

Survival of the Oak Wilt Fungus in Logs Fumigated with Sulfuryl Fluoride and Methyl Bromide

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Abstract

Methyl bromide (MB) fumigation of oak logs destined for export is required to mitigate risks associated with movement the oak wilt fungus, *Bretziella fagacearum*. Due to MB's ozone-depleting properties, alternative fumigants with similar efficacy against *B. fagacearum* are urgently needed. Fumigation with sulfuryl fluoride (SF) is considered a promising substitute for oak log fumigation. Logs (1.8 m long) were obtained from *Quercus* trees (18.3-29.2 cm dbh) that were naturally infested (NI) or artificially inoculated (AI) with *B. fagacearum* to compare pathogen colonization and survival rates following fumigation with SF and MB. The logs were fumigated with SF for either 72 h with 240, 280, and 320 g/m³ or 96 h with 128 and 240 g/m³. MB fumigations were conducted using the current treatment schedule for oak logs destined for export (240 g/m³ for 72 h). Frequencies of successful pathogen isolation before treatment were higher for AI logs than for NI logs based on isolation rates from wood chips sampled from the sapwood. Treatments greatly reduced frequencies of viable pathogen presence, but no treatment was successful in eradicating the pathogen. Experiments also were conducted on blocks (10.2 x 10.2 x 11.4 cm³) obtained from *Quercus* trees to investigate simulated penetration and diffusion of SF and MB into oak logs. Slow, variable fumigant diffusion never reached concentration-time combinations lethal to *B. fagacearum*. Based on these results, reliance on SF alone as a quarantine measure may require higher concentration x time (CT) products to achieve quarantine level control of the oak wilt fungus in logs.

Keywords

Bretziella fagacearum, *Ceratocystis fagacearum*, log fumigation, phytosanitary treatments