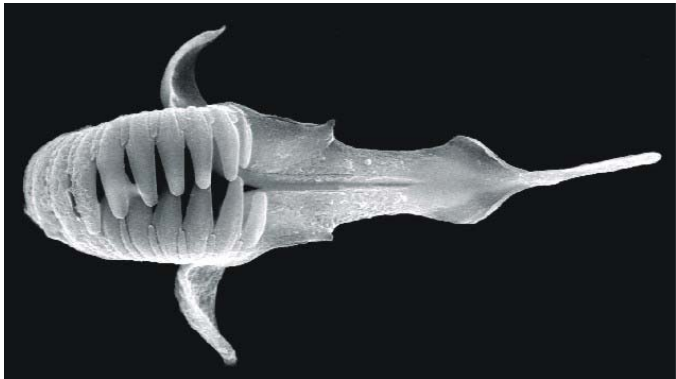
2 toothed jaws assoc with pharyngeal bulb
Single basal plate inside lower lip, toothed or not. Various pharyngeal glands present



Gnathostomula armata



3 gnathostomulids and their jaws



Reproduction

Most are hermaphrodites, but some are monoecious.

Males with 1-2 testes, females with a single large ovary

Fertilization occurs internally with the production of a single large egg.

The egg later escapes from the body by breaking directly through the body wall.

Cleavage of the egg is spiral, and the development to adulthood is direct.

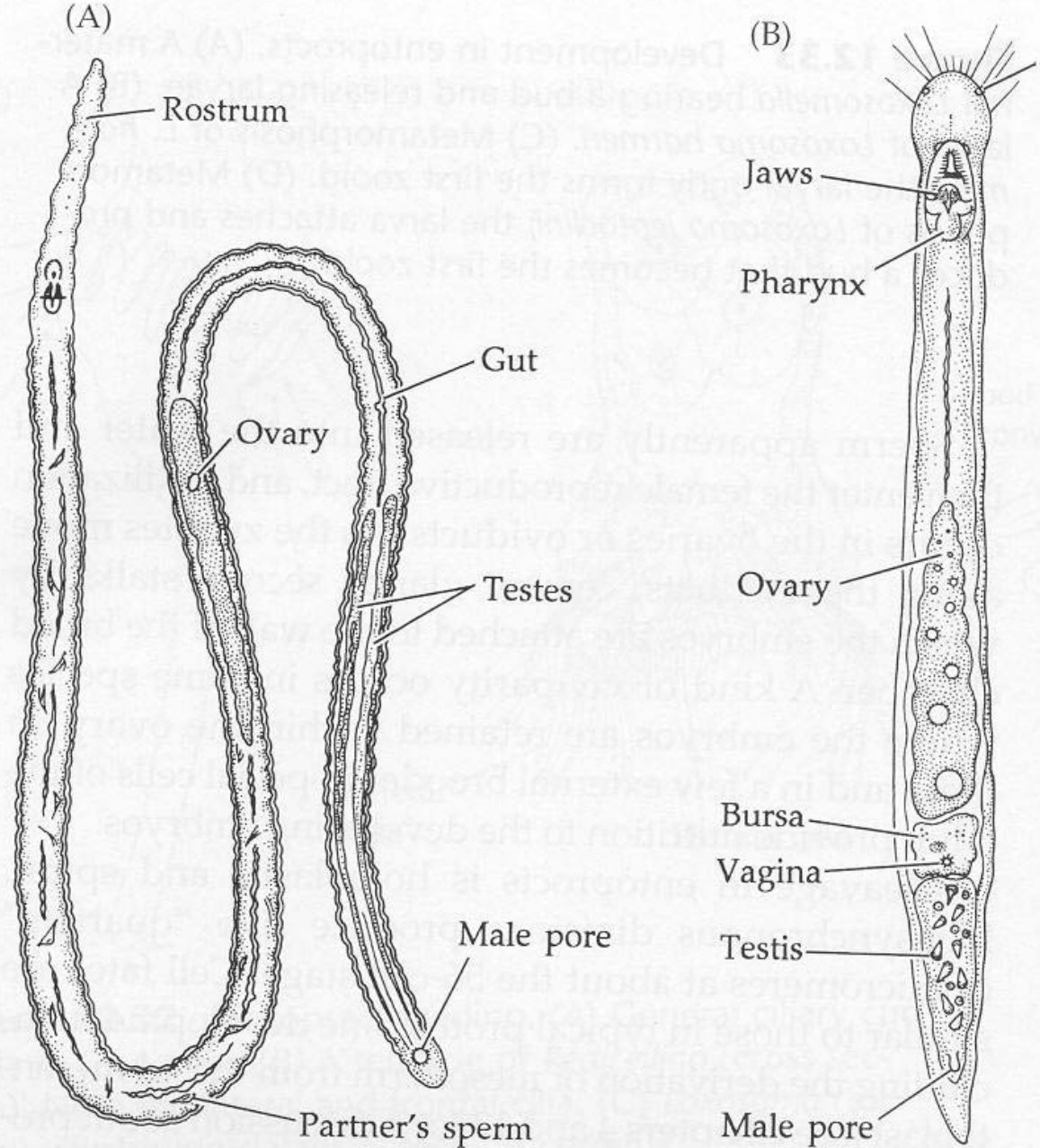


Figure 12.34 Representative gnathostomulids. (A) *Haplognathia simplex*. (B) *Austrognatharia kirsteueri*.

Distribution

Worldwide in marine gravels to muds (fine sands optimally); intertidal to several m

Interstitial animals. All movement is achieved through ciliary gliding, swimming and contortion of the body.

Highest densities in sulfide rich, anoxic marine sediments

Encrusted bacteria and fungi are scraped up by the basal plate, and chopped by the jaws before passing into the gut.

Nervous system

Nervous system intraepidermal, brain in rostrum, six symmetrically disposed longitudinal nerve cords, 2 additional nerve cords from brain to ganglion associated with the pharyngeal bulb

1. Sensory cells, compound bristles all monociliated except perhaps for a pair of spiral-ciliary organs flanking the mouth
2. Ciliated pits of unknown function often present on rostrum
3. No eyes, statocysts

Excretory system

Protonephridia are isolated solenocytes similar to epidermal cells which join a canal cell opening on the body surface

Muscular system

Body wall musculature in outer circular, and 6 inner longitudinal, symmetrically disposed bundles of fibers (associated with 6 longitudinal nerve cords)

Taxonomy

Gnathostomulida were initially described as aberrant turbellarians (Ax 1956)
Made a distinct phylum by Rupert Riedl (1969)

Two Orders

Order Filospermoidea - long pre-oral rostrum, males without penis, sperm filiform females without vagina
ca. 20 spp.

Order Bursovaginoidea – Body length/width ratio not as high as the filospemoids. Males with penis, sperm not filiform, females with bursa and most times vagina

Suborder Scleroperalia
ca. 30 spp.

Suborder Conophoralia
ca. 10 spp.

The phylogenetic position of Gnathostomulids is not resolved

They share a number of features being shared with the turbellarian flatworms, with whom they were formerly included.

But the presence of monociliate cells, and a cross-striated musculature is more indicative of Cnidarian or perhaps Gastrotrich affiliations.

Gnathostomulids could be the missing link between the Cnidarians and the Turbellarians.