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The ovipositor of Hymenoptera (Arthropoda: Insecta).

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Females have a typical ovipositor that allows them to pierce the host or access inaccessible places, often modified into a stinger. It can be up to 6 times longer than the body length in several groups, or so short that it is barely visible. The ovipositor is elongated, generally cylindrical, and composed of a central structure, formed by the gonapophyses by a sheath derived from the gonocoxite and gonostyle. The gonapophyses are often called valves of the ovipositor [1-12].

The ovipositor may be exposed or contained within the metasoma. The externalized portion of the ovipositor can be extremely long, often exceeding the length of the rest of the body and long ovipositors can behave like probes, while long ovipositors collected inside the metasoma can unwind like springs or be everted like an injection. In other cases, the ovipositor may be short, but associated with an elongated metasoma or telescoped, so that the female can still reach a hidden host. Within Hymenoptera, a large group is also included, the Aculeata, in which the female external genitalia are no longer used as an ovipositor but as a stinger that injects poisons into hosts and enemies [1-12].

During laying, females inoculate the wood with a symbiotic fungus that is transported within a pair of abdominal pouches, the development of which contributes to the death and digestion of the tissue. The larvae are considered xylophagous and feed on the wood attacked by the fungus, and the enzymes secreted by the fungus are used to digest fragments of wood, although it has also been suggested that larvae would feed directly on the fungus mycelium [1-12].

The ovipositor, which is equipped with sensor organs, allows us to analyze the suitability of the probable host and the presence or absence of parasitoids inside it. Many delis mark the hosts on which they oviposited and the ability of other females to recognize this marking prevents the occurrence of superparasitism, which leads to the death of surplus larvae due to lack of food or injuries resulting from fights between larvae (Figures 1-2) [1-12].

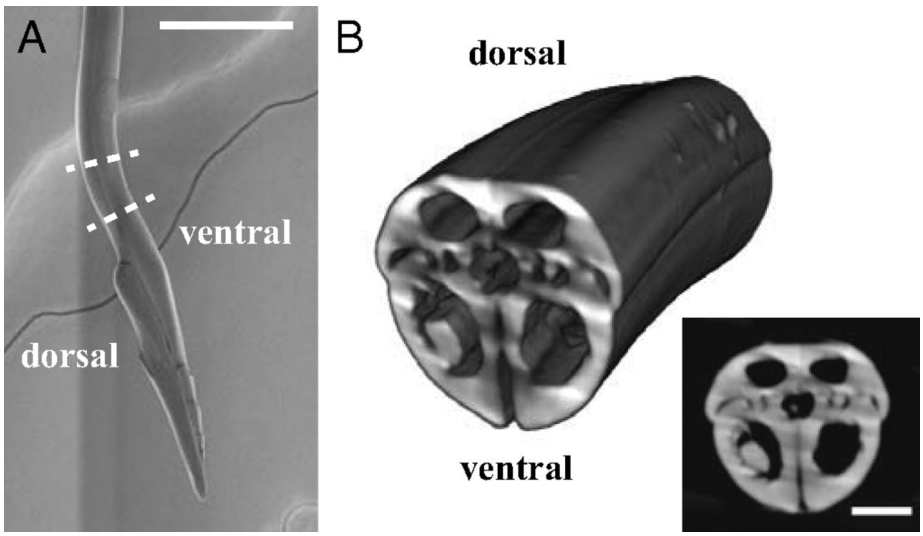

Figure 1. Ovipositor of *Diachasmimorpha longicaudata* (Ashmead, 1905) (Hymenoptera: Braconidae. (A) SEM image of the ovipositor; side view. The region shown in Bis is indicated with dashed lines. (B) A 3D reconstruction of a part of the ovipositor was obtained with a micro-CT scan. (B, Inset) Cross-section of the ovipositor showing the three valves. Sources: https://doi.org/10.3897/jhr.95.89678 and https://bmczool.biomedcentral.com/articles/10.1186/s40850-018-0037-2.

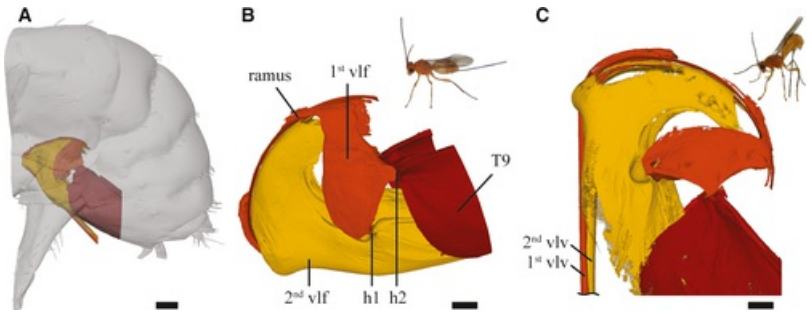

Figure 2. The ovipositor apparatus. (A) The ovipositor basal apparatus is located within the metasoma on its ventral side. Metasoma (grey) with the basal ovipositor (colored) depicted in probing position with aligned valvulae. The distal part of the terebra is not shown. (B) Top right: Wasp with ovipositor in resting position. Bottom: Side view of the configuration of the basal apparatus in the resting position with aligned valvulae; valvulae not shown. (C) Top right: Wasp in probing position. Sources: https://doi.org/10.1111/joa13216 and https://onlinelibrary.wiley.com/doi/full/10.1111/joa.13216.

The release of the ovipositor occurs through extrusion by hydrostatic pressure in the metasoma, often assisted by muscles inserted at the base of the ovipositor. There are two types of ovipositor systems in the superfamily Platygastroidea (Insecta: Hymenoptera). The ovipositor system of the *Scelio* type (Latreille, 1805) has a telescopic conjunctiva between metasomal tergites 6 and 7 and operates only through internal changes in hydrostatic pressure, whereas muscles are involved in the extension and retraction of the ovipositor in the *Ceratobaeus* type Ashmead, 1893 [1-12].

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