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Evaluation of Borate-Glycol Wood Preservatives to Control Dry-Wood Termite and Pin-Hole Borers in Sri Lanka

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Abstract

Wood destroying insects cause heavy losses to wood used in construction and has been a serious economic concern of the construction industry. Thus it is very important to treat wood properly in order to extend the service life of wooden products. Borates as indoor wood preservatives have played an effective and ever increasing role in preservation of wood and made them particularly attractive in today's environmentally conscious market. The prime objective of this study is to evaluate efficacy of different formulations of borate-glycol wood preservatives against dry-wood termites (*Cryptotermes brevis*) and pin-hole borers (*Euplatypus parallelus*) using laboratory no-choice feeding test, chemical retention, and chemical penetration. Wood specimens were treated with different formulations of wood preservative which were prepared using monoethylene glycol (MEG) and monopropylene glycol (MPG) with varying boron percentages (10%-20%). Adult insects collected from infested timber were introduced to these samples and kept for eight weeks in closed containers. Mean mortality, wood weight loss and number of holes were observed in each test unit. There were remarkable physical and behavioral changes in both dry-wood termites and pin-hole borers after the exposure to the wood preservatives. With regards to mean mortality of *C. brevis* in the no-choice feeding tests in 1:2 (by volume) aqueous dilution of borate/glycol, termite mortality increased from about 83% to 100% with increasing boron percentage 15% to 20%. All the formulations showed 100% mortality when applied them in 1:1 (by volume) aqueous dilution of borate/glycol. MEG showed high mean mortality than MPG. No significant difference in mass loss was observed for all treated samples and there was no sign of wood consumption by termites in borate treated wood specimens when compared with untreated specimens. In pin-hole borer no-choice feeding test, there were no holes made by *E. parallelus* adults on the test blocks which were treated with all formulations except for the formulation consisting 10% boron in MPG and mean mortality of *E. parallelus* was around 75% for all formulations. Maintaining healthy population of *E. parallelus* is difficult due to delicate living conditions of their natural habitat. According to the results obtained, 20% boron in MEG is the most suitable formulation for wood preservation owing to its high effectiveness to wood destroying insects.

Keywords: Preservation, Borates, Dry-wood termites, Pin-hole borers, Mortality