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Citation: Egypt. Acad. J. Biolog. Sci. (A. Entomology) Vol. 10(6)pp: 129-134(2017)

Egypt. Acad. J. Biolog. Sci., 10(6): 129-134 (2017)



Egyptian Academic Journal of Biological Sciences A. Entomology

> ISSN 1687- 8809 www.eajbs.eg.net



Toxicity Effect of Some Recommended Bollworms Insecticides And Their Mixtures With Fungicide Against The Cotton Bollworms, Boll Rot And Yield Production In Egypt Cotton Filed.

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ARTICLE INFO Article History

Received: 3/9/2017 Accepted: 3/10/2017

Keywords:

bollworms, boll rot, alph-cypermethrin, chlorpyrifos, thiabendazole, cotton

ABSTRACT

An experiment was conducted at Kom El-Qanater, Abo-Houmse, El-Bihera, Egypt season of 2016-2017, to study the effect of some recommended insecticides to control cotton bollworms mixed by a fungicide to control the cotton boll rot disease, and the effect of this mixing on the efficiency of bollworm insecticides. The experiment was carried out under field conditions in randomized complete block design with three replications in four treatments and compared with untreated cheek. Cotton variety Giza 86 was used in the experiment. Meanwhile, three Successively sprayed were used two insecticides Super Alpha[®]10% EC (alph-cypermethrin) and Dora[®] 48% EC (chlorpyrifos) were recommended against the cotton bollworms, where they were used individually in the 1st and 2nd treatments and mixed with Tecto® 50% SC (thiabendazole) fungicides in the 3rd and 4th treatments. The obtained results showed that the field application of two recommended insecticides against the cotton bollworms gave a high significant efficacy when dividedly mixed with thiabendazole as fungicide (Tecto[®] 50% SC). The average values of bollworms/100 bolls were significantly decreased 1.22 and 1.88 for alph-cypermethrin + thiabendazole mixture, 1.33 and 1.66 for chlorpyrifos + thiabendazole mixture during the two seasons of evaluation respectively, comparing with the values in the treatments free fungicide or the check treatment. Moreover, each evaluated mixture indicated that the infested of the boll rot was significantly decreased as 1.33 and 1.44 with 1st and 2nd mixture in both season respectively. The cotton yield was increased as % values to be 100 and 90 with alph-cypermethrin, 83.3 and 76 with chlorpyrifos, 150 and 137 with alph-cypermethrin + thiabendazole mixture and 150 and 136 with chlorpyrifos + thiabendazole mixture in both seasons respectively. The obtained finding may be concluded that the thiabendazole as fungicide when mixed with the evaluated insecticides can improve effectiveness against the cotton bollworms and decrease the boll rot disease. In addition, these treatments can increase the cotton yield to a high significant value.

INTRODUCTION

The cotton is one of the oldest plant fibers cultivated in the world, and it has been used not only for producing natural raw materials for the textile industry, but also by the use of its products for other important purposes, such as edible oil, pharmaceutical and animal feed oil (Chitarra, 2008). It has exposed to economic losses caused by many pests causing reduced yield, low lint quality and increased costs of insecticides (Amin and Gergis, 2006). Cotton bollworms, Pink bollworm Pectinophora gossypiella(Saund.) and the spiny bollworm Earia sinsulana(Boisd.) are the most serious cotton pests in Egypt (Hussein et al. 2002), were they are considered to be the important factors that influence on cotton production and cause damage to the cotton yield,. However, in the last decade due to the change in the conventional agricultural practices in cotton growing in Egypt, especially in the coastal area and the West Delta region, where the cultivation of cotton is late than its original date we have noticed as researchers in the science of cotton increase the incidence of boll rot. The cotton boll rot can be caused by Physiological factors such as high temperature, high relative humidity, increased nitrogen fertilization and various pathogens, especially the fungi Colletotrichum gossypii South var. cephalosporioides Costa, Botryodiplodia theobromae Pat, Diplodia gossypina Cke, Fusarium sp, Ramularia areola Atk., Alternaria spp., Aspergillus flavus and the bacterium Xanthomonas axonopodis pv. malvacearum Smith Dye. These plant pathogens can directly affect the crop by reducing the productivity, the fiber quality and also by increasing the costs of production. Based on these facts, the knowledge of symptoms of the disease, morphology, physiology and epidemiology of pathogens are critical factors for defining the best control strategy to be adopted, in order to achieve high yield and quality of cotton fiber (Zancan et al 2011, Belot and Zambiasi 2007).

In this study, we will discuss the effect of mixing a fungicide used to control boll rot with the bollworm insecticides, and study the effect of the mixtures on suppressing the infestation of each of bollworm and boll rot,. Due to the prevalence of cotton boll rot in the West Delta governorates in the last Period, the late planting dates, bolls formation in high temperatures and high relative humidity, as well as excessive nitrogen fertilization by farmer's whose believing that this compensates for periods of delay in agriculture.

MATERIALS AND METHODS

The field experiments in a complete randomized block design were conducted at Kom El-Qanater, Abo-Houmse, El-Bihera Governorate in western Delta Egypt, during two growing cotton seasons of 2016 and 2017. Giza 86 variety was sown in these trails. The experiment consisted of four treatments included two insecticides recommended by Egyptian Ministry of Agriculture to control cotton bollworms and one fungicide.

The 1st treatment were treated by the insecticides Super Alpha[®] 10% EC (alphcypermethrin), 2nd treatment treated by the Dora[®] 48% EC (chlorpyrifos), 3rd treatment treated by Super Alpha[®] 10% EC mixed with Tecto[®] 50% SC (thiabendazole) and the 4th treatment were treated by Dora[®] 48% EC mixed with Tecto[®] 50% SC as a fungicide.

Hydraulic Knapsack hand sprayer was used to apply three sprays during the two seasons in the treatments. Treatments were run in four replicates and evaluated according to its efficiency in reducing the occurrence of bollworms infestation. Samples of 100 green bolls per treatment were diagonally collected at random along different sampling intervals. Bolls were examined externally before dissected, and the

occurrence of infestation was based on the appearance of injury symptoms regardless the presence of spiny and pink bollworm larvae.

Treatments were keeping running in four replicates and assessed by its productivity in diminishing the event of bollworms and boll rot invasion. Samples of 100 green bolls for each treatment were diagonally collected at random along various sampling intervals. Bolls were inspected externally before dissected, and the event of invasion depended on the presence of damage side effects in any case of bollworm larvae and/or boll rot.

RESULTS AND DISCUSSION

Effect of insecticides and their mixtures with a fungicide against bollworms:

The data in the first season 2016 at Table (1) Indicate that there were no significant differences between the applied individually insecticides and/or mixed with the fungicide in the 1st and 2nd sprays gave (2.33 & 2.33, 2.66 & 2.00, 2.00 & 1.33, and 2.33 & 1.33 larva/100 bolls), respectively. However, there were significant differences between the treatments with insecticides alone and/or there mixtures with the fungicide and untreated cheek which gave (5 and 9 larva/100 bolls) in the 1st and 2nd sprays. Otherwise, the results showed a significant difference between the treatments by insecticides and/or it's mixed with the fungicide in the 3rd spray (1.6, 1.6, 0.33 and 0.33 larva/100 bolls) respectively compared with untreated cheek; 13 larva/100 bolls. It showed that there were significant differences among of the three sprays.

Table (1): Effect of insecticides and their mixtures with fungicide against bollworms season 2016

Common nomo	Trade name	Conc.		Spray		M.N.	LSD.05	Significant
Commentanie			1 st	2 nd	3 rd			
alph- cypermethrin	Super Alpha	10% EC	2.33 ^b	2.33 ^b	1.66 ^b	2.11 ^b		
chlorpyrifos	Dora	48% EC	2.66 ^b	2.00 ^b	1.66 ^b	2.11 ^b		
alph- cypermethrin+t hiabendazole	Super Alpha+Tecto	10%EC +50%SC	2.00 ^b	1.33 ^b	0.33 ^c	1.22 ^c	0.61	***
chlorpyrifos + thiabendazole	Dora + Tecto	48% EC +50%SC	2.33 ^b	1.33 ^b	0.33 ^c	1.33 ^c		
Untreated Check			5.00 ^a	9.00 ^a	13.00 ^a	9 ^a		
LSD.05			1.15	1.15	1.24			
Significant			**	***	***			

M. N. =Mean Number of treatments - *** high significant

The results in Table (2) in the second season 2017 illustrated there were no significant differences between the treatments of insecticides and/or the mixture with the fungicide in the 1^{st} , 2^{nd} and 3^{rd} sprays, while, there were significant differences between the evaluated treatments and untreated cheek through the three sprays. However, significant differences were observed in the mean of the three sprays (2.55, 3.00, 1.88 and 1.66 larva/100 bolls) respectively, in comparing with the untreated cheek (13 larva/100 bolls).

The above results indicated that the application of thiabendazole fungicide enhanced the efficiency of alph-cypermethrin and chlorpyrifos that used to control bollworms in cotton these obtained findings are agreed with those reported by (Hasan 2014) who suggested that the antioxidant butylated hydroxyanisol (BHA), ergosterol biosynthesis inhibiting (EBI) fungicides enhanced the insecticidal activity of profenofos, esfenvalirate and spinosad against 2nd instar *S.littoralis*. (Plling and Jepson 1994). Found that the toxicity of pyrethroid was enhanced from 9-16 folds when combined with Prochloraz and Propiconazol fungicides to honey bee. These results also, agree with the previous studies (Colin and Belzunness 1992). They reported that the fungicides have been identified as synergists of pyrethroids insecticides in the honey bee. Additionally Mahmoud and Khalifa (2005) found that antioxidant butylated hydroxyanisol (BHA) fungicides increased the herbicide activity of the bensulfuron-methyl herbicide against radish especially with low concentration of the herbicides.

Table (2): Effect of insecticides and	their mixtures	with fungicide	against bollworms
season 2017			

Common name	Trade name	Conc.	1 st	Spray 2 nd	3 rd	M.N.	LSD.05	Significant
alph-cypermethrin	Super Alpha 10% EC	10% EC	3.00 ^b	2.33 ^b	2.33 ^b	2.55 ^{bc}		
chlorpyrifos	Dora 48% EC	48% EC	4.00 ^b	2.66 ^b	2.33 ^b	3.00 ^b		
Alph- cypermethrin+thiabe ndazol	Super Alpha + Tecto	10%EC+ 50%SC	2.66 ^b	2.00 ^b	1.00 ^b	1.88 ^{cd}	0.80	***
chlorpyrifos +thiabendazol	Dora® + Tecto®	48%EC+ 50%SC	2.33 ^b	1.66 ^b	1.00 ^b	1.66 ^d		
Untreated Check			8.00 ^a	14.00 ^a	17.00 ^a	13.00 ^a		
LSD.05			1.55	1.15	1.55			
Significant			***	***	***			

M. N. =Mean Number of treatments - *** high significant

Effect of insecticides and their mixtures with thiabendazole fungicide against boll rot:

The results in Tables (3 and 4) refer to there were significant differences between the treatments by insecticides (Super Alpha[®] and Dora[®]) and/or their mixtures with the fungicide thiabendazole (Tecto[®]) in the three sprays where recorded mean number values over the three sprays (4.22, 4.44, 1.33, 1.33 and 4.77 boll rot infection/100 boll) respectively, during 1st season 2016 and (4.11, 4.11, 1.44, 4.77 boll rot infection/100 boll) respectively, during 2nd season 2017. These results are consistent with (Zancan 2011) who provided that chemical control with fungicides is a rapid and effective tactic in the management of diseases, either through seed treatment or foliar sprays, this technique is successful to control the cotton boll rot along with others techniques, Additionally, Mahmod et al. (2015) explained that fungicides appeared to be the best for its performance in controlling cotton fungi as well as in decreasing boll rot incidence and increasing yield of cotton. Thus, recommended insecticides in controlling cotton bollworms when mixed with thiabendazole fungicide can enhance the efficiency of insecticides and decreas boll rot incidence and finally increase the cotton yield.

Effect of insecticides and it mixed with thiabendazole fungicide on the cotton yield.

Data in Table (5) summarized that the evaluated insecticides increased the cotton yield was as % values to be 100 and 90 with alph-cypermethrin, 83.3 and 76 with chlorpyrifos, 150 and 137 with alph-cypermethrin + thiabendazole mixture and 150 and 136 with chlorpyrifos + thiabendazole mixture in both seasons respectively, Compared the untreated Check. This explains the importance of controlling boll rot, that has a high adverse effect on the cotton boll.

Common name	Trada nomo	Cocn.	Spray			MN		Significant
	Trade fiame		1 st	2 nd	3 rd	IVI.IN.	LSD.05	Significant
alph- cypermethrin	Super Alpha	10% EC	4.00 ^{ab}	5.33 ^a	1.33 ^b	4.22 ^b		
chlorpyrifos	Dora	48% EC	4.33 ^a	6.00 ^a	3.00 ^b	4.44 ^{ab}		
Alph- cypermethrin +thiabendazol	Super Alpha +Tecto	10 EC +50%SC	2.66 ^c	1.33 ^b	0.00 ^c	1.33 ^c	0.51	***
chlorpyrifos +thiabendazol	Dora+Tecto	48% EC +50%SC	3.00 ^{bc}	1.00 ^b	0.00 ^c	1.33 ^c		
Untreated Check			4.00 ^{ab}	6.33 ^a	4.00 ^a	4.77 ^a		
LSD.05		1.05	1.40	0.46				
Significant			*	***	***			

Table (3): Effect of insecticides and their mixtures with fungicide against boll rot season 2016

M. N. =Mean Number of treatments - *** high significant

Table (4): Effect of insecticides and their mixtures with fungicide against boll rot season 2017

Common name	Trade name	Conc.	1 st	Spray 2 nd	3 rd	M.N.	LSD.05	Significant
alph- cypermethrin	Super Alpha	10% EC	3.67 ^{ab}	5.33 ^b	3.33ª	4.11 ^b		
chlorpyrifos	Dora	48% EC	4.00 ^{ab}	5.33 ^b	3.00 ^a	4.11 ^b	1	
Alph- cypermethrin +thiabendazol	Super Alpha + Tecto	10 EC +50%SC	3.00 ^b	1.33°	0.00 ^b	1.44°	0.73	***
Chlorpyrifos +thiabendazol	Dora+ Tecto	48% EC +50%SC	3.00 ^b	1.33°	0.00 ^b	1.44 ^c		
Untreated Check		4.67 ^a	9.33ª	3.33ª	5.78 ^a			
LSD.05			1.33	1.56	0.66			
Significant			*	***	***			

M. N. =Mean Number of treatments - *** high significant

Table (5): Effect of insecticides and their mixtures with fungicide on the cotton yield

Trada nomo	Common	1 st sease	on 2016	2 nd season 2017		
Trade name	name	ne Weat (Kg)/fed. increase (%)* We		Weat (Kg)/fed.	Increase (%)*	
alph- cypermethrin	Super Alpha	945	100	950	90	
Chlorpyrifos	Dora	866.3	83.3	880	76	
Alph- cypermethrin +thiabendazol	Super Alpha +Tecto	1181.3	150	1185	137	
chlorpyrifos +thiabendazol	Dora +Tecto	1181.3	150	1180.5	136	
Untreated Check		472.5		500		

*Expressed as% increase than untreated cheek according to Hussin et al. (2002)

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ARABIC SUMMARY

تأثير سمية بعض المبيدات الموصى بها ضد ديدان اللوز مخلوطه مع مبيد فطريات على ديدان اللوز وعفن اللوز وإنتاجية القطن في مصر

> **هشام محمد محمد البسيوني** مركز البحوث الزراعية – معهد بحوث وقاية النبات – قسم بحوث ديدان اللوز الدقي – جيزة – مصر

أجريت التجربة خلال موسمي نمو القطن ٢٠١٦-٢٠١٧ بكوم القناطر - أبو حمص - البحيرة -مصر لدراسة بعض المبيدات الحشرية الموصى بها للسيطرة على ديدان اللوز منفردة ومخلوطة بمبيد فطري للسيطرة على ديدان اللوز ومرض عفن اللوز في القطن وتأثير هذا الخلط على كفاءة المبيدات الحشرات لديدانً اللوز. نفذت التجربة في الظروف الحقلية بتصميم عشوائي كامل وذلك على في أربع معاملات بكل منها ثلاث مكررات والمقارنة. إستخدم صنف قطن جيزة ٨٦ في التجربة. تم استخدام ثلاثة رشات على التوالي استخدام مبيدين من مبيدات الحشرات سوبر ألفا®١٠٪ EC (ألفا-سيبرمثرين) و دورا[®] ٤٨ EC (كلوربيريفوس) موصى بهما ضد ديدان اللوز ، حيث تم استخدامها بُشكل فردي في المعاملتين الأولى و الثانية ومختلطة مع تكتو® • °% SC (ثيابندازول) مبيد فطريات في المعاملتين الثالثة و الرابعة. وأظهرت النتائج التي تم الحصول عليها أن التطبيق الحقلي للمبيدات الحشرية الموصى بها ضد ضد ديدان اللوز أعطت فعالية كبيرة عند خلطها مع ثيابندازول كمبيد للفطريات (تيكتو ٥٠٪ SC). وإنخفض متوسط التعداد ضد ديدان اللوز /١٠٠ لوزة بشكل معنوى ١.٢٢ و ١.٨٨ لمخلوط ألفاً- سيبرمثرين + ْثيابندازول و ١.٣٣ و ١.٦٦ لخليط الكلوربيريفوس + ثيابندازولّ خلال الموسمين على التوالي، وذلك مقارنة مع تعداد المعاملات منفردة دون خلط وعلاوة على ذلك، أشارت النتائج لكلا من المخلوطين المقييمن إلى انخفض الإصابة بعفن اللوز بشكل ملحوظ ١.٣٣ و ١.٤٤ مع كلا منهما في الموسمين على التوالي. وزاد محصول القطن بنسبة ٪ ١٠٠ و ٩٠ مع ألفا-سيبر مثرين، ٨٣.٣ و ٧٦ مع كلُّوربير يفوس، ١٥٠ و ٧٣٢ مع خليط ألفًا- سيبر مثرين + ثيابندازول و ١٥٠ و ١٣٦ مع خليط كلوربيريفوس + ثيابندازول في كلا الموسمين على التوالي. ويمكن التوصل إلى النتيجة التي تم الحصول عليها بأن ثيابندازول كمبيد للفطريات عند تخلطه مع المبيدات الحشرية التي تم تقبيمها يمكن أن تحسن فعاليها ضد ديدان اللوز في القطن وتقليل مرض تعفن اللوز . وبالإضافة إلى ذلك، زيادة الإنتاجية من لمحصول القطن بنسبة عالية.