AN APPARATUS FOR THE RAPID EVALUATION OF NATURAL SOIL FUMIGANTS SUCH AS BENZALDEHYDE

C. L. Wilson[1]*, D. R. Fravel[2], and J. M. Solar[1]

[1]USDA ARS Appalachian Fruit Research Station, 45 Wiltshire Road, Kearneysville, WV 25430, and [2]USDA ARS Biocontrol of Plant Disease Laboratory, Room 275, Building 011A, Beltsville Agricultural Research Center, Beltsville, MD 20705-2350.

An apparatus was developed for the rapid evaluation of soil fumigants in a controlled manner using small volumes of soil and a simple assay procedure. The apparatus consisted of a manifold to which six canisters containing a sandy loam soil adjusted to -100 kPa infested either with conidia of *Fusarium oxysporum* or *Trichoderma harzianum;* sclerotia of *Sclerotinia minor,* ascospores of *Talaromyces flavus;* or beet seed colonized with *Phytium aphanidermatum* or *Rhizoctonia solani.* Using nitrogen as a carrier gas, either nitrogen or nitrogen plus each of the fumigants was passed through the soil for 24, 48, or *72* h. At all three exposure times, benzaldehyde + nitrogen reduced viability of R. *solani* and S. *minor,* and reduced populations of P. *aphanidermatum* and T. *harzianum.* Populations of F. *oxysporum* were reduced after 48 and *72* h of exposure to benzaldehyde, whereas populations of T. *flavus* were reduced only after *72* h exposure. Benzaldehyde is relatively nontoxic to man and the environment and merits further consideration for use as a Soil fumigant. The biocontrol fungus T. *flavus* was less sensitive to benzaldehyde than the pathogens or the biocontrol fungus T. *harzianum.* Thus, it may be possible to combine T. *flavus* with benzaldehyde to enhance biocontrol.