POTENTIAL PHYTOSANITARY TREATMENTS FOR NEW ZEALAND EXPORT LOGS: A LITERATURE REVIEW

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Abstract A comprehensive literature review of over 30 fumigants, including 15 major fumigants and 18 minor fumigants, was undertaken for STIMBR to determine whether any fumigants, or disinfestation strategies, methods, or techniques presented viable alternatives to methyl bromide (MB) fumigation for New Zealand log exports. The viability of alternatives focused on currency in the literature, economic and regulatory feasibility, environmental and human health concerns, efficacy against target pests, utility for log exports, and commercial application. The goal of this review was to recommend two fumigants as viable alternatives for further research under the Ministry for Business, Innovation, and Employment (MBIE) research programme, “Protecting Market Access for Wood Exports”.

In addition to fumigants, a secondary goal of the review was to investigate nonchemical treatments and methods, including controlled and modified atmospheres, energy treatments (irradiation, microwave, electrical, infrared), physical treatments (cold, heat, pressure, and vacuum), and other alternatives, such as debarking of logs, pest management systems, and systems approaches.

Other than ethanedinitrile (EDN) and sulphuryl fluoride (SF), no other fumigant had any possibility of being considered for further research as a MB alternative for New Zealand export logs. In addition, no energy (other than the joule heating process currently being studied) or physical treatment (other than a combined heat and modified atmosphere treatment) showed any potential.

EDN is recommended for further study pursuant to recent tests that showed that EDN was both efficacious against the life stages of burnt pine longhorn beetle and that EDN sorption rates for sawn timber were promising. Additional research is needed to determine the suitability of using EDN for logs, to identify the most EDN-tolerant forest insect species and life stages, and to complete the associated laboratory and commercial efficacy tests.

SF, a common timber and structural fumigant for termites, was a distant second possibility. While acknowledging environmental

issues (SF is a greenhouse gas), and a documented lack of efficacy against insect eggs, SF cannot be overlooked. Therefore, SF is recommended for further study only if efficacy and sorption studies with EDN show this fumigant to be an unsuitable alternative treatment for export logs.

Additionally, the review recommended further studies with MB to determine whether current rates that include high concentrations (e.g., 140 g/m^3) and long fumigation times (e.g., 24 h) could be reduced on the basis of efficacy tests with New Zealand forest pests. STIMBR funded research to initiate the efficacy studies to identify the potential for using reduced rates or fumigation times for methyl bromide fumigation. Although this obviously is not a “methyl bromide alternative”, positive research results could mean significant reductions in methyl bromide use and cost savings to the New Zealand log export industry.