Available online at www.ijpab.com

DOI: http://dx.doi.org/10.18782/2320-7051.5635

ISSN: 2320 – 7051

Int. J. Pure App. Biosci. **5 (4):** 1112-1116 (2017)

International Journal of Pure & Applied Bioscience

Research Article

OPEN ACCESS

Efficacy of Entomopathogenic Fungi against Jassida on Okra

Ravi Palthiya[1*], R. V. Nakat[2] and S. Jadhav[2]

[1]Research Associate, KVK, Adilabad. Prof. JayashankarTelangana State Agricultural University. Hyderabad

[2]Department of Agrilcultural Entomology, M.P.K.V, Rahuri (413722), Maharsashtra, India

*Corresponding Author E-mail: ravipalthiya35@gmail.com

Received: 21.07.2017 | Revised: 29.07.2017 | Accepted: 30.07.2017

ABSTRACT

The field experiment was conducted during Kharif season of 2013 to study the Efficacy of Entomopathogenic fungi against Jassids on okra. During the course of present investigation, three entomopathogenic fungi were tested for their effect at various combinations with each other at same concentrations and compared with chemical insecticide dimethoate 30EC, with a view to find out most effective treatment (s) on Jassidson okra. The experiment was conducted at P.G. Research Farm of Agril. Entomology Department, Mahatma PhuleKrishiVidyapeeth, Rahuri. The influence of different biopesticides and their combinations on Jassidswas studied during the investigation. Thus, the results indicated that combination of entomopathogenic fungi as V. lecanii1.15 % WP + M. anisopliae1.15 % WP was the most effective treatment as compared to standard check dimethoate for suppression of jassids population on okra.

Key words: *Beauveriabassiana, Metarhiziumanisopliae, Verticilliumlecanii, Jassids, okra.*

INTRODUCTION

Okra (Bhendi) *Abelmoschus esculentus* (L.) Moench is one of the most important vegetable grown throughout the tropics and warmer parts of temperate zone. It is widely cultivated as a summer season crop in North India and Maharashtra. Okra is especially valued for its tender delicious fruits in different parts of country. Though it is mainly used as a fresh vegetable, it is also consumed as canned, dehydrated and frozen forms. Dry okra seeds contain 18 to 20 per cent oil, 20 to 23 per cent crude protein and good source of iodine[4]. It has good export potential accounting for 60 per cent of fresh vegetable[10]. Though okra finds its origin in Central Africa, India stands top in area and production. It is cultivated in an area of 5.8 lakh hectares with an annual production 63.50 lakh tones with a productivity of 12.0 Mt/ha [3]. In Maharashtra, okra cultivated in an area of 0.22 lakh hectares with an annual production 3.28 lakh tones/ha with a productivity of 14.90 Mt/ha [2]. The major okra growing states include Andhra Pradesh, Uttar Pradesh, Bihar, Orissa, Karnataka, Maharashtra and Assam[3].

One of the most important constraints in production of okra is insect pests. As high as 72 species of insects have been recorded on crop[11], among which, the sucking pest complex consisting of aphids (*Aphis gossypii* Glover), leafhopper (*Amrasca biguttula biguttula* Ishida), whitefly (*Bemisiatabacii*. Gennadius) and Thrips (*Thripstabaci Lindeman*) are major pest and causes 17.46 per cent yield loss in okra[9].

Cite this article: Palthiya, R., Nakat, R.V. and Jadhav, S., Efficacy of Entomopathogenic Fungi against Jassida on Okra, *Int. J. Pure App. Biosci.* **5(4):** 1112-1116 (2017). doi: http://dx.doi.org/10.18782/2320-7051.5635

To tackle the pest menace, a number of chemical insecticides are liberally sprayed on this vegetable crop which leads to several problems like toxic residues, elimination of natural enemies, environmental disharmony and development of resistance. The demand is ever increasing for organically produced agricultural commodities all round the world and biological control agents have vital role to reduce the pest damage.

Okra being a fresh vegetable that is harvested at regular interval, it is critical to evaluate safer alternatives like botanicals and mycopathogens which possess no residual toxicity, is best suited for vegetables like okra, where we use fresh vegetables for consumption. Earlier workers tested bio-efficacy of some of the indigenous materials against pests of okra[7] and Dhanalakshmi[5] and reported their effect in reducing the pest population. Very meager information is available on the effect of entomopathogenic fungi against okra Jassids. In this background, the present studies were carried out to evaluate the efficacy of entomopathogenic fungi against okra Jassids.

MATERIALS AND METHODS

The field trial was carried out at the experimental farm of Department of Agricultural Entomology, Post Graduate Institute, Mahatma Phule Krishi Vidhyapeeth, Rahuri, Dist. Ahmednagar, Maharashtra during *Kharif* 2013-14 on variety of okra Phule Utkarsha in a randomized block design with three replications. Treatments of *B. bassiana*1.15% WP @ 5 gm/lit, *M. anisopliae*1.15% WP @ 5 gm/lit and *V. lecanii* 1.15%WP @ 5 gm/lit and their combinations were tested in comparison with Dimethoate 30 EC 1.5ml/lit and untreated control (Table 1). Three sprays were imposed on need basis. Observations on jassids was recorded one day before and 5, 10 and 15 days after spraying, on five randomly selected plants covering three leaves, one each from top, middle and bottom portion of the plant. The data were obtained and analysed statistically suggested by Panse and Sukhatme[8].

RESULTS AND DISCUSSION

The data on the efficacy of various biopesticides treatments on reducing Jassids population after first, second and third spraying are furnished in table 1, 2 and 3, respectively. The pretreatment counts were made a day before spraying indicated that there was no significant difference among the treatments.

At average of first spray indicated that, all the treatments were found superior in suppressing the jassids population as compared to untreated control. The treatment dimethoate 30 EC was significantly superior over other treatment recorded 1.73 jassids/leaves/plant. The next promising treatment was combinations of *V. lecanii*1.15% WP + *M. anisopliae* 1.15%WP spray in controlling jassids with survival population of 2.49 jassids/leaves/plant which were at par with the treatment *B. bassiana*1.15 % WP + *M. anisopliae*1.15 %WP + *V. lecanii*1.15 % WP recorded 2.91 jassids/leaves/plant. It was followed by the treatment *M. anisopliae*1.15 % WP (3.27 jassids/leaves/plant). The next preformed treatments in order to their merits were *V. lecanii*1.15% WP (3.65 jassids/leaves/plant), *V. lecanii*1.15% WP + *B. bassiana*1.15 % WP (3.95 jassids/leaves/plant), *B. bassiana*1.15% WP + *M. anisopliae*1.15% WP (4.07 jassids/leaves/plant). The least significant treatment was *B. bassiana*1.15% WP recorded (4.45 jassids/leaves).respectively (Table 1)

At average second spray indicated that, all the treatments were found superior in suppressing the jassids population as compared to untreated control. The treatment dimethoate 30 EC was significantly superior over other treatment recorded 1.74 jassids/leaves/plant. The next promising treatment was combination of *V. lecanii*1.15% WP + *M. anisopliae*1.15%WPspray in controlling jassids with survival population 3.78 jassids/leaves/plant which were at par with the treatments *B. bassiana*1.15% WP + *M. anisopliae*1.15%WP + *V. lecanii*1.15 % WP recorded 4.05 jassids/leaves/plant. It was followed by the treatment of *M.*

*anisopliae*1.15%WP4.66 jassids/leaves/plant. The performing treatments in order to their merit were *V. lecanii*1.15% WP + *B. bassiana*1.15% WP (5.37 jassids/leaves/plant), *B. bassiana*1.15% WP + *M. anisopliae*1.15% WP (5.51 jassids/leaves/plant). The least significant treatment was *B. bassiana*1.15 % WP recorded 5.68 jassids/leaves/plant. Respectively (Table 2).

At average of third spray indicate that among entomopathogens, *V. lecanii*1.15 % WP + *M. anisopliae*1.15%WP recordedlowest population of jassids (2.71 jassids/ leaves/plant) and which was at par with the treatment *B. bassiana*1.15% WP + *M. anisopliae*1.15%WP + *V. lecanii* 1.15% WPrecorded (3.04 jassids/leaves/plant). It was followed by the treatment *M. anisopliae*1.15% WP (3.74 jassids/leaves/plant). The next best treatments *V. lecanii*1.15% WP (4.04 jassids/leaves/plant), *V. lecanii*1.15 % WP + *B.bassiana* 1.15% WP (4.43 jassids/ leaves/plant), *B. bassiana* 1.15% WP + *M. anisopliae* 1.15% WP (5.23 jassids/ leaves/plant) and *B. bassiana* 1.15% WP (5.44 jassids/ leaves/plant), respectively (Table 3).

The present findings are also in agreement with Virakthamath[12] *et al.*, they reported that the incidence of fungus, *V. lecanii*on the mango leaf hoppers *I. nitidulaus* and *I. nagpurensis* for the first time from Karnataka. The maximum number of dead leaf hoppers (35.3 + 9.94 leaf hoppers/ 20 shoots) due to fungal infection were found at the base of shoots and minimum number (12.7 + 5.99/20 leaves) on the leaves.

Similar results were obtained by Anita[1] and Girish[6], who reported that although *M. anisopliae, V. lecanii and B. bassiana*were effective in reducing the leaf hopper population.

Table 1: Efficacy of entomopathogenic fungi against jassids after first spray

Tr. No.	Treatments	Number of jassid nymphs/leaves/plant					
		Dosage	I Spray				
		Qty./lit.	DBS	5 DAS	10 DAS	15 DAS	Average
T1	*B. bassiana* 1.15% WP	5 gm/lit	5.99 (2.55)	4.92 (2.33)	3.93 (2.10)	4.81 (2.30)	4.55 (2.25)
T2	*M. anisopliae* 1.15% WP	5 gm/lit	6.68 (2.68)	3.36 (1.96)	2.45 (1.71)	4.00 (2.11)	3.27 (1.94)
T3	*V. lecanii* 1.15% WP	5 gm/lit	6.28 (2.60)	3.73 (2.04)	2.55 (1.80)	4.67 (2.27)	3.65 (2.04)
T4	*V. lecanii* + *M. anisopliae* 1.15% WP	5 gm/lit. each	5.36 (2.41)	2.55 (1.74)	2.18 (1.61)	2.73 (1.80)	2.49 (1.73)
T5	*B. bassiana* 1.15% WP +*M. anisopliae* 1.15 % WP	5 gm/lit. each	5.42 (2.43)	4.43 (2.22)	3.30 (1.94)	4.47 (2.22)	4.07 (2.13)
T6	*V. lecanii* 1.15% WP + *B. bassiana* 1.15% WP	5 gm/lit. each	5.95 (2.54)	4.41 (2.21)	3.17 (1.91)	4.26 (2.17)	3.95 (2.11)
T7	*B. bassiana* 1.15% WP + *M. anisopliae* 1.15% WP + *V. lecanii* 1.15% WP	5 gm/lit. each	6.35 (2.61)	3.05 (1.88)	2.48 (1.73)	3.19 (1.92)	2.91 (1.84)
T8	Dimethoate 30EC	1.5 ml/lit	6.35 (2.62)	(1.72) (1.49)	1.12 (1.27)	2.55 (1.74)	1.73 (1.49)
T9	Untreated control	-	6.54 (2.65)	7.64 (2.85)	8.15 (2.94)	9.01 (3.08)	8.27 (2.96)
	SE ±	-	0.08	0.08	0.06	0.10	0.07
	CD at 5%	-	NS	0.24	0.18	0.30	0.20
	CV %	-	15.67	8.08	9.41	8.90	5.56

Figures in the parentheses are ($\sqrt{x+0.5}$) transformations, DBS-Day before spraying & DAS-Days after spraying

Table 2: Efficacy of entomopathogenic fungi against jassids on okra after second spray

Tr. No.	Treatments	Number of jassid nymphs /leaves/plant				
		Dosage	II Spray			
		Qty./lit.	5 DAS	10 DAS	15 DAS	Average
T_1	*B. bassiana* 1.15% WP	5 gm/lit	6.00 (2.55)	5.01 (2.34)	6.05 (2.55)	5.68 (2.48)
T_2	*M. anisopliae* 1.15% WP	5 gm/lit	4.60 (2.26)	4.03 (2.13)	5.36 (2.43)	4.66 (2.28)
T_3	*V. lecanii* 1.15% WP	5 gm/lit	4.40 (2.19)	5.66 (2.48)	5.66 (2.48)	5.24 (2.39)
T_4	*V. lecanii* + *M. anisopliae* 1.15% WP	5 gm/lit. each	3.92 (2.09)	3.30 (1.93)	4.12 (2.14)	3.78 (2.06)
T_5	*B. bassiana* 1.15% WP +*M. anisopliae* 1.15 % WP	5 gm/lit. each	4.99 (2.33)	5.62 (2.47)	5.99 (2.54)	5.51 (2.45)
T_6	*V. lecanii* 1.15% WP + *B. bassiana* 1.15% WP	5 gm/lit. each	5.48 (2.44)	4.98 (2.34)	5.67 (2.48)	5.37 (2.42)
T_7	*B. bassiana* 1.15% WP + *M. anisopliae* 1.15% WP + *V. lecanii* 1.15% WP	5 gm/lit. each	4.10 (2.13)	3.53 (2.00)	4.50 (2.23)	4.05 (2.12)
T_8	Dimethoate 30EC	1.5 ml/lit	1.26 (1.32)	0.58 (1.03)	3.38 (1.97)	1.74 (1.49)
T_9	Untreated control	-	10.43 (3.30)	10.30 (3.28)	10.41 (3.30)	10.38 (3.30)
	SE ±	-	0.12	0.11	0.10	0.07
	CD at 5%	-	0.35	0.33	0.29	0.21
	CV %	-	12.70	13.14	14.81	5.96

Figures in the parentheses are ($\sqrt{x + 0.5}$) transformations, DBS-Day before spraying & DAS-Days after spraying

Table 3: Efficacy of entomopathogenic fungi against jassids on okra after third spray

Tr. No.	Treatments	Number of jassid nymphs /leaves/plant				
		Dosage	III Spray			
		Qty./ lit.	5 DAS	10 DAS	15 DAS	Average
T_1	*B. bassiana* 1.15% WP	5 gm/lit	5.12 (2.38)	4.94 (2.32)	5.73 (2.50)	5.44 (2.42)
T_2	*M. anisopliae* 1.15% WP	5 gm/lit	3.77 (2.06)	3.10 (1.90)	4.36 (2.18)	3.74 (2.07)
T_3	*V. lecanii* 1.15% WP	5 gm/lit	4.00 (2.11)	3.19 (1.91)	4.93 (2.32)	4.04 (2.13)
T_4	*V. lecanii* 1.15% WP + *M. anisopliae* 1.15% WP	5 gm/lit. each	3.01 (1.87)	2.29 (1.66)	2.89 (1.82)	2.71 (1.80)
T_5	*B. bassiana* 1.15% WP +*M. anisopliae* 1.15 % WP	5 gm/lit. each	5.09 (2.37)	4.00 (2.08)	5.44 (2.44)	5.23 (2.33)
T_6	*V. lecanii* 1.15% WP + *B. bassiana* 1.15% WP	5 gm/lit. each	4.75 (2.27)	3.80 (2.06)	4.81 (2.30)	4.43 (2.22)
T_7	*B. bassiana* 1.15% WP + *M. anisopliae* 1.15% WP + *V. lecanii* 1.15% WP	5 gm/lit. each	3.63 (2.03)	2.57 (1.74)	3.01 (1.86)	3.04 (1.88)
T_8	Dimethoate 30EC	1.5 ml/lit	0.90 (1.18)	0.27 (0.87)	1.35 (1.36)	0.84 (1.16)
T_9	Untreated control	-	8.85 (3.06)	8.99 (3.07)	7.18 (2.77)	8.34 (2.97)
	SE ±	-	0.10	0.14	0.12	0.06
	CD at 5%	-	0.30	0.38	0.36	0.24
	CV %	-	9.66	11.41	9.55	9.12

Figures in the parentheses are ($\sqrt{x + 0.5}$) transformations, DBS-Day before spraying & DAS-Days after spraying

CONCLUSIONS

Among the different entomopathogenic fungi treatments, the treatment *V. lecanii*1.15 % WP + *M. anisopliae*1.15 *%* WP was found to be the most effective treatment for suppression of jassids on okra.

REFERENCES

1. Anitha, K.R., Seasonal incidence and management of sucking pest of Okra. *M.Sc. (Agri.) Thesis*, Univ. Agric. Sci., Dharwad, Karnataka, India. (2007).
2. Anonymous, 2012. Nat. Hort. Board, Indi. Hort. Database. (2012).
3. Anonymous, 2013. Nat. Hort. Board, Indi. Hort. Database. (2013).
4. Barry, S.K., Kalra, C.L., Shegal, R.C., Kulkarni, S.G., Sukhvirkaur, Arora, S.K., and Sharma, B.R., Quality characteristics of seeds of five okra (*Abelmoschus esculentus* L.) cultivars. *J. Food Sci. and Technol*., 25: 303 305, (1988).
5. Dhanalakshmi, D.N., Studies on storability and utilization of indigenous materials on okra pests. *M.Sc.(Agri.) Thesis, Univ.* Agric. Sci., Dharwad,(India). (2006)
6. Girish, K.H.M., Studies on population dynamic and management of mango leafhoppers. *M.Sc. (Agri.) Thesis*, Univ. Agric. Sci., Dharwad, India. (2000).
7. Jayakumar, P., Bioefficacy of botanicals and bioagens on sucking pests of cotton. *Ann. Pl. Protec. Sci*., **14 (1):** 8-10, (2006).
8. Panse, V.G. and Sukhatme, P.V., Statistical methods for Agricultural Workers, Indian Council of Agricultural Research, New Delhi. 347 (1996).
9. Sarkar, P. K., Mukherjee, A. B. and Ghosh, J., Assessment of loss of bhendi against red spider mite. Environ. Ecol., **14 (2):** 480-481 (1996).
10. Sharman, B.R. and Arora, S.K., Advances in breeding of okra *Abelomoscus esculentus* (L.) in India. Proc. of Sixth Int. Cong., SABRAO. 285-288 (1993).
11. Srinivasa, R. and Rajendran, R., Joint action potential of neem with other plant extracts against the leaf hopper *Amrascadevastance* (Distant) on okra. Pest Mgt. and Econ. Zool., **10:** 131-136, (2003).
12. Virakthamath, S.A., Vastrad, A.S. and Lingappa, S., Incidence of the fungus *Verticilliumlecanii* (Zimm.) on mango leaf hoppers. *Karnataka* J. Agric. Sci., **7:** 242-243. (1994).