SCIENTIFIC INFORMATION

(SINCE 2004)

Sr. No.	Title of research information	Year
1.	**Study on biodiversity of insect fauna through light traps** Among the different types of light used in the light trap, visible and ultra violet lights found more effective and efficient to monitor the insects under field conditions. The coleopterans and dipterans insects were maximum in ultraviolet light, while hemipteran and hymenopteran insects in visible light.	2015
2.	**Screening of Brassica species against aphid** The genotypes RAYAD 9602, NRCM 120, NRCM 353 (*Brassica juncea*) and PUSA SWARNIM (*B. carinata*) found highly resistant to aphid, *Lipaphis erysimi* Kalt. under field condition.	2015
3.	**Bio-efficacy of different insecticides against anar butterfly, *Virachola isocrates* (Fabricius) infesting pomegranate** Two sprays of flubendiamide 39.35 SC 0.015 per cent (3 ml/10 litre of water) or chlorantraniliprole 18.5 SC 0.006 per cent (3 ml/10 litre of water) or emamectin benzoate 5 SG 0.0025 per cent (5 g/10 litre of water) first at initiation of the pest and second at 30 days after first spray proved effective for the control of anar butterfly, *Virachola isocrates* (Fabricius) infesting pomegranate in *mrugbahar*.	2016
4.	**Bio-efficacy of newer insecticides against *Spodoptera litura* (Fabricius) infesting castor** For effective and economical management of leaf eating caterpillar, *Spodoptera litura* (Fabricius) in castor, spray any one of the following insecticides at initiation of pest. 1. Emamectin benzoate 5 SG, 0.002 %, 4 g/10 L of water 2. Chlorantraniliprole 18.5 SC, 0.006 %, 3 ml/10 L of water 3. Spinosad 45 SC 0.009 %, 2 ml/10 L of water	2018
5.	**Evaluation of root dip treatment and foliar spray of insecticides against aphid infesting gaillardia (var. Lorenziana)**	2018

	Dipping the roots of gaillardia for two hours in the solution of thiamethoxam 25 WG, 0.0125 % (5 g/10 L of water) coupled with foliar spray of dimethoate 30 EC, 0.03 %, (10 ml/l0 L of water) at initiation of aphid and second spray after 15 days of first spray give effective and economical control of the pest.	
6.	**Bio-efficacy of different insecticides against capsule borer, *Dichocrosis punctiferalis* Guenee infesting castor** For effective and economical control of capsule borer in castor, spray any one of the following insecticides at initiation of the pest damage and second at 15 days of the first spray. 1. Chlorantraniliprole 20 SC, 0.006 %, 3 ml /10 L of water 2. Flubendiamide 48 SC, 0.015 %, 3 ml /10 L of water 3. Indoxacarb 15.8 EC, 0.0079 %, 5 ml /10 L of water 4. Emamectin benzoate 5 SG, 0.0025 %, 5 g/10 L of water	2018
7.	**Bio-efficacy of insecticides against aphid in cumin** For effective and economical control of cumin aphid, spray any one of the following insecticides, first spray at initiation of aphid and if required, second spray at 15 days after first spray. 1. Flonicamid 50 WG, 0.015 %, 3 g/ 10 L of water 2. Clothianidin 50 WDG, 0.02 %, 4 g/ 10 L of water 3. Carbosulfan 25 EC, 0.04 %, 16 ml/ 10 L of water 4. Thiacloprid 24 SC, 0.024 %, 10 ml/ 10 L of water	2018
8.	**Bio-efficacy of insecticides against thrips, *Scirtothrips dorsalis* Hood in pomegranate** Application of spinosad 45 SC, 0.01% (2.20 ml/10 litre water, 100 g a.i./ha) or *buprofezin 15% + acephate 35% (50 WP), 0.063% (12.5 g/10 litre water, 625 g a.i./ha) when thrips population attain 5 thrips/10 cm shoot and second after 15 days for effective control of thrips in maize. **Note**: *Banned with effect from 31.01.2020	2020
9.	**Evaluation of insecticides against leaf eating caterpillar in drumstick** Chlorantraniliprole 18.5% SC, 0.006% (3.00 ml/10 litre water, 30 g a.i./ha) or emamectin benzoate 5% SG, 0.0019% (3.80 g/10 litre water,	2020

	9.50 g a.i./ha), first at appearance of pest and second after 15 days proved effective against drumstick leaf eating caterpillar.	
10.	**Efficacy of granular insecticides against fall armyworm, *Spodoptera frugiperda* (J. E. Smith) in maize** Whorl application of fipronil 0.6% GR, 20 kg/ha (120 g a.i./ha) first at appearance of pest and second after 15 days for effective control of fall armyworm, *Spodoptera frugiperda* in maize.	2020
11.	**Evaluation of bio-pesticides against fall armyworm, *Spodoptera frugiperda* (J. E. Smith) in maize** Application of *Nomuraea rileyi* 1% WP (2 x 10^8 cfu/g) @ 40 g/10 litre water first at initiation of pest and subsequent two sprays at 10 days interval for effective and economical control of fall armyworm, *Spodoptera frugiperda* infesting maize.	2020
12.	**Bio-efficacy of organic inputs against aphid in fennel** Application of two sprays either of *Lecanicillium lecanii* 1.15% WP (1 x 109 cfu/g) 40 g or *Metarhizium anisopliae* 1.15% WP (1 x 109 cfu/g) 40 g per 10 litre of water along with sticker 0.1% (10 ml/ 10 litre of water) first at starting of colony formation of aphid and second at fifteen days after the first spray was found effective for the management of aphid infesting fennel.	2023
13.	**Evaluation of various insecticides as lure toxicants for fruit fly in mango orchard** To prepare fruit fly traps using plywood block (5 x 5 x 1.2 cm) impregnating with ethyl alcohol: methyl eugenol: malathion 50 EC (6:4:1) (v/v) or ethyl alcohol: methyl eugenol: spinosad 45 SC (6:4:1) (v/v) and install at 30 meter apart to each other one feet below the crop canopy at flowering stage for trapping maximum male fruit flies in mango orchard.	2024
14.	**Evaluation of various insecticides as lure toxicants for fruit fly in bitter gourd** To prepare fruit fly traps using plywood block (5 x 5 x 1.2 cm) impregnated with in Ethyl alcohol: Cue-lure: Malathion 50 EC (6:4:1) (v/v) and install at 30 meter apart to each other one feet below pendal at flowering stage for trapping maximum male fruit flies in bittergourd	2024

	orchard (Cucurbetaceae vegetables) in-case of unavailability of malathion 50 EC, use spinetoram 11.7 SC for trap preparation.	
15.	**Evaluation of bio-pesticides against invasive thrips, *Thrips parvispinus* (Karny) infesting chilli** Application of neem cake @ 250 kg/ha during soil preparation followed by sequential one spray of following bio-pesticides at 7 days interval starting from initiation of pests found effective against black thrips *Thrips parvispinus* in chilli. 1. *Pseudomonas fluorescens* 1% WP (2×10^8 cfu/g) 40 g /10 litre of water 2. *Metarhizium anisopliae* 1.15% WP (1×10^9 cfu/g) 40 g /10 litre of water 3. Aqueous bidi tobacco dust extract 2 %, 200 g/ 10 litre of water 4. *Pseudomonas fluorescens* 1% WP (2×10^8 cfu/g) 40 g /10 litre of water 5. *Metarhizium anisopliae* 1.15% WP (1×10^9 cfu/g) 40 g /10 litre of water 6. Aqueous bidi tobacco dust extract 2 %, 200 g/ 10 litre of water OR Application of neem cake @ 250 kg/ha during soil preparation followed by sequential one spray of following bio-pesticides at 7 days interval starting from initiation of pests found effective against black thrips *Thrips parvispinus* in chilli. 1. Neem Seed Kernel Extract 5%, 500 g/ 10 litre of water 2. Azadirachtin 10000 ppm, 0.003%, 30 ml/ 10 litre of water 3. Aqueous bidi tobacco dust extract 2 %, 200 g/ 10 litre of water 4. Neem Seed Kernel Extract 5%, 500 g/ 10 litre of water 5. Azadirachtin 10000 ppm, 0.003%, 30 ml/ 10 litre of water 6. Aqueous bidi tobacco dust extract 2 %, 200 g/ 10 litre of water	2024

RESEARCH RECOMMENDATIONS FOR FARMING COMMUNITY

(SINCE 2004)

Sr. No.	Title of Recommendation	Year
1.	**Evaluation of the Integrated Management strategy for *Helicoverpa armigera* (Hubner) Hardwick** From the view point of safety to environment and natural enemies, following eco-friendly IPM module is recommended for the control of pod borer, (*Helicoverpa armigera* (Hubner) Hardwick. Hand pick in chickpea (var. ICCC 4) cultivated in Middle Gujarat, it is found comparatively safer to natural enemies and also found cost effective (ICBR 1:13.03). a) Installation of T-shaped perches @ 100/ha to attract the predatory birds at two weeks after germination. b) Spray of neem based formulation 1% EC (Azadirachtin 10,000 ppm) @ 5 ml in 10 liter water (Azadirachtin 0.0005%) on appearance of first instar larvae.	2005
2.	**Evaluation of effective dose and source of Azadirachtin against mango hopper, *Amritodus atkinsoni*** The mango growers of middle Gujarat who want to use neem-based formulations are advised to spray azadirachtin based EC formulation at 0.0018 per cent or neem seed kernel extract at 5 per cent or neem oil at 0.5 per cent for the management of mango hopper.	2006
3.	**IPM for fruit and shoot borer in brinjal** In order to reduce load of pesticides in the environment and to conserve natural enemy *Trathela flavo-orbotalis* following eco-friendly IPM strategy has been recommended to the farmers of middle Gujarat and south Saurashtra region for the management of fruit and shoot borer, *Leucinodes orbonalis* in brinjal crop: **1)** Removal of previous year brinjal crop residue from farm before planting **2)** Prompt cutting and disposal of damaged shoots.	2007

	3) Installation of pheromone-baited traps @ 40 / ha throughout the field once at flowering starts. The trap should be installed in such a way that the lure remains 1 feet above canopy level. The lure should be changed at least at monthly interval.	
4.	**Control of mango leaf weber** One spray application of dichlorvos @ 0.05 % or chlorpyriphos @ 0.04 % is recommended to the farmers of middle Gujarat for the control of mango leaf weber. The spray application covering the whole canopy of the tree should be made at the initiation of tent formation usually in the month of August – September. The costs of application for one spray of above insecticides are Rs. 4 and 11 per tree, respectively.	2007
5.	**Fruit fly in small gourd** In Middle Gujarat Agro-climatic Zone, *Bactrocera cucurbitae* and *Dacus ciliatus* are only species of fruit fly damaging small gourd. Therefore, the farmers of middle Gujarat are advised not to use methyl eugenol for the control of *Bactrocera cucurbitae* and *Dacus ciliatus*. For effective and economical management of above mentioned fruit flies following strategy is recommended. Installation of Cue-lure impregnated wood blocks @ 16/ha at the initiation of the fruiting followed by spot application of poison bait made by mixing of Jaggary at 5% and **Fenthion at 0.1%** in water (500 g Jaggary + 10 ml of Fenthion 85EC in 10 liter of water) @8 liters/ha in the form of coarse droplets undersides the foliage at weekly interval. The spots should be spaced at 7 m x 7 m distance. The traps should be placed or hung at the border of the pendal and just 1 foot below the foliage or vines. (CBR 1:17.46). **OR** Spot application of poison bait made by mixing Jaggary at 5% and Fenthion at 0.1% in water (500 g Jaggary + 10 ml of Fenthion 85EC in 10 liter of water) @8 liters/ha in the form of coarse droplets undersides the foliage at weekly interval starting from initiation of fruits. The spots should be spaced at 7 m x 7 m distance (ICBR 1:12.79). **OR**	2008

	Installation of cue lure impregnated wood block trap @ 16/ha at equal distance. The traps should be placed or hung at the border of the pendal and just 1 foot below the foliage or vines (ICBR 1:7.45). If fenthion is not available, **dichlorvos** 76% @ 5 ml/10 litres should be used.	
6.	**Fruit fly in bitter gourd** The farmers of middle Gujarat are advised to execute male annihilation technique using Cue-lure impregnated wood blocks @ 10/ha OR bait application technique using 3% protein hydrolysate poison bait as wide area/village level control of fruit fly in bitter gourd. If protein hydrolysate is not easily available, jaggary 3% bait can be used.	2008
7.	**Control of cotton mealy bug** The cotton growers are advised to apply methyl parathion 2% dust on the soil @ 25 kg ha^{-1} one month after germination followed by spray application of profenophos 50 EC 0.1% (20 ml in 10 litre water) OR carbaryl 50 WP 0.2% (40 g in 10 litre) OR triazophos 40EC 0.1% (25 ml in 10 litre) OR methyl-o-demeton 25 EC 0.05% (20 ml in 10 litre) at appearance of mealy bug (*Phenacoccus solenopsis*) infestation in the field for its effective control. Add detergent powder @ 10 g in 10 litres of spray fluid.	2009
8.	**Standardization of number of pheromone traps for mass trapping of *Helicoverpa armigera* (Hubner) Hardwick in chickpea** The farmers of middle Gujarat growing chickpea are advised to install pheromone traps with *Helicoverpa armigera* lures @ 40 traps ha^{-1} for effective and economical management of pod borer (*H. armigera*). The traps should be installed one month after sowing and at one feet height above the crop canopy covering the whole field uniformly. The lure should be changed after every 3 weeks.	2009
9.	**Standardization of number of pheromone traps for mass trapping *Earias vittella* Fabricius in okra** The farmers of middle Gujarat growing okra are advised to install pheromone traps with *Earias vittella* lures @ 60 traps ha^{-1} for effective and economical management of shoot and fruit borer, *E. vittella*. The traps should be installed 3 weeks after germination and at one feet height above	2009

	the crop canopy covering the whole field uniformly. The lure should be changed after every 3 weeks.	
10.	**Bio-efficacy of neem based formulation against aonla leaf roller, *Gracillaria acidula*** The aonla growers are advised to apply one spray of neem oil 0.5% (50 ml neem oil + 10 g detergent powder in 10 litres of water) at the appearance of leaf roller, *Gracillaria acidula* for its effective and economical suppression.	2010
11.	**Field evaluation of bio-efficacy of insecticides against aonla aphid, *Cerciaphis emblica*** The aonla growers are advised to apply one spray of imidacloprid 0.005% (3 ml of imidacloprid 17.8 SL in 10 litres of water) at the appearance of aphid, *Cerciaphis emblica* for its effective and economical suppression.	2010
12.	**Evaluation of IPM module for the management of sucking pests in *Bt* cotton** Following IPM module found cost effective and safer to the natural enemies is recommended for the management of aphid, jassid, whitefly and thrips in *Bt* cotton (BG II) cultivated in middle Gujarat. **a)** One need based (5 aphids or leafhoppers or whiteflies/leaf) application of *Beauveria bassiana* (2 x 10^8 cfu/g) @ 40 g/10 litre water followed by need based application of thiamethoxam 25 WG 0.01% (4 g/10 litre water) (50 g a.i./ha). **b)** Need based (5 thrips/ leaf) application of acephate 75 SP 0.075% (1 g/ litre water) (375 g a.i./ha). **c)** The waiting period of thiamethoxam 25 WG 0.01% (50 g a.i./ha) and acephate 75 SP 0.075% (375 g a.i./ha) should be maintained 21 and 15 days after application, respectively.	2012
13.	**Evaluation-cum-demonstration of management strategies for the control of fruit flies (*Bactrocera cucurbitae* and *Dacus ciliatus*) in bitter gourd orchard** Bitter gourd growers of middle Gujarat are advised to install pheromone traps with Cue-lure impregnated wood blocks @ 16/ha at the initiation of the flowering followed by spot application of poisoned bait made by mixing of 400 g Jaggary + 8 ml of dichlorvos 76 EC in 10 litres of water at	2012

	fortnightly (15 days) interval. The spots should be spaced at 7 × 7m distance. The bait should also be applied on border/field boundaries.	
14.	**Management of mustard aphid** Farmers of middle Gujarat growing mustard are advised to spray any of the following insecticides twice, first at 1.5 aphid index and second after 15 days. **1.**Dimethoate 30 EC @ 0.03% (10 ml/ 10 litre of water) [150 g a.i./ ha] **2.** Imidacloprid 70 WG @ 0.014% (2 g/ 10 litre of water) [70 g a.i./ ha] **3.** Thiamethoxam 25 WG @ 0.01% (4 g/ 10 litre of water) [50 g a.i./ ha] The pre-harvest interval of 30 days is recommended for imidacloprid and thiamethoxam. As per CIB recommendation, dimethoate is safe at harvest from residue point of view.	2013
15.	**Management of sucking pests in *Bt* cotton** The farmers of middle Gujarat growing *Bt* cotton are advised to spray any of the following insecticides on initiation of sucking pests (aphid, leafhopper, whitefly and thrips) and subsequently two sprays at 15 days interval. **1)** Imidacloprid 17.8 SL @ 0.009 % (5 ml/ 10 litre of water) (44.5 g a.i./ha) **2)** Diafenthiuron 50 WP @ 0.05% (10 g/ 10 litre of water) (250 g a.i./ha) The pre-harvest interval of 30 days is recommended for imidacloprid and diafenthiuron.	2013
16.	**Management of pod borer in black gram** The farmers of middle Gujarat growing black gram are advised to spray emamectin benzoate 5 WG @ 0.0025 % (5 g/ 10 litre of water; 7.5 g a.i./ha) or flubendiamide 480 SC @ 0.01% (2 ml/10 litre of water; 28.8 g a.i./ha) at the initiation of pest incidence for the control of pod borers. The pre-harvest interval of 20 and 11 days is recommended for emamectin benzoate and flubendiamide, respectively.	2013
17.	**Management of termite through seed treatment in wheat** The farmers of middle Gujarat growing wheat are advised to treat the seeds before 12 hours of sowing with any one of the following insecticides for the control of termite. **1)** Chlorpyriphos 20 EC @ 4 ml in 50 ml water /kg seed (0.8 g a.i./ kg seed)	2013

	2) Fipronil 5 SC @ 5 ml in 50 ml water /kg seed (0.025 g a.i./ kg seed)	
18.	**Control of mango hoppers** The farmers of middle Gujarat are advised to spray any one of the following insecticides at 5 nymphs per inflorescence. 1) Imidacloprid 17.8 SL @ 0.009 % (5 ml/ 10 litre of water) 2) Acetamiprid 20 SP @ 0.01% (5 g /10 litre of water) 3) Thiamethoxam 25 WG @ 0.0125% (5 g /10 litre of water) The pre-harvest interval of 45 days is recommended for imidacloprid, acetamiprid and thiamethoxam.	2013
19.	**Bio-efficacy of some insecticides against Bihar hairy caterpillar, *Spilosoma oblique* Walker on cowpea, *Vigna unguiculata* (Linnaeus) Walpers** For effective and economical control of Bihar hairy caterpillar, *Spilosoma obliqua* Walker in cowpea, farmers of middle Gujarat are recommended to apply one spray of any one of the following insecticides at the initiation of the pest. 1. Thiodicarb 75 WP, 0.15% (20 g/10 litre of water) 2. Indoxacarb 15.8 EC, 0.0158% (10 ml/10 litre of water) 3. Emamectin benzoate 5 SG, 0.0025% (5 g/10 litre of water)	2017
20.	**Integrated management of termite in wheat** The farmers of middle Gujarat growing irrigated wheat are recommended to apply cake before sowing and sow the seeds air dried for 12 hours after treating with any one of the following insecticides diluted in 5 litre of water for the management of termite. 1. Castor cake @ 1 ton/ha and fipronil 5 SC 500ml/100 kg seeds 2. Castor cake @ 1 ton/ha and chlorpyriphos 20 EC 400ml/100 kg seeds 3. Neem cake @ 1 ton/ha and fipronil 5 SC 500 ml/100 kg seeds	2017
21.	**Bio-efficacy of selected insecticides against pink bollworm in *Bt* cotton** The farmers of Gujarat growing *Bt* cotton are recommended to apply any one of the following insecticides alternatively, first spray at 75 days after sowing and second at 15 days of first spray for effective management of pink bollworm.	2017

	1. Indoxacarb 15.8 EC, 0.0079 % (5 ml/ 10 litre of water) 2. Emamectin benzoate 5 SG, 0.0025 % (5 g/10 litre of water) 3. Spinosad 45 SC, 0.014 % (3 ml/10 litre of water)	
22.	**Standardization of pheromone traps required for mass trapping of pink bollworm in *Bt* cotton** The farmers of Middle Gujarat Agro-climatic Zone are recommended to set up 40 pheromone traps/ha, 30 cm above crop height at equidistantly one week prior to flowering and change the lure at one-month interval till last picking of *Bt* cotton for effective and economical management of pink bollworm in *Bt* cotton.	2018
23.	**Evaluation of pre-harvest spray of insecticides for control of pulse beetle, *Callosobruchus* spp. in green gram** Green gram seed producers of middle Gujarat Agro-climatic Zone are advised to spray indoxacarb 14.5 SC, 0.012 % (8 ml/10 L water) at pod maturity stage to check the infestation of pulse beetle during storage up to two months without adverse effect on seed germination.	2019
24.	**Biorational management of cumin pests** Farmers of middle Gujarat Agro-climatic Zone are advised 22 to spray neem oil, 1% (100 ml/10 L water) or garlic extract, 5% at appearance of pest and second spray at 10 days after first spray for effective control of aphid and thrips in cumin. For preparation of 5% garlic extract, 500 g garlic cloves to be crushed in required quantity of water followed by filtration and dilution in 10 litres of water.	2019
25.	**Efficacy of insecticides against fall armyworm, *Spodoptera frugiperda* (J. E. Smith) infesting maize** Spinetoram 11.7 SC, 0.0117% (10 ml/10 l water) or emamectin benzoate 5 SG, 0.0025% (5 g/10 L water) or chlorantraniliprole 18.5 SC, 0.006% (3 ml/10 L water) or chlorantraniliprole 0.4% G (whorl application, 20 kg/ha), or poison bait consisting maize flour 25 kg + jaggery 5 kg + thiodicarb 75 WP 250 g/ha (for preparation of poison bait, dissolve 5 kg jaggery in 5litre of water and add in 25 kg rice bran/maize flour 10- 12 hrs in advance before its application, add 250 g thiodicarb in this bait and mix properly) or spray *Bacillus thurengiensis* 0.5 WP (108 cfu /g) @20 g/10 L of water or	2019

<table>
<tr><td></td><td>Nomuriarileyii1.15 WP (2 x 106 cfu/g) 40 g/10 L of water were found effective in checking the population and damage caused by Spodoptera frugiperda in maize.</td><td></td></tr>
<tr><td>26.</td><td>Study on foraging activities of honeybees in middle Gujarat on various crops
Farmers interested to start the bee keeping are advised to grow following various crops in different seasons to settle 23 bee colonies in their area.<table><tr><th>Season</th><th>Crops</th></tr><tr><td>Kharif</td><td>Shankhavali, sesame, sunflower, golden rod, bajara, green gram, cowpea, maize, pigeon pea, senna, castor, damaro, cotton, water lily, rudrakh, basil and gallardia</td></tr><tr><td>Rabi</td><td>Shankhavali, fennel, mustard, lucerne, coriander, sunflower, maize, fenugreek, water lily, damaro and gallardia</td></tr><tr><td>Summer</td><td>Sesame, sunflower, Shankhavali, green gram, bajara and maize</td></tr></table>These crops should be grown periodically to provide pollen and nectar to bees.</td><td>2019</td></tr>
<tr><td>27.</td><td>Bio-efficacy of insecticides against thrips, Scirtothrips dorsalis Hood in pomegranate
The pomegranate growers of middle Gujarat Agro-climatic zone are advised to apply cyantraniliprole 10.26 OD, 0.008% (7.50 ml/10 litre water) when thrips population attain 5 thrips/10 cm shoot and second after 15 days for effective control of thrips.</td><td>2020</td></tr>
<tr><td>28.</td><td>Efficacy of insecticides against fall armyworm, Spodoptera frugiperda (J. E. Smith) infesting maize
Farmers of middle Gujarat Agro-climatic zone are advised to spray spinetoram 11.7 SC, 0.0117 % (10 ml/ 10 litre of water) or emamectin benzoate 5 SG, 0.0025% (5 g/ 10 litre of water) or chlorantraniliprole 18.5 SC, 0.006% (3 ml/ 10 litre of water) or thiodicarb 75 WP, 0.11% (15 g/ 10 litre of water) first at initiation of pest and second after 15 days for effective and economical control of fall armyworm, Spodoptera frugiperda infesting maize. PHI of 30 days should be kept.</td><td>2020</td></tr>
</table>

29.	**Efficacy of granular insecticides against fall armyworm, *Spodoptera frugiperda* (J. E. Smith) in maize** Farmers of middle Gujarat Agro-climatic zone are advised to give whorl application of chlorantraniliprole 0.4% GR, 20 kg/ha, first at appearance of pest and second after 15 days for effective and economical control of fall armyworm in maize. PHI of 30 days should be kept.	2020
30.	**Evaluation of bio-pesticides against fall armyworm, *Spodoptera frugiperda* (J. E. Smith) in maize** Farmers of middle Gujarat Agro-climatic zone are advised to spray *Nomuraea rileyi* 1% WP (2 x108 cfu/g) @ 40 g/10 litre water or *Bacillus thuringiensis* var. *kurstaki* 1% WG (2 x108 cfu/g) @ 20 g/10 litre water first at initiation of pest and subsequent two sprays at 10 days interval for effective and economical control of fall armyworm, *Spodoptera frugiperda* infesting maize.	2020
31.	**Efficacy of poison baits against fall armyworm, *Spodoptera frugiperda* (J. E. Smith) infesting maize** Farmers of middle Gujarat Agro-climatic zone are advised to apply poison baits: • Rice bran 25 kg + jaggery 5 kg + thiodicarb 75 WP 250 g/ha **or** • Maize flour 25 kg + jaggery 5 kg + thiodicarb 75 WP 250 g/ha **or** • Rice bran 25 kg + jaggery 5 kg + emamectin benzoate 5 SG 125 g/ha First at initiation of pest and second after 15 days for effective and economical control of fall armyworm in maize. **Note:** Dissolve 5 kg jaggery in 5 litres of water, mix 25 kg of bran/flour in to it and keep it overnight, next day add insecticide in bait before application.	2020
32.	**Evaluation of bio-pesticides against fall armyworm, *Spodoptera frugiperda* (J. E. Smith) in maize** Farmers of middle Gujarat Agro-climatic zone are advised to spray *Bacillus thuringiensis* var. *kurstaki* 1 % WG @ 20 g/10 litre water first at initiation of pest and subsequent two sprays at 10 days interval for effective and	2020

	economical control of fall armyworm, *Spodoptera frugiperda* infesting maize.	
33.	**Biorational management of mango hoppers** Mango growers of middle Gujarat Agro-climatic zone are advised to apply neem seed kernel extract 5% (500 g/10 litre water) or neem oil 0.5% (50 ml/10 litre water) or neem leaf extract 10% (1000 g/10 litre water) first when hopper population crosses ETL (*i.e.*, 5 hoppers/panicle) and second at 10 days after first spray for effective management of hoppers in mango.	2021
34.	**Bio-efficacy of botanicals against aphids on coriander** Farmers growing coriander in middle Gujarat Agro-climatic zone are advised to spray tobacco dust aqueous extract 2% (200g/10 litres water) or ginger rhizome aqueous extract 5% (500g/10 litres water) first at aphid population start building up and forming colony on branches and second after 10 days for effective management of aphid in coriander.	2021
35.	**Effect of date of sowing on incidence of fall armyworm, *Spodoptera frugiperda* (J. E. Smith) infesting maize** Sweet corn growers of Gujarat are recommended to sow the crop during 3rd week of November as the infestation of fall armyworm, *Spodoptera frugiperda* (J. E. Smith) remains low and higher green cob as well as fodder yield can be obtained.	2022
36.	**Evaluation of attractants on foraging activity of honey bee in mustard** Mustard growers of Gujarat are advised to give first spray of sugar syrup 10% (1 kg/ 10 litre water) as attractant at 10% flowering and second spray after 10 days of the first spray to increase the foraging activity of honeybees and thereby increasing seed yield.	2022
37.	**Bio-efficacy of insecticides against thrips, *Thrips parvispinus* (Karny) infesting chilli (*Ad-hoc*)** Chilli growers of middle Gujarat agro climatic zone are recommended to spray spinetoram 11.7 SC, 0.012 % (10 ml/ 10 litre of water) or tolfenpyrad 15 EC, 0.03 % (20 ml/10 litre of water) for effective management of new invasive thrips species, *Thrips parvispinus* (Karny).	2022
38.	**Evaluation of bio-pesticides against thrips, *Thrips parvispinus* (Karny) infesting chilli (*Ad-hoc*)**	2022

	Chilli growing farmers of Gujarat are recommended to spray azadirachtin 10000 ppm, 0.003% (30 ml/ 10 litre of water) or *Pseudomonas fluorescens* 1% WP, 2 x 10^8 cfu/g (40 g/ 10 litre of water) for management of black thrips, *Thrips parvispinus* (Karny).	