

Stone Centipedes up Close

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These 30-short-legged (15 pairs) of brown centipedes (Order: Lithobiomorpha) are common predators living under stones and bark in my area. Very rarely I see one or two in my basement and am glad to have them there – they get rid of any damaging insects. Unfortunately these centipedes somehow get into steep sided open-top plastic containers and cannot get out (no idea how they get in). When discovered they are dried shrunken shells but a few hours in a 5% KOH (potassium hydroxide) solution brings them back to their normal flat hydrated form; albeit dead. Cleaned of any adhering debris these softened specimens make for interesting low-magnification microscopic subjects.

Body plan

Being arthropods they have the basic structure of an external skeleton, multisegmented body, and jointed appendages. Figure 1 shows a re-hydrated specimen in ventral view, note the 15 pairs of legs separated into 12 similar pairs and 3 modified pairs at the posterior end of the body.



Fig. 1. Ventral view

Head & 1st body segment

It is worth considering these together as they are both intimately concerned with feeding. The head is multisegmented with the segments fused into a single head capsule but the associated paired appendages remain essentially intact reflecting the original segmented design of the head, in order from front to back these are: antennae, mandibles, 1st maxillae, 2nd maxillae (Fig. 2). Associated with these head appendages are a pair of huge poison claws (maxillipeds) with their own set of tiny teeth (Figs. 2, 4, 6).



Fig. 2. Head and anterior body segments; ventral view

The head capsule also has a cluster of ocelli (eyes) on each side behind the bases of the antennae and best seen in dorsal view (Fig. 3).



Fig. 3. Head; dorsal view

Poison claws (maxillipeds)

The initial stage of feeding is the capture of prey. In these centipedes prey capture is accomplished using the first pair of body appendages, which would normally be walking legs, that have been modified as claws for grasping live prey and producing and injecting a lethal dose of a paralyzing chemical. The sharp-pointed tips of these claws articulate with the adjoining segment and have a poison-producing gland which connects to an opening at the tip by a duct (Figs. 4, 5). (I have been unable to fully trace the duct and to find the opening).

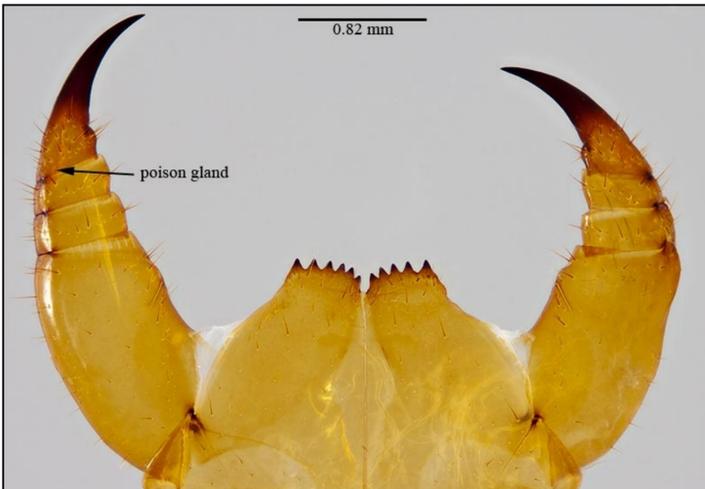


Fig. 4. Poison claws (1st body appendages); ventral view

Figure 5 is a close-up of the base of the tip showing the position and shape of the poison gland and the start of the duct.

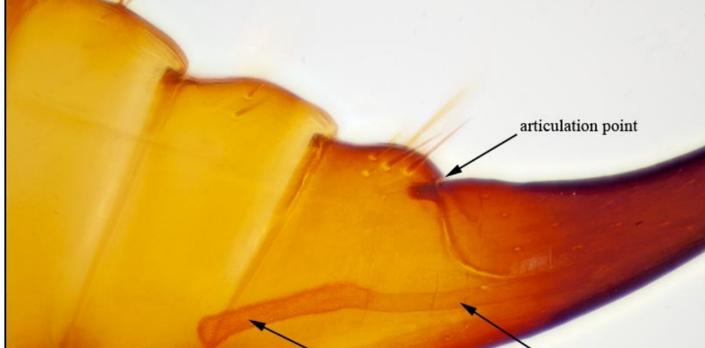


Fig. 5. Tip area of poison claw showing poison-producing gland and its duct; dorsal view

Figure 6 shows a close-up of the 'teeth' at the base of the poison claws; these probably function as a lower lip to hold the prey in proximity to the actual mouthparts.

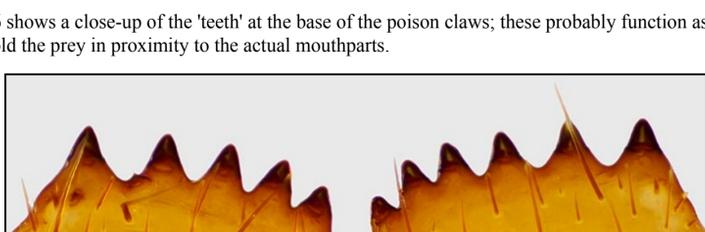


Fig. 6. 'Teeth' at bases of the maxillipeds

Mandibles

The paired mandibles are the main macerating appendages and are situated directly below the mouth. Each mandible has a series of strong teeth at the end of a long shaft for muscle attachment. A protruding knob, condyle, near the teeth articulates with the internal skeleton (tentorium) of the head capsule (Fig. 7).

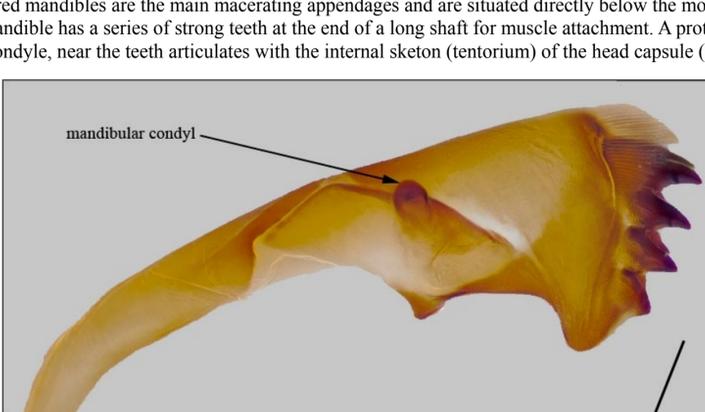


Fig. 7. Mandible

1st & 2nd Maxillae

Both these paired bearing appendages are part of the feeding apparatus. Whereas the 1st maxillae consist of a basal portion bearing a palp-like jointed and outer lobes the 2nd maxillae are fused together to form a lower lip and each possess a pair of terminal claws possible used for food manipulation (Fig. 8).

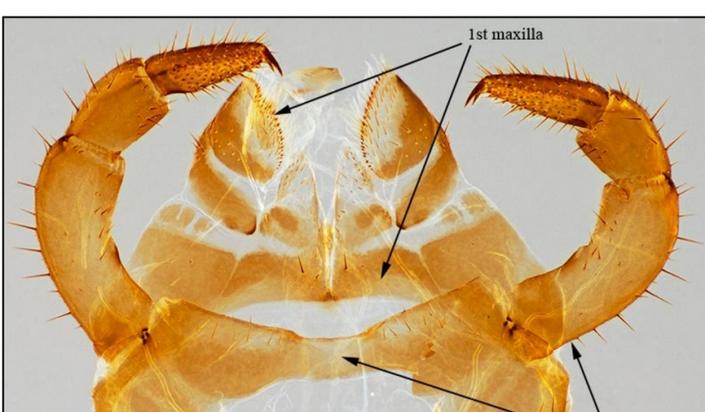


Fig. 8. Maxillae; ventral view

Respiration

Gas exchange is through a series of spiracles situated in the membranes between the hardened body plates. These spiracles lead into a series of anastomosing trachea which carry gases to and fro (Fig. 9).



Fig. 9. Spiracle and associated tracheae; dorsal view

Walking legs

The first 12 pairs of walking legs are relatively simple 6-jointed appendages ending in a single claw. However, the three posterior pairs are larger and stouter (Fig. 1) and can be raised above the body. Their basal joints, the coxae, contain glands that secrete a sticky noxious substance that can be directed at 'enemies' for protection. This defensive chemical passes out through funnels in a pore plate. Figure 10 shows one of these coxal plates with the associated pores, and Fig. 11 is a close-up showing the funnel structure.

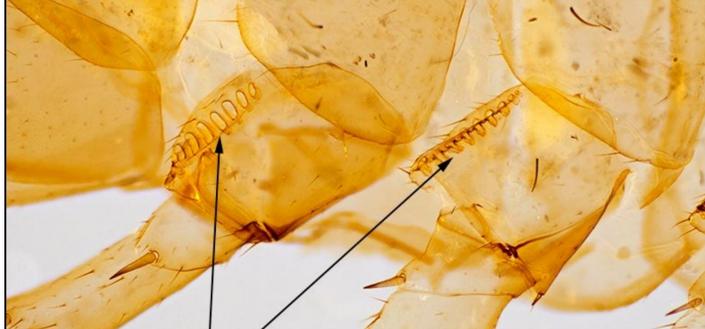


Fig. 10. Coxal pore plates at bases of posterior legs

