PROTECTIVE POTENTIAL OF CERTAIN PESTICIDES TO GRAPES FROM HOUSE SPARROW, *PASSER DOMESTICUS NILOTICUS* ATTACK

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Abstract

This study was conducted during the restricted period which started from the middle of June of each of 2006 and 2007 at Belbeis district, Shakia Governorate to investigate the Protective Potential of certain Pesticides to grapes from house sparrow, *Passer domesticus niloticus* attack. Four chemical Pesticides namely, Bayfidan, Pyriban, Cidial L and Captan, were used. Two bird mechanical management means namely, nest destruction and Reflecting stripes were also tested.

Results showed that the tested pesticides at 0.5% and 1.0% concentration achieved quite protection for seedless grape against house sparrows compared to check treatment. The degree of protection was related to increasing the level of application. The high repellency effect against the house sparrow was occurred by Bayfidan and Captan during second season while the same results were realized by Bayfidan and Pyriban during first season. Also, the gained figures assured that Nest destruction and reflection strips gave a great protection against house sparrow. Reflection strips as bird scaring was preferable than nest destruction in protecting the seedless grape from the birds. The effect of two used concentrations (0.5% and 1.0%) of the four tested pesticides on grape fruits. The whole pesticides induced a considerable increase in rate of changing in weight and in both long (L) and short (S) diameter of berries grape during two seasons. In addition, Cidial L gave the highest rate of changing for each of soluble solids and acidity and the lowest figures was recorded in case of Bayfidan at 1.0% concentration.

INTRODUCTION

Grapes are the most widely distributed fruit crops. They are the most important fruits due to high production which give a great net income to growers.

Bird damage problem all over the world is of great concern, since the economic losses caused by birds reached more than 10% of losses in grape production in the world due to bird damage reached several millions of dollars annually (Dehaven *et al.* 1979). Egypt suffers from considerable production losses from flying vertebrates. However, controlling of birds is considered the most difficult operation because many birds are protected by international lows.

Bird repellent methods are safe for the environment and for non target and even target species. Their functions are usually based on the physical and chemical senses of target pests. Accordingly, these methods are classified into the following given groups, visual, acoustical, tactile, gustatory and olfactory repellents (smell) (Fitzwater, 1982). A good repellent method or material is the one that affects two or more of these senses. Therefore, application of pesticides to control of the noxious bird species (i.e. house sparrow, *Passer domesticus niloticus* and Spanish sparrow, Passer Spaniolensis) on vineyards was accompanied with improving the yield and quality of the fruits. These integrated bird management applied in vineyards was followed by improving productivity (Winkler, 1953, Winkler, 1965, Winkler *et al*, 1974 and ware, 1983). The aim of this manuscript is estimating the efficiency of some techniques which could play a good role in the integrated control of the bird specially at the vine yards in Egypt environment.

MATERIALS AND METHODS

Tested compounds:-

A- Bayfidan (25% Ec):-

Common name: - Triadimenol.

Chemical name: B- (4-chlor-phenoxy) and (1, 1 – dimethyl ethyl) 1-H- 1, 2, 4 traizole – 1- ethanol.

B- Pyriban (48% Ec):-

Common name:- Chloropyrifos.

Chemical name: 0, 0 – diethyl – 0- (3, 5, 6 trichloro – 2- Pyridyl) phosphorothioate.

C- Captan (50% W.P.):-

Common name:- Captan.

Chemical name: N- trichloro methylthio – 4- cyclohexene – 1, 2- dicarboxi mide.

D- Cidial – L (50% E.C.):-

Common name:- Phenthoate.

Chemical name: S – (&- ethoxy – carbonyl bonzyl) – 0, 0- dimethyl phosphor-odithioate.

The effectiveness of different bird management techniques and approaches were evaluated on fruit orchard (Thompson seedless grape) during the period from 2006 to 2007 years at Belbies district, Sharkia Governorate.

In Egypt, noxious bird species (i.e. house sparrow, *Passer domesticus niloticus* severely attack the different growth stages of Thompson seedless grape fruits. To

solve this problem the efficacy of some control techniques and approaches were evaluated against house sparrow. This was implemented in accordance to the vineyards protection index (PI) research programs under different agro-ecosystems.

1- Mechanical means:-

A- Nest destruction of house sparrow:-

Nests on randomly selected trees were monthly destroyed during the breeding seasons of each of 2005 and 2007 year using long plates with a large hook at the end. The destroyed nests were cleaned up and fired to prevent the birds from reusing the materials. Bird damage was assessed in the cultivated area treated trees and another one 4km. far from treated ones as a check control. Protection index (PI) was also calculated by the equation adopted Inglis and Isaacson (1987).

$$\textbf{Protection index (PI)} = \frac{A - B}{A} \times 100$$

Where A = mean damage percentage in the untreated area.

B = mean damage percentage in the treated area.

B- Reflecting stripes:-

Three tested field, each two feddans. At the experimental area, reflecting stripes, 11mm wide and 30m length with different colours were stretched and strung on 2m wooden poles against the wind direction at 5m intervals in parallel strands above the plants with 0.5m. one feddan was completely covered with 10 rollers of reflecting stripes. Another feddan was left without treatment as a control far at lest 500m from the treated ones (Conover and Dolbeen, 1989). Bird damage was assessed in the treated and untreated areas and protection index (PI) was calculated as mentioned before.

3-1- Chemical means:-

Repellency Effect of sprayed Pesticides:-

The trial was conducted under the conditions of vineyard fields to examine the repellency potential of Bayfidan, Pyriban, Captan and Cidial. Each investigated concentrations (0.5% and 0.1%) of the mentioned compounds formly were dissolved in water. These concentrations were applied once at the middle of June of 2006 and 2007 (about 6 weeks before harvesting time). Experimental plots of seedless grape were separated from each other by about 3 meters. Three replicates were used for each treatment. Spraying the pesticide was carried out by using a motorized knapsack sprayer. Bird damage assessment was carried out in treated and untreated area after 15 days from spraying. Damage percentage and protection index (PI) were calculated as mentioned before.

Physical and chemical characteristics of berries:-

Clusters were harvested in both seasons when the total soluble solids of the untreated berries reached about 16-17% according to Tourky *et al.* (1995). At harvest time (Last week of July) from each treatment, six samples each containing 50 berries were used for physical and chemical determinations such as average 50 berry weight (g), Rate of changing and berry dimensions (i.e. length (L) and short (S)) were calculated. In the Juice, the chemical aspects were determined i.e Total soluble solids, total acidity and total soluble solids / total acidity ratio according to the methods outlines by A.O.A.C. (1985).

All the obtained data were tabulated and subjected to proper statistical analysis according to Snedecor and Cochran (1967) using new L.S.D. test to differentiate the different between various treatment means.

RESULTS AND DISCUSSION

A-Effect of different means for protecting the seedless grape fruits from house sparrow attack:-

A-1-Chemical means:

Data in Table (1) revealed that birds caused noticeable damage for seedless grape. The percentages of mean damage were, 2.2, 2.05, 1.6 and 2.95% at 0.5% concentration of the comming compounds, Bayfidan, Pyriban, Cidial and Captan, respectively. Compared to, 0.51, 0.66, 1.1 and 1.75% at 1.0% an centration of the former compounds respectively. On the other hand, the tested pesticides at 0.5 and 1.0% concentrations achieved a considerable protection for seedless grape, i.e. (27.8% and 86.8%) and (85.2% and 94.2%) for Bayfidan, (53.7% and 57.9%) and (87.0% and 83.9%) for Byriban, (63.0% and 68.4%) and (70.4% and 84.2%) for Cidial L, (24.1% and 52.6%) and (42.6% and 89.5%) for Captan against house sparrow birds, *Passer domesticus niloticus* in seedless grape field during 2006 and 2007 seasons, respectively. The previous data proved that spraying pesticides at 1.0% gave the highest efficiency for protecting seedless grape during the two seasons compared with 0.5%. Also, it is evident that the high repellency effect against the house sparrow birds was occurred by Bayfidan and Captan during 2007 2^{nd} season, while the same results were realized by Bayfidan and Pyriban Both during 2006 1^{st} season. On the other hand, all tested pesticides exhibited different repellency effect under field conditions during the periods of the study. Finely the effectiveness of the tested pesticides differed according to the type of chemical concentration and density of birds. The results agree with those obtained by Flegler *et al.* (1987), El-Deeb (1990), Abd-El-All *et al.* (1995) and Abd-El-All *et al.* (2006).

A-2-Mechanical means:-

Destruction of nests and eggs has been suggested as a method of population reduction of bird species. The highest values of protection percentage was higher in second season, (52.6) than the first season (33.3%). In general the mean of protection percentage of the mechanical mean which was applied during the whole period of this work was 43%. Moreover, the results indicate that the effect of reflection strips method in repelling the house sparrow was higher in case of second season, 71.1% than the first season 64.8%. Meanwhile the mean protection of the two seasons was 68.0%. This may be due to the pressure of bird in field crops.

These findings are in agreement with that reported by Bruggers and Ruelle (1981), Bruggers *et al.* (1986) and Abd-El-All *et al.* (2006).

B- Effect of certain pesticides on some aspects of seedless grape:-

B-1- Physical aspects:-

The tabulated results in Table (2) show effect of two concentrations (0.5% and 1.0%) of the four tested pesticides on some physical aspects of grape fruits. The whole pesticides induced a quite increase in rate of changing in weight and in both long (L) and short (S) diameter of berries grape during two successive seasons. The obtained results showed that Bayfidan, Pyriban, Captan and Cidial L at 1.0% concentration in the two cases of rate of changing were more effective than 0.5% concentration. The maximum increase reached 1.74g and 1.68g and 1.25/0.71cm and 1.34/0.86cm when berries grapes treated with Captan at 1.0% concentration. While the minimum increase were 1.13g and 1.1g and 1.14/0.54cm and 1.08/0.46cm when grape fruits were treated with Cidial L at 0.5% concentration during the experimental periods.

In general, increasing in rate of changing in berries weight (g) and long and short diameter (L/S cm) was attributed to the applied pesticides in different values because of kind of pesticides or its used concentration. The obtained results are in accordance with those of Winkler (1953) and Winkler *et al.* (1974).

B-2- Chemical aspects:-

The gained results in Table (3) show effect of Bayfidan, Pyriban, Captan and Cidial L on rate of changing in each of total soluble solids and total acidity of seedless grape fruits. These figures cleared that the difference for the used concentrations (0.5% and 1.0%) for each pesticides was too slight for rate of changing of either soluble solids or acidity throughout two successive seasons.

Generally, the data proved that there is a positive link between soluble solids and acidity. Also, Cidial L gave the highest rate of changing for each of soluble solids and acidity (26.5% and 0.53%) and the lowest figures was recorded in case of Bayfidan (24.5% and 0.6%) at 1.0% concentration. These findings are confirmed with those reported by Weaver (1976) and Abd-El-All *et al.* (2006).

Table 1. Effect of chemical means as compared to mechanical means for protecting the seedless Grape fruits from house sparrow, *Passer domesticus* damage.

Control means	Pesticides	0.5%						1.0 %					
		1st seasons		2nd seasons		Damage mean %	Protection mean %	1st seasons		2nd seasons		Damage mean %	Protection mean %
		Damage %	Prot. %	Damage %	Prot. %			Damage %	Prot. %	Damage %	Prot. %		
Chemical means	Bayfidan 25% Ec	3.9	27.8	0.5	86.8	2.2	57.3	0.8	85.2	0.22	94.2	0.51	89.7
	Pyriban 48% Ec	2.5	53.7	1.6	57.9	2.05	55.8	0.7	87.0	0.61	83.9	0.66	85.5
	Cidial 50%	2.0	63.0	1.2	68.4	1.6	65.7	1.6	70.4	0.6	84.2	1.1	77.3
	Captan 50%	4.1	24.1	1.8	52.6	2.95	38.4	3.1	42.6	0.4	89.5	1.75	66.1
Mechanical means	Nest Destraction	3.6	33.3	1.8	52.6	2.7	43.0						
	Reflecting stripes	1.9	64.8	1.1	71.1	1.5	68						
	Control	5.4	-	3.8		4.6							

Table 2. Effect of certain pesticides on rate of changing in each of weight and length of two diameters of seedless Grape berries.

Treatment	Concentration %	1st season			2nd season			Average of two season	
		Average weight of 50 berry Grapes (g)	Rate of changing weight	L / S cm	Average weight of 50 berry Grapes (g)	Rate of changing weight	L / S cm	Average weight of 50 berry Grapes (g)	L / S cm
Bayfidan 25% Ec	0.5	105.9	1.27	1.36/0.67	91.9	1.12	1.1/0.47	98.9	1.23/0.57
	1.0	118.7	1.42	1.18/0.37	105.5	1.29	1.19/0.73	112.1	1.19/0.55
Pyriban 48% Ec	0.5	98.6	1.18	1.18/0.48	87.7	1.07	1.08/0.48	93.2	1.13/0.48
	1.0	116.7	1.40	1.3/0.84	101.5	1.24	1.32/0.84	109.1	1.31/0.84
Cidial 50%	0.5	109.4	1.31	1.37/0.78	92.4	1.13	1.07/0.44	100.9	1.22/0.61
	1.0	144.8	1.74	1.25/0.71	137.2	1.68	1.34/0.86	141.0	1.30/0.79
Captan 50%	0.5	94.2	1.13	1.14/0.54	90.4	1.1	1.08/0.46	92.3	1.11/0.5
	1.0	108.7	1.30	1.16/0.75	102.2	1.25	1.22/0.57	105.5	1.19/0.66
Control		83.3	1.0	1.01/0.5	81.7	1.0	1.05/0.38	82.5	1.03/0.44
LSD	0.5	15.3		0.11	17.6		0.20		
	1.0	6.3		0.38	14.0		0.08		

Table 3. Effect of certain pesticides on rate of changing in each of total soluble solids and total acidity of seedless grape fruits.

Pesticides	Concentration %	1st season				2nd season				Mean	
		Soluble solids		Acidity		Soluble solids		Acidity		Soluble solids %	Acidity %
		Total %	Rate of changing	Total %	Rate of changing	Total %	Rate of changing	Total %	Rate of changing		
Bayfidan 25% Ec	0.5	25.2	1.15	0.63	0.97	23.8	1.27	0.61	0.97	24.5	0.62
	1.0	25.2	1.15	0.61	0.94	23.8	1.27	0.59	0.94	24.5	0.6
Pyriban 48% Ec	0.5	25.2	1.15	0.62	0.95	23.8	1.27	0.58	0.92	24.5	0.6
	1.0	26.2	1.20	0.59	0.91	24.7	1.32	0.56	0.89	25.5	0.58
Cidial 50%	0.5	27.0	1.23	0.58	0.89	25.5	1.36	0.56	0.89	26.3	0.57
	1.0	28.3	1.29	0.56	0.86	26.2	1.40	0.54	0.86	27.3	0.55
Captan 50%	0.5	27.8	1.27	0.54	0.83	26.0	1.39	0.52	0.83	26.9	0.53
	1.0	27.0	1.23	0.53	0.82	25.9	1.39	0.52	0.83	26.5	0.53
Control		21.9	1.0	0.65	1.0	18.7	1.0	0.63	1.0	20.3	0.64
LSD	0.5	4.44		0.06		5.5		0.05			
	1.0	5.2		0.05		4.6		0.03			

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الكفاءة الوقائية لبعض مبيدات الآفات في حماية محصول العنب من عصفور النيل الدوري

فاطمة كامل خضر

قسم بحوث الحيوانات الضارة – معهد بحوث وقاية النباتات – مركز البحوث الزراعية – دقى – جيزة

أجريت هذه الدراسة في محافظة الشرقية بمركز بلبيس لقياس كفاءة أربعة مبيدات (باي فيدان، بيريبان، سيديال، كابتان) لحماية محصول العنب خلال موسمي ٢٠٠٦/٢٠٠٧ رشاً بتركيزين (٠,٥% ، ١%) كما أشتملت الدراسة علي كفاءة بعض الطرق الميكانيكية مثل هدم العشوش وإستخدام أشرطة الكاسيت ومقارنتها بكفاءة المبيدات المستخدمة.

وقد أوضحت النتائج أن إستخدام المبيدات المختبرة بتركيز ٠,٥% ، ١% أدي الي حماية عناقيد العنب من هجمات العصافير وذلك مقارنة بالمناطق التي لم ترش (الكونترول) وقد بينت النتائج أن درجة الحماية من هجوم العصافير ترتبط بزيادة التركيز المستخدم من كل مبيد حيث أشارت النتائج الي أن الباي فيدان أكبر فاعلية في طرد العصافير في موسمي الدراسة يليه البيريبان والسيديال بينما كان الكابتان أقلهم كفاءة في طرد العصافير خلال موسمي الدراسة وقد أظهرت النتائج أن إستخدام المبيدات السابق بتركيز ٠,٥% ، ١% علي محصول العنب أدي الي زيادة في معدل التغير في وزن الحبة وأبعاد الحبة (الطول – العرض) خلال موسمي الدراسة وقد أعطي مبيد السيديال أعلي معدل تغير في المواد الصلبة والحموضة بينما سجل مركب الباي فيدان أقل معدل تغير في الحبة وذلك عند تركيز ١%.

وقد أشارت النتائج ألي أن إستخدام الطرق الميكانيكية قد أدي الي حماية محصول العنب بنسبة أقل من مبيدات الآفات الطاردة المستخدمة وكانت أشرطة الكاسيت أكثر كفاءة من هدم العشوش في حماية المحصول.