

## THE INFESTATION PERCENTAGE OF THE GREAT POLLEN *ARENIPSES SABELLA* HAMPS (PYRALIDAE: LEPIDOPTERA) ON CULTIVARS DATE PALM TREES IN SOUTH OF IRAQ

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### Abstract

The date palm (*Phoenix dactylifera* L.) is a very important economic crop in Iraq, Palm trees are attacked by a large number of insect pests in all their parts, causing them sometimes serious and great damage, represented in the weakness of the palm, which leads to a decrease in its productivity of dates in terms of quality and quantity. This study was conducted to find out the rate of infestation and economic loss caused by the infestation of the Great Pollen *Arenipses sabella* Hamps (Pyralidae: Lepidoptera) on date palm trees, *Phoenix dactylifera* L, Barhi cultivar, in Abu Al-Khasib area, Basra Governorate, during the 2020 season. the results showed that the highest infestation rate was in the Al-Barhi cultivar, which amounted to 50.77%, while the infestation of the Al-Sayer cultivar was 49.09%, with a significant difference from the infection rate of the Al-Halawi cultivar, which amounted to 43.81%, which recorded the lowest infestation with the great pollen worm, , the infection rate was 50.77% and 49.09%, respectively, while the lowest rate of infection was recorded on Al-Halawi cultivar, with a significant difference from the two previously mentioned cultivars, amounting to 43.81%, and the general average of the date palm infestation level was 47.89 %.

**Keywords:** Date Palm trees · *Arenipses sabella* · The infestation percentage, the Great Pollen.

### Introduction

The date palm (*Phoenix dactylifera* L.) is a very important economic crop in different countries, It is one of the important trees in human life due to its importance in meeting the food and commercial needs and the rest of the other requirements of life, as it has economic importance and great nutritional value (Abbas and Mazel, 2019, Khalaf, 2013). Palm trees are attacked by a large number of insect pests in all their parts, causing them sometimes serious and great damage, represented in the weakness of the palm, which leads to a decrease in its productivity of dates in terms of quality and quantity, and these damages also lead to the death of the palm. At the top of the date palm, the pollen and fruits of the date palm are exposed to many pests and insects that attack the flowering spurs before and after they open. They also attack the fruits in their different stages, including the greater date moth *Arenipses sabella* Hamps (Pyralidae: Lepidoptera), which leads to wilting and breaking of the fruits. Then its fall (Al-Jubouri, 2007). As well, the greater date moth *Arenipses sabella* Hamps is considered one of the important pests on the date palm, as the rate of damage to the pollen reaches 77%, as its larvae feed on all stages of the fruits (Al-

Ahmad,2003). The loss may reach 90% in some farms, as the importance of the pest lies in the emergence of its different generations with all periods of fruit growth from the emergence of pollen to the harvest of the crop (Al-Jubouri, 2010). Palm varieties differ in their sensitivity and resistance to pests, including severe, medium and low sensitivity to infection, the real reasons for the sensitivity or resistance of palm varieties to pests are not precisely known until now. The difference in the proportions of the components of the vegetative, fruiting, physiological and anatomical parts may be related to resistance and sensitivity, as there is a difference in the components of each of the jamri, khalal, wet and dates between the varieties (Abdul Hussein, 1985). The symptoms of infection also differ in the degree of their appearance among palm varieties, where the limp appears twisted with blackened edges of the sprouts, as well as the drying of the scallops and their loss of green color, and the discoloration of the fruits in black in the habbuk phase with a small expenditure on the base of the arjoun. In view of the significant spread of these two insects in palm orchards in Basrah governorate,

In view of the economic importance of date palm trees, especially the Barhi, Al-Sayer and Al-Halawi cultivars, as it is one of the most abundant cultivars, as well as the lack of research on the Great Pollen *A. sabella* in Basra Governorate, this study was conducted to find out the Great Pollen *A. sabella* on date palm cultivars sensitive to infection and to calculate the percentage of infestation.

#### Materials and Methods

The research was conducted in one of Basra's orchards, Abu Al-Khasib district, south of Basra Governorate, for the agricultural season 2020, where three varieties of date palms were selected: Al-Sayer, Al-Halawi and Al-Barhi. These cultivars were also inoculated with the male pollen (Ghanami al-Khader) and three replicates (palm trees) were selected for each type of pollen appearance. The emergence of the insect was monitored .

#### Sampling the *A. sabella*

Random samples were taken from ten trees. In each visit, the female pollen of all studied species was examined from the beginning of its appearance until its formation as a stump, and any symptoms of infection with the major pollen worm were observed, 4 cluster from 4 stems were examined in different directions on each tree ,50 fruits were collected randomly from the ground and placed in small plastic bags, labeled and kept in plastic bags for transport to the laboratory. Larvae numbers were counted in the laboratory after examination.

#### Symptoms of infection and damage caused by *A. sabella*:

The symptoms of infection caused by the insect were followed up from the beginning of the emergence of pollen by manual pollination of palm trees until the stage of the ripe fruit through the weekly follow-up of symptoms, where the infected pollen was transferred to the laboratory and the larvae were examined and reared to obtain the role of adult insects.

#### Percentage of infestation with *A. sabella*:

The percentage of infection was calculated by calculating the number of infected tastes which symptoms appeared after the pollen was opened (from the total number of tastes while

continuing to follow up on the symptoms of infection weekly after teaching the affected tastes) and the percentage was extracted through the following law:

$$\text{Infection rate \%} = \frac{\text{The number of infected cluster}}{\text{Total number of cluster}} \times 100$$

The number of larvae of *A. sabella*:

The population density was calculated in the field by counting the number of larvae of different ages present on the cluster for every three clusters that were marked for each palm and according to the symptoms of infection.

Statistical analysis:

All trials were analyzed using the R.C.B.D. randomized block design. At a probability level of 0.05, the averages were compared according to the least significant difference method, the average R.L.S.D. Based on (Al-Rawi and Khalaf Allah, 1980). Statistical analysis was performed using the software SPSS Statistics for Windows Version 21 (SPSS 2012).

Results and Discussion

Symptoms and appearance of infestation caused by *A. sabella*:

Through the field follow-up of infected pollen grains from the beginning of their emergence and pollination until maturity, the following was observed, the movement of the larvae of this insect was observed, they are fast omnivorous and feed on the top of the pollen before it opens after the pollen division and pollination, for a period of about seven days or more, it was noted that the flower is damaged, with the neck of the fruit remaining, and its color is brown and withered, as the larvae were observed on the flowers and fruits after opening, and then on the bases of the thorns until the thorns remained naked without fruits hiding in it. The presence of silk threads and excrement of larvae on the covers of the pollen with the presence of larvae of different ages. It was noted the presence of silk threads and larval excrement in the armpits of the buttocks, the place where the larvae came into contact with the pollen with the presence of traces of feeding on the pollen, as well as the presence of holes on the pollen containing the larvae and the shape of their excrement. The presence of thick silky threads with larval excrement at the base of the stoma and inside the pollen sheaths with the presence of larvae. Al-Masoody (2015) showed that after the splitting of the pollen and pollination, with a period of about 2 days or more, it was noticed that the flower was damaged, with the neck of the fruit remaining, and its color was brown and shriveled. Otherwise, Al-Jubouri (2010) showed that the large pollenworm larvae dig multiple grooves on top of the pollen cover during the months of March and April in Iraq and at the base of Al-Shamarikh from their contact with the burrowing with the woven silk threads.

Percentage of infestation with *A. sabella*:

The results in Figure 1 showed the infestation rate of the major pollen worm, as the results showed that the highest infestation rate was in the Al-Barhi cultivar, which amounted to 50.77%, while the infestation of the Al-Sayer cultivar was 49.09%, with a significant difference from the infection rate of the Al-Halawi cultivar, which amounted to 43.81%, which recorded the lowest

infestation with the great pollen worm, and the results also showed that the infection of the insect of the Barhi class started from mid-March and continued to June, and the peak of infection was during the beginning of April to mid-May, reaching 83.07%, 99.67%, 99.78%, 96.32% and 91.79%, respectively, while the infection began on the Al-Sayer variety during the beginning of March and continued until the end of May and reached its peak at the end of March and continued until the beginning of May, reaching 78.85%, 87.97%, 95.33%, 96.08% and 83.04%, respectively. On the other hand, the results showed that the infection on the Halawi cultivar started from the beginning of March and continued to the end of May. The peak of infection reached at the end of March and continued until the beginning of May, reaching 69.54%, 78.97%, 92.41%, 97.38% and 71.3% respectively.

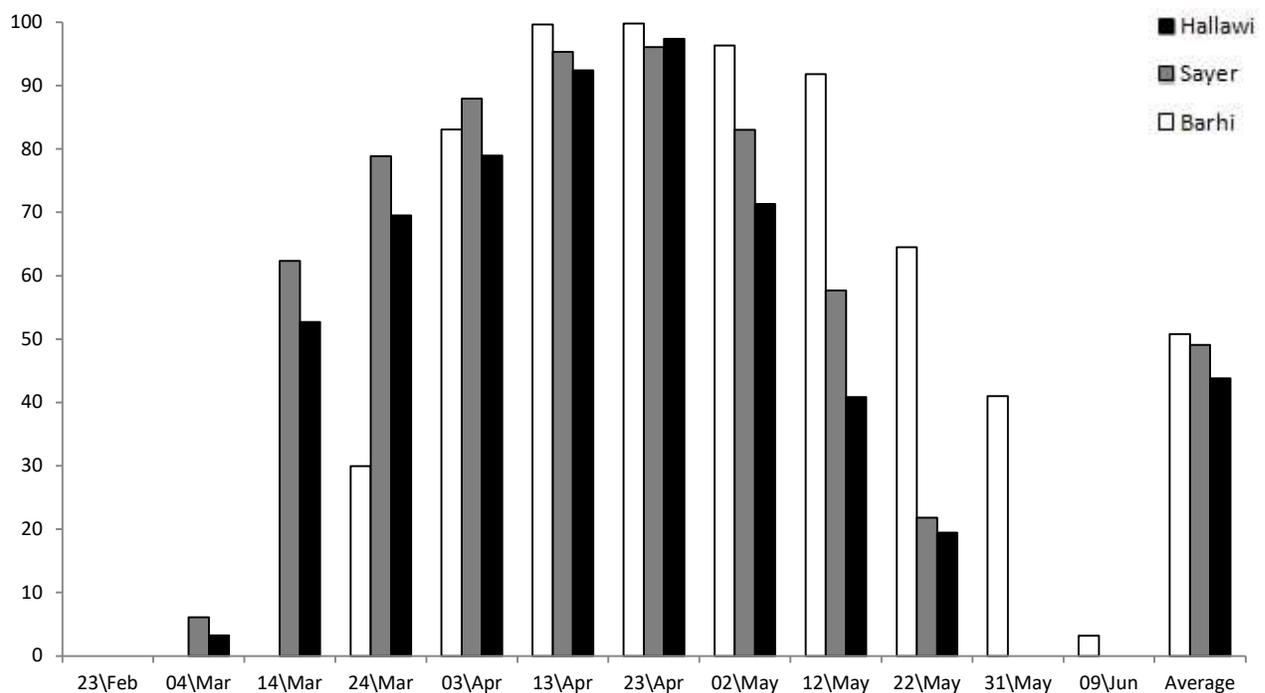


Figure 1: The rate of infestation of the major pollen worm on Barhi, Sayer and Halawi cultivars during the months of the year.

This may be due to the appropriateness of the climatic conditions for the activity of the insect in reproduction and nutrition through the appropriate temperatures and relative humidity. Abd-Hussein (1985) mentioned that the major and minor pollen worms need a high temperature to cause severe and high infestation on palms, and that the high rate of infection during The month of March and April for all types has shown an appropriate extent, the climatic conditions of the insect on those species. Al-Azzawi (1990) also showed that the larvae of the large pollen worm dig multiple grooves at the top of the pollen cover during the month of March and April in Iraq, and after the pollen opens, it feeds on the flowers in the clusters and after the fruit set. On the other hand, according to Al-Masoudi (2015), the highest percentage of infestation with the large pollen worm *A. sabella* was 46.10% at the third week, compared to the tenth week, where the percentage was

3.33%, and the highest percentage of infection was on the Al-Sayer variety in the third and fourth week, which amounted to 100%, and it was on the same variety at the tenth week, 10%.

Infestation rates of the *A. sabella* on date palm cultivars:

The results shown in Table (1) show that there is no significant difference between infection with *A. sabella* in Al-Barhi and Al-Sayer cultivars, the infection rate was 50.77% and 49.09%, respectively, while the lowest rate of infection was recorded on Al-Halawi cultivar, with a significant difference from the two previously mentioned cultivars, amounting to 43.81%, and the general average of the date palm infestation level was 47.89 %. Otherwise, the total infection rate of the tested female pollen for all varieties was 15.41 %, as the highest percentage of infection with female pollen was recorded for the Barhi cultivar and amounted to 19.78 %, with a significant difference from the Al-Sayer variety, which recorded 16.56 %, while the Halawi variety recorded the lowest infection for female pollen, it was 9.89 %. The results in Table (1) show that the total infection rate of the mites examined for all varieties is 15.81%, and the results showed that there was no significant difference between infection with *A. sabella* in Al-Barhi and Al-Sayer cultivars, where the infection rate was 16.11% and 18.42%, respectively, while the lowest infection rate was recorded on Al-Halawi cultivar with a significant difference from the two previously mentioned cultivars, which amounted to 12.91%. On the other hand, the results showed that there was no significant difference between the Barhi and Al-Sayer cultivars in the rate of infection with *A. sabella* on the hammock, reaching 20.63% and 19.21%, respectively, while it was less infested with the Halawi cultivar, reaching 11.72%, and the overall average of The infection of the rods of the studied varieties is 17.18%. The total infestation rate of the examined fruits of all varieties was 13.34 %, as the highest rate of infestation of fruits was recorded for the Al-Barhi and Al-Sayer cultivars and amounted to 17.08% and 14.75 %, respectively, with a significant difference from the Halawi cultivar, which recorded the least infestation of fruits and amounted to 8.21 %.

Table 1: The rate of infestation with *A. sabella* on date palm cultivars.

Cultivar	Date palm infestation (%)	Total inflorescence infestation (%)	Total bunch infestation (%)	Total female spathes infestation (%)	Fruit infestation (%)
Barhi	50.77 a	19.78 a	16.11 a	20.63 a	17.08 a
Sayer	49.09 a	16.56 b	18.42 a	19.21 a	14.75 a
Hallawi	43.81 b	9.89 c	12.91 b	11.72 b	8.21 b
Average	47.89	15.41	15.81	17.18	13.34

L.S.D. Date palm infestation=3.702

L.S.D. Fruit infestation=2.681

L.S.D.Total bunch infestation =2.663

L.S.D. Total female spathes infestation=4.257

L.S.D. Total inflorescence infestation=2.946

variance of *A. sabella*. Mansour (2008) mentioned one very wrong practice applied during the manual pollination of female trees, which can be considered as a vital tool for the distribution of *A. sabella*. Male inflorescences infected with *A. sabella* larvae can be used by local farmers for

pollination. It was recorded in Iraq Hussein (1963) that 70% of the palm trees were infested in Basra. In Egypt, Gamil (2017) showed that in the New Valley Governorate in Egypt, *A. sabella* has a great ability to spread and infect all date palm cultivars present in the study area, where the infection rate exceeded 80%. Abdel-Rahman et al. (2007) found that infected trees ranged from 41% to 100% with a mean of 60% in Siwa Oasis.

Jamil (2017) showed that the maximum infestation of clusters was 34.21%, and the rate ranged between 17.90% in 2015 and 14.39% in 2016. Hussein (1963) found that 49% of palm clusters were infested in Iraq. In the New Valley, cluster incidence ranged between 8 and 50% as recorded (Jamil and Sayed, 2009; Jamil et al., 2014). Otherwise Al-Antari et al. (2015) recorded that the large date moth is considered one of the most important economic pests in Jordan, and all the trees that were found infested in the farms of Ghor Kabid and Al-Baqoura, 45% and 55% of the clusters were found infested.

Al-Wakeel et al. (2015) emphasized that many important pests of the date palm that must be identified, especially the major date moth, *A. sabella* that can cause serious damage to crops and it can be emphasized that the larger date moth has become one of the most important pests on date palm and it needs cooperation Researchers to conduct further investigations and environmental and biological studies to understand the behavior of this insect.

#### Conclusion

The dateworm major has become a major and important pest in the palm fields in some palm-growing areas in recent years. There is not enough information to cover the aspects the importance of the life history of the insect, the dynamics of its preparation and the activity of its natural enemies. There is a need for more research on these thousands of special understanding of the good understanding of the life and environmental characteristics of the goshawk, the method of monitoring, and the monitoring of its preparations, and the creation of a record method to challenge the economic blame and the extent of the fate and the extent of the sufficiency. All of the above represent the important foundations and pillars upon which the integrated management of this scourge is built. Educating farmers and intensifying organized extension campaigns would contribute effectively to the development and implementation of control programs that reduce the danger of this insect.

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