

Recommendation made by Department of Entomology for farmers:

Year 2020-21

1. Comparison of different colour sticky traps for monitoring of sucking pests in brinjal

The farmers of Gujarat are recommended to install yellow (RGB-255,255,0) or dark green (RGB-0,128,0) sticky traps (15 cm x 21 cm) @ 25/ha at crop height for the effective monitoring of jassid and whitefly in brinjal. The sticky trap is to be installed at at one week after transplanting and it should be changed at weekly interval. As adhesive material grease could be utilized.

2. Comparison of different colour sticky traps for monitoring of sucking pests in seed spices

The farmers of Gujarat growing seed spices are recommended to install yellow (RGB-255, 255, 0) or dark green (RGB-0, 128, 0) sticky traps (15 cm x 21 cm) @ 25 traps/ha at crop height for the effective monitoring of aphids in coriander, cumin, fenugreek and fennel, while dark blue (RGB-0, 0, 255) and yellow (RGB-255, 255, 0) sticky traps (15 cm x 21 cm) @ 25 traps/ha at crop height for the effective monitoring of thrips in cumin, fennel and ajwain. The sticky trap is to be installed at at one week after transplanting and it should be changed at weekly interval. As adhesive material grease could be utilized.

3. Bio-efficacy of different biopesticides against rugose spiralling whitefly in coconut

The farmers of Gujarat having coconut orchards are advised to apply three sprays of *Beauveria bassiana* 1.15 WP (Min. 1×10^8 cfu/g) 0.009% (80 g/10 litre of water) or *Isaria fumosorosea* 1.15 WP (Min. 1×10^8 cfu/g) 0.009% (80 g/10 litre of water) along with 1% (10g/lit) starch, first spray at initiation of pest infestation, second and third spray at 10 days interval after first spray for effective management of rugose spiralling whitefly.

Summary of Recommendation for Farmers

Year	Crop	Target	Pesticides with formulation	Dosage				Total Qty. of Chemical suspension required /ha	Application schedule	Waiting period/ PHI (days)
				g.a.i /ha	Qty. of formulation/ha	Conc. (%)	Dilution in water (10 lit.)			
2020-21	Coconut	Rugose Spiralling Whitefly	<i>Beauveria bassiana</i> 1.15 WP	46	4 kg	0.009%	80 g	500 litre	First spray at initiation of pest infestation, second and third spray at 10 days interval after first spray	-
			<i>Isaria fumosorosea</i> 1.15 or WP	46	4 kg	0.009%	80 g			-

4. Bio-efficacy of different insecticides against rugose spiralling whitefly in coconut

The farmers of Gujarat having coconut orchards (1 to 3 year old palms) are advised to apply three sprays of pyriproxyfen 10% + bifenthrin 10% EC 0.02% (10 ml/10 litre of water) or spiromesifen 22.9 SC 0.027% (12 ml/10 litre of water) or diafenthiuron 50 WP 0.05% (10 g/10 litre of water) along with 1% (10g/ litre of water) starch, first spray at initiation of pest infestation, second and

third spray at 10 days interval after first spray for effective management of rugose spiralling whitefly.

Summary of Recommendation for Farmers										
Year	Crop	Target	Pesticides with formulation	Dosage				Total Qty. of Chemical suspension required/ha	Application schedule	Waiting period/ PHI (days)
				g.a. i./ha	Qty. of formulation/ha	Conc. (%)	Dilution in water (10 lit.)			
2020-21	Coconut	Rugose Spiralling Whitefly	Pyriproxyfen 10% + Bifenthrin 10% EC	100	0.50 lit.	0.02	10 ml	500 lit.	First spray at initiation of pest infestation, second and third spray at 10 days interval after first spray	-
			Spiromesifen 22.9 SC	137	0.60 lit.	0.027	12 ml			-
			Diafenthiuron 50 WP	250	0.50 kg	0.05	10 g			-

5. Management of rugose spiralling whitefly through root feeding of insecticides in coconut

The farmers of Gujarat having coconut orchards (>5 year old palms) are advised to give root feeding (pencil size root) application of monocrotophos 36 SL @ 10 ml with 10 ml of water per palm, first at initiation of pest infestation and second at one month after first application for management of rugose spiralling whitefly.

Summary of Recommendation for Farmers										
Year	Crop	Target	Pesticides with formulation	Dosage				Total Qty. of Chemical suspension required/ha	Application schedule	Waiting period/ PHI (days)
				g.a. i./ha	Qty. of formulation/ha	Conc. (%)	Dilution in water (10 lit.)			
2020-21	Coconut	Rugose Spiralling Whitefly	Monocrotophos 36 SL	0.637	1.77 lit.	-	-	-	First root feeding at initiation of pest infestation, and second at 1 month	-

		tefl y							interval after first root feeding	
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6. Effect of different schedule based insecticides and biopesticides spray against fall army worm *Spodoptera frugiperda*(J. E. Smith) infesting maize

The farmers of Gujarat growing maize are advised to apply schedule spraying of chlorantraniliprole 18.5 SC 0.005% (3 ml/10 litre of water), emamectin benzoate 5 SG 0.0025% (5 g/10 litre of water) and thiodicarb 75 SP 0.09% (10 g/10 litre of water) at ten days interval after initiation of pest infestation for the effective management of fall armyworm in maize.

The farmers interested in organic maize are advised to apply schedule spraying of *Beauveria bassiana* 1.15 WP (1 x 10⁸cfu/g) 0.007 % (60 g/10 l of water), first at initiation of pest infestation and subsequent two sprays at 10 days interval for the effective management of fall armyworm in maize.

Summary of Recommendation for Farmers										
Year	Crop	Target	Pesticides with formulation	Dosage				Total Qty. of Chemical suspension required/ha	Application schedule	Waiting period/ PHI (days)
				g.a.i./ha	Qty. of formulation/ha	Conc. (%)	Dilution in water (10 lit.)			
2020-21	Maize	Fall armyworm	Chlorantraniliprole 18.5 SC	28	0.150 lit.	0.005%	3 ml	500 lit.	First spray at initiation of pest infestation, subsequent second and third at 10 day interval	-
			Emamectin benzoate 5 SG	13	0.250 kg	0.0025%	5 g			-
			Thiodicarb 75 SP	375	0.5 kg	0.09%	10 g			-
			<i>Beauveria bassiana</i> 1.15 WP (1 x 10 ⁸ cfu/g)	35	3.0 kg	0.007%	60 g			-

Year: 2021-22

1: Bio-efficacy of different biocides against aphid in coriander

The farmers of Saurashtra region growing coriander are recommended to spray JAU- isolate *Beauveria bassiana* 1.15 WP (1 x 10⁸ cfu/g) 0.009 % (80 g/10 lit. of water) or *Lecanicillium lecanii* 1.15 WP (1 x 10⁸ cfu/g) 0.009% (80 g/10 lit. of water), first at initiation of pest infestation and subsequent three sprays at 10 days interval for the effective and economical management of aphid in coriander.

સૌરાષ્ટ્ર વિસ્તારમાં ધાણાની ખેતી કરતા ખેડૂતોને ભલામણ કરવામાં આવે છે કે, મોલોના અસરકારક અને અર્થક્ષમ નિયંત્રણ માટે જૈએયુ- આઈસોલેટ બ્યુવેરીયા બાસીયાના ૧.૧૫% ડબલ્યુ. પી. (ન્યુનતમ ૧x૧૦^૮ સી.એફ.યુ./ગ્રા) ૦.૦૦૯% (૮૦ગ્રા/૧૦લી. પાણીમાં) અથવા લેકાનીસીલીયમ લેકાની ૧.૧૫ ડબલ્યુ. પી. (ન્યુનતમ ૧x૧૦^૮ સી.એફ.યુ./ગ્રા) ૦.૦૦૯% (૮૦ ગ્રા/૧૦લી. પાણીમાં), પ્રથમ છંટકાવ જીવાત દેખાય ત્યારે અને ત્યારબાદ બીજા ત્રણ છંટકાવ, પ્રથમ છંટકાવના ૧૦ દિવસના અંતરે કરવાની ભલામણ છે.

2: Bio-efficacy of *Beauveria bassiana* and different insecticides against insect pests of groundnut

The farmers of Saurashtra region growing *Kharif* groundnut are recommended to apply five sprays of bio-pesticide, JAU- isolate *Beauveria bassiana* 1.15 WP (1 x 10⁸cfu/g), 0.008 % (75 g/10 l of water) at 15 days interval after initiation of infestation of pest for the effective and economical management of sucking pests (Jassid, aphid and thrips) and leaf eating caterpillars (*H. armigera* and *S. litura*) in groundnut.

સૌરાષ્ટ્ર વિસ્તારમાં ચોમાસું મગફળીની ખેતી કરતા ખેડૂતોને ભલામણ કરવામાં આવે છે કે, ચુસીયા (તડતડીયા, મોલો અને થ્રીપ્સ) અને પાન ખાનારી (લીલી અને લશ્કરી ઈયળ) જીવાતોના અસરકારક અને અર્થક્ષમ નિયંત્રણ માટે જૈવિક જંતુનાશક, જૈએયુ- આઈસોલેટ બ્યુવેરીયા બાસીયાના ૧.૧૫% વે.પા. (ન્યુનતમ ૧x ૧૦^૮ સી.એફ.યુ./ગ્રા), ૦.૦૦૯% (૭૫ ગ્રા/૧૦લી. પાણીમાં) નો પ્રથમ છંટકાવ જીવાત દેખાય ત્યારે અને ત્યારબાદ બીજા ચાર છંટકાવ, પ્રથમ છંટકાવના ૧૫ દિવસના અંતરે કરવા.

Year: 2022-23

1. Bio-efficacy of different biocides against aphid in coriander

The farmers of Gujarat growing coriander are recommended to spray *Beauveria bassiana* 1.15 WP (Min. 1 x 10⁸ cfu/g) 0.007 % (60 g/10 l of water) or *Lecanicillium lecanii* 1.15 WP (Min. 1 x 10⁸ cfu/g) 0.009% (80 g/10 l of water), first at ETL and subsequent three sprays at 10 days interval for effective and economical management of aphid.

2. Bio-efficacy of *Beauveria bassiana* and different insecticides against insect pests of groundnut

The farmers of Gujarat growing *kharif* groundnut are recommended to apply five sprays of bio-pesticide, *Beauveria bassiana* 1.15 WP (Min. 1 x 10⁸ cfu/g), 0.007 % (60 g/10 l of water) at 15 days interval after initiation of any pest infestation for effective and economical management of sucking pests (jassid, aphid and thrips) and leaf eating caterpillars (*H. armigera* and *S. litura*).

3. Bio-efficacy of insecticides against leaf eating caterpillar, *Spodoptera litura* Fab. infesting soybean

The farmers of Gujarat growing soybean are recommended to spray spinetoram 11.70 SC, 0.011% (9 ml/10 l of water) or emamectin benzoate 1.9 EC, 0.002% (8.5 ml/10 l of water), first at the initiation of pest infestation and second spray at 15 days after first spray, for effective and economical management of leaf eating caterpillar.

Year: 2023-24

1. Bio-efficacy of insecticides against leaf eating caterpillar, *Spodoptera litura* fab. Infesting soybean

The farmers of Gujarat growing soybean are recommended to spray spinetoram 11.70 SC, 0.011% (9 ml/10 l of water) or emamectin benzoate 1.9 EC, 0.002% (8.5 ml/10 l of water), first at the initiation of pest infestation and second spray at 15 days after first spray, for effective and economical management of leaf eating caterpillar.

2. Effect of different poison baits against fall army worm *Spodoptera frugiperda* (J. E. Smith) infesting maize

The farmers of Gujarat growing maize are recommended to apply poison baits of thiodicarb 75 WP 250 g or emamectin benzoate 5 SG 100 g mixed with 5 kg jaggery and 25 kg maize flour in 8 litre of water/ha in whorl of plants, first at the initiation of pest infestation and second application at 20 days after first application for effective management of fall armyworm.

3. Standardization of number of pheromone traps for management of mango fruit fly, *Bactrocera dorsalis* (Hendel)

The farmers of south Saurashtra having mango orchards are recommended to install 30 methyl eugenol parapheromone traps per hectare at pea sized fruit stage and three meter height from ground level for effective management of fruit fly and the lure to be changed three times at an interval of 40 days

Year: 2024-25

1. Standardization of number of pheromone traps for shoot and fruit borer, *Leucinodes orbonalis* (Guenée) in brinjal

Farmers of Gujarat growing brinjal are recommended to install 40 sex pheromone traps per hectare (equal distance between each trap) after 15 days of transplanting for effective management of brinjal shoot and fruit borer and the lure to be changed three times at an interval of 40 days.

2. Effect of different sequence based insecticidal spray against shoot and fruit borer, *Leucinodes orbonalis* (Guenée) in brinjal

Farmers of Gujarat growing brinjal are recommended to apply sequencebased spraying of emamectin benzoate 5 SG 0.002% (4 g /10 L water), chlorpyrifos 20 EC 0.04% (20 ml/10 L water), azadirachtin 1.0 EC 0.002% (20 ml/10 L water) and chlorantraniliprole 18.5 SC 0.007% (4 ml/10 L water) at 15 days interval after pest crosses ETL (5% fruit damage) for the effective management of brinjal shoot and fruit borer. A minimum pre-harvest interval (PHI) of 3 days for emamectin benzoate 5 SG 0.002%, azadirachtin 1.0 EC 0.002% and chlorantraniliprole 18.5 SC 0.007% should be kept.

3. Standardization of operational procedures for application of biopesticides through drone against defoliators in groundnut

Farmers of Gujarat growing groundnut are recommended to apply three sprays of *Beauveria bassiana* 1.15 WP (Min. 1×10^8 cfu/g) @ 3 kg/ha. in 20 L water through drone at a speed of 2 m/sec. and 2 m above crop canopy during morning or evening time in windward direction, first spray at initiation of pest and second spray at 10 days after first spray for effective, economical and time saving management of *Helicoverpa armigera* and *Spodoptera litura*.