

HOW TO USE BIOLOGICAL CONTROL AGENTS FOR MANAGING MITE PESTS, SUCH AS THE “OLIGONYCHUS AFRASIATICUS”

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Oligonychus afrasiaticus Mc.gregor-figure1

Abstract:

The “old world date mite” *Oligonychus afrasiaticus* is a common spider mite pest of the date palms *Phoenix dactylifera* in most of North Africa and the Middle East. The most significant damage was noted on the Deglet-Nour date variety, one with high commercial value. The rate of infestation of palm tree plantations of the Wargla area in Algeria was examined. Four stages of the plant were identified and will be discussed later on in this article.

This date mite in Algeria Boufaroua (*Oligonychus afrasiaticus*, McGregor) of the Tetranychidae family is one

of the main pests of date fruits causing irreversible damage to the crops and can cause result in a total loss. Many experiments were performed to fight this pest. All gave good results; some used chemicals, others used natural methods. In order to fight this pest we need to understand the life cycle of this date mite and its evolution.

Introduction

The starting of *O. afrasiaticus* infestation on fruits varied from year to year starting usually between the first and the third week of July. Mite populations on pinnae (leaflets) remain low from May through December, not exceeding two mites per pinnae, whereas on fruit bunch, they reach peak populations of approximately 100 mites per date bunch. Plants such as *Sorghum bicolor* (L.) Moench, *Phoenix canariensis* Chabaud, *Cynodon dactylon* (L.), *Aeluropus littoralis* (Gouan), *Convolvulus arvensis* L., *Solanum melongena* L., and *Cucumis melo* L. contains densities of *O. afrasiaticus* during early spring and may be a factor of infestation, for the palm tree.

So we applied Insect barrier glue on trees but this method was found ineffective. (The glue usually acts as a deterrent - insects normally probe it with their antennae and turn away.) Fruit bunch continued being infested. This is why the infestation of date palm by *O. afrasiaticus* must be happening via aerial dispersal of motile forms.

In order to fight this pest mite, we are going to examine the safe and adequate biological method to reduce this infestation.

A general idea about biological life of



Date bunch(phoenix dactylifera)-figure 2



Spider web cover date bunch-figure 3

the date mite Boufaroua (O.afraziaticus.)

After the mite has landed on the palm tree, via aerial ways, the (olygonichus afrasiaticus) stays dormant for a period of about 5 months, during the winter season. In early spring, when temperature rises up to around 22°C the date mite (Boufaroua) comes out and starts feeding on young branches.

The presence of date mites is visible from the time of date palm blooms until maturity or harvest. This pest is located on stems, date buds first and then on young dates. Spider webs are the first sign that a tree has been contaminated by the mites. (olygonichus afrasiaticus) The adult female mite lays then its eggs on the web and holds them together with a sticky substance. Some dust and insects are also caught in the spider web causing more damage to the dates. When the web has finally covered the entire tree, each bunch of dates can carry more than 100 mites. A whitish aspect is a symptom of a mite infestation. The development of these eggs goes through some distinct stages (eggs-larva- nymph and adult stages) to reach full development.

This process takes between 10-15 days to occur and 3 weeks depending on the temperature. The warmer it is the faster they grow.

This life cycle can take up to 20 generations throughout the year and the last generation can live up to 5 months during winter season.

Date mite description: The pest mite adult

(Boufaroua) has a hairless body with an oval shape and slightly flat on back side, with 4 pair of legs of different colors, greenish yellow color to pink color and sometimes red color according to its area of origin. It is almost invisible to see with dimensions ranging from 0.22mm to 0.44mm in length and 0.17mm to 0.20mm width.(figure1)

The egg has a spherical shape; its size is about 0.1mm in diameter; with varied color of pink, yellow and/or red. The female mite can lay from 50 eggs up to 100 eggs. The larva has 3 pair of legs with yellowish white, yellow, light green or orange color. Its size is about 0.15mm. The nymph is light yellow, yellowish white or light orange color with 4 pair of legs.

Biology

The Boufaroua pest mite undergoes several stages on the date palm while hibernating (phoenix dactylifera). In the spring season, beginning in May, its activity quickly increases and it becomes more obvious.

During this time; the pest mite

(boufaroua) grows and invades dates palm trees (phoenix dactylifera) and also young date bunch fruits.(figure2)

In Algeria, the highest density of spider mites is observed between the month of May and July. This peak activity is also observed as temperature rises to higher levels. As temperature rise to higher levels, it also speeds up the life cycle development of mites. This cycle can take place in 10 days to 15 days (from eggs to adult mites).

Pest mite (olygonichus afrasiaticus) damage:

Pest mites (boufaroua) can attack the date palm from germination to full maturity. The pest mites suck the fruit sap through the skin (vegetable tissue) of date fruits. With several stings, the green fruit's skin is quickly destroyed. The fruit becomes dry and then turns a reddish color as in (figure 3). It is completely destroyed making it unfit for human consumption.

Damages caused by these mites to Algerian palm groves were estimated between 30% and 70% of all production in 1981.

How to fight this phenomenon?

Fighting strategy:

1. Prophylactic measures.

This is most important. Constant



Infested date bunch-figure 4



Phytoseiulus_persimilis (figure 4)

good care of a palm tree, adequate irrigation and balanced nutrition with meticulous cleaning of date trees and its environment (destruction of vegetable debris, dry leaves and weed) and cleaning off the entire contaminated area (by burning them and sprinkle some sulfur mixed with lime over date palm affected by diseases) is crucial. These measures constitute the first barrier against infestation of this pest.

2. Chemical fight

Specific steps are required for chemicals to be effective. Two to three treatments are often necessary to get the spread of these mites under control. The first treatment starts at the first sign of contamination.

Unfortunately these chemical treatments are not without consequences on the ecosystem and the fragile palm grove.

3. Biological fight.

We are now going to study another method much safer and easier for the ecosystem than chemical treatments.

Several natural enemies of date mite (*O. afrasiaticus*) have been identified such as the ladybug *Stethorus punctillum* (Weise), and mite predators such as *Phytoseiulus persimilis*, *Neoseiulus Californicus*. (figure 4,5,6)

After examining the results between the 2 different approaches, the results are conclusive. The university of desert cultivation in the wargla area of Algeria found that the ladybug with small size and black in color gives better results (very aggressive) (*Stethorus punctillum*), especially on tétanyques.

This predatory mite spread across vegetation and is able to find little pest mite colonies. Although it needs dense colonies of spider mites to feed upon, it takes only 3 weeks for an egg to develop into an adult killing machine. This predator's mite can eat as much as 75 to 100 pest mites (*O. afrasiaticus*) per day, whatever the pest mite development stage is, either egg or adult). In Canada, this pest's predator (*S. punctillum*) is used as a method to fight spider mites, especially in green house farming.

In Algeria, these ladybugs are considered first class mite predators. They are very common in rural or agricultural areas where strong policies year-round are in place to protect them.

This mite predator (*Stethorus punctillum*) is very common in the wargla palm grove and in most of Algeria's oasis. The ladybug (*S. punctillum*) plays an important role in the control of date pest mite (*O.*

afrasiaticus) although it is not enough for a full protection of the palm grove.

It will be certainly most effective as trees are most infested. This first biological fight's attempt against pest mite (*O. afrasiaticus*) in Algeria, to release some ladybugs (*S. punctillum*) is very promising in protecting date palms against acarasis.

This ladybug strategy combined with some other natural mite predators could be very effective as long as we have enough ladybugs or other natural mite predators for the infested tree. Here is a list of natural predators to the (*O. afrasiaticus*) pest mite: Two species of phytoseiidae mites such as *Amblyseius* and the "Typhlodromus.) and another specie of hétéroptères *Anthocoridae* (*Anthocoris*).

Moreover, two ladybug species (*Pharoscymnus ovoideus* Sicard et *P. numidicus* Pic) have been observed recently. These two species could attack particularly the pest mites.

These entire potential predators to pest mites (*O. afrasiaticus*) must be protected in order to determine the most potent mite predator to control the phytophage mites.

Conclusion:

The tree infestation varied according to the tree and increased progressively according to date ripening.

The effectiveness of the released ladybug was significant, especially when trees were highly infested.

The mite predator (*Stethorus punctillum* (weise)) plays an important role in the control of the pest mite (*O. afrasiaticus*).

Other natural predators, however, are present in Algeria; they will have to be studied more in depth in order to determine what the best biological control agent is, in order to optimize the palm tree's protection against date pest mite (*O. afrasiaticus*), natural resources and environment.

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Oligonychus afrasiaticus and phytoseiid predators' seasonal occurrence on date palm Phoenix dactylifera (Deglet Noor cultivar) in Tunisian oases

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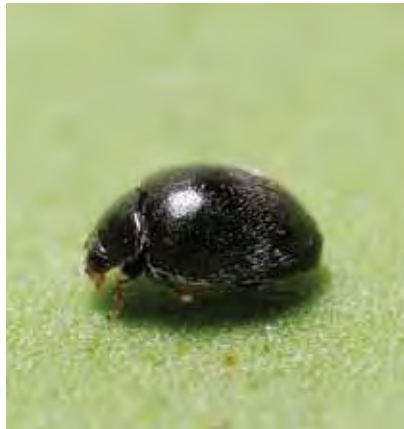
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Neoseiulus californicus-figure 6

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