

COMPATIBILITY BETWEEN THE ENTOMOPATHOGENIC FUNGUS *METARHIZIUM ANISOPLIAE* SOROKIN AND SOME PESTICIDES AGAINST RED SPIDER MITE, *TETRANYCHUS URTICAE* KOCH

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Abstract

The compatibility of *Metarhizium anisopliae* Sorokin with three pesticides was studied *in vitro* and under field condition. Three concentrations of each pesticide were tested in the laboratory to study its effect on the mycelial growth of the entomopathogenic fungus *Metarhizium anisopliae*, at recommended concentrate, at half of recommended concentrate and fourth of recommended concentrate.

There is no inhibition of mycelial growth with Baioca at the three concentrates 100 % (++++). On the other hand, Bermectine has the same effect at 1/2RC and 1/4RC 100 % (++++), but at RC it exhibit 50 % mycelial growth (++) . However Ortus exhibit 25 % mycelial growth (+) at RC and exhibit 50 % mycelial growth (++) at 1/2RC while at 1/4RC mycelial growth was approximate 100 % (++++).

In addition, the efficacy of tested combinations (Bioranza plus, Ortus, Baioca and Bermectine) were evaluated in the field on eggplant against the red spider mite, *Tetranychus urticae* Koch at the recommended and half recommended rates and could be stated that, the bioinsecticide Bioranza 4%WP could be successfully used for controlling *Tetranychus urticae* at recommended rate (200 gm. / 100 L.) in combination of Ortus (25 cm³/100 L.) , Baioca (50 cm³/100 L.) and Bermectine (20 cm³/100 L.) at their half recommended application rates. This gives us the significance value for protecting the environment and our selves by reducing the used rates of pesticides and then less hazards and problems resulting from excessive use of pesticides achieving the significance value by decreasing the application rates of pesticides on crops and obtaining good production with less residuals and good quality.

Also, co-toxicity resulted from addition of Bioranza to Ortus, Baioca, and Bermectine against *Tetranychus urticae* individuals stated that, the type of joint action obtained from the addition of the bioinsecticide at its recommended RC to Ortus, Baioca and Bermectine at the two application rates induced regular joint action against *Tetranychus urticae*, indicating a dominated additive effect where, the additive effect for the total mortality of the combination is higher than the mortality of summation of each compound separately, Thus, the joint action of the two compounds in the mixtures was more effective against the two spotted spider mite *Tetranychus urticae* than the compound alone.

Key words: compatibility, *Metarhizium anisopliae*, insecticides, *Tetranychus urticae*

INTRODUCTION

The conservation of biological control agents within agro ecosystems is one of the strategies adopted for the exploitation of entomopathogens. Equally important are the techniques of inoculative, inundative and incremental introductions. In all cases, either to preserve the entomopathogen or to use it in combination with chemical pesticides, it is necessary to know the action of these products on the microorganism and then determine their compatibility. This interaction should be considered before recommending a given chemical agent and represents an important tool in programs of integrated pest management. Several studies have contributed information for the choice of pesticides with more selective action on the entomopathogens and most of them was conducted under laboratory conditions and concerned entomopathogenic fungi (Ramaraje *et al.* 1967, Alves 1986, Silva *et al.* 1993).

Ignoffo *et al.* (1975) studied *in vitro* several chemical products employed in soybean crop and observed that almost all fungicides and some insecticides and herbicides tested inhibited fungal growth and affected fungal virulence. The fungi *Aschersonia aleyrodalis*, *Hirsutella thompsonii*, *Paecilomyces farinosus* and *Verticillium lecanii* are pathogens of great importance for the natural control of different insects and mites and occurs in various agro ecosystems. The interaction between *Beauveria bassiana* and mineral oil was evaluated by Batista Filho *et al.* (1995) in order to control the banana plant borer, *Cosmopolites sordidus* (Gem.). These investigators observed an additive effect of the combination, which caused 98 % adult insect mortality compared to 70 % caused by the fungus alone and 33 % by mineral oil alone.

The present work aims to study the compatibility between the entomopathogenic fungus *Metarhizium anisopliae* and three pesticides against the two spotted spider mite *Tetranychus urticae* Koch.

MATERIALS AND METHODS

Laboratory experiments:

The present study was conducted in the Bio-insecticides Production Unit at Plant Protection Research Institute, Agriculture Research Center, Ministry of Agriculture, Dokki, Giza, Egypt.

- Isolation of *Metarhizium anisopliae*:

Metarhizium anisopliae was isolated in pure culture on Czapek's Dox agar medium (CDA) from infected adults of *Rhynehophorus ferruginens* collected from Ismailia Governorate, Egypt (Ibrahim, 2006).