

**DEPARTMENT OF ENTOMOLOGY
COLLEGE OF AGRICULTURE,
NAVSARI AGRICULTURAL UNIVERSITY,
BHARUCH CAMPUS, BHARUCH-392 012**

1. MANDATE:

The Department of Entomology is one of the most important component of College of Agriculture. The discipline has major share with the problems regarding pests particularly in pigeonpea, cotton and pulse crops.

1. To impart the education at undergraduate and postgraduate level
2. To upgrade the knowledge, skill and different principles regarding the current pest problems of the farmers in entomological field.
3. To conduct the various research experiments/projects sponsored by State Government, ICAR, Private Pesticide Companies, other agencies etc.
4. Providing diagnostic services to the farmers for insect pests infesting different crops.
5. Providing knowledge to the farmers for insect pests infesting different crops and its management through TV talk, radio talk, video conference *etc.*
6. To develop the pest management technologies for farmers and scientific communities.
7. To transfer the recommended technologies to farmers through literature distribution, and publication of popular articles, leaflets, folder *etc.* in newspaper and magazine *etc.*
8. Training on pest management during training programs organized by Director of Extension, State Agricultural Department, NGO, KVK and other extension agencies.
9. Publication of extension literatures (Popular articles, leaflet, folder *etc.*) on Pest Management.
10. Publication of research related to insect pests and its management carried out in the Department.

2. OBJECTIVES:

1. To upgrade the knowledge, skill and different principles regarding the current pest problems of the farmers in entomological field.
2. To impart the education at U.G. and P.G. level.
3. To conduct the various research experiments approved by Plant Protection Sub Committee in AGRESCO and other agencies.
4. To develop the pest management technologies for farmers and scientific communities.
5. To transfer the recommended technologies to farmers through literature distribution, popular articles in news paper and training *etc.*

3. MAJOR ACTIVITIES:

1. Teaching:

(a) Under graduate:

Courses of Entomology in B.Sc. (Hons.) Agri.

Sr. No.	Semester	Course Number	Title of course	Credits
1	3 rd	Ag. Ento. 3.1	Fundamentals of Entomology	2+1
2	4 th	Ag. Ento. 4.2	Principles of Integrated Pest Management	1+1
3	4 th	Ag. Ento. 4.3	Management of Beneficial Insects	1+1
4	5 th	Ag. Ento. 5.4	Pest of Field Crops and Stored Grains and their Management	1+1

5	6 th	Ag. Ento. 6.5	Pests of Horticultural crops and their management	1+1
Total				11

(b) Post graduate teaching:

Courses of Entomology in M.Sc. (Agri.)

Sr. No.	Course No.	Course Title	Credits
I Sem			
1	ENT 501	Insect Morphology	1+1
2	ENT 504	Classification of Insects	2+1
3	ENT 511	Pests of Field Crops	1+1
II Sem			
4	ENT 502	Insect Anatomy, Physiology and Nutrition	2+1
5	ENT 505	Insect Ecology	1+1
6	ENT 508	Toxicology of Insecticides	2+1
7	ENT 512	Pests of Horticultural and Plantation Crops	1+1
III Sem			
8	ENT 507	Biological Control of Crop Pests and Weeds	1+1
9	ENT 510	Principles of Integrated Pest Management	1+1
10	ENT 591	Master's Seminar	1+0
IV Sem			
11	ENT 599	Master Research	0+20

(c) Polytechnic in Agriculture:

Courses of Entomology in Polytechnic in Agriculture

Sr. No.	Semester	Course Number	Title of course	Credits
1	1 st	Ag. Ento. 1.1	Fundamentals of Entomology	2+1
2	2 nd	Ag. Ento. 2.2	Principles of Integrated Pest Management	2+1
3	3 rd	Ag. Ento. 3.3	Pests of Field crops and Stored grain and their management	2+1
4	4 th	Ag. Ento. 4.4	Pest of Horticultural crops and their management	2+1
Total				12

List of students who have completed their Ph. D. (Agri. Entomology) degree:

Sr. No.	Name of student	Title of Thesis	Name of Major Advisor	Year of Award of Degree
1	Bhadani Dhavalkumar Jaysukhlal	Morphological and Biochemical Basis of Resistance against pod borer complex in pigeonpea, <i>Cajanuscajan</i> (L.) Millspaugh	Dr. J. J. Patel	2019

2	Berani Nikulkumar Khodabhai	Pest succession and sources of resistance against brinjal pest complex	Dr. J. J. Patel	2020
---	-----------------------------	--	-----------------	------

List of students who have completed their M.Sc. (Agri. Entomology) degree:

Sr. No.	Name of student	Title of Thesis	Name of Major Advisor	Year of Award of Degree
Within NAU:				
1	Mahesh B. Kavadi	Population dynamics and management of mite (<i>Tetranychus urticae</i> Koch) in brinjal [<i>Solanum melongena</i> Linnaeus]	Dr. J. J. Patel	2015
2	Prabhatkumar S. Patel	Incidence of thrips in organic onion and its management	Dr. J. J. Patel	2016
3	Rajesh M. Makvana	Succession of major pests, varietal screening and effect of spacing and bio-fertilizers on cow pea pod borer	Dr. J. J. Patel	2017
4	Priyanka J. Patel	Population dynamics, varietal screening and bio-efficacy of insecticides against sucking pests in summer okra	Dr. J. J. Patel	2017
5	Trivedi Nikhil Pravinchandra	Biodiversity of aphids and their host plants	Dr. J. J. Patel	2019
Other than NAU:				
1.	Miss Nilam Raghunath Bangar	Management of shoot and fruit borer, <i>Earias vittella</i> (Fabricius) and residue status of some insecticides in/on okra, <i>Abelmoschus esculentus</i> (Linnaeus) Moench in summer	Dr. J. J. Patel	2011
2.	Mr. Himansu Chandrakant Patel	Population dynamics, varietal susceptibility and management of thrips [<i>Thrips tabaci</i> Lindeman] in Onion (<i>Allium cepa</i> Linnaeus)	Dr. J. J. Patel	2011
3.	Mr. Parth Bharatbhai Patel	Population dynamics, varietal susceptibility and management of thrips (<i>Thrips tabaci</i> Lindeman) in garlic (<i>Allium sativum</i> Linnaeus)	Dr. J. J. Patel	2011
4.	Mr. Mayur V. Variya	Varietal Susceptibility and management of leaf miner (<i>Liriomyza trifolii</i> Burgess) in tomato	Dr. J. J. Patel	2012
5.	Mr. Bhavik V. Barot	Eco-friendly management of thrips, <i>Scirtothrips dorsalis</i> (Hood) in chilli, <i>Capsicum annum</i> L.	Dr. J. J. Patel	2012
6.	Mr. Arif A. Shaikh	Management of sucking pests in brinjal [<i>Solanum melongena</i> Linnaeus]	Dr. J. J. Patel	2012

4. RESEARCH ACTIVITY:

Ongoing experiments

S.No.	Title of experiment
1	Survey and surveillance of major insect pests and diseases of urdbean, mungbean and soybean at College Farm and surrounding area of Bharuch and Narmada districts
2	Survey and surveillance of major insect pests of pigeonpea growing area of Bharuch

	and Narmada district
3	Screening of SSVT (Medium) pigeon pea against pod borer and pod fly
4	Screening of SSVT (ME) pigeon pea against pod borer and pod fly
5	Screening of LSVT (Mid late) pigeon pea against pod borer and pod fly
6	Screening of SSHT (ME) pigeon pea against pod borer and pod fly
7	Screening of LSHT (ME) pigeon pea against pod borer and pod fly
8	Screening of PET(M) pigeon pea against pod borer and pod fly
9	Screening of PET(ME) pigeon pea against pod borer and pod fly
10	Screening of IVT (E) pigeon pea against pod borers
11	Screening of AVT (E) pigeon pea against pod borers
12	Morphological basis of resistance in pigeonpea (<i>Cajanus cajan</i> (L.) Millspaugh) against pod borer complex

RESEARCH RECOMMENDATIONS:

S.No.	Title and Recommendation	AGRESCO No. & Year
1.	<p><i>Helicoverpa armigera</i> moth catches in pigeonpea through sex pheromones</p> <p>The peak activity of moths and larvae of <i>Helicoverpa armigera</i> in pigeonpea were showed during mid of November to March and end of October to December, respectively. Seasonal & yearly moth and seasonal larval activities of <i>H. armigera</i> were significantly negatively correlated with minimum temperature, morning & evening relative humidity, rainfall and rainy days, while it was significantly positive correlated with sun shine hours. <i>H. armigera</i> moths were significantly negatively correlated with maximum temperature and wind speed during crop season and year, respectively. Seasonal larval incidence and moth catches of <i>H. armigera</i> were showed significantly positive correlation.</p>	10 th (2014)
2.	<p>Population dynamics of major insect pests of sapota</p> <p>Chiku moth, bud borer, leaf miner, mid rib folder and fruit fly remain active round the year under Agro climatic zone- II, AES- V indicating their peak in 1st fortnight of September, 2nd fortnight of September, 1st fortnight of December, 1st fortnight of November and 2nd fortnight of July, respectively.</p>	12 th (2016)
3.	<p>Monitoring of fruit fly in mango orchard</p> <p>The fruit flies remain active round the year under Agro climatic zone – II, AES- V in mango orchard with peak population during the 2nd week of July (28th SMW).</p>	12 th (2016)
4.	<p>Evaluation of insecticides against chiku moth, <i>Nephoteryx eugraphella</i> R.</p> <p>For effective management of chiku moth in 4sapota, apply three sprays of either flubendiamide 39.35 SC @ 0.0096% (2.4 ml/10 litre) or emamectin benzoate 5 SG @ 0.0022% (4.4 gm/10 litre) at one month interval during fruiting stage for higher yield and better return. The</p>	12 th (2016)

	residues of these insecticides remain below determination level in sapota fruits.																	
5.	<p>Evaluation of insecticides against pod bug, <i>Clavigralla gibbosa</i> Spinola in pigeon pea cv. Vaishali</p> <p>Two sprays of any of the following insecticide at an interval of 15 days commencing at pod formation stage are effective to control pod bug, <i>Clavigralla gibbosa</i> Spinola in pigeon pea.</p> <p>Imidacloprid 17.8 SL @ 0.005 % Acetamiprid 20 SP @ 0.004% Thiacloprid 24 SC @ 0.024%</p>	13 th (2017)																
6.	<p>Survey and surveillance of major insect pests of pigeon pea at College Farm, Bharuch as well as Narmada district</p> <p>The pigeon pea pests were active round the year under Agro climatic zone II, AES V with higher activity period mentioned as under with standard meteorological week (SMW).</p> <table border="1" data-bbox="379 734 1114 1102"> <thead> <tr> <th>Pest</th> <th>Higher Activity</th> </tr> </thead> <tbody> <tr> <td>Aphid</td> <td>36, 38, 39, 45 and 46th SMW</td> </tr> <tr> <td>Jassid</td> <td>37, 38, 39, 43 , 47 and 48th SMW</td> </tr> <tr> <td>PSB</td> <td>49th to 2nd SMW</td> </tr> <tr> <td>MBDR</td> <td>45th SMW</td> </tr> <tr> <td><i>Helicoverpa</i> sp.</td> <td>47th to 50th SMW</td> </tr> <tr> <td><i>Maruca</i> sp.</td> <td>48 and 49th SMW</td> </tr> <tr> <td>Leaf Roller</td> <td>41st to 43rd SMW</td> </tr> </tbody> </table>	Pest	Higher Activity	Aphid	36, 38, 39, 45 and 46 th SMW	Jassid	37, 38, 39, 43 , 47 and 48 th SMW	PSB	49 th to 2 nd SMW	MBDR	45 th SMW	<i>Helicoverpa</i> sp.	47 th to 50 th SMW	<i>Maruca</i> sp.	48 and 49 th SMW	Leaf Roller	41 st to 43 rd SMW	13 th (2017)
Pest	Higher Activity																	
Aphid	36, 38, 39, 45 and 46 th SMW																	
Jassid	37, 38, 39, 43 , 47 and 48 th SMW																	
PSB	49 th to 2 nd SMW																	
MBDR	45 th SMW																	
<i>Helicoverpa</i> sp.	47 th to 50 th SMW																	
<i>Maruca</i> sp.	48 and 49 th SMW																	
Leaf Roller	41 st to 43 rd SMW																	
7.	<p>Evaluation of acaricides against pigeonpea eriophyid mite, <i>Aceria cajani</i></p> <p>Three sprays of spiromesifen 22.9 SC @ 0.005% (2 ml/10 lit) or fenazaquin 10 EC (10 ml/ 10 lit) @ 0.01% at 25, 40 and 55 days after sowing which effectively control pigeonpea eriophyid mite, <i>Aceria cajani</i> and give higher seed yield and net return. Further, the residues of these acaricides were found below determination level in pigeonpea seeds and plant residue.</p>	14 th (2018)																
8.	<p>Screening of pigeon pea genotypes against pod borer and pod fly under natural field condition</p> <p>Infestation of pod borers and pod fly was less in the pigeon pea entries viz., NPEK-15-03, NPEK-15-25, ICPL-87119, NPEK-15-09, BP-15-23, GJP-1303, SKNP-1413, AGT-2 and BP-15-11.</p>	16 th (2020)																

5. PUBLICATION

(i) Research Paper Published in International Journal:

1. Jhala,R.C., **K.G.Patel**, C.B.Patel and A.H.Shah (1990). Field efficacy of different insecticides for the control of Mango leaf gall midge, *Procontarinia mattenia*: Kieffer and cecconi. *International pest control*, **32**(2): 40-41.
2. Jhala, R.C., Z. P. Patel, **K. G. Patel**, M. B. Patel and C. B. Patel (1991). Chemical control of bud boring insects, *Anarsia achrasella* Bradley and *Nephopteryx eugraphella* Ragonot on Sapota . *International pest control*, **35** (3): 75-77.
3. **Patel, K.G.** and S. Raman (2000). Use of colored plastic traps to attract aphid, *Aphis gossypii* Glov. and white fly, *Bemisia tabaci* Genn. in cotton. *J. Appl. Zool. Res.*, **11** (1): 11-13.

4. Patel, K.A., M.S. Purohit and **K. G. Patel** (2010). Screening of rice varieties for resistance to rice Sheath mite, *Stenotarsonemus spinki* smilly in South Gujarat. Int. Sym. Cum Work shop in Acarology. Int. Jou. Of Acarology, UK & Acarology Development Foundation, USA: **Abstract: 8-10** (4):59.
5. Patel, K. A., M. S. Purohit and **K. G. Patel** (2010). Effect of nitrogenous fertiliser to crop on the incidence of rice Sheath mite, *Stenotarsonemus spinki* smilly in South Gujarat. Int. Sym. Cum Work shop in Acarology. Int. J. Acarol., UK & Acarology Development Foundation, USA: **Abstract: 8-10** (4): 57.
6. **J. J. Patel** and R. C. Jhala (2010). Evaluation of Eco-friendly modules for the management of serpentine leaf miner, *Liriomyza trifolii* (Burgess) in cucumber, *Cucumis sativus* Linnaeus. *Green Farming*, **1**(1) 46-50.
7. Shinde, S.V., H. V. Patel., S.M. Chavan., **K.G. Patel.**, M.S. Purohit and M.B.Patel (2011). In vitro mass multiplication Media and its Impact Assessment on Entomopathogenic Nematode *Steninerema carpocapsae* (weiser) (Nematoda: Steninerematidae) *Biopesticide Intl.*, **7** (1): 64-67.
8. Patel, K.M. and **K.G. Patel** (2011). Influence of water level in rice field on the population build up of *Leptispa pygmaea* baly. Crop Improvement, Special Issue: **ISSN 0256-0933(2) 6-8: 182.**
9. Desai, C.P. and **K. G. Patel** (2011). Seasonal incidence of rice brown plant hopper, (*Nilaparvata lugens* stal.). Crop Improvement, Special Issue: **ISSN 0256-0933(2) 6-8: 451.**
10. Desai, C.P. and **K. G. Patel** (2011). Varietal screening of rice against rice brown plant hopper, (*Nilaparvata lugens* stal.). Crop Improvement, Special Issue: **ISSN 0256-0933(2) 6-8: 453.**
11. Patel, H.V. and **K. G. Patel** (2011). Population dynamics of insect pest complex and Spider on Jatropha (*Jatropha curcas* L.) In South Gujarat. Crop Improvement, Special Issue: **ISSN 0256-0933(2) 6-8: 214.**
12. Arve, S. S., **K. G. Patel.**, S.M. Chavan, S.S. Alunkhe and M.B.Patel (2011). Impact of weather parameters on population of Solenopsis Mealybug, *Phenacoccus solenopsis* on Hibiscus Rosa- Sinensis under South Gujarat conditions Crop Improvement, Special Issue: **ISSN 0256-0933(2) 6-8: 456.**
13. Arve, S. S., **K. G. Patel.**, S.M. Chavan and P.K.Vidhate (2011) Investigation on population dynamics of hibiscus mealybug, *Phenacoccus solenopsis* Tinsley in relation to biotic factors under South Gujarat condition. *J. Biopesticides*, **4**(2): 211-213.
14. Sushma Deb, Borad, P. K. and **Patel, J. J.** (2012). Evaluation of synthetic insecticides against Sitophilus oryzae (L.) on maize under storage condition. *AGRES- An International e-Journal*, **1**(3): 251-255.
15. Patel, P. B. and **Patel, J. J.** (2012). Susceptibility of different garlic genotypes/cultivars to thrips (*Thrips tabaci* Lindeman). *AGRES- An International e-Journal*, **1**(3): 256-262.
16. Patel, H. C. and **Patel, J. J.** (2012). Evaluation of conventional insecticides against thrips, *Thrips tabaci* Lindeman infesting onion (*Allium cepa* L.). *AGRES- An International e-Journal*, **1**(3): 268-273.
17. Patel, P. B. and **Patel, J. J.** (2012). Impact of different nitrogen levels and irrigation intervals on incidence of thrips (*Thrips tabaci* Lindman) infesting garlic. *AGRES- An International e-Journal*, **1**(3): 287-292.
18. Shaikh, A. A. and **Patel, J. J.** (2012). Effect of different levels of potash on incidence of sucking pests in brinjal. *AGRES- An International e-Journal*, **1**(3): 298-304.
19. Bangar, Nilam R. and **Patel, J. J.** (2012). Residual status of insecticides in/on okra fruits. *AGRES- An International e-Journal*, **1**(3): 305-313.
20. Patel, R. K., Mehta, A. N., Patel D. R., **Patel, J. J.** and Patel, R. R. (2012). Impact of sowing period and varieties on incidence of pod borers and grain yield in pigeonpea. *AGRES- An International e-Journal*, **1**(3): 321-327.
21. Bangar, Nilam R. and **Patel, J. J.** (2012). Evaluation of various synthetic insecticides against *Earias vittella* Fabricius infesting okra. *AGRES- An International e-Journal*, **1**(3): 367-375.

22. Barot, B. V. and **Patel, J. J.** (2012). Evaluation of different oils against thrips, *Scirtothrips dorsalis* Hood in chilli. *AGRES- An International e-Journal*, **1**(3): 390-394.
23. **Patel, J. J.**, Patel, P. B. and Patel, H. C. (2012). Bio-efficacy of buprofezin 70% DF against jassid infesting okra. *AGRES- An International e-Journal*, **1**(3): 395-399.
24. Shaikh, A. A. and **Patel, J. J.** (2012). Bio-efficacy of insecticides against sucking pests in brinjal. *AGRES- An International e-Journal*, **1**(4): 423-434.
25. Variya, M. V. and **Patel, J. J.** (2012). Evaluation of different insecticides against leaf miner (*Liriomyza trifolii* Burgess) in tomato. *AGRES- An International e-Journal*, **1**(4): 453-462.
26. Barot, B. V., **Patel, J. J.** and Shaikh, A. A. (2012). Population dynamics of chilli thrips, *Scirtothrips dorsalis* Hood in relation to weather parameters. *AGRES- An International e-Journal*, **1**(4): 480-485.
27. H. C. Patel, **J. J. Patel** and P. B. Patel (2012). Screening of onion genotypes/ cultivars for susceptibility to thrips, *Thrips tabaci* Lindeman. *AGRES- An International e-Journal*, **1**(4): 492-496.
28. Bangar, Nilam R. and **Patel, J. J.** (2012). Resistance sources of okra genotypes/cultivars to shoot and fruit borer (*Earias vittella* Fabricius). *AGRES- An International e-Journal*, **1**(4): 497-503.
29. H. C. Patel and **J. J. Patel** (2012). Impact of different nitrogen levels and irrigation intervals on incidence of thrips (*Thrips tabaci* Lindaman) infesting onion (*Allium cepa* L.). *AGRES- An International e-Journal*, **1**(4): 509-513.
30. Variya, M. V. and **Patel, J. J.** (2012). Evaluation of chrysanthemum and marigold as trap crops against leaf miner (*Liriomyza trifolii* Burgess) in tomato. *AGRES- An International e-Journal*, **1**(4): 514-521.
31. **Patel, J. J.**, Patel, H. C., Patel, P. B. and Bangar, N. R. (2012). Bio-efficacy of cyazypyr 10 OD W/V against thrips (*Scirtothrips dorsalis* Hood) and fruit borer [*Helicoverpa armigera* (Hubner) Hardwick] infesting chilli. *AGRES- An International e-Journal*, **1**(4): 534-538.
32. **Patel D.R.**, Purohit, M. S. and Patel, R.K. (2012). Occurrence of army worm, *Mythimna separata* walker on kharif sorghum. *AGRES- An International e-Journal*, **1**(3): 334-339.
33. **Patel D.R.**, Purohit, M. S. and Patel, R.K. (2012). Studies on parasites of stem borer, *Chilo partellus* on kharif sorghum. *AGRES- An International e-Journal*, **1**(4): 475-479.
34. **Patel D.R.** and Purohit, M. S. (2012). Population fluctuation of stem borer, *Chilo partellus* Swinhoe infesting sorghum in relation to weather parameters in kharif season *AGRES- An International e-Journal*, **1**(3): 350-355.
35. **Patel D.R.** and Purohit, M. S. (2012). Susceptibility of sorghum cultivars to stem borer, *Chilo partellus* Swinhoe *AGRES- An International e-Journal*, **1**(3): 376-384.
36. Shaikh, A. A., **Patel, D. R.** and **Patel, J. J.** (2013). Screening of different genotypes/cultivars against sucking pests infesting brinjal. *AGRES- An International e-Journal*, **2**(1): 51-57.
37. **Patel, D. R.**, **Patel, J. J.**, Pathak, D. M. and Patel, R. R. (2013). Studies on incidence of earhead worm, *Helicoverpa armigera* on rain fed sorghum. *AGRES- An International e-Journal*, **2**(2): 225-231.
38. Shaikh, A. A. and **Patel, J. J.** (2013). Population dynamics of sucking pests on brinjal in relation to weather parameters. *AGRES- An International e-Journal*, **2**(3): 370-378.
39. Variya, M. V. and **Patel, J. J.** (2013). Population dynamics of leaf miner (*Liriomyza trifolii* burgess) on tomato in relation to weather parameters. *AGRES- An International e-Journal*, **2**(3): 385-391.
40. **Patel D.R.** and Purohit, M. S. (2013). Occurrence of armyworm, *Mythimna separate* on rabi sorghum *Internat. J. Plant Protec.*, **6**(1): 225-226.
41. Kapadiya H.J.; Pathak D.M. and **Patel.D.R.** (2013) Effect of artificial injuries and fresh neck cutting against black mould (*Aspergillus niger*) on onion bulb. *Internat. J. Plant Protec.*, **6**(2): 422-424.

42. **Patel D.R.** and Purohit, M. S. (2013). Some physical plant characters in relation to shoot fly, *Atherigona soccata* (Rondani) resistance in sorghum. *Internat. J. Plant Protec.*, **6**(2): 312-315.
43. **Patel D.R.** and Purohit, M. S. (2013). Influence of different weather parameters on aphid, *Melanaphis sacchari* infesting Kharif sorghum. *Internat. J. Plant Protec.*, **6**(2): 484-486.
44. **Patel D.R.** and Purohit, M. S. (2013). Some morphological plant characters in relation to army worm, *Mythimna separata* resistance in sorghum *Internat. J. agric.Sci.*, **9**(2): 667-670.

(ii) Research Paper Published in National Journal:

1. **Patel, K.G.**, R.C. Jhala, C.B. Patel and A. H. Shah (1985). Evaluation of some newer insecticides against Mango hopper, *Amritodus atkinsoni* leth. (Cicadellidae: Homoptera) In Gujarat. *Pestology*, **9**(10): 24-33.
2. **Patel, K.G.** and A. H. Shah (1990). Safety measures for plant protection in Mango orchard. *Agricultural Extension Review*, **3 - 4**: 8- 9 pp.
3. Rai, A.B., **K.G.Patel**, R.C.Jhala, and C.B.Patel (1992). Chemical control of Mealy bug *Coccidohystrix insolita* (Green) pseudococcidae: Homoptera infesting pigeon pea in South Gujarat. *GAU Res. J.*, **17**(2): 72-75.
4. Vyas, R.V.; **Patel, J. J.**; Godhani, P. H. and Yadav, D. N. (1993). Evaluation of green muscardine fungus (*Metarrhizium anisopliae* var. *anisopliae*) for control of mango hopper (*Amritodus atkinsoni*). *Indian J. Agric. Sci.*, **63** (9): 602-603.
5. **Patel, K. G.**, S. Raman, D.M. Korat, J.F.Dodia and A.R. Pathak (1996). Integrated pest management in paddy. *Pestology*, **20**(9): 26.
6. Patel, C. B., **K. G. Patel** and S. N. Saravaiya (1996). Dose and efficacy period of methyl eugenol to attract Mango fruit fly *Bactrocera dorsalis* Hendal. *GAU Res. J.*, **21** (2): 132-136
7. **Patel, J. J.**; Patel, N. C.; Jyani, D. B. and. Patel, J. R. (1996). Bio-efficacy of synthetic and botanical insecticides against aphid, *Lipaphis eysimi* Kalt. and diamond back moth, *Plutella xylostella* L. infesting cabbage. *GAU Research J.*, **22** (1): 67-71.
8. **Patel, J. J.**; Patel, N. C.; Jyani, D. B.; Patel, J. R. and Patel, B. D. (1997). Bio-efficacy of synthetic and botanical insecticides for controlling pod borer (*Helicoverpa armigera*) and podfly (*Melanagromyza obtusa*) infesting vegetable purpose pigeonpea (*Cajanus cajan*). *Indian J. Agric. Sci.*, **67** (3): 117-119.
9. Patel, N. C.; **Patel, J. J.**; Jyani, D. B. and Patel, J. R. (1997). Evaluation of insecticide schedules for controlling thrips (*Scirtothrip dorsalis*) infesting chilli (*Capsicum frutescens*). *Indian J. Agric. Sci.*, **67** (2): 75-76.
10. Patel, N. C.; **Patel, J. J.**; Jyani, D. B., Patel, J. R. and Patel, B. D. (1997). Bio-efficacy of conventional insecticides against pests of okra. *Indian J. Ent.*, **59** (1): 51-53.
11. **Patel, J. J.**; Patel, N. C. and Patel, J. R. (1998). Bio-efficacy of some of the newer insecticides against thrips, *Scirtothrips corsalis* Hood infesting chilli. *Proceedings of the Entomology in 21st century: Biodiversity, Sustainability, Environmental safety and Human health* held at Rajasthan College of Agriculture, Udaipur during 30 April to 2 May, 1998. pp. 57-59.
12. Patel, K. I.; Bharpoda, T. M.; **Patel, J. J.**; Chaudhri, G B. and Patel, J. R. (1998). Effect of weather on activity of cotton bollworms in middle Gujarat. *Proceedings of the Entomology in 21st century: Biodiversity, Sustainability, Environmental safety and Human health* held at Rajasthan College of Agriculture, Udaipur during 30 April to 2 May, 1998. pp. 301-304.
13. Patel, N. C.; **Patel, J. J.** and Patel, J. R. (1998). Bio-efficacy of some new insecticides against aphid, *Lipaphis eysimi* infesting cabbage. *Indian J. Ent.*, **60** (1): 100-101.

14. **Patel, J. J.;** Patel, J. R.; Valand, V. M.; Patel, B. H. and Patel, M. J. (1998). Bio-efficacy of some of the new insecticides against leafminer, *Phyllocnistis citrella* and psylla, *Diaphorhina citri* infesting citrus. *Indian J. Ent.*, **60** (1): 101-103.
15. **Patel, J. J.;** Patel, N. C.; Jyani, D. B. and Patel, J. R. (1998). Cyromazine -an effective insecticides against the american serpentine leafminer, *Liriomyza trifolii* Burgess infesting tomato (*Lycopersicon esculentum*). *Indian J. Agric. Sci.*, **68** (12): 782-783.
16. **Patel, K.G.,** S. Raman, D.M. Korat, J.F.Dodia and A.R.Pathak (1999). Field evaluation of some newer insecticide against rice yellow stem borer, *Scirpophaga incertulas* (walker). *Pestology*, **23** (12): 61-63.
17. Bharpoda, T. M.; Patel, H. P.; **Patel, J. J.;** Patel Usha, Patel, G. P. and Patel, J. R. (1999). Evaluation of economic threshold level for *Helicoverpa armigera* on “H-6” cotton (*Gossypium hirsutum*) in central Gujarat region. *Indian J. Agric. Sci.*, **69** (4): 304-305.
18. Chaudhari, G. B.; Bharpoda, T. M.; **Patel, J. J.;** Patel, K. I. and Patel, J. R. (1999). Effect of weather on activity of cotton bollworms in middle Gujarat. *Journal of Agrometerology*, **1** (2): 137-142.
19. **Patel, J. J.;** Patel, N. C.; Patel, B. H. and Patel, J. R. (1999). Bio-efficacy of different spray schedules against thrips, *Scirtothrips dorsalis* Hood infesting chilli. *Indian J. Ent.*, **61** (4): 345-350.
20. Bharpoda, T. M.; Patel, H. P.; Patel, U. P.; Patel, G. P.; **Patel, J. J.** and Patel, J. R. (2000). Integrated Pest Management (IPM) in cotton H-6 cultivated in middle Gujarat. *Indian J. Ent.*, **62** (4): 327-331.
21. **Patel, J. J.;** Bharpoda, T. M.; Jhala, R. C. and Patel, J. R. (2000). Acaricidal bio-efficacy of some pesticides against mite, *T. telarius* L. (Tetranychidae : Acarina) infesting rose (*Rosa* spp.). *J. Applied Hort.*, **4** (1 & 2): 71-77.
22. Patel, M. G.; Bharpoda, T. M.; **Patel, J. J.;** Chavda, A. J. and Patel, J. R. (2002). Evaluation of various modules for IPM in pigeon pea. *Indian J. Ent.*, **64** (1): 39-43.
23. **Patel, K.G.,** C.B. Patel and H.R. Desai (2002). Biology of *Tuckerella kumaonensis* Gupta (Acari: Tuckerellidae) on fruits of Sapota. *Gujarat J. Appl. Hort.*, **1** (2): 17-24.
24. Bharpoda, T. M.; Patel, G. P. Patel Usha, Patel, H. P.; **Patel, J. J.** and Patel, J. R. (2003). Need based control of cotton boll worms with mixture of synthetic and botanical insecticides. *Indian J. Pl. Prot.*, **28** (1): 74-77.
25. **Patel, K.G.** (2003). Need based control of insect pest complex of paddy in South Gujarat. *Pestology*,
26. Panickar, B. K.; Bharpoda, T. M.; **Patel, J. J.** and Patel, J. R. (2003). Ovicidal effect of botanical and synthetic insecticides on boll worms. *Indian J. Ent.*, **65** (2): 292-293.
27. **Patel, K.G.** and H.R. Desai (2004). Monitoring rice yellow stem borer, *Scirpophaga incertulas* (Walker) using sex pheromones /light traps. *Insect Environ.*, **10**(2): 51-52.
28. Patel, M. L., **K.G.Patel** and H.R. Desai (2004). Spider fauna of rice ecosystem of south Gujarat. *Insect Environ.*, **10** (3): 119-121.
29. **Patel, K.G.,** C.B.Patel and J.J. Pastagia (2004). Spatial distribution of mite, *Tuckerella kumaonensis* Gupta (Acari: Tuckerellidae) on sapota tree and role of pruning for its management. *Insect Environ.*, **10** (3):
30. Patel, M. L., **K.G.Patel** and H.V. Pandya (2005). Effect of insecticides commonly used for the control of insect pests of paddy on predatory spiders in Gujarat. *Insect Environ.*,
31. Patel, M.L., **K. G.Patel** and H.V. Pandya (2005). Population of spiders of various species in the rice field in Gujarat., *Insect Environ.*,
32. Patel, B.H.; **Patel, J. J.;** Kathiria, K. B. and Bhatt, P. D. (2006). Evaluation of non pesticideal management in comparison to chemicals for control of brinjal pest complex. Proceedings of National Symposium on “Biodiversity and Insect Pest Management”. pp. 364-66.
33. **Patel, J. J.;** Patel, B.H.; Bhatt, P. D. and Maghodiya, A. B. (2006). Bio-efficacy of difenthiuron 50 WP against sucking pests of brinjal (*Solanum melongena* L.). Proceedings of National Symposium on “Biodiversity and Insect Pest Management”. pp. 367-68.

34. **Patel, J. J.;** Patel, B.H.; Bhatt, P. D. and Maghodiya, A. B. (2006). Relative bio-efficacy of thiamethoxam 25 WG and various recommended insecticides against sucking pests complex of okra [*Abelmoschus esculentus* (L.) Moench]. Proceedings of National Symposium on "Biodiversity and Insect Pest Management". pp. 369-71.
35. **Patel, J. J.;** Patel, B.H.; Bhatt, H. V.; Maghodiya, A. B. and Bhalala, M. K. (2006). Bio-efficacy of difenthiuron 50 WP against sucking pests of brinjal (*Solanum melongena* L.). *Indian J. Ent.*, **68** (3): 272-73.
36. Patel, B.H.; **Patel, J. J.;** Bhatt, H. V.; Maghodiya, A. B. and Bhalala, M. K. (2006). Bio-efficacy of thiomethoxam 25 WG and difenthiuron 50 WP against thrips, *Scirtothrip dorsalis* Hood infesting chilli (*Capsicum frutescens*). *Indian J. Ent.*, **68** (3): 274-75.
37. Bhalala, M. K.; Patel, B.H.; **Patel, J. J.;** Bhatt, H. V. and Maghodiya, A. B. (2006). Bio-efficacy of thiomethoxam 25 WG and various recommended insecticides against sucking pests complex of okra [*Abelmoschus esculentus* (L.) Moench]. *Indian J. Ent.*, **68** (3): 293-95.
38. **Patel, K. G.** and H.V. Pandya (2007). Effect of mulching of paddy straw on abundance of spiders in rice of south Gujarat. *Insect Environ.*, **13**(1) : 15-16.
39. Ghule, S. D., **K.G. Patel** and H.V. Pandya (2008). Seasonal incidence of rice earhead bug (*Leptocorisa acuta* Thun.) of paddy in south Gujarat. *Insect Environ.*, **14**(1): 7-8.
40. Ghule, S.D., **K.G. Patel** and H.V. Pandya (2008). Association between rice grain discoloration and earhead bug. *Insect Environ.*, **14**(1): 9-10.
41. Ghule, S.D., **K.G. Patel** and H.V. Pandya (2008). Varietal screening of rice against rice earhead bug. *Insect Environ.*, **14**(1): 10-11.
42. Patel, H.N., **K.G. Patel** and H.V. Pandya (2008). Seasonal incidence rice leaf folders, *Cnaphalocrocis medinalis* Guenee and *Pelopidas mathias* Fabricius in south Gujarat. *Insect Environ.*, **14**(1):13-15.
43. Patel, H. V., **K. G. Patel** and H.V. Pandya (2009). Inter correlation of major Insects pest of Jatropha, spiders and with weather parameters under South Gujarat. *Insect Environ.*, **15**(3):
44. Patel, H. V., **K. G. Patel** and H.V. Pandya (2009). Screening of various genotypes against insect pest complex of Jatropha (*Jatropha Curcas* L.) in South Gujarat. *Insect Environ.*, **15**(2): 58-59.
45. **Patel, K.G.** and H.V. Pandya (2009). Feasibility of spot application of insecticides to control the insect pest complex of paddy. *Insect Environ.*, **15**(2)P: 60-63.
46. **Patel, K.G.,** H.L. Chauhan and H.V. Pandya (2009). Chemical control of thrips *Retithrips syriacus* M infesting Jatropha (*Jatropha Curcas* L.) in South Gujarat. *Pestology*, **33**(10): 32-34.
47. Patel, K.M., **K.G. Patel** and H.V. Pandya (2009). Bio-Efficacy of chemical and botanical insecticides against rice blue beetle, *Leptispa pygmaea* Baly. *Pestology*,
48. **J. J. Patel,** B. N. Satodiya and K. B. Kathiria (2009). Effect of insecticides as seed treatment against okra pests. *Insect Environment*, **14** (4): 179-81.
49. **J. J. Patel,** B. N. Satodiya and K. B. Kathiria (2009). Bio-efficacy of Emmamectin benzoate 5% SG against fruit borer infesting tomato. *Insect Environment*, **14** (4): 181-84.
50. **J. J. Patel,** B. H. Patel, S. M. Patel and K. B. Kathiria (2009). Sex pheromone based IPM for brinjal shoot and fruit borer management. *Insect Environment*, **15** (2): 51-53.
51. J. C. Shroff, H. R. Patel, V. Pandey, G. G. Patel, K. B. Kathiria, **J. J. Patel,** R. P. Vadodaria and B. K. Bhatt (2010). Development of weather based modules for predicting outbreak of pests of okra in middle Gujarat region. *Agrometeorological Services for Farmers*, pp. 282-288.
52. **J. J. Patel** and R. C. Jhala (2010). Impact of weather parameters on population dynamics of leaf miner, *Liriomyza trifolii* (Burgess) in cucumber, *Cucumis sativus* Linnaeus. *Agrometeorological Services for Farmers*, pp. 310-325.
53. P. K. Patel, P. K. Borad and **J. J. Patel** (2010). Bionomics and behaviour of *Scutellera noblis* Fabricius on Jathropa. *GAU Research Journal*, **35**(2): 116-119.

54. B. V. Patel, P. K. Borad and **J. J. Patel** (2010). Population dynamics of red spider mite, *Tetranychus cinnabarinus* Boisduval on okra. *GAU Research Journal*, **35**(2): 120-123.
55. **J. J. Patel**, Nilam R. Bangar, H. C. Patel and K. B. Kathiria (2011). Bio-efficacy of emamectin benzoate 5% SG against shoot and fruit borer infesting okra. *Insect Environment*, **16** (4): 180-182.
56. **J. J. Patel**, H. C. Patel and K. B. Kathiria (2011). Bio-efficacy of fenazaquin 10 EC against red spider mite, *Tetranychus urticae* on brinjal. *Insect Environment*, **16** (4): 183-185.
57. P. K. Patel, P. K. Borad and **J. J. Patel** (2011). Bio-efficacy of some newer insecticides against shield back bug (*Scutellera nobilis* Fab.) infesting Jathropa. *GAU Research Journal*, **36**(1): 34-37.
58. B. V. Patel, P. K. Borad and **J. J. Patel** (2011). Susceptibility of okra cultivars/genotypes to spider mite (*Tetranychus cinnabarinus* Boisduval). *GAU Research Journal*, **36**(1): 41-43.
59. **Muchhadiya, D.V.**, Saradava, D.A. and Kabaria , B.B. (2011). A study on population dynamics of insect pests and natural enemies on Bt cotton under natural condition. *Indian Journal of Agricultural Research & Extension*. **4**:71-78.
60. **J. J. Patel**, H. C. Patel and K. B. Kathiria (2012). Ecofriendly management of serpentine leaf miner, *Liriomyza trifolii* Burgess and fruit fly, *Bactrocera cucurbitae* Coquillett infesting cucumber, *Cucumis sativus* L. *Insect Pest Management, A Current Scenario*, pp. 483-484.
61. **J. J. Patel**, H. C. Patel and K. B. Kathiria (2012). Effect of organic and inorganic fertilizers on the incidence of pest complex of brinjal, *Solanum melongena* L. *Insect Pest Management, A Current Scenario*, pp. 485-487.
62. **J. J. Patel**, P. B. Patel and K. B. Kathiria (2012). Effect of organic and inorganic fertilizers against chilli thrips, *Scirtothrips dorsalis* Hood and fruit borer, *Helicoverpa armigera* (Hubner) infesting chilli, *Capsicum frutescens* L. *Insect Pest Management, A Current Scenario*, pp. 488-490.
63. Nilam Bangar, **J. J. Patel** and J. J. Dhruve (2012). Screening for varietal susceptibility of okra genotypes/cultivars to *E. vittella* and correlation between biochemical constituents and *E. vittella* infestation. *Indian J. Agric. Biochem.*, **25**(1): 76-79.
64. **D.R. Patel**, M.B. Patel and C.B. Patel Biology of sugarcane leaf hopper, *Pyrilla perpusilla* Wlk. (Lophopidae: Homoptera). *Cooperative Sugar*, **25**(3 &4): 123-126.
65. **D.R. Patel**, M.B. Patel and C.B. Patel Population dynamics of sugarcane leaf hopper (*Pyrilla perpusilla* Wlk.) and its ectoparasite (*Epiricania melanoleuca* F.) in relation to climate. *GAU Res.J.*, **19**(1): 56-63.
66. **D.R. Patel**, M.B. Patel and C.B. Patel Evaluation of granular insecticides against sugarcane leaf hopper, *Pyrilla perpusilla* Wlk. On sugarcane. *GAU Res.J.*, **19**(1): 52-55.
67. **Patel D.R.** and Purohit, M. S. (2012). Hibernation of stem borer, *Chilo partellus* in rabi and kharif sorghum. *Insect Environment*, **18**(1&2): 18-22.
68. **Patel D.R.** and Purohit, M. S. (2012). Competitive displacement of insect-pest of sorghum. *Insect Environment*, **18**(1&2): 26-28.
69. **Patel D.R.** and Purohit, M. S. (2012). Seasonal abundance of parasitoids of stem borer, *Chilo partellus* on rabi. *Insect Environment*, **18**(1&2): 29-31.
70. **Patel D.R.** and Purohit, M. S. (2012). Some morphological plant characters in relation to aphid resistance in sorghum. *Indian journal of Applied Ent.*, **26**(1): 81-82.
71. **Patel D.R.** and Purohit, M. S. (2013). Incidence of shootfly, *Atherigona soccata*, Rondani on raiifed sorghum. *Insect Environment*, **18**(3&4): 84-88.
72. **Patel D.R.** and Purohit, M. S. (2013). Occurrence of earhead bug, *Calocoris angustatus* Leth. on rainfed sorghum. *Insect Environment*, **18**(3&4): 81-84.
73. **Patel D.R.** and Purohit, M. S. (2013). Spatial distribution of sorghum aphids, *Melanaphis sacchari*. *Indian J.Ent.*, **75**(4):342-344.

74. **Muchhadiya, D.V.**, Kabaria, B.B. , **Patel, K.G.** and Patel, D.V. (2013).Population dynamics of major natural enemies of Bt cotton. *Indian Journal of Applied Entomology*, **27**(2) :146-149.
75. **Muchhadiya, D.V.**, Saradava, D.A. and Kabaria, B.B. (2014). Population dynamics of insect pests and some of their natural enemies and their correlation with weather parameters on Bt Cotton. *Indian J. Agric. Sci.*, **84** (5):572-578.
76. **Muchhadiya, D.V.**, Damasiya, D.M., Saradava, D.A. and Kabaria, B.B. (2014). Seasonal incidence of sucking insect pests of Bt cotton in relation to different weather parameters. *Journal of Agrometeorology*. **16** (2) : 227-229.
77. N. B. Patel, **J. J. Patel** and P. B. Patel (2014). Bio-efficacy of diafenthiuron 50 WP (new source) against chilli mite. *Pestology*, **38**(11): 38-41.
78. N. B. Patel and **J. J. Patel** (2015). Bio-efficacy of flubendiamide 20% WG against borer pests of chilli. *Pestology*, **39**(4): 32-35.
79. Saradava, D.A., **Muchhadiya, D.V.** and Patel, V.N. (2015). Bio-efficacy of ecofriendly insecticides against leaf webber and capsule borer *Antigastra catalaunalis* Duponchel in sesame. *Pestology*,**39** (8) : 35-37.
80. H. C. Patel and **J. J. Patel** (2015). Population dynamics of thrips (Thrips tabaci Lindeman) on onion in relation to different weather parameters. *Trends in Biosci.*, An Intl. Fortnightly Journal, 8 (2): 531-34.
81. Kavad, M. B. and **Patel, J. J.** (2015). Population dynamics of mites, *Tetranychusurticae* Koch on brinjal in relation to weather parameters. *AGRES- An International e-Journal*, **4**(3): 255-262.
82. Saradava, D.A., **Muchhadiya, D.V.** and Patel, V.N. (2015). Bio-efficacy of ecofriendly insecticides against leaf webber and capsule borer *Antigastra catalaunalis* Duponchel in sesame. *Pestology*,**39** (8) : 35-37.
83. Kavad, M. B., **Patel, J. J.** and Muchhadiya, D. V. (2016). Impact of different levels of nitrogen on incidence of mites, *Tetranychusurticae* Koch in brinjal Population dynamics of mites, *Tetranychusurticae* Koch on brinjal in relation to weather parameters. *AGRES- An International e-Journal*, **5**(4): 383-391.
84. Kavad, M. B. and **Patel, J. J.** (2016). Impact of different dates of transplanting on incidence of mites in brinjal Population dynamics of mites, *Tetranychusurticae* Koch on brinjal in relation to weather parameters. *AGRES- An International e-Journal*, **5**(4): 435-442.
85. Patel, P. S. and **Patel, J. J.** (2017). Population dynamics of thrips (*Thripstabaci* Lindeman) on onion in relation to weather parameters. *AGRES- An International e-Journal*, **6**(3): 525-530.
86. Patel, P. S. and **Patel, J. J.** (2017). Impact of spacing and organic fertilizers on incidence of thrips (*Thripstabaci* Lindeman) infesting onion. *AGRES- An International e-Journal*, **6**(3): 494-499.
87. Makvana, R. M, Patel, J. J. and Pathak, D. M. (2017). Succession of major pests of cowpea and its relation with weather parameters. *AGRES- An International e-Journal*, **6**(4): 696-703.
88. Makvana, R. M. Patel, J. J. and Pathak, D. M. (2017). Impact of spacing and organic fertilizers on incidence of pod borers infesting cowpea. *AGRES- An International e-Journal*, **6**(4): 723-732.
89. Patel, D.R., Patel, J.J.,**Muchhadiya, D.V.**, Patel, R.R. and Patel, K.G. (2018).Evaluation of Insecticides against chiku moth, *Nephoteryx eugraphella* Ragonot. *Indian Journal of Entomology*, **80**(2): 263-266.
90. Patel, D.R., Patel, J.J.,**Muchhadiya, D.V.**, Patel, R.R. and Patel, K.G. (2018).Seasonal incidence of pests of Sapota in South Gujarat. *Indian Journal of Entomology*, **80**(2): 504-505. (NAAS Rating :5.89)
91. K. G. Patel, D. V. Muchhadiya and **J. J.Patel** (2019) Pest Management in Pulse Crops. Lead paper published in *National Symposium on ''Sustainable Management of Pests and Diseases in Augmenting Food and Nutritional Security''* held at ACHF, NAU, Navsari during January 22-24, 2019, pp. 172-184.

92. Bhadani, D. J. and **Patel, J. J.** (2019). Seasonal incidence of pod fly, *M. obtusa* infesting pigeon pea. *Int. Journal of Pure Applied Bioscience*, 7(2): 44-50. ISSN: 2320-7051. (NAAS Rating: 4.74).
93. Bhadani, D. J. and **Patel, J. J.** (2019). Seasonal incidence of lepidopteran pod borers infesting pigeon pea. *Int. Journal of Pure Applied Bioscience*, 7(2): 119-126. ISSN: 2320-7051. (NAAS Rating: 4.74).
94. Patel, D.R., Patel, J.J., **Muchhadiya, D.V.** and Patel, R.B. (2019). Influence of weather parameters on mango fruit fly, *Bactrocera dorsalis* H. *Journal of Entomology and Zoology Studies*, 7(4):1157-1160.
95. Trivedi, N. P., **Patel, J. J.** and Ghetiya, L. V. (2020). Diversity of aphids in South Gujarat. *Journal of Entomology and Zoology Studies*, 8(5): 127-131
96. N. K. Berani, **J. J. Patel** and H. D. Zinzuvadiya (2020). Screening of different brinjal cultivars/genotypes against sucking insect pest of brinjal. *Journal of Entomology and Zoology Studies*, 8(6): 1582-1587.
97. N. K. Berani and **J. J. Patel** (2020). Population fluctuation of sucking insect pest of brinjal and its relation with weather parameters. *Journal of Entomology and Zoology Studies*, 8(6): 1613-1617.
98. **Muchhadiya, D.V.**, Patel, K.G., Patel, J.J. and Patel, D.R. (2020). Seasonal incidence of pod borers and effect of abiotic factors on population of pod borers in cowpea [*Vigna unguiculata* (L.) Walp.]. *Ind. J. Pure App. Biosci.*, 8(2): 76-81.
99. **Muchhadiya, D.V.**, Patel, K.G., Patel, J.J. and Patel, D.R. (2020). Bio-efficacy of insecticides against pod borers infesting cowpea [*Vigna unguiculata* (L.) Walp.]. *Ind. J. Pure App. Biosci.*, 8(3): 678-684.

(iii) Practical manuals/theory manuals prepared:

Sr. No	Publications	Title of Article	Article Published in	Year
1	Practical Manual (Ag. Ento. 2.2)	Principles of insect control (1+1) Patel D. R.; Muchhadiya D.V. and Patel J.J.	Polytechnic in Agriculture, Bharuch	2013
2	Theory Note (Ag. Ento. 2.2)	Principles of insect control (1+1) Patel D. R.; Muchhadiya D.V. and Patel J.J.	Polytechnic in Agriculture, Bharuch	2013
3	Theory Note (Ag. Ento 3.3)	Pests of field crops and their management (1+1) Patel D. R.; Patel J.J.; Muchhadiya D.V. and Patel, K.G.	Polytechnic in Agriculture, Bharuch	2014
4	Practical Manual (Ag. Ento 3.3)	Pests of field crops and their management (1+1) Patel D. R.; Patel J.J.; Muchhadiya D.V. and Patel, K.G.	Polytechnic in Agriculture, Bharuch	2014
5	Theory Note (Ag. Ento. 6.4)	Pests of horticultural crops and their management (1+1) Muchhadiya D.V.; Patel J.J.; Patel D. R.; and Patel, K.G.	College of Agriculture, Bharuch	2015
6	Practical Manual (Ag. Ento. 5.3)	Pests of field crops and stored grain and their management (2+1) Patel D. R.; Patel J.J.; Muchhadiya D.V. and Patel, K.G	College of Agriculture, Bharuch	2015
7	Theory Note (Ag. Ento. 5.4)	Pests of fruit and vegetable Crops and their Management (1+1) Patel D. R.; Patel J.J. and Muchhadiya D.V.	Polytechnic in Agriculture, Bharuch	2015

8	Practical Manual (Ag. Ento. 5.4)	Pests of fruit and vegetable Crops and their Management (1+1) Patel D. R.; Patel J.J.; Muchhadiya D.V. and Patel, K.G	Polytechnic in Agriculture, Bharuch	2015
9	Practical Manual (Ag. Ento. 8.6)	Non Insect Pest and Their Management (1+2) Muchhadiya D.V.	College of Agriculture, Bharuch	2016
10	Practical Manual (Ag. Ento. 6.4)	Pests of Horticultural crops and their management (1+1) Muchhadiya D.V.; Patel J.J.; Patel D. R.; Patel, R.B. and Patel, K.G.	College of Agriculture, Bharuch	2016
11	Practical Manual (Ag. Ento. 4.2)	Insect Ecology and Integrated Pest Management including Beneficial Insects. (2+1) J.J. Patel & D.V. Muchhadiya	College of Agriculture, Bharuch	2016
12	Practical Manual (Ag. Ento. 4.3)	Management of Beneficial Insects Muchahdiya, D.V., Patel, J.J. and Patel, D.R.	College of Agriculture, Bharuch	2019
13	Practical Manual (Ag. Ento. 4.4)	Pests of Horticultural Crops and Their Management Patel D. R.; Patel J.J.; Muchhadiya D.V. and Patel, R.B.	Polytechnic in Agriculture, Bharuch	2020

6. TRANSFER OF TECHNOLOGIES:

1. Department staff is also actively participating in Krushi mela, Khedut Din, Khedut Shibir, Seminar, Radio and television programme time to time.
2. This department is also guiding farmers through publishing press notes in daily news paper and weekly/monthly periodicals on the agronomic aspects of major crops as well as through Agro ITI programmes.