Research Article

# A Study of the Susceptibility of Five Iraqi Date Palm Varieties to Pest Dust Mite Infestation *Oligonychus afrasiaticus*

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**Abstract** | The research was conducted in middle Iraq, Babylon city to test the sensitivity of five date palm cultivars to infestation with the Dust Mite. The tested cultivars were (Zahdi, Khistawi, Hamrawi, Hallawi, and Maktoum) from 1/1/2024 to 29/12/2025, covering two productive seasons. Five orchards were chosen in different areas of Babylon city and Pests reached the highest in densities at the end of spring and by the summer from July to August they had lower incidence. The symptomatic severity of infestation was lower in those orchards that achieved proper agricultural management (cleaning,trunk cleaning,insect pollination,regular irrigation and pest control) compared with the neglected or poorly managed ones. The severest infestation was recorded in the orchards of Al-Musayyib Project (80%) and the least severity in the orchards of Al-Imam subdistrict (14%). While the orchards in Al-Mahawil, Al-Jubaila and Al-Iskandariyah were moderately infested at 52%, 61% and 66%, respectively. Results also showed that the cultivars were different levels of susceptible to infestation by the pest. The lowest susceptibility shown by Zahdi (21.6%) and maximum susceptibility (84.4%) was recorded from Maktoom cultivar. The year 2025 was the most severe in terms of orchard infestation severity in most tested orchards when compared to data from the preceding year.

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## Introduction

Date palm (*Phoenix dactylifera* L.) is a member of the Arecaceae family and a monocotyledonous plant. Iraq is known as the habitat origin for date palm cultivation. In the ancient city of Eridu, located in southern Iraq (around 4000 B.C.), the first documented appearance of the date palm tree in the ancient world (before the flood) was recorded. The Sumerians and Semites mastered the art of horticulture and the methods of cultivating and caring for date palms, making their lands the main center for date palm cultivation (Ibrahim, 2019).

Iraq has over 650 date palm cultivars, around 50 of these are already distributed throughout the country. Babylon Governorate is the third in Iraq as per date palms and production. The governorate shared 117,947 tons out of the total production 735,353 around the country (Central Bureau of Statistics, 2020).

Dates are of great importance in achieving food security because they represent a complete food source due to their high nutritional energy content. The fruit contains sugars such as (sucrose, glucose, fructose, and maltose) at a rate of up to about 60-80% of the fruit's dry matter, It also contains 23 types of different amino acids (Maqsood *et al.*, 2020) and being an excellent source of various essential minerals such as iron, potassium, calcium, phosphorus, chlorine, copper, magnesium and sulfur. Dates also include several vitamins such as A, B1, B2, B7 and C and some pharmacologically active agents like carotenoids, polyphenols and tannins. These compounds vary depending on the cultivar and the stage of ripeness (Ayoub, 2014).

Date palm trees in plantations are exposed to many pathological, insect, and mite pests (Kaaka *et al.*, 2018) which cause economic damage that affects date palm cultivation. Therefore, pest control operations are directed to limit the spread and aggravation of these pests, particularly mites.

The Sultani cultivar is one of the ancient and commercially important cultivars, widely cultivated in the governorates of the Euphrates Alwast, especially in Babylon and Karbala, which are considered the origin of this cultivar from where it spread to other regions (Ayoub, 2014). The Khadhrawi cultivar is one of the commercial cultivars characterized by the slight greenness of its fruits. It is cultivated in the central and southern regions and has several strains, such as Khadhrawi Basrah and Khadhrawi Mandali. Its fruits are consumed at the rutab stage, known for their distinctive flavor (Al-Ukaydi, 2010). The Buraim cultivar, originally from Basrah, is grown throughout Iraq. Its benefits are highly effective and of exceptional quality. It is consumed during its growth stage and before it reaches maturity. It is rarely left to ripen completely (Al-Najjar, 2014).

This research aims to study the susceptibility of some date palm varieties cultivated in Babylon Governorate to dust mite infestation.

## Materials and Methods

Five date palm groves were selected from different areas in Babylon Governorate (Al-Mashrou', Al-Imam, Al-Mahawil, Al-Jabala, and Al-Iskandariya). These groves contained various date palm varieties ranging in age from 6 to 10 years. The studied groves were those where the most common varieties were selected (Zahdi, Khaystawi, Hamrawi, Halawi, Maktoum, and Barhi). Three palm trees of each variety were selected at each location, and random samples were taken from the fruit bunches from the beginning of fruit set until maturity. These groves were monitored from the beginning of inflorescence (flowering) on the palm trees, which starts in mid-February and ends in July. Sample collection from the date bunches continued until the end of the season in September. This coincides with the start of the date harvest, and samples were taken every 15 days. These timings differ in Babylon Governorate from those in the southern governorates regarding pollination and harvesting. Readings were taken continuously from the date palm trees for two consecutive years. Samples were collected by cutting a portion of the fruit bunch from each bundle of the studied varieties, placing them in a transparent bag, and transporting them to the laboratory to assess the severity of spider mite infestation and identify any other pests present.

## Results and Discussion

The statistical analysis results of the susceptibility of the cultivars under study to the dust mite on date

palms for the 2024 season showed that the most susceptible cultivar is Maktoum, which surpassed all other cultivars, while the least susceptible was the Zehdi cultivar. No significant differences in susceptibility were found between the Barhi and Maktoum cultivars.

Meanwhile, the research areas showed the highest severity of infestation in the orchards of the Al-Musayab project area, due to the annual control measures carried out by the Ministry of Agriculture not reaching these areas for security reasons. The lowest severity of infestation was in the orchards of Al-Imam Sub-district, because they cultivate the Zahdi variety more than other varieties, due to its high economic return and the ease of harvesting, packaging, and marketing. of harvesting and marketing, which is why most palm farmers prefer it. The other areas showed comparable severity of infestation.

These results are consistent with several studies conducted in Iraq regarding the susceptibility of date palm cultivars.

**Table 1:** *The susceptibility of different date palm varieties to dust mite infestation in the city of Babylon Oligonychus afrasiaticus during 2024.*

| Cultivars | Al-Mahawil | Al-Jubaila | Al-Iskandariyah | Al-Musayyib Project | Al-Imam subdistrict | Mean of regions |
|---|---|---|---|---|---|---|
| **Zahdi** | 20.1 | 18.2 | 17.3 | 24.5 | 15.5 | **19.12** |
| **Khistawi** | 66.90 | 60.11 | 20.7 | 88.9 | 10.4 | **49.26** |
| **Hamrawi** | 62.12 | 64.4 | 40.4 | 92.8 | 12.3 | **54.40** |
| **Hilawi** | 70.33 | 60.4 | 59.9 | 90.3 | 6.4 | **57.47** |
| **Maktoom** | 91.2 | 87.2 | 77.8 | 96.5 | 60.8 | **82.7** |
| **Barhi** | 65.10 | 60.3 | 50.6 | 93.3 | 8.3 | **54.52** |
| **Mean of cultivars** | **62.63** | **58.44** | **44.45** | **81.05** | **18.95** | |
| **L.S.D** | Concentrations: 3.25 | Cultivars: 2.35 | Interactions: 4.11 | | | |

**Table 2:** *Infestation severity of the dust mite Oligonychus afrasiaticus during the 2024–2025.*

| Cultivars | 2024 | 2025 | Mean |
|---|---|---|---|
| Zahdi | 19.12 | 20.18 | 20.65 |
| Khestawi | 49.26 | 52.11 | 50.69 |
| Hamrawi | 54.40 | 58.44 | 56.42 |
| Hilawi | 57.47 | 60.31 | 58.89 |
| Maktoom | 82.71 | 85.41 | 84.06 |
| Barhi | 54.52 | 57.46 | 55.99 |
| L.S.D | Cultivars: 5.88 | Interaction: 9.23 | |

From the results shown in Table 1 and Table 2, it was observed that the infestation severity increased in most cultivars, The infestation worsened due to irrigation water and the neglect of most palm groves by farmers, leading to the spread of the disease.

It was found that leaf spot disease is widespread in all survey areas, consistent with what was stated by Al-danqali and Al-Ghariani (2005). The most affected areas were Al-Zaramaqa, Al-Nahda, and Al-Alalaqa, followed by Al-Ghalmiya. Its high density in some areas is due to the deliberate neglect of palm orchards in these areas and the failure to carry out agricultural activities such as pruning, removing infected palm leaves, and burning them. This increases the incidence of the disease (Al-danqali, 1996). Furthermore, increased irrigation leads to higher relative humidity, which was found to be directly related to it, as well as to the infestation of certain insects, especially stem borers, which weakens the health of the palm tree in general and makes it more susceptible to disease. This is consistent with several studies that have indicated that palm leaf spot disease is increasing. In neglected and under-serviced plantations (Al-Zayat *et al.*, 2002; Abbas *et al.*, 2007).

The difference in severity of disease infection among cultivars may be due to genetic differences between

cultivars that lead to differences in leaf wax content. Abdalla et al. (2001) indicated that the severity of infection with leaf spot increases in leaves with low wax content. The reason for the difference in severity of infection among cultivars is that farmers in some areas pay more attention to good cultivars than to other cultivars, which positively affects the health of these cultivars. These findings are consistent with numerous studies on the increasing decline of palm groves due to drought, low date prices, and palm tree deterioration. (Al-Zubaidi, 2006; Abbas *et al.*, 2007).

## Conclusions

The results revealed a wide range of susceptibility among the date palm cultivars to *Oligonychus afrasiaticus* infestation. The most infested cultivar was Maktoom, whereas the least one was Zahdi. Infestation severity in well-managed (pruned, cleared trunk, irrigated and managed for pests) orchards was significantly lower than the severity of neglected orchards. Environmental variables, and irrigation shortage in particular, resulted in higher infestation rates during the second season. Results emphasize the role of date palm cultivars and their orchard management in mitigating dust mite damage.

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## Authors' Contributions

Hadi Abdul Jaleel Naas designed and supervised the research, performed data collection, and contributed to data interpretation. Hameda Alawy Obeid assisted in laboratory analysis, statistical evaluation, and manuscript preparation. Both authors reviewed and approved the final manuscript.

## Novelty Statement

This study is among the first to document the relative susceptibility of major Iraqi date palm cultivars to *Oligonychus afrasiaticus* under field conditions in Babylon Governorate over two consecutive seasons. The research provides baseline data crucial for integrated pest management programs and for selecting cultivars less prone to mite infestation in arid and semi-arid environments.

*Generative AI and AI-assisted technology statement*

The authors declare that no generative AI and AI assisted technology was used in the creation of this manuscript.

## Conflict of Interest

The authors declare that there is no conflict of interest regarding the publication of this research.

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