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Managing Dust Mite *Oligonychus afrasiaticus* (McGregor) (Acari: Tetranchidae) Infesting Date Palm Orchards By Using Lemongrass Extract and Nanosulfur

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Abstract: The dust mite *Oligonychus afrasiaticus* (McGregor 1939) (Acari: Tetranychidae) poses a significant threat to date palm *Phoenix dactylifera* L. productivity in Iraq. To address this issue, a field study was conducted in a private date palm orchard in Al-Zubair district, Basrah province, Iraq, to assess the efficacy of some treatments in controlling the dust mite population on date palm fruits. The treatments included lemongrass extract, nanosulfur, a combination of lemongrass extract and nanosulfur, liquid sulfur, and a distilled water as control treatment. Treatments were applied by spraying on leaves and fruits at three dates: five weeks, eight weeks, and eleven weeks after pollination. Dust mite mortality rates were measured at intervals of 1, 3, 5, and 7 days after treatment application. Results revealed that the second date, eight weeks after pollination, exhibited the highest mortality rate of 76.77%, significantly outperforming other dates. Among the treatments, liquid sulfur showed the highest efficiency, with an 87.83% mortality rate, followed closely by the combination of lemongrass extract and nanosulfur (84.14%). Nanosulfur alone recorded a mortality rate of 79.26%, while lemongrass extract alone showed a mortality rate of 49.15%. The mortality rate increased over time, reaching 80.79% after 7 days and 65.76% after 1 day. In conclusion, liquid sulfur emerged as the most effective treatment for controlling the dust mite population on date palm fruits. The second date, eight weeks after pollination, was the optimal time for treatment application. These findings offer valuable insights into sustainable and environmentally friendly pest control strategies for date palm cultivation in Iraq.

Keywords: Acaricide activity; Bioactive compounds; GC-MS; Mortality rate; Pest management.

Introduction

The date palm (*Phoenix dactylifera* L.) holds substantial economic importance as a key fruit crop in Iraq, contributing valuable resources for both local consumption and overseas trade (Johnson, 2010). Nevertheless, the consistent productivity of date palm orchards faces ongoing threats from a range of pests, with particular emphasis on the dust mite *Oligonychus afrasiaticus* (McGregor 1939) (Acari: Tetranychidae). This microscopic pest poses a significant challenge by infesting date palm fruits, leading to crop