

A NEW INTRODUCTION OF A SUBTERRANEAN TERMITE,  
*COPTOTERMES HAVILANDI* HOLMGREN (ISOPTERA:  
 RHINOTERMITIDAE) IN MIAMI, FLORIDA

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During April 1996, we were informed by the Department of Agriculture and Consumer Services of a possible new infestation of the Formosan subterranean termite, *Coptotermes formosanus* Shiraki, in a commercial building at the northwest corner of Highway 1 and State Road 836 in Miami, Florida (Fig. 1). This infestation, which is 2 blocks west of the Port of Miami, is about 10 km south of the currently known distribution of *C. formosanus* in southeastern Florida, and about 1.5 km south of the site of another introduced subterranean termite, *Heterotermes* species (Scheffrahn & Su 1995). A large number of alates swarmed in the front office of this building, and numerous foraging tubes similar to those of *C. formosanus* were found on the garage walls. Workers and soldiers were also collected from a nearby tree. A close examina-

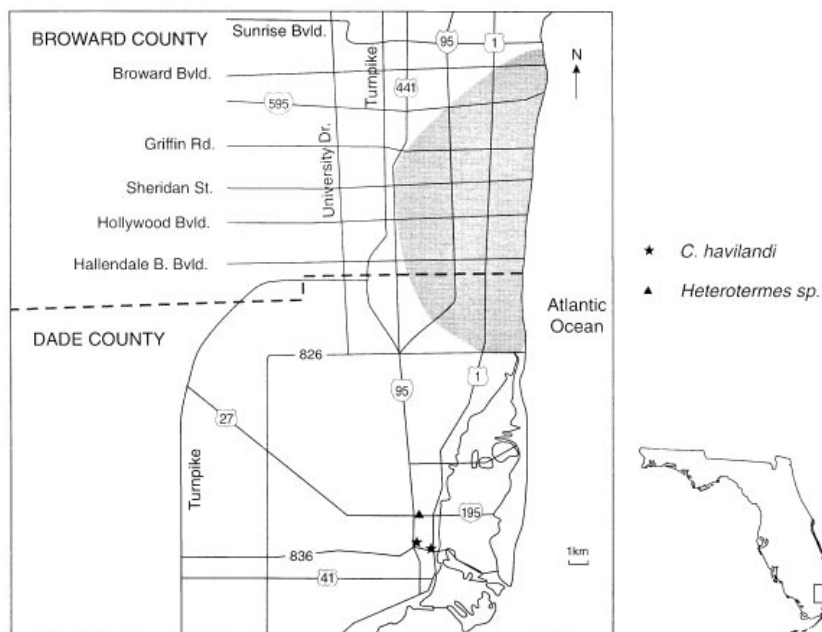


Fig. 1. The first infestation of *C. havilandi* was found in a commercial building at the northwest corner of Highway 1 and State Road 836 in Miami (solid star); about 10 km south of the currently known distribution of *C. formosanus* in southeastern Florida (shaded area), and about 1.5 km south of the site of another introduced subterranean termite, *Heterotermes* species (solid triangle). The second *C. havilandi* infestation was found in a church at the northeast corner of I-95 and State Road 836; about 1 km west of the first find (solid star).

tion of alates revealed that the infestation belonged to another destructive species of subterranean termite, *Coptotermes havilandi* Holmgren. This is the first record of this species in the continental United States. Voucher specimens were deposited at the University of Florida termite collection in Ft. Lauderdale.

Alates of *C. havilandi* are readily distinguishable from *C. formosanus* by the differential dorsal and ventral coloration. Head and abdominal dorsal tergites of *C. havilandi* alates are dark brown, and the ventral surfaces of their heads and abdomens are light yellowish brown. Alates of *C. formosanus* are entirely light yellowish brown. The presence of white, halfmoon-shaped "antennal spots" in front of each ocellus (Fig. 2) is also characteristic of *C. havilandi* alates (Ahmad 1965). Alates of *C. formosanus* lack such antennal spots. A consistent diagnostic characteristic that distinguishes soldiers of *C. havilandi* from *C. formosanus* is the single pair of setae projecting dorso-laterally from the base of the fontanelle. Soldiers of *C. formosanus* have two pairs of such setae (Scheffrahn et al. 1990).

*Coptotermes havilandi* is a destructive pest of structural wood and agricultural crops in Thailand, Malaysia, and Indonesia (Ahmad 1965, Gay 1967, Roonwal 1979). Like *C. formosanus*, *C. havilandi* is considered native to the Orient (Araujo 1970, Grassé 1984) and has been widely exported. First introduced to Brazil in 1923, *C. havilandi* is currently considered the major structural pest in the city of Sao Paulo (Lelis 1995). This termite species was first found in the West Indies on Barbados (Adams 1938). Current distribution of *C. havilandi* in the West Indies also includes Antigua, Cayman Islands, Cuba, Isla de la Juventud, Jamaica, Montserrat, and Turks and Caicos Islands (Scheffrahn et al. 1994). Other regions of known *C. havilandi* distribution are Madagascar and Mauritius (Edwards & Mill 1986).

*Coptotermes havilandi* is mostly found in the tropics whereas *C. formosanus* is distributed primarily in subtropical and temperate regions (Su & Tamashiro 1987). Both *C. havilandi* and *C. formosanus* cause devastating damage to structures wherever they occur. Records showed that *C. havilandi* in southeast Asia attacks dead and dying trees of various species, construction timber, furniture, structural wood, plastics, and synthetic fibers (Roonwal 1979). Like *C. formosanus*, *C. havilandi* in Sao Paulo, Brazil also construct aerial nests in high rise buildings (Lelis 1995). No data are available for the overall economic impact by *C. havilandi* in the Caribbean, but it is a serious pest of structures in Little Cayman, and Providenciales and Turk (Su & Scheffrahn, unpublished data).

Numerous timbers in the one-story concrete building infested by *C. havilandi* in Miami were so severely damaged that they had to be replaced. The infestation was noticed by the occupants 5 years ago, but commercial pest control firms contracted for treatment have mistaken the infestation for native subterranean termites, *Reticulitermes* species. Soil termiticides have been applied annually for the last 5 years. The most recent soil termiticide treatment was done in April 1996. Despite the annual application of soil termiticide, infestation by this *C. havilandi* colony continues.

According to the occupant, alate swarming was observed 3 years ago. Because it generally takes 3-5 years for a colony to be mature enough for alate production, and because of the treatment history, *C. havilandi* was probably introduced to Miami about 10 years ago. Leisure-crafts infested by *C. havilandi* have been found in Caribbean and Florida waters (Scheffrahn et al. 1990). The close proximity of this infestation to the Port of Miami suggests a maritime introduction. Our suspicion that *C. havilandi* is not limited to this site was confirmed when, in August, another infestation was found in a church at the northeast corner of I-95 and State Road 836; about 1 km west of the first find (Fig. 1). Damage potential and behavior of *C. havilandi* is similar to that of *C. formosanus*, but these two pest species are geographically separated because of their different climatic adaptations. This is an unprecedented inci-

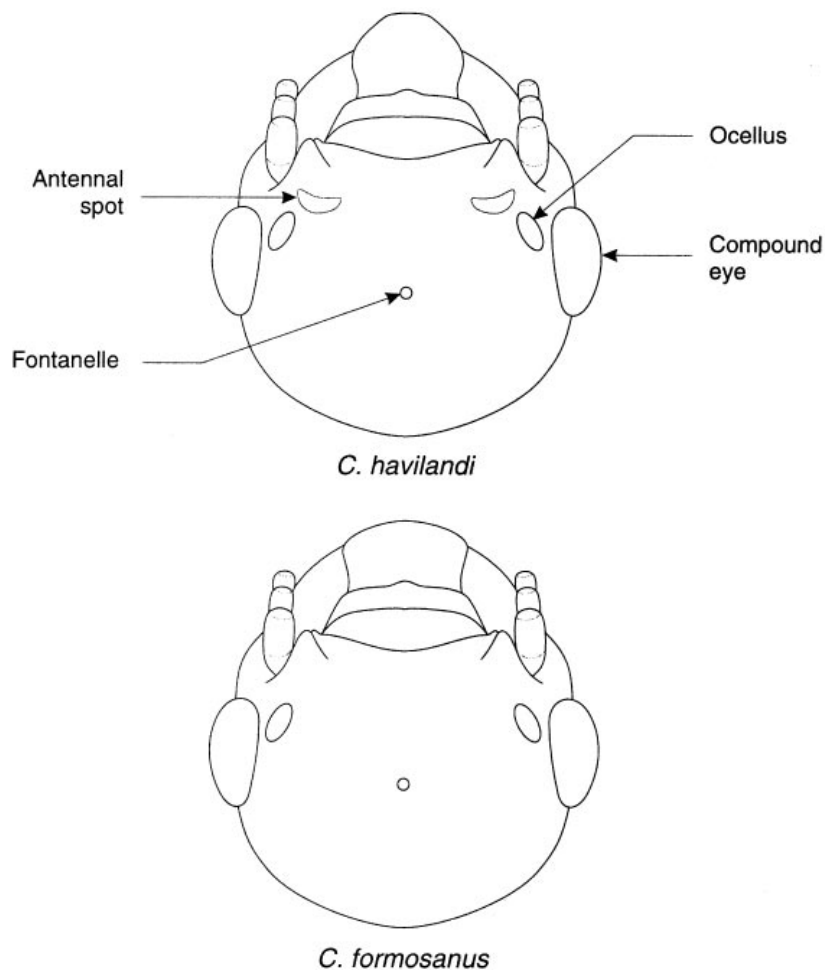


Fig. 2. Alates of *C. havilandi* is distinguishable from *C. formosanus* by the presence of white, halfmoon-shaped "antennal spots" in front of each ocellus.

dent in which both *C. havilandi* and *C. formosanus* are found within such a short distance, and their interaction will be closely monitored.

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#### SUMMARY

The first introduction record of the subterranean termite, *Coptotermes havilandi* Holmgren, into the continental United States is reported. Thus far, two infestations

have been recorded in Miami, Florida. The infestation history suggests that *C. havilandi* was probably introduced to Miami about 10 years ago through maritime transportation. *Coptotermes havilandi* is found primarily in tropical regions such as southeast Asia, Brazil, and the Caribbean, and its damage potential is similar to that of the Formosan subterranean termite, *C. formosanus* Shiraki.

## REFERENCES CITED

- ADAMSON, A. M. 1938. Notes on termites destructive to buildings in Lesser Antilles. *Trop. Agric., Trinidad* 15: 220-224.
- AHMAD, M. 1965. Termites (Isoptera) of Thailand. *Bull. American Mus. Nat. Hist.* 131: 1-114.
- ARAUJO, R. L. 1977. Catálogo dos Isoptera do Novo Mundo. Acad. Brasileira de Ciências, Rio de Janeiro, RJ. 92 pp.
- EDWARDS, R., AND MILL, A. E. 1986. Termites in buildings. Their biology and control. Rentokil Ltd., W. Sussex.
- GAY, F. J. 1967. A world review of introduced species of termites. CSIRO Melbourne, Australia, *Bull.* 286: 1-88.
- GRASSÉ, P.-P. 1984. *Termitologia - Tom II: Fondations des sociétés Construction*, Chap. V pp. 162-208, Masson, Paris.
- LELIS, A. T. 1995. A nest of *Coptotermes havilandi* (Isoptera: Rhinotermitidae) off ground level, found in the 20th story of a building in the city of Sao Paulo, Brazil. *Sociobiology*, 26: 241-245.
- ROONWALD, M. L. 1979. Termite life and termite control in tropical South Asia. Scientific Publishers, Jodhpur.
- SCHEFFRAHN, R. H., AND N.-Y. SU. 1990. Native, introduced, and structure-infesting termites of the Turks and Caicos Islands, B.W.I. (Isoptera: Kalotermitidae, Rhinotermitidae, Termitidae). *Florida Entomol.* 73: 622-627.
- SCHEFFRAHN, R. H., AND N.-Y. SU. 1995. A new subterranean termite introduced to Florida: *Heterotermes Froggatt* (Isoptera: Rhinotermitidae: Heterotermitinae) established in Miami. *Florida Entomol.* 78: 623-627.
- SCHEFFRAHN, R. H., J. P. E. C. DARLINGTON, M. S. COLLINS, J. KRECEK, AND N.-Y. SU. 1994. Termites (Isoptera: Kalotermitidae, Rhinotermitidae, Termitidae) of the West Indies. *Sociobiology*, 24: 213-238.
- SU, N.-Y., AND M. TAMASHIRO. 1987. An overview of the Formosan subterranean termite (Isoptera: Rhinotermitidae) in the world, pp. 3-15 in M. Tamashiro and N.-Y. Su [eds.], *Biology and control of the Formosan subterranean termite*. College of Trop. Agric. Human Res., Univ. of Hawaii, Honolulu, Hawaii.