

EFFECT OF TWO COMMERCIAL ENTOMOPATHOGENIC FUNGUS INSECTICIDES, *Beauveria bassiana* (BALS). APPLIED ALONE OR TOGETHER WITH NATURAL OIL ON WHITE FLY UNDER BEAN FIELD CONDITIONS

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ABSTRACT

The effect of two fungus insecticides, *Beauveria bassiana* (Bals.) Biosect and Biofar was evaluated at the rates of 200 gm; 100gm./100L. water against the white fly, *Bemisia tabaci* (Gennadius) (Homoptera: Aleyrodidae) at Etay-Elbaroad Agri. Res. Station El-Behera Governorate during 2001;2002 seasons. Obtained data revealed that the two fungus formulations Biosect and Biofar were effective against both immature and adult stages of white fly in the field. Reducing the two fungus formulations dose to the half resulted in reducing both immature and adult stage density of white fly in the field. Mixing the two fungus formulations at the previous doses with Soya bean natural oil Naturals at the dose 625 ml./100L. water increased the percent reduction of the immature and adult stages Population. Entomopathogens like Biosect and Biofar alone or in mixture with soya bean natural oil gave promising result in controlling both adult and immature stage of white fly and can be safely applied in I.P.M. program of white fly on vegetable plants.

INTRODUCTION

Phaseolus " *Phaseolus vulgaris*" (L.) is an economically Legume crop in many parts of the world. In Egypt phaseolus is a crop of great value for local human consumption and export. The seriousness of phaseolus plants infestation by the white fly is not only due to their direct feeding on the plant sap, but also due to the pests role in transmitting the leaf roll virus and mosaic which reduce the yield and grade of market ability in many instances. Moreover, plants growing from virus-infected become non-reproductive.

Integrated pest management (I.P.M.) through entomopathogenic fungi helps to put these pests below their economic threshold level, and also to keep the environment free from any hazards due to intensive application of chemical insecticides frequently used. Treifi, (1984) recorded that *Beauveria bassiana* caused mortality of the nymphs, amounting to 60.4% was significantly different from the control mortality at the relative humidity of 61-81% and 25-30 °C after that, Fransen, (1987) reported that the use of pathogens in biological control can be integrated with other natural enemies, even of the same host, and the immediate effect of an application of a microbial agent can protect the crop.

The present study aimed to throw more light and investigate the development and implementation of one of the integrated pest management programs Fungus *Beauveria bassiana* (Bals.) against white fly in Egypt.

MATERIALS AND METHODS

Entomopathogenic fungus *Beauveria bassiana* (Bals.) formulations were provided as two commercial insecticides as Biosect by Kafer El - Ziat Company and Biofar by Plant Protection Research Institute and applied in the field by 200 gm. and 100 gm. / 100 liter water .

An experimental area (One feddan) for each of the two above mentioned years (2001 and 2002) was cultivated with Phaseolus plant Giza 6 variety at Etay – El -Baroad Agri. Res. Station All treatments recived the agricultural recommended practices .The experimental area was devided into four replicate in randomized complete block design . The two tested formulaions were applied in the field using two rates (200 gm. and 100 gm./100 L. of water) , soy bean oil (Naturals) was applied alon and mixeing with the two entomopathogenic formulation in the rate of 625 ml. /100 L.of water, untreated control sprayed with water only , all tretments were replicated four times in randomized complete block design. Spraying was performed in the early morning using ground motor .The efficiacy against the adult stage was determined by counting early at morning the insect on the lower surface of 25 leaves from the upper ,medium and lower levels/plot in the field.The efficiacy against immature stages was tested by taking 300 randomized leaves/ treatment .These leaves were kept in a paper bag and were immediately examined by using a binocular microscope in the laboratory .Reduction of infestation evaluated according Henderson and Tilton (1955) analyzed according to the procedure of Steel and Torrie (1981) by using costat program which was run under dos or win. gx / Me computer system .

RESULTS AND DISCUSSION

The effect of two formulations of fungus *Beauveria bassiana* (Bals.) alone or mixture with natural oil "Naturals" at the rate 625 ml. /100 L.water against adult and immature stages of white fly on bean plants at the different dose 200 gm. and 100 gm. /100 L. water was evaluated at Etay El-Baroad Agri .Res .Station during 2001 and 2002 seasons. The obtained data tabulated in tables (1 , 2 , 3 , 4) : indicated that the two fungus formulations were effective against immature and adult stages when applied at 200 gm. and 100 gm./100 Liter water .The population reduction of the treated immature stage ranged from (60.3%-63.4%) while it was (64.0%-64.6%) for the adult stages . Reducing the dose of the two tested formulations to the half (100gm. /100 liter water) decreased the population reduction of treated immature stage of white fly to (48.2% - 44.9%) while recorded (56.4% -52.6%) for the adult stage .

Table (1) : Population of *Bemisia tabaci* immature stages under spray condition with two concentration of two commercial *Beauveria bassiana* spores formulations and their mixtures with soya bean oil ;under field condition during bean nili plantation of two successive years.

Treatment's	Rate/ 100 L. water	Before spraying	Season 2001			Season 2002			Mean of two seasons	
			After spraying			After spraying				
			2 days	5 days	7 days	2 days	5 days	7 days		
Biosect	1 200gm.	4632	2293	2253	3110	3878	1037	1360	2008	2010.2 bc
	2 100gm.	4526	3094	2737	3529	4028	1638	2010	2558	2594.3 ab
Biofar	1 200gm.	4546	2705	2450	3065	3815	733	971	1574	1916.3 bc
	2 100gm.	4863	3874	3184	3627	4244	1794	2353	2862	2949.0 a
Biosect+oil	1 200gm.+625ml	4326	1163	1445	2250	3289	351	596	794	1099.8 d
	2 100gm.+625ml	4117	2389	1983	2959	3535	1045	1260	1790	1904.3 bc
Biofar+oil	1 200gm.+625ml	4266	1167	1493	2277	3271	318	593	1023	1145.2 d
	2 100gm.+625ml	4102	2266	2256	3619	3706	1089	1451	2089	2128.3 bc
Natural oil	625 ml.	3025	1695	1907	2914	2972	1055	1373	1751	1782.5 cd
Check	water only	3186	5188	3899	4326	3757	3183	3478	3996	4011.7
L.S.D.		—	58.4	132.0	101.3	—	12.9	11.9	8.21	—

Table (2) : Population reduction of *Bemisia tabaci* immature stages treated with two concentration of two commercial *Beauveria bassiana* spores formulations and their mixtures with soya bean oil under field condition during bean nili plantation of two successive years .

Treatment's	Rate/100 L. water	Before spraying	Season 2001			Season 2002			Mean of Two seasons	
			% Reduction of <i>B. tabaci</i>			% Reduction of <i>B. tabaci</i>				
			2 days	5 days	7 days	2 days	5 days	7 days		
Biosect	1 200gm.	4632	69.8	60.1	50.3	3876	68.4	62.1	51.3	60.3 ab
	2 100gm.	4526	58.3	50.4	42.3	4028	52.0	46.1	40.3	48.2 b
Biofar	1 200gm.	4546	63.7	55.8	50.1	3815	77.3	72.5	61.2	63.4 ab
	2 100gm.	4863	51.4	46.3	44.8	4244	50.1	40.1	36.6	44.9 b
Biosect+oil	1 200gm.+625ml.	4326	83.6	72.6	61.5	3289	87.4	80.4	77.3	77.1 a
	2 100gm.+625ml.	4117	64.6	60.5	46.8	3535	65.1	61.5	52.4	58.5 ab
Biofar+oil	1 200gm.+625ml.	4266	83.3	71.3	60.5	3271	88.5	80.4	70.6	75.8 a
	2 100gm.+625ml.	4102	68.3	54.9	34.7	3706	65.3	57.7	47.0	54.3 b
Natural oil	625 ml.	3025	65.8	48.3	28.7	2972	58.1	50.1	44.6	49.3 b
Check	water only	3186	—	—	—	3757	—	—	—	—
L.S.D.		—	2.26	2.04	2.53	—	2.39	2.58	2.88	—

Table (3) : Population of *Bemisia tabaci* adult stage under spray conditions with two concentration of two commercial *Beauveria bassiana* spores formulations and their mixtures with soya bean oil ; under field condition during nili bean plantation of two successive years ...

Treatment's	Rate/ 100 liter water	Season 2001						Season 2002						Mean of two seasons
		Before sprayig	After spraying				Before sprayig	After spraying						
			1 day	3 days	5 days	7 days		1 day	3 days	5 days	7 days			
Biosect	1 200gm.	1566	365	624	568	811	1189	929	423	538	721	622.4 e		
	2 100gm.	1653	465	742	558	924	1280	332	546	860	1188	701.9 d		
Biofar	1 200gm.	1432	320	490	469	542	987	202	415	557	702	462.1 g		
	2 100gm.	1993	1002	1326	971	859	1426	388	608	947	1146	905.9 b		
Biosect + oil	1 200gm.+ 625ml.	1862	380	563	504	508	1185	299	378	535	714	485.1 fg		
	2 100gm.+ 625ml.	1743	909	1089	848	1128	1188	544	765	664	1120	880.6 bc		
Biofar+ oil	1 200gm.+ 625ml.	1832	215	596	597	774	1437	151	414	602	848	524.4 f		
	2 100gm.+ 625ml.	1862	1360	1735	1290	1369	1615	345	647	916	1217	1134.9 a		
Natural oil	825 ml.	1947	755	1033	807	930	1438	500	733	861	1165	850.5 c		
Check	water only	1994	2156	2645	1932	1896	1945	1784	2091	2210	2628	2167.8		
L.S.D.		—	26.9	28.8	49.9	28.7	—	8.81	10.5	11.0	7.46	—		

Table (4) : Population reduction of *Bemisia tabaci* adult stage treated with two concentration of Two commercial *Beauveria bassiana* spores formulations and their mixtures with soya bean oil ; under field condition during nili bean plantation of two successive years.

Treatment's	Rate/ 100 liter water	Season 2001						Season 2002						Mean of two seasons
		Before sprayig	% Reduction of <i>B. tabaci</i>				Before sprayig	% Reduction of <i>B. tabaci</i>						
			1 day	3 days	5 days	7 days		1 day	3 days	5 days	7 days			
Biosect	1 200gm.	1566	78.6	70.1	62.6	45.6	1189	72.6	66.9	60.2	55.1	64.0 a		
	2 100gm.	1653	74.1	66.3	65.2	41.3	1280	71.7	60.3	40.9	31.3	56.4 ab		
Biofar	1 200gm.	1432	79.4	74.3	66.2	60.2	987	77.7	60.9	50.3	47.4	64.6 a		
	2 100gm.	1993	53.7	50.1	49.8	54.7	1426	70.2	60.2	41.4	40.3	52.6 ab		
Biosect + oil	1 200gm.+ 625ml.	1862	81.2	77.3	72.1	71.4	1185	72.5	70.3	60.3	55.4	70.1 a		
	2 100gm.+ 625ml.	1743	52.0	54.0	50.0	32.0	1188	50.1	40.1	50.8	30.2	44.9 b		
Biofar+ oil	1 200gm.+ 625ml.	1832	89.2	75.6	66.4	55.6	1437	88.5	73.2	63.1	56.4	71.0 a		
	2 100gm.+ 625ml.	1862	32.6	30.1	28.6	22.8	1615	78.7	51.2	50.1	44.2	42.1 b		
Natural oil	825 ml.	1947	64.3	60.2	57.3	49.8	1438	62.1	52.6	46.1	40.0	54.1 ab		
Check	water only	1994	—	—	—	—	1945	—	—	—	—	—		
L.S.D.		—	2.22	2.36	2.40	2.56	—	3.10	4.07	3.17	3.27	—		

L.S.D. values in a column followed by the same letter are not significantly differences by (p = 0.05) to Duncan's (1955) .

Mixing the two recommended dose of the fungus formulations Biosect and Biofar with natural oil at the rate of 625 ml./100 liter water increased clearly the efficiency of the two fungus spore formulations . The population reduction of the treated immature stages increased to (75.8% -

77.1%) while it was (70.1%-71.0%) for the adult stage . while mixing the two fungus formulations Biosect and Biofar at the rate of 100 gm ./100 liter water with natural oil "Naturals" at the rate of 625 ml ./100 liter water decreased the efficiency of the two fungi spore formulation .The percent reduction of the treated immature stages with half dose mixed with oil increased to (54.3%-58.5%) compared with (42.1%-44.9%) for the adult stage .

It may be concluded that Entomopathogenic insecticides in combination with natural oil is a potential agent for controlling *B. tabaci* immature and adult stage wheres the effect of natural oil can be attributed to the suffocation effect result of preventing O² of entering the tracheal system ,also their ability to dissolve the outer layer of immature wax layer and adult stage which in sequence increase the water loss of their bodys. The efficiency of Entomopathogenic fungus *Beauveria bassiana* against white fly and aphid on vegetable plants in field were studed by several investigators : Sopp et al .(1989) ;Feng and Johenson (1990); Meade and Byrne (1991) ; Erkilic(1992) ; Miranpuri and Khachatourians (1993) and Zaki (1998) .

In other wise ,the naturally derived compounds ,Bio-pesticide applied alone or together with mineral oil against white fly under field condition decreased the population density of white fly .The effect of the vegetable oils was studied by several investigators, Price and Schuster (1990); Horowitz (1997); Liu et al.(2000) and Medeiros *et al.* (2001).

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التقييم الحقلى لبعض المبيدات الفطرية *Biosect ; Biofar* والمستخدان فى صورته منفردة أو مخلوطة مع زيت فول الصويا (ناتورالس) ضد الذبابة البيضاء *Bemisia tabaci* (Genn.) على نباتات الفاصوليا
حافظ إسماعيل حافظ عمر و سالم عبد السلام هادى
معهد بحوث وقاية النباتات ، مركز البحوث الزراعية ، الدقى ، الجيزة ، مصر

تناول البحث دراسة حقلية على الأطوار المختلفة للذبابة البيضاء التى تصيب نباتات الفاصوليا صنف جيزة ٦ وذلك باستخدام الفطر *Beauveria bassiana* تحت ظروف المعاملة بمبيدان تجاريان هما *Biosect ; Biofar* بالمعدلان ٢٠٠ جم ، ١٠٠ / جم / ١٠٠ لتر ماء خلال الموسم الزراعيان ٢٠٠١ ، ٢٠٠٢ م . وقد أوضحت نتائج الدراسة فى العمان المذكوران قدرة الفطر على خفض تعداد الحوريات و الحشرة الكاملة للذبابة البيضاء عند استخدام الجرعات الموصى بها (٢٠٠ جم / ١٠٠ لتر ماء) لكل من ال *Biosect , Biofar* بينما أدى تخفيض الجرعة إلى النصف لخفض الفاعلية للمركبان المستخدمان .

كما أوضحت التجارب أن خلط المبيدان التجاريان *Biosect , Biofar* بالجرعة ٢٠٠ جم مع ٦٢٥ مل / ١٠٠ لتر ماء من الزيت النباتى المستخلص من فول الصويا فى خفض تعداد الحوريات والحشرات الكاملة . بينما استخدام نصف الجرعة للمستحضران التجاريان أدى لخفض فاعليتهما فى مكافحة الحشرة .

هذا يوضح أهمية استخدام الفطر *Beauveria bassiana* فى صورة المركبان *Biosect , Biofar* كمعصر أمان فى مكافحة المتكاملة للذبابة البيضاء على نباتات الفاصوليا .