UT Youth Environment and Health

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Pests and Pesticides in Child-serving Facilities: An IPM Newsletter

Special Points of Interest

Sand wasps &

millipedes

This issue

Sand Wasps Stinging Pre-K Children?

Karen Vail, UT Entomology & Plant Pathology

I have another unusual situation to share. Several weeks ago, I received an inquiry from an East Tennessee school system about what they thought were sweat bees stinging pre-K children. The insects were flying in and out of holes in the sand in and around a sandbox. When a pest management professional also sent an email questioning the identity of the "bee" the same day, I suspected something else was happening. The latest email included a photo of the alleged bee (Figure 1). I could determine the insect was not a sweat bee but could not distinguish it from a potter wasp or sand wasp. Potter wasps are in the Family Vespidae, and sand wasps in the Family Crabronidae; both can provision nests below ground. Vespids have an arched pronotum, the first segment of the thorax directly behind the head, and crabronids have a straight pronotum. Unfortunately, the pronotum was not visible in the excellent submitted image.

Figure 1. Photo of insect stinging pre-K children at an East Tennessee school system. Credit: local school system personnel.

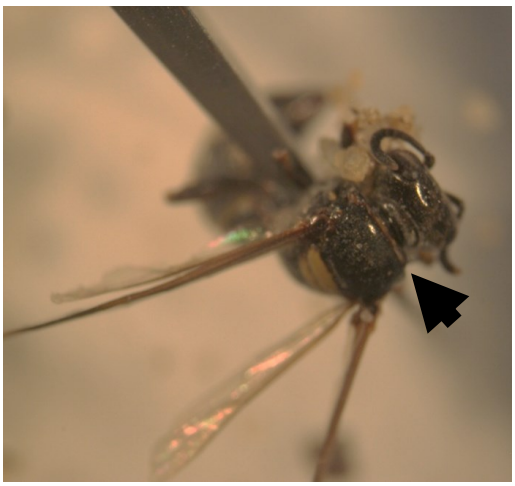

Figure 2. The straight pronotum (arrow) indicated this was not a vespid.

Luckily, I was scheduled to conduct a fire ant bait demonstration in this same school system last week and received the insects in question. Once I could view the insect with the pronotum in view, it was easy to discern it was straight (Figure 2) and not a vespid.

Determining the genus and species was slightly more difficult because the species that looked the most similar was from South America and not found in the U.S.; that is, until I dug a little deeper and discovered it had been introduced into the southern U.S. (Bohart 1997). I've **tentatively** identified this sand wasp as *Hoplisoides semipunctatus* (Taschenberg). I'm far from an expert on sand wasps, so I'll inform you later if we get an expert's identification on this wasp.

Assuming it is *H. semipunctatus*, DiscoverLife.org lists an August 19, 2008 specimen collection from Warren Wilson College in North Carolina, about a 2-hour drive east/southeast of Knoxville. Other species of sand wasps have been introduced into nonnative lands through potted plants, so that could have been the case for this species since it was first detected near southern airfields.

In Argentina, the nests of *H. semipunctatus* are relatively shallow, with the terminal chamber ranging from 3.6 – 4.4 inches below ground in excavated nests. Females have been observed to dive into the nest opening with an oblique angle from about 1 m above and travel through a tunnel with a 45-degree angle from the slightly sloping, bare, sandy surface. The tunnels were 5.9 – 6.7 inches long. In Argentina, all of the nest provisions were membracids or treehoppers.

Interestingly, while most North American *Hoplisoides* use a temporary cover when seeking provisions, *H. semipunctatus* leaves the nest open. Nest openings are apparent due to a small pile of sand on the downward side of the slope. No eggs were found in the observed Argentinian nests; thus, it seems this insect provisions the nest before laying an egg.

Many sand wasps may occur in an area. While they are gregarious, they are not social insects and do not have other colony members, so they can not defend a nest en masse. That is, you will NOT have hundreds of sand wasps responding to an alarm pheromone and chasing you down a trail for 100s of feet.

It's unusual to hear of sand or other solitary wasps stinging people. Are the wasps seeking salt from perspiration as sweat bees do? If so, we should have heard about this before. Stinging occurs probably when the wasp is crushed against the skin. Are the children swatting at the wasps or catching them in their hands causing the wasps to defend themselves with a sting? Have the children removed their shoes and stepped on them? Well, we can't rule this out when dealing with 3 – 5 yr. olds. I'm assuming that a stinging event occurs rarely.

I visited the school Monday, September 18, to better understand the situation. According to the maintenance person assigned to this facility, the sandbox had been installed 4 years ago, but this was the first year they had a problem. He noted adult wasps were very common starting the last week in July and estimated hundreds of wasps were flying at a time. Not only were the wasps seen digging tunnels inside the sand box, but because sand had been thrown or dumped outside the box by the children, wasps had also tunneled outside the sandbox (Figure 3).

Figure 3. Sandbox where sand wasps are tunneling in the sand inside (A) and outside (B) the box.

Figure 4. Sand wasp approaching the tunnel it has been excavating.

Figure 5. When I destroyed a sand wasp tunnel, the wasp searched within several feet of the original tunnel for 9 minutes and then initiated another tunnel about 4 inches away.

When I arrived, the sandbox was covered. But, once the cover was pulled back, sand wasps soon began digging tunnels (Figure 4) in the sandbox, seeming to prefer the yellow, coarse sand in the box to that outside the box. I observed the wasps for some time, but not long enough to see them provision the nest. They kicked out sand very quickly (see facebook.com/UrbanIPMTN for a video), and at no time did I see them make a temporary closure to the opening. I decided to destroy a tunnel and observe the wasp's subsequent behavior, curious to know if it would abandon the site. I watch the wasp fly close to the ground and investigate the sand within a foot or so of the original tunnel. Within 9 minutes, it settled down and began excavating a new tunnel about 4 – 5 inches from the original (Figure 5).

I covered a wasp standing on the sand with the insect net; it remained on the ground and did not fly up into the net. I next tried waving an insect net around the sandbox to catch the wasps in flight or otherwise disturb them. I did manage to catch a couple, but that wasn't easy. No, I don't have a video of the net waving to share with you. After waving around the net, I counted to determine how long they avoided the area. I only counted to three before the wasp activity returned.

Figure 6. Sand wasp resting on the yellow caution tape about 3 ft above the ground.

We also noted some wasps resting on the yellow caution tape about 3 ft above the ground (Figure 6). Are sand wasps attracted to yellow? Could we hang yellow sticky cards or tape about 3 ft off the ground to trap the wasps? That thought lasted a few seconds as images of 3 – 5 yr olds running around the playground with yellow tape or cards stuck to them came to mind.

The challenge remains in reducing the occurrence of these sand wasps in and around the sandbox. School personnel had been innovative in their attempts to rid the area of these wasps. Maintenance personnel had tried raking the sandbox every morning, but this had no effect. I wasn't surprised by this since the wasps had returned in 3 seconds after being disturbed. Two to three weeks ago, school personnel excavated and replaced all of the sand in the box. At the very least, they may have removed the next generation developing in the sand. But, when adult

wasp activity returned, the sandbox was covered, and children were prevented from playing in this area.

Because small children are digging through this sand, pesticide use is discouraged. Before my visit, I had several suggestions.

1. Wait until the nest provisioning ceases which could be after the second hard frost at the latest, then excavate the nests to remove the developing insects before the next generation of adults emerges. Dead wasps were found around the sandbox when I visited, which may be a sign that the current generation of sand wasps is approaching the end of their life. While nest burrows aren't reused, the area could still be attractive to sand wasps next year. Removing the next generation may reduce the number of sand wasps in the area and thus their use of this sand. While this may be the case, just as I was leaving the site, the principal informed me of sand wasp activity near the drop-off line in the front of the school. The sandbox wasn't the only area near the school rearing sand wasps. Most likely, these other sand wasps would eventually find the sandbox.

2. When activity is noticed next year, run a robot over the sandbox so the commotion may prevent the sand wasps from nesting. Well, scrap this option. We already noted that disturbance doesn't keep the sand wasps away from the sand for very long, 3 seconds.

3. Make this situation a biology experiment and use this area for observation. Keep the students away from the sand so they aren't stung, and discuss the sand wasp behavior with them. Create artwork about the sand wasp biology.

4. Cover the sandy area with a tarp to prevent the wasps from creating tunnels. Of course, this would mean the children could not play in the sand during this time. Rather than a tarp, the school had already tried this option with a cover that fit the sandbox. Unfortunately, this may be the best option. When, or if, the sand wasps become active next year, cover the sandbox and prevent the children from playing in the sandbox until adult activity ceases. This may require a few months of no sandbox play.

If you have other suggestions on ridding the sandbox of sand wasps, I'm willing to listen. Send me an email or post your suggestion to our Facebook site.

References

Bohart, R.M. 1997. A review of the genus *Hoplisoides* Gribodo (Hymenoptera: Sphecidae: Gorytini) in North America. *Proceedings of the Entomological Society of Washington* 99: 645–660.

Discover Life. 2023. *Hoplisoides semipunctatus* (Taschenberg, 1875), https://www.discoverlife.org/mp/20q?search=Hoplisoides+semipunctatus&flags=subgenus:&mobile=1, Accessed 17-09-2023

Evans, H. E., and K. M. O'Neill. 2007. The Sand Wasps : Natural History and Behavior, Harvard University Press, Cambridge, MA.

Evans, H. E. and R. W. Matthews. 1974. Observations on the Nesting Behavior of South American Sand Wasps (Hymenoptera). Biotropica 6(2): 130-134, https://www.jstor.org/stable/2989825, Accessed: 17-09-2023

Hahn, J., J. Walker and J. Weisenhorn. 2021. Solitary Wasps. University of Minnesota Extension. https://extension.umn.edu/yard-and-garden-insects/solitary-wasps

Missouri Department of Conservation. Sand Wasps. https://mdc.mo.gov/discover-nature/field-guide/sand-wasps, Accessed: 17-09-2023

Reprinted with minor modifications from Vail, K. 2023. Sand Wasps Stinging Pre-K Children? Insec(tc)ure*: Are you insecure about your insect cures? E&PP Info #841 4(9): 1-5. https://epp.tennessee.edu/urban-ipm-newsletters/

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An Unusual Infestation of Millipedes

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Figure 1. A rural Tennessee school surrounded by forest on three and a half sides. To the east is a septic drain field and parking lot.

In June of 2022, a facility director from a rural Tennessee school district contacted us about a millipede issue. He described millipedes entering the school in large numbers. I told him pesticides could help, but getting control would depend on removing the moisture surrounding the school and sealing entry points. Well, little did I know what this would entail.

Let me give you a tour of what we encountered during a site visit. The school was surrounded by forest on three and a half sides. On the northeast side was a septic drain field, and to the east, a parking lot (Figure 1). Tree leaves and needles in these forests could retain moisture on the ground and provide a source of decaying organic matter for these arthropods to feed. So right away, we were concerned.

Figure 2. The millipedes found at this school were Oxidus gracilis (C. Koch), a common invasive species.

We started walking around the school's perimeter on our way to the gym in the northeast corner. It didn't take long for us to encounter the first of many *Oxidus gracilis* (C. L. Kock), commonly called a garden, greenhouse, hothouse or short-flange millipede (Figure 2). We saw millipedes just about everywhere we looked. Occasionally we would stop to take a photo (Figure 3).

Figure 3. Dead millipedes from insecticide applications to the exterior perimeter.

We reached the gym to find it being used, but still found many millipedes scattered about. Figure 4 shows an example of these pests scattered over a classroom floor. The more we explored, the more we discovered this place was a paradise for millipedes. As we continued our inspection, we saw chalk on the sidewalk and set out to observe the artwork (Figure 5). However, we very quickly noted the art was not our main attraction; a tremendous number of millipedes were enjoying the art too (Figure 6).

Figure 4. Living and dead millipedes scattered across the interior of a classroom.

Figure 5. Chalk art drew us to this section, but it wasn't the main attraction.

Figure 6. A tremendous number of millipedes were found in this corner close to the downspout.

Figure 7. Condensation from the AC unit is led to the drain.

Figure 8. Upon closer inspection, millipedes were also abundant here.

Figure 9. The drainage system runs through the grass on the north side of the school and before the red shale bank.

Figure 10. Peaking between the drain slats we noticed a clump of living millipedes.

Moisture sources were abundant at this school. Drain pipes ran through the area behind the school. That is, between the school and a steep red shale bank. Condensation from the AC unit emptied into a drain (Figure 7) and sure enough, millipedes were enjoying this area too (Figure 8). Observation through a drain covering in the grass (Figure 9), yielded the same result of numerous millipedes, but this time they were alive (Figure 10).

Figure 11. Moss growing on the exterior of the building was probably due to a prior drainage system or damaged roof.

We were impressed with the downspouts and the drainage system at this school. We typically find downspouts stopping before ground level and leaving draining water to create giant puddles below, concerning us about mosquito larvae living in the puddle, or springtails, millipedes, etc., feeding on the moist, decaying matter that follows. However, these downspouts were in reasonably good shape and appeared to lead neatly into an underground drainage system. Moss growing on the side of this building (Figure 11) indicates moisture problems above. The millipedes were abundant here too (Figure 12).

As we made our way around the school, we noticed a few more areas possibly conducive to millipedes. Northwest of the school, I'm uncertain if it's on their property or not, we noted a small wet area (Figure 13).

Figure 12. Millipedes were abundant at the base of this downspout too.

Sure enough, we lifted a board sitting on the ground (Figure 14), and found an abundance of thriving millipedes (Figure 15). But the story doesn't end there.

Figure 13. A small wet area on the northwest corner of the school.

Figure 14. A board sitting on the ground in the wet area.

Figure 15. An abundance of millipedes living under the board in Figure 14.

If you look at the image in Figure 1, note the bare area on the north side of the school. That's a steep bank of red shale (Figure 16). The many cracks and crevices in this bank could provide harborage for millipedes. Poking around in a shady part of this bank led us to a scorpion, probably *Vaejovis carolinianus* (Beauvois), the southern unstriped scorpion also called the southern sun devil. We brought it and some of the rocks and soil, along with a few millipedes, back to the lab to observe interactions between the two. We were surprised that our scorpion was a female - the young we later found on her back led us to this discovery (Figure 17).

Figure 16. A steep red shale bank with many cracks and crevices for millipedes to hide, runs the entire north side of the school about 20 - 40 feet from the building.

We had envisioned the scorpion acting as a potential biocontrol agent, but our dreams were dashed. It did not appear that millipedes were on her dinner menu. Look closely at Figure 17 and you'll note that a millipede rests near a joint just before the scorpion's pedipalps or pinchers.

So now that you see this is a paradise for millipedes, what can we do to prevent millipedes from entering the structure when reducing moisture in the environment and removing food sources (decaying vegetation) and harborage is near impossible? As I look through the long list of management options in W357 Occasional invaders: Millipedes, improving pest-proofing could be helpful. Doors have gaps and lack sweep brushes (Figure 18), so this could be remedied. But, unfortunately, each exterior room has a vent that will be difficult to seal well enough to prevent millipede entry and still allow air flow (Figure 19). Sealing doors and windows will be helpful, but will the millipedes just walk through the vent? The moisture problem allowing moss to grow on the wall could be repaired.

Perimeter treatment of quick-acting pesticides such as pyrethroids kill these pests, but often the pests enter the living space before dying and still need to be swept or vacuumed, whether dead or alive. I can't find a good solution for this situation, but I'm open to any suggestions. Anyone wanting to sponsor a research study, please contact me.

For more details on managing millipedes, see

Phillips, G, R.J. Pivar, K. Vail and R. M. Shelley. 2016. W357 Occasional invaders: Millipedes. UT Extension https://extension.tennessee.edu/publications/Documents/w357.pdf

Vail, K. 2013. Moisture-loving millipedes. Pests and Pesticides in Child-serving Facilities: An IPM Newsletter, 6(7): 3- 4. https://schoolipm.tennessee.edu/wp-content/uploads/sites/207/2020/12/07-July_2013.pdf

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Figure 17. The southern sun devil with young on her back. Note that a millipede rests in the joint just before her pedipalps or pinchers (arrow) leading us to believe that scorpions do not prey on millipedes.

Figure 18. Damaged door sweeps and gaps between doors. Brush sweeps and astragal (brush between the doors) would seal the doors better.

Figure 19. Each exterior room has a vent that would be difficult to screen, allow air flow and keep millipedes out.

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National School IPM
schoolipm.ifas.ufl.edu/

IPM in Schools Texas
http://schoolipm.tamu.edu/

IPM Institute of North America
www.ipminstitute.org/

The Pest Defense for Healthy Schools Online IPM Training for School Employees
pestdefenseforhealthyschools.org

EPA schools
http://www2.epa.gov/managing-pests-schools

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To protect people and the environment, pesticides should be used safely. This is everyone's responsibility, especially the user. Read and follow label directions carefully before you buy, mix, apply, store or dispose of a pesticide. According to laws regulating pesticides, they must be used only as directed by the label and registered for use in your state.

Disclaimer

This publication contains pesticide recommendations that are subject to change at any time. The recommendations in this publication are provided only as a guide. It is always the pesticide applicator's responsibility, by law, to read and follow all current label directions for the specific pesticide being used. The label always takes precedence over the recommendations found in this publication.

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