

## Ecology and Management of the date moth, *Ectomyeloisceratoniae* (Zeller) (Lepidoptera: Pyralidae), a pest of dates, *Phoenix dactylifera* L., in the southern palm grove of Algeria

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**Abstract** – Saoura region is situated in the south west of Algeria characterized by a height density of date palm trees (*Phoenix dactylifera* L.) where the number exceeded 900000, tree we note several oases (Igli, Béni Abbes, Taghit, among others). Despite this high density, the production of dates is still insufficient even for the local consumption, this is due to:

- Increasing water salinity, the spread of many fungal diseases, where the most serious is the Bayoud (*Fusarium oxysporum*)
- Insect pests, three of them remain the most serious: white scale locally named Semm (*Parlatoria blanchardi* Targ.), Boufaroua (*Oligonychus afrasiaticus*), and Doud called dates worm (*Ectomyelois ceratoniae* Zell.).

The percentage of worm-eaten fruit at harvest is 8 to 10%, but this proportion may be higher to 80%. (Doumandji-mitiche, 1983) report that on the ground, the percentage of attacked fruits can attained 42.5% in Ouargla and increases during the storage to 64.7%.

Various products are applied in the field, in particular, Malathion 2%, Parathion 1.25%, Phosalone 4%. However the biological control use the predators and parasites of *Ectomyelois ceratoniae*. The species most used belong to the family Hymenoptera.

**Keywords** : Date moth, Malathion, Parathion, Phosalon, Predators, Parasites.

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### 1. Introduction

For more than two decades and more precisely since the nineties, the Saoura region has experienced a period of cross-border invasion of locusts which has

caused serious damage to crops and considerable economic losses to phoeniculturists in many Oases . Control strategies and methods of minimizing agricultural damage are still traditional. To solve the problem, pinpoint invasions and

limit pest damage, agricultural services use every possible means, where they spraying thousands of liters of insecticides was the easier and the more effective solution.

Over time, the consequences of this treatment start to float on the surface. These processes succeeded in eradicating the locust but causing very heavy damage to the oasis ecosystem, where the proliferation of the date moth has never ceased to aggravate the situation she succeeded to reach more than four generations per year.

## **2. The date moth *Ectomyelois ceratoniae* Zeller.,**

The date moth *Ectomyelois ceratoniae* Zeller., Is an extremely polyphagous pest. His caterpillar lives at the expense of several fruits and causes enormous damage. It is very polyphagous and attacks a multitude of crops and spontaneous plants in very different bioclimatic stages (Doumandji, 1981).

*Ectomyelois ceratoniae* Zeller., Is a cosmopolitan depredator well represented throughout the world, especially in the Mediterranean area (Doumandji - mitiche, 1977).

### **2.1 Morphological description (Photo 1)**

#### **2.1.1 Adult**

Date moth, *Ectomyelois ceratoniae* Zeller., Is a small lepidoptera with a length of 6 to 12 mm and a wingspan of 16 to 22 mm (Dhouibi, 1991).

According to the work of Doumandji-mitiche (1977) & Doumandji (1981), the butterfly has two different shapes depending on the geographical origin.

It takes on a gray color in the coastal areas and becomes lighter and more or less creamy white in the Oases. Species belonging to the genus *Ectomyelois* are

distinguished by their median ribs M2 and M3 of the anterior and posterior wings which are separated over two-thirds of their length instead of being fused as in *Ephestia* (Dhouibi, 1991). The fore wings are adorned with more or less marked drawings. The hindwings are bordered by a silky fringe (Dhouibi, 1991).

#### **2.1.2 Egg**

The egg has an oblong shape, its size can reach 0.6 to 0.8 mm. It is white at first and turns pink after 24 hours. Its surface has a reticle appearance (Doumandji, 1981).

Larva: on the order of 1mm at emergence, the larvae of the date moth may be about 18 mm in size during its last larval stage (Dhouibi, 1991), (Table 1). Its larval life can range from six weeks to six months, depending on the ambient temperature (Le Berre, 1978). It lodges between the pulp and the nucleus and gradually fills the free space with dates of silk threads and excrements (Doumandji-mitiche, 1977).

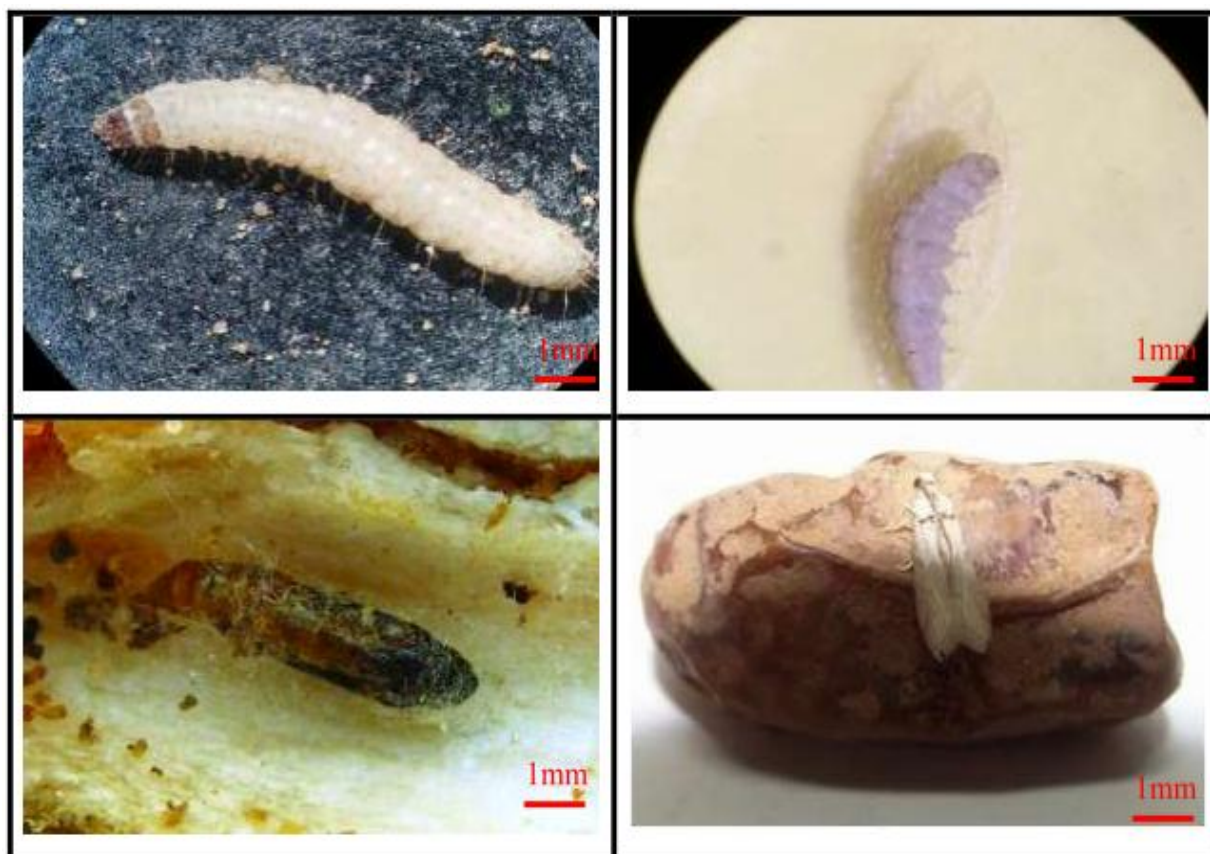
**Table 1. Characteristics of the various larval stages (Dhouibi, 1989).**

Larval stages	L1	L2	L3	L4	L5
Hooksnumber	8	12	15	32	35
Size (mm)	1,1à 2	2 à 2,3	3,3 à 5,6	6,9 à 12,4	12,3 à 14,6
Cephalic capsule size at 1/10 mm	2,98	4,46	6,35	10,25	15,43

### 2.1.3 Chrysalis

The chrysalis is about 8 mm long and has a cylindro-conical shaped body. It is characterized by the presence of seven pairs of spines on the first seven abdominal segments and two hooks on the abdominal end. The prothorax is usually rough, with

an irregular mediodorsal hull. The chitinous envelope is brown in color and generally surrounded by a silk sheath woven by the caterpillar before its pupal moulting (Dhouibi, 1991).



**Figure1. Development stages of date moth (Boulanouar 2015)**

## 2.2 Damages

For several years, *Ectomyelois ceratoniae* has been one of the main pests causing considerable damage to dates (Wertheimer, 1958). Its percentage of attack is more than 10% and up to 30% in North Africa.

The percentage of worm-eaten fruit at harvest is 8 to 10%, but this proportion may be higher to 80%. (Doumandji-mitiche, 1983) report that on the ground, the percentage of attacked fruits can attained 42.5% in Ouargla and increases during the storage to 64.7%.

## 2.3 Control means

The production of dates is permanently subject to attacks by date moth, and presently it presents the major constraint. Several control methods have been used to control the population of this pest (Wertheimer, 1958; Warner, 1988).

### 2.3.1 Chemical control

Various products are applied in the field, in particular, malathion 2%, parathion 1.25%,

phosalone 4%. During the storage, the date is treated with fumigants such as Methyl Bromide.

However, in addition to the high toxicity, ineffectiveness, prolonged persistence of certain active substances favored the loss of natural enemies and the emergence of resistant strains) Arif, 2009).

### 2.3.2 Biological control

Doumandji (1981) inventoried a list of predators and parasites of *Ectomyelois ceratoniae*. The species most used in biological control belong to the family Hymenoptera. Dhouibi & Jemmazi (1996) have tried to control the date moth in warehouses in Tunisia through the use of parasitoid populations (*Habrobracon hebetor*).

Trials of release *Trichogramma embryophagum* were initiated in the Ouargla's Palm Grove by Idder (1984). The results are encouraging, the rate of parasitism of eggs of *Ectomyelois ceratoniae* by *trichogramma* reaches up to 19.35% (Idder, 1984).

**Table 02:** Natural Enemies of *E. ceratoniae* (Nay, 2006)

Orders	families	species
Hymenoptera	Braconidae	<i>Phanerotoma flavitestacae, Phanerotoma dentata, Phanerotoma sp. Habrobracon brevicornis, Habrobracon hebet. Bracon mellitor Microbraconpembertoni Apanteleslacteus, A. myeloenta, Apantelessp. Ascogastersp. Rhogastestaceus</i>
	Pteromalidae	<i>Anisopteromalus mollis</i>
	Bethylidae	<i>Perisierolagallicola, P. emigrata Goniozuslegneri</i>
	Encyrtidae	<i>Pentalitomastixplethoricus</i>
	Ichneumonidae	<i>Pristomerusvulnerator, Nemeritiscanescens Horogenes sp. Gelissp. Herpestomusarridens</i>
	Chalcididae	<i>Brachymerisaegyptiaca, Brachymeris sp. Antrocephalusmitys</i>
	Perilampidae	<i>Perilampustristis (hyper-parasite d'Apantelespupae)</i>
	Trichogrammatidae	<i>Trichogramma embryophagum, Trichogramma sp</i>
Diptera	Tachinidae	<i>Clausicellasuturata</i>
Acari	Pyemotidae	<i>Pyemotesventricosus</i>

### 3. Conclusion

The stored dates are exposed to the infestation of the datemoths which consequently cause fungal contaminations. The development of this fungal flora under appropriate conditions (temperature, humidity, pH ...) can have harmful consequences by altering the organoleptic properties and reducing the nutritional quality of dates.

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