

## EFFICIENCY OF GAUCHO AND CRUISER APPLIED AS COTTON SEED TREATMENT ON SUCKING PESTS AND ASSOCIATED PREDATORS AS LONG ACTING EFFECT

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### ABSTRACT

The insecticidal activity of Gaucho and Cruiser applied as seed treatments was evaluated against early season sucking pests (thrips, aphid, jassid, whitefly and mites) on cotton under field conditions at the rate of 7 and 2 g/kg seeds respectively. Results revealed that Gaucho and Cruiser were proved to be superior in the evaluation of thrips, they had relatively fast effects against thrips and residual effect lasted for seven weeks (pre-thinning), the percentage of reduction was (90.66 and 87.77%) for Gaucho and Cruiser, respectively. While the value of percentage of reduction was less in the other insect pests than thrips. Data also indicated that the tested insecticides have no significant decrease on the population density of associated predators. It was noticed that the two chemicals as seed treatment had improved the development of the cotton plant and there was not any phytotoxicity on cotton plants.

### INTRODUCTION

Cotton is the most important economic crop in Egypt. It is liable to be attacked by certain sucking pests e.g. cotton aphid (*Aphis gossypii*), jassid (*Empoasca decipiens*), whitefly (*Bemisia tabaci*), thrips (*Thrips tabaci*) and *Tetranychus* spp. Damage to cotton is predominately a result of honey dew produced by the insects (such as aphid and whitefly) and associated fungal growth that causes sticky cotton and lint staining which greatly reduces cotton grade (Perkins, 1987). Abou-Sholoua (2001) also indicated that the sucking pests suck sap of plant tissues, and transmit viral disease. Thrips is considered to be among the economic pests of cotton seedlings, its damage may be extensive, so that re-sowing may be necessary, also it may be subjected to high infestation by bollworms at the end of the season. Planning for integrated control programme must include seed treatment.

The systemic effect of Gaucho applied as seed treatment against sucking insects was studied by several investigators, Elbert *et al.* (1990), Elbert *et al.* (1991), Omar *et al.* (1994), Attique and Ghaffar (1996), Gupta *et al.* (1998) and Siddiqui and Trimohan (2000).

The present work aims to evaluate the effect of some systemic insecticides applied as seed treatment against early sucking pests on cotton and their associated predators.

### MATERIALS AND METHODS

Experiment was conducted during 1999 cotton growing season at Gemmeiza Agriculture Research Station, The cultivated cotton variety was Giza 86. Treatments were ranged in a complete randomized block design with four replicates of 175 m<sup>2</sup> each. Cotton plants were subjected to normal agriculture practices. Wetted cotton seeds were coated with pesticides used

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in cylinder container and shacked well before check planting and untreated seeds were used as untreated check.

**Sucking pests:**

After seed emergence, 25 seedlings/or (25 leaves after thinning) for each replicate, were picked up at random every week interval for sucking pests, cotton thrips, *Thrips tabaci* (Lind.), cotton aphids, *Aphis gossypii* (Glover), cotton jassids, cotton jassids, *Empoasca decipiens* (Paoli). Cotton whitefly, *Bemisia tabaci* (Genn.) and common red spider mites, *Tetranych* spp. numbers were examined and recorded according the technique followed by El-Nawawy et al. (1979).

**Associated predators:**

Samples of 100 cotton 25 seedlings (or leave after thinning for each replicate) were taken randomly. They were examined weekly to count the number of following: *Coccinella undecimpunctata*, *Orius* sp., *Chrysoperla carnea*, *Scymnus* spp., *Paederus alferii* and true spider.

**Pesticides:**

The pesticides used and their rates were as followed:

1. Gaucho 70% W.S.: at 7 gm/kg seeds 1-(b-chloro-3-pyridymethyl) N-nitro imidazolidin-2-ylidene amine.
2. Cruiser 70% W.S. (CGA 293 343) 2 gm/kg seeds belongs to new chemical class of nitronethylenes.

In order to measure the efficiency of the tested insecticides percentages of reduction were calculated by comparison with data obtained from untreated plots using the following formula:

% reduction =  $100(1 - \text{population No. in treatment} / \text{population No. in the check})$ .  
and chi-square method was used at 5% probability to evaluate significant differences of efficiency among treatments.

## RESULTS AND DISCUSSION

The efficiency of Gaucho and Cruiser on sucking pests and associated predators was evaluated in field trail at Gemmeiza Research Station. The number of pests and so the reduction percentage of infestation was calculated.

**1. Sucking pests:**

The obtained results are presented in Tables (1 & 2). Data in these Tables revealed that the tested pesticides reduced the population of thrips compared with untreated one with light significant difference of percent of reduction. Both tested products induced the highest effect where the total numbers of thrips during scouting period were 363, 475 individuals for Gaucho and Cruiser respectively compared with 3885 for untreated check. They induced a complete protection for cotton seedling for four weeks from planting, the two compounds had fast initial effect, where the reduction in thrips population more than 98%, after seven weeks of planting, the efficiency was decreased to 90.67 and 87.77%, reduction for Gaucho and Cruiser respectively. The results proved systemic and residual effects of tested insecticides against thrips. Eissa (1990) reported that, imidacloprid applied as

**Table (1): Number and percent of reduction of different sucking pests throughout the scouting periods following seed treatments at Gemmeize during 1999 season.**

Treatment	Rate /fed.	Time	Sucking pest											
			<i>T. tabaci</i>		<i>E. decipiens</i>		<i>A. gossypii</i>		<i>Tetranychus</i> spp.		<i>B. tabaci</i>			
			Pop <sup>1</sup>	Red <sup>2</sup>	Pop	Red	Pop	Red	Pop	Red	Mature		Immature	
Gaicho	7 g/kg	Pre-thinning (2-7) weeks	363	90.67 a	151	0.0	42	34.38 a	2361	0.0	354	18.43	253	77.21 a
70% W.S	seeds	Post-thinning (8-19) weeks	-	-	2009	7.16	2206	35.95 a	10339	0.0	1436	7.59	675	17.78 a
Cruiser	2 g/kg	Pre-thinning (2-7) weeks	481	87.77 a	163	0.0	33	48.44 a	2761	0.0	336	22.58	283	74.50 a
70%W.S	seeds	Post-thinning (8-19) weeks	-	-	1983	8.36	2265	34.23 a	4947	0.0	1513	6.50	680	17.17 a
		Pre-thinning (2-7) weeks	3885	-	110	-	64	-	452	-	434	-	1110	-
Control	-	Post-thinning(8-19) weeks	-	-	2164	-	3444	-	883	-	1554	-	821	-

<sup>1</sup>Pop = population

<sup>2</sup>Red = % of reduction

The statistical analysis were computed in between both pre-thinning values or post-thinning values.

Table (2): Elucidates number of sucking pests after different periods from sowing dates following seed treatments in at Gemmeiza during 1999 seasons.

Date	Number of sucking pest/100 cotton seedling (or leaf) after different period of sowing																				
	<i>T. tabaci</i>			<i>E. decipiens</i>			<i>A. gossypii</i>			<i>Tetranychs</i> spp. egg stage			<i>Tetranychs</i> spp. mobile stage			<i>B. tabaci</i> mature			<i>B. tabaci</i> immature		
	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
Prethinning																					
2 weeks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3 weeks	124	195	703	4	3	4	-	-	-	76	50	20	12	14	9	34	33	42	-	-	-
4 weeks	28	35	1896	9	10	7	2	2	4	124	193	32	29	74	26	58	59	75	41	44	166
5 weeks	155	186	950	16	19	9	24	17	37	606	507	276	166	324	130	76	72	98	48	62	226
6 weeks	44	51	253	34	36	30	16	14	23	267	514	45	324	428	34	92	87	108	76	81	342
7 weeks	12	14	83	88	95	69	-	0	0	456	360	39	301	297	41	94	85	111	88	96	376
Total	363	481	3885	151	163	119	42	33	64	1539	1624	412	832	1047	240	354	336	434	253	283	1110
% reduction	90.66 a	87.77 a	-	0	0	-	34.38 b	48.44 a	-	0	0	-	0	0	-	18.43 a	22.58 a	-	77.21 a	74.50 a	-
Post thinning																					
8 weeks	-	-	-	59	60	48	-	-	-	3432	899	115	915	549	104	55	55	71	45	51	64
9 weeks	-	-	-	53	45	39	-	-	-	1830	1239	198	1411	729	63	56	52	62	17	13	36
10 weeks	-	-	-	54	53	40	-	-	-	1358	699	111	446	258	26	51	57	42	18	10	24
11 weeks	-	-	-	44	39	56	-	-	-	225	118	91	226	125	42	42	43	43	89	77	98
12 weeks	-	-	-	33	30	31	-	-	-	150	39	55	90	83	17	35	30	35	56	52	64
13 weeks	-	-	-	63	57	123	-	-	-	167	14.9	17	89	60	44	57	54	74	48	39	55
14 weeks	-	-	-	319	320	341	-	-	-	-	-	-	-	-	-	116	116	114	37	30	72
15 weeks	-	-	-	368	395	371	155	172	187	-	-	-	-	-	-	157	162	167	207	220	244
16 weeks	-	-	-	280	305	275	185	253	235	-	-	-	-	-	-	154	156	192	158	188	164
17 weeks	-	-	-	208	195	236	213	200	191	-	-	-	-	-	-	210	218	239	-	-	-
18 weeks	-	-	-	242	198	301	433	424	1481	-	-	-	-	-	-	267	277	293	-	-	-
19 weeks	-	-	-	286	286	303	1220	1216	1350	-	-	-	-	-	-	236	293	222	-	-	-
Total	-	-	-	2009	1983	2164	2206	2265	3444	7.162	3133	587	3177	1804	296	1436	1513	1554	675	680	821
% reduction	-	-	-	7.16a	8.36a	-	35.95a	34.23a	-	0	0	-	0	0	-	7.59a	6.5a	-	17.78a	17.17a	-

1) Gaucho 70% W.S at rate of 7 g/100 kg seeds.

2) Cruiser 70% W.S. at rate of 2 g/100 kg seeds.

3) Control.

seed coating protected from early pests for 6-7 weeks. Emara (1996) found that Gaucho had a relatively fast initial effects against thrips on cotton and the residual efficiency lasted for 6-7 weeks. El-Hamady and Abu-Sholoua (1999) reported that imidacloprid was rather efficient in suppressing the population on cotton seedlings and the residual effect lasted 7 weeks after application.

As for jassids, it is of interest to notice that the population increased in case of pre-thinning on the two treatment compared with untreated check. There is no significant difference on post thinning throughout scouting periods, Gaucho and Cruiser application did not provide control of Jassids after where thinning, number of jassid individuals were 2000 and 1983 for Gaucho and Cruiser, respectively as compared to 2164 for untreated check, which decreased by 7.16 and 8.36%, respectively (Table 1).

Regarding the results obtained for aphid, Tables (1 & 2) it was noticed that population density decreased on both treatments pre-thinning and post thinning compared with untreated one. On the other hand, an obvious increasing in number of aphids was noticed in the last five inspections. The total number of aphids during different inspections period was 2206, 2265 and 3444 individual for Gaucho, cruiser and Control respectively. Comparing the percentage of population reduction obtained with the two compounds, it was found to be 34.38 and 35.95 for pre- and post-thinning with Gaucho, also 48.44 and 34.23 for pre- and post-thinning with cruiser. El-Modather (1996) found that, Gaucho at the two forms induced a complete protection for seedling for 30 days from planting where the percent reduction in aphids population was more than 99%, after 42 days from planting there were insignificant differences among treatments. The current results are confirmed with this finding.

On the other hand, data in Table (1 & 2) revealed that the population density of spider mite increased in both treatments of pre-thinning and post thinning compared to untreated check (on the population of eggs and mobile stages). The total number of eggs and mobile stages of spider mites during scouting periods pre-thinning were 1529 and 832 for Gaucho, 1624 and 1047 for Cruiser in comparison with 412 and 240 for control. The same trend continue during post thinning (Table 2).

With regard to the insecticidal activity of the two compounds on whitefly population, results showed that the tested pesticides reduced the population density of whitefly in all treatments compared with untreated check before and after thinning, they decreased the population density of mature stages of whitefly compared with untreated one where the percentage of reductions reached 18.43 and 7.59 for pre and post thinning with Gaucho, while they were 22.58 and 6.5% for Cruiser. Immature stages emphasize the previous findings. It is of interest to notice that both of Gaucho and Cruiser were more effective on immature stages, in other words, percentage of reduction pre-thinning reached 77.21 and 74.50 with Gaucho and Cruiser respectively. On the other hand, post-thinning proved the same trend.

## **2. Associated predators:**

Data presented in Tables (3 & 4) elucidate the initial and residual effects of the tested insecticides on the associated predators.

Table (3): Number and percent of reduction of different predators throughout the scouting period following seed treatments at Gemmiza during 1999 season.

Treatment	Rate /fed.	Time	Predators													
			Co.		Sc. Syriacus		S. pancitillum		Orius		P.		True spider		Ch. carnea	
			undecimpunctata						sp.		alaferil					
Pop	Red	Pop	Red	Pop	Red	Pop	Red	Pop	Red	Pop	Red	Pop	Red	Pop	Red	
Gaicho	7 g/kg	Pre-thinning (2-7) weeks	0	0	0	0	0	0	1	0	0	0	4	0	0	0
70% W.S	seeds	Post-thinning (8-19) weeks	166	8.79 a	134	0 b	594	1.16 b	132	0	1338	0	1060	5.20 a	528	0
Cruiser	2 g/kg	Pre-thinning (2-7) weeks	0	0	0	0	0	0	0	0	0	0	4	0	0	0
70% W.S	seeds	Post-thinning (8-19) weeks	167	8.24 a	126	5.95 a	546	9.15 a	135	0	1383	0	1040	6.90 a	536	0
		Pre-thinning (2-7) weeks	0	-	0	-	0	-	0	-	0	-	10	-	0	-
Control	-	Post-thinning (8-19) weeks	182	-	134	-	601	-	112	-	1331	-	1116	-	504	-

<sup>1</sup>Pop = population

<sup>2</sup>Red = % of reduction

The statistical analysis were computed in between both pre-thinning values or post-thinning values.

**Table (4): Elucidates number of natural enemies post thinning with different periods after seed treatments At Gemmiza during 1999 season.**

Date	No. of associated predators after different periods from sowing (post-thinning)																				
	Coccl. undecimpunctata			S. syriacus			S. panctillum			P. affierii			Orlus sp.			True spider			Ch. carnea		
	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
Post thinning	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8 weeks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9 weeks	-	5	3	1	1	-	19	17	14	133	141	106	-	-	-	94	88	106	64	56	45
10 weeks	-	2	2	4	1	5	14	13	20	86	99	75	6	7	3	68	64	94	103	129	98
11 weeks	14	13	19	9	9	8	20	18	18	78	71	64	4	5	5	72	66	61	64	65	61
12 weeks	32	32	30	17	14	14	27	30	26	72	67	66	15	9	11	52	57	51	44	42	44
13 weeks	13	14	18	22	21	18	98	90	98	123	130	120	17	19	14	125	117	124	62	55	49
14 weeks	14	14	13	18	18	16	41	44	39	113	104	110	14	14	10	94	86	90	39	34	50
15 weeks	16	14	15	20	21	18	71	60	59	145	150	162	17	24	18	81	86	87	30	36	34
16 weeks	14	16	15	9	11	7	76	81	75	189	171	181	12	9	5	141	134	132	11	11	10
17 weeks	14	14	16	23	16	14	70	53	68	107	104	97	31	32	29	94	103	110	40	39	37
18 weeks	19	15	20	9	6	7	85	71	96	173	164	162	8	9	8	115	113	120	38	34	35
19 weeks	30	28	31	11	8	9	73	69	88	179	182	188	8	7	9	124	126	141	33	35	41
Total	166	167	182	134	126	134	594	546	601	1398	1383	1331	132	135	112	1060	1040	1116	528	536	504
% reduction	8.79 a	8.24 a	-	0	5.97 a	-	1.16 b	9.15 a	-	0	0	0	0	0	-	5.10	6.89	-	0	0	-

- 1) Gaucho 70% W.S at rate of 7 g/100 kg seeds.
- 2) Cruiser 70% W.S. at rate of 2 g/100 kg seeds.
- 3) Control.

Results showed that there is no significant effect on population density of

different predators in both treatment (Gaucho and Cruiser), pre-thinning and post thinning compared with untreated check throughout the scouting periods.

Finally, there are a great differences between treated and untreated plots in plant development that the use of the two chemicals as seed treatment improved the development of cotton plant and there were no any phytotoxicity on cotton plants.

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**كفاءة مركبات الجاوشو والكرويزر على المدى الطويل بمعاملة بذرة القطن على  
الثاقبة المصابة والاعداء الطبيعية المرتبطة بها  
عبد الله محمد حامد – سوزان احمد البسيونى – فائزة حسن شـرف –  
عبد السميع عبد المجيد قرقر  
معهد بحوث وقاية النباتات – مركز البحوث الزراعية – دقى ، جيزة**

اجريت التجربة لدراسة التأثير الابادى للمبيدات الجهازية الجاوشو والكرويزر على افات  
البادرات الثاقبة الماصة على نبات القطن وهى الترس والمن والذبابة البيضاء والجاسيد والعنكبوت  
الاحمر والاعداء الطبيعية وذلك تحت الظروف الحقلية وذلك بخلطهم مع البنور بمعدلات ٧ ، ٢  
جم/كيلوجرام بذرة على الترتيب.  
أوضحت النتائج المتحصل عليها ان كل من الجاوشو والكرويزر أعطيا أعلى تأثير  
لهما على الترس حيث اوضحا كفاءة سريعة واستمر التأثير لمدة ٧ أسابيع – وكانت نسبة الخفض  
للجاوشو والكرويزر ٩٠,٦٦ – ٨٧,٧٧% على الترتيب ، فى حين كان التأثير اقل على باقى  
الافات. كما أوضحت النتائج عدم وجود تأثير جوهري فى اعداد الاعداء الطبيعية. كما لوحظ ان  
هذه المركبات أعطت تكوين نباتى جيد.