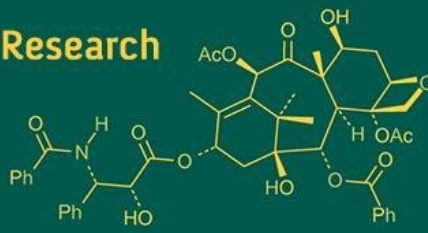


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Rahul Raj
Department of Ag.
Entomology, Baba Raghav
Das Post Graduate College,
Deoria, Uttar Pradesh, India

Amarendra Pratap Singh
Department of Ag.
Entomology, Baba Raghav
Das Post Graduate College,
Deoria, Uttar Pradesh, India

Aditya Kumar Sharma
Department of Ag.
Entomology, Baba Raghav
Das Post Graduate College,
Deoria, Uttar Pradesh, India

Ankit Kumar
Department of Ag.
Entomology, Baba Raghav
Das Post Graduate College,
Deoria, Uttar Pradesh, India

Abhishek Kumar Yadav
Department of Ag.
Entomology, Baba Raghav
Das Post Graduate College,
Deoria, Uttar Pradesh, India

Abhishek Gupta
Department of Ag.
Entomology, Baba Raghav
Das Post Graduate College,
Deoria, Uttar Pradesh, India

Corresponding Author:
Aditya Kumar Sharma
Department of Ag.
Entomology, Baba Raghav
Das Post Graduate College,
Deoria, Uttar Pradesh, India

Efficacy of bio-pesticides and insecticides against sucking insect-pest of okra

Rahul Raj, Amarendra Pratap Singh, Aditya Kumar Sharma, Ankit Kumar, Abhishek Kumar Yadav and Abhishek Gupta

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Abstract

The field studies were conducted during *kharif* season 2022 to determine the efficacy of Bio-pesticides and Insecticides against sucking insect-pests of Okra at Agricultural Research farm of B.R.D. P.G. College Deoria, Uttar Pradesh, India. Results revealed that all the treatments were found effective in reducing the population of Whitefly, Jassid and Mealy bug as compared to control, Imidacloprid 17.8SL @ 0.5 ml l⁻¹ was the most effective treatment indicating reduction in population of Whitefly (0.76/3leaves), Jassid (0.88/3 leaves) and Mealy bug (0.16/plant), followed by Spinetoram 11.7% SC @ 0.25 ml l⁻¹ and Fipronil 5% SC @ 1 ml l⁻¹. Next effective treatment viz., Emamectin benzoate 5% SG @ 1 ml l⁻¹ and Dr. Neem @ 5 ml l⁻¹ showed moderately effectiveness, while botanical Neem oil 5% @ 5 ml l⁻¹ and Neem rus @ 2 ml l⁻¹ were comparatively show less effective against sucking insect-pest of okra. These results suggest that the prudent use of Imidacloprid 17.8SL @ 0.5 ml l⁻¹ can provide the effective management of Whitefly (*Bemisia tabaci*), Jassid (*Amrasca biguttula biguttula*) and Mealy bug (*Phenacoccus solenopsis*) on Okra.

Keywords: Bio-pesticides, efficacy, Imidacloprid 17.8 SL, okra (*Abelmoschus esculentus*) and Spinetoram 11.7% SC

Introduction

Okra [*Abelmoschus esculentus* (L.) Moench] is most popular vegetable crop belongs to the Malvaceae family. In India, it is grown both in summer and rainy seasons. It is generally utilized as a green vegetable with lots of nutrition. Tender fruits of okra are used as vegetable or in culinary preparations as sliced and dried pieces. It is also used for thickening gravies and soups, because of its high mucilage content. In Uttar Pradesh Varanasi, Jaunpur, Gazipur, Chanduli, Gorakhpur, Deoria and Kushinagar are the major okra producing district. These tender okra fruits/capsules are used as vegetable. It is a good source of vitamins (A, B and C), proteins, minerals and an excellent source of iodine, linoleic acid, an essential fatty acid, has also been reported to be present, abundantly in okra seed oil (Saini *et al.* 2023) [7]. Growers of okra commonly claim productivity losses due to insect infestations. However, its cultivation faces substantial challenges from insect pests, which reduces both yield and quality, posing economic risks to farmers. Among the most damaging pests are sucking insects such as Jassids/Leaf hopper (*Amrasca biguttula biguttula*), Whiteflies (*Bemisia tabaci*) and Mealy bug (*Phenacoccus solenopsis*), alongside the lepidopteran shoot and fruit borer (*Earias vittella*). Whiteflies cause direct feeding damage and transmit viral diseases, such as yellow vein mosaic virus, with reported yield losses of 17.46 to 54.04% if left uncontrolled in early growth stages. (Mohapatra, 2023) [4]. Sastry and Singh (1974) [8] reported 93.80 percent yield loss caused due to whitefly in okra. Kishnaiah (1980) [2] reported about 40 to 56 percent losses in okra due to leafhopper. There is a reduction of 49.8 and 45.1 percent in height and number of leaves, respectively due to attack of leaf hopper. Mealy bug (Homoptera: Pseudococcidae) are cottony in appearance small oval soft bodied sucking insects. Both nymphs and adults cause damage by sucking the phloem sap from the growing points resulting the infested plants to lose their vitality, remain stunted, leaves turning yellow, dry up and finally death of plants in case of heavy infestation. Excess sap is excreted as honey dew which attracts ants develops sooty mould inhibiting the plants ability to manufacture food.

Heavy infestation can be caused exfoliation and even death of the plant. They cause up to 45 to 58% losses in okra crop. In order to prevent infestation of insect pests and to produce a quality crop, it is essential to manage the pest population at appropriate time with suitable control measures. Most of the conventional chemicals are broad spectrum, persistent in nature and having long residual action. Thus there is renewed interest in the application of botanical or Bio-pesticides for crop protection. Botanical pesticides are biodegradable and their use in crop protection is a practical sustainable alternative. It maintains biological diversity of predators, and reduces environmental contamination and human health hazards. Therefore the present study attempts to evaluate the efficacy of bio-pesticides and insecticides against sucking insect-pest okra in Eastern Uttar Pradesh.

Materials and Methods

Study was carried out in the experimental field of Baba Raghav Das Post Graduate College Deoria, Uttar Pradesh, under the Agriculture Research farm of Entomology department during Kharif season of 2022. The experimental design employed a randomized block design (RBD) with eight treatments, encompassing seven insecticide applications and an untreated control, each replicated three times. Plots were established at 2m × 2m, with optimum spacing maintained at 60 cm between rows and 30 cm between plant to ensure uniform pest exposure and treatment consistency. Local variety of Okra viz., Ankur-40 sown during experiment. The treatments includes Spinetoram 11.7% SC @ 0.25 ml l⁻¹, Neem oil 5% @ 5 ml l⁻¹, Fipronil 5% SC @ 1 ml l⁻¹, Dr. Neem @ 5 ml l⁻¹, Imidacloprid 17.8 SL @ 0.5 ml l⁻¹, Neem Rus @ 2 ml l⁻¹ and Emamectin benzoate @ 1 ml l⁻¹. Insecticidal sprays were applied when the pest population reached the economic threshold level (ETL). Observations were recorded at 3, 5, 7 and 10 days after spraying (DAS). The population of major sucking insect-pest viz., Whitefly and Jassid recorded per three leaves (Top, middle and Bottom leaves) while Mealy bug per plant form randomly 10 selected plants on each experimental plot. All the observations were recorded with the help of a hand lens (10X). All recommended agronomic practices were followed to raise the crop.

Results and Discussion

Efficacy of bio-pesticides and insecticides against Whitefly (Aleyrodidae: Hemiptera)

The data presented in Table 1 and Figure 1 indicated that the pre-treatment population of Whitefly was uniformly distributed in the experimental plots and did not differ significantly among treatments, ranging from 8.22 to 8.34 per 3 leaves. After application of treatments, all insecticides significantly reduced the pest population compared with the untreated control.

At 3 days after spraying (DAS), the lowest population of whitefly (0.96/3 leaves) was recorded in the Imidacloprid 17.8 SL @ 0.5 ml l⁻¹ treated plots, followed by Spinetoram 11.7% SC @ 0.25 ml l⁻¹ (1.33/3 leaves) and Fipronil 5% SC @ 1 ml l⁻¹ (1.80/3 leaves). Emamectin benzoate 5% SG @ 1 ml l⁻¹ (2.37/3 leaves) and Dr. Neem @ 5 ml l⁻¹ (3.01/3 leaves) showed moderate effectiveness, whereas the botanical treatments Neem oil 5% @ 5 ml l⁻¹ (3.07/3 leaves) and Neem rus @ 2 ml l⁻¹ (3.18/3 leaves) were comparatively less effective against whitefly. The highest

population was recorded in the untreated control (8.33/3 leaves).

A similar tendency was observed at 5, 7 and 10 DAS Imidacloprid 17.8 SL @ 0.5 ml l⁻¹ consistently recorded the lowest pest population (0.67, 0.50 and 0.92 whitefly/3 leaves respectively,) followed by Spinetoram 11.7% SC @ 0.25 ml l⁻¹ (1.04, 0.81 and 1.27 whitefly/3leaves) and Fipronil 5% SC @ 1 ml l⁻¹ (1.45, 1.20 and 1.78 whitefly/3 leaves). Emamectin benzoate 5% SG @ 1 ml l⁻¹ (2.01, 1.74 and 3.34/3 leaves) and Dr. Neem @ 5 ml l⁻¹ (2.84, 2.19 and 3.01/3 leaves) showed moderate effectiveness, whereas the botanical treatments Neem oil 5% @ 5 ml l⁻¹ (2.89, 2.47 and 3.11/3 leaves) and Neem rus @ 2 ml l⁻¹ (2.93, 2.55 and 3.19/3 leaves) remained least effective throughout the observation period against whitefly. The untreated control plots recorded the highest whitefly population (8.67, 9.00 and 9.08/3 leaves, respectively) at all observation intervals. The higher efficacy of Imidacloprid 17.8 SL against whitefly observed in the present study is in agreement with the findings of Kumar and Kumar (2017) revealed that all the treatments were found effective in reducing the population of whitefly. Imidacloprid 17.8SL was the most effective treatment indicating reduction in population of whitefly (1.33/3leaves) followed by Thiamethoxam 25WG. Similar results were also reported by Begum and patil (2016) ^[1] reported that Imidacloprid 17.8SL was the most effective treatment indicating reduction in population of whiteflies.

Efficacy of bio-pesticides and insecticides against Leafhopper (Cicadellidae: Hemiptera)

The data presented in Table 2 and Figure 1 indicated that the pre-treatment population of Leafhopper (*Amrasca biguttula biguttula*) was uniformly distributed in the experimental plots and did not differ significantly among treatments, ranging from 6.26 to 6.38 per 3 leaves. After application of treatments, all insecticides significantly reduced the pest population compared with the untreated control.

At 3 days after spraying (DAS), the lowest population of leafhopper (1.37/3 leaves) was recorded in the Imidacloprid 17.8 SL @ 0.5 ml l⁻¹ treated plots, followed by Spinetoram 11.7% SC @ 0.25 ml l⁻¹ (1.86/3 leaves) and Fipronil 5% SC @ 1 ml l⁻¹ (2.49/3 leaves). Emamectin benzoate 5% SG @ 1 ml l⁻¹ (3.19/3 leaves) and Dr. Neem @ 5 ml l⁻¹ (3.98/3 leaves) showed moderate effectiveness, whereas the botanical treatments Neem oil 5% @ 5 ml l⁻¹ (4.09/3 leaves) and Neem rus @ 2 ml l⁻¹ (4.19/3 leaves) were comparatively less effective against leafhopper. The highest population was recorded in the control plot (6.34/3 leaves).

A similar trend was observed at 5, 7 and 10 DAS Imidacloprid 17.8 SL @ 0.5 ml l⁻¹ consistently recorded the lowest leaf hopper population (0.80, 0.59 and 0.77 leafhopper/3 leaves respectively,) followed by Spinetoram 11.7% SC @ 0.25 ml l⁻¹ (1.41, 0.95 and 1.19 leafhopper/3leaves) and Fipronil 5% SC @ 1 ml l⁻¹ (2.31, 1.45 and 1.66 Leafhopper/3 leaves). Emamectin benzoate 5% SG @ 1 ml l⁻¹ (2.94, 1.95 and 2.15 leafhopper/3 leaves) and Dr. Neem @ 5 ml l⁻¹ (3.73, 2.95 and 2.91 leafhopper/3 leaves) showed moderate effectiveness, whereas the botanical treatments Neem oil 5% @ 5 ml l⁻¹ (3.80, 3.20 and 3.39/3 leaves) and Neem rus @ 2 ml l⁻¹ (3.99, 3.57 and 3.75 leafhopper/3 leaves) remained least effective throughout the observation period against Leafhopper. The untreated control plots recorded the highest leafhopper

population (6.42, 6.59 and 6.70/3 leaves, respectively) at all observation intervals. These findings are in accordance with the findings of Kumar and Kumar (2017) [3] revealed that all the treatments were found effective in reducing the population of Leafhopper. Imidacloprid 17.8SL was the most effective treatment indicating reduction in population of leafhopper/jassid (1.26/3leaves) followed by Thiamethoxam 25WG. Also Pawar *et al.*, (2016) [6] reported that, mean population of jassids after three sprays revealed that Imidacloprid was effective and superior, the next best were Thiamethoxam.

Efficacy of bio-pesticides and insecticides against Mealy bug (*Pseudococcidae: Hemiptera*)

The data presented in Table-3 and Figure-1 indicated that the pre-treatment population of Mealy bug (*Phenacoccus solenopsis*) was uniformly distributed in the experimental plots and did not differ significantly among treatments, ranging from 3.09 to 3.16 per plant. After application of treatments, all insecticides significantly reduced the mealy bug population compared with the untreated control.

At 3 days after spraying (DAS), the lowest population of mealy bug (0.16/plant) was recorded in the Imidacloprid 17.8 SL @ 0.5 ml l⁻¹ treated plots, followed by Spinetoram 11.7% SC @ 0.25 ml l⁻¹ (0.31/plant) and Fipronil 5% SC @ 1 ml l⁻¹ (0.48/plant). Emamectin benzoate 5% SG @ 1 ml l⁻¹ (0.67/plant) and Dr. Neem @ 5 ml l⁻¹ (0.94/plant) showed

moderate effectiveness, whereas the botanical treatments Neem oil 5% @ 5 ml l⁻¹ (1.24/plant) and Neem rus @ 2 ml l⁻¹ (1.53/plant) were comparatively less effective against mealy bug. The highest population was recorded in the control plot (3.21/plant).

A similar tendency was observed at 5, 7 and 10 day after spray Imidacloprid 17.8 SL @ 0.5 ml l⁻¹ consistently recorded the lowest mealy bug population (0.12, 0.21 and 0.15/plant respectively,) followed by Spinetoram 11.7% SC @ 0.25 ml l⁻¹ (0.22, 0.34 and 0.32/plant) and Fipronil 5% SC @ 1 ml l⁻¹ (0.37, 0.51 and 0.55/plant). Emamectin benzoate 5% SG @ 1 ml l⁻¹ (0.51, 0.71 and 0.84/plant) and Dr. Neem @ 5 ml l⁻¹ (0.93, 1.05 and 1.15/plant) showed moderate effectiveness, whereas the botanical treatments Neem oil 5% @ 5 ml l⁻¹ (0.70, 1.31 and 1.44/plant) and Neem rus @ 2 ml l⁻¹ (0.95, 1.61 and 1.78/plant) remained least effective throughout the observation period against Mealy bug. The untreated control plots recorded the highest mealy bug population (3.27, 3.32 and 3.39/plant, respectively) at all observation intervals. These result collaborate with Nidheesh *et al.* (2020) [5] recorded that out of the seven insecticides screened against *P. solenopsis* under laboratory conditions, neonicotinoids such as Thiamethoxam 25% WG @ 0.40 g/l and dinotefuran 20% SG @ 0.25 g/l were found to be most effective in reducing the mealy bug population at recommended and above recommended doses.

Table 1: Efficacy of Bio-pesticides and Insecticides against Whitefly/3 leaves

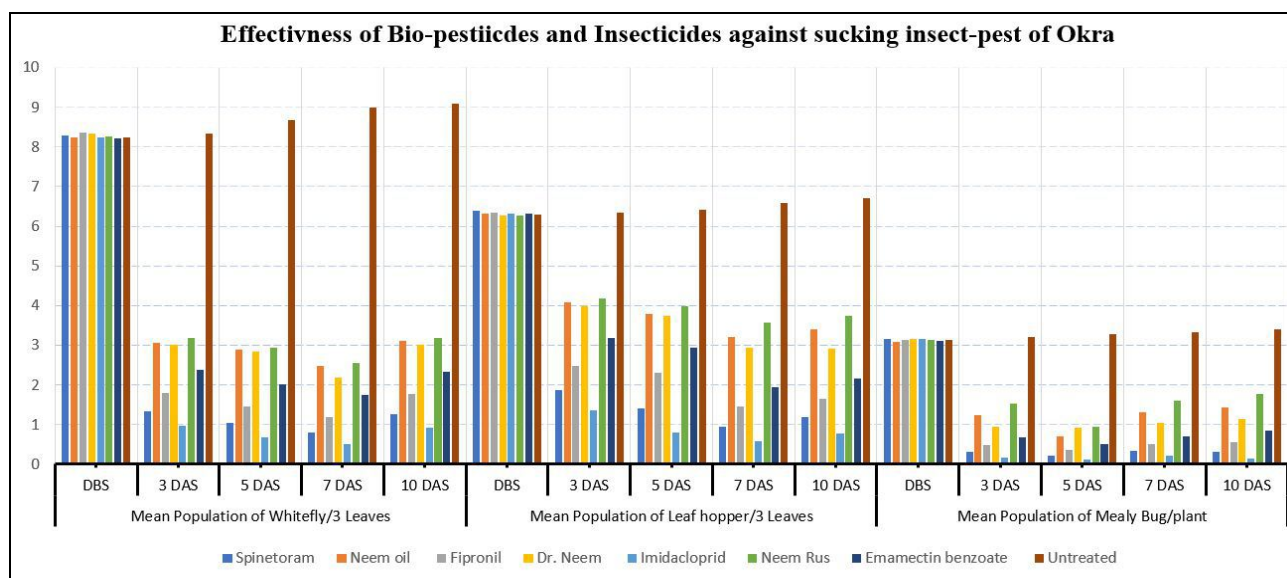
Treatments	Dose (ml/l)	Mean Population of Whitefly/3 Leaves				
		DBS	3 DAS	5 DAS	7 DAS	10 DAS
Spinetoram 11.7 % SC	0.25 ml	8.28 (2.88)*	1.33 (1.15)	1.04 (1.02)	0.81 (0.90)	1.27 (1.13)
Neem Oil 5%	5 ml	8.25 (2.87)	3.07 (1.75)	2.89 (1.70)	2.47 (1.57)	3.11 (1.76)
Fipronil 5% SC	1 ml	8.35 (2.89)	1.80 (1.34)	1.45 (1.21)	1.20 (1.10)	1.78 (1.33)
Dr. Neem	5 ml	8.34 (2.89)	3.01 (1.73)	2.84 (1.68)	2.19 (1.48)	3.01 (1.73)
Imidacloprid 17.8 SL	0.5 ml	8.25 (2.87)	0.96 (0.96)	0.67 (0.82)	0.50 (0.70)	0.92 (0.94)
Neem Rus	2 ml	8.27 (2.88)	3.18 (1.78)	2.93 (1.71)	2.55 (1.59)	3.19 (1.79)
Emamectin Benzoate 5% SG	1 ml	8.22 (2.87)	2.37 (1.54)	2.01 (1.41)	1.74 (1.31)	2.34 (1.53)
Untreated	-	8.24 (2.87)	8.33 (2.89)	8.67 (2.94)	9.00 (3.00)	9.08 (3.01)
SeM ±			0.06	0.06	0.05	0.06
CD 5%			0.18	0.18	0.17	0.19

Table 2: Efficacy of Bio-pesticides and Insecticides against Leafhopper/3 leaves

Treatments	Dose (ml/l)	Mean Population of Leaf hopper/3 Leaves				
		DBS	3 DAS	5 DAS	7 DAS	10 DAS
Spinetoram 11.7 % SC	0.25 ml	6.38 (2.53)	1.86 (1.36)	1.41 (1.19)	0.95 (0.98)	1.19 (1.09)
Neem Oil 5%	5 ml	6.33 (2.52)	4.09 (2.02)	3.80 (1.95)	3.20 (1.79)	3.39 (1.84)
Fipronil 5% SC	1 ml	6.34 (2.52)	2.49 (1.58)	2.31 (1.52)	1.45 (1.20)	1.66 (1.28)
Dr. Neem	5 ml	6.27 (2.50)	3.98 (1.99)	3.73 (1.93)	2.95 (1.71)	2.91 (1.70)
Imidacloprid 17.8 SL	0.5 ml	6.31 (2.51)	1.37 (1.15)	0.80 (0.89)	0.59 (0.76)	0.77 (0.87)
Neem Rus	2 ml	6.26 (2.50)	4.19 (2.05)	3.99 (1.99)	3.57 (1.89)	3.75 (1.94)
Emamectin Benzoate 5% SG	1 ml	6.31 (2.51)	3.19 (1.79)	2.94 (1.72)	1.95 (1.40)	2.15 (1.47)
Untreated	-	6.30 (2.51)	6.34 (2.52)	6.42 (2.53)	6.59 (2.57)	6.70 (2.59)
SeM ±			0.06	0.07	0.06	0.06
CD 5%			0.19	0.20	0.19	0.19

Table 3: Efficacy of Bio-pesticides and insecticides against Mealy bug/plant

Treatments	Dose (ml/l)	Mean Population of Mealy Bug/plant				
		DBS	3 DAS	5 DAS	7 DAS	10 DAS
Spinetoram 11.7 % SC	0.25 ml	3.15 (1.77)	0.31 (0.56)	0.22 (0.47)	0.34 (0.58)	0.32 (0.56)
Neem Oil 5%	5 ml	3.09 (1.76)	1.24 (1.11)	0.70 (0.83)	1.31 (1.14)	1.44 (1.20)
Fipronil 5% SC	1 ml	3.13 (1.77)	0.48 (0.69)	0.37 (0.60)	0.51 (0.71)	0.55 (0.74)
Dr. Neem	5 ml	3.16 (1.78)	0.94 (0.97)	0.93 (0.97)	1.05 (1.02)	1.15 (1.07)
Imidacloprid 17.8 SL	0.5 ml	3.15 (1.77)	0.16 (0.40)	0.12 (0.34)	0.21 (0.45)	0.15 (0.38)
Neem Rus	2 ml	3.13 (1.77)	1.53 (1.24)	0.95 (0.97)	1.61 (1.27)	1.78 (1.33)
Emamectin Benzoate 5% SG	1 ml	3.10 (1.76)	0.67 (0.82)	0.51 (0.72)	0.71 (0.84)	0.84 (0.92)
Untreated	-	3.13 (1.77)	3.21 (1.79)	3.27 (1.81)	3.32 (1.82)	3.39 (1.84)
SeM ±			0.04	0.04	0.04	0.04
CD 5%			0.13	0.11	0.11	0.12

**Fig 1:** Effectiveness of bio-pesticides and insecticides against sucking insect pest of okra on different time interval.

Conclusion

The study revealed that all insecticidal treatments significantly reduced the population of sucking insect-pest viz., Whitefly, Leafhopper and Mealy bug in Okra compared to the untreated control. Imidacloprid 17.8 SL @ 0.5 ml l⁻¹ was most effective against all major sucking insect pest of okra. These insecticides can be recommended for effective pest management in Okra growing farmers under Eastern Uttar Pradesh conditions.

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References

- Begum, K., Patil, S., Mohite, P. Evaluation of newer molecules of insecticides against sucking pests complex infesting okra. Indian journal of applied research, 2016. 6(2), 30-34.
- Kishnaiah K. Methodology for assessing crop losses due to pests of vegetables Assessment of crop losses due to pest and disease. U.S.A Tech 1980. 33:259-26.
- Kumar, K. P., Kumar, A. Efficacy of selected insecticides against sucking insect pests [*Amrasca biguttula biguttula* (Ishida) and *Bemisia tabaci* (Gennadius)] of okra [*Abelmoschus esculentus* (L.) Moench]. International Journal of Current Microbiology and Applied Sciences, 2017. 6(8), 3256-3259.
- Mohapatra, S. Evaluation of various pest management modules for insect pest complex in okra, *Abelmoschus esculentus* (L.) Moench (Doctoral dissertation, Department of Entomology, 2023. OUAT, Bhubaneswar).
- Nidheesh, T. D., Jayappa, A. H., Shylesha, A. N., Nagaraju, N., Jayadeva, H. M. Screening of new insecticide molecules against cotton mealybug, *Phenacoccus solenopsis* Tinsley (Homoptera: Pseudococcidae). International Journal of Current Microbiology and Applied Sciences 2020. 9(3), 2542-2550.
- Pawar, S.A., Zanwar, P.R., Lokare, S.G., Dongarjal, R.P., Sonkamble, M.M. Efficacy of newer insecticides against sucking pests of okra. Indian Journal of Entomology, 2016. 78(3): 257-259.
- Saini, A., Kumar, R., Mishra, S. K., Mishra, A. K., Tiwari, B., Singh, S. Efficacy of novel insecticides against sucking insect pests of okra (*Abelmoschus esculentus* L. Moench). The Pharma Innovation Journal, 2023. 202(312), 7.
- Sastry K.S.M., Singh S.J. Effect of yellow vein mosaic virus infection on growth and yield of okra crop. Indian phytopathology. 1974. 27:294-297.