



## *Cerceris fumipennis* “The Smokey Winged Beetle Bandit”

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**Order:** Hymenoptera

**Family:** Crabronidae

**Species:** *Cerceris fumipennis* (Say)



*Cerceris fumipennis* is a solitary digger wasp (crabronid) native to eastern North America. It is a predator almost exclusively of adult beetles of the family Buprestidae. This wasp gathers many species of native metallic wood-boring beetles, as well as the invasive emerald ash borer, *Agrilus planipennis* (Fairmaire) (EAB). The conspicuous manner with which *C. fumipennis* provisions its nest, as well as its docile response to human handling, makes it a useful biosurveillance tool for detection of EAB. It has been shown to be more effective than other monitoring methods that rely on human technology, which are more costly and labor intensive. Early detection of EAB is critical to salvaging infested trees and protecting others nearby from attack, making *C. fumipennis* observation especially valuable due to the wasp’s ability to recover prey even at low densities.

**Identification:** *C. fumipennis* is approximately the size of a yellow jacket with dark, smokey blue or black wings and easily visible characteristic body markings. Its body is black with a single yellow or cream-colored band across its abdomen (Fig. 1). Facial markings are unique among eastern North American wasps and consist, for the female, of three rectangular spots of the same cream color placed between the wasp’s eyes and below its antennae (Figure 2); males have instead two triangular markings directly adjacent to the eyes pointing towards the center of the face (Fig. 2). Though *C. fumipennis* is solitary, it tends to aggregate with a diagnostic nest entrance having the approximate circumference

of a pencil and a circular mound of loose soil 1-2 cm high (Fig. 3). Nests are typically located in relatively disturbed areas with packed, sandy soil, such as dirt parking lots, camp sites, footpaths and baseball diamonds. Females can be observed flying in proximity to active nest sites during the 5-8 week flight season, typically beginning mid-May – June in Virginia (onset of flight season depends on climate, beginning earlier in warmer coastal areas).



Fig. 1. *C. fumipennis*

**Biology:** To capture buprestid prey, *C. fumipennis* lands on the adult beetle and stings the vulnerable coxal joint, injecting venom to paralyze the beetle. It then carries the beetle back to

its subterranean nest to provision cells intended for future offspring. Brood cells are built 7 – 20 cm below ground, generally with 5-12 cells (but up to 25) built off of the main nest tunnel. Once a cell has been sufficiently stocked with living immobile beetles, a single egg is laid on a beetle and the cell is closed off with sandy soil. When the egg hatches, the larval wasp consumes the beetles within its brood cell and pupates. Approximately 10 months following oviposition, adult wasps emerge. They will tunnel up and out of their brood cells, forming what will be, for females at least, their own nest to provision and oviposit within. Female wasps perform daily orientation flights over the nest entrance, using landmarks to find the hole again after foraging for beetles. *C. fumipennis* can fly up to 2 km to hunt, but a range of about 750 m is more typical



Fig. 2. *C. fumipennis* female (top) and male (below)

**Surveying for emerald ash borer using *C. fumipennis*:** Once an active *C. fumipennis* nest site has been identified, it is relatively easy to monitor for EAB. A file card can be cut into a 2 X 6 cm strip with two holes punched into it with a standard hole punch (one hole at each end of the strip). Place one punched hole directly over the nest entrance and drive a golf tee into the other to anchor the card strip (Fig. 4). The hole should be large enough to permit a wasp without prey to pass through it, but one holding a beetle will not fit through it. A returning wasp with beetle prey will buzz and claw around the nest entrance vigorously enough to attract attention of a human observer. The bright green coloration of EAB is easily distinguished visually, and if the prey is another buprestid species, the card strip can simply be moved aside, allowing the wasp to enter. If the beetle is indeed EAB, the observer can gently handle the wasp, which will not sting, taking the beetle from it for collection and subsequent reporting to regional extension agencies.



Fig. 4. *C. fumipennis* nest entrance (left) and survey card (right) with wasp returning with EAB prey.

## **References**

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