

# Sting of a Wasp

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In North America the Subfamily Vespinae (in Family Vespidae) includes Yellowjackets and Hornets. These are the readily recognizable 'wasps' that are feared by many people. Most of our (NA) species are in the genera *Vespula* and *Dolichovespula* and are commonly called Yellowjackets. A single species, the European Hornet (*Vespa crabro*), has been introduced into NA. Unfortunately our largest and common Yellowjacket (*Dolichovespula maculata*) is commonly called the **Baldfaced Hornet**.

This short essay examines the sting of worker female Baldfaced Hornets.

## The Wasp

Baldfaced Hornets are large black and white wasps with a formidable stinger (Figure 1).



Fig. 1. Worker Baldfaced Hornet (damaged wings are the result of cleaning in an ultra-sonic waterbath).

## The Sting

The Sting is a modified ovipositor and thus found only in females. It consists of a shaft formed from a single dorsal/lateral stylet and two ventral lancets. The stylet partially sheaths the lancets laterally and together these three components form a canal for the duct of the poison sac housed more anteriorly (Figures 2 & 3).

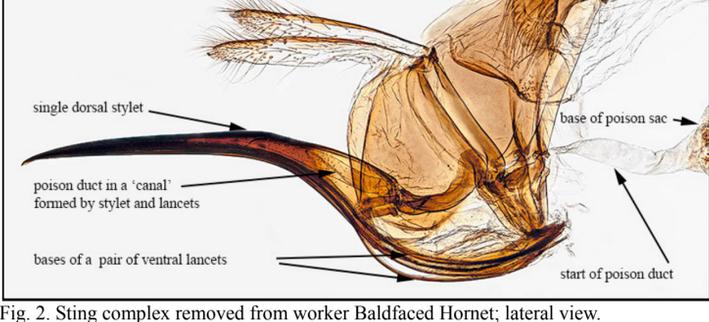


Fig. 2. Sting complex removed from worker Baldfaced Hornet; lateral view.

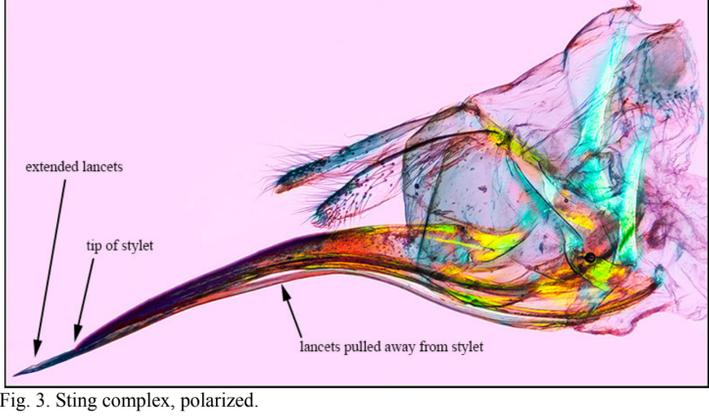


Fig. 3. Sting complex, polarized.

## The Lancets

Each lancet is barbed along its outer lateral edge near its tip (Figures 4 & 5). The lancets are moved forward alternately so that the entire sting is sunk deeper into the 'victim'. The barbs prevent the sting from readily slipping out of the wound but the wasp is able to retract the sting for use another time. In honeybees the barbs on the sting are much larger and prevent the sting being removed from human skin; the bee has to tear herself away leaving the sting complex behind.

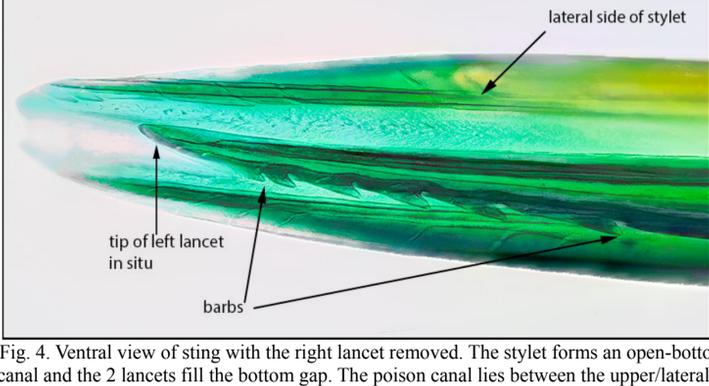


Fig. 4. Ventral view of sting with the right lancet removed. The stylet forms an open-bottomed canal and the 2 lancets fill the bottom gap. The poison canal lies between the upper/lateral stylet and the lower lancets. Stained.

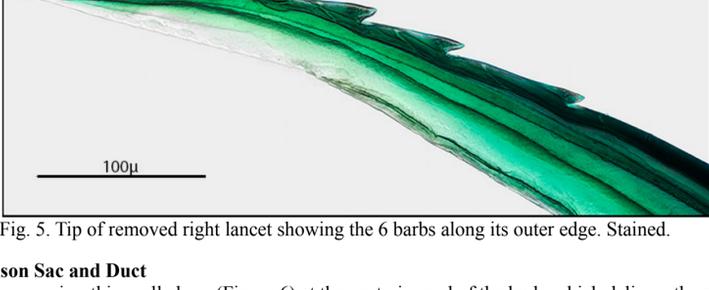


Fig. 5. Tip of removed right lancet showing the 6 barbs along its outer edge. Stained.

## The Poison Sac and Duct

The poison sac is a thin-walled sac (Figure 6) at the posterior end of the body which delivers the poison by a fine tube or duct to about one-third of the distance down the sting (Figures 2 & 7). Presumably the poison canal, formed by the stylet and lancets, beyond this point is sufficiently narrow and close-fitting that the poison, under pressure, does not leak sideways out of the sting but is delivered to the opening at the tip. The tip of the poison duct appears to have a valve (Figures 7 & 8) to prevent any backflow of poison.

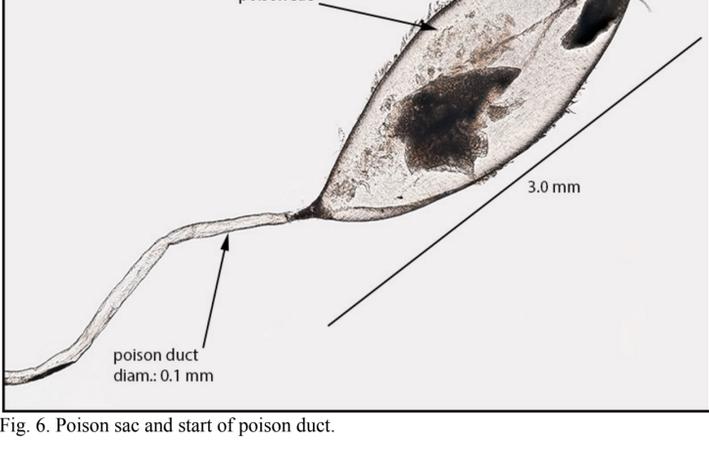


Fig. 6. Poison sac and start of poison duct.

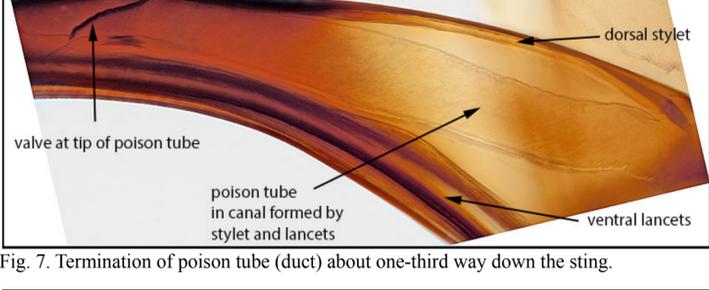


Fig. 7. Termination of poison tube (duct) about one-third way down the sting.

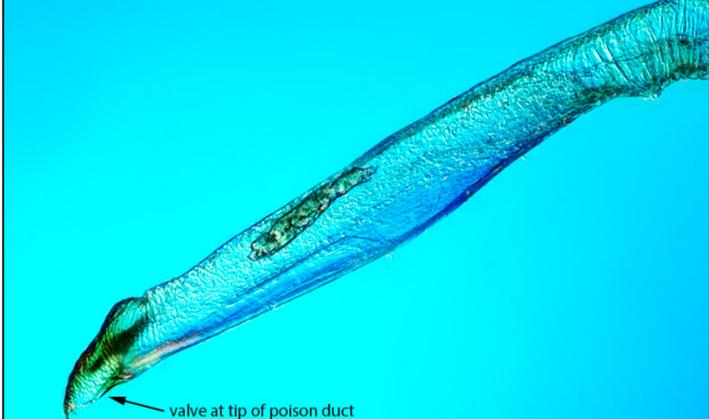


Fig. 8. Tip of poison duct removed from poison canal. DIC image.

## Microscope and Photographic Equipment

My basic equipment is an Olympus BH2 with 2x, 4x, 10x, 20x, 40x, 60x, and 100x objectives; Olympus 2.5x NFK relay lens. I also have the components for Phase Contrast, DIC and Polarization. Camera is a Nikon D600 with Nikon PB-6 bellows; Nikon flash in place of Olympus' halogen lamp. For reflected light images I use Nikon CF objectives, El-Nikkor enlarging lenses, and a MF 105mm Micro Nikkor with a Nikon D90 camera. Most images are stacks of several frames processed by Zerene Stacker.

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