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Article

Detecting acaricide resistance in Turkish populations of *Panonychus citri* McGregor (Acari: Tetranychidae)

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Abstract

In this study resistance levels of eggs and adult females of citrus red mite *Panonychus citri* McGregor (Acari: Tetranychidae) were determined for spirodiclofen, dicofol, tetradifon and fenbutatin oxide which are commonly used acaricides in the Çukurova Region of Turkey. Bioassay tests were conducted with five different populations of *P. citri*. Four populations were collected from commercial citrus orchards from Havutlu, Karadut, Kayarli and Çiçekli villages of the Çukurova region, where acaricide-insecticides have been intensively applied by growers to supress mite populations. One population was collected from a pesticide free area in the city center of Adana to be used as a susceptible (S) population in the experiments. According to the study, all four orchard populations were found to be more resistant than the S population to the four acaricides used in the experiments. Furthermore, acaricide resistance levels of tested populations varied, ranging from location to location due to the different spraying habits and frequency. Additionally, the resistance ratios obtained with eggs were lower than the resistance ratios of adult females. Compared to the S population, the highest resistance ratios of *P. citri* eggs were found 19.0, 38.9, 7.5 and 7.9 for Karadut, Çiçekli, Çiçekli and Kayarli populations, for spirodiclofen, dicofol, tetradifon and fenbutatin oxide, respectively. In the adult females, the highest resistance ratios were found to be 70.3, 159.6, 111.9 and 212.3 for the same populations and the acaricide order given above, respectively. Results of this study indicated that acaricides used to control *P. citri* should be monitored regularly to determine citrus red mite resistance levels for successful mite management. Acaricides which have least resistance should be preferred. In addition, rotation of acaricide having different modes of action to minimize development of resistance is essential.

Key words: *Panonychus citri*, Citrus red mite, Resistance levels, Acaricides, Turkey

Introduction

Turkey is the tenth largest citrus producer in the world, with 3.026 million tons of production per year. The east Mediterranean region, also known as Çukurova region, supplies 75% of Turkish citrus production (FAO, 2010). Approximately 90 arthropod species have been reported to be citrus pests in Turkey, but only 17 species carry economic importance. The citrus red mite *Panonychus citri* McGregor (Acari: Tetranychiidae) is an important pest associated with citrus crops in the Çukurova Region (Uygun, 2001). *P. citri* have two population peaks in this region, one in autumn and the other in spring season when the citrus have fresh shoots. Because of the more favourable climatic conditions, the spring population is more damaging than the autumn one (Kasap, 2009). Leaf bronzing is the first noticeable symptom caused by *P. citri*. Leaf and fruit drop may be observed following heavy infestations by this mite (Jeppson *et al.*, 1975).

Chemical control is the method preferred by citrus growers to control *P. citri* in the Çukurova Region. Unfortunately, they have also applied acaricides aganist pests like *Phyllocoptruta oleivora* (Ashmead), and *Aceria sheldoni* (Ewing) (Acari: Eriophyidae) which can cause great and

