Natter's Notes

A New Pest of Mason Bees: The "Houdini" Fly

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Early in 2020, a new pest of mason bee, *Cacoxenus indagator,* was identified in Washington State for the first time. It's often referred to as the Houdini Fly because of the unique way it escapes from the mason bee's nesting cell. It's also nicknamed the Red Devil due to its large red eyes, or just Devil Fly. It's presence in Oregon is suspected but not yet verified.

The arrival of the Houdini fly is suspected to be an unfortunate example of moving bees without carefully inspecting them and their nests prior to the move. "In New York, the first two records were in 2011, although it may have arrived there earlier. It had presumably come there from Europe, probably someone moving an unclean nest block," said Josh Vlach, from the Oregon Department of Agriculture; interviewed by Andony Melathopolous; PolliNation Podcast #154 (2020).

A Houdini fly, *Cacoxenus indagator*, at the entrance of a nesting tube. (https://bugguide.net/node/view/1837327/bgimage)

What damage does the fly cause?

"The flies don't actually attack the bees; they're kleptoparasites," continued Vlach. "The fly is in the same group as Drosophila fruit flies that fly around a bowl of over-ripe fruit." They closely resemble their fruit fly cousins – about the same size, with large red eyes, but otherwise a dull brown color. They move rather sluggishly, and are often seen near the entry to a nesting tunnel.

After the mother bee leaves the nesting tunnel, the Houdini fly enters the tube, lays eggs on the pollen ball, then quickly exits. After the nesting cell is closed by the mother mason bee, the fly larvae hatch and eat the pollen ball. As a result, the mason bee larva starves.

The Houdini fly, *Cacoxenus indagator,* is a newly identified kleptoparasite of mason bees in Washington State. Its presence is not yet verified in Oregon. This fly resembles the Drosophila fruit fly; it's the same size, has large red eyes, but is a drab brown overall and moves sluggishly. (https://bugguide.net/node/view/1837327/bgimage)

How to recognize an infestation

Telltale signs of these kleptoparasitic flies are sticky clusters of small white maggots in a nest cell. The bee larva is dead or missing. But beware! Another pest, a parasitoid, produces a similar cluster of small white larvae. [Note: Kleptoparasite may be spelled with a "c" as in cleptoparasite.]

Filamentous frass is a key characteristic of an Osmia nest cell invaded by *Cacoxenus indagator*, the Houdini fly. It's a relative of fruit flies

seen near over-ripe fruit. As kleptoparasites they eat the pollen provided for the *Osmia* larva, starving it. (https://www.bee-safe.eu/articles/bees-international/cleptoparasites-a-microcosm-in-trapnests/)

Be aware: A look-alike infestation by wasps

Unfortunately, to the untrained eye, the white larvae of *Monodontomerus* wasps could be mistaken for Houdini fly maggots. These small black wasps – sometimes referred to as 'Mono' wasps – are much more active than adult Houdini flies. The adult wasps erratically flit about. They're parasitoids which lay multiple eggs in a single mason bee larva. However, the end point is the same as with the Houdini flies: Dead mason bees.

A newly emerged *Cacoxenus indagator's* body is soft and flexible. It inflates its hydraulic head and rams it against the nesting cell to escape. (https://nurturing-nature.co.uk/wildlife-garden-videos/the-houdini-fly-cacoxenus-indagator-escape-artist-that-uses-its-head-2/)

Management suggestions for Houdini flies

(Source: WSDA Pest Alert)

- Harvest mason bee cocoons – Open mason bee nesting materials before the bees emerge in the spring and destroy Houdini fly maggots.
- Control adult mason bee emergence – If you cannot open nesting materials, place your nesting materials in a fine mesh bag and close tightly. As the bees emerge, release the mason bees daily and kill any Houdini flies.
- Only use nesting materials that allow you to open, inspect, and harvest cocoons. Visual inspections can greatly reduce Houdini fly populations. (Editor's note: Kill the larvae and adults on sight.]
- Before purchasing mason bees, ask the provider how they harvested and whether they inspected the cocoons for Houdini fly.
- Only purchase pest-free mason bee cocoons.

A few final words

- "Please do not unnecessarily move bee blocks or boxes around." (from a draft of the WSDA Pest Alert)

- If you're having sizeable losses of healthy mason bee cocoons, seriously consider modifying your materials, methods, and procedures.

- A viable alternative to using clustered artificial housing for native bees is a healthy environment with modest-sized patches of suitable flowering plants that provide a year-round succession of bloom

- Perhaps the best habitats for native bees include patches of bare soil, along with naturally-occurring tubes, among them spent plant stems and wood with holes from boring beetles, all in a pesticide-free location.

Resources

- PolliNation transcript #154 – An interview with Josh Vlach, ODA. (https://extension.oregonstate.edu/podcast/pollination-podcast/154-josh-vlach-invasive-pests-pollinators)
- "Parasitoids and Cleptos"- ". . .artificial bee nests and hotels may be preferentially used by introduced bee species and native wasps, rather than native bees." https://ento.psu.edu/research/centers/pollinators/resources-and-outreach/disappearing-pollinators/parasatoids-and-cleptos
- Video: Houdini fly, a kleptoparasite of *Osmia* - https://nurturing-nature.co.uk/wildlife-garden-videos/cacoxenus-indagator-a-cleptoparasite-of-red-mason-bees-video/
- Video: Life cycle of *Monodontomerus* wasp - https://www.youtube.com/watch?v=_bwhBipHktI
- "How to Manage the Blue Orchard Bee"- An overview. https://www.sare.org/wp-content/uploads/How_to_Manage_the_Blue_Orchard_Bee.pdf
- "Orchard Mason Bee" (10-Minute University) -- Orchard Mason Bees (wordpress.com)
- Pest Alert WSDA: "Houdini fly found" https://agr.wa.gov/departments/insects-pests-and-weeds/insects/apiary-pollinators/pollinator-health/houdini-fly Images and 2 videos: **1.** How does *Cacoxenus* escape? **2.** Devil fly on nesting tubes.
- "The accompanying fauna of *Osmia cornuta* and *Osmia rufa"* - Pests of *Osmia* in Europe, with images (http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.598.9947&rep=rep1&type=pdf