EFFICACY OF CERTAIN ACARICIDES AGAINST *TEGOLOPHUS GUAVAE* AND *BREVIPALPUS PHOENICIS* ON GUAVA TREES

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Abstract

In the recent years Guava trees were infested with the rust mite *Tegolophus guavae* (Boczek) and Tenuipalpid mite *Brevipalpus phoenicis* (Geijskes) El-Halawany and Abou-Setta (2014). Inspection of guava trees showed that the population abundance of phytophagous mite, *T. guavae* was high on leaves and *B. phoenicis* was high on leaves and fruits. The present investigations were carried out to evaluate eight acaricides, (Agromic, Deva, Berfect, Nest, Baroq, Koncor, Menova and Ortus) against *T. guavae* and *B. phoenicis* under field conditions. Results indicated that Ortus, Menova, Agromic and Baroq were the most effective compounds in reducing guava rust mite population, *T. guavae* followed by Deva, Berfect and Koncor which gave good reduction over (86.0%), while Nest was the lowest (72% mortality). The reduction percentage of *B. phoenicis* after three weeks of application was 84% mortality, the highest reduction was recorded for Ortus 5% (90%) on leaves and fruits.

INTRODUCTION

The guava rust mite *T. guavae* was recorded for the first time in Egypt on *Psidium guajava* L. by El-Halawany (2012) at Qalubia Governorate. After that ecological studies were done studied by (El-Halawany & Abou-Setta, 2014). on guava indicated that *T. guavae* inhabiting leaves in February then increased in the number and reach maximum number in June and October especially on young leaves. On the other hand, the Tenuipalpid mite *B. phoenicis* inhabiting leaves in march and infested fruit after fruit setting and increased in the number in July on leaves and June on fruit causes brown-reddish. In Florida, USA, the mite *T. guavae* and *Brevipalpus* spp., cause damage to fruits and tender leaves (Pena *et al.,* 1999). Highest numbers of *T. guavae* are observed in early autumn, winter and spring months. The mites are most often observed on fruit, causing deformations. The tenuipalpid mite, *Brevipalpus phoenicis* (Geijskes) is an important pest of more than 50 genera of ornamental plants, it's evidently well distributed throughout the world, this mite transmit virus leprosies when population are high (Jeppson *et al.*, 1975), also Zaher (1984) found *B. phoenicis* is a principal of citrus, other hosts include guava, quince, sweet potato and acalypha, prefere the lower surfaces of leaves around the midrib and main veins, they were found also in pits, pedical and floral apex of fruits.

Many researchers studied the effect of some acaricides against phytophagous mites. Rezk (1998) evaluated the two acaricides, Ortus (fenpyroximate) and Neoron (bromopropylate), on *Brevipalpus obovatus* on citrus orchards in Egypt.

On fig trees, abamectin showed a promising control against *Tetranychus urticae*, *Rhyncophytoptus ficifoliae* and *Aceria ficus* it caused reduction of 85%, 75% and 68% in population, respectively (Abou-Awad *et al.*, 2000).

(Abou-Awad *et al.,* (2005) showed the effect of abamectin on eriophyid olive mites, the results indicate that abamectin gave reduction of 85.40 % and 88.90 % in the population of *Aceria oleae* and *Tegolophus hassani* on leaves, respectively, during the 35-day period following applications. Similar results of abamectin biocide against eriophyid mites were found on citrus in Florida (Childers, 1986). Tayyib *et al.* (2005) in Pakistan evaluated new insecticides for controlling *T. urticae* on cotton. The chlorfenapyr gave highest mortality (87.5%), also fenpyroximate gave (63.75%), while the dicofol and azocyclotin gave less than 50% mortality.

AL-Joboory and AL-Jorany (2011) found that the efficacy some Acaricides (Envidor 240 SC, Ortus 5% SC, Bye Bye 20 EC, King bow 24 ES and Abamectin 1.8% EC) were a high sufficiency in controlling the mites and gave longer protection duration for the plants.

Al-Azzazy *et al*. (2013) indicated that the Abamectin was superior in reducing *Aceria tulipae* (79% reduction) after 28 days.

This study aims to evaluate of certain acaricides for controlling *T. guavae* and *B. phoenicis* on Guava trees in Qalubia governorate.

MATERIALS AND METHODS

Eight of acaricides were evaluated on 17 May 2013 namely (Agromic 1.8% EC, Deva 1.8 EW, Berfect 12% EW, Nest 20% SC, Baroq 10% SC, Koncor 24% SC, Menova 10%EC and Ortus 5% SC). Two groves of guava trees were chosen one at Tanan village Qalubia Governorate, four acre, three years old which highly infested with *Tegolophus guavae* while, the other grove at El-saad village Qalubia Governorate, two acre seven years old which highly infested with *Brevipalpus phoenicis*, during season 2013. The two experiments design were randomized in complete block, included 180 trees. The two groves were divided into nine treatments were used including control, Each treatment included four replicates, each replicate represented with five trees. Each sample included 20 leaves and 10 fruits per replicate totally 80 leaves and 40 fruits per treatment after 3, 7, 14 and 21 days of each treatment to determine the reduction percentages. The compounds were sprayed by

using a highly volume motor sprayer of 600 liters capacity. Pre-count was detected before spraying to estimate the reduction percentage in population by using (Henderson & Tilton equation ,1955).

Chemical acaricides:

Table 1. Treatments and their application rates.

Trt.	Trade name	Common name	Chemical name	application/ 100 liter of water
1	Agromic 1.8% EC	Abamactin	5-*O*-demethylavermectin A_{1a}(i) mixture with 5-*O*-demethyl-25-de(1-methylpropyl)-25- (1-methylethyl) avermactin A_{1a}(ii)	50cc
2	Deva 1.8 EW	Abamactin	5-*O*-demethylavermectin A_{1a}(i) mixture with 5-*O*-demethyl-25-de(1-methylpropyl)-25- (1-methylethyl) avermactin A_{1a}(ii)	40cc
3	Berfect 12% EW	2%Abamactin + 10% Chlorofenapyr	5-*O*-demethylavermectin A_{1a}(i) mixture with 5-*O*-demethyl-25-de(1-methylpropyl)-25- (1-methylethyl) avermactin A_{1a}(ii) **+** 4-bromo-2-(4-chlorophenyl)-1-ethoxymethyl-5-trifluoromethyl-1*H*-pyrrole-3-carbonitrile	30cc
4	Nest 20%SC	2%Abamactin + 10% Chlorofenapyr	5-*O*-demethylavermectin A_{1a}(i) mixture with 5-*O*-demethyl-25-de(1-methylpropyl)-25- (1-methylethyl) avermactin A_{1a}(ii) **+** 4-bromo-2-(4-chlorophenyl)-1-ethoxymethyl-5-trifluoromethyl-1*H*-pyrrole-3-carbonitrile	30cc
5	Baroq 10% SC	Ectxazole	2-(2,6-difluorophenyl)-4-[4-(1,1-dimethylethyl)-2-ethoxyphenyl]-4,5-dihydrooxazole	25cc
6	Koncor 24%SC	Spirodiclofen	3-(2,4-dichlorophenyl)-2-oxo-1-oxaspiro[4.5]dec-3-en-4-yl 2,2-dimethylbutanoate	40cc
7	Menova 10%EC	Hexythiazox	(4*RS*,5*RS*)-5-(4-chlorophenyl)-*N*-cyclohexyl-4-methyl-2-oxo-1,3-thiazolidine-3-carboxamide	50cc
8	Ortus 5%SC	fenpyroximate	1,1-dimethylethyl (E)-4- (((1.3-dimethyl-5-Phenoxy-1 H- pyrazol-4-yl) methylen) amino) methyl) benzoate.	50cc

Statistical analysis:

Percent reduction of phytophagous mites were analyzed by two-way ANOVA and means were compared by using Fisher's least significant difference. Significance level was $P< 0.05$. Analysis were conducted using SAS statistical software (SAS Institute, 2010).

RESULTS AND DISCUSSION

The present study revealed that all tested acaricides were sufficient to control the guava rust mite, *Tegolophus guavae* and tenuipalpid mite, *Brevipalpus phoenicis*. As shown in Table (2) and Fig.(1) reduction percentage of guava eriophyid mite, *T. guavae* populations as a result of biocides and acaricides treatments under field conditions after 21 days. There were significant differences between acaricides exhibited reduction percentages. Ortus 5% SC, Menova 10% EC, Agromic 1.8% EC and Baroq 10% SC the highest reduction percentage over 90% while, Deva 1.8%, Berfect 12% EW, and Koncor 24% SC gave reduction over 85%, the lowest reduction of population occurred for Nest 20% SC (72.24%) after 21 days. Thus, it could be concluded that the all acaricides were effective against *T. guavae*.

Data in Table (3) and Fig.(2) cleared the effect of tested acaricides on tenuipalpid mite, *B. phoenicis* population on leaves. Ortus 5% SC exhibited the highest reduction percentage, 93.63% followed by Deva 1.8% EW and Nest 20% SC 90%. The reduction percentage of population for other treatments, 85.0, 87.94, 89.26, 86.62 and 88.5% for Agromic, Berfect, Baroq, Koncor and Menova, respectively.

On fruit, the fenpyroximate (Ortus) gave the highest reduction percentage (91.98%), while non-significant different between Agromic, Deva, Berfect, Nest, Baroq, and Koncor, whereas, it's reduction percentage were 87.95, 85.79, 89.31, 89.75, 89.36 and 87.38% on *B. phoenicis* population after 21 days, respectively. Table (4) and Fig. (3). Menova also gave good reduction 84.28%.

Obtained results indicated that all acaricides showed excellent results against the two phytophagous mites *T. guavae* and *B. phoenicis* under field conditions. Similar results were obtained by (Childer, 1986, Rezk, 1999, Pena, *et al.,*1999, Abou-Awad, *et al.,* 2000, 2005, Tayyib, *et al.,*2005, Al-Azzazy *et al*., 2013, AL-Joboory and AL-Jorany, 2011).

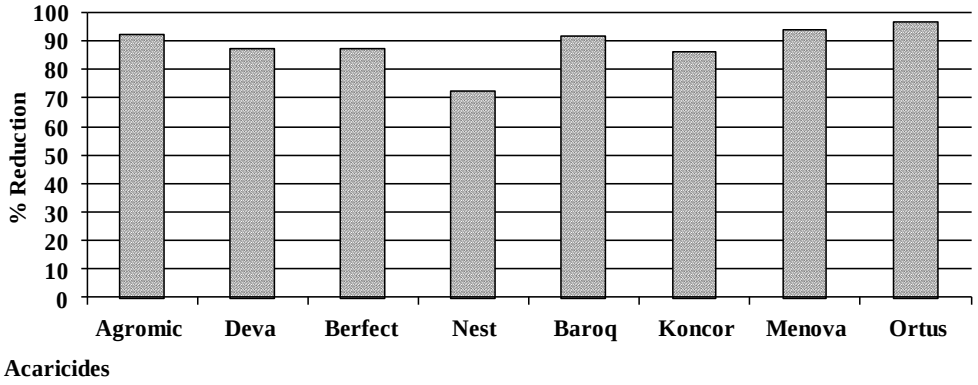

Fig. 1. Percentage reduction of guava rust mite *T. guavae* populations as a result of acaricides treatments under field conditions.

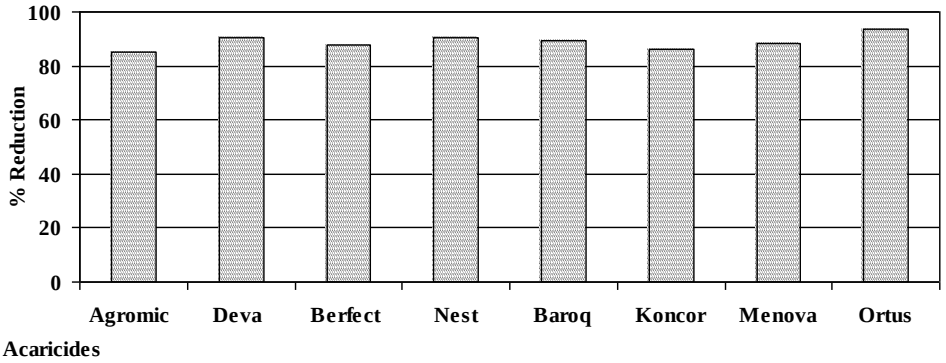

Fig. 2. Percentage reduction of tenuipalpid mite *B. phoenicis* populations on leaves as a result of acaricides treatments under field conditions.

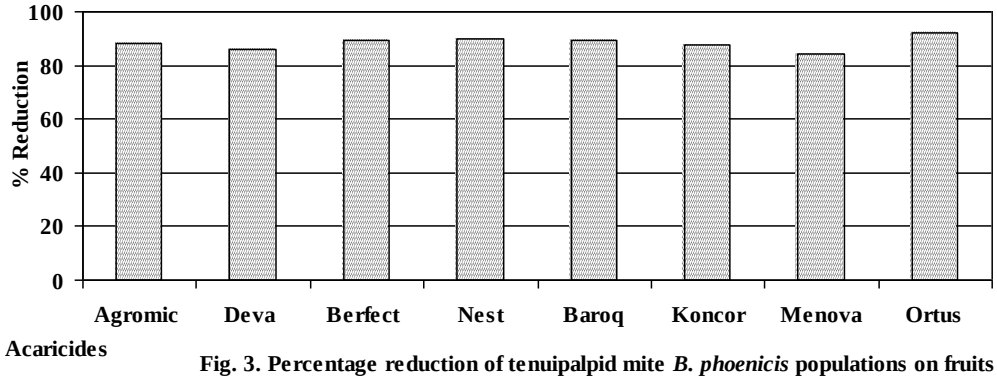

Fig. 3. Percentage reduction of tenuipalpid mite *B. phoenicis* populations on fruits as a result of acaricides treatments under field conditions.

Table 2. Percentage reduction of guava rust mite *T. guavae* populations as a result of acaricides treatments under field conditions.

Trade name	Common name	Rate of application / 100 Liter of water	No. of individuals before treatment	Number and % reduction of individuals/ 80 leaves after treatment								Average% reduction
				3 days		One week		Two weeks		Three weeks		
				No.	% R.	No.	% R.	No.	% R.	No.	% R.	
Ortus 5%SC	fenpyroximate	50cc	27552	833	97.33	1112	96.60	1272	96.13	1620	95.81	96.47 [a]
Menova 10%EC	Hexythiazox	50cc	27803	1594	94.94	1972	94.03	2164	93.48	2605	93.32	93.94 [ab]
Agromic 1.8% EC	Abamactin	50cc	14792	958	94.28	1480	91.58	1514	91.42	1746	91.59	92.22 [b]
Baroq 10% SC	Ectxazole	25cc	11292	804	93.71	1156	91.38	1320	90.20	1494	90.58	91.47 [b]
Berfect 12% EW	2%Abamactin + 10% Chlorofenapyr	30cc	5916	578	91.37	1000	85.77	1133	83.94	1226	85.24	86.58 [c]
Deva 1.8 EW	Abamactin	40cc	5874	580	91.28	1000	85.67	1086	84.51	1140	86.18	86.91 [c]
Koncor 24%SC	Spirodiclofen	40cc	7168	807	90.05	1123	86.80	1411	83.49	1637	83.72	86.02 [c]
Nest 20%SC	2%Abamactin + 10% Chlorofenapyr	30cc	3934	652	85.36	1295	72.27	1642	65.02	1862	66.29	72.24 [d]
Control	-	-	24432	27666	-	29026	-	29156	-	34300	-	-

No. =number R. =reduction LSD = 4.19 at level 5%

Different letters in vertical column denote significant difference (F-test, $P < 0.05$, $P < 0.01$).

Table 3. Percentage reduction of tenuipalpid mite *B. phoenicis* populations on leaves as a result of acaricides treatments under field conditions.

Trade name	Common name	Rate of application / 100 Liter of water	No. of individuals before treatment	Number and % reduction of individuals/ 80 leaves after treatment								Average% reduction
				3 days		One week		Two weeks		Three weeks		
				No.	% R.	No.	% R.	No.	% R.	No.	% R.	
Ortus 5%SC	fenpyroximate	50cc	691	24	96.65	38	94.99	47	87.59	105	87.59	93.36[a]
Deva 1.8 EW	Abamactin	40cc	784	61	92.49	74	91.41	78	87.18	123	87.18	90.66[ab]
Nest 20%SC	2%Abamactin + 10% Chlorofenapyr	30cc	760	54	93.14	54	92.09	66	84.31	146	84.31	90.54[ab]
Baroq 10% SC	Ectxazole	25cc	802	52	93.74	66	92.51	117	83.19	165	83.19	89.26[bc]
Menova 10%EC	Hexythiazox	50cc	525	31	94.30	40	93.06	91	81.33	120	81.33	88.50[bcd]
Berfect 12% EW	2%Abamactin + 10% Chlorofenapyr	30cc	622	40	93.79	53	92.24	128	83.19	128	83.19	87.94[bcd]
Koncor 24%SC	Spirodiclofen	40cc	561	37	93.63	48	92.21	137	81.36	128	81.36	86.62[cd]
Agromic 1.8% EC	Abamactin	50cc	509	49	90.70	62	88.91	95	76.25	148	76.25	85.00[d]
Control	-	-	763	790	-	838	-	899	-	934	-	-

No. =number R. =reduction LSD = 3.76 at level 5%

Different letters in vertical column denote significant difference (F-test, $P < 0.05$, $P < 0.01$).

Table 4. Percentage reduction of tenuipalpid mite *B. phoenicis* populations on fruits as a result of acaricides treatments under field conditions.

Trade name	Common name	Rate of application / 100 Liter of water	No. of individuals before treatment	Number and % reduction of individuals/ 40 fruits after treatment								Average% reduction
				3 days		One week		Two weeks		Three weeks		
				No.	% R.	No.	% R.	No.	% R.	No.	% R.	
Ortus 5%SC	fenpyroximate	50cc	404	12	97.15	32	92.80	43	90.88	64	87.09	91.98[a]
Nest 20%SC	2%Abamactin + 10% Chlorofenapyr	30cc	384	25	93.74	35	91.71	54	87.96	68	85.57	89.75[ab]
Baroq 10% SC	Ectxazole	25cc	442	29	93.69	40	91.77	61	88.18	88	83.77	89.36[ab]
Berfect 12% EW	2%Abamactin + 10% Chlorofenapyr	30cc	336	24	93.14	31	91.61	46	88.27	65	84.23	89.31[ab]
Agromic 1.8% EC	Abamactin	50cc	226	13	94.47	21	91.55	37	85.98	56	79.81	87.95[bc]
Koncor 24%SC	Spirodiclofen	40cc	265	14	94.92	27	90.74	49	84.16	66	79.70	87.38[bc]
Deva 1.8 EW	Abamactin	40cc	196	14	93.14	20	90.72	36	84.27	60	75.05	85.79[bc]
Menova 10%EC	Hexythiazox	50cc	245	15	94.12	20	92.58	59	79.37	87	71.06	84.28[c]
Control	-	-	370	385	-	407	-	432	-	454	-	-

No. =number R. =reduction LSD = 3.95 at level 5%

Different letters in vertical column denote significant difference (F-test, $P < 0.05$, $P < 0.01$).

REFERENCES

1. Abou-Awad, B. A. El-Sawaf, B. M. Reda, A. S. and A. A. Abdel-Khalek. 2000. Environmental management and biological aspects of two eriophyoid fig mites in Egypt: *Aceria ficus* and *Rhyncophytoptus ficifoliae*. Acarologia, 40: 419–429.
2. Abou-Awad, B. A., A. M. Metwally and M. M. Al-Azzazy. 2005. Environmental management and biological aspects of two Eriophyid olive mites in Egypt: *Aceria oleae* (Nalepa) and *Tegolophus hassani* (Keifer). Z. Pflanzenkrankh. Pflanzensch., 112 (3): 287–303.
3. Al-Azzazy, M.M., A.A. Abdallaha and H.M. El-Kawas. 2013. Studies on the wheat curl mite, *Aceria tulipae* Keifer (Eriophyidae), in Egypt. Arch. of Phytopathol. Plant Protection, 46 (10): 1150-1158.
4. AL-Joboory, H. K. and R. S. AL-Jorany. 2011. Effect of infection by the olive bud mite *Aceria oleae* (Nalepa) and the olive rust mite *Tegolophus hassani* (Keifer) on some characters growth vegetation of olive nurseries and the efficacy control of some acaricides on their. Diyala J. of Agric. Sci., 3 (2): 364-372.
5. Childers C.C. 1986. Methods for the routine screening of acaricides against the citrus rust mite *Phyllocoptruta oleivora* (Ashmead) (Acari: Eriophyidae). British Crop Protection conf., Pests and Diseases 3, C-17.
6. El-Halawany, A.S.H. 2012. Survey of eriophyid mites on some fruit trees, with re-descriptions of two newly recorded species and a checklist of eriophyid mites in Egypt (Acari: Eriophyoidea). Egypt. Acad. J. biolog. Sci., 5 (2):205 -216.
7. El-Halawany, A.S. and M. M. Abou-Setta. 2014. Mites inhibiting guava trees and their dynamics in relation to weather factors and plant phenology. Acarines (In press).
8. Henderson, C. and E. Tilton. 1955. Test with acaricides against the brown wheat mite. J. Econ. Entomol., 84:157-161.
9. Jeppson, L. R., H. H. Keifer and E. W. Baker. 1975. Mites injurious to economic plants. University of California Press, California, 614 pp.
10. Pena, J. E., R. Duncan, and T.Vasquez. 1999. Guava arthropod seasonality and control of fruit files in South Florida. Proc. Fla. State Hort. Soc., 112: 206-209.
11. Rezk, H. A. 1998. The false spider mite, *Brevipalpus obovatus* Donnadieu (Acari: Tenuipalpidae): host-related biology, seasonal abundance, and control. Acarology: Proceedings of the 10th International Congress, Canbrra, Australia. 291-294.
12. SAS Institute. 2010. SAS Statistics and Graphics Guide, Release 9.1. SAS Institute, Cary, North Carolina 27513, USA.
13. Tayyib, M., A.S. Sohail, A. Murtaza and F.F. Jamil. 2005. Efficacy of some new-chemistry insecticides for controlling the sucking insect pests and mites on cotton. Pakistan Entomol. Vol. 27 (1): 63-66.
14. Zaher, M. A. 1984. Survey and ecological studies on phytophagous, predaceous and soil mites in Egypt. I: Phytophagous mites in Egypt (Nile vally and Delta). PL.480 Programme. USA Project No. EG. ARS, 30. Grant. No, FG, Eg., 1-181pp.

كفاءة بعض المبيدات الأكاروسية لمكافحه الحلم الدودي ***Tegolophus guavae*** والأكاروس المبطط ***Brevipalpus phoenicis*** على أشجار الجوافة

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في السنوات الأخيرة ظهرت على أشجار الجوافة أعراض صدأ على الأوراق نتيجة إصابتها بالحلم الدوى *Tegolophus guavae* (Boczek والحلم المبطط *Brevipalpus phoenicis* (Geijskes بأعداد كبيرة على الأوراق والثمار. أجريت تجربة لتقييم فعالية ثمانية مبيدات أكاروسية هي (أجروميك، ديفا، بيرفكت، نست، باروك، كونكور، مينوفا، أورتس) على الحلم الدودي والمبطط تحت الظروف الحقلية.

أشارت النتائج المتحصل عليها أن أورتس ومينوفا وأجروميك و باروك كانت أكثر فعالية في الحد من تعداد حلم صدأ أوراق الجوافة الدودي، يليها ديفا ثم بيرفكت ثم كونكورو أعطى نست أقل نسبة خفض كانت ٧٢,٢٤% . أعطت المبيدات الأكاروسية الثمانية نسبة خفض أكثر من ٨٤% على الحلم المبطط على الأوراق والثمار وسجل أورتس أعلى نسبة خفض أكثر من ٩٠% بعد ثلاثة أسابيع من الرش.

كما أشارت النتائج المتحصل عليها أن جميع المبيدات المستخدمة أعطت نتائج جيدة في خفض تعداد كل من الحلم الدودي والأكاروس المبطط على أشجار الجوافة تحت الظروف الحقلية.