

UPDATE ON EASTERN SUBTERRANEAN TERMITES

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The eastern subterranean termite, Reticulitermes flavipes (Kollar), has now been reported in 29 Ontario municipalities. In 1987, new infestations were found in several properties in the Town of Pickering, east of Toronto, & in a commercial building in a previously unaffected portion of the Town of Kincardine. Kincardine remains the northernmost location of established subterranean termite infestation in Ontario. However, established Reticulitermes infestations were also found in a block of houses in Winnipeg, Manitoba, in 1987, indicating the potential for broad distribution of subterranean termites in Canada. In the City of Toronto alone, 16 new blocks were found to be affected by termites in 1987, & costs of termite control treatments & breaking contacts between wood members & the soil totaled approximately \$1.14 million (Jafri, 1988).

Research efforts have concentrated on four areas:

- (1) describing the biology & behavioural ecology of subterranean termite colonies in southern Ontario (e.g., foraging dynamics & colony demographics);
- (2) establishing the role of behavioural chemicals in termite orientation & feeding, & isolating compounds from plants & fungi of potential value in termite control;
- (3) determining the effects of fungi associated with termite colonies, & their potential for use in biological control;
- (4) assessing the toxic & behavioural effects on termites of compounds of low human toxicity for use in wood protection.

A mark-release-recapture technique was developed to determine the size of foraging territories & populations of eastern subterranean termite colonies. At one of several sites studied in Metropolitan Toronto, termite feeding on 1,158 white pine stakes was monitored, & traps consisting of rolled corrugated cardboard installed in the soil. Termites collected in these traps were fed filter paper impregnated with an oil-soluble dye (Grace & Abdallay, 1988), counted, released back into the soil, & then recovered by a series of trap collections. Over 200,000 termites were individually examined & counted at this site.

The maximum distance between interconnected traps at this site was found to be 79 metres, & the area over which dyed termites traveled exceeded 1,000 square metres (Fig. 1) (Grace, Abdallay & Farr, in prep.). Using a simple proportionality, the foraging population at this site can be estimated at over 3 million insects. Since a single R. flavipes worker ingests slightly less than 0.1 mg per day, approximately 300 g of wood is consumed each day by a group of this size. These foraging distances & populations greatly exceed those reported in the southern United States (Howard et al., 1982), suggesting differences in southern & northern termite biology. Long-distance foraging by termite workers supports the concept of disseminating a bait through the colony by movement of the foragers.

Cooper & Grace (1987) reported infestation of living trees in Toronto by R. flavipes, a behaviour found only in north-eastern Reticulitermes populations in

North America. Compounds affecting termite feeding & survival have been extracted from several of the tree species mentioned in this study, such as horse chestnut, & are under evaluation for toxicity & effects on termite orientation behaviour (e.g., repellence, attractance).

Many species of fungi have been isolated from traps & other nest materials (Zoberi & Grace, in prep.), & the effects of these fungi & their metabolites on termite survival & behaviour are under evaluation. Competitive & parasitic interactions among fungal species appear to limit detrimental effects on termite survival, & disruption of these inter-fungal interactions would exert pressure on termite populations.

Environmentally acceptable wood preservatives & insecticides are necessary components of a multi-tactic approach to termite control (Grace, 1987). One area of interest is the use of non-repellent compounds, such as borates, in termite baits, possibly in combination with attractant chemicals. By contrast, the fungicide TCMTB is repellent to subterranean termites at dosages as low as 0.1% (weight/weight), where toxicity is negligible (Grace, 1988). Small loadings of repellent materials may offer protection from termite attack equivalent to toxic quantities, or more toxic preservatives.

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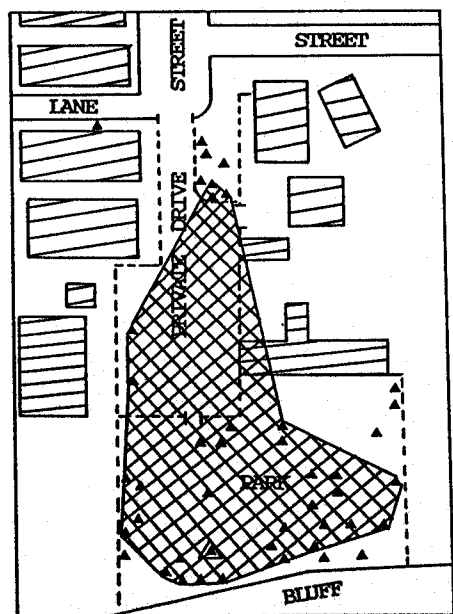


Fig. 1. Foraging territory (crosshatched) of *R. flavipes* colony at an urban site on the Scarborough bluffs. Shaded objects are buildings, solid triangles indicate trap locations.

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