

Environmental Persistence of *Bacillus thuringiensis* Products Tested under Natural Conditions Against *Thaumetopoea wilkinsoni*

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Information on persistence of *Bacillus thuringiensis* (*Bt*) is needed to improve the microbial pest management programs against the pine processionary moth *Thaumetopoea wilkinsoni* in pine forests in Israel. The persistence of the microbe under natural conditions of rain and sunlight was evaluated and is documented here for the first time. Pine saplings were sprayed with three commercial *Bt* products, Foray 48B, Delfin WG and Dipel DF, all used at 32,000 IU mg⁻¹ in a formulation with 1% (w/v) of condensed milk. In experiments conducted in November and December of 2004, the saplings were either exposed to rain and sunlight or were sheltered to avoid these environmental factors. The lowest rainfall recorded in the 8-day experiments was 16.5 mm (test 2) and the heaviest was 71.1 mm (test 1). Solar irradiation ranged from 9.4 to 10.9 MJ m⁻². The minimum temperature was close to 10°C and the maximum was less than 23°C. Needles of the treated saplings and their controls were sampled after 0, 1, 5 and 8 days, and were fed to 1st or 2nd instar larvae. Dipel DF persisted better than Delfin WG and still retained its initial activity of 80–100% mortality on day 8 at low rainfall (test 2). Dripping of *Bt* from upper to lower branches was quantified with the larval bioassays. The milk formulation proved to be an effective rain-fasting adjuvant.

KEY WORDS: Persistence; *Bacillus thuringiensis*; pine sapling; *Thaumetopoea wilkinsoni*; rainfall; solar irradiation; temperature; larval mortality; bioassays.

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