



Chapter 9 Chaetognatha

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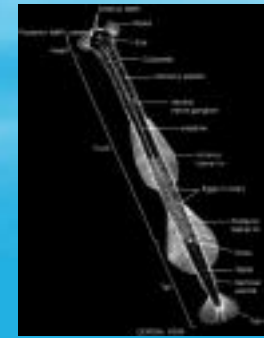
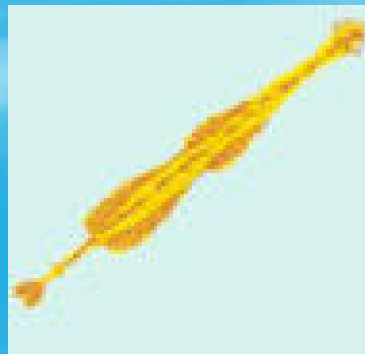
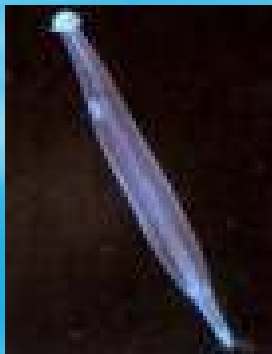
References

- 萧贻昌, 2004. 中国动物志 无脊椎动物 V38
毛颚动物门 箭虫纲



Characteristic Features

- **body transparent and elongated, bilateral symmetry**
- **bristles on the frontal part of body**
- **body form arrow-like**
- **embryonic development belong to Deutostoma**
- **coelom**
- **significance in studies on evolution, special group**

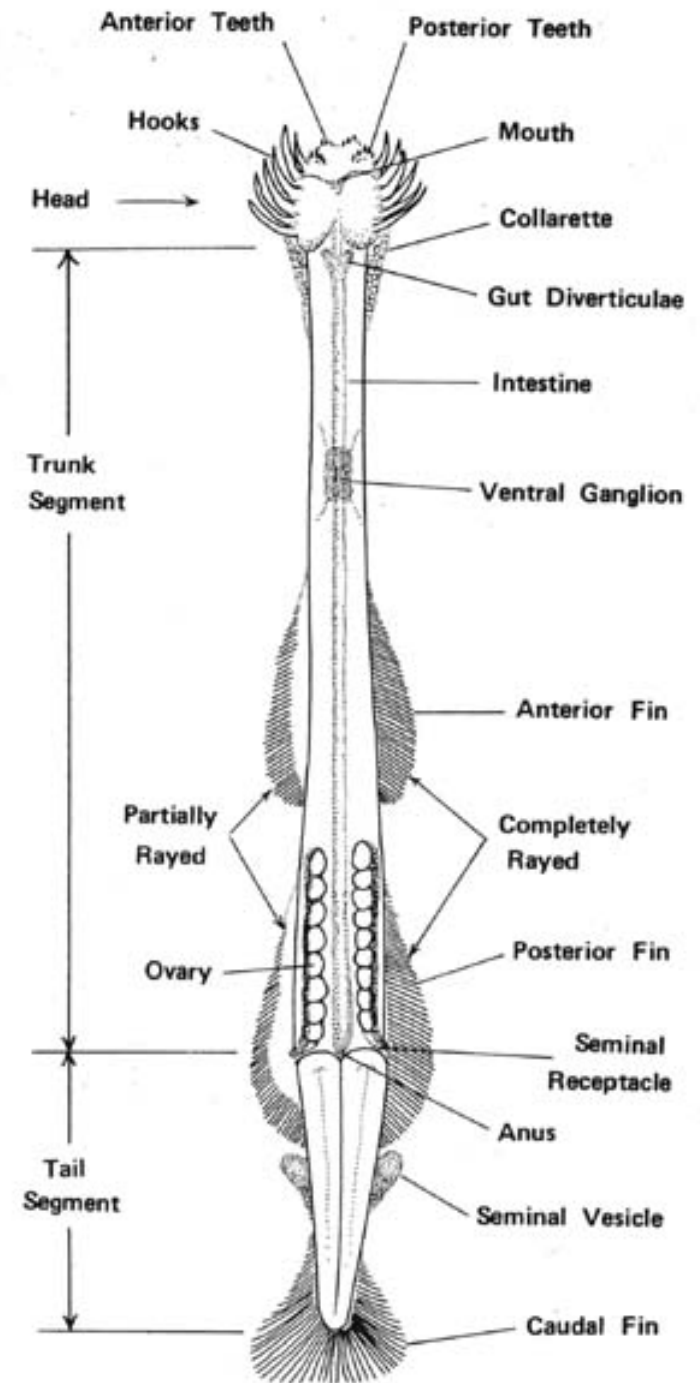


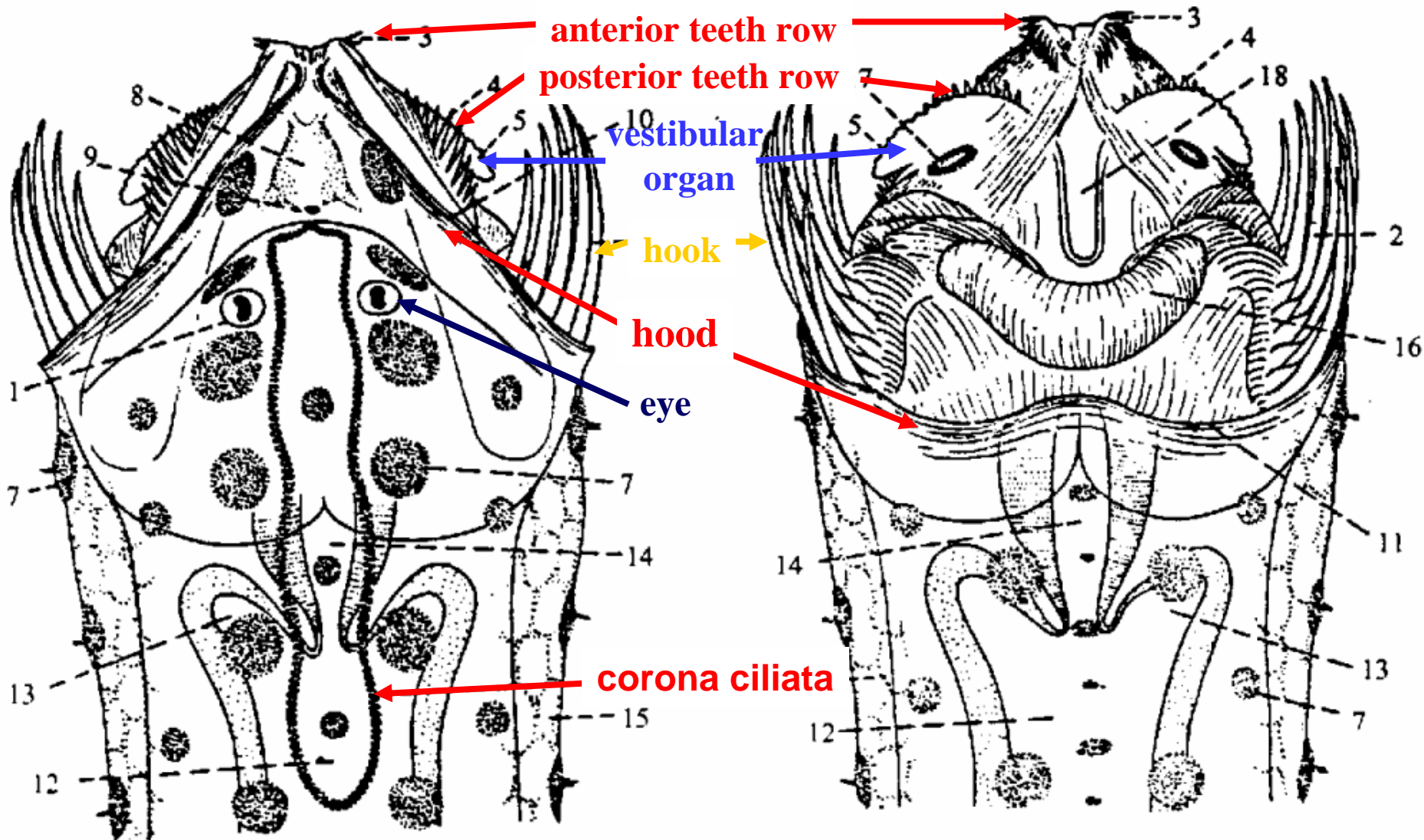
9.1 General Features

9.1.1 External Features

Head

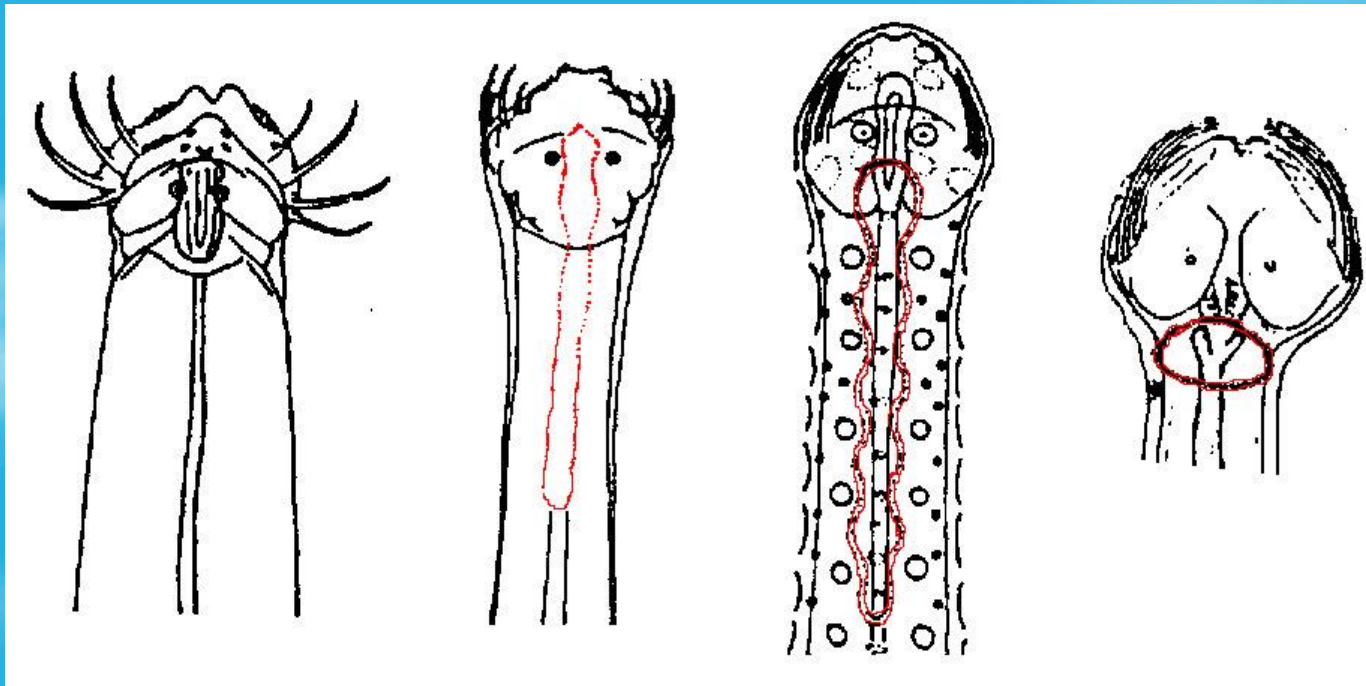
- 1) hood 头巾
- 2) bristles (hook) 颚刺 (颚毛)
- 3) tooth
- 4) eye
- 5) corona ciliata 纤毛冠
- 6) vestibular organ 前庭器





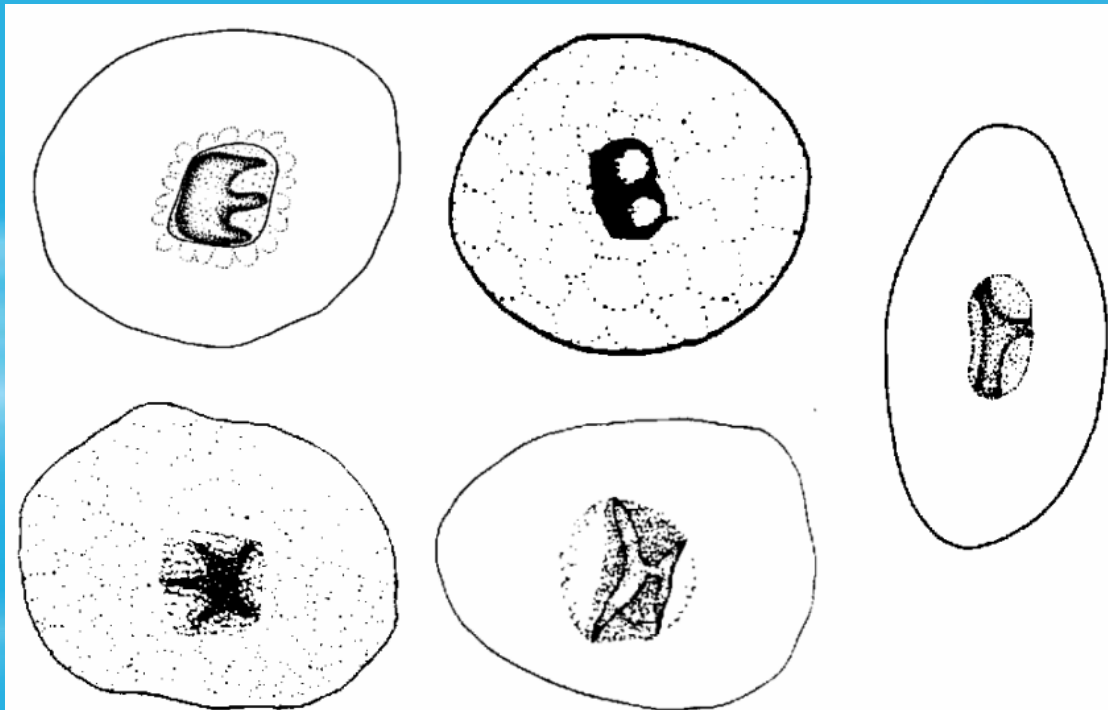
corona ciliata

- **Type A:** 限于头部，呈盾形或卵圆形 *S. enflata*, *S. hexaptera*
- **Type B:** 从脑后向后伸展道躯干前部，细长，两侧作波浪状弯曲 *S. pacifica*, *S. sinica*, *S. bipunctata*, *S. robusta*
- **Type C:** 起于眼后，延伸到躯干前部，细长，有波状弯曲 *S. crassa*, *S. delicata*
- **Type D:** 分布局限于颈部，呈长圆形或扁圆形 *Spadella plana*, *Spadella cephaloptera*

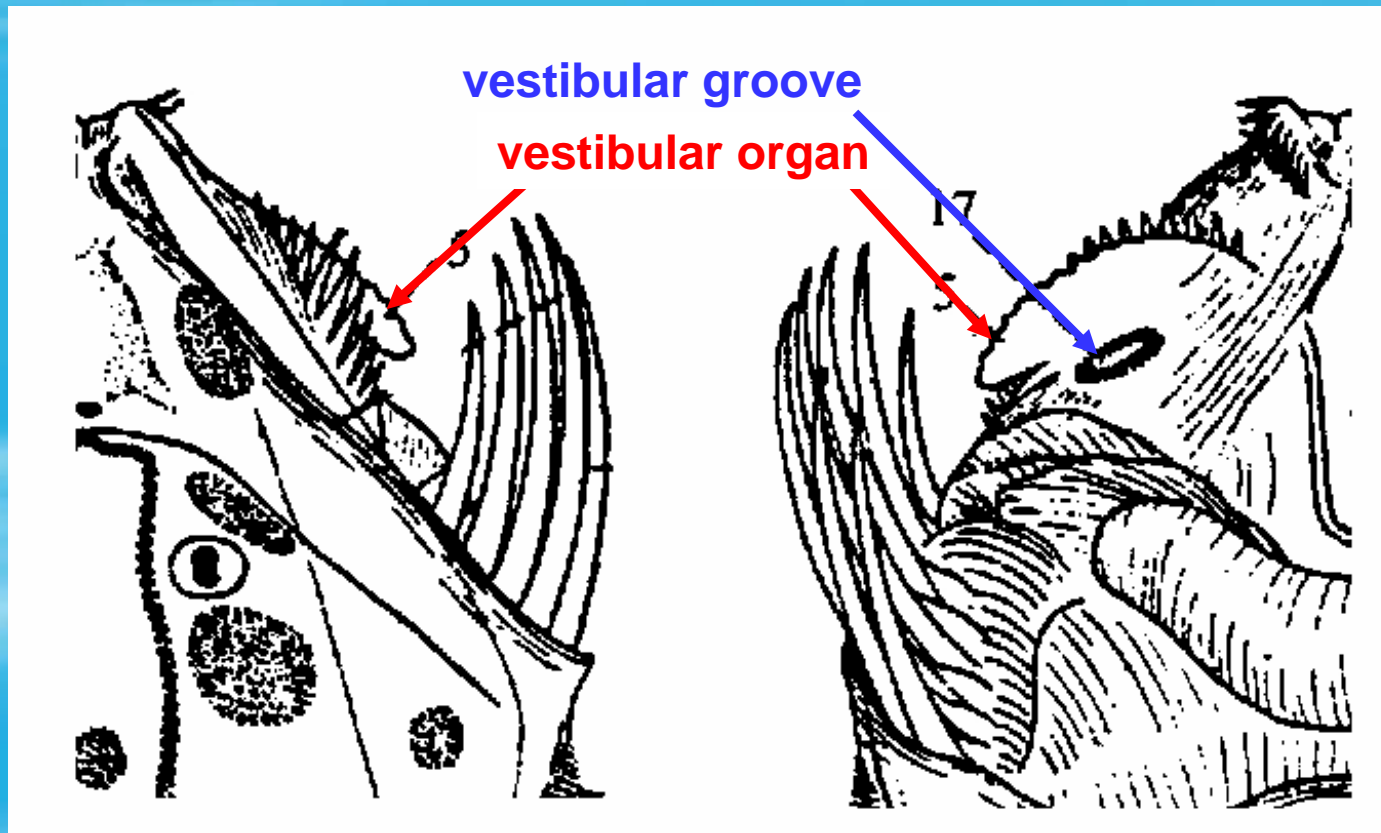


eye

- “E” type: *Sagitta sinica*, *S. crassa* f. *naikaiensis*
- “B” type: *S. nageae*
- “star” type: *S. enflata*, *S. bedoti*
- “H” type: *S. lyra*, *S. scrippsae*
- “卜” type: *S. pacifica*, *S. hexaptera*, *S. ferox*



vestibular organ



Trunk

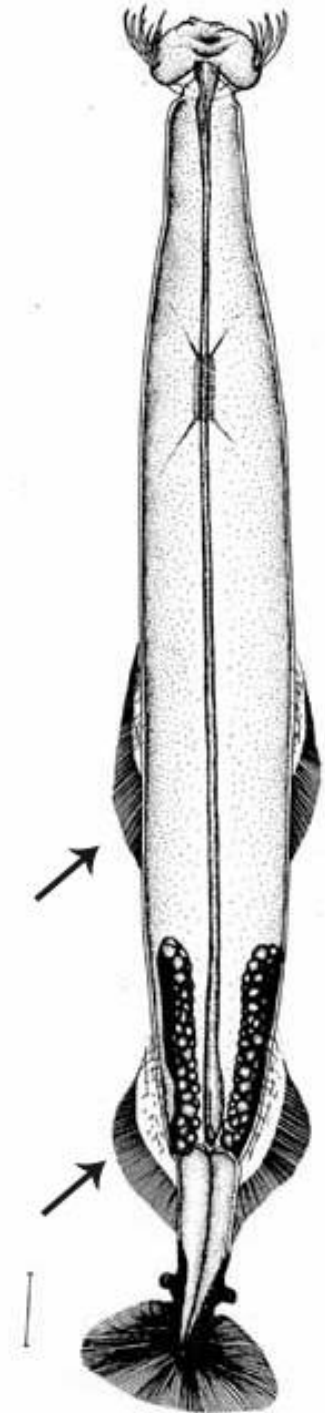
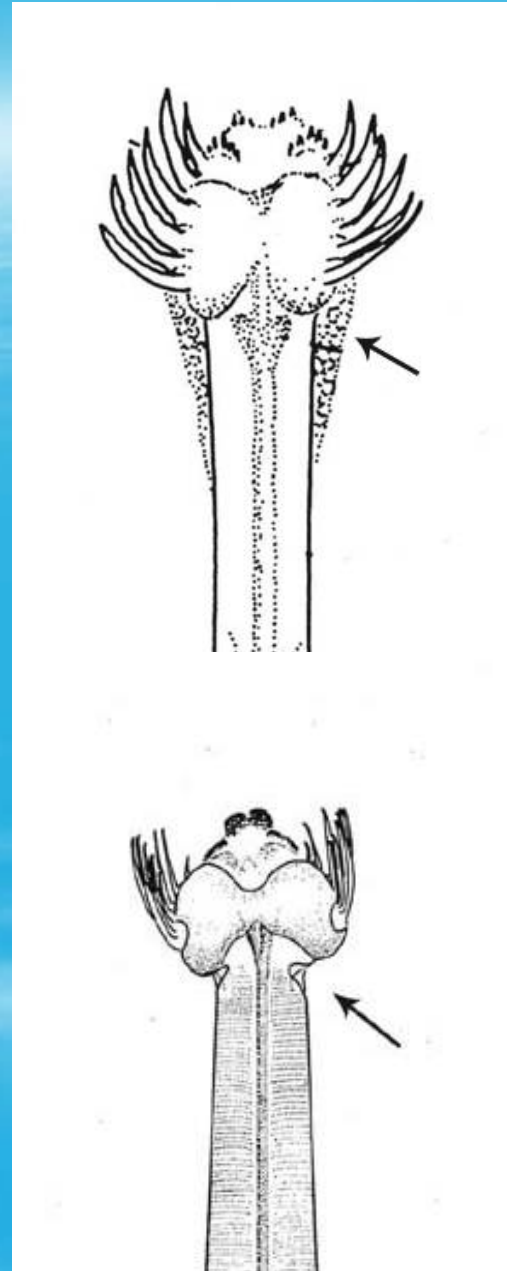
collarete

lateral fins

Tail

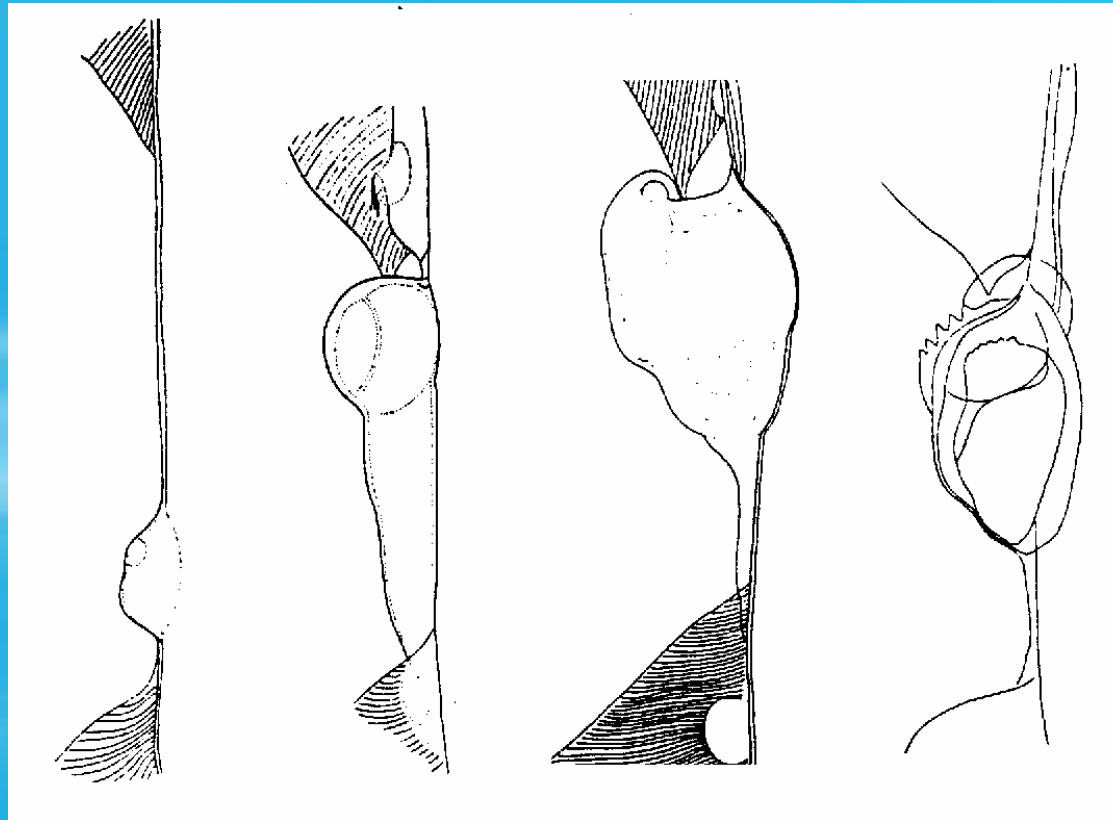
(1) tail fin

(2) seminal vesicle



seminal vesicle

- **Type A:** 圆形或卵圆形，排精时侧面破裂 *S. enflata*
- **Type B:** 前部膨大，后部狭长，沿前部侧面破裂 *S. crassa*
- **Type C:** 长椭圆形，沿侧面或前部侧面破裂 *S. bedoti*
- **Type D:** 前端侧面有齿状突起，沿侧面中段破裂排精 *S. pacifica*



9.1.2 Internal Features

Coelom

Digestive system

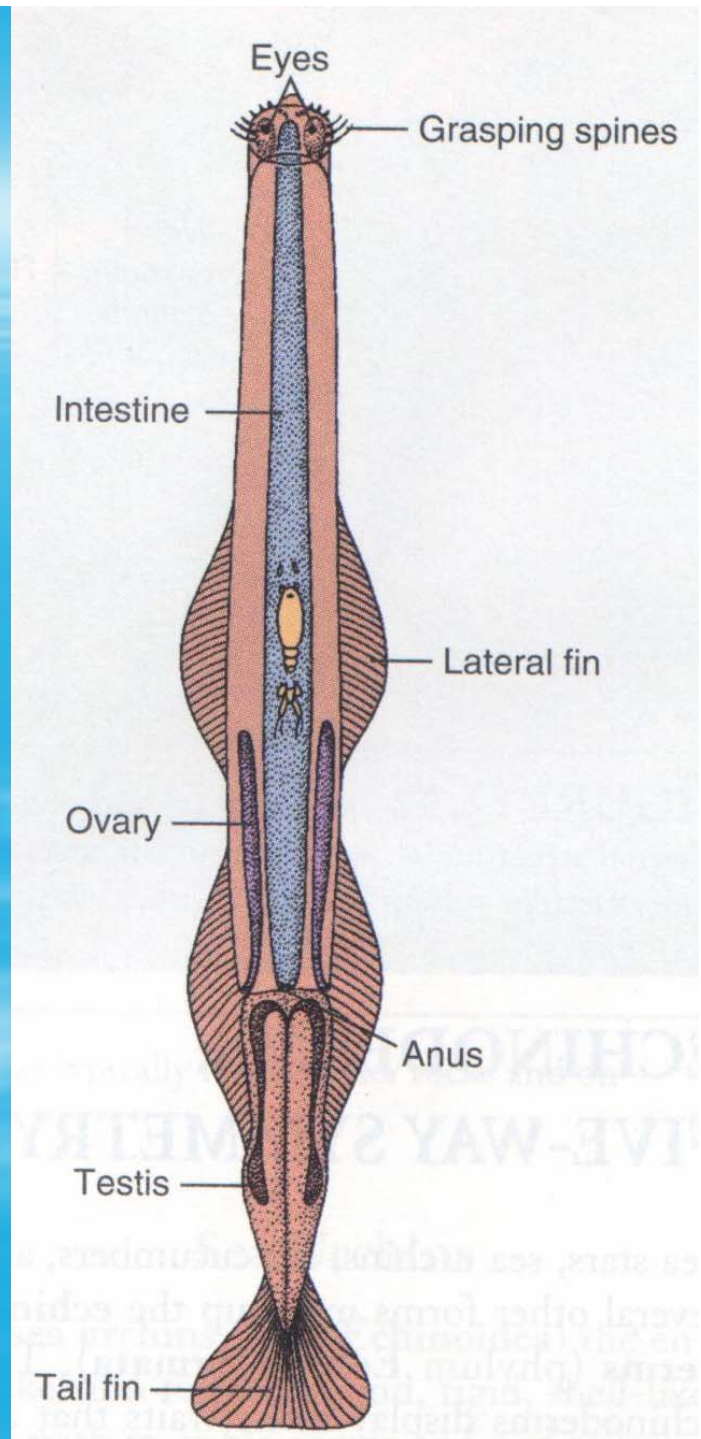
Nervous system

- **cerebral ganglion**
- **ventral ganglion**

Muscle

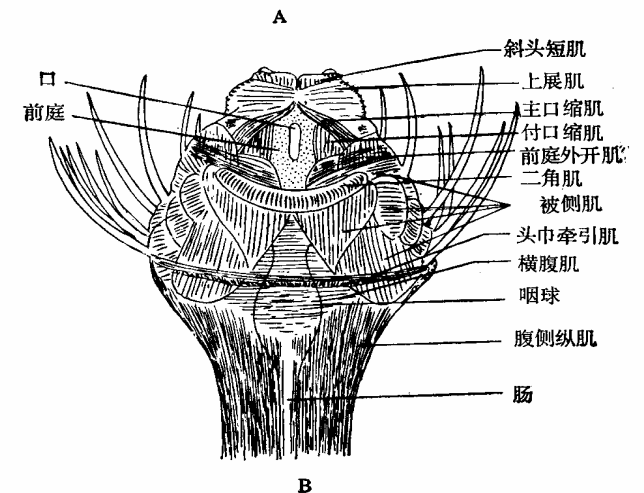
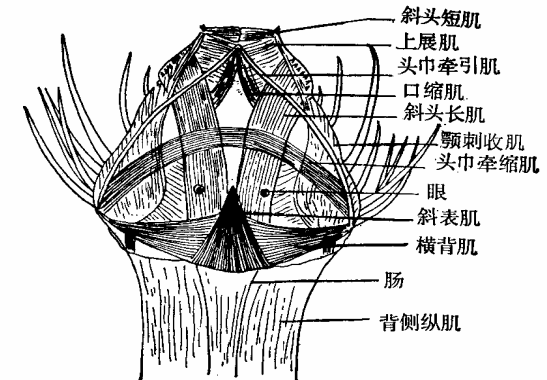
Reproductive system

protandrous hermaphrodite



Muscle

- well developed and rather complicated
- 1) lateral band
- 2) dorsolateral longitudinal muscle band
- 3) ventrolateral longitudinal muscle band



箭虫的肌肉

A. 头部背面观; B. 头部腹面观

9.2 Classification

one class, Sagittoidea; two orders, 5 families, 6 genera

Comparison with common families

	Sagittidae	Pterosagittidae	Krohnittidae
Lateral fins	2 pairs	1 pair, located on the tail	1 pair, located on both trunk and tail
teeth	two rows	two rows	one row
collaretta	with not well developed	well developed	without

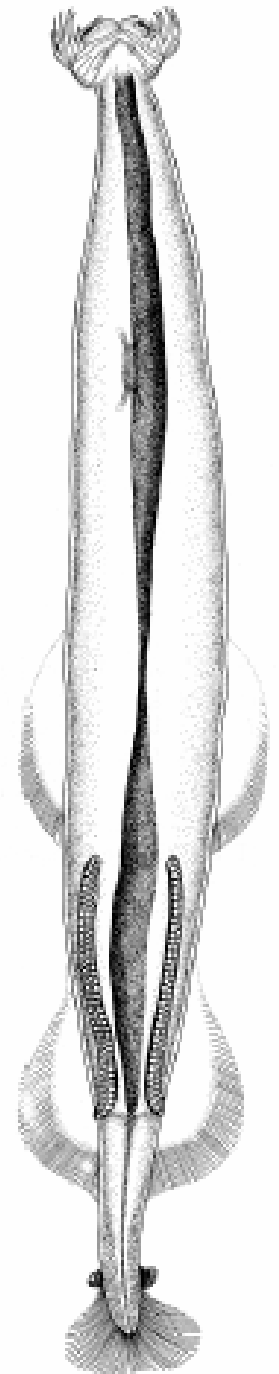
9.2.1 Sagittidae

characteristics for classification:

- **Size and the ratio of caudal to body length**
- **Number of anterior and posterior teeth**
- **Position and shape of the corona ciliata**
- **Degree of development for collarette**
- **Position and number of lateral fins and the distribution of fin rays**
- **Position and shape of seminal vesicle**

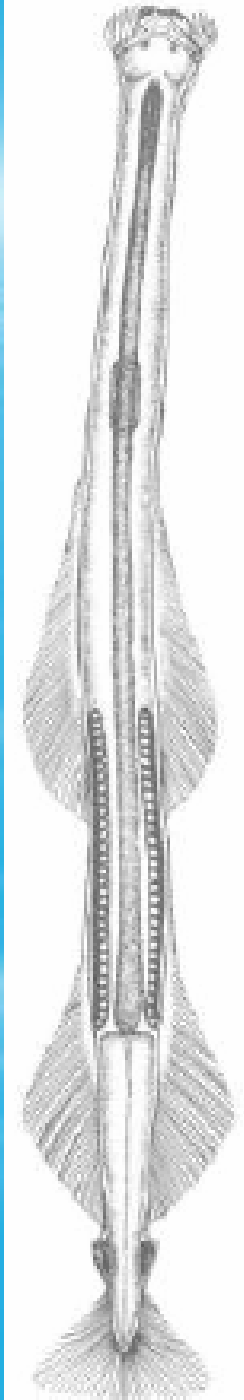
S. enflata

- **Body wide, floppy, transparent and widest around its mid-length.**
- **On either side of the head 7-10 hooks, 6-11 anterior teeth and 8-18 posterior teeth.**
- **Head is wider than long with a conspicuous neck.**
- **The lateral fins short, approximately the same length, show distinctive rayless zones. Anterior fins separate from posterior fins and start distance behind ventral ganglion**
- **No collarette or intestinal diverticula.**
- **Small spherical, seminal vesicles touch the caudal fin, but well separated from the posterior fins.**



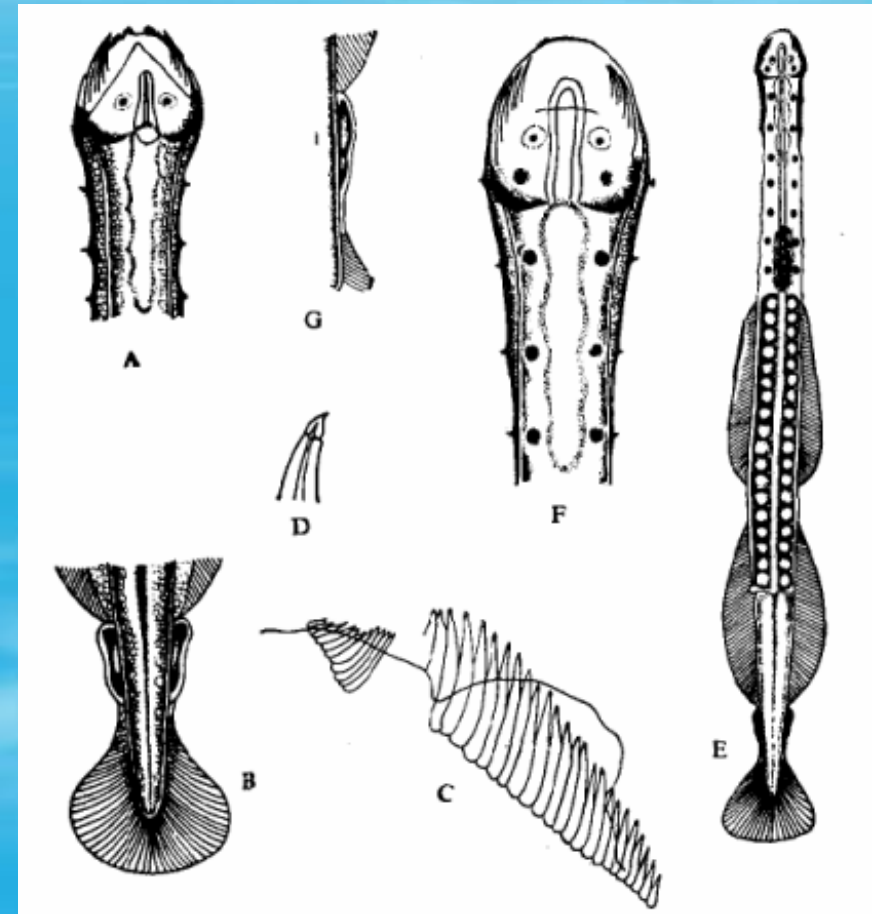
S. bedoti

- **Body opaque, firm and wider at the middle.**
- **On each side of the head 6-8 thick, short, not strongly curved hook, 10-13 anterior teeth and 23-29 thin, closely packed posterior teeth.**
- **A short thin collarette can be present.**
- **The anterior fins start in the middle of the ventral ganglion, both pairs of fins have an anterior and long internal rayless zone.**
- **No gut diverticula.**
- **The seminal vesicles touch both the posterior and caudal fins.**



S. crassa

- Lateral fins are completely rayed, with fin rays almost at right angles to the body wall.
- Intestinal diverticula present.
- Seminal vesicles generally situated just behind the posterior fins, less apart from the tail fin.
- Tail segment relatively long.



S. pacifica

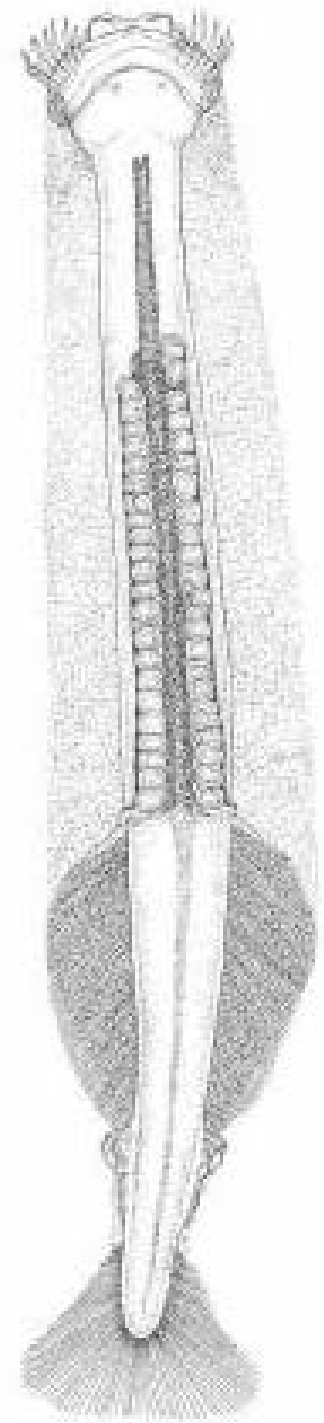
- **Body translucent, slender, firm and rigid, with trunk region of the same width along its whole length.**
- **On either side of the head 5-6 serrated hooks, 9-11 anterior teeth and 18-23 posterior teeth.**
- **A thin collarette can be present on the neck and between the seminal vesicles and caudal fin.**
- **Lateral fins completely rayed, anterior fins start slightly behind posterior edge of ventral ganglion.**
- **Intestinal diverticula absent.**
- **Seminal vesicles touch the posterior fins, but separated from caudal fin. The vesicles have a series of chitinous teeth on the side.**



9.2.2 Pterosagittidae

Pterosagitta draco

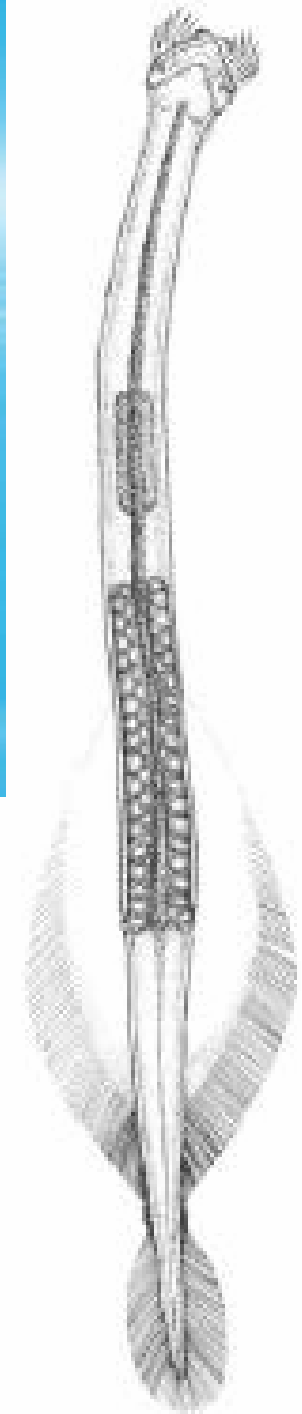
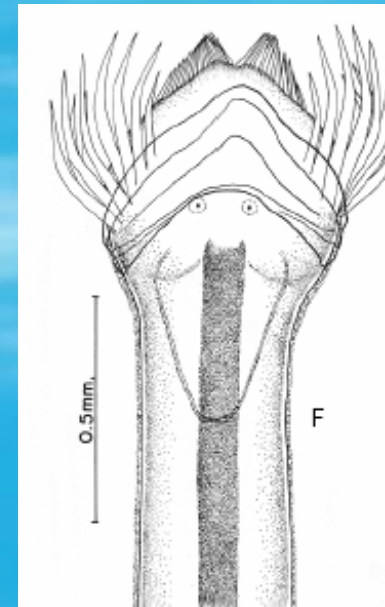
- Opaque, firm and stout body.
- On each side of head 7-9 hooks, 7-9 anterior teeth, 11-17 posterior teeth.
- Massive collarette, extending from the neck over the paired fins, thinning towards the tip of the tail.
- A single of lateral fins, semicircular in shape and with no rayless zone, run between the trunk/tail septum and the seminal vesicle.



9.2.3 Krohnittidae

Krohnitta pacifica

- The body is slender and transparent.
- On either side of the head there are 7-10 hooks and 11-16 teeth in a single row. The teeth are long and meet at the tips to give a funnel shape.
- A single pair of lateral fins, extending from the tail section to less than half way along the trunk. The fin rays cover the outer half of the fin surface, leaving the internal and anterior part without rays.
- No collarette or gut diverticular.



9.3 Biology and Significance

9.3.1 Distribution

1 Geographic distribution

(1) temperature:

- frigid species
- temperate and subtropic species
- tropic species

(2) salinity:

- neritic species
- oceanic species

(3) eurythermic species

2 Vertical distribution

9.3.2 Reproduction and Development

9.3.3 Feeding carnivore

9.3.4 Regeneration

9.3.5 Significance

- (1) food for fish
- (2) current indicators
- (3) evolution studies

9.3.6 Harmful to fisheries

