How to find your *Cerceris fumipennis* colonies

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Step #1 Finding Good Sites:

You should be able to find *C. fumipennis* in suitable habitats from Florida to southern Ontario. To narrow your search area check for specimens in your local university or museum collections (figure 1). If the collection is not well curated you might have to pick the *C. fumipennis* out of unidentified material, which is generally easy because the females have distinctive facial and abdominal markings; three yellow/cream patches on the frons (figure 2) and a strong yellow/cream band on tergite number two (figure 3). These wasps are commonly collected on flowers some distance from their colonies, so collection records will give you a basic idea of where to start your search.

Fig 1. Specimen of *C. fumipennis* (P. Careless)

Fig 2. Facial markings of a female *C. fumipennis* (D. Cheung)

Fig 3. Female *C. fumipennis* (P. Careless)

Visit the locations on the specimen labels during the wasp's flight season and look for suitable nest sites. *C. fumipennis* becomes active around the end of June in Ontario; earlier farther south.

i) The wasps seem to prefer flat, open sites exposed to full sunlight for most of the day. You don't need to bother poking around in the middle of the woods.

ii) The ground should be a hard-packed, relatively fine, loose sandy soil (ignore fluffy beaches or sand boxes although other digger wasps like those sites). At each Ontario colony the soil was hard-packed as a result of human activity so concentrate on areas disturbed by humans.

iii) Sparse herbaceous vegetation seems to be important. Focus on areas with a mixture of about 50% bare hard packed sand and 50% short herbaceous vegetation. Sandy road shoulders or informal parking lots work well.

iv) The buprestids being gathered by *C. fumipennis* are primarily arboreal and it is unlikely that the wasps would nest far from the "grocery store". Most known colonies are less then 200m (200yards) from a forested area.

v) The wasps overwinter approximately 15cm below the soil surface and seem to build new nest chambers off the hole they emerged from earlier in the summer. For there to be a colony of suitable size the soil below 3cm must have been left undisturbed for more then a year. Avoid any freshly dumped mounds of soil or recently landscaped areas.

Sites we have had luck with in Ontario are: ball diamonds (figure 4), parking areas, infrequently used roads (figure 5), sandy roadsides, foot paths, soil around fire pits (figure 6), open campsites are very good (figure 7). *C. fumipennis* nests seem to be directly associated with, if not dependent on areas which undergo intermittent human disturbance. All the known Ontario colonies support such a correlation.

Fig 4. Colony at Bronte Creek Park ball diamond, 488 nests in 2006 (P. Careless)

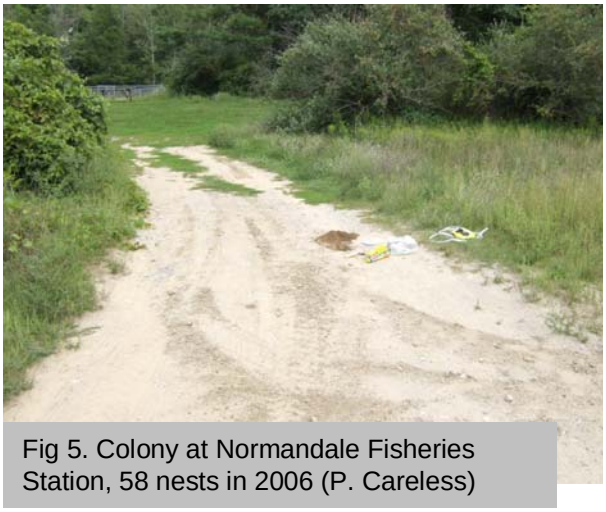

Fig 5. Colony at Normandale Fisheries Station, 58 nests in 2006 (P. Careless)

Fig 6. Colony at Rock Point Park, 24 nests around fire pit in 2007 (P. Careless)

Fig 7. Colony at Woodland Trails Scout Camp, 105 nets in 2006 (P. Careless)

Step #2 Finding possible nests at the site

Once you find a good-looking location walk around the site and look for nest entrances; nests are often tucked beside a tuft of grass (figure 8). Each digger wasp and bee creates their own telltale entrance. Some wasps, like *Ammophila,* cover up the openings but *C. fumipennis* makes a nice little mound (~4cm in diameter) much like an ant mound with a large hole in the centre (figures 8, 9). Some digger wasps make paddle-shaped mounds of soil (since they dig like dogs) but *C. fumipennis* makes round mounds.

Fig 8. Nest entrance and excavated soil known as tumulus (P. Careless)

Fig 9. Older nest entrance and owner (P. Careless)

When you find mounds, check to see if they possess a round central entrance hole. This entrance hole should travel straight down into the nest (figure 8, 9); other wasps make D-shaped holes that access from the side (stone oven style). The diameter of the hole should be big enough to fit a pencil. Digger bees like colletids, andrenids and halictids make circular mounds but the entrance holes are usually much smaller.

Many other insects are found amongst *C. fumipennis* nests; all are taking advantage of similar soil and light conditions. These other insects are helpful indicators when trying to locate a *C. fumipennis* colony. Keep an eye out for digger wasps buzzing over the ground and excavating nests. Bee Wolves (*Philanthus spp.* figure 10), *Tachytes* (figure 11), *Cerceris bicornuta* (figure 12), digger bees (figure 13) and some tiger beetles (*Cicindela punctulatus* or *Cicindela scutellaris*; figure 14) are found at many *C. fumipennis* colonies in Ontario.

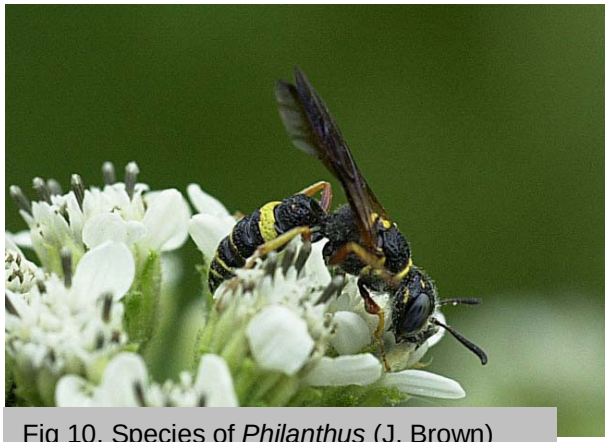

Fig 10. Species of *Philanthus* (J. Brown)

Fig 11. Species of *Tachytes* (P. Careless)

Fig 12. *Cerceris bicornuta* nest among and competes with *C. fumipennis* for nesting sites (D. Cheung)

Fig 13. Many species of Digger Bees nest amongst *C. fumipennis* (P. Careless)

Dead buprestids lying around the nests or near the entrances are a good sign that you have found a colony, even if wasps are not currently active at the site. The female *C. fumipennis* are cumbersome fliers when carrying larger buprestids, such as *Dicerca* beetles and will drop the beetle if it feels threatened. Without a beetle, the urge to "get" a beetle seems to kick in and rather then picking up the beetle they just dropped the wasp will head off into the woods to catch a new one.

Fig 14. *Cicindela scutellaris* forage around *C. fumipennis* colonies (P. Careless)

Step #3 Confirming nest occupancy

To determine if the nest holes you have found are occupied by *Cerceris fumipennis* try one of two tricks.

i) Look down the hole and check if a female is looking out. Often females wait 2cm below the nest entrance to guard against other females that may want to take their nest. If the wasp looking back at you is a female *C. fumipennis* she will have a black head with three yellow/cream square patches across the centre of her face (figure 2). Male facial markings are different but they would rarely be found in a nest.

ii) If the hole is empty place a clear plastic cup over the entrance and put a stone on top of it to prevent the cup from blowing away. While looking for more nests at the site periodically (every 5 minutes) check the cup to see if a female is flying around it (figure 15) or buzzing inside of it. By catching the female you can easily identify her to species. Leave the cup in place for about 45 minutes.

Fig 15. Clear plastic cup placed over nest entrance and a returning female with prey (P. Careless)

Step #4 Marking nests

If you are using a colony to collect buprestids or check for Emerald Ash Borer (*Agrilus planipennis*) you likely want to keep tack of individual of nests and should mark each burrow. Use cheap wooden golf tees and a small strip of flagging tape (figure 16). Drive the tee and tape in to the soil about 3cm north of each hole. This way if the entrance gets obscured you know exactly where the nest entrance should be. During dry weather the ground may be so hard you will need a hammer to drive down the tee. Writing the nest numbers on the top of the tee or flagging tape will allow you to distinguish each nest.

Fig 16. Golf tee and flagging tape used to mark a *C. fumipennis* nest entrance (P. Careless)

Inevitably someone will pull out a tee or two, no doubt thinking "Wow a free tee!" but for the most part they are left alone. Other literature talks about using nails rather then tees. Nails may last longer but remember that *C. fumipennis* like to nest in areas used by humans and it is hard to get tetanus from or puncture a tire with a wooden golf tee.

Final Thoughts

Finding the first nest will be the hard part but once you have found one colony and know what to look for, you will hopefully begin to easily locate new colonies. Don't get too hung up at any one location. If the wasps are there you will see them, if they are not conspicuous then that site is not worth the time and energy so search else where.

When you have found some colonies you may want to go back and revisit a few of the old areas. It is easy to overlook small colonies on days when they are not active, for example after a recent heavy rain. Quickly revisiting possible sites again a week later is not a bad idea.

To optimise efforts you will want to work around the following schedule. In Ontario the wasps are active starting about June 28th and finishing up around September 5th. There is only a single brood in Ontario but in south Florida the wasp is double-brooded with the first brood becoming active at the beginning of April. Observations in both Ontario and Florida suggest that the wasps rarely forage before 9:30am and most females stop foraging by about 6:00pm; females spend the nights in their burrows. The wasps are more active on sunny days then cloudy days.

If you have any questions please email me at pcareles@uoguelph.ca.

Happy hunting and good luck...