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Wanderers on the Sand--the Velvet Ants

Expanses of open sand are common in this country. Large dunes line the shores of the lakes, and sand flats scattered about the interior of several states vary in size from a few square feet to several acres. This is a habitat which imposes some harsh requirements on insects which live there; little shelter is available, and mid-day sand surface temperatures may reach 130° F in the summer. Certain insects have become adapted to the rigors of life on the open sand, and make up an assemblage which becomes familiar to a person watching activity on one of these sandy acres. Solitary wasps may be seen excavating their nests or occasionally flying in, carrying their prey. Ants forage continuously, an occasional hapless individual stepping over the edge of an ant lion larva's pit trap. Boldly-patterned predatory tiger beetles run over the sand or fly up in front of an observer, landing a few feet away. Still other predators, the robber flies, leave their lookout posts on rocks or upright twigs to investigate possible meals.

The velvet ants too, are also members of this group of sand-inhabiting insects, and may be noticed as they walk busily over the sand surface. Although appearing superficially like true ants, closer scrutiny shows them to be more "compact" in appearance and to possess a fine coating of hair over the body (Fig. 1). Often they are brightly colored in combinations of red, black, or yellow. The common name is given because of the resemblance to ants and the velvet-like covering of hair.

Velvet ants are actually wingless wasps of the family Mutillidae. Their compactness of appearance is the result of fusion of body regions and strong development of the exoskeleton. Each insect is in effect surrounded by armor plate which prevents water loss and affords protection from predators as well; mouthparts of most insects are simply not massive enough to penetrate the body wall of a velvet ant. As an even more formidable defense mechanism the insect possesses a sting which, because of its length and maneuverability, may be directed at a considerable angle from the abdomen. Although its major function may not be a defensive one, an acknowledgement of the sting's effectiveness as a weapon is apparent in another common name for the velvet ants: The "cow killers." The bright color pattern on the body wall may well serve as advertisement to potential predators that an unpleasant experience is in store if a velvet ant is dealt with carelessly.

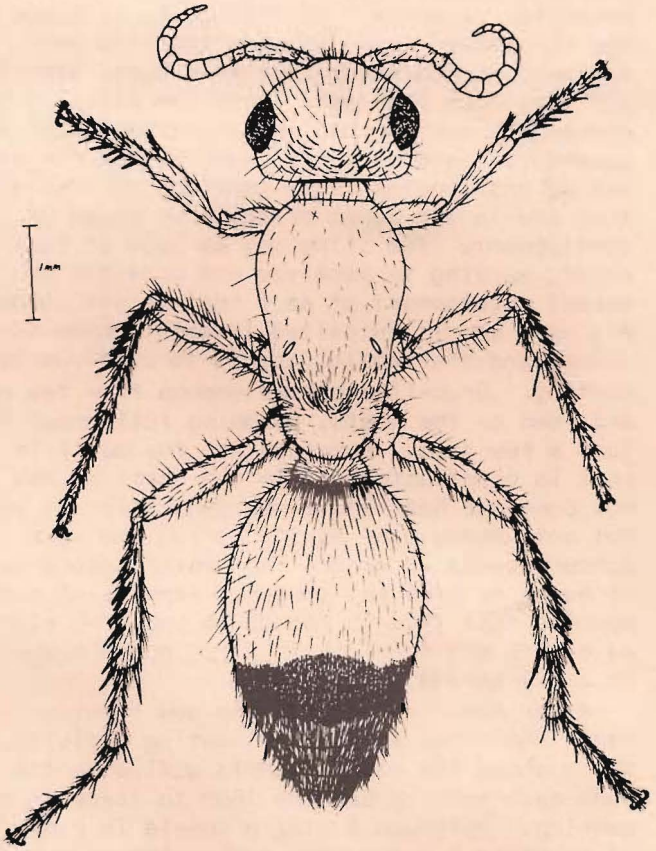

Figure 1. Female *Dasymutilla nigripes* (Fab.)

Velvet ants seen walking on the sand are all females. Males have well-developed wings, are generally blacker in color, and appear more like wasps (Fig. 2). Like males of other wasp groups, they are incapable of stinging. They occur in smaller numbers than females and may only be present during a relatively short part of the summer. Males are often sighted

flying in irregular patterns a few feet above the sand. How males locate females is not known precisely; vision may play a part but there is probably also an odor response to mating pheromones produced by females (one method of collecting males is to hold a female above the ground in a forceps--several males may then fly in and circle the captive insect). Once a male locates an appropriate female, there is a brief mating after which the female continues her wandering. A mated female apparently soon loses her attractiveness to males, each must locate the burrow of a solitary wasp or bee, a task made difficult by the host's usually having covered up the nest entrance. In this hunting activity, velvet ants give the impression of extreme persistence as they walk over the sand, investigating every surface irregularity and constantly tapping objects with their antennae. Once a burrow of a suitable host species is found, the velvet ant digs it open. Sometimes the burrow will still be active, and defended by an irate bee or wasp. Little physical damage is done to the well-protected velvet ant in this case, although she may be removed some distance from the nest entrance in the struggle that ensues, straying off away from the nest. Once the mutillid has opened the nest or has pushed herself past a defender, she crawls in, investigates the nest cells, and locates those immature solitaries that are in the pupal or prepupal stage of development. The sting may be used at this point, serving to paralyze and possibly to arrest development of each host in its cocoon. A single egg is deposited in each cocoon located, and the female departs to continue her hunting. Grub-like larvae emerge from the eggs and feed on the hosts, becoming full-grown in just a few days. A cocoon for the mutillid pupa is constructed within the shell of the now consumed host and a new generation of velvet ants emerges as adults during the same summer season or spends the winter underground in pupal or prepupal stages. Females of some species that live in the north pass the winter as adults and start their foraging once again in early spring.

After they have mated, the new females begin their own persistent hunting activity, being among the first insects active on the sand each morning and the last to leave in the evening. Although a single female is capable of covering a large area during the course of a day or through a season, it is not known if the search pattern is a random one or whether already-searched areas may be avoided. Searching activity decreases in the middle of the day, when the velvet ants take refuge from the high surface temperatures by burrowing under debris or climbing onto plants. This refuge-taking can be put to use by the collector; an effective method of finding females is shaking plants that grow on the open sand and collecting the insects that are dislodged. Little is known about feeding of the adults, but it is believed that they may lap up nectar or other sugary liquids. There may also be some feeding on immature hosts when a female gains access to a nest.

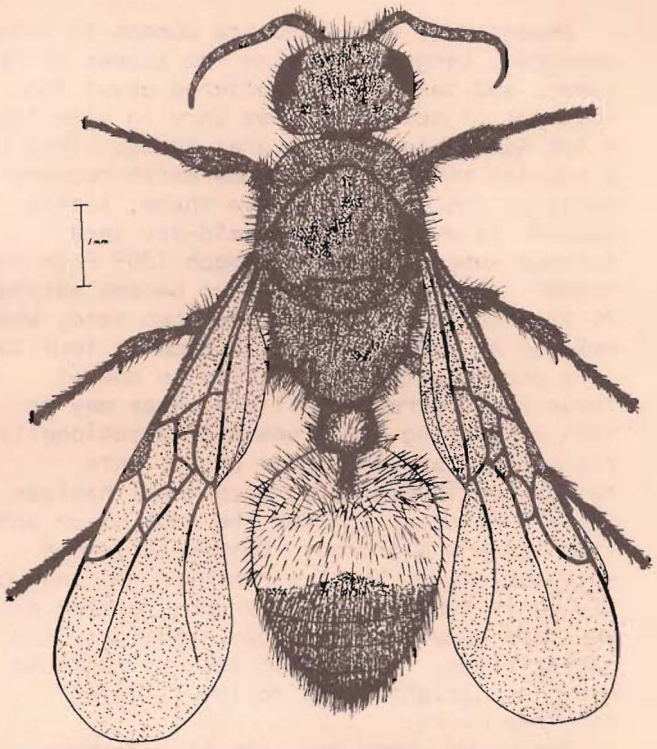

Figure 2. Male *Dasymutilla nigripes* (Fab.)

Identification of velvet ants has been troublesome because of the great differences between males and females and because of variation in size of adults within single species: size of the adult apparently depends upon size of the host species used.

Velvet ants are fascinating insects by virtue of their life activities and the many questions about them which remain unanswered. A person can quickly develop respect and appreciation for any organism which is so well-adapted to such seemingly inhospitable surroundings.

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