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Termites in Eastern Canada: A Brief Review and Assessment

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## ABSTRACT

The distribution of termites in Canada is reviewed, with particular emphasis on the eastern subterranean termite Reticulitermes flavipes (Kollar) in Ontario province. Municipal and provincial termite control programs are discussed and current treatment practices are described. Previous research on R. flavipes in Ontario is briefly reviewed, with reference to a number of unpublished reports and publications of limited distribution.

Keywords: Reticulitermes flavipes, subterranean termites, Rhinotermitidae, termite distribution, termite control.

## TERMITE DISTRIBUTION

Only four species of termites are known to occur in Canada and their occurrence is, in general, limited to the southern portions of two provinces, British Columbia and Ontario. According to Blackall (1981), isolated instances have also been reported in southern Quebec and the Maritimes, undoubtedly due to transport of infested wood. On the Pacific coast, the western subterranean termite Reticulitermes hesperus Banks (Rhinotermitidae) occurs throughout southern British Columbia, as do the two rotten wood termites Zootermopsis angusticollis (Hagen) and Z. nevadensis (Hagen) (Termopsidae). In the eastern province of Ontario, the eastern subterranean termite Reticulitermes flavipes (Kollar) was apparently first reported in the southernmost portion of the province at Point Pelee (Essex County) in 1929 (Kirby 1965, 1967). Whether it is indigenous to this area is a matter of debate (cf. Cooper and Morris 1981; Husby 1980), although some suspect that R. flavipes was introduced to Point Pelee in lumber brought in from the United States to construct vacation cottages (G.M. Cutten, personal communication). In other portions of Ontario, R. flavipes has only been found in the vicinity of human habitations, although not necessarily within those habitations.

Following its discovery at Point Pelee, R. flavipes was reported damaging a building on the Toronto lakefront in 1938, reportedly as the result of an introduction from the United States around 1935 (Urquhart 1953). The growth of this and subsequent infestations in the greater metropolitan Toronto area has since been the major cause of concern in Ontario. Termites have now been reported in 13% of the city blocks in Toronto (Jafri 1987). To date, subterranean termite infestations have been reported in 28 Ontario municipalities (Cutten 1987). The northernmost known site of infestation is Kincardine (Bruce County), where R. flavipes was first collected in 1954 from a rubbish pile near the railway station (Kirby 1967).

#### MUNICIPAL AND PROVINCIAL PROGRAMS

A unique aspect of termite control in Ontario is the degree of involvement of provincial and municipal governments in inspection and control, rather than simply in regulation of the pest control industry. In 1962, the City of Toronto appointed a full-time termite inspector (Jafri 1983). Enabling legislation enacted by the provincial government in 1963 empowered municipalities to pass by-laws providing for both preventive and remedial termite control measures, and financial assistance to property owners. As enacted by Toronto (in 1963, replaced in 1973 and revised in 1984) and other affected municipalities, these by-laws give municipal building inspectors authority to require soil treatment of infested properties and elimination of earth-to-wood contacts. Some by-laws (e.g., Toronto) also provide authority to order soil treatment of adjacent properties as a preventive measure. In 1984, the Toronto by-law was revised to require pre-treatment of soil for new construction where wood structural members are used. These by-laws also apply to other wood destroying insects, such as carpenter ants which are a significant problem in some areas (e.g., the northern section of Toronto).

Although several private pest control companies are willing to inspect properties for termite infestation, such inspections are usually performed by a municipal building inspector - either at the request of a resident, in the course of surveying a selected area of the city, or in conjunction with other building inspection duties. If a private pest inspector recognizes termite infestation, a municipal inspector would then also have to visit the site in order for the property owner to take advantage of financial assistance programs. This arrangement (inspection by a public official) avoids the potential for conflict of interest and unethical behaviour inherent in a private termite inspection industry, but also begins to strain the resources of municipal personnel as public awareness and incidences of infestation increase. Unless these resources can be increased in proportion to the extent of the problem, more delegation of inspection responsibilities to private inspectors will be necessary.

Where termite infestation is noted, the property owner is instructed (mandated) by the city to contact any of several private pest control companies registered with the city to perform termite control, and to eliminate any contacts between wood members and the soil. The municipal inspectors also assist in completing the forms necessary to recover a portion of the costs of these control measures from the municipal and provincial grant programs.

Currently, the grant program administered by the City of Toronto will reimburse property owners 25% of the cost of soil treatment, either with chemicals or nematodes, to a maximum of CDN \$125 (Jafri 1987). Other municipalities offer similar grants. In addition, provincial grants administered by the Ontario Ministry of the Environment will cover 60% of the combined cost of chemical soil treatment and wood-soil separation, to a maximum of CDN \$2,000. The province will also pay 60% of the cost of soil pre-treatment for new construction, to CDN \$1,000. Other grants for home repair are available to low-income property owners. The Ministry of the Environment also monitors termite activity in Ontario through annual inspection surveys of selected areas.

Grants for termite control cost the Ontario provincial government CDN \$500,000 annually, while the City of Toronto spent CDN \$46,822 for soil treatment grants in 1986 (Jafri 1987). Since these grants cover only a portion of treatment costs and do not include costs for most structural repairs, actual losses due to termites certainly exceed this amount.

#### CURRENT CONTROL PRACTICES

As indicated by the requirements of the municipal by-laws and the provincial grant program, wood-soil separation is recognized in Ontario as essential to subterranean termite control. The Toronto by-law requires that such structural problems be corrected before chemical treatments are performed, and the province partially subsidizes the cost of eliminating wood-soil contacts.

Soil treatments with termiticides are extremely thorough: if evidence of termite infestation is found anywhere on the property, then sub-slab and soil injection is used to treat both sides of the entire peripheral foundation wall and any intermediate bearing walls and columns. Brick, hollow block, and rubble foundations are all common in eastern Canada, and wall voids are drilled and injected with termiticide. R. flavipes frequently attacks living trees in Toronto, and termiticide is injected into the soil around infested trees to contain the infestation.

Aldrin, chlordane, and chlopyrifos are all currently registered for soil treatment in Ontario. Of these, only

chlopyrifos is actually marketed in Canada at this time, but aldrin and chlordane remain the most common termiticides due to existing stock. Registration of permethrin is in process, but is likely to take at least another year (G.M. Cutten, personal communication). Nematodes are available, but have been used to treat only a few properties. Nematode applications can be subsidized under the Toronto grant program, but not under the provincial program.

Current soil treatment methods faithfully implement the "barrier" approach to termite control. However, they also place a large chemical load on the environment. As in the eastern United States, public health concerns have been raised about the cyclodienes, leading the Toronto Department of Public Health to propose a ban on their use. With chlorpyrifos available as an alternative, pressure for such a ban is likely to increase, as in New York State.

#### TERMITE RESEARCH IN ONTARIO

R. flavipes is widely distributed in eastern and southeastern North America, and examinations of this species at the northernmost limits of that range have euristic appeal. However, research in Ontario has emphasized mapping the distribution of the species and evaluating the success of control efforts. Kirby (1967) reports on the use of large numbers of spruce bait stakes to survey termite activity in Toronto and southern Ontario in 1948, 1952, and 1962. Baits decayed by Gloeophyllum trabeum were used by Esenther and Gray (1968), and this led to the successful demonstration in Ontario of the efficacy of the bait-block method of control by Ostaff and Gray (1975). The Ministry of the Environment continues to use bait stakes to a limited extent in their surveys, but the emphasis has shifted to more intensive inspection of buildings, fences, and trees in selected areas.

Much of the information on subterranean termites in Ontario is available only in government publications of limited distribution and unpublished research reports. In the first category are a well-illustrated consumer pamphlet (Anonymous, undated) and a very complete manual on termite control (Cutten 1987) distributed by the Ontario Ministry of the Environment, and reports issued by several municipal governments. The City of Toronto Planning and Development Department issued a comprehensive study of termite control in Toronto in 1983 (Jafri 1983) and has continued to issue detailed annual reports on the subject (Jafri 1987).<sup>1</sup>

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<sup>1</sup>Available upon request from Mr. Anwar Jafri, Planning and Development Department, City of Toronto, E 19th, City Hall, Toronto, Ontario, Canada M5H 2N2.

Cooper (1987) reports briefly on a study of the occurrence of R. flavipes in trees in Toronto conducted in 1980 (Cooper 1981). In unpublished reports, Keefer (1979) and Cooper and Morris (1981) provided historical reviews and evaluations of the termite problem in the province. Husby (1980) studied R. flavipes colony composition, reproduction, and seasonal cycles.

From late 1982 through April 1984, the City of Toronto employed Dr. R.V. Carr as a consulting entomologist. Among Carr's recommendations was the suggestion that facilities for research on termite biology and control be established in the Toronto area (Carr 1987; Jafri 1987). This led the City of Toronto Department of Buildings and Inspections to enlist the cooperation of the Faculty of Forestry at the University of Toronto in an effort to establish a Chair of Urban Entomology, with termite research the principal focus. This unique effort was modified to the creation of an Urban Entomology Research Project within the Faculty of Forestry, initially for a period of five years. Through the persistent efforts of Faculty and City representatives, support for the project was derived from a broad base of municipal, provincial, national, and private sources, and a Director was appointed in January 1987. Research specifics are now in the planning stages since the greater portion of the first year of the project is concerned with problem analysis. However, the general focus of this program is on characterization of some of the biological, environmental, and sociological variables impinging on R. flavipes control in Ontario, and on long-term reduction of chemical usage through the development of alternatives and adjuncts to current methods of termite detection and control in eastern Canada.

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