March 4, 2022 E&PP Info #841 Volume 3, Issue 4

Insec(tc)ure*:
Are you insecure about your insect cures?

A UT Urban IPM Lab Newsletter for the Pest Management Industry

Drywood Termites in Tennessee and A Hack for Using a Portable Heater and IR Camera to Detect Infested Areas?

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Drywood termites do not naturally occur in Tennessee, but that doesn't stop them from cropping up occasionally. As I look through the pest submissions to my lab over the last 26 years, I note two species were identified, the light southeastern drywood termite, *Incisitermes snyderi* (Light) and one *Cryptotermes* species, possibly the West Indian drywood termite, *Cryptotermes brevis* (Walker). Often I was sent fecal pellets or images of fecal pellets, so species identification wasn't possible. Most of the reported infestations were traced to wooden furniture or other wood sources from Florida or other Gulf Coast states where these species are typically found (Figure 1 and 2). Still, several structural infestations occurred in the past few years without an obvious connection to the gulf. I refer to wood used in the home's construction as a structural infestation. The purpose of this newsletter is to draw your attention to possible drywood termite structural infestations and to ask you to determine the source of these infestations carefully. If you cannot find a link to wood from tropical/subtropical places, please let me know (kvail@utk.edu). If climate change expands these insects' range, we want to document it and increase our educational efforts to the public and pest management professionals. We'll need to change our inspection protocols as the techniques for drywood termites differ from subterranean termites.

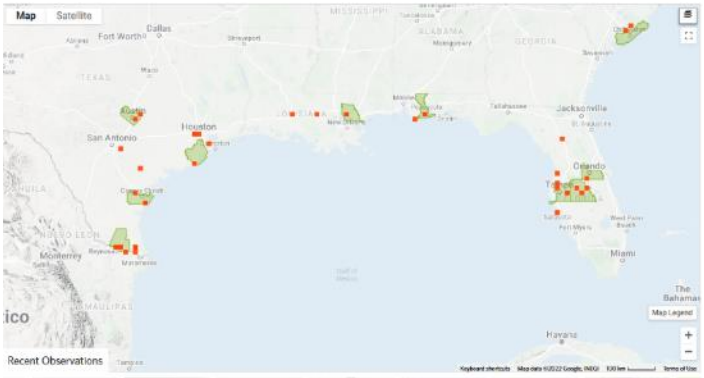

Figure 1. Distribution of Incisitermes snyderi in the southern US in Inaturalist 3/1/2022. *Credit Inaturalist, https://www.inaturalist.org/taxa/261633-Incisitermes-snyderi*

Figure 2. US distribution of Cryptotermes brevis. *Credit: Schreffrahn and Su 2005 UF Extension EENY079*

Unlike subterranean termites that require a moisture source often in soil, drywood termites lack this requirement. They can live in wood with low moisture, which allows them to be easily shipped in infested furniture and other wooden objects. The two genera I mentioned above, *Cryptotermes* and *Incisitermes*, look very different, especially the soldier caste (Figure 3). Although the soldier's head of these two genera differs, these drywood termites are easily distinguished from subterranean termites. In drywood termites, the pronotum is as wide as the head and in subterranean termites, the pronotum is narrower than the head capsule in both the soldiers and workers (Figures 3 and 4).

Figure 3. Soldiers of Cryptotermes brevis *(above) and* Incisitermes minor *(below). Both of these drywood termites have pronotums that are as wide as the head which distinguishes them from subterranean termites with a pronotum narrower than the head. Photo credit: Rudolf Scheffrahn, https://www.rudolfscheffrahn.com/*

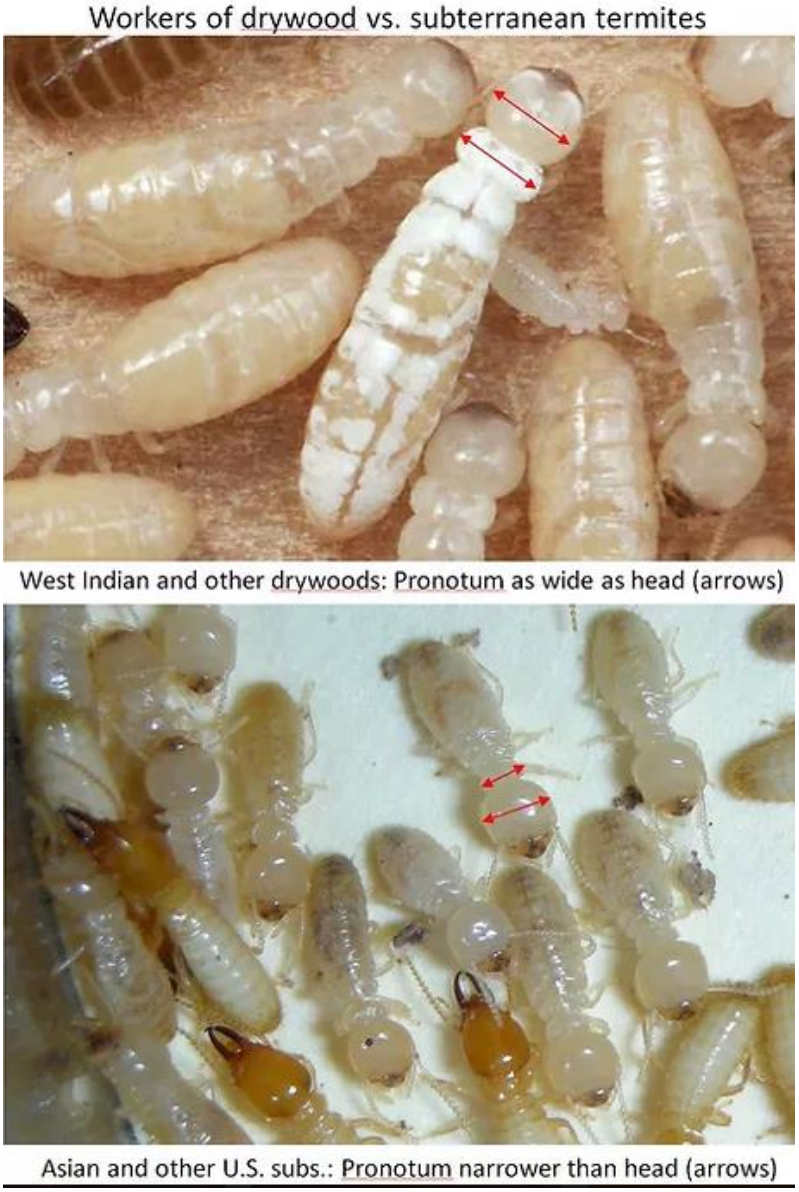

Figure 4. The worker's pronotum is as wide as the drywood termite's head and narrower than the subterranean termite's head. The same is true of the soldiers. Photo credit: Rudolf Scheffrahn, https://www.rudolfscheffrahn.com/

Figure 5. Drywood termite fecal pellet color is not associated with the wood color and may be due to the microorganisms or endosymbionts present in the termite gut. Photo credit: Rudolf Scheffrahn, https://www.rudolfscheffrahn.com/

The drywood termites' concave, six-sided fecal pellets are also reasonably diagnostic (Figure 5), although there are some look-alikes to avoid misidentifying. Last year, about this time, I received two samples that looked somewhat similar to drywood termite frass. A rodent's food cache of seeds (Figures 6 and 7) could have easily been confused with drywood termite fecal pellets, except the seeds were not six-sided and are much larger than the 1 mm long fecal pellets. Fecal pellets may pile up under kick-out holes and are often one of the first signs of drywood termites infestation. The wings left behind by swarmers may also be another sign. Drywood termites will have three or more darkened wing veins at the base of the leading edge of the fore wing, but this is difficult to see (Figure 8) unless the wing is removed, the leading edge flattened and observed under magnification.

Figure 6. Materials found in a closet that resemble drywood termites feces, but are seeds, possibly elongated wheat berries, stored by a rodent.

Figure 7. Another example of a rodent food cache. These were submitted as suspect insect eggs, but also could be confused with drywood termite fecal pellets except they lack the concave, six sides and are larger.

Figure 8. Drywood termite, Incisitermes snyderi*, alate. It is difficult to see the 3 or more darkened wing veins at the base of the leading edge of the wing when the wing is intact. Remove the front wing and ensure the leading edge is flat before counting the darkened wing veins.*

My most recent drywood termite case involved orthodontist's cabinets originating from Florida and installed about six years ago. As I understand it, there was at least one misidentification of this "dust" being caused by acrobat ants. A closer look was taken when the ant treatment did not stop the production of "dust." Images of the "dust" eventually made their way to me. After a request to increase the magnification and resolution, I could see the concave sides of the drywood termite fecal pellets. There's some discrepancy when the fecal pellets or dust was first noticed. I had heard months, but others involved mentioned years. I don't usually make a site visit, but this site was nearby, and I wanted to see if an infrared camera could locate the infested areas. Upon arrival, I noticed an obvious pile of fecal pellets near the bottom of the orthodontist's cabinets (Figure 9). Personnel reported drywood termite fecal pellets in five of seven cabinets, but I focused on the one with the most pellets. Staff also indicated that no swarmers or wings had ever been noticed in the office. If it was reliable, this was good news because it meant that the termites hadn't spread to other cabinets. Only those that came from Florida had any signs. The cabinets sat on a linoleum-covered concrete slab, so the termites hadn't entered wood flooring. I had brought a screwdriver to test the integrity of the cabinet and while I

could prod exterior surfaces, we couldn't flip the cabinets because of the air lines attached to the cabinets. I failed to penetrate any cabinet surface when pressed with the screwdriver. I didn't find any fecal pellets in the drawers or elsewhere besides the area next to the cabinet bottom. The pellets were in a pile indicating that they had fallen a short distance to the floor.

Figure 9. Orthodontic cabinet infested with drywood termites. Note the pile of feces on the ground.

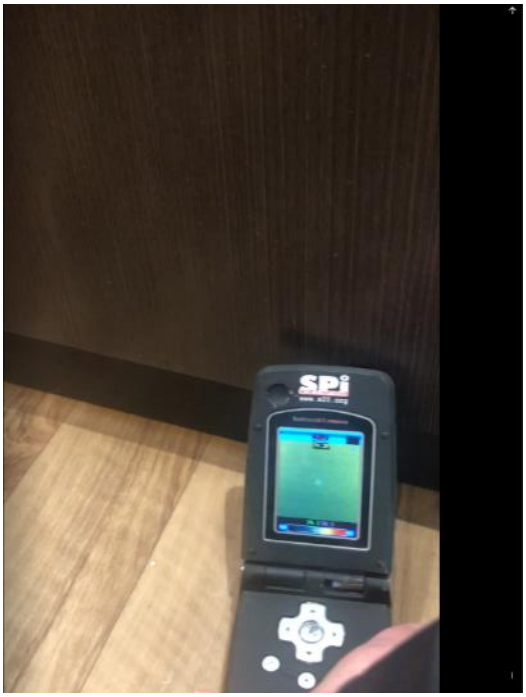

Figure 10. Infrared camera not detecting a hot spot.

Because drywood termites aren't frequently found in Tennessee, I hadn't purchased inspection equipment that might have proved more fruitful in determining infested areas of the cabinets. But I did have a 13-yr old infrared camera. I first pointed the IR camera at the cabinet and worked around it but found no major thermal differences (Figure 10). I flippantly mentioned that we needed something to create a stronger thermal gradient, and someone retrieved a portable electric heater. We placed the heater in the main compartment of the cabinet and waited for the heat to spread. I don't think it was very long before I started using the camera again. A hollow area would heat faster than a solid area and I was hoping to find hotter spots in the cabinet that could correlate with termite activity. The kick plate area was the only site with a higher temperature (Figure 11), and I assume this was due to the drywood termites consuming the wood in this area and allowing the void to heat faster. Unfortunately, I couldn't confirm this without damaging the cabinet. Drilling and injecting insecticide (especially a dust) into furniture in an orthodontist's office would risk exposing clientele and personnel to insecticide. To be effective, all areas of activity would need to be treated and we weren't sure that was possible. So the decision was made to remove the cabinets, take them off-site and fumigate. Less fumigant would be needed whether they used a trailer or an off-site fumigation room. Therefore, it would be more cost-effective than treating the entire structure – although there is no guarantee that the termites hadn't spread to other areas but weren't leaving any visible signs. Someone should vacuum all the pellets on the floor and in the cabinets to ensure any pellets produced are from new activity. However, this is easier said than done, depending on the locations of the pellets.

Figure 11. A portable electric heater placed inside the cabinet helped heat penetrate the void created by termite feeding and allowed detection by the infrared camera. The red showing from the kick plate area indicates this area was hotter than surrounding areas and that the drywood termites had probably eaten this wood.

References:

Gordon, J.M, R.H. Scheffrahn, and N.Y. Su. 2021. **West Indian Drywood Termite *Cryptotermes brevis* (Walker)(Insecta: Isoptera: Kalotermitidae). University of Florida/IFAS Extension EENY-79**

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Insec(tc)ure is edited by Jennifer Chandler and Pat Parkman and archived online at
https://epp.tennessee.edu/urban-ipm-new/

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