

Current thoughts on evaluation criteria for new phytosanitary treatments and update on RF heating and phosphine fumigation

Adnan Uzunovic^a, Kelli Hoover^b, Ron Mack^c and Eric Allen^d

^a FPIinnovations, Vancouver, CANADA

^b Pennsylvania State University, University Park, PA USA

^c USDA- APHIS - PPQ – CPHST, Buzzards Bay, MA, USA

^d Canadian Forest Service Pacific Forestry Centre, CANADA

For several years the International Forestry Quarantine Research Group (IFQRG) discussed the efficacy and evaluation criteria for new phytosanitary treatments for wood. At the last annual meeting in September 2011 the group suggested a simplified approach, and in particular addressed “probit 9” requirements (100% mortality of at least 93,613 test organisms) that has been stalling new treatment development. The proposed new approach is under review by the Technical Panel on Forest Quarantine (TPFQ) for consideration by the Standards Committee (SC) of the IPPC. The summary of the discussion and new proposed approach will be presented. Probit 9 has been criticised as inappropriate especially for the majority of wood pests. Quantity and types of different pests that should be tested will also be addressed. A simplified three-step process is recommended with only seven pests to be tested in the first exploratory step (reference-easy-to-rear insects, e.g., species from *Sitophilus*, *Oryzaephilus*, *Trogoderma*, Ambrosia beetle), pine wood nematode -PWN, a decay fungus from *Heterobasidion* sp, and one available species from each of the Scolytinae, Bostrychidae, Buprestidae and Cerambycidae. Steps 2 and 3 involve tests with the most tolerant pest using a manageable number of replications (60-100 test units with no survivors after the successful treatment). This protocol allows for the efficacy level of the treatment to be calculated and reported based on the total pest load in the treated material

A summary of the evaluation of Radio Frequency (RF) irradiation and phosphine fumigation, using currently available evaluation criteria and guidance, is also presented. The results showed that to effectively treat PWN infected wood the entire sample must reach at least 56°C for a minimum of one minute, which supports previous results using microwave technology. RF heating to a minimum target temperature of 55°C for 1 minute killed 100% of treated emerald ash borers (EAB) and Asian longhorn beetle (ALB) in field-infested round wood.

Evaluation of phosphine efficacy using 10L glass jars that allow precise, accurate control of temperature, fumigant concentration, and exposure time, showed that commercially suggested dosages for phosphine (200-500 ppm for 3-5 days at temperatures above 16°C) were not effective in killing pine wood nematodes, two species of bluestain fungi and a decay fungus. Nematodes and fungi survived exposure to phosphine for 5 days at 800 ppm, at 15 and 20°C. Additional study indicated the same pests were also not killed at similar or even higher concentrations over 5 days at 20°C and 25°C although the number of nematodes was drastically reduced. Further work is needed to evaluate additional concentrations and exposure times, and study under scaled up-field conditions, in collaboration with international partners, before data are ready to be submitted to IPPC to be evaluated and considered as an alternative treatment to wood products.

Corresponding Author:

Dr. Adnan UZUNOVIC

FPIinnovations

2665, East Mall, Vancouver, B.C., CANADA

e-mail: adnan.uzunovic@fpinnovations.ca