Short communication

A simple technique for milking the venom of a small parasitic wasp, *Melittobia digitata* (Hymenoptera: Eulophidae)

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Abstract

We describe a simple method for obtaining good a quantity of pure venom from a small parasitoid wasp, *Melittobia digitata*. Crushing the insect’s head causes venom to be extruded from the ovipositor that dries rapidly as it is collected onto an insect pin. This technique may be applicable to other parasitic Hymenoptera.

Keywords: Venom milking; Paralysis; Parasitoid wasp

*Melittobia digitata* Dahms is a small (ca. 1 mm long) gregarious ectoparasitic wasp whose primary hosts are solitary bees and wasps (Dahms, 1984). The host becomes immobile after being stung by a female *Melittobia* (Malyshev, 1968), and fails to complete normal development (Deyrup et al., 2003). The exact factor or factors responsible for these effects have not been determined, but are likely to be some component of the wasp’s venom.

Three methods for obtaining insect venom are commonly used: extracts of the whole body, dissection of the venom glands, and milking (Piek, 1986). The purest venom, or that which is probably most similar to the substance actually injected by a sting, is obtained by milking. This procedure is most popular for obtaining venom samples of aculeate Hymenoptera, which (due to their tendency to sting in defense) can be easily stimulated to eject venom from their sting.

Many procedures for milking venom from the sting have been developed, ranging from freezing to electro-stimulus to alarm pheromone stimulus (Piek, 1986). For some Hymenoptera, particularly the solitary or parasitic species, venom milking can be impractical and tedious or impossible because of the insect’s behavior or size. Here, we describe a procedure for milking the pure venom of *M. digitata*, a species of increasing utility in teaching and research programs (Matthews et al., 1997; Consoli and Vinson, 2002a,b).

To milk *M. digitata*, several females are released onto a clean surface. With a piece of double-sided cellophane tape (Permanent Double Stick Tape, Scotch®, 3M) stuck to one’s index finger, the wasps are gently collected with care not to crush them. Once the wasps wings become lightly stuck to the tape, the tape is removed from the finger and stuck onto a glass slide, wasp side up. This positions the females on their backs. The tip of a #2 insect pin can be used to readjust wasps as necessary, and to loosen any abdomens that have stuck to the tape. The head of the female is then crushed with the pin. This produces a repetitive extension of the wasp’s ovipositor. Venom should flow from the tip of the ovipositor as a thin, rapidly drying thread (Fig. 1). The long curling strand is collected onto a clean insect pin (#2, black japanned finish, Elefant, Emil Alrt) as the venom extrudes. The venom can be stored for a limited time, dried, or dissolved in saline solution.

As venom is collected, the act of milking seems to stimulate additional venom flow, perhaps as a result of either the pull on the venom strand (like drawing silk from a spider’s spinnerets) or the contact on abdominal hairs. Although the amount obtained from an individual wasp may

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Vary, we have found that we can milk several wasps in a single session and consistently reap a fairly uniform quantity of venom from the group as a whole using this relatively simple procedure. Subsequently this venom has been added to physiological saline, and injected into *Megachile rotundata* (Hymenoptera: Megachilidae) prepupae, and meal worm (*Tenebrio molitor*) (Coleoptera: Tenebrionidae) pupae and adults producing paralysis (unpublished data).

This procedure works quite well for *M. digitata* and *M. australica* Girault. With other wasp species, some adjustments may be necessary, and venom quantity will undoubtedly vary. When we used this procedure with *Nasonia vitripennis* Walker (Hymenoptera: Pteromalidae), a slightly larger wasp, we needed stickier tape, and found it necessary to crush both the head and the prothorax to obtain the slightest venom ejection response. Even so, we were unable to collect usable quantities of venom from this wasp.

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**References**


