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IMPACT OF THE ENTOMOPHAGOUS FAUNA ON THE *Parlatoria blanchardii* TARG POPULATION IN THE BISKRA REGION
Part II

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Abstract *: Based on the Iperti scale (1987), infestation map of Parlatoria blanchardii Targ on the date palm trees in the Biskra region shows different levels of infestation These are du either to the presence or the absence of natural and local predators of P. blanchardii such as Pharoscymus semiglobusus and Cvboceohalus palmarum.*

To elliminate or ut least to decrease the white cochenial population, individuals of Pharoscymus semiglobusus and Cvbocephalus palmarum were taken from oasis classified as free of P. blanchardii and relocated in infested ones.

Two sites were selected ; the jirst one as a sampling site with an average mean of 59 white cochenial / m² and 10 predators in the same palm leaf , the second as a receiving site with an average mean of 171,4 white cochenial / cm² of palm leaf and where almost no predators were recorded

A known number of individuals of the predatory fauna were taken from the first site and relocated in the second one in a known number of date palm trees. Before relocating the predators, P.blanchardii population was measured in the receiving site and every 30 days during the two next months. After this period of time, population of P.blanchardii decreased in some cases up to 50%.

Besides that, the observed pattern proved that in presence of its natural predators, P.blanchardii population could be decreased or at least kept at an acceptable level.This relocating technique could be used as an alternative to the conventioanal one i.e. an increase of the predatory population in a breeding unit and then its release in infested oasis.

Key ***Words*** *: levels of infestation, relocating, entomophagous fauna, taking site, receiving site.*

الملخـــــص : أظهرت خريطة الاضرار التي تسببها القشريات البيضاء على أشجار النخيل في منطقة بسكرة، إصابات متفاوتة الدرجة و ذلك حسب سلم ايبراتي (1987).

و على ما يبدو أن هذه الفروق في الإصابة تكون ناتجة ، أما عن تواجد مجموعة عشيرة الحشرات الخاتلة للقشريات البيضاء مثل ، *Cybocephalus sp. Pharoscymnus semiglobosus* أو الى انعدامها.

و بهدف التقليص أو على الاقل التخفيض من مجموعة القشريات البيضاء في بساتين النخيل و التي صنفت على آنها بساتين ذات درجات عالية من الإصابة بهذه الحشرة الضارة. قمنا بتحويل و تغيير لموقع عدد من مجموعة عشيرة الحشرات الخاتلة من بساتين النخيل التي صنفت درجات إصابتها بالحشرة الضارة إلى مستويات ضئيلة و التي تحتوي خاصـــة على عدد كافي من الحشـــــرات الخاتلـــة مثل *Cybocephalus sp. Pharoscymunus ovoideus* و نقلها الى البساتين المصابة بدرجات عالية بالقشريات البيضاء.

موقعين تجريبين تم إنتقائهما ، بحيث يكون الأول موقعا للاستقبال و يحتوي على معدل إصابة بالقشريات البيضاء بنسبة 171،4 قشرة/سم^2 من مساحة الوريقة و تنعدم به مجموعة الحشرات الخاتلة أما الثاني ، يمثل موقعا لسحب عدد من الحشرات الخاتلة و سجل به معدل إصابة بالقشريات البيضاء بنسبة 59 قشيرة/سم^2 من مساحة الوريقة و تتواجد به ايضا نسبة تقدر بعشرة (10) حشرة قاتلة في الجريدة الواحدة.

عدد معينا من افراد عشيرة الحشرات الخاتلة تم نقلها و تحويلها من موقع السحب الى موقع الاستقبال و نشرها و توزيعها على عدد معينا من أشجار النخيل المصاب.

و كانت قد تمت قراءات لمعرفة درجات الإصابة بالقشريات البيضاء على مستوى النخيل شهر قبل المعالجة ثم شهرين بعد المعالجة. في هذه الفترة ، تقلص معدل عدد القشريات البيضاء بصفة محسوسة ، و إنخفض الى 50 بالمئة في بعض النخيل المعالج.

هذه النتائج أكدت على أنه من الممكن التقليص في معدل الإصابة بهذه الحشرة الضارة أو على الأقل تثبيتها الى مستويـــات مقبولة و هذا إذا قمنا بتوفير العدد الكافي من الحشـــرات الخاتلة في تعايش مع *Parlatoria blanchardii TARG* لوحدة تربية تكاثر الحشرات المفترسة.

الكلمات الدالة : درجات الإصابة ، تحويل ، الحشرات الخاتلة ، موقع السحب ، موقع الإستقبال.

INTRODUCTION

Among thc many problems and constraints that face the date palm trees in the Biskra region, *Parlatoria blanchardii Targ* is actually a real threat not only for the growth of the palm tree but also for its fruits.

Notwithstanding the eradicating means uscd it is widely accepted that if the white cochenial is living in presencc of its natural predators, it could he possible to control its population The damages caused on datc palm trees could be also kept at a relativcly acceptable level with preservation of the environment.

To rcach these two aims , this experiment was conducted in two parts, Thc first one startcd in april 1997 and lasted 6 months (Mohammedi and Salhi, 1999). Througout this pcriod, the main activities were foçused on the understanding of :

The extcnt of the infestation by *P. blanchardii* in thc Biskra region.

The relationship between *P. blanchardii* and its local predatory fauna. (Table I).

The second part of this experiment started in June 1998, whcrc two oasis or experimental sites were sclccted using two criteria :

Levels of infestation in the two oasis by *f? blanchardii*

The population of the entomophagous fauna living in the same oasis

A Known numher of local predators of *P.blanchardii* was relocated from the first oasis to the second one.

Table I : Infestation levels by *P. blanchardii* in the 17 oasis selected for the experiment throughout the Biskra region. (Mohammedi and Salhi 1999)

	Districts	Numberof Date palm Trees	Number of white cochenils/cm²	Infestation levels (1)
1	Sidi Okba	213100	101	2
2	Ourlal (Saâda)	110168	128	2
3	El Haouch	72302	111	2
4	Oumache	106011	112	2
5	Aïn Naga	32777	125	2
6	Chetma	72 800	126	2
1	Gouchagroun	61100	58	1
8	El Hadjeb	11 6139	51	1
9	Lichana	74 900	48	1
10	El Ghrous	85600	38	1
11	Magtoufa	209 000	59	1
12	Ouled Djellal	166500	12	0.5
13	Sidi Khaled	82000	13	0.5
14	Lioua	166520	05	0.5
15	Mekhadma	96848	15	0.6
16	M'lili	109351	08	0.5
17	El Kantara	16500	10	0.5

) According to the Iperti Ssale (1987)

This transfer or relocating individu& of the entomophagous species such as *Pharoscymus semiglobusus* a n d *P. ovoidus* should be able to reduce the white cochenial population in the receiving site and will tend to create an equilibrium between the two populations.

This trend and/or control of P. *blanchardii* hy its natural predators such as C. *palmarum* and *P. anchorago* was rcported by Balachowski (1926). Iperti and al (1970) confirmed the same phenomena with *Chilochrus bipustulatus*.

MATERIAL AND METHODS

1 - Selection of the two sites :

With its low level of infestation by *P. blanchardii* and the presence of local predators in high number, Magtoufa district was selected as the «taking» site. The «receiving» site was located in Oumache district (Table II).The same criteria as for the «taking» site wcrc used however with reversed valucs. Distance between the two selected sites is around 62 Km.

Table II : Criteria used in the experimcnt to select the receiving and the taking sites.

Criteria **used to Select the tow Sites**	Taking site	Receiving site	**Selected** sites
Number of white cochenials/cm²	59	*171.4*	Magtoufa
Number of predators/palm leaf	10	0	Oumache

2 - Relocating Process :

Three predatory species were selectcd for the experiment : *Pharoscymus semiglobusus*, *P. ovoidus and Cybocephalus palmarum* Individuals from this species were picket up from the lowcst crown of the date palm trees. Each palm leaf was covered with a 1m x 2m of white clowth and shaken hardly. The white clowth was then laycd down on the ground and all predators found in this clowth were collected put in test tubes and taken back to the laboratory for identification , sclcction and counting

All sclected individu& were settled back in test tubes and taken to the rccciving site. These were then freed onto the palm leaves of the date palm trees used for the experiment (Fig. 1) Seventeen date palm trees were taken at random in the receiving site. 5 groups of 10 individuals of the predatory species wcrc freed in each of the 17 date palm trees. The first four groups were put in opposite palm leaf, the fifth in the middlc of the crown.

Each of the 4 palm leaves that received thc predatory individuals was covered with a piece of tulle.

To measurc the impact of the entomophagous fauna uscd in this experiment on *P. blanchardii* population, three countings were carried out. Thc first one before the beginning of the trcatment, while the next ones were donc respectively at the end of september and october 1998.

Twelve leaflets were cut from each of the date palm trees taken back to the laboratory to be examined under a dissecting binocular.

Three samples of Icm were taken to be used for this counting. Two ofthethree samples were taken on both end of the leaflet, the third one in its middle. With a specific ruler, individuals of *P. blanchardii* present on the 12 leatlets were counted. Empty follicles were disregardcd. The average mean of the three samplings were taken as thc infestation average mean of each leatlct. The 12 means from the 12 leaflets wcrc taken as the infcstation level of each date palm tree (Table III),

Table III : Average mean of infestation by *P. blanchardii* in the 17 date palm trees throughout the experimental period (individuals of white cochenial / cm)

Date palm trees Treated Pu / y (1)	Before treatment	After 1 month	After 2 months
P 1/7	190	169	124
P 1017	196	174	124
P 1217	192	144	99
P 1317	182	140	120
P 1517	160	140	69
P 16/4	152	112	86
P 8/10	167	136	101
P 10/10	186	158	112
P 13110	172	166	105
P 14/10	198	176	112
P 17/10	150	136	96
P 18110	193	174	104
P 6/2	167	144	98
P 912	174	156	112
P 1615	130	99	74
P 1/6	163	140	109
P 2/6	142	120	59

(1) u = Palm tree, y = line tree in the oasis.

RESULTS

Aftcr transformation of the observed infestation means in the treated date pahn trees into differences between each of the three countings that is, before trcatment, one month then tow months later, rcsults were analysed using ANOVA (Table IV). All sources of variance as well as interactions exhibited highly significant levels ($P < 0,001$), suggesting that thcrc is an impact of the entomophagous fauna on the white cochenial population. Furthermore, to test the lack of consistancy of the treatment over the two months, a 5% S.N.K. test (Steel and Torrie, 1980) was carried out through

$$Wp = q \propto (p, f)\, SY$$

$$p = t, t\text{-}1, \ldots\ldots, 2$$

using q from thc upper 5% points of the standartized range, where :

p = t = full number of variables, and
f = error d f

A summary of the results using underscores (Table V) shows that there is a consistancy in the decreasing of the white cochenial population in the 17 treated date palm trees suggeting that the applied treatment was very efficient over the two countings.

Table IV : Analysis of variance of the impact of the entamaphagous fauna on *P. blanchardii* population during the experimcntal pcriod.

	D.F	M.S	F
Locations	16	1 087,73	12,57***
Countings	2	22 131,38	255,74***
Error	32	**86,54**	

Figurc 2 shows also very clearly that the number of whitc cochenials individuals dccrcased with the applied treatment. Further morc this decreasing trend was more or lcss constant after the two months.

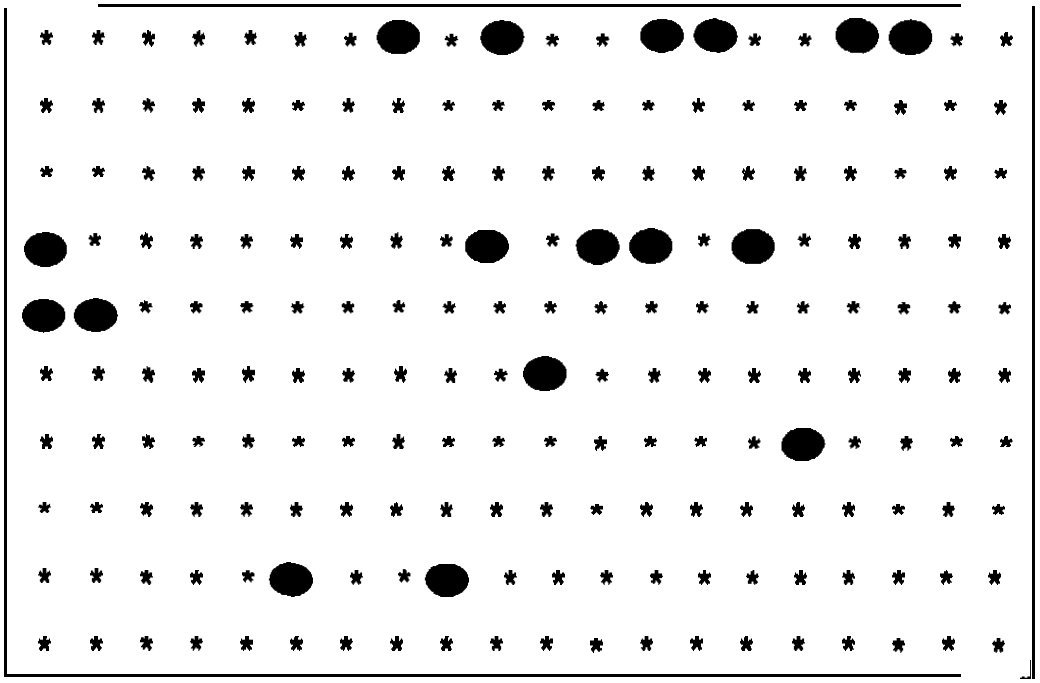

Figure 1 : receiving site of Oumache

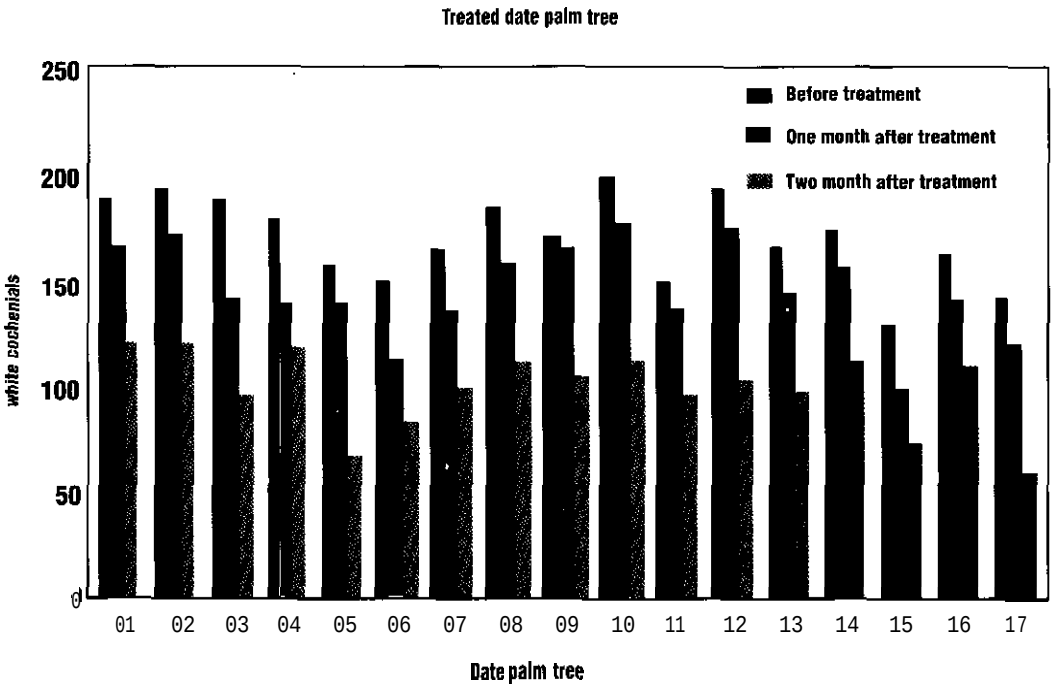

Figure 2 : Evolution of the averages means of the white Cochenials population over thc three counting in the treatcd palm trees.

Table V : SNK test for homogeneity of the mean responscs of the entomophagous fauna throughout the experimental period at 5% lcvel

P	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	
Wp	15,47	18,66	20,58	21,95	23,01	23,88	24,61	25,24	25,79	26,29	26,73	27,14	27,51	27,85	28,17	28,16	
Borted Means	164	162	161	157	152	147	147	147	145	137	136	134	127	123	116	107	101

DISCUSSIONS

Throughout many regions of thc world many techniques have been tried to cradicate or at least reduce the white cochcnial population. Burning the leaves has been used up to the moment where it was found that some individuals if thc parasite could survive an/or hide undcr some parts of the date palm trcc such as the bark. Treatment with chemical products showed also its limits in terms of hiph costs, environmental cffccts etc...

One way that could avoid many negative aspects of common use means is without any doubt thc biological way. However in poor regions with scarce financial means and long distances between oasis to bc treated, conventional techniques of increasing the entomophagous fauna in a breeding unit and then its release in oasis seems to create many problems such as :

high costs of the breeding unit and its equipments

acclimatization and adaptation of thc new colony to a new und sometimes hostile environment.

Scnsitivity of the new bred colony in regard to its unknown enemies living in the ncw environment

The method suggested in this paper that is thc dclocation of a known number of individuals from thc local entomophagous fauna from a less infested site to a morc infested one hy the white cochcnial seems in the first place very efficient. Analysis of these first results are very promising in a woy that the population of thc whitc cochenial living in the trcatcd palm trees decreased in some cases up to 50%.

Besides that, the first results arc very promising, the delocation technique offers much more advantages than thc hreeding unit, costs of equipments, mastery of the technique etc... However many aspects of the delocation technique have to be perfectcd at a small and/or medium scale before its generalization at a field scale.

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