COMPARATIVE QUARANTINE TREATMENTS OF NARCISSUS FLIES USING VACUUM, HERMETIC or CO_2

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Under present agreements of the Montreal protocol, methyl bromide (MB) phase-out for developed countries will take place by 2005. Although there is a large number of a suggested potential alternative to MB for disinfestation of durable commodities, development of most of these alternatives is likely to be costly. Furthermore, any alternative must compare favorably with the rapid kill achieved by MB, which is its major advantage over other treatments.

The combined factors of MB phase-out, the gradual development of insect resistance to fumigants and the undesirable effects of fumigant residues in food, have led to the idea of comparing of alternative treatments. The objective of this investigation was to develop an alternative control treatment based on vacuum, hermetic storage, or CO_2 enriched controlled atmosphere against the large narcissus fly (*Merodon eques*).

The large narcissus fly *Merodon eques* is a quarantine insect species that attacks narcissus bulbs as well as bulbs of other geophytes. Fumigation with methyl bromide is the only rapid treatment available for handling infested bulbs. However, the most recent international resolution under terms of the Montreal Protocol, ending the use and production of methyl bromide as well as the phytotoxic effects of methyl bromide required further studies to find alternative fumigation methods. Maggots of the species were obtained from infested narcissus bulbs and exposed to treatments. Because the *Merodon* develops inside the bulb, maggot infested bulbs were placed inside the treatment chambers. LT_{99} values below 50 mm Hg vacuum, at hermetic conditions and at 90% CO_2 were 24, 34, and 24 h, respectively. Hermetic conditions, due to the respiration of the bulbs, developed 24% and 42% CO_2 within 26 and 34 h, respectively. Germination of the bulbs planted in October, showed excellent results with vacuum treatment and acceptable results under CO_2 or hermetic conditions.

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