Susceptibility of Two Bulb Mites, *Rhizoglyphus robini* and *R. setosus* (Acarina: Acaridae), to some Acaricides and Insecticides

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ABSTRACT


The susceptibility of two field-collected bulb mites, *Rhizoglyphus robini* and *R. setosus* to some organophosphorus, carbamates, pyrethroids and other compounds with acaricidal activity was evaluated. In general, *R. setosus* was more tolerant to these compounds than *R. robini*. Among the 58 commercially formulated compounds tested, *R. robini* was susceptible to chlorpyrifos 22.5% EC, EPN 45% EC, ethion 46.5% EC, fenitrothion 50% EC, methamidophos 50% S, methidathion 40% EC, mevinphos 25.3% EC, omethoate 25% EC, parathion 47% EC, phosmet 50% WP, profenofos 43% EC, prothiophos 50% EC, benfuracarb 20% EC, carbofuran 40.64% F, carbosulfan 48.34% EC, formetanate 50% SP, methiocarb 50% WP, azocyclotin 25% WP and cyhexatin 50% WP. Demeton-S-methyl 25% EC, methidathion 40% EC, phosmet 50% WP, profenofos 43% EC, prothiophos 50% EC, azocyclotin 25% WP and cyhexatin 50% WP gave good toxicity to *R. setosus*. Both species were tolerant to avermectin 1.8% EC and some newly developed synthetic pyrethroids, which were proved to have acaricidal activity. In addition, two bioassay methods were also evaluated for these two mites.

INTRODUCTION

Bulb mites, *Rhizoglyphus* spp., are pests of many crops with tubers, corms and bulbs, both in field and in storage (Garman, 1937; Manson 1972; Muller and Hollinger, 1980). These cosmopolitan mites also play the role of disseminating bacteria and fungi which infect bulbs and corms, and even facilitate the infection of pathogens to their host plants (Forsberg, 1959; Poe et al., 1979).

*Rhizoglyphus robini* is the first *Rhizoglyphus* species recorded in Taiwan (Wang, 1982). It infests not only gladiolus corms but also the bulbs of green-
onion and leek. The other species, *R. setosus*, is a newly recorded mite pest, which also affects the culture of the above crops (Ho and Chen, 1987). These two mites are sometimes found infesting the same crop in the field.

The solar-heating method proposed by Gerson et al. (1981) did not provide sufficient control of bulb mites in Taiwan, probably due to different climatic situations and culture systems. Soil fumigation and water-dipping methods were tested by Wang and Lin (1986), yet these methods are not economical enough to be adopted by farmers. Chemical control may still be one of the most efficient and convenient ways of controlling bulb mites. To date, no chemicals have been recommended for controlling these mites on green-onion or leek and no information is currently available on the susceptibility to various compounds of the field strains of *R. robini* and *R. setosus* in Taiwan. Bioassays were thus conducted to determine the susceptibility of these two mites to 58 formulated compounds.

MATERIALS AND METHODS

*Mites*

Colonies of *R. robini* and *R. setosus* were collected from the infested green-onion and leek fields. They were separated according to the key characters described by Manson (1972) and reared on an artificial medium for acarid mites (Bot and Meyer, 1967). Mite colonies were maintained at 25°C, > 95% r.h. and in darkness. Adults of the 2nd generation were used for bioassays.

*Chemicals*

The compounds used were: acephate 50% WP (Chevron); amitraz 20% EC (FBC); avermectin 1.8% EC (Hoechst AG); azinphos-methyl 20% EC (Bayer AG); azocyclotin 25% WP (Bayer AG); benfuran 20% EC (Otsuka); benzomate 20% EC (Nippon Soda); bifenthrin 10% WP (FMC); binapacryl 50% WP (Hoechst AG); bromopropylate 25% EC (Ciba-Geigy); butocarboxim 50% WP (Wacker-Chemie GmbH); carbaryl 50% WP (Union Carbide); carbofuran 40.64% F (FMC); carbosulfan 48.34% EC (FMC); chlorpyrifos 22.5% EC (Dow), cyfluthrin 5.7% EC (Bayer AG); cyhexatin 50% WP (Dow); cypermethrin 5% EC (Dow); dichlorvos 50% EC (Bayer AG); deltamethrin 2.8% EC (Roussel Uclaf); demeton-S-methyl 25% EC (Bayer AG); diazinon 60% EC (Ciba-Geigy); dicofol 42% EC (Rohm and Haas); dimethoate 44% EC (American Cyanamid); dinobuton 30% EC (KenoGard); endosulfan 35% EC (Hoechst AG); EPN 45% EC (Nissan); ethion 46.5% EC (FMC); fenbutatin-oxide 50% WP (Shell); fenitrothion 50% EC (Sumitomo); fenpropathrin 10% EC (Sumitomo); fenvalerate 20% EC (Sumitomo); fluoclytrinate 31.6% EC (American Cyanamid); fluvalinate 25% EC (Zoecon); formetanate 50% SP