INFLUENCE OF HOST PLANT VOLATILES ON THE COLONIZATION OF TEA BY THE LOW COUNTRY LIVE WOOD TERMITE, *Glyptotermes dilataus* Bugnion and Popoff

By

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ABSTRACT

Damage by termites is considered to be a major problem especially in low country tea plantations. Kalotermitidae (*Glyptotermes, Neotermes*), Rhinotermitidae (*Coptotermes, Heterotermes*) and Termitidae (*Hospitalitermes, Hypotermes Microcerototermes, Nasutitermes, Odontotermes*) are the economically important termite families affecting tea plantations in Sri Lanka. *Glyptotermes dilatatus* and *Neotermes greeni* are the two commonly occurring live wood termites causing serious damage, with the former predominating. Termites are attracted to dead and decaying wood in tea bushes caused by wood rot following attack by shot hole borer, branch canker, sun-scorch, mechanical damage and die back of branches.

Many insects use air bone volatiles emitted from plants to locate their hosts. The information on volatile chemicals that attract insects to their hosts and stimulate oviposition upon arrival could be of benefit to pest control programme. A study was carried out to identify the chemical constituents of tea clones TRI 2023, TRI 2027, TRI 2016 and TRI 3063 showing attractant or repellent effects on termites. Extractions were made from rotted wood, infested wood and dead wood (die back) of the respective tea clones using Simultaneous Distillation and Extraction and cold extraction methods.

The effects of the extractives from wood materials, on termites were tested by conducting olfactometer and petri dish couplet studies. Extracts of rotted wood of termite tolerant clone, TRI 2027 and termite susceptible clone TRI 2023 showed

statistically similar attractiveness to termites. Thus there may be factors other than attractants, which make tea clones tolerant or susceptible. Bioassays with dichloromethane extracts showed that the highly susceptible clone TRI 3063 is more attractive than the susceptible clone TRI 2023. As these findings were in agreement with field observations on the susceptibility of clones, they proved the suitability of using olfactometry in recognising attractant or repellent compounds in plant extracts, in relation to Low country Live –wood termites. Both non-volatile compounds and volatile compounds are responsible for the attractiveness of the tea clones TRI 2023 and TRI 3063.

Extractives from rotted wood of TRI 2023 and TRI 3063 were fractionated using Vacuum Liquid Chromatography and fractions attractive to termites were further separated using Medium Pressure Liquid Chromatography. From this study four fractions showing significantly high attractance to termites were identified.

In order to investigate the antifeedant or attractant effect, aqueous extracts of tea clones TRI 2023, TRI 2027, TRI 2016, TRI 2025, TRI 3063, TRI 3041, TRI 3014, TRI 3055, TRI 4049 were used in an artificial diet study. Extracts of TRI 2023 and TRI 3063 showed the highest feeding activity monitored by the formation of galleries and periods of survival, compared with the low activity seen in aqueous extracts of tea clones of TRI 2016 and TRI 3041.

In order to determine whether the susceptible, moderately susceptible, tolerant and immune clones contain similar volatile compounds, the extracts of the different clones

were analysed using gas chromatography. However the results indicated no generalized pattern of volatile compounds in each group of these clones.