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Hybrid *Coptotermes* Termites: Separating Fact from Fiction[1]

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Introduction

While there are dozens of species in the genus *Coptotermes* worldwide (Chouvenc et al. 2016a), only the Formosan subterranean termite (*Coptotermes formosanus*) and the Asian subterranean termite (*Coptotermes gestroi*) have become widespread outside of their native range. These two species are the most destructive invasive subterranean termites in the world (Su and Lee 2023).

Formosan subterranean termites were first described in Florida from the southeastern coast in 1981 (Thompson 1985), while Asian subterranean termites were first documented approximately 15 years later in Miami (Su et al. 1997). More information about each species can be found in the Ask.IFAS.ufl.edu publications for the Formosan Subterranean Termite and Asian Subterranean Termite.

Because these species are extremely destructive pests, homeowners and pest control professionals are concerned about them. The overlap in their distribution in southeastern Florida, followed by the laboratory confirmation in 2015 that the two species can interbreed and form hybrid colonies (Chouvenc et al. 2015), have raised questions. The following publication seeks to provide reliable, research-based answers to these questions for homeowners and pest management professionals in Florida, and to describe some of the ongoing research into the biology and development of these species.

What Are Hybrid Termites?

Coptotermes "hybrid" termites result from the inter-specific mating of Formosan and Asian subterranean termites. In nature, hybrid termites can occur where two different species a) are *sympatric*, meaning they live in the same geographic area; b) produce *alates*, the scientific term for the sexually reproductive termite caste (the ones that you see flying if you happen to observe a termite colony swarm), at the same time of year; and c) are closely related genetically, enough that they are able to breed.

Based on laboratory-established colonies and the collection of natural *Coptotermes* hybrid alates, scientists have learned that both reciprocal mating combinations (female *C. formosanus* x male *C. gestroi* and female *C. gestroi* x male *C. formosanus*) can occur and successfully establish colonies. Colonies produced directly from the combination of two different parent species are referred to as the "F1 generation." In a familiar example, the hybrid offspring of a male donkey and a female horse is a mule, which is considered the F1 generation of this hybrid cross.

Are *Coptotermes* Hybrids Established in Florida?

Yes, but only in southeastern Florida. *C. formosanus* x *C. gestroi* hybrid alates were identified from dispersal flight collections in two of the known areas of overlap: Taiwan starting in 2019 (Chen et al. 2024) and southeastern Florida (Fort Lauderdale, Broward County) starting in 2021 (Chouvenc et al. 2025). Hybrid field colonies were identified in Broward County in October 2024 (Chouvenc et al. 2025). To date, no other occurrence of the hybrid termite has been observed outside of Broward County, but it is possible that the *Coptotermes* hybrid termites could occur where both parental species are also well established. As of 2025, dispersal flight records indicate that only 0.1% of alates were hybrid in parts of Broward County (Chouvenc et al. 2025), indicating an extremely low prevalence of their occurrence.

Are *Coptotermes* Hybrids a New Species of "Super" Termite?

No. While the formation of new species (speciation) through hybridization is possible, there are a couple of requirements. First, speciation takes a very long time (i.e., millions of years). Additionally, the offspring must be able to successfully reproduce with each other and become reproductively isolated from (unable to successfully mate with) the two original parent species. To continue with the example above, mules are not considered their own species because they are sterile and thus not able to successful reproduce. The hybrid *Coptotermes* termite therefore represents a "gray area" between the two

species. There is potential for gene exchange over time among the hybrid termites, but they are as of yet not isolated from their parent species and are not interbreeding with one another exclusively. It is far too soon to declare them a "new species."

What Is the Distribution of *Coptotermes* Hybrids?

***Coptotermes* hybrid colonies can only exist where both parent species occur.** Historically, Formosan subterranean termites are able to tolerate cooler temperatures than the tropical Asian subterranean termites can tolerate. To date, *C. formosanus* and *C. gestroi* only overlap in three geographic locations globally, where the climate accommodates the temperature tolerance thresholds of both species: Taiwan, Hawaii, and Florida (Figure 1) (Chouvenc et al. 2016b; Huang et al. 2022; Tong et al. 2017). *Coptotermes* hybrid termites, however, can tolerate a wider range of temperature conditions than can the two parental *Coptotermes* species. Laboratory studies have shown that these hybrid termites can tolerate the combined temperature range of both parental species (Patel et al. 2019). This fact is of particular concern because the shipment of goods and movement of boats from areas where *Coptotermes* are established can facilitate the introduction of these pest species into new areas (Chouvenc 2025; Evans et al. 2013). For the foreseeable future, then, the hybrid termite will only occur in areas where the two species geographically overlap, but its greater temperature tolerance range means that it may be able to establish elsewhere in a more distant future.

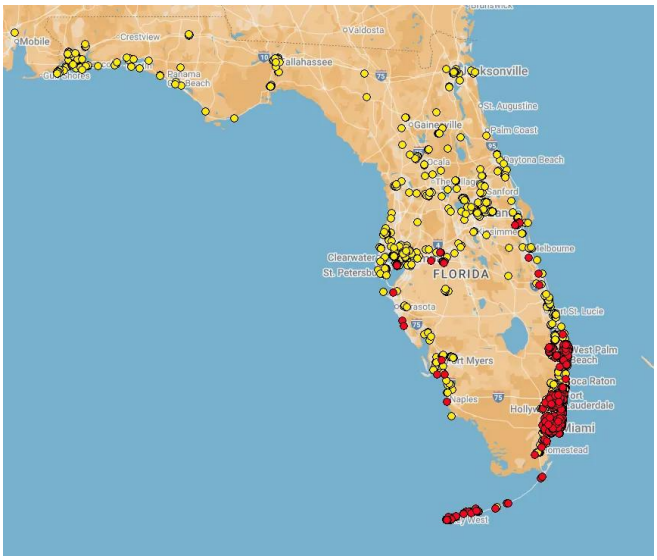

Figure 1. Distribution of the Formosan subterranean termite (*Coptotermes formosanus*) (yellow dots) and the Asian subterranean termite (*Coptotermes gestroi*) (red dots) in Florida as of August 1, 2025.
Credit: Thomas Chouvenc, UF/IFAS, from the Florida Termite Distribution Map

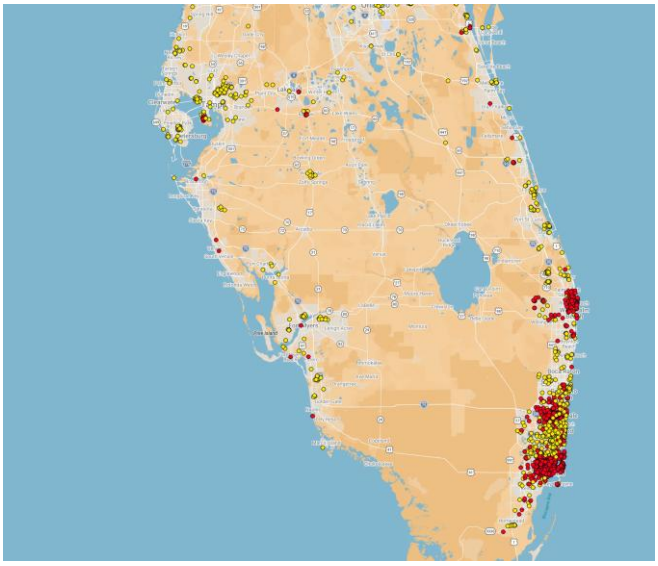

Figure 2. Close-up of the distribution of the Formosan subterranean termite (*Coptotermes formosanus*) (yellow dots) and the Asian subterranean termite (*Coptotermes gestroi*) (red dots) in Florida as of August 1, 2025.
Credit: Thomas Chouvenc, UF/IFAS, from the Florida Termite Distribution Map

Are *Coptotermes* Hybrids More Destructive Than *Coptotermes formosanus* or *Coptotermes gestroi*?

Initial studies showed that hybrid crosses demonstrated one-year colony survival similar to that of the parent species (Chouvenc et al. 2015). It was later shown in laboratory studies that hybrid colonies can continue to grow and consume wood at a rate similar to the rates of both Formosan and Asian subterranean termites (Patel et al. 2023). Therefore, the damage from hybrid termite colonies should be on par with damage from the two parent species. Research on *Coptotermes* hybrid termites in the field is ongoing.

How Can *Coptotermes* Hybrid Termites Be Identified?

As with their parent species, **only the alate and soldier castes can be used for morphological (visual) identification.** When viewed side-by-side using suitable magnification, hybrid *C. formosanus* x *C. gestroi* alates and soldiers (Figure 3) are considered intermediate in their appearance between the two species (Chen et al. 2024; Chouvenc et al. 2025), though all naturally collected hybrid termites in the scientific literature were confirmed through molecular diagnostics. Thus, **in all cases, it is not possible to positively identify collected termites as hybrids through visual inspection alone.** To date, no samples submitted to and identified by the UF Termite ID Service by pest management professionals or householders have

been identified as hybrids, and very few samples collected during rigorous surveys by the UF termite research group have been identified as hybrids. (The Ask.IFAS.ufl.edu publication "Termite Species Distribution in Florida and UF Termite Identification Services" explains where various termite species are established within the state to help Floridians stay informed.) In case of suspicion of *Coptotermes* hybrid termites, always first provide a sample (must be an alate, or winged reproductive, or a soldier) to the University of Florida Insect ID Lab or Termite ID Service before making a claim. More information on how to submit samples can be found on their respective webpages: UF Insect ID Lab and UF Termite ID Service.

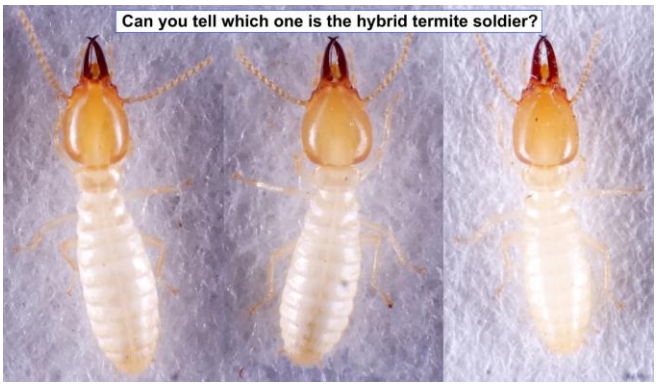

Figure 3. This image, featuring individuals from the soldier caste, is meant to highlight the similarities of appearance across both parental species, the Formosan subterranean termite (*Coptotermes formosanus*), the Asian subterranean termite (*Coptotermes gestroi*), and hybrids. Visual identification of hybrid termites can only be done under magnification by experts that are familiar with identification characteristics. Submitting a sample to the UF/IFAS Termite ID Service (TermiteIDServices@ifas.ufl.edu) remains the best option to confirm any suspected samples. Credit: Thomas Chouvenc

What If I Am Told I Have Hybrid Termites in My House?

While the existence of the hybrid termite may be concerning, the two parental species will continue to represent the vast majority of subterranean termite problems to communities impacted by the Formosan subterranean termite and the Asian subterranean termite in Florida. Any claim that your house is infested with "hybrid termites" is highly unlikely to be accurate without rigorous confirmation—and is relatively meaningless, besides, from the point of view of a homeowner or indeed a town or a county confronting a termite problem, given that both the severity of a termite infestation and treatments will be the same whether the termite colony is *C. formosanus*, *C. gestroi*, or a hybrid. Therefore, such claims should first be confirmed by the University of Florida Termite ID Service, which can be contacted at TermiteIDServices@ifas.ufl.edu .

Note: Both the Formosan subterranean termite and the Asian subterranean termite are deeply problematic pests, and hybrids of these two species will be exactly as problematic as the parent species: not worse. Labeling termites "hybrids" may make them sound scary, but the hybrid termites are in fact not any scarier than their scary parents. They won't eat your house any faster or become more numerous or in any way become a bigger termite problem for Florida than the existing termite problem posed by the high termite density Florida already has. Please submit any termites you find to the UF/IFAS Termite ID Service.

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