

Insec(tc)ure*:

Are you insecure about your insect cures?

A UT Urban IPM Lab Newsletter for the Pest Management Industry

***Muscina pascuorum* (Meigen) Invading Eastern Tennessee Cabins**

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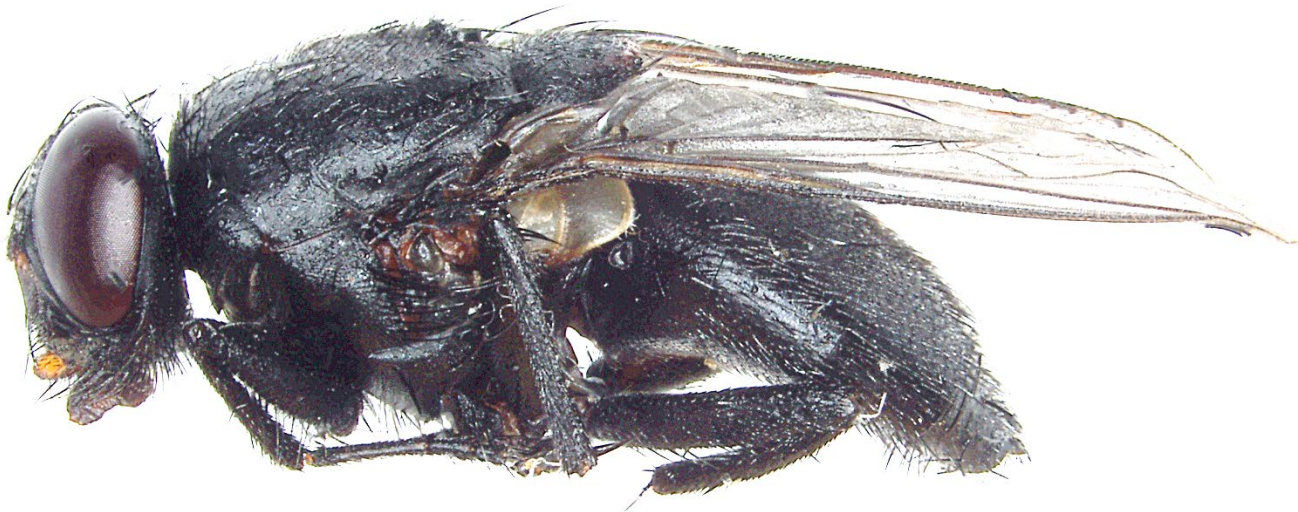
On November 4, I received a voicemail from Jimmie Murphy with All About Bugs in Sevierville, TN, about a significant infestation of flies in multiple cabins. We assumed it was cluster flies, but I asked for images or specimens. In less than one day, most of the hundreds of flies in the cabins were dead, but more would enter again. The flies gathered around upstairs windows but were not found in the bedrooms. He estimated 50 – 100 cabins were experiencing this issue. I inquired with Dan Hekman of PestTech in Chattanooga to get an idea of how widespread the problem was, and he mentioned they had a few structures with flies, but he hadn't looked at the flies very closely. Jimmie delivered a bag of flies, and Dan forwarded an image.



Flies from the Chattanooga area, early November 2022. Note the eyes are widely separated indicating this is a female. Credit: Dan Hekman and Stephen Grider, PestTech Chattanooga.

This fly had a slight light blue shiny abdomen which reminded me of a blow fly in the family Calliphoridae, but coarse bristles and stripes on the thorax resembled a large house fly (family Muscidae). The submitted specimens were 9.25-11 mm from the head to the abdomen (and 10-12 mm from head to wingtip). So definitely larger than a house fly which is 6 – 7 mm long. When I provide training for the General Pest and Rodent Control (GRC) Licensing Exam, I usually mention that cluster flies, blue bottle flies and face flies commonly overwinter in structures. However, I could tell these weren't cluster flies, *Pollenia* sp., because they lacked the golden hairs on the thorax. They also lacked the orange hairs under the eyes, which eliminated the bluebottle fly, *Calliphora vomitoria*, and they lacked a patterned abdomen which eliminated face flies, *Musca autumnalis*.

Hmm, this was going to require a decent microscope and keys to determine family and species identification. Enter Jackson Turner. Jackson is a concurrent Master's/Ph.D. student in our department of Entomology and Plant Pathology at the University of Tennessee studying flies in the family Dixidae under the direction of Dr. Kevin Moulton. Jackson offered to key the fly to species.



Profile view of *Muscina pascuorum* adult (above) and wing (below). Note the fly is wet with ethanol and the blue coloring on the abdomen and black stripes on the thorax aren't visible. Credit: Jackson Turner, UT EPP

Jackson keyed the fly to *Muscina pascuorum* (Meigen), which was described in 1826 in Europe and wasn't discovered in the US until 1922 (Johnson 1923). Subsequent reports from Johnson and others a few years later, report this fly in the family Muscidae from New Jersey to Maine and into Canada. One hundred years later, I can relate to the surprise experienced by these earlier entomologists. Where did all of these flies come from, and why haven't I seen these before? I may have received these or similar flies sometime during the past decade, but we didn't identify them. Becky Nichols reported this species from the Great Smoky Mountains National Park, Twin Creeks Science and Education Center, on November 13, 2012 at 559 m (1834 ft) elevation (TIBLC, <https://www.gbif.org/occurrence/1415231552>), so I guess we shouldn't be surprised to see it here. DNA barcoding using the mitochondrial cytochrome c oxidase subunit 1 confirmed these flies collected from eastern Tennessee cabins in November 2022 as *Muscina pascuorum*. Its worldwide distribution is indicated in the map below.



Figure 1. Worldwide distribution of *Muscina pascuorum* from the GBI, Global Biodiversity Information Facility Website, <https://www.gbif.org/species/1526160>

It's challenging to find descriptions of this fly's larval hosts. Johnson (1923) stated the larvae were found in mushrooms (*Amanita citrina*). Bajerlein et al. (2022) found them in pig carcasses but then indicated that they weren't commonly found in carrion (Grzywacz et al. 2017). References in Skidmore (1985) show it was reared from caterpillars, found in decaying vegetable and animal matter in the South Korean mountains, and that adults visit carrion and feces. Suffice it to say, we probably won't know what the hosts were for these flies. Did we have an unusual amount of mushrooms or decaying vegetable or animal matter this year? Maybe. No matter their larval hosts, they are now seeking overwintering sites in East Tennessee, and we will need to treat these adult flies like cluster flies.

First, seal potential entry sites around windows, doors and vents. Oh wait, did I say these were in cabins? As my research specialist, Jennifer Chandler, says, "A cabin is a crack and crevice." Good luck finding and sealing all entry points. Check that screens cover exterior vents in crawl space or attic/roof areas. Treat entry points around the exterior perimeter with fast-acting products such as pyrethroids (but remember the restrictions on band width) or others. Both pyrethroids and neonicotinoids have been reported to provide quick knockdown of these flies indoors. If harborage sites are located, these can be treated with dusts, foams or spray, but it's physically impossible to treat every crack and crevice in a cabin.

Since *M. pascuorum* is reported to gather at windows, light traps may provide another management option. Window curtains should be drawn to reduce competition with the light traps, and the traps placed away from the windows. And, in cabin rentals, the light traps will need to be placed where they won't distract the renters. Another

tricky part of managing flies in these cabins is the lack of attic space. Cluster or attic flies often gather in the attic. So placing a light trap in the attic is not an option.

So far, only a tiny portion of the *M. pascuorum* in the Pigeon Forge/Gatlinburg/Sevierville cabins have survived the perimeter treatments. The problem with flies overwintering in structures is that survivors of the perimeter treatment will find a crack and crevice to hide. On warm days, they may become active and move to the living space. As it cools, they move back into the gap. And repeat. This movement in and out of cracks may become a very frustrating experience for the renters, the owners and the pest management professionals. In the spring, when the weather warms, the remaining flies will eventually make their way outdoors again. But in the meantime, to keep complaints down, we may need to turn this into a competition to determine which renter kills the most flies and offer a bonus refund to the winner.

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