

A NEW SUBTERRANEAN TERMITE INTRODUCED TO  
FLORIDA: *HETEROTERMES* FROGGATT  
(RHINOTERMITIDAE: HETEROTERMITINAE)  
ESTABLISHED IN MIAMI

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On 3 January 1995, we were asked to identify termites collected on 30 December 1994 from a house in Miami. The sample, a termite-infested board and attached nest material (carton) contained thousands of workers and hundreds of soldiers and young brachypterous nymphs. We were struck by their small size and recognized the soldiers as *Heterotermes* which are characterized by their slender and straight mandibles in contrast to the relatively thick, curved mandibles of the native *Reticulitermes* spp. [Fig. 1; also see Mathews (1977) for character diagnosis of *Heterotermes*]. The specimens more or less fit the brief description of *H. convexinotatus* (Snyder 1924), a widely reported northern Neotropical species (Araujo 1977). However, the taxonomic status of *Heterotermes* in this region is vague and in need of revision, therefore, we have not as yet assigned a species name to this find.

On 12 January 1995, we inspected the infested property, a small, older single-family house located 0.6 km east of Interstate Highway 95 and 0.3 km north of Interstate Highway 195 in the "Little Haiti" district of Miami. The *Heterotermes* infestation was centered in a room addition which was under construction on the north side of the house. The addition consisted of concrete-block walls opening without a ceiling to a covered wood-truss roof. We observed extensive drywood termite damage to the roof rafters of the original house. The floor area of the addition was unfinished, consisting of fill sand on bare soil. The sand completely or partially buried numerous plywood and solid lumber scraps. Additional scraps were scattered or stacked near the former north wall of the original house. Although conditions were dry, nearly all wood scraps were under some degree of *Heterotermes* attack. Foraging tubes criss-crossed the surfaces of some of the wood. Fist-size pieces of carton were attached to the older damaged wood. No foraging tubes were observed on any of the structure itself. The condition of the infestation and large numbers of brachypterous nymphs indicated that it had been active for years and had likely undergone one or more annual reproductive dispersal cycles.

Our suspicion that additional colonies were established in the neighborhood were confirmed on 30 March 1995 when several soldiers and workers were collected by a pest control operator from a warehouse located about 300 m ENE from the original site. Unlike the original site, the warehouse showed many signs of above-ground for-



Figure 1. Soldiers of *Coptotermes formosanus* Shiraki (left), *Heterotermes* sp. (center), and *Reticulitermes flavipes* (Kollar) (right), all known from Dade County, Florida.

aging activity and damage to the structure itself. As in the original site, however, none of the activity was associated with wet conditions or moisture sources. Foraging tubes, originating from the foundation slab, extended several meters up concrete walls. The small size of the *Heterotermes* foragers may have contributed to their ability to penetrate narrow cracks, fissures, or joints in the building's foundation. Destruction of wood was observed in framing, molding, and doors. Indoor workings of *Heterotermes* were spread over a 50 m distance suggesting an infestation by either one massive or several smaller colonies. The only damage observed outside the building was to a wooden exterior door. As of this writing, dispersal flights have not been observed, nor alates collected from either site. Based on our observations of *Heterotermes* in the West Indies, fully formed alates do not appear in colonies until the beginning of the rainy season (May-June).

This second infestation is important because it confirms that *Heterotermes* is well-established and thriving in a relatively large urban location and demonstrates the destructive potential of this species. The infestation also underscores the significance of *Heterotermes*' small size and ability to forage under dry conditions allowing it to occupy a niche currently not exploited by other subterranean termite species in Florida. Our long-term expectations are that *Heterotermes* will expand its distribution well beyond current bounds and rival the pest status of preexisting subterranean termite species in Dade and adjacent counties of subtropical Florida.

This is the first known successful exotic introduction of *Heterotermes* into the United States. These termites almost certainly originated from the West Indies or the Neotropical mainland. The only U.S. species, the native *H. aureus* (Snyder), is found

TABLE 1. SIMILARITIES AND DIFFERENCES BETWEEN NEW WORLD *RETICULITERMES* AND *HETEROTERMES*.

		Differences	
		<i>Heterotermes</i>	<i>Reticulitermes</i>
Similarities			
1. Subterranean termites in the Subfamily Heterotermitinae	1. All but one species Neotropical	1. All species temperate or subtropical Nearctic	
2. Diffuse and architecturally unstructured subterranean nests	2. Foraging tubes and fecal spots often cream colored	2. Foraging tubes and fecal spots often more brown.	
3. Severe structural damage potential due to large colonies and long-range foraging	3. Foraging tubes narrow, smooth, and more circular	3. Foraging tubes broad, rough, and flatter	
4. Superficial morphological likeness of soldier and worker castes	4. Well adapted to drier habitats	4. Poorly adapted to drier habitats	
5. Nest carton weak, easily broken by hand	5. Alate body, wings golden brown; wing margins ciliate; wing membrane smooth, opaque	5. Alate body usually dark; wing margins lacking cilia; wing membrane reticulate, more clear	
	6. Dispersal flights at dusk or night during rainy season in late spring or summer	6. Dispersal flights in sunshine following rain in early spring	
	7. Soldiers usually smaller, more numerous, and aggressive	7. Soldiers usually larger, less common, and apt to retreat	
	8. Soldier mandibles straight, slender with narrow bases; able to cross into "X"	8. Soldier mandibles more curved, thick with massive bases; unable to cross into "X"	
	9. First marginal tooth of worker/imago left mandible shorter than apical tooth	9. First marginal tooth of worker/imago left mandible as long as apical tooth	
	10. Postclypeus of worker usually inflated	10. Postclypeus of worker not bulging	

in the Sonoran and Colorado deserts of Arizona, southern California, and adjacent areas of northern Mexico (Snyder 1954). Soldiers and workers of *H. aureus* are proportionally larger than those from the Miami discovery and are not conspecific. Like *Reticulitermes*, *Heterotermes* spp. are generally serious structural pests where they are found. In Table 1 are listed general similarities and differences between New World species of these two genera.

From a worldwide perspective, *Heterotermes* Froggatt is primarily a tropical genus (Emerson 1971) with the exception of several species in southern Australia (Hill 1942) and the aforementioned *H. aureus*. Eight species are described from throughout the Neotropical region, including three from the West Indies (Araujo 1977). Recently, extensive collecting in the West Indies has cast some doubt on the validity of one or two of the *Heterotermes* species which were described from there (Scheffrahn et al. 1994). Although occurring in drier habitats in the northern Neotropics, *Heterotermes* spp. are found in a wide range of pantropical habitats. Emerson (1971) suggests that individual species of *Heterotermes* are confined to their respective climatic zones by the limits of soil moisture and temperature.

It is unclear why West Indian *Heterotermes* spp. have not previously become established in southern Florida or the Florida Keys, or why *Reticulitermes* spp. do not occur in the West Indies or, at least, on nearby offshore islands of the Bahamas. Since climatic differences between these land groups are minimal, we suspect that allopatry has been maintained because these genera are poor candidates for introduction across ocean barriers by natural means. Introduction of *Heterotermes* to new localities by human activity is rare. Gay (1967) reports only two known cases of established human-aided introductions of *Heterotermes*; *H. perfidus* (Silvestri) from unknown origin to St. Helena about 1840, and *H. philippinensis* (Light) from the Philippines to Madagascar and Mauritius early in the 1900s. Emerson (1971) speculates that *H. convexinotatus* was introduced to the Galapagos Islands by man.

In light of their broad distribution and structure-infesting potential, *Heterotermes*, along with *Coptotermes*, represent the two principle rhinotermitid subterranean pest genera of the tropical world. In addition to *Heterotermes*, three other pestiferous termite species have been introduced into Florida. These include: *Coptotermes formosanus* Shiraki (Fig. 1), the Formosan subterranean termite, which has saturated or appeared in numerous urban and suburban sites throughout the state; and two kalotermitid species, *Cryptotermes brevis* (Walker), the West-Indian powderpost drywood termite, a widely distributed species; and *Incisitermes minor* (Hagen), the western drywood termite, which is occasionally encountered in Florida (Scheffrahn & Su 1994).

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#### SUMMARY

Two well-established structural infestations of the subterranean termite genus *Heterotermes* Froggatt were discovered in Miami, Florida, in 1995. This is the first record of an exotic *Heterotermes* sp. in the United States and constitutes the fourth exotic termite species living in Florida.

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