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एक राष्ट्र, एक कृषि और एक टीम''

NATIONAL CONFERENCE

On

Advances in Sustainable Plant Protection under Changing Agriculture Scenario

18-20 SEPTEMBER, 2025

Organized by

Entomological Research Association
Department of Entomology
Rajasthan College of Agriculture
Maharana Pratap University of Agriculture & Technology
Udaipur, Rajasthan - 313 001

ABSTRACT BOOK

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NATIONAL CONFERENCE

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Department of Entomology
Rajasthan College of Agriculture
Maharana Pratap University of Agriculture & Technology
Udaipur, Rajasthan - 313 001

Book of Abstracts: National Conference on Advances in Sustainable Plant Protection under Changing Agriculture Scenario

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PREFACE

The contemporary agricultural landscape is undergoing a profound transformation, driven by crop diversification, rapid climatic shifts, and the integration of biotechnological advancements. These dynamic changes are significantly altering the status and behavior of pests, including insects, diseases, weeds, and nematodes, within our agro-horti ecosystems. This has led to unpredictable biotic stresses, the alarming conversion of minor pests into major threats, and the development of polyphagy in established species. The over-reliance on chemical pesticides to combat these issues has further disrupted natural ecological balances, adversely affecting beneficial natural enemies and leading to pest resurgence, resistance, and new epidemic outbreaks of previously sporadic pests.

In this challenging scenario, marked by the emergence of invasive species and host crossovers, the exchange of knowledge on pest status, their qualitative and quantitative impacts on crops, and the promotion of eco-safe, sustainable management strategies has never been more critical. Judicious use of agrochemicals, integrated with innovative, bio-intensive approaches, is paramount for safeguarding our agricultural productivity and environmental health.

The National Conference on **"Advances in Sustainable Plant Protection under Changing Agriculture Scenario"**, organized by the Entomological Research Association, Department of Entomology, Rajasthan College of Agriculture, MPUAT, Udaipur aims to bring together leading scientists, researchers, academicians, and industry professionals from across the nation to deliberate on these pressing challenges. The deliberations will not only highlight scientific advancements but also provide directions for developing farmer-friendly, eco-resilient, and economically viable solutions for crop protection.

The conference will focus on a wide range of thematic areas, including biosystematics and invasive organisms, impact of climate change on pest dynamics, bio-intensive and IPM approaches, bioecology of pests and loss estimation, novel molecules and biotechnological tools, IoT and bioinformatics applications, as well as entrepreneurship and policy regulations. We firmly believe that the discussions, research contributions, and recommendations emerging from this conference will go a long way in shaping the future of sustainable plant protection in India. This souvenir is a humble attempt to present the collective efforts, abstracts, and scholarly contributions of participants from across the country.

On behalf of the Organizing Committee, we extend our heartfelt gratitude to all the distinguished guests, resource persons, delegates, sponsors, and partners for their invaluable support and participation. We are confident that this academic gathering will inspire new ideas, foster collaborations, and contribute meaningfully to the advancement of sustainable agriculture. We believe this compilation will serve as a comprehensive resource and a catalyst for future research, fostering advancements in sustainable plant protection for a resilient agricultural future.

The financial assistance received from Research and Development Fund of National Bank for Agriculture and Rural Development (NABARD) towards conduct of National Conference including publication of Conference / Seminar / Abstract / Proceedings of the Conference is greatly acknowledged.

Organizing Committee
National Conference on Advances in Sustainable Plant Protection
September 18-20, 2025
Department of Entomology, RCA, MPUAT, Udaipur

FORWARD

The Entomological Research Association (ERA), Department of Entomology, Rajasthan College of Agriculture, Maharana Pratap University of Agriculture and Technology, Udaipur, is proudly organizing the **National Conference on "Advances in Sustainable Plant Protection under Changing Agriculture Scenario"** from September 18–20, 2025, in the Beautiful City of Lakes of Rajasthan, Udaipur.

The purpose of organizing such a National Conference is to provide a platform for bringing together renowned scientists, extension functionaries, students, entrepreneurs, and policy makers to discuss the latest issues in the field of entomology. The programme includes lead lectures by eminent speakers and thematic sessions featuring lead oral and poster presentations by researchers and students from different parts of the country. On behalf of the Organising Committee and the Editors, we are delighted to present the Book of Abstracts for the National Conference, covering various thematic areas in entomology.

We also extend our hearty wishes to our organising team, co-organisers/knowledge partners, sponsors, and delegates for their contributions to this transformative mega event.
As we navigate the evolving landscape of agriculture, this conference stands as a testament to our collective commitment to sustainable practices, scientific innovation, and interdisciplinary collaboration. The insights shared here will not only enrich academic discourse but also inspire actionable strategies for resilient pest management and ecological stewardship.
We hope that all the deliberations and exchanges during the conference will foster new partnerships, ignite fresh ideas, and strengthen the national resolve toward sustainable plant protection.

The financial assistance received from Research and Development Fund of National Bank for Agriculture and Rural Development (NABARD) towards conduct of National Conference including publication of Conference / Seminar / Abstract / Proceedings of the Conference is greatly acknowledged.

A WARM WELCOME TO THE CITY OF LAKES, UDAIPUR, INDIA.
May your experience here be intellectually rewarding and culturally enriching.

Dr. M.K. Mahla
Chief Organizing Secretary

डॉ. अजीत कुमार कर्नाटक
कुलगुरू
Dr. Ajeet Kumar Karnatak
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महाराणा प्रताप कृषि एवं प्रौद्योगिकी विश्वविद्यालय
विश्वविद्यालय परिसर, उदयपुर - 313 001 (राजस्थान), भारत

MESSAGE

I am delighted to learn that the Entomological Research Association, in collaboration with the Department of Entomology, Rajasthan College of Agriculture, is organizing the National Conference on "Advances in Sustainable Plant Protection under Changing Agriculture Scenario" during September 18-20, 2025, at Maharana Pratap University of Agriculture and Technology, Udaipur. The Department of Entomology has a distinguished legacy of hosting several national and international conferences and symposiums in the past, contributing significantly to scientific dialogue and advancement.

The challenge of emerging insect pests continues to pose a serious threat to agriculture and biodiversity, as their sudden proliferation and outbreaks severely affect crop productivity and sustainability, besides creating enduring challenges for global agricultural trade. Studies suggest that insect pests account for approximately 18-20 percent losses in Indian agriculture. Factors such as excessive and imbalanced use of fertilizers, unsustainable cropping patterns, introduction of high- yielding and hybrid varieties, and indiscriminate use of pesticides have further aggravated the problems of pest resurgence, resistance, and secondary outbreaks.

The theme of this conference is both timely and comprehensive, covering vital aspects such as biodiversity, ecology, integrated pest management, biological control, applications of IoT, and modern technological interventions. I am confident that the deliberations by over 250 participating scientists, researchers, and students from across the country will generate valuable insights, foster meaningful exchanges of knowledge, and propose pragmatic solutions to pressing challenges in Entomology and plant protection.

I extend my warm congratulations to the organizers for this commendable initiative and wish the National Conference great success in achieving its objectives.

(Ajeet Kumar Karnatak)

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MESSAGE

It is indeed a privilege to participate as a sponsor in "National Conference on Advances in Sustainable Plant Protection under Changing Agriculture Scenario" to be held from 18'*- 20'^ September, 2025 at RCA Udaipur. As an alumni it brings in nostalgic memories!

Agrochemicals are one of the critical inputs in agriculture. The industry today has reacheda turnover of Z80,000 crores with exports touching Z44,000 crores during 2022- 23. It is a matter of pride that the effort by Indian companies to focus on 'Make in India' has been well accepted by the fact that we are exporting to 167 countries meeting, Global specifications.

This conference aims to bring scientists and researchers in plant protection to share their experiences in major theme areas, However, the thrust on indigenous R&D would facilitate in adoption of new technologies and a more positive perception.

We would like to compliment Entomological Research Association, Department of Entomology, Rajasthan College of Agriculture, Maharana Pratap University of Agriculture & Technology, Udaipur for takipg the initiative for this 1 0'* Edition on Plant Protection to discuss ways and means to reduce croplosses, thereby increase productivity.

CCFI and their members have the mandate to promote safe and judicious use of Agro Chemicals for the safety of humans, animals and the environment which is reflected in the kind of farmer training programs that we conduct on PAN India basis.

Wishing the event a grand success. Best wishes,

(Harish Mehta)

Dr. J. P. Singh
Plant Protection Adviser
Directorate of Plant Protection,
Quarantine & Storage, Faridabad,
India – 121001

MESSAGE

It is a matter of great satisfaction to witness the organization of the National Conference on "Advances in Sustainable Plant Protection Under Changing Agriculture Scenario," being held from September 18–20, 2025, at Maharana Pratap University of Agriculture and Technology, Udaipur. The collaborative initiative of the Entomological Research Association and the Department of Entomology, Rajasthan College of Agriculture, in convening this timely and thematically rich event is truly commendable.

In the context of evolving agricultural practices and climate variability, the Directorate of Plant Protection, Quarantine & Storage (DPPQS) remains steadfast in its commitment to promoting ecologically sound, economically viable, and scientifically robust plant protection strategies. Our guiding principles emphasize Integrated Pest Management (IPM), reduction in chemical pesticide dependency, and the adoption of bio-rational and precision-based technologies. The themes addressed in this conference—ranging from biodiversity and biosystematics to digital innovations and IoT-enabled pest surveillance—are well aligned with our national objectives to safeguard plant health and ensure sustainable agricultural development.

As the Plant Protection Adviser, I deeply appreciate the efforts of the organizers in bringing together a distinguished assembly of scientists, academicians, and stakeholders to deliberate on these critical issues. Such platforms are instrumental in shaping future-ready pest management frameworks, strengthening extension systems, and empowering farming communities with actionable, field-level solutions.

I extend my best wishes for the grand success of this important initiative and for its enduring contribution to resilient agro-ecosystems and national food security.

डॉ. पूनम जसरोटिया
सहायक महानिदेशक
(पादप संरक्षण एवं जैव सुरक्षा)

Dr. Poonam Jasrotia
Assistant Director General
(Plant Protection and Biosafety)

भाकृअनुप
ICAR

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MESSAGE

It gives me immense pleasure that the Entomological Research Association, in collaboration with the Department of Entomology, Rajasthan College of Agriculture, MPUAT, Udaipur, is jointly organizing the National Conference on "Advances in Sustainable Plant Protection under Changing Agriculture Scenario" from September 18–20, 2025.

Thetheme of the conference highlights the urgent need to reorientplant protection practices in light of shifting climatic patterns, evolving pest dynamics, and the demand for environmentally safe solutions. With agriculture facing challenges such as pest resistance, biodiversity loss,and overdependence on chemical pesticides, there is growing emphasis on integrating eco-friendly technologies, biocontrol agents,precision tools, and climate-smart practices. Advances in molecular entomology, microbial solutions, digital surveillance, and integrated pest management are opening new pathways to safeguard crops while minimizing ecological footprints. This approach ensures sustainable production, strengthens farmers' resilience, and supports long-term food security, highlighting the need for innovative plant protection strategies that combine sciencewith practical applications.

The conference offers a timely platform for researchers, policymakers, and industry stakeholders to exchangeknowledge and innovations. Through collaboration and dialogue, it aims to strengthen sustainable plant protection strategies that enhance crop productivity, build resilience to future challenges, and contribute to food security, ecosystem health,and farmers' livelihoods. I extend my warm greetings and best wishes for the success of this conference and hope it generates meaningful recommendations for farmers, students, and the scientific community.

(Poonam Jasrotia)

भकृ अनुप
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डा. शान्ति कुमार शर्मा
सहायक महानिदेशक (मानव संसाधन प्रबंधन)
Dr. Shanti Kumar Sharma, Ph.D. (Agronomy), IARI
Assistant Director General (Human Resource Management)

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MESSAGE

I am pleased to know that the MPUAT and Entomological Research Association, Department of Entomology, RCA, Udaipur (Raj.) is organizing a National Conference “Advances in Sustainable Plant Protection under Changing Agriculture Scenario" from 18-20 September, 2025.

Pests, weeds and disease cause a yearly loss of around 30% of the world agricultural production. To feed the world population which is still growing improvement of yield and quality of crops are needed. Plant protection is one of the major issues in enhancing agricultural production across the world with increasing climatic risks, changing monocultures and declining fauna & flora diversity across the world. This has led to ecological imbalance & change in diversity of major and minor pests in different crop ecosystem. Besides, the quality upgradation of agricultural produce assumes great significance in the new trade regime. The natural resource management, ecological balances, environmental protection etc. are also associated with pest control methods.
In such a scenario, understanding the spatial and temporal factors in different agro- ecosystems will greatly help to develop more sustainable crop protection strategies using the latest technologies for pest monitoring and management.

In this context, this National Conference covering sub-themes like changing pests' scenario in agriculture and horticultural ecosystems, bio-ecology, management techniques and their impact on environment and human health, biotechnological and eco friendly approaches of pests' management are quite timely.

I hope this National Conference will identify short term and long-term researchable and capacity building issues in the areas of pest management with special reference to crop ecosystem and come out with specific actionable recommendations.

I convey my best wishes to the organizers for grand success of the event.

(S K Sharma)

डॉ. अरविन्द वर्मा
निदेशक अनुसंधान
Dr. Arvind Verma
Director Research

अनुसंधान निदेशालय
महाराणा प्रताप कृषि एवं प्रौद्योगिकी विश्वविद्यालय
राजस्थान कृषि महाविद्यालय परिसर, उदयपुर–31 3001 (राज.)
DIRECTORATE OF RESEARCH
MAHARANA PRATAP UNIVERSITY OF AGRICULTURE & TECHNOLOGY
RCA CAMPUS, UDAIPUR-313001 RAJASTHAN

MESSAGE

Sustainable plant protection has become a critical priority in modern agriculture, as pests, weeds, and diseases are responsible for nearly 30% of global crop losses each year. The challenges are further intensified by climatic variability, monocropping systems, and declining biodiversity, especially in the fragile and diverse agro-climatic zones of Southern Rajasthan.

In this context, the National Conference on *"Advances in Sustainable Plant Protection under Changing Agriculture Scenario"*, being organized during September 18–20, 2025 by MPUAT, Udaipur in collaboration with the Entomological Research Association, provides an important platform to deliberate on eco-friendly and innovative solutions. Guided by its vision to serve the farming community of Southern Rajasthan with need-based technologies, MPUAT is committed to promoting sustainable practices that enhance productivity, conserve natural resources, and safeguard the environment.

I am confident that the conference will foster meaningful discussions among scientists, policymakers, and stakeholders, leading to strategies that strengthen resilient and sustainable plant protection for the future.

(Arvind Verma)

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सूरजपोल बाहर, उदयपुर – 313001

Dr. R.L. Soni
Director Extension Education

MESSAGE

It is a matter of immense pleasure that the Entomological Research Association, in collaboration with the Department of Entomology, Rajasthan College of Agriculture, MPUAT, Udaipur, is organizing a National Conference on "**Advances in Sustainable Plant Protection under Changing Agriculture Scenario"** from 18th to 20th September, 2025.

The theme of this conference is highly relevant and timely, especially in the wake of evolving climatic patterns, emerging pest dynamics, and the increasing need for eco-friendly and economically viable plant protection strategies. In this context, the conference provides an excellent platform for researchers, academicians, extension professionals and policy makers to deliberate upon recent innovations, challenges, and opportunities in sustainable plant protection.

Extension Education plays a pivotal role in translating research findings into field-level applications. The collaboration between research and extension is crucial for ensuring that the fruits of scientific advancements in plant protection reach the farming community in a practical and accessible manner. I am confident that the insights and recommendations emerging from this conference will significantly contribute to the formulation of sustainable and farmer- friendly plant protection strategies.

I extend my heartfelt congratulations to the organizers for their sincere efforts in bringing together distinguished experts and stakeholders from across the country.

I wish the conference grand success, joyful and memorable time at Maharana Pratap University of Agriculture and Technology, Udaipur.

RLSoni

(R. L. Soni)

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RAJASTHAN COLLEGE OF AGRICULTURE
MAHARANA PRATAP UNIVERSITY OF AGRICULTURE & TECHNOLOGY
GURU GOVIND SINGH MARG, UDAIPUR 313 001

Dr. M.K. Mahla
Dean & Chairman, Faculty of Agriculture

MESSAGE

I am glad to know that the Entomological Research Association, in collaboration with the Department of Entomology at Rajasthan College of Agriculture, is organizing the National Conference on "Advances in Sustainable Plant Protection under Changing Agriculture Scenario" from September 18–20, 2025, at Maharana Pratap University of Agriculture and Technology, Udaipur. The Department of Entomology is credited with conducting several national and international conferences/symposiums in the past.

Emerging insect pests consistently threaten humanity, since their abrupt proliferation and outbreaks adversely impact crop output and biodiversity, while also posing a persistent risk to global agricultural trade. Estimates indicate that these pests inflict varied losses of 18-20 percent in Indian agriculture. Numerous activities, including the overuse of fertilisers, inappropriate cropping patterns, the introduction of high-yielding and hybrid varieties, and the indiscriminate application of pesticides, have significantly influenced the reappearance, resistance, and secondary outbreaks of insect pests.

The conference theme is relevant and encompasses a broad spectrum of subjects, including biodiversity, ecology, pest management, bio control, IoT, and contemporary methodologies in pest management. I anticipate that about 250 scientists, students, and research experts from various regions of the country will present their research findings at this conference. This platform provides an excellent opportunity to talk, exchange knowledge, and generate ideas on many challenges pertaining to Entomology, ultimately yielding beneficial solutions for the agricultural sector.

I wish the National Conference a grand success and also congratulate the organisers for these initiatives.

(Manoj Kumar Mahla)

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COLLEGE OF DAIRY & FOOD TECHNOLOGY
Maharana Pratap University of Agriculture and Technology
Udaipur – 313001(Rajasthan)

Prof. Lokesh Gupta
DEAN

MESSAGE

It is a privilege to convey my warm greetings and best wishes on the occasion of the Conference on "Advances in Sustainable Plant Protection under Changing Agriculture Scenario" jointly organized by MPUAT and Entomological Research Association, Department of Entomology, RCA, Udaipur (Raj.)

Agriculture, being the foundation of food and nutritional security, is undergoing rapid transformation under the influence of climate change, globalization, and intensification of production systems. Plant protection, which has always been pivotal to agricultural productivity, now requiresredefined approaches that harmonize with sustainability, environmental stewardship, and the welfare of farming communities. The emergence of new pests and diseases, resistance development, and concerns over chemical-intensive practices necessitate innovative, eco-friendly, and integrated solutions.

The chosen theme of this conference is of great contemporary relevance and academic importance. By bringing together experts from research, academia, industry, and policy, this event provides a valuable forum to deliberate on the latest scientific advancements and to chart pathways for resilient and sustainable agricultural systems. I am confident that the exchangeof knowledge and collaborative discussions during the conference will contribute meaningfully towards strengthening plant protection strategies and building climate-resilient farming systems.

The dedicated efforts of the organizing committee in hosting this significant academic event are praiseworthy,and I convey my best wishesfor its successful conduct and productive discussions. I am confident that the deliberations of this conference will foster innovative perspectives, actionable strategies, and collaborative endeavours in support of sustainable agricultural development..

(Lokesh Gupta)

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DEPARTMENT OF ENTOMOLOGY
RAJASTHAN COLLEGE OF AGRICULTURE
(Maharana Pratap University of Agriculture & Technology)
Udaipur 313 001 (Rajasthan)

Dr. S. Ramesh Babu, Prof. & Head

MESSAGE

Growing awareness of the challenges facing a predicted global population of nearly 10 billion by 2050 has placed the urgent need for environmental sustainability at the forefront of international policy deliberations. The rise in food production due to population expansion has led to a dependence on intensive farming practices. The overuse of agricultural chemicals, such as fertilizers and insecticides, negatively impacts the ecology, soil quality, water supplies, and human health. It causes biodiversity loss, air and water pollution, and the emergence of pests resistant to pesticides. Agrochemicals can also have a substantial financial impact on farmers, affecting their sustainability and long-term profitability. Innovative approaches are essential to overcoming these obstacles to produce healthier goods and cut the use of pesticides in half.

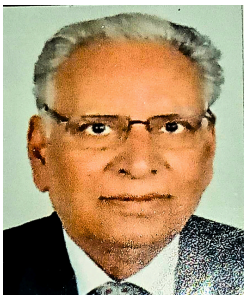
It is in this context that the Entomological Research Association, Udaipur, in association with the Department of Entomology, Rajasthan College of Agriculture, MPUAT, is organizing the National Conference on **"Advances in Sustainable Plant Protection under a Changing Agriculture Scenario"** from September 18–20, 2025, at Maharana Pratap University of Agriculture and Technology, Udaipur. I am sure that this conference will provide a platform and opportunity for scientists, students, stakeholders and extension agencies to deliberate on the current situation on the subject and suggest a way forward to enhance the utility of different IPM technologies in a compatible manner for the sustainability of food production. Participants will have the chance to engage in discussions, share innovative ideas, and explore collaborative approaches that can significantly impact agricultural practices. By fostering a multidisciplinary dialogue, we aim to create actionable strategies that address the pressing challenges faced in sustainable agriculture today.

I congratulate the organizers on the grand success of this conference.

(Ramesh Babu)

ENTOMOLOGICAL RESEARCH ASSOCIATION
Department of Entomology
Rajasthan College of Agriculture
Maharana Pratap University of Agriculture & Technology,
Udaipur-313001 Rajasthan

Dr. S. C. Bhardwaj
President



MESSAGE

It is a matter of great pleasure and pride for us at the Entomological Research Association, Department of Entomology, Rajasthan College of Agriculture, MPUAT, Udaipur, to host this NATIONAL CONFERENCE ON "ADVANCES IN SUSTAINABLE PLANT PROTECTION UNDER CHANGING AGRICULTURE SCENARIO" FROM SEPTEMBER 18-20, 2025. It reflects the urgency of addressing the evolving challenges in pest management amidst shifting agricultural landscapes. Insect-pests continue to cause variation in crop production causing significant economic losses in production. This conference aims to spotlight the scientific and technological advancements that can reshape our approach to sustainable agriculture. The sessions will encompass a wide range of topics—from pest resurgence and biosystematics to ecological modelling and digital surveillance—providing a robust platform for meaningful exchange.

Agriculture today stands at a crossroads, where climate unpredictability, intensive cultivation, and invasive species have disrupted conventional pest control strategies. The overuse of agrochemicals has led to resistance, ecological imbalance, and declining soil and water quality. Through this conference, we seek to promote integrated and eco-conscious solutions such as bio-intensive IPM models, biotechnological innovations, and smart farming tools powered by IoT and bioinformatics. We are honoured to welcome over 250 esteemed participants from across the country, including leading scientists, emerging scholars, and industry experts, whose contributions will enrich the dialogue and help shape future directions in plant protection.

As organizers, we believe this gathering will foster interdisciplinary collaboration and inspire actionable insights that benefit not only the research community but also farmers, Policymakers, and Extension professionals. The deliberations held over these three days will help refine strategies, encourage innovation, and strengthen the collective resolve to build resilient agricultural systems. We extend our sincere appreciation to all contributors and attendees for their enthusiastic participation and support. May this conference serve as a beacon for sustainable progress and scientific excellence in the field of entomology and beyond.

(Bhardwaj)

Dr. R. Ravi Babu
Chief General Manager
NABARD
Rajasthan Regional Office, Jaipur

MESSAGE

I am pleased to learn that the Entomological Research Association, Department of Entomology, Rajasthan College of Agriculture, MPUAT, Udaipur, is organizing the National Conference on "Advances in Sustainable Plant Protection under Changing Agriculture Scenario" from 18 to 20 September 2025. The theme is both timely and highly relevant in the face of climate change and evolving agricultural challenges.

Pest dynamics are shifting with the emergence of new species and the increasing spread of invasive organisms, issues further aggravated by rising temperatures, erratic rainfall, and longer cropping seasons. These trends highlight the urgent need for sustainable, climate-smart plant protection strategies that safeguard biodiversity, productivity, and farmer livelihoods.

The conference will serve as a vital forum for researchers, academicians, industry representatives, and other stakeholders to exchange insights on the latest innovations, trends, and challenges in plant protection. It will help us collectively identify strategic research and development thrust areas that bridge critical knowledge gaps and inform adaptive, climate-smart solutions.

I am confident that the deliberations of this conference will generate valuable insights and recommendations to guide research, policy, and practice in strengthening agricultural resilience.

I extend my best wishes to the organizers and participants for the success of this important event.

(Dr. R. Ravi Babu)

Dr. Deepak Shah
Chairman
Crop Care Federation of India

MESSAGE

Our Agrochemical Industry has gone through fairly difficult times, especially over the last one year when there was a lot of volatility and reduction in the price of almost all technical.

Due to this fiasco, the price of the finished products also started plummeting despite all the manufacturers had escalated the price of raw material and inventories.

After delivering spectacular growth over the last decade, the Indian agrochemical industry experienced several challenges in 2023, from slowing global demand and crop- related issues due to erratic monsoons affecting the whole agrochemicals sector to the dumping of Chinese chemicals in the market, which has led to reduced price realizations'.

However despite these challenges, the agrochemical industry is showing some signs of recovery.

A major positive development is the reduction in gas prices. In addition, there are 'green shoots' signaling an improvement in global demand. This can be attributed to the 'China plus one' strategy favouring countries like India. Furthermore, the fundamentals of the Indian agrochemical industry remain strong. As a result, the industry's prospects look promising. We are exporting to 167 countries with quality matching global standard.

I am pleased to learn that CCFI is the prime sponsor for this event.

We would like to compliment Entomological Research Association, Department of Entomology, Rajasthan College of Agriculture, Udaipur has taken this subject on plant protection which is the key to our agrochemical industry.

With Best Wishes

(Deepak Shah)

NATIONAL CONFERENCE

on

ADVANCES IN SUSTAINABLE PLANT PROTECTION UNDER CHANGING AGRICULTURE SCENARIO

18-20 September, 2025

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Abstracts

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ABSTRACTS

THEME 1

Biosystematics, Re-emerging and Invasive organisms

BRIO(O)-01

Bio-Intensive Management of Major Insect Pests of Bottle Gourd in Semi-arid Region of Rajasthan

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Investigations on the "Bio-intensive management of major insect pests of bottle gourd in semi-arid region of Rajasthan" were conducted at Horticulture Farm, S.K.N. College of Agriculture, Jobner (Jaipur) during *Kharif* 2023. A survey was conducted at fifteen-day intervals across five tehsils in Jaipur district, namely Chomu, Sambhar, Jobner, Bassi, and Renwal. Major pests recorded included the red pumpkin beetle and fruit fly. Bassi tehsil showed the highest mean beetle population (1.15 ± 0.21 per plant), with Renwal tehsil having the lowest (0.45 ± 0.13). The leaf damage Infestation ranged from 2 to 26 per cent with the highest damage in Bassi and the lowest in Renwal and Sambhar (12%). Fruit fly infestation ranged from 5 to 25 per cent, with the highest mean infestation in Bassi tehsil (11.87±2.97).

The beetle incidence on bottle gourd ranged from 0.28 to 3.72 beetles per plant, with leaf damaged escalated to 31.20% by 40th standard meteorological week (SMW). Correlation studies showed a significant positive relationship between the red pumpkin beetles and leaf damage with maximum temperature. The seasonal occurrence of fruit flies commenced in 36th SMW, initially with infestation rates of 16.67% by number and 15.07% by weight basis. Correlation studies indicated that fruit fly infestation positively correlated with sunshine hours, while minimum temperature and evaporation showed significantly negative correlations with fruit fly infestation, both in terms of number and weight basis.

All treatments significantly lowered the red pumpkin beetle population compared to the untreated control. Among them, Spinosad 45 SC was the most effective, recording 0.93 beetles per plant. This was followed by Cyantraniliprole 10.26 OD (1.08), Flubendiamide 39.35 SC (1.22), and Emamectin benzoate 5 SG (1.34),Neem oil 2%, Azadirachtin 5%, and NSKE showed comparatively lower efficacy. Spinosad was the most effective against fruit flies, lowering infestation to 7.80% by count and 6.78% by weight, and Cyantraniliprole and flubendiamide were also highly effective, with infestations of 8.44% and 8.20%. Spinosad treatment produced the maximum fruit

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yield of 333.87 q/ha, with Cyantraniliprole (331.20 q/ha), Emamectin benzoate (329.60 q/ha), and Flubendiamide (316.80 q/ha) following closely behind. The highest incremental benefit-cost ratio of 1:50.53 was observed with Emamectin benzoate 5 SG, followed by Spinosad (1:20.90) and Azadirachtin (1:19.90).

Keywords: Bottle Gourd, Red Pumpkin Beetle, Fruit Fly, Spinosad 45 SC, Emamectin Benzoate

BRIO(O)-02

Biocontrol potential of *Chrysoperla zastrowi sillemi* against *Eriosoma lanigerum*

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Woolly apple aphid, *Eriosoma lanigerum* (Hausmann) is an economically important pest of apple which poses a significant threat to apple production worldwide. The pest forms dense colonies covered with a white, waxy, filamentous secretion, typically on trunks, large branches, new shoots and roots of apple trees. Severe infestations of *E. lanigerum* lead to the formation of hypertrophic galls on roots and branches, impairing tree growth and vigour. The damage caused by the aphid compromises bud development, reduces fruit yield and significantly lowers fruit quality. The aphid does not feed on leaves but infests trunks, branches and twigs, resulting in deformities, blisters, splitting and gall like swellings of the bark. Presently farmers rely mainly on insecticides for management of this pest which is harmful to our environment. So, we evaluated the predatory potential of *Chrysoperla zastrowi sillemi* (Esben-Petersen) against woolly apple aphid under controlled conditions in departmental laboratory. Different instars of *C. zastrowi sillemi* preyed about 111 to 221 woolly apple aphids of different stages. The transformation rate was between 1.23 to 2.49 woolly apple aphids with stable predation rate of 5.78 to 12.48 woolly apple aphids. The finite predation rate was between 6.60 to 14.25 woolly apple aphids. These parameters showed *C. zastrowi sillemi* was successfully able to devour all the stages of woolly apple aphid and completed its lifecycle successfully on it and hence can be incorporated in IPM programmes against *E. lanigerum* after evaluating it in field based long term studies.

Keywords: Woolly apple aphid, *Chrysoperla zastrowi sillemi*, Predatory potential

Oral Presentation

BRIO(O)-03

Biodiversity of Pentatomid Bug Fauna in Western Rajasthan

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Conservation and management of biodiversity have become major global priorities, as they help sustain ecological stability through prey–predator interactions across different trophic levels of the food chain. Members of the family Pentatomidae are known to act as natural biocontrol agents; however, due to their sap-sucking habit, they can also attain pest status and inflict considerable damage on host plants. The present investigation was undertaken to study the diversity and distribution of Pentatomids in different localities of western Rajasthan. In total, 15 species belonging to 13 genera were documented and species diversity and richness were evaluated using the Shannon–Weiner diversity index across various zones. The species are *Acrosternum gramineum, Adria parvula, Bagrada hilaris, Carbula biguttata, Carbula socia, Dolycoris indicus, Eysarcoris ventralis, Eysarcoris sp., Erthesina acuminata, Halys serrigera, Piezodorus hybneri, Placosternum taurus, Sciocoris indicus, Eocanthecona furcellata and Andrallus spinidens.*

Keywords: Biocontrol, Pest, Management, Ecological Stability, Pentatomoids.

Oral Presentation

BRIO(O)-04

Biodiversity of *Thrips* spp. Under Middle Gujarat Agroclimatic Conditions

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An extensive field-based survey was conducted systematically to assess thrips species assemblage to elucidate the taxonomic composition and ecological facets of thrips diversity in the middle Gujarat region. During the survey conducted in January-February, 2022; various thrips species found on different hosts from middle Gujarat districts (Ahmedabad, Anand, Vadodara, Kheda, Mahisagar, Panchmahal and Chhotaudepur). Along with chilli, an invasive thrips, *Thrips parvispinus* was also recorded infesting surrounding plant species like mustard, pigeon pea, rajgira and rose. Such plants have been reported as new hosts of this invasive thrips, *T. parvispinus*. In this survey, two major families of thrips *viz*., Thripidae: Terebrantia and Phlaeothripidae: Tubulifera were found. Total nine different species under five genera were recorded. Majority of the collected specimens were identified belonging to Thripidae family (Eight species from four diff. genera, 89.00%) followed by Phlaeothripidae (11.00%). The highest distribution per cent recorded in Anand district (66.67%), where six thrips species were found *i.e., Haplothrips* sp., *Megalurothrips* sp., *Thrips florum, Thrips hawaiiensis, Thrips palmi* and *T. parvispinus*; followed by Ahmedabad district (55.56%). Most dominant species was *T. parvispinus* with per cent host preference (71.43%) on chilli, mustard, pigeon pea, rajgira and rose.

Keywords: Gujarat, Invasive thrips, Biodiversity, Host preference, Taxonomic hierarchy, Terebrantia, Tubulifera, *Thrips parvispinus*

Oral Presentation

BRIO(O)-05

Biology of Rice Moth, *Corcyra cephalonica* Reared on Different Food Grains

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During the study of biology of *Corcyra cephalonica*, it was found that sorghum is preferred by the *C. cephalonica*. In general, hatching period of rice moth ranged from 3.67 to 5.67 days, while it was maximum in pearlmillet and minimum in sorghum. Similarly, larval period varied from 36.00 to 41.67 days to complete the 5 instars of larval period, while it was minimum in sorghum and maximum in pearl millet. The maximum larval weight was recorded on sorghum, while it was minimum on pearlmillet, larval weight ranged from 44.67 to 52.33 mg. The pupal period varied from 8.67 to 10.67 days, maximum in pearlmillet and minimum in sorghum, whereas, pupal weight maximum in sorghum and minimum in pearlmillet with mean pupal weight ranged from 36.33 to 38.37 mg. The maximum adult longevity recorded in sorghum 10.67 days, while minimum in pearlmillet 8.67 days. Adult emergence on different food grains ranged from 75.00 to 81.00 per cent. The maximum mean fecundity and growth rate index was recorded on sorghum, whereas, development period was minimum in sorghum. Among all seven different food grain sorghum found best host for biology of rice moth.

Keywords: *Corcyra cephalonica,* Pearlmillet, Pupal weight, Fecundity, Biology

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BRIO(O)-06

Comparative Biodiversity of Insects and Mites in Organic and Conventional Farming Systems of Tomato

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Comparative biodiversity of insects and mites was studied in organic and conventional farming systems (FS) of tomato at certified organic farming unit of ASPEE College of Horticulture and Forestry (ACHF) and conventional farm of N.M. College of Agriculture (NMCA), Navsari Agricultural University, Navsari, Gujarat during 2018 – 2020, respectively. Total 1016 insect and mite individuals belonging to 9 insect orders (14 families, 20 species) and 1 mite order (2 families, 2 species) were recorded at organic farm (FS) against 967 individuals belonging to 8 insect orders (13 families, 17 species) and 1 mite order (2 families, 2 species) at conventional farm (FS). The diversity of insect and mites was higher in organic as compared to conventional FS. Higher species richness (22), species abundance (1016), species evenness (J= 0.76), species richness index (R= 3.03) and Shannon diversity index (H= 2.36) was observed at organic FS against lower species richness (19), species abundance (967), species evenness (0.69), species richness index (2.62) and Shannon diversity index (2.04) in conventional FS. Insect order Hemiptera and mite order Acarina were more represented at conventional farm (49.63 and 30.50 %) as compared to organic farm (46.99 and 24.17 %) whereas, Coleoptera order was more abundant at organic FS as compared to conventional FS. Relative abundance of herbivores was higher (82.10 %) with lower species evenness (0.71), species richness (1.20) and Shannon diversity index (1.55) in conventional FS as compared to lower relative abundance (69.68 %) with higher species evenness (0.74), species richness (1.37) and Shannon diversity index (1.71) in organic FS. Similarly, 288 insect and mite predators were recorded at organic farm as compared to 161 individuals in conventional FS. The relative abundance of predators was higher (28.30 %) with higher species evenness (0.70), species richness (1.59) and Shannon diversity index (1.64) at organic farm whereas, relative abundance (16.55 %), species evenness (0.67), species richness (1.59) and Shannon diversity index (1.64) remained lower at conventional farm. Similarly, higher parasitoids (21), relative abundance (2.02 %), species evenness (0.96), species richness (0.37) and Shannon weiner index (0.67) was observed in organic FS as compared to conventional FS (15,

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1.52, 0.91, 0.34 and 0.63). In the present investigation, no pollinators were observed in both the farming systems.

Keywords: Biodiversity, Conventional Farming System, Herbivores, Insect, Mite, Tomato organic farming system, Parasitoids, Predators

BRIO(O)-07

Estimation the Alpha Diversity of Pod Bugs on Mungbean

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The pod bugs comprised of 3 families with the total of 169 specimens from Agricultural Research Sub Station, Sumerpur (Pali) and College of Agriculture, Jodhpur. A total of 17 species belonging to 15 genera under 3 families were recorded which includes *Riptortus pedestris* under Alydidae Family; *Anoplocnemis phasiana*, *Cletus punctiger*, *Clavigralla gibbosa* and *Homoeocerus signatus* (Coreidae), Three species of *Nezara*, *andrallus spinidens*, *Agonocelis nubilis*, *Eocanthecona furcellata*, *Carbula biguttata*, *Codophilla maculicololis*, *Dolycoris indicus*, *Halys serrigera*, *Niphe subferruginea* and *Piezodorus hybneri*. It is evident that relative abundance of Pentatomidae (58.58%) was found to be the maximum followed by Coreidae (20.71%) and Alydidae (20.71%). The pod bugs comprised of 17 species belonging to 15 genera under 3 families, *viz*., Alydidae, Coreidae and Pentatomidae. The diversity of pod bugs observed in mungbean agroecosystem from ARSS, Sumerpur (Pali) and College of Agriculture, Jodhpur. The Shannon Wiener Diversity Index (H') and Simpson Index (D) pod bugs at Sumerpur was 2.34, 0.88 whereas, it was 1.47, 0.81 pod bugs at Jodhpur repectively. The pod bugs had maximum diversity in mungbean cultivated at ARSS, Sumerpur (H'= 2.34) (D = 0.88).The diversity of pod bugs has found be more in mungbean cultivated at ARSS, Sumerpur (H'= 2.34) compared to mungbean cultivated at College of Agriculture, Jodhpur (H'=1.47). Similarly, the more Simpson index (D) was observed in mungbean cultivated at ARSS, Sumerpur, Pali (D = 0.88) as compared to mungbean cultivated at College of Agriculture, Jodhpur (D = 0.81).

Keywords: Diversity, Pod bugs, Coreidae, Shannon Wiener Diversity Index, Simpson Index, Pentatomidae

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BRIO(O)-08

Evaluation of the New Molecules of Insecticides against Rice Leaf Folder *C. medinalis* (Guenee)

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An experiment on "Evaluation of the new molecules of insecticides against rice leaf folder *C. medinalis* (Guenee) in Central Uttar Pradesh" was carried out with seven chemical insecticides at Crop research Farm, Nawabganj, C. S. Azad University of Agriculture and Technology, Kanpur during *Kharif*, 2017 and 2018 using appropriate statistical design and tools. The key objective of this experiment is to find out the comparative efficacy of insecticides for effective management of Rice Leaf Folder. A pooled data analysis of both the years was done and it was found that all the treatments were found significantly superior over control. The application of Chlorantraniliprole 18.5 SC @ 30 g a.i./ha numerically proved best among all treatments by reducing per cent mean leaf infestation 1.36 and 0.69/10 hill in 1st and 2nd spray. The second best treatment was Fipronil 5% SC @ 75 g a.i./ha with 0.75/10 hill mean per cent leaf infestation, followed by Thiacloprid 21,7 SC @ 120 g a.i./ha (0.79/10 hill. The highest grain yield of 51.12 and 50.42 q/ha for both years, respectively, were recorded in Chlorantraniliprole 18.5 SC and minimum was 46.30 and 45.90 q/ha observed for both years, respectively, in Chlorpyriphos 20 EC treated field. Based on the economics of the treatment the highest cost benefit ratio 1:5.33 was recorded in Fipronil 5% SC @ 75 g a.i./ha which was superior in terms of economy to overall treatments irrespective of economy with additional yield i.e. 9.75 q/ha and net profit was Rs. 9789/ha. The Second-best treatment was Chlorantraniliprole 18.5 SC @ 30 g a.i./ha treated plot that produced 8.32 qtl additional yield worth Rs. 12014 with ICBR 4.72. Efficacy of newer insecticides revealed that the Chlorantraniliprole 18.5 SC @ 30 g a.i./ha and Fipronil 5% SC @ 75 g a.i./ha were found most effective against *C. medinalis* in present study & may be recommended in field conditions due to minimum per cent leaf damage and ultimately produced highest yield.

Keywords: Insecticide, Chlorantraniliprole, Fipronil.

Oral Presentation

BRIO(O)-09

Impact of Climate Change on Insect Pests, Natural Enemies and Pollinators

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The effects of climate change on insect pest populations can be direct, through impacts on physiology/ behaviour; or, indirect, through biotic interactions. Relationship between insect pests and their natural enemies will change because of global warming, resulting in both increase and decrease in the status of individual pest species. Change in temperature also alters the timing of diurnal activity patterns of different groups of insects and changes in inter-specific interactions which could also alter the effectiveness of natural enemies for pest management. The climate change affects the crop production by three ways *viz*., direct effect of changes in temperature, precipitation, and carbon dioxide (CO_2) levels on plant growth and health; indirect effect on plant health *via* climate-induced changes in herbivore and competitor distribution and abundance; indirect effect on plant health *via* changes in higher trophic level interactions of predation, parasitism, and competition on herbivore and/or competitor distribution and abundance. The effects of climate change on natural enemies that are mediated by CO_2, temperature and moisture effects on plants can be complex. Extreme weather events can influence the interactions between crops, pests, diseases and natural enemies in an unpredictable way, potentially resulting in the failure of some crop protection strategies and subsequent reductions in yields. Climate change, an emerging global phenomenon, with a potential to affect every component of agricultural ecosystems, is reported to impact insect pollinators at various levels, including their pollination efficiency.

Keywords*:* Climate change, GHG, Parasitoid, Pollinators, Predators

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BRIO(O)-10

In Vitro Study of Maize Cultivars on the Growth and Feeding of Fall Armyworm Larvae

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Maize (*Zea mays* L.) is one of the most important cereal crops in the world. It is known around the world as the "Queen of Cereals" because of its high genetic yield potential and ability to adjust. FAW attacks more than 350 different kinds of plant species and is considered to polyphagous. Host plant resistance, cultural control, biological control, biopesticides, mating disruption technologies, synthetic pesticides, and agroecological management are just a few of the many technologies and management techniques that have been developed over the years and are now available for the control of FAW. FAW neonate larvae (one day old) were obtained from a FAW colony and were reared at the Department of Entomology, RCA, MPUAT, Udaipur (25 ± 2) °C, RH 75 ± 5%) with a natural diet. The present study was carried out to variation between different maize cultivars available locally by assessing the plant damage which might be used as parameters for FAW resistance. Larval arrestment and consumed leaf area were significantly higher in the cultivars PMC-6 and local cultivar and PMC-6, respectively. At days 9, and 12 larval weight was significantly higher in PMC-6 (0.035, 0.176 respectively). The percentage of accumulated mortality and pupation of FAW of different maize cultivars was recorded maximum in HQPM-1 and sweet corn, respectively. Assimilated food weight and consumed leaf weight was recorded higher in PMC-6. Trichome density significantly difference between maize cultivars and maximum no. of trichomes were recorded in sweet corn (29.8).

Keywords: Fall Armyworm, Davis score, Plants damage, FAW resistance, Larval arrestment, Consumed leaf area

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Management of Coconut Rugose Spiralling Whitefly, *Aleurodicus rugioperculatus* Martin under South Gujarat Coastal Condition

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Coconut Rugose Spiralling Whitefly (RSWF) (*Aleurodicus rugioperculatus*) (Aleurodidae: Hemiptera) was an invasive polyphagous pest reported in Gujarat during the year 2020. An investigation was carried out at farmer's field village Ichhapur Tal-Gandevi Dist-Navsari (Gujarat) with a 2 to 3 year's old coconut palm [GPS coordinates: N20°51′54.3168″; E72°59′6.6228″] to find out effective and ecologically sustainable pest management strategies during 2022-23 and 2023-24. The pooled data of two years showed that the significant lowest RSWF intensity was registered in the treatment of *Beauveria bassiana* 1.15 WP (1 x 10^8 cfu/g) 0.007% (16.41% intensity). The next best treatment was *Lecanicillium lecanii* 1.15 WP (1 x 10^8 cfu/g) 0.007% (23.65% intensity). The control (untreated) had 57.95 per cent RSWF intensity. The rest of the treatments had intermediate results *viz*., *Metarhizium anisopliae* 1.15 WP (1 x 10^8 cfu/g) 0.007% (27.26% intensity), azaditrachtin 1 EC (10000 ppm) 0.002% (29.98% intensity), azaditrachtin 0.15 EC (1500 ppm) 0.0006 (34.35% intensity), Fish Oil Rosin Soap 0.2% (36.01% intensity), Neem oil 0.5% (38.92% intensity), Water spray (untreated) had 42.52% damage intensity. 1% starch solution (10 g/litre of water) was added during each application.

Keywords: Coconut, RSWF, *Aleurodicus rugioperculatus*, management.

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BRIO(O)-12

Report and Biology of Cigarette Beetle, *Lasioderma serricorne* (Fabricius) Infesting Stored Coriander Seeds from Middle Gujarat, India

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The cigarette beetle, *Lasioderma serricorne* (Fabricius) (Coleoptera: Anobiidae), is recognized as one of the most destructive storage pests of spices. This study reports, for the first time, the infestation of stored coriander (*Coriandrum sativum*) seeds by *L. serricorne* in Middle Gujarat, India, during 2024. The beetle was isolated from infested coriander seeds and taxonomically identified. The developmental stages of cigarette beetle on coriander seeds include egg, larva, pupa and adult. The incubation period averaged 6.00 ± 0.73 days. The larval period, comprising four instars, lasted 27.43 ± 3.64 days, with the duration of the first, second, third and fourth instars being 5.20 ± 1.19, 6.03 ± 1.42, 7.40 ± 1.34 and 8.80 ± 2.08 days, respectively. The pupal stage lasted 5.96 ± 0.85 days with a pupal recovery rate of 86.67%. The adult lifespan averaged 17.00 ± 0.45 days in males and 18.08 ± 0.52 days in females, with an overall adult longevity of 17.57 ± 0.85 days and an adult emergence rate of 88.46%. The observed sex ratio was 1:1.09 (male: female). The total developmental duration was 55.36 ± 5.43 days for males and 58.75 ± 3.68 days for females. In adult females, the pre-oviposition, oviposition and post-oviposition periods averaged 3.60 ± 1.02, 9.20 ± 1.33 and 4.00 ± 0.89 days, respectively, with a mean fecundity of 59.00 ± 1.10 eggs per female. This report highlights coriander as a new host for *L. serricorne* in Middle Gujarat and underscores the potential risk to spice storage systems.

Keywords: Cigarette beetle, *Lasioderma serricorne*, Coriander, *Coriandrum sativum*, Storage pest.

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BRIO(O)-13

Role of Bee Pollination on Yield of Fenugreek

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Experiment on effect of mode of pollination on yield attributing characters of fenugreek was carried out at Agricultural Research Station, Ummedganj- Kota during 2016-17. The experiment comprises three treatments *viz*., Pollinator Exclusion (PE), Bee Pollination cage (BP) and Open Pollination (OP) with eight replications. Fenugreek crop (Variety RMT 305) was sown in 30 cm row to row distance following all suitable agronomical practices for raising crop. 10 plants were selected and tagged in each plot and data on yield attributing characters of fenugreek *viz*., number of pods/plants, number of seeds/pods, test weight (g) and seed yield (kg/ha) were recorded and per cent yield increase were also calculated. Results revealed that highest number of pods (12.75 pods/plant), number of seeds (13.50 seeds/pod), test weight (10.21 g) and seed yield (1321.25 kg/ha) were found in Open Pollination followed by 12.00 pods/plant, 13.00 seeds/pod, 10.21 g/1000 seed weight and 1321.25 kg/ha seed yield however lowest was found in Pollinator Exclusion as 11.50 pods/plant, 12.38 seeds/pod, 9.80 g/1000 seed weight and 1130 kg/ha seed yield. Per cent yield increase over Pollinator Exclusion showed that 16.92 per cent yield was increased in Open Pollination and 8.80 per cent in Bee Pollination.

Keywords: Pollination, Fenugreek, Yield attributing characters, Bee Pollination cage, Pollinator Exclusion

Oral Presentation

BRIO(O)-14

Thrips parvispinus: An Emerging Threat in Protected Capsicum in Haryana

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The black thrips, *Thrips parvispinus* is a widespread invasive pest of quarantine importance native of South East Asia. Occurrence of this species in India has been first reported during 2015 on papaya from Bengaluru. It is an invasive pest which attacks on vegetable crops like capsicum, green beans, potato and brinjal from other countries. Both adults and nymph damage plants by rasping and sucking of the cell sap resulted leaf curling, elongated leaves, flower drop, reduced plant size and distorted fruit shapes. Outbreak of *T. parvispinus* has been reported from southern states (Telangana, Andhra Pradesh, Maharashtra and Karnataka) especially on chilli crops causing 50-80 per cent damage. In present study monitoring survey were conducted by Department of Entomology, Chaudhary Charan Singh Haryana Agricultural University, Hisar to observed the incidence of black thrips, *T. parvispinus* on capsicum in different districts of Haryana *viz.* Sonipat, Panipat, Karnal, Fatehabad and Hisar during 2023 to 2025. A total of 10 polyhouses were surveyed in the month of September, October, November, December, March and April. In 2023 the incidence of black thrips on capsicum under polyhouse conditions was observed in Sonipat and Panipat districts. Wheareas, in 2024-25 the incidence of black thrips was observed in Sonipat, Panipat, Karnal and Fatehabad districts with very high intensity. In September-October thrips population was ranged from 2-4 thrips/flower and its population increased 25-40 thrips/flower in the month of November even after regular spray of insecticides. According to farmers the yield of capsicum reduced drastically during 2023-24 and 2024-25 in comparison to previous years. It was also found on garlic and onion under open field conditions. In future it will be a major threat in protected capsicum.

Keywords: Black thrips, Polyhouse, Capsicum, Chilli, Invasive

Oral Presentation

BRIO(O)-15

To Study on the Seasonal Incidence and Varietal Resistance against Major Sucking Insect Pests of Cluster Bean [*Cyamopsis tetragonoloba* (Linn.) Taubert.]

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An investigation entitled "To study on the seasonal incidence and varietal resistance against major sucking insect pests of Cluster bean [*Cyamopsis tetragonoloba* (Linn.) Taubert.]" was conducted during the *Kharif* season,2024 at the Research Farm, Rajmata Vijyaraje Scindia Krishi Vishwa Vidyalaya, Gwalior, Madhya Pradesh. The results showed that incidence of three insect pests were observed during crop season, namely Jassid, *Empoasca kerri* (Pruthi), Whitefly, *Acaudaleyrodes rachipora* (Singh), and Mite, *Polyphgotarsonemus latus* (Banks). Peak population of jassid were observed during 38thSMW (6.2 jassids/plant); and peak population of whitefly were observed during38thStandard meteorological week(5.0whiteflies/plant). While peak population of Mites observed during 38th SMW with the population of 4.6 mites per three leaves. The results showed that jassid had positive significant correlation with rainfall(r=+0.573),whitefly had positive significant correlation with minimum temperature (r = +0.641) and rainfall (r = +0.559), also mites significantly correlated with minimum temperature (r=+0.725).The treatments consisted of 13 genotypes of cluster bean *viz.* CAZG 20-17, GG 2111, Karan Guar15(ch),HG20-3,CAZG21-3,RGR18-1(KaranGuar14)(CH),GD594,CAZG2021,GujratGuar3(ch),CAZG2038,GG2210,Gujrat Guar1(ch),GD 591,were tested in randomized block design with three replications. The lowest mean population of jassid was observed on genotype Gujrat Guar 1 (ch) and the highest mean jassid population was observed on genotype CAZG20-21. The genotypes GG 2111 and Gujrat Guar 1 (ch) were recorded as least susceptible. The minimum population of whitefly was recorded on genotype GD 591 and the maximum population of whitefly was observed on genotype RGR 18-1 (Karan Guar 14) (ch). The genotypes GD 591, Karan Guar 15 (ch) were recorded as least susceptible.

Keywords: Rainfall, Mean, Genotypes.

Oral Presentation

BRIO(P)-01

Behavioral Hormoligosis in Oviposition Preference of *Bemisia tabaci* on Brinjal

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The studies on insecticidal hormoligosis in brinjal whitefly, *Bemisia tabaci* has been carried out under screenhouse condition at Chaudhary charan singh Haryana Agricultural University Hisar, India, during 2019 and 2020. The repeated application of diafenthiuron (150, 210 and 300 g ai/ha), fenpropathrin (50, 70and 100 g a.i./ha), thiamethoxam (25, 35 and 50 g a.i./ha) and deltamethrin (7.5, 10.5 and 15 g a.i./ha) were evaluated for hormoligosis in terms of effect on oviposition preference. The results of experiment conducted in 2019 revealed that lowest dose of fenpropathrin (50 g a.i./ha) recorded maximum number of eggs (41.4 eggs) followed by lowest dose of deltamethrin (37.9 eggs). Minimum number of eggs were recorded in thiamethoxam at 50 g a.i./ha (14.9 eggs) which was at par with untreated control. Almost similar trend was during 2020 in which plants treated with sub lethal doses of fenpropathrin received significantly a greater number of eggs. Minimum number of eggs were recorded in untreated control which differ significantly from other treatments. The analysis of pooled data of both the year revealed that sublethal dose of fenpropathrin were more preferred for oviposition by the whitefly adults which were followed by deltamethrin as compared to other treatments. The results also revealed that number of eggs laid by females of *B. tabac*i on different treatments during 2020 were comparatively more than the eggs laid during 2019. This may be attributed to the suitability of weather conditions during 2020 than in 2019. These results have confirmed the behavioral hormoligosis in oviposition preference that induced by fenpropathrin in *B.tabaci*, which may be one of the causes behind its resurgence on plants repeatedly treated with these insecticides.

Keywords: Hormoligosis, Oviposition, Whitefly, Treatments

Poster Presentation

BRIO(P)-02

Biodiversity of Soil Oribatid Mite (Acari: Oribatidae) in Different Agro-ecosystems

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Biodiversity of oribatid mites were investigated in different disturbed and undisturbed soil of orchards, vegetables, field crops, greenhouse, forest plants, organic farm, bio-diversity park, spices crops, vermicompost bed, ornamental and medicinal plants in Navsari Agricultural University campus during the year 2018 and 2019. Among 3 suborders Brachypylina contributed 66 per cent of total species recorded in Navsari Agricultural University campus. Total 8 species of the suborder Brachypylina were recorded on different agro-ecosystem and fallow land. Out of all 12 species, the proportion of *S. curvialatus* was highest (20.67%) and was followed by *Scheloribates* sp. (15.77%), *O. kuehnelti* (14.95%), *S. huancayensis* (10.21%) and *J. kuehnelti* (10.05%). Maximum numbers of oribatid species were recorded during August-November and moderate population was observed in June-July months during the survey period in different agro-ecosystems. The value of Shannon index of diversity for oribatid mites at Navsari Agricultural University campus is 2.2340 and value of Simpson's index is 0.1253, evenness of oribatid mite species was 0.6650 while, species richness is 12.

Keywords: Oribatid mites, Biodiversity, Species Richness.

Poster Presentation

BRIO(P)-03

Diversity of Mites (Acari) Associated with Date Palm in Kutch

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The survey was carried out at date palm growing areas of Kutch and the mite infested dates, leaves and soil samples were collected. The results of the survey showed the identification and abundance of mites inhabiting date palm. The collected mites from leaves and soil were belonging to nine species. Based on the generally known of the primary feeding habits, mites were categorized into three trophic groups: phytophagous, predaceous and miscellaneous. The phytophagous mites were numerically dominant of three species belonging to two families i.e. Tetranychidae and Tenuipalpidae. The mites belonging to family Tetranychidae were *Tetranychus urticae* Koch, *Oligonychus* tylus (Baker & Pritchard) and the mite belonging to the family Tenuipalpidae was identified as *Raoiella indica* Hirst. The predatory mites collected from date palm various parts of date palm were belonging to family Phytoseiidae. The species were identified as: *Amblyseius largoensis* Muma, *Amblyseius herbicolus* (Chant), *Euseius alstoniae* Gupta, *Euseius finlandicus* (Oudemans), *Euseius ovalis* Evans, *Neoseiulus barkeri* Hughes, *Neoseiulus longispinosus*(Evans), *Neoseiulus paspalivorous* (De Leon), *Paraphytoseius orientalis* Narayanan, Kaur & Ghai, and *Amblyseius herbicolus* (Chant). Moreover, the miscellaneous species belonging to families were Cunaxidae and Acaridae and the species were identified as *Cunaxa sp.*and *Tyrophagus longior* (Gervais). Out of 15 mite species recorded from date palm, 3 were phytophagous, 1 saprophytic and 11 were predaceous.

Keywords: Date palm, Mites, Diversity, Phytophagous, Predaceous.

Poster Presentation

BRIO(P)-04

Effectiveness of Various Modules against Pest Complex on Capsicum (*Capsicum annum* L.) Under Shade Net House

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Field experiment was conducted under shade net house at Hi-Tech Horticulture farm, Rajasthan Agricultural Research Institute (Sri Karan Narendra Agriculture University, Jobner) Durgapura, Jaipur (Rajasthan) to investigate the effectiveness of IPM modules on damage by pest complex during summer 2014 and 2015 on capsicum (*Capsicum annum* L). The experiment comprised three modules along with local check replicated seven times under randomized block design. The treatments were imposed at an interval of 20 days, starting from initial notice of pest population up to 6 treatment spray observation. The results revealed that during 2014 and 2015 all the treatments significantly reduce the leaf curling or damage due to yellow mites, thrips and beet armyworm at 7, 11 and 13 week after transplanting (WAT) over untreated control. The findings revealed that module M-II, chemical intensive modules (imidacloprid 17.8 SL (0.0089%) - dimethoate 30 EC (0.051%) - emamectin benzoate 5 SG (0.002%) - fenazaquin 10 EC (0.02%) - dicofol 18.5 EC (0.37%) - acephate 75 SP (0.075%) proved significantly most effective in minimum leaf curling by yellow mite, thrips and lead damage by beet army worm (6.43%, 4.41 % and 7.50 % on the basis of overall effect on 7, 11 and 13 week after transplanting, respectively. Module M-I, IIHR based module comprising (profenophos 50 EC (0.1%) - NSKE 5% - emamectin benzoate 5 SG (0.002%) - *Verticillium lecanii* (0.004%) - fenazaquin 10 EC (0.02%) - profenophos 50 EC (0.1%) showed medium order of effectiveness in minimum leaf curling by yellow mite, thrips and lead damage by beet army worm (10.60%, 7.62 % and 11.90 % on the basis of overall effect on 7, 11 and 13 week after transplanting, respectively. Module M-III, bio-rational module comprising (imidacloprid 17.8 SL (0.0058%) - azadirachtin 0.15 EC (0.0003%) - emamectin benzoate 5 SG (0.002%) - NSKE (5%)- *Verticillium lecanii* (0.004%)- imidacloprid 17.8 SL (0.0058%) showed least order of effectiveness in minimum leaf curling by yellow mite, thrips and lead damage by beet army worm (14.76%, 8.57 % and 12.15 %) on the basis of overall effect on 7, 11 and 13 week after transplanting, respectively. Study revealed that imidacloprid 17.8 SL @ 0.5 ml/l, dimethoate 30 EC @ 1.7 ml/l, emamectin benzoate 5 SG @ 0.4 gm/l, fenazaquin 10 EC

Poster Presentation

@ 1 ml/l, dicofol 18.5 EC @ 2 ml/l and acephate 75 SP @ 1 gm/l can be sprayed for minimizing the crop damage by yellow mite, thrips and beet army worm on capsicum under shade net house conditions during summer for off season production.

Keywords: Effectiveness, Module, Pest complex, Capsicum, Shed net house.

BRIO(P)-05

Fipronil 5 SC Induces Resurgence of Chilli Thrips (*Scirtothrips dorsalis*) on Chilli (*Capsicum annum* L.)

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Chilli, *Capsicum annum* L. is an important vegetable crop due to its adaptability to varied climatic conditions. Thrips reported as the challenging pest in chilli growing areas. An insecticides field efficacy study was carried out at Agricultural research station, Sriganganagar (SKRAU, Bikaner) during *Kharif*-2021 and 2022 for the management of thrips. Nine prominent insecticides *viz.* buprofezin 25 SC @ 600 ml/ha, diafenthiuron 50 WP @ 600 g/ha, fipronil 5 SC @ 1000ml/ha, emamectin benzoate 5 SG @ 220 g/ha, diamethoate 30 EC @ 1000 ml/ha, spinetoram 11.7 SC @ 420 g/ha, spinosad 45 SC @ 160, spiromesifen 22.9 SC @ 500 ml/ha and profenophos 50 EC @ 1000 ml/ha were evaluated against thrip, *Scirtothrips dorsalis*. The possibility of pesticide induce resurgence of thrips was explored by applying field recommended dose of fipronil 5 SC. Field trial revealed no resurgence with respect to buprofezin 25 SC, diafenthiuron 50 WP, emamectin benzoate 5 SG, diamethoate 30 EC, spinetoram 11.7 SC, spinosad 45 SC, spiromesifen 22.9 SC and profenophos 50 EC usage consequently. fipronil 5 SC induced heavy resurgence (36.93 and 37.89 %) with resurgence ratio 1.37 and 1.36. The abundance of thrips on fipronil treated elms was 40-folds greater than on untreated plants linked to lower numbers of predators. monocultures of host plants along with synthetic organic pesticides contribute to high thrips densities indirectly through the elimination of natural enemies. This phenomenon is quite evident in the chilli ecosystem as revealed by pesticide usage pattern and resurgence studies. The other insecticides used in the study which could not show the resurgence. Further, with respect to selected insecticides, induced resurgence of thrips in chilli detailed investigations are essential to know the underlying mechanism and to develop suitable strategies for management.

Keywords: Resurgence, Thrips, Chilli, Insecticide, Fipronil 5 SC, Spinetoram 11.7 SC, Spinosad 45 SC, Spiromesifen 22.9 SC

Poster Presentation

BRIO(P)-06

Management of Alternaria Leaf Spot of Greengram using through Plant Extract

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Greengram *[Vigna radiata* (L.) Wilczek] is one of the significant pulse crops grown in India also known as moong bean. It is self-pollinating crop and belongs to the family *Leguminaceae,* subfamily *Papilionoidae*. Alternaria leaf spot is one of the important foliar diseases in greengram. The causal agent associated with greengram leaves was identified as *Alternaria alternata* based on the colony morphology and conidial characters and infection of *Alternaria alternata* in greengram started as small, light brown lesions on leaves, which later turned grayish to dark brown and dull white in centre. Six botanicals were tested under *in vivo* and *in vitro* condition *viz*., garlic (bulb extract), neem (leaf extract), giloy (stem extract), eucalyptus (leaf extract), wild sunflower (leaf extract) and lemon grass (leaf extract). Among the six botanicals was found garlic bulb extract 10 per cent recorded 75 per cent control the disease incidence.

Keywords: Greengram, Alternaria leaf spot, Botanicals, *Alternaria alternata*

Poster Presentation

BRIO(P)-07

Seasonal Incidence of Major Insect Pests and their Natural Enemies of Pigeon Pea

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A field study was conducted during the *Kharif* 2023 season at the Experimental Farm, College of Agriculture, Gwalior (Madhya Pradesh), to monitor the seasonal incidence of major insect pests and their natural enemies on pigeon pea. Result revealed that peak infestations of insect pests and natural enemies were recorded as follows: aphids (2.8/plant) during the 41st Standard Meteorological Week (SMW), green stink bugs (2.2/plant) on the 46th SMW, ladybird beetles (2.4/plant) on the 48th SMW, pod borer larvae (3.0/plant) and spotted pod borer larvae (6.4/plant) on the 44th SMW and pod fly maggots (1.8/plant) also on the 44th SMW. Correlation analysis indicated that maximum temperature had a significant positive correlation with the population of spotted pod borer larvae and ladybird beetles. In contrast, evening relative humidity exhibited a significant negative correlation with aphid and pod fly maggot populations. Additionally, both morning and evening relative humidity had a negative effect on ladybird beetle populations. These findings highlight the influence of abiotic factors on pest and natural enemy dynamics, which is crucial for developing effective pest management strategies.

Keywords: Correlation, Standard Meteorological Week, Natural enemies.

Poster Presentation

BRIO(P)-08

Survey the Infestation of Fruit Borer Complex and their Natural Enemies on Tomato in Semi Arid Region of Rajasthan

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The survey on fruit borer complex *viz*., tomato pinworm, *Tuta absoluta (*Meyrick) and fruit borer, *Helicoverpa armigera* (Hubner) and their natural enemies on tomato crop conducted in Jaipur district during Kharif*,* 2023 and 2024 showed that *T. absoluta* and *H. armigera* were observed as major insect pests of tomato both at vegetative and fruiting stages. The highest incidence of borer complex was recorded in Chomu and Sanganer tehsils consistently emerged as major hotspots, whereas less infestation was recorded at Dudu and Kishangarh Renwal tehsils. The natural enemies *viz.,* mirid bug, *Nesidiocoris tenuis* and spiders were consistently observed across all surveyed tehsils. The highest population of *N. tenuis* was recorded in Chomu tehsil, whereas, spiders population was in Sanganer tehsil.

Keywords: Survey, Complex, Natural Enemies, Hotspots, Incidence

Poster Presentation

THEME 2

Impact of Climate Change and Emerging Trends in Pests

ICEP(O)-01

Distribution and Life Cycle Patterns of Lac Insect in Assam

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Lac is a resinous substance produced by a tiny lac insect belonging to the order Hemiptera, family Kerriidae. In North-eastern corner of the country, Assam is the leading producer of lac. In Assam, *Kerria chinensis* predominantly occurs naturally and cultivated by tribal farmers from time immemorial for their livelihood as well as household purposes whereas *Kerria lacca* is widely cultivated species in few states across India. An intensive survey conducted from 2016-2024 covering all 33 districts has revealed the occurrence of wild or cultivated *K. chinensis* in only 7 districts of Assam. Survey across districts of Assam has also revealed *Ficus religiosa*, *Cajanus cajan*, *Leea* sp. as most cultivated lac host plants by tribal farmers. Along with these, *Flemingia strobilifera*, *Croton persimilis*, *C. caudatus* and *Litchi chinensis* were recorded to be suitable host plants for *K. chinensis*. Under Assam climatic conditions, *K. chinensis* has been exhibiting bivoltine life cycle completing two cycles (winter: Nov/Dec to Apr/ May; summer: Apr/May to Oct/ Nov) in a year with approximately 6 months duration from brood inoculation to till harvest. Field studies indicated significantly higher raw lac yield during winter cycle than summer cycle due to typical climatic conditions of Assam that include intermittent heavy rainfall, high temperature and relative humidity which often aligns with critical crop stages like emergence and settlement. These higher temperatures combining with heavy rainfall and extreme humidity adversely affects the settlement and survival of crawlers. This study confirms the role of rainfall, temperature and humidity in yield performance of *K. chinensis* in Assam which signifies the need for tailoring region-specific practices for enhancing yield and to minimize loss in lac cultivation in North-Eastern India.

Keywords: Assam, *Kerria chinensis*, Summer crop, Temperature and Winter crop

Oral Presentation

ICEP(O)-02

Ecological Significance and Conservation Challenges of Bees under Climatic Change

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Bees are critical pollinators that underpin global biodiversity, agricultural productivity, and ecosystem resilience. Their "silent buzz" increasingly reflects population declines driven by climate change, habitat fragmentation, pesticide use, pathogens, and monocultural farming practices. This paper examines the ecological roles of bees in sustaining plant reproduction and food security, while analyzing the multifactorial drivers of colony losses. Drawing on recent empirical studies, it highlights the cascading consequences of bee decline for ecosystems and human livelihoods. Finally, the study reviews emerging strategies in conservation biology, sustainable agriculture, and policy frameworks aimed at mitigating threats and ensuring pollinator health. By foregrounding the silent crisis of bees, this research underscores the urgent need for integrated, cross-disciplinary approaches to secure their future and the ecological services they provide. Premature blooming and mismatches in plant – pollinator timing may be the most dangerous effect of climate change on any given ecosystem as a whole. The changing floral composition and physiology have negative effect on bee foragers. Without the resources to feed an increased population, this mismatch in timing could lead to colony starvation. These effects often result in a cycle of destruction within an ecosystem where pollinators that cannot find sustenance die out, and the plants that depend on them for pollination struggle to reproduce. In short, less pollinators means suboptimal or no pollination. It also results in more pest infestation and bee infertility.

Keywords: Climate change, Pollinators, Conservation.

Oral Presentation

ICEP(O)-03

Impact of Climate Change and Emerging Trends in Pests

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Climate change is transforming pest ecology by influencing both abiotic and biotic factors that govern pest population dynamics and distribution. Rising temperatures, irregular rainfall patterns, and more frequent extreme weather events (abiotic factors) create favourable conditions for faster pest growth, longer breeding seasons, and survival in areas that were previously unsuitable for infestation. Increased atmospheric CO_2 can alter crop physiology, often making plants more vulnerable to pest attacks. At the same time, biotic factors—such as shifts in host plant availability, disruptions in predator–prey balance, competition among pest species, and changes in the spread of natural enemies—are being significantly affected. Together, these changes are driving shifts in pest distribution, earlier and more severe seasonal outbreaks, the resurgence of secondary pests, and the emergence of new invasive species. Key agricultural pests, including *Helicoverpa armigera*, *Spodoptera frugiperda*, and *Nilaparvata lugens*, are demonstrating greater adaptability under these evolving conditions. Notable emerging trends include the spread of pests across borders, rapid development of pesticide resistance, and altered interactions between pests and plant pathogens. Understanding the complex relationship between climate-induced abiotic stressors and changing biotic interactions is essential for developing adaptive, sustainable pest management strategies that protect agricultural productivity and ensure food security.

Keywords: Climate change, Emerging pest trends, Pest migration, Adaptive pest management.

Oral Presentation

ICEP(O)-04

Impact Of Climate Change and Emerging Trends in Pests

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Climate change and global warming are of great concern to agriculture worldwide and are among the most discussed issues in today's society. Climate parameters such as increased temperatures, rising atmospheric CO2 levels and altered precipitation patterns have profound significant impacts not only on agricultural productivity but also on the behaviour and ecology of insect pests. Climate change and extreme weather events have a major impact on crop production and agricultural pests. The reproduction, survival, dissemination, and population dynamics of pests, as well as the interactions between pests, the environment, and natural enemies, respond differently to different causes of climate change. Climate change and associated phenomena, such as rising global temperatures and atmospheric carbon dioxide concentrations, heat waves, flooding, severe storms, droughts, and other extreme weather occurrences, are the main focus of current scientific research and agronomy. Therefore, as the inclination to decrease yield loss owing to such situations develops, agricultural research is paying more attention to the abiotic elements indicated above.

Keywords: Global Warming, Climate change, CO_2 levels, Insect pests, Pest population dynamics.

Oral Presentation

ICEP(O)-05

Impact of Climate Change on Insect pests Natural Enemies and Pollinators

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The effects of climate change on insect pest populations can be direct, through impacts on physiology/ behaviour; or, indirect, through biotic interactions. Relationships between insect pests and their natural enemies will change because of global warming, resulting in both increase and decrease in the status of individual pest species. Change in temperature also alter the timing of diurnal activity patterns of different groups of insects and changes in inter-specific interactions could also alter the effectiveness of natural enemies for pest management. The climate change affects the crop production by three ways *viz*., direct effect of changes in temperature, precipitation, and carbon dioxide (CO_2) levels on plant growth and health; indirect effect on plant health *via* climate-induced changes in herbivore and competitor distribution and abundance; indirect effect on plant health *via* changes in higher trophic level interactions of predation, parasitism, and competition on herbivore and/or competitor distribution and abundance. The effects of climate change on natural enemies that are mediated by CO_2, temperature and moisture effects on plants can be complex. Extreme weather events can influence the interactions between crops, pests, and natural enemies in an unpredictable way, potentially resulting in the failure of some crop protection strategies and subsequent reductions in yields. Climate change, an emerging global phenomenon, with a potential to affect every component of agricultural ecosystems, is reported to impact insect pollinators at various levels, including their pollination efficiency.

Keywords: Abiotic and biotic interactions, Climate change, Natural enemies, Pollinators

Oral Presentation

ICEP(O)-06

Leaf cutting weevil, *Deporaus marginatus* Pascoe (Coleoptera: Curculionidae): Emerging Pest of Mango in Nursery under Humid Tropics of Gujarat

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The *Deporaus marginatus* Pascoe (Coleoptera: Curculionidae) is commonly known as the 'Mango leaf cutting weevil', which is a pest of grafted plants and young orchards of mango. The *D. marginatus*, which was previously viewed as a minor pest in South Gujarat, has recently become a major pest. The present investigation on damaging patters, population dynamics in terms of leaf damage in mother plants, seedlings and grafts and their correlation with biotic and abiotic factors, effect of *D. marginatus* infestation on growth of mango seedlings and grafts were studied at Agriculture Experimental Station, Navsari Agricultural University, Paria (Gujarat) during 2023 and 2024. Results revealed that three kinds of damage by adults of *D. marginatus* were observed i.e., leaf scraping, leaf cutting and leaf necrosis. Infestation in terms of leaf scrapping and leaf cutting was commenced as soon as monsoon commenced and reached first peak during 29th SMW with 10.37 per cent leaf scrapping damage (LSD), 16.47 per cent leaf cutting damage (LCD) and total damage (TD) 26.83 per cent, respectively. Subsequently, infestation reached second peak with 11.71, 16.22 and 27.93 per cent LSD, LCD and TD, respectively. Correlation with weather parameter revealed that LSD, LCD and TD showed highly significant and negative correlation with maximum temperature, sunshine and evaporation respectively. Morning relative humidity, evening relative humidity, rainfall and rainy days showed highly significant positive correlation. The predators like spider, syrphid fly, praying mantid, lady bird beetle (LBB) and black ant were recorded which showed highly significant and positive correlation with *D. marginatus* damage. Infestation of *D. marginatus* on mango seedlings revealed that damage was found minimum during early development stages of mango seedlings i.e 30 DAS (2.05 and 6.32% by LSD and LCD, respectively) and reached to maximum during 90 DAS (6.02 and 17.23% by LSD and LCD, respectively). Similarly maximum LSD and LCD of 3.07 and 4.97 per cent, respectively was observed during 90 DAG on mango grafts. *D. marginatus* infestation on growth of mango seedlings and grafts revealed that significantly lowest plant height (51.18, 53.12 and

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54.40 cm at 60, 90 and 120 DAS, respectively) of mango seedlings was observed in damaged plants as compared to healthy plants (53.94, 56.40 and 59.13 cm). Similarly, significantly highest stock girth (53.91, 56.42 and 59.20 cm at 60, 90 and 120 DAS, respectively) of mango seedlings was observed in healthy plants as compared to damaged plants (47.47, 49.31 and 51.0 cm). Significantly highest plant height (51.51, 54.02 and 56.62 cm) of mango grafts was observed in healthy plants as compared to damaged plants (48.78, 50.73 and 52.04 cm). Similarly, significantly lowest scion girth (5.48, 5.96 and 6.37 cm) and stock girth (6.21, 6.94 and 7.73 cm) of mango grafts was observed in damaged plants as compared to healthy plants (5.77, 6.35 and 6.86 cm of scion girth and 6.50, 7.25 and 8.06 cm of stock girth, respectively).

Keywords: Mango leaf cutting weevil, *Deporous marginatus*, Leaf scrapping, Seedlings, grafts, Mother plants, Predators.

Oral Presentation

ICEP(O)-07

Monitoring of Adult Through Sex Pheromone and Larval Incidence of Gram Pod Borer (*Helicoverpa armigera*) In Chickpea Ecosystem of Eastern Part (Dholpur) Of Rajasthan

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Present investigation were carried out during *Rabi* season of the year 2022-23 and 2023-24 at Krishi Vigyan Kendra, Dholpur to monitor the adults population of *Helicoverpa armigera* by using pheromone trap. The adults population appeared first in 1st standard week with (0.4 & 0.1 adults/trap/week) and remained active throughout the crop season i.e. upto 14th SMW during both the years. The adults population of *H. armigera* attained to its peak in 8th and 7th SMW during 2022 and 2023-24, respectively. After the peak population, the population of *H. armigera* started to decline and reached to low level in the 14th SMW near maturity of the crop during both the years. Maximum temperature had significant positive correlation (r=0.582& 0.554) during both the year and minimum temperature had positive non significant correlation (r=0.300 & 0.412), whereas morning and evening relative humidity had negative correlation with *H.armigera* adult population (r=-.265 & -0.496 and -0.360 & -0.784) during 2022-23 and 2023-24 respectively.Rainfall showed negative correlation (r=-0.255) in year of 2022-23 and had positive correlation (r=0.309) during 2023-24. The Larval population of *H. armigera* was started in the 1st standard with a mean population of 0.86 and 0.93 larvae/MRL during rabi 2022-23 and 2023-24, respectively. Its population touched the peak with a mean of 5.93 & 5.66 larvae/MRL in 8th SMW during rabi 2022-23 and 2023-23, respectively. The larval population of *H. armigera* population exhibited positive significant correlation (r= 0.631 & 0.654) with maximum temperature, while larval showed positive non significant correlation with minimum temperature(r=0.355 & 0.448) whereas morning and evening relative humidity had negative correlation with *H.armigera larval* population (r=-0.439 & -0.545 and -0.451 & -0.664) during 2022-23 and 2023-24 respectively. Rainfall showed negative correlation (r=-0.324) in the year of 2022-23 and had positive correlation (r=0.404) with larval population during 2023-24.

Keywords: Monitoring, Sex pheromone trap, *H.armigera*, Chickpea.

Oral Presentation

ICEP(O)-08

Seasonal Incidence of Papaya Mealybug, Paracoccus marginatus (Williams and Granara de Willink) in Southern Rajasthan

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Study on Seasonal Incidence of Papaya Mealybug, *Paracoccus marginatus* Williams and Granara de Willink in Southern Rajasthan was conducted at CTAE Instructional Farm and Department of Entomology, Rajasthan College of Agriculture, MPUAT, Udaipur during *Kharif*, 2024 i.e. July to December 2024. The observation made during the study reveals that the peak activity of *Paracoccus marginatus* on papaya was recorded with the maximum population (91.5 mealybugs/5cm^2/leaf/plant) during 40th Meteorological week. Mealybug incidence showed significant positive correlation with maximum temperature (r = 0.392) and sunshine hours (r = 0.436). Whereas, wind velocity showed significant negative correlation (r = - 0.530).

Keywords: Seasonal incidence, Papaya mealybug, Papaya, Significant

Oral Presentation

ICEP(O)-09

Succession of Major Insect-Pests in Rice

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The rice crop is grown in various agro-ecological zones in tropical and subtropical areas, especially in India. More than 100 different species of insects are known as rice pests, out of which about 15 are major and economically important. Pests' succession studies help in planning need-based application of insecticides as it clearly reveals the insect peak activity as well as insect free periods during the crop growth. The investigation on succession of major insect-pests in rice conducted at the Main Rice Research Station, Anand Agricultural University, Nawagam during the *Kharif*, 2021 and 2022. The seeds of rice variety, GR 11 were sown on the well-prepared nursery bed and raised by adopting the recommended agronomical practices. The seedlings of 30 days old were transplanted in the field with spacing of 20 × 15 cm. The experimental plot was kept free from any plant protection measures. The observations were recorded from randomly selected 5 quadrates each of 1 × 1 m area in the experimental plot. The observations on infestation of insect-pests and spiders were recorded from five randomly selected hills from each quadrate at weekly interval starting from immediately after transplanting to harvest of the crop. The result revealed that, the yellow stem borer and leaf folder infestation in rice initiated during the booting stage (38th Standard meteorological week (SMW), 35 days after transplanting (DAT)) and persisted until crop maturity. Yellow stem borer infestation peaked during the mature grain stage (45th SMW, 84 DAT), while leaf folder damage reached highest during dough grain stage (43rd SMW, 70 DAT). White backed plant hopper (WBPH) population were highest during the flowering stage (40th SMW, 49 DAT) and green leaf hopper (GLH) population peaked during the milky grain stage (42nd SMW, 63 DAT). The flowering stage favoured WBPH multiplication, while GLH preferred the milky grain stage (42nd SMW, 63 DAT). Whereas, the spider population, fluctuated throughout the crop period.

Keywords: Days after transplanting, Green leaf hopper, Leaf folder, Rice, Succession, Standard meteorological week, White backed plant hopper and Yellow stem borer

Oral Presentation

ICEP(O)-10

Survey of Major Plant Parasitic Nematodes Associated with Acid lime (*Citrus aurantifolia*) Orchards in Jaipur and Dausa Districts of Rajasthan

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A survey study was carried out in 26 localities of Jaipur and Dausa districts of Rajasthan during the months of November, 2024 to April 2025. The study was conducted for to find out the population status of root-knot nematode, *Meloidogyne* spp. and other important plant parasitic nematodes in citrus orchards. In this survey study 283 total number of soil and roots samples were collected from citrus orchards and different localities. Out of 283 soil and root samples, root-knot nematode, *Meloidogyne* spp. was found highest in 219 samples with 77.39 % absolute frequency 31.31 % absolute density and 2.75 % prominence value. Other plant parasitic nematodes genera like *Tylenchulus* spp., *Helicotylenchus* spp., *Pratylenchus* spp. and *Hoplolaimus* spp. were also found in smaller numbers in surveyed localities. The results observed during survey showed that citrus orchards were found susceptible to the attack of root-knot nematode and other plant parasitic nematodes. The results of this study indicates that the 100 % infection of root-knot nematode was recorded in Durgapura locality of Jaipur district of Rajasthan state.

Keywords: Acid lime orchards, Distribution, Plant Parasitic Nematodes, Root-knot Nematode and Survey.

Oral Presentation

ICEP(O)-11

The Prevalence of Diseases in Pomegranate Orchards

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A field survey to assess pomegranate diseases was conducted across various locations in the Jalore district during 2023-24 and 2024-25. The survey began in the first week of August and concluded in the second week of March. The study identified four prominent diseases: Wilt complex Cercospora leaf & fruit spot, Anthracnose, and Bacterial Leaf Blight (BLB), which affected all ten surveyed locations. Wilt complex disease emerged as the most significant issue in every orchard, leading to losses of 10-15%. Following this, Anthracnose caused severe damage during the fruiting period, resulting in losses of 5-10%. Both Cercospora leaf & fruit spot, and Bacterial Leaf Blight also contributed to notable reductions in economic yield. Overall, the diseases led to significant losses ranging from 30-40% in all orchards surveyed.

Keywords: Pomegranate orchards, Cercospora leaf & Fruit spot, Anthracnose loss

Oral Presentation

ICEP(P)-01

Effect of Temperature and Relative Humidity (RH) on Conidial Germination of *Erysiphe polygoni* DC in Pea

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Pea (*Pisum sativum* L) is a valuable crop all over the world, is also known as "Matar". It belongs to family *Leguminosae* and sub family *Papilionaceae*. It's affected by various Fungal, Bacterial and Viral diseases. Powdery mildew of pea is one of the major diseases of pea incited by *Erysiphe polygoni* DC. An experiment was conducted under *in vitro* condition during *Rabi* season 2021. The conidial suspension obtained and placed as above was incubated at 20, 25, 30 and 35° C in separate digital B.O.D. incubator in laboratory. After 24 hours of incubation, per cent conidial germination was counted under microscope. Result revealed that maximum conidial germination was recorded when conidia were incubated at 25°C temperature and second best noted at 30°C temperature. Different relative humidity levels were created in desiccators by dissolving concentrate sulphuric acid and sterilized double distilled water in different proportion by the method suggested by Buxton and Mellan by (1934). The result of various stages of relative humidity on conidial germination of *Erysiphe polygoni* was studied via 60, 70, 80, 90 and 100 per cent relative humidity at 25°C temperature. Results revealed that maximum per cent conidial germination was recorded at 90 per cent relative humidity followed by 100 and 80 per cent relative humidity.

Keywords: Temperature, Powdery mildew, Relative Humidity, Pea

Poster Presentation

ICEP(P)-02

Evaluation of Chickpea (*Cicer arietinum*) Genotypes for Resistance to Root-Knot Nematode, *Meloidogyne javanica*

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The root knot nematode, *Meloidogyne javanica* is considered to be one of the major limiting factors in the cultivation of chickpea which causes substantial loss in yield. An experiment was conducted to find out the chickpea genotype against the root-knot nematode, *Meloidogyne javanica* to source of resistance. A total one hundred sixty-four chick pea genotype were screened. Out of one hundred sixty-four genotypes of chick pea nine were found moderately resistant against root-knot nematode, *Meloidogyne javanica*. The genotypes were found moderately resistant *viz.,* DC 24-1, DC 24-2, BDNG 2020-66, RSGD 1249, Phule G 171028, NBeG 1137, GLD 19076, GNG 2645 & GBM 2 (ch), ninety-six genotype recorded as susceptible and fifty-nine chick pea genotypes were recorded highly susceptible against *M. javanica*. No anyone was found highly resistant and resistant against *M. javanica*.

Keywords: *Cicer arietinum,* Evaluation, Genotype, *Meloidogyne javanica*, Resistance

Poster Presentation

ICEP(P)-03

Impact of Seasonal Variability on the Infestation of Ear Head Worm and Grey Weevil in Pearl Millet

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The present experiments on seasonal incidence of ear head worm and grey weevil in pearl millet was conducted at Research Farm, Agricultural Research Station, Mandor during *Kharif* 2022. The infestation of ear head worm, *Helicoverpa armigera* and grey weevil, *Myllocerus discolor* were started in 35th and 29th SMW, respectively while infestation of ear head worm and grey weevil reached to peak in the 36th SMW with 12.60 larvae/5 ear heads and 32th SMW with 31.50 per cent plant damage, respectively. The grey weevil damage showed negative significant correlation (r = -0.764) with maximum temperature and positive non-significant correlation with morning relative humidity (r = 0.463), evening relative humidity (r = 0.292) and rainfall (r = 0.211). The larval population of ear head worm recorded positive non-significant correlation (r = 0.242) with maximum temperature in pearl millet.

Keywords: *Pennisetum glaucum,* Seasonal incidence, *Helicoverpa armigera*, *Myllocerus discolor*, Correlation coefficient

Poster Presentation

ICEP(P)-04

Impact of Weather Parameters on the Incidence of Fall Armyworm (*Spodoptera frugiperda*) in Maize

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The present research experiment was conducted at the Entomology Research Farm, College of Agriculture, Gwalior, M. P. during two consecutive years i.e., *Kharif*, 2021-22 and *Kharif* 2022-23. The number of larvae was recorded on ten randomly selected plants at weekly intervals, starting from germination until harvest. Infested and healthy plants was also recorded to determine the percentage of plant damage during each standard meteorological week. The result revealed that the larval population of fall armyworm, *Spodoptera frugiperda* was first observed in 31st SMW, when the crop was 15 days old and reached its peak during 35th SMW during both year 2021 and 2022. At the end of 44th SMW, the minimum number of fall armyworm larvae observed in both the years. Additionally, the lowest percentage of plant damage caused by *S. frugiperda* was recorded during 31st SMW in both the years and reached its peak during 36th SMW. However, the infestation gradually decreased, and the lowest mean plant damage was recorded during 44th SMW in both the consecutive years. The larval population of *S. frugiperda* exhibited a positive significant correlation with minimum temperature at 5 % level of significance (r = 0.823) during *Kharif* 2021 and significant positive at 1% level of significance during *Kharif* 2022 (r = 0.781).

Keywords: Seasonal incidence, Plant damage, Larval population, Correlation, Linear fit.

Poster Presentation

ICEP(P)-05

Population Dynamics of Aphid, *Aphis gossypii*, Glover of *Bt* cotton and its correlation with weather parameters

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A field investigation was conducted at the Experimental Farm, S.K.N. College of Agriculture, Jobner (Rajasthan) to study the seasonal incidence of the aphid *Aphis gossypii* Glover on *Bt* cotton its relationship with prevailing weather parameters during *Kharif* 2023 and 2024. The aphid infestation commenced in the third week of August (34th SMW) with initial populations of 1.52 and 1.60 aphids per three leaves, respectively, in 2023 and 2024. The population gradually increased and peaked in the second week of October (42nd SMW), reaching 25.12 and 30.16 aphids per three leaves in the respective years, followed by a steady decline until mid-December. Weather analysis indicated that the onset of infestation coincided with higher maximum temperatures. Correlation analysis revealed that aphid population was significantly and positively associated with maximum temperature (r=0.46 and 0.72) and sunshine hours (r=0.42 and 0.58), and negatively associated with relative humidity (r=-0.37 and -0.50). These findings suggest that higher temperatures and dry weather conditions favoured aphid population buildup on *Bt* cotton.

Keywords: *Aphis gossypii*, *Bt* cotton, population dynamics, weather parameters, correlation, Rajasthan

Poster Presentation

ICEP(P)-06

Population Dynamics of Chilli Mite, *Polyphagotarsonemus latus* (Banks) in Relation to Weather Parameters

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Chilli is an important vegetable crop and "Capsaicin" an alkaloid responsible for their pungency and has medicinal properties. Chilli crop is attacked by yellow mite, *Polyphagotarsonemus latus* and it cause heavy yield loss. Studies on population dynamics of chilli mite was done during 2023 and 2024 at SKNAU, Jobner. The infestation of yellow mites commenced in the last week of August (35th SMW) in 2023 and 2024 and remained throughout the crop season during both the years. Initially, the mean population was 0.88 and 1.48 mites per three leaves during 2023 and 2024, respectively, which gradually increased and touched its peak with mean population of 21.32 mites per three leaves in second week of October (41th week) during 2023 while, 22.40 mites per three leaves in same duration in 2024. After reaching the peak, the population of mite started to decline during both the years. Occurrence of chilli mite is positively correlated with maximum temperature (r = 0.697 and r = 0.822) during 2023 and 2024, respectively.

Keywords: Chilli, Yellow mite, *Polyphagotarsonemus latus*, Population Dynamics, Positively, Weather parameters

Poster Presentation

ICEP(P)-07

Population Dynamics of Sapota Fruit Mite, *Tuckerella kumaonensis* Gupta (Tuckerellidae: Acari) with Relation to Abiotic and Biotic Factors

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Sapota, *Manilkara achras* (Mill.) Fosberg is an important tropical fruit crop of Navsari district of South Gujarat. The damage caused by insect pests and mite is considered as a major constraint which affect the economic yield and quality of fruit crops. The economic value of sapota fruits have been affected by *Tuckerella kumaonensis* Gupta especially on the basis of quality. The present investigation was carried out to overcome the problem of fruit mite in a comprehensive manner. The results of the present study revealed that the mite activity was started from first fortnight of January with 3.39 mites per 2 cm² area of fruit surface. Further, the population of mite increased gradually and reached to its first peak level (9.24 mites/2 cm2 area of fruit surface) in the second fortnight of April and second peak level (6.69 mites/2 cm2 area of fruit surface) during first fortnight of October. The correlation co-efficient study of the sapota fruit mite, *T. kumaonensis* with abiotic and biotic factors revealed that maximum temperature, bright sunshine hours and predatory mite had significantly positive correlation with sapota fruit mite population, whereas, it was significantly negative correlation with evening relative humidity, rainfall and rainy days. The multiple correlation coefficient (R) was found to be significant as total contributions of the abiotic factors on population buildup of sapota fruit mite to the tune of 76.40 per cent on the basis of regression equations developed for build-up of sapota fruit mite, *T. kumaonensis* population.

Keywords: *Tuckerella kumaonensis* Gupta, Population, Abiotic and Biotic factors.

Poster Presentation

ICEP(P)-08

Seasonal Abundance and Temperature-Dependent Biology of Melon Fruit Fly (*Zeugodacus cucurbitae*) on Cucumber

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The melon fruit fly, (*Zeugodacus cucurbitae*), is a major cucurbit pest, causing 30–100% yield loss depending on host and seasonal conditions. A field-laboratory study was carried out at CCSHAU, Hisar, to assess its seasonal abundance and temperature-dependent biology on cucumber. During the rainy season of 2024, adult activity was recorded from the 28th SMW to the 43rd SMW, peaked in the 40th SMW with an average of 62 fruit flies/trap. In the summer of 2025, activity began in the 7th SMW and continued until the 18th SMW, peaked in the 15th SMW with an average of 48 fruit flies/trap. In the rainy season, maximum temperature (r = 0.56) and evaporation (r = 0.50) showed significant positive correlations with trap catches. In summer, maximum (r = 0.86), minimum temperature (r = 0.71) and evaporation (r = 0.84) had highly significant positive correlations, while relative humidity (morning r = –0.78, evening r = –0.73) showed strong negative correlations. Temperature significantly influenced biological traits. At 15 °C, total development required 66.6 days, with low egg hatchability 20.7%, extended adult longevity (female: 48.1 days; male: 46.3 days) and reduced fecundity (22.4 eggs/female). At 25 °C, development duration reduced to 14.6 days, with peak egg hatchability (85.8%) and highest fecundity (77.8 eggs/female). At 35 °C, development was fastest (12.3 days), but with reduced longevity (female: 20.2 days; male: 16.0 days) and fecundity (68.1 eggs/female). Sex ratio remained male-biased across all temperatures but became more balanced at higher temperatures. These findings provide a scientific basis for forecasting pest outbreaks and implementing temperature-based management strategies.

Keywords: Abundance, Biology, Cucumber, Temperature, *Zeugodacus cucurbitae*

Poster Presentation

ICEP(P)-09

Seasonal Abundance of Fruit Borer, *Helicoverpa armigera* (Hub.) on Tomato, *Lycopersicon esculentum* (Miller)

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The investigation on "Seasonal abundance of fruit borer, *Helicoverpa armigera* (Hub.) on tomato, *Lycopersicon esculentum* (Miller)" was conducted at Instructional Farm, S.K.N. College of Agriculture, Jobner, Rajasthan during two consecutive season *i.e. Kharif*, 2023 and 2024, revealed that the population of tomato fruit borer, *H. armigera* was first appeared during third and fourth week of September (37^{th} & 38^{th} SMW) and reached to peak in the first and second week of November (44^{th} & 45^{th} SMW), while on fruits it started in the first and second week of October and reached to maximum in the first and second week of November (44^{th} SMW & 45^{th} SMW) in both the years. The larval population and fruit infestation showed significant positive correlation with maximum temperature and significant negative correlation with evening relative humidity, while with morning relative humidity only in 2024.

Keywords: Seasonal, Abundance, Tomato, Fruit Borer, Maximum, Significant, Positive

Poster Presentation

ICEP(P)-10

Seasonal Abundance of Sucking Pests and their Relation with Weather Parameters in *Bt* COTTON, *Gossypium hirsutum* L.

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In cotton ecosystem, number of insect pests simultaneously occur and cause enormous damage to crop. Hence, investigation on succession of sucking pests in *Bt* cotton cultivar was carried out during 2022 and 2023 at S. D. Agricultural University, Sardarkrushinagar, Gujarat, India. The order of sequential occurrence of pests in *Bt* cotton was jassid > thrips > whitefly > aphid > mealybug > red cotton bug > dusky cotton bug. Maximum incidence of aphid was observed during 46th SMW (32.30 aphids/3 leaves), while maximum jassid (18.90 jassids/3 leaves) was observed during 42nd SMW. The incidence of whitefly was reached to peak level (4.56 whiteflies/3 leaves) during 43rd SMW, however the peak activity of thrips was noticed during 41st SMW (19.72 thrips/3 leaves). Red cotton bug was reached to peak level during 48th SMW (8.14 red cotton bugs/plant), however dusky cotton bug showed its highest peak (3.38 dusky cotton bugs/boll) during 46th SMW and incidence was noticed after boll bursting stage. Maximum incidence of mealybug was observed during 43rd SMW (3.72 mealybugs/10 cm twig). The relationship thus obtained was clearly showed that aphid and jassid population exhibited negative and significant correlation with morning relative humidity and evening relative humidity. The whitefly exhibited negative and significant correlation with morning relative humidity. Highly significant and positive influence of thrips population with maximum temperature was noticed during the study period. Red cotton bug, dusky cotton bug and mealybug showed negative and significant relationship with minimum temperature, morning relative humidity and wind speed whereas, it has shown positive and highly significant correlation with sunshine hours.

Keywords: Aphid, Jassid, Whitefly, Thrips, Red cotton bug, Dusky cotton bug, Correlation

Poster Presentation

ICEP(P)-11

Seasonal Incidence of Major Insect pest and their Natural Enemies in Chickpea

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Investigation on Seasonal Incidence of Major Insect pest and their Natural Enemies in Chickpea was conducted at the Department of Entomology, Rajasthan College of Agriculture, Udaipur during Rabi, 2021-22. The incidence of gram pod borer in the chickpea crop initiated in the 50th SMW (1.32 larvae/plant) with its peak in the 9th SMW with 3.92 larvae/plant The population shows a significant positive correlation with maximum and minimum temperature (r = 0.598 and r = 0.507) while a negative non-significant correlation with maximum and minimum RH (r = -0.27, r = -0.136) and rainfall (r = -0.138) was observed. The incidence of *Campoletis chlorideae* initiated in third week of December with a mean population of 0.80 adults/plant and continued up to last week of March (12th SMW) during *Rabi,* 2021-22. The population of *C. chlorideae* touched its peak (1.90 adult/plant) during the 8th SMW (4th week of February). There was a significant positive correlation with the maximum temperature (r = 0.512*) and positive correlation with minimum temperature (r = 0.365). Whereas, negative non-significant correlation with maximum and minimum relative humidity (r =-0.171, r = -0.066) and rainfall (r = -0.346), was observed.

Keywords: Seasonal incidence, *Helicoverpa armigera, Campoletis chlorideae,* Temperature, Humidity, Rainfall.

Poster Presentation

ICEP(P)-12

Seasonal Incidence of Major Insect Pests and their Natural Enemies of Pigeon Pea

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A field study was conducted during the *Kharif* 2023 season at the Experimental Farm, College of Agriculture, Gwalior (Madhya Pradesh), to monitor the seasonal incidence of major insect pests and their natural enemies on pigeon pea. Result revealed that peak infestations of insect pests and natural enemies were recorded as follows: aphids (2.8/plant) during the 41st Standard Meteorological Week (SMW), green stink bugs (2.2/plant) on the 46th SMW, ladybird beetles (2.4/plant) on the 48th SMW, pod borer larvae (3.0/plant) and spotted pod borer larvae (6.4/plant) on the 44th SMW and pod fly maggots (1.8/plant) also on the 44th SMW. Correlation analysis indicated that maximum temperature had a significant positive correlation with the population of spotted pod borer larvae and ladybird beetles. In contrast, evening relative humidity exhibited a significant negative correlation with aphid and pod fly maggot populations. Additionally, both morning and evening relative humidity had a negative effect on ladybird beetle populations. These findings highlight the influence of abiotic factors on pest and natural enemy dynamics, which is crucial for developing effective pest management strategies.

Keywords: Correlation, Standard Meteorological Week, Natural enemies.

Poster Presentation

ICEP(P)-13

Seasonal Incidence of Onion Thrips, *Thrips tabaci* Lindeman in Gird Region of Madhya Pradesh, India

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An investigation was undertaken to study the seasonal incidence of onion thrips, Thrips tabaci Lindeman, on onion in the Grid region of Madhya Pradesh, India. The experiment revealed that the thrips infestations in plants occurred during 52nd Standard Metrological Week (SMW) in 2022-23 and 2023-24, with an average of 6.28 and 5.80 thrips per plant, respectively. The maximum incidence was 41.70 and 41.98 thrips per plant, respectively, during the 9th SMW in both consecutive years. The number of thrips was significantly positively correlated with minimum and maximum temperature during both the consecutive years of study. However, evening relative humidity was negatively correlated with thrips population during 2022-23 and 2023-24, but the morning relative humidity showed negative correlation only during 2022-23.

Keywords: *Thrips tabaci Lindeman,* Abiotic factors, Regression, Correlation, Population, Sucking insect pest, Onion.

Poster Presentation

ICEP(P)-14

Seasonal Incidence of Sucking Insect Pests of Citrus with Meteorological Parameters at Malwa Region of Madhya Pradesh

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The experiment was carried out at citrus orchard area of farm, College of Horticulture, Mandsaur, R.V.S.K.V.V., Gwalior (M.P.), during, 2022-23. Four locations were selected in the orchard and in each location four plants were considered for observations. The peak of the citrus psylla population was noted on 10th SMW. Rainy days (r =0.397*) exhibited significant positive correlation with psylla population. The occurrence of leaf miner reached its peak in 11th SMW. Maximum temperature (0.669**) and minimum temperature (0.589**) showed positively highly significant relation, and relative humidity (-0.667**) had negatively highly significant correlation. The peak of citrus whitefly & black fly was observed in 13th SMW. Maximum temperature (0.615**) and minimum temperature (0.639**) exhibited positively highly significant correlation and relative humidity (-0.690**) showed negative highly significant.

Keywords: Correlation, Significant, Population,Temperature.

Poster Presentation

ICEP(P)-15

Studies on Population Dynamics of the Red Pumpkin Beetle (*Aulacophora foveicollis* Lucas) Infesting Pumpkin

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The current study was carried out in the *Kharif* 2024 at instructional horticulture farm, RCA, MPUAT, Udaipur on the population dynamics and infestation trends of the red pumpkin beetle (*Aulacophora foveicollis* Lucas) on pumpkin. Observations suggested that the red pumpkin beetle was initially noted during the 29th Standard Meteorological Week with a population of 0.41 beetles per plant. The population steadily rose, peaking at 5.68 beetles per plant in the 35th Standard Meteorological Week. Afterward, the population decreased, with the final observation on the 41st Standard Meteorological Week noting 2.04 beetles per plant. The peak beetle population occurred when the maximum temperature was 33.1°C, the minimum temperature was 22.8°C, morning relative humidity was 83.4 per cent, evening relative humidity was 81.6 per cent, and there was 18.6 mm of rainfall. Correlation analysis revealed a significant positive correlation between beetle population and maximum temperature (r = 0.624), as well as a significant negative correlation with rainfall (r = -0.532). Various factors such as the lowest temperature, morning humidity levels, and evening humidity levels, exhibited non-significant correlations. Damage to leaves caused by beetle infestations began in mid-July, with the least damage (0.2%) reported during that period. The damage escalated, peaking at 17.7 per cent by the end of August, coinciding with a beetle population ranging from 3.48 to 5.68 beetles per plant. A strong positive correlation (r = 0.909) was identified between leaf damage and the beetle population. Furthermore, leaf damage showed a considerable positive relationship with the highest temperature (r = 0.603), while other meteorological factors showed non-significant correlations. This study highlights the impact of climatic factors, especially temperature and rainfall, on the population dynamics and infestation trends of the red pumpkin beetle.

Keywords*: Aulacophora foveicollis,* Population dynamics, Infestation

Poster Presentation

ICEP(P)-16

Succession and Incidence of Major Sucking Insect Pests of Cowpea and their Natural Enemies in Relation to Meteorological Parameters

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Cowpea, *Vigna anguiculata* (Linn.) Walp. is one of the most important pulse crop grown all over the world, native to Central Africa. The incidence of insect pests, nature and extent of damage to the crop vary in different regions due to change in agro-climatic conditions. For effective pest management, study on the influence of various parameters responsible for population fluctuation on a particular crop may assist in prediction of occurrence in a given area. The investigations on "Succession and incidence of major sucking insect pests of cowpea and their natural enemies in relation to meteorological parameters" gave an idea about peak period of insect pests activity, which is helpful in developing pest management strategy. The infestation of the aphid, *Aphis craccivora* Koch commenced in the first week of August (31st SMW) and leafhopper, *Empoasca fabae* (Harris) and whitefly, *Bemisia tabaci* (Genn.) in the last week of July (30th SMW). The peak populations of aphid (111.68 aphids/ 10 cm terminal shoot), leafhopper (13.20/ three leaves) and whitefly (8.80/ three leaves) were recorded in the first week of September (35th SMW), when the minimum temperature, maximum temperature and relative humidity was 21.1^{o}C, 33.2^{o}C and 41 per cent, respectively. The leafhopper and whitefly population showed negative significant correlation with relative humidity (r= -0.67 & -0.68) and nonsignificant correlation with other meteorological parameters. The population of aphid and *Coccinella septumpunctata* showed nonsignificant correlation with all the meteorological parameters, whereas, the population of *Coccinella septumpunctata* showed positive significant correlation with aphid (r= 0.88), leafhopper (r= 0.87) and whitefly (r= 0.82) population.

Keywords: Cowpea, Aphid, Correlation, Succession, Population

Poster Presentation

THEME 3

Bio intensive and IPM Approaches for Sustainable Plant Protection

BISP(O)-01

Assessment of Nutritional Indices and Biochemical Factors in Host Preference of *Spodoptera frugiperda* on Maize

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The invasive pest, *Spodoptera frugiperda* (also known as fall armyworm) poses a major threat to maize production in India. The relative host preference of this insect is significantly influenced by the nutritional and biochemical profile of the host plant. Therefore, the nutritional efficiency and preference of *S. frugiperda* larvae was evaluated on two maize cultivars—PMH 13 and JC 4 at different crop stages (15, 30, and 45 days after germination, which corresponds to V5, V8 and V12 growth stage of maize). Larval assays were conducted for L2-L5 instars. The feeding preference and consumption were highest for the V5 stage, particularly the 4th and 5th instars, which revealed higher relative growth rate and approximate digestibility in JC4, (.39±.02; .43±.01 for L4 and 51.23±0.94; 57.15±1.02 for L5, respectively) in comparison to PMH 14, indicating its greater palatability by the insect. In contrast, PMH 14 recorded lower indices (.35±.03; 42.23±1.14 for L4 and .41±.02; 46.19±2.03 for L5, respectively), suggesting enhanced resistance which could be attributed to the elevated levels of secondary metabolites and defensive enzymatic activity (PAL- 23.08±.47, TAL- 15.26±.52 n moles min^{-1} g^{-1} fresh weight and Polyphenol oxidase- 28.13±1.01 min^{-1} g^{-1} fresh weight of sample. Overall, both varieties exhibited maximum resilience at the V12 stage, coinciding with the increased lignification and higher concentrations of phenols, tannins, and flavonoids (17.22±.70, 6.52±.80, 4.73±.53 and 2.17±.04 mg of standards g-^{1} fresh weight, respectively). These findings highlight the importance of crop stage and varietal selection in developing effective pest management strategies.

Keywords: Feeding Preference, Resistance, Phenology

Oral Presentation

BISP(O)-02

Bio-intensive and IPM Approaches for Sustainable Plant Protection

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Integrated Pest Management (IPM) emerged as a promising and sustainable paradigm for crop protection by adopting a combined strategy to reduce reliance on chemical pesticides while improving crop productivity and reduced on-farm and off-farm environmental impacts and more effective and sustainable pest management. Biointensive pest management is a systemic approach to pest management based on an understanding of pest ecology. It begins with steps to accurately diagnose the nature and source of pest problems, and emphasizes the employment of prevention and cultural control measures involving sanitation, crop rotation, intercropping, and the utilization of resistant varieties to create conditions that are less favorable for pest populations to develop. Monitoring, and decision-making tools (*i.e.*, economic injury levels, action thresholds, scouting, and sampling techniques) help farmers to assess pest populations and determine when intervention is necessary., biological control methods, including the employment of natural enemies, conservation and augmentation of beneficial insects, genetic control, and classical biological control, harness the power of predators/parasites to keep pest populations in check. Lastly, chemical inactivation methods, including biopesticides, selective/targeted pesticide utilization, and nanotechnology, are used judiciously to control pests when other methods are inadequate. By investing in research, education, and extension that can generate and disseminate relevant and actionable knowledge and practices, and by creating enabling policies and institutions that can support the adoption and diffusion of IPM, we can harness the power of IPM to achieve a more sustainable and equitable future for all.

Keywords: IPM, Bio Intensive Pest Management, Economic injury level, Biopesticides.

Oral Presentation

BISP(O)-03

Bio-Efficacy of Insecticides against Thrips, *Thrips parvispinus* (Karny) Infesting Chilli

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Chilli is considered as one of the important commercial spice crop and is widely used universal spice and named as "wonder spice". It is grown almost throughout the country in *Kharif* and *rabi* seasons. Growing chilli faces several major constraints like abiotic and biotic stresses. The yield potential and total production of chilli crops are low due to poor yielding varieties and the high occurrence of insect pests and diseases, especially thrips. Earlier only one species of thrips *i.e., Scirtothrips dorsalis* (Hood) was found infesting chilli and causing economic loss but during since last few years another invasive thrips, *Thrips parvispinus* (Karny) was observed causing serious damage to flowers and fruits of chilli. The thrips cause large scale shedding of flowers, malformation of fruits and fruit drop in chillies, leading to severe yield loss. CIBRC has recommended list of insecticides for management of chilli thrips, based on that we have formed new set of treatments for managing this new species of thrips infesting chilli. To evaluate efficacy of insecticides an experiment was conducted at two different locations *i.e.,* Farmer`s Field, Dagjipura (Var. Picador) and MVRS, AAU, Anand (Var. AVNPC-131) in Randomized Block Design (RBD) with three replications during *Rabi* 2021-22. Chilli crop was raised by following standard agronomical practices except pest control. The application of insecticides was carried out when the plots were heavily infested by the pest. For recording observations, five plants were randomly selected from each plot. From each plant three flowers (upper, middle and lower) were observed and total number of thrips were counted from each flower. The observations were recorded one day prior to first application and subsequently at 1, 3, 7 and 14 days after each application. The result shows that the lowest thrips population was recorded in the plots treated with spinetoram 11.7 SC, 0.012% (2.39 thrips/ flower). However, it was found at par with plots treated with tolfenpyrad 15 EC, 0.03% (2.67 thrips/ flower). Diafenthiuron 47% + bifenthrin 9.4% SC, 0.071% (3.11 thrips/ flower) and thiamethoxam 12.6% + lambda cyhalothrin 9.5% ZC, 0.007% (3.26 thrips/ flower) found mediocre in their efficacy against black thrips. Among the evaluated insecticides,

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emamectin benzoate 5 SG, 0.002% (7.79 thrips/ flower) recorded the highest thrips population and found at par with spinosad 45 SC, 0.014% (7.62 thrips/ flower) followed by thiamethoxam 25 WG, 0.010% (7.23 thrips/ flower) and fipronil 5 SC, 0.010% (7.06 thrips/ flower). All these four treatments were found the least effective against black thrips infesting chilli.

Keywords: Chilli, Invasive pest, Black thrips, *Thrips parvispinus* (Karny), Insecticides

BISP(O)-04

Bio-rational Management of Major Insect Pests of Green gram, *Vigna radiata* (L.) Wilczek

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Mungbean *Vigna radiata* (L.) Wilczek member of family Leguminosae is one of the principal pulse crops of tropics. It is a popular crop because of its excellent nutritional quality, including its high protein content (around 24%). Rajasthan is one of the major greengram growing state of India with 21.40 lakh ha area (46 %) and 10.97 lakh tonnes production (45 %) in the total mungbean contribution in the country. Our research work was focused on the application of biorational insecticides to control of major insect pests in green gram, carried out at RCA, Udaipur during *Kharif*, 2022. The relative bio-efficacy of different bio rational insecticides i.e. abamectin 1.9 EC, emamectin benzoate 5 SG, indoxacarb 14.5 SC, neem oil 2%, NSKE 5% and spinosad 45 SC were evaluated against major insect pests. The result revealed that the among different treatments spinosad 45 SC was found most effective in reducing the pest population with maximum mean reduction after first and second spray which found superior over other treatments followed by abamectin 1.9 EC and NSKE 5 % was found least effective. Spinosad 45 SC @ 200 ml/ha was found most effective in reducing the pod borer population followed by emamectin benzoate 5 SG @ 200 gm/ha in both first and second spray. NSKE 5 % was found least effective treatment.

Keywords: Greengram, Biorational insecticides, Whitefly, Pod borer, Aphid and Thrips.

Oral Presentation

BISP(O)-05

Biocontrol Potential of *Chrysoperla zastrowi sillemi* against *Eriosoma lanigerum*

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Woolly apple aphid, *Eriosoma lanigerum* (Hausmann) is an economically important pest of apple which poses a significant threat to apple production worldwide. The pest forms dense colonies covered with a white, waxy, filamentous secretion, typically on trunks, large branches, new shoots and roots of apple trees. Severe infestations of *E. lanigerum* lead to the formation of hypertrophic galls on roots and branches, impairing tree growth and vigour. The damage caused by the aphid compromises bud development, reduces fruit yield and significantly lowers fruit quality. The aphid does not feed on leaves but infests trunks, branches and twigs, resulting in deformities, blisters, splitting and gall like swellings of the bark. Presently farmers rely mainly on insecticides for management of this pest which is harmful to our environment. So, we evaluated the predatory potential of *Chrysoperla zastrowi sillemi* (Esben-Petersen) against woolly apple aphid under controlled conditions in departmental laboratory. Different instars of *C. zastrowi sillemi* preyed about 111 to 221 woolly apple aphids of different stages. The transformation rate was between 1.23 to 2.49 woolly apple aphids with stable predation rate of 5.78 to 12.48 woolly apple aphids. The finite predation rate was between 6.60 to 14.25 woolly apple aphids. These parameters showed *C. zastrowi sillemi* was successfully able to devour all the stages of woolly apple aphid and completed its lifecycle successfully on it and hence can be incorporated in IPM programmes against *E. lanigerum* after evaluating it in field based long term studies.

Keywords: Woolly apple aphid, *Chrysoperla zastrowi sillemi*, Predatory potential

Oral Presentation

BISP(O)-06

Colonization of *Metarhizium anisopliae* AAUBC-*Ma* 26 and *Beauveria bassiana* AAUBC *Bb*- 5a in Cabbage Plants

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Entomopathogenic fungi are promising microbial biocontrol agents due to their broad host range and eco-friendly mode of action. However, their field performance is often limited by short shelf life, dependency on high humidity, and poor persistence under adverse conditions. Endophytic colonization of host plants offers a novel strategy to overcome these challenges. The present study, conducted at the Department of Plant Pathology and Biological Control Research Laboratory, AAU, Anand, evaluated the colonization dynamics of *Metarhizium anisopliae* AAUBC-Ma 26 and *Beauveria bassiana* AAUBC-Bb 5a in cabbage plants. Four inoculation methods—seed treatment, seedling root dip, foliar spray, and a combination of all—were tested at 30, 45, and 60 days post-inoculation (dpi). Results showed that *M. anisopliae* AAUBC-Ma 26 achieved maximum stem colonization (66.6% at 30 dpi) and highest mean leaf colonization (51.3%) with the combination treatment, while seed treatment alone yielded the highest root colonization (79.1% at 30 dpi). For *B. bassiana* AAUBC-Bb 5a, foliar spray achieved the highest stem colonization (54.1% at 30 dpi), whereas the combination treatment recorded the highest leaf (91.6%; mean 62.4%) and root colonization (79.1%; mean 49.9%). Overall, the combination of seed treatment, root dip, and foliar spray proved to be the most effective and consistent approach for both isolates. These findings highlight the potential of endophytic establishment of entomopathogenic fungi as a sustainable pest management strategy in cabbage cultivation.

Keywords: Endophytes, *Beauveria bassiana*, *Metarhizium anisopliae*, Cabbage.

Oral Presentation

BISP(O)-07

Effect of Bee (*Apis Mellifera*) Pollination on Enhancement of Seed Yield in Radish

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Honeybees are considered as one of the efficient pollinators and play an important role in enhancing the seed yield of radish. Experiment on effect of mode of pollination on yield attributing characters of radish was carried out at Agricultural Research Station, Ummedganj- Kota during 2016-17. The experiment comprises three treatments *viz.*, Pollinator Exclusion (PE), Bee Pollination cage (BP) and Open Pollination (OP) with eight replications in Randomized Block Design (RBD). Radish crop (Variety Pusa Chetki) was sown in 30 cm row to row distance following all suitable agronomical practices for raising crop. 10 plants were selected and tagged in each plot and data on yield attributing characters of radish *viz.*, number of pods/plants, number of seeds/pods, test weight (g) and seed yield (kg/ha) were recorded and per cent yield increase were also calculated. Results revealed that highest number of pods (295 pods/plant), number of seeds (8.25 seeds/pod), test weight (11.06 g) and seed yield (785.63 kg/ha) were found in Open Pollination followed by 249.50 pods/plant, 7.75 seeds/pod, 10.44 g/1000 seed weight and 731 kg/ha seed yield however lowest was found in Pollinator Exclusion as 222 pods/plant, 7.0 seeds/pod, 9.75 g/1000 seed weight and 674.75 kg/ha seed yield. Per cent yield increase over Pollinator Exclusion showed that 16.43 per cent yield was increased in Open Pollination and 8.34 per cent in Bee Pollination.

Keywords: Pollination, Radish, Yield Attributing Characters, Bee Pollination cage, *Apis mellifera*

Oral Presentation

BISP(O)-08

Effect of Different Artificial Diet Enriched with Vitamins on Biology of Rice Moth, *Corcyra cephalonica*

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To assess the effect of seven different diets comprising a base diet of sorghum, crushed groundnut seeds, and powdered yeast supplemented with different vitamins *viz.*, Vitamin A, Vitamin B complex, Ascorbic acid (Vitamin C), Vitamin E, Vitamin H and Multivitamin on biology of rice moth, *Corcyra cephalonica,* a laboratory study was conducted at Biological Control Research Laboratory, ICAR Unit-9, Anand Agricultural University, Anand (Gujarat) during 2024-25. The different diets had no significant effect on the incubation period of the rice moth. The *C. cephalonica* exhibited shortest larval period (26.56 days), pupal period (7.04 days), maximum adult emergence percentage (98.48 %), highest female biased sex ratio (1.80), minimum female (47.56 days) and male (44.52 days) developmental period, the shortest total developmental period (46.04 days), preoviposition (1.00 day) and post oviposition (1.02 days) period, longest oviposition period (5.88 days), maximum fecundity (378.50 eggs), exceptionally elevated growth index and maximum food efficiency index (12.84), when reared on diet (Sorghum + Groundnut + Powdered yeast + Vit A). The longest female (9.84 days) and male (6.08 days) longevity was reported on diet (Sorghum + Groundnut + Powdered Yeast + Vitamin E). The treatment (Sorghum + Groundnut + Powdered Yeast) exhibited the least favourable outcomes across the majority of parameters observed.

Keywords: Rice moth, Vitamins, Developmental period

Oral Presentation

BISP(O)-09

Effective Management of Stem Borer (*Scirpophaga incertulas* Walker) Infesting Rice

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The experiment was conducted at the Main Rice Research Centre, Navsari Agricultural University, Navsari, Gujarat during *Kharif* 2021, 2022 & 2023 to effectively manage the *Scirpophaga incertulas* (Walker) infesting rice. The experiment consists of twelve treatments including a combination of seedling root dipping and foliar application. The overall data revealed that all insecticidal treatments significantly reduced the incidence of YSB (dead hearts and white ears) than the untreated control. Treatment Thiamethoxam 25 WG (Root dipping) + Chlorantraniliprole 0.40 GR (Field Application) Found most effective (5.79 % dead heart & 12.23 % White earhead) followed by Treatment Thiamethoxam 25 WG (Root dipping) + Flubendiamide 0.70 GR (Field Application) (9.05% dead heart & 13.34 % White earhead) in the terms of management of yellow stem borer of rice and also registered a highest yield of rice seed 5.23 and 5.10 t/ha. Furthermore, the seedling root dip in the insecticidal solution absorbs a good amount of insecticide which is translocated in the plant and controls the yellow stem borer damage the same treatments also show the below quantification level residues at the time of harvest thus this is the safe practices in aspect to environment and health.

Keywords: *Scirpophaga incertulas,* Paddy, Root dip, Yield, Residue

Oral Presentation

BISP(O)-10

Effectiveness of Different Coloured Sticky Traps against Sucking Pests in Bt Cotton, *Gossypium hirsutum* L.

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In cotton ecosystem, number of insect pests simultaneously occur and cause enormous damage to crop. There are many sampling methods that are being used to monitor insect pests and among them the sticky traps are widely used to sample insect worldwide. Hence, field experiment was carried out on trapping efficiency of coloured sticky trap against sucking pests in Bt cotton cultivar GTHH 49 (BG II) during *kharif* 2022 and 2023 at S. D. Agricultural University, Sardarkrushinagar, Gujarat, India. The trials consisted of different coloured sticky traps viz., Black, Yellow, Purple, Red, Blue, Orange, Green and Transparent, replicated three times by using randomized block design. The data on aphid trapping revealed that population of aphid per trap was ranged between 1.90 to 7.23 aphids per trap. The highest number of aphid capturing was recorded from yellow coloured sticky trap (7.23 aphids/trap) and proved as the most effective sticky traps against aphids. Yellow coloured sticky trap significantly attracted more number of jassids with a population of 13.56 jassids per trap and found most effective. The data on whitefly trapping indicated that population of whitefly was ranged between 1.04 to 5.45 whiteflies per trap. The highest number of whitefly capturing was recorded from yellow coloured sticky trap (5.45 whiteflies/trap) and registered as the most effective sticky traps. The data on thrips trapping revealed that population of thrips per trap was varied from 1.40 to 8.38 thrips per trap. The maximum 8.38 thrips per trap were attracted to blue coloured sticky trap and it was statistically at par with yellow coloured sticky trap (7.51 thrips/trap).

Keywords: Aphid, Jassid, Whitefly, Thrips, Traps, Sticky trap

Oral Presentation

BISP(O)-11

Effects of Various Light on Adult White Grubs

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An experiment was conducted at the KVK & Farmers field of Krishi Vigyan Kendra Bamanwara (Jalore-II) to record the population of white grub species using different light traps. Five different coloured LED bulbs (white, light blue, deep blue, light yellow, and light red) were employed to monitor the adult population of white grubs. Weekly observations of scarabaeoid beetle adults were made with different wattage vapor lights from dawn to dusk between March and June in the groundnut field across five locations. The results indicated that beetle populations began to emerge in the second week of March, peaked during the last week of April, and continued until the second week of June. The adults of white grubs were most attracted to the white LED bulbs, followed by light-yellow and light blue bulbs, while they were less attracted to the light red and deep blue bulbs.

Keywords: White grubs, Light intensities, Groundnut

Oral Presentation

BISP(O)-12

Efficacy of Various Botanicals against *Clostera* spp on Poplar

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Poplar (*Populus deltoides* Bartram ex Marshall) is the most desired and efficient agroforestry tree for plantation purpose in the states of North Western India. *Clostera cupreata* (syn. *Pygaera cupreata*) (Butler) and *C. fulgurita* (Walker) are the two 'major pests' causing economic loss of more than 50 per cent, along with tree mortality in severe cases. The present study emphasize on the eco-friendly management of these pests by botanicals as the indiscriminate use of chemical insecticides results in serious environmental consequences. Botanicals like neem seed kernel powder (NSKE), dharek seed kernel powder (DSKE), neem oil, castor oil, karanj oil were sprayed in two concentrations of 40 ml/l and 50 ml/l of water while home-made neem extract (HMNE) home-made dharek extract (HMDE) were sprayed in concentration of 12.5ml/l and 15ml/l. There were 15 treatments along with untreated control. The impacts of various botanicals were evaluated on the basis of number of larvae and number of damaged leaves (skeletonized/eaten) per meter branch at pre-treatment, 3 days, 7 days and 10 days after treatment. The neem oil spray with 50ml/l was the most effective as it showed the highest per cent reduction over control for number of larvae and number of damaged leaves per metre branch. The results reflected that the Neem oil (50ml/l) provided significantly higher per cent reduction over control in number of larvae and number of damaged leaves per metre branch, followed by NSKE, karanj oil, castor oil, DSKE, HMNE and least effect was shown by HMDE.

Keywords: Poplar, *Clostera* spp, Botanicals, Neem oil

Oral Presentation

BISP(O)-13

Evaluation of Bio-Efficacy of Bio-Pesticides against Leaf Eating Caterpillar in Drumstick

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Drumstick, *Moringa oleifera* Lamarck (Moringaceae: Capparidales) is an important vegetable crop rich in minerals and vitamins, grown by Dravidians as well as by the Aryans in each and every home yard widely distributed in India. There are a number of biotic stresses of *M. oleifera* in its native Indian range, which affects its production from both qualitative and quantitative aspects. In 2017, leaf eating caterpillar, *Noorda blitealis* was first time reported causing damage to leaves as well as pods of drumstick from Gujarat. To evaluate bio-efficacy of bio-pesticides against leaf eating caterpillar in drumstick (PKM-1), the experiment was conducted in Completely Randomized Design (CRD) at Gamdi village, Ta. Anand, Dist. Anand during *Kharif*, 2018 and 2019. Total seven bio-pesticides were evaluated against leaf eating caterpillar. Each treatment was repeated four times (each plant considered as one repetition). The existing drumstick orchard of farmer was selected for the experiment. The plants having equal growth, age and canopy were selected. The first spray was made at initiation of the leaf eating caterpillar. Subsequently, second and third spray were done after 10 days interval. Spray fluid was applied to the extent of slight run off using foot sprayer with triple action nozzle. For recording observations of leaf eating caterpillar, one plant was considered as one repetition. From each plant four branches were selected from each direction (North, South, East and West). From each branch five shoots (each of 15 cm) were selected randomly and damaged shoot(s) were counted. Larval population were also recorded from same selected shoot. The observations were recorded one day prior to first spray and subsequently at 5 and 10 days after each spray. On the basis of population of drumstick leaf eating caterpillar and shoot damage caused in tested bio-pesticides treatments, neem seed kernel extract (NSKE) 5 % and neem oil 1 % were found highly effective. Bio-pesticides *viz.*, garlic bulb extract 5 %, ginger rhizome extract 5 % and *Beauveria bassiana* 0.4 % found mediocre in their effectiveness in suppressing the incidence of leaf eating caterpillar on drumstick. Of the tested bio-pesticides, Tulsi leaf extract 10 % and *Lantana camara* leaf extract 10 % were found poor in reducing the incidence of leaf eating caterpillar in drumstick.

Keywords: Drumstick, Leaf eating caterpillar, Bio-pesticides.

Oral Presentation

BISP(O)-14

Evaluation of Certain Indigenous Plant Powders as Seed Grain Protectants against *Sitophilus* spp. Infesting Maize

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A laboratory experiment was conducted to assess the susceptibility of five maize varieties—Chakhao Chujak, LMC-19, LMC-9, White Local, and Mizo Local—to infestation by *Sitophilus* sp. during storage and to evaluate seed and weight loss over a 45-days period. Results revealed significant varietal differences in susceptibility to weevil damage. Chakhao Chujak (T3) was the most susceptible, showing the highest seed loss (34.40%) and weight loss (10.43%), followed by LMC-19, White Local, and LMC-9. Mizo Local (T4) exhibited the least seed (3.62%) and weight loss (1.17%), indicating its resistance to *Sitophilus* spp. Further studies were conducted on Chakhao Chujak to evaluate the efficacy of various botanical and chemical treatments for minimizing post-harvest losses. Among the treatments, sweet flag (T1), NSKE powder (T4), and Lemongrass powder (T3) significantly reduced seed loss (10.46%, 11.56%, and 13.58% respectively) and weight loss (4.07%, 4.58%, and 4.69%), and were statistically at par with the chemical control. In terms of seed germination, NSKE powder showed the highest germination rate (80%), followed by Lemongrass (57%) and Chinese chaste tree (55.33%). Overall, botanicals such as NSKE and Lemongrass powder offer promising eco-friendly alternatives to synthetic insecticides for safe maize storage with effective protection and better seed germination.

Keywords: Maize, NSKE powder, *Sitophilus* sp,

Oral Presentation

BISP(O)-15

Field Efficacy of Insecticides against Fall Armyworm, *Spodoptera frugiperda* (J. E. Smith) (Lepidoptera: Noctuidae) on Sweet Corn

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The occurrence of invasive pest fall armyworm, *Spodoptera frugiperda* (J.E. Smith) (Lepidoptera: Noctuidae) was reported for the first time in India from Karnataka during the year 2018. Thereafter, the pest spread to most states of India and caused severe damage to maize. Being a new invasive pest, there is limited information on its susceptibility to insecticides and biopesticides. Hence, a field experiment was conducted in a randomized block design to find out the effective management of fall armyworm, through different insecticides and biopesticides during Dec 2022 at the College Farm, N. M. College of Agriculture, NAU, Navsari (Gujarat). The results revealed that the lowest larval population and damage per cent of fall armyworm were exhibited in the treatment of emamectin benzoate 5SG @0.002 per cent (0.65 larvae/plant and 30.03%) which was at par with spinetoram 11.7SC @0.006 per cent (0.69 larvae/plant and 31.88%) followed by chlorantraniliprole 18.5SC @0.007 per cent (0.76 larvae/plant and 33.07%) and thiamethoxam 12.6+lambda-cyhalothrin 9.5ZC @0.006 per cent (0.79 larvae/plant and 34.68%), respectively. While the highest (1.08 larvae/plant and 46.71%) was registered with the treatment of control (water spray). Higher efficacy also was correlated with higher cob (16.21 t/ha) and green fodder yield (27.55 t/ha) in comparison with the control. The highest ICBR was obtained from emamectin benzoate 5SG @0.002 per cent treated plot (1:27.29) over control. emamectin benzoate, spinetoram and chlorantraniliprole and are suitable as one of the components of Integrated Pest Management of fall armyworm in India.

Keywords: Damage per cent, Field efficacy, Larval population, Yield

Oral Presentation

BISP(O)-16

Improvement of Nutritional Status of Culture Media to Enhance the Efficacy of *Cordyceps javanica* (OM321438) against Tea Mosquito Bug, *Helopeltis theivora*, Waterhouse

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The current study was conducted to improve the growth condition and efficacy of the entomopathogenic fungus, *Cordyceps javanica* (OM321438) against adult of *Helopeltis theivora* during 2024-2025 in the Department of Entomology, AAU, Jorhat-13 under DST-SERB Project. The aim of this study was to evaluate the influence of different media *viz.,* Potato Dextrose Broth (PDB); Malt Extract Broth (MEB) and Sabouraud Dextrose Broth (SDB) as well as different nutrient and mineral sources such as glucose, sucrose, dextrose, chitin, peptone, yeast extract and NaCl, $MgCl_2$ and $CaCO_3$ on the growth parameters of *C. javanica*. Additionally, castor oil, coconut oil, mustard oil and sunflower oil as spreader and Carboxy Methyl Cellulose (CMC), Poly Vinyl Pyrrolidone (PVP), Glycerol, Tween-80 and Triton X-100 as additives were evaluated to enhance both growth parameters and virulence of *C. javanica* against *H. theivora*. The growth parameters such as conidial density and sporulation were observed at three concentrations (0.5%, 0.75% & 1.0%) for each nutrients, spreaders (0.025%, 0.1% & 0.5%) and additives (CMC, PVP & glycerol @ 0.5%, 0.75% & 1.0% and Tween-80, Triton X-100 @ 0.01%, 0.023% & 0.05%). The nutrient enriched media were maintained under BOD incubator at 26 ±1°C for 15 days. After 15 days of incubation, the media of MEB enriched with dextrose, peptone and NaCl recorded the best conidial density and spore germination of *C. javanica which* was followed by PDB. Among the spreaders, the highest conidial load (20.18 x 10^7conidia/ml) and sporulation (86.4%) were recorded in coconut oil @0.5%.,whereas among the additives, CMC @ 0.75% and Tween 80 @0.023% showed the significant results in respect to conidial density (22.6x10^7 conidia/ml & 23.34x10^7conidia/ml) and sporulation (87% & 93.40%), respectively. The combination of the best nutrient enriched media with coconut oil @0.5%, CMC @ 0.75% and Tween 80 @ 0.023% showed the highest conidial density (25.98 x 10^7 conidia/ml), spore germination (94.80%).and pathogenicity against *H. theivora* (92%).

Keywords: Additives, *Cordyceps javanica, Helopeltis theivora*, Nutrients, Spreaders.

Oral Presentation

BISP(O)-17

Influence of Insecticides on Entomopathogenic Fungus, *Lecanicillium lecanii*

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Entomopathogenic fungi as biological control agents are important pest management tools because most of them can be used to avoid the negative effects of chemical pesticides. However, most entomopathogenic fungi have limited shelf lives, act slowly, and have narrow target ranges. Combining an effective biopesticide based on fungi and compatible pesticides in an integrated pest management (IPM) programme offers promise. The entomopathogenic fungus, *Lecanicillium (=Verticillium) lecanii* (Zimm.) Zare & Gams naturally infects a wide range of sucking pests such as thrips, whiteflies, aphids, *etc*. It is necessary to investigate the effects of insecticides on *L. lecanii* to determine which insecticides can be combined successfully in IPM. The assays were carried out in vitro with three doses (lower, recommended and higher) of nineteen commonly used insecticides. The precipitation test and the insecticide effect on the growth of the fungus were evaluated by the poison food technique. The results revealed that there were no precipitations observed even after 24 hrs of mixing *L.lecanii* talc-based formulation with tested insecticides and found compatible with tested insecticides. Furthermore, the results of the poison food technique revealed that clothianidin 50WDG, flonicamid 50WG and dinotefuran 20SG were categorised as harmless (Group 1) (<30% reduction in growth) to *L. lecanii* at lower (0.5xRD) and recommended doses. None of the tested insecticides were categorised as harmless (Group 1) to *L. lecanii* at higher doses. Moreover, cyantraniliprole 10.26OD and tolfenpyrad 15EC were categorised as moderately harmful (Group 3) (80-99% reduction in growth) to *L. lecanii* at the higher dose while the rest of the insecticides were categorised below the category of moderately harmful (Group 3) at different concentrations *i.e*. lower, recommended and higher doses.

Keywords: Compatibility, Entomopathogenic fungus, Insecticides, *Lecanicillium lecanii*

Oral Presentation

BISP(O)-18

Integrated Management of Invasive Thrips, *Thrips parvispinus* (Karny) in Chilli

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The invasive black thrips, *Thrips parvispinus* (Karny), has become a serious threat to chilli (*Capsicum annuum* L.) cultivation in India, particularly in Gujarat. Infestation begins as early as the first week after transplanting and persists throughout the crop cycle. To address this, a field experiment was conducted at three locations *viz.,* Agricultural Research Station, Derol; Main Vegetable Research Station, Anand; and Agricultural Research Station, Sansoli during the *rabi* seasons of 2022-23 and 2023-24. The objective was to evaluate various Integrated Pest Management modules against *Thrips parvispinus*. Among the tested modules, Module III proved most effective, incorporating seedling root dip in imidacloprid 17.8 SL, neem cake application, blue sticky trap installation, and sequential sprays of spinetoram 11.7 SC, *Metarhizium anisopliae* 1.15% WP, broflanilide 300 G/L SC, azadirachtin 10000 ppm, and tolfenpyrad 15 EC. This module recorded the lowest thrips population (2.46 per twig and 3.26 per flower), minimal fruit damage (4.32%), and the highest green chilli yield (9.36 tonnes/ha) across all locations. This integrated strategy is recommended for the sustainable management of *Thrips parvispinus* under Indian agro-ecological conditions.

Keywords: Invasive black thrips, *Thrips parvispinus*, IPM

Oral Presentation

BISP(O)-19

Large Scale Validation of Integrated Pest Management Strategy for Basmati Rice

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Rice *(Oryza sativa L.)* is an economically important food crop and its yield is severely affected by insect-pests and diseases. To manage pest problems with minimum use of pesticides, integrated pest management (IPM) strategy was designed and implemented in *basmati* rice cv. PB1718 in wide area in farmers' participatory mode in Rohtak, Haryana during *Kharif* 2020 to 2023 in 200 hectares. The IPM proved effective in significantly reducing yellow stem borer incidence (21.91%), brown plant hopper (45.95%), bakane disease (86.02), bacterial leaf blight (78.92%) and blast (55.30%), along with an increase in natural enemy population i.e. spiders compared to farmer practice (FP). The population of spiders was higher in IPM (1.07/hill) compared to FP (0.22/hill). IPM helped in reducing the cost of cultivation (15.60%) by reducing number of pesticides application (48.72%) as well as amount of pesticides' active ingredient (82.29%). The yield under IPM increased by 8.48 % over FP due to reduced losses and adoption of good agriculture practices. The benefit cost ratio in IPM (2.80) was superior to FP (2.17) with 29.51 % higher net return over FP. The refined IPM strategy proved economically viable, provided an effective pest suppression in an eco-friendly manner by conserving natural enemies through minimization of pesticide applications, and thus adoptable under farmers' field conditions.

Keywords: IPM, Basmati rice, Bakane, Yellow stem borer, *Pseudomonas fluorescens*, Leaf folder

Oral Presentation

BISP(O)-20

Management of Fall Armyworm, *Spodoptera frugiperda* (J. E. Smith) in Fodder Maize

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To evaluate the effectiveness of some insecticides (cyantraniliprole 19.8% + thiamethoxam 19.8% FS, 6 ml/kg seed; acephate 50% + imidacloprid 1.80 SP, 6 g/kg seed) as seed treatment (S), foliar spray of bio-pesticides (B) (*Metarhizium anisopliae* 1.15% WP (1×10^9 cfu/g) [40 g/10 litre water]; *Bacillus thuringiensis* var.*kurstaki* 1 % WG (1×10^8 cfu/g) [20 g/10 litre water]; *Beauveria bassiana* 5% WP (1×10^9 cfu/g) [40 g/10 litre water] and whorl application of soil (B), 5 g/plant for the control of fall armyworm, *Spodoptera frugiperda* (J. E. Smith) in fodder maize; an experiment was carried out at ARS, Anand Agricultural University, Sansoli-387 130 (Gujarat) during *Kharif*, 2021, 2022 and 2023. The maize seeds were treated with respective insecticides as per mentioned rates before 12 hours of sowing. The foliar sprays of respective bio-pesticides were given at 25 and 35 days after sowing (DAS). Whorl applications of soil were given at 30 and 45 DAS. For recording observations, ten plants were selected randomly from net plot and total number of larva(e) as well as damaged plant(s) were recorded at weekly interval after germination till harvest of the crop for green fodder. The green fodder yield were recorded from each net plot and converted into kg/ha. Pooled over years results indicated that an interaction effect of seed treatment and foliar spray of bio-pesticides and whorl application (S x B) found non-significant for germination (%) and green fodder yield. An interaction effect of seed treatment and foliar spray of bio-pesticides and whorl application of soil (S x B) on population of fall armywarm and plant damage found significant wherein significantly the lowest larval population (0.75 and 0.78 larva/10 plants) observed in the interaction effect of S_2B_2 and S_1B_2, respectively and plant damage (6.05 and 7.31 %, respectively) observed in the interaction effect of S_1B_2 and S_2B_2, respectively. Among the different treatments evaluated, the highest (65366 kg/ha) green fodder yield registered in treatment of foliar spray of *Bacillus thuringiensis var.kurstaki* 1 % WG (B_2) followed by whorl application of soil (B_4) (57703 kg/ha). In nutshell, seed treatment with cyantraniliprole 19.8% + thiamethoxam 19.8% FS, 6 ml/kg seeds and acephate 50% + imidacloprid 1.80 SP, 6 g/kg seed) using equal quantity of water before 12 hours of sowing and

Oral Presentation

application of two foliar spray of *Bacillus thuringiensis var. kurstaki* 1 % WG (1×10^8 cfu/g), 20 g/10 litre water first spray at 25 and second spray at 35 days after sowing found effective for the management of fall armyworm in fodder maize.

Keywords: Fall armyworm, Insecticide application methods, Fodder maize

Oral Presentation

BISP(O)-21

Morphological Basis to Determine Resistance of Pigeonpea Genotypes/Varieties against Pod Fly, *Melanagromyza obtusa* (Malloch)

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In India, a wide variety of crops are cultivated, among which pulses hold a significant place due to their high economic value and contribution to export earnings. Pigeonpea is one of the major pulse crops, ranking next to chickpea in terms of area and production across the country. It is generally attacked by more than 300 species of insect pests; among them, the pod fly, *M. obtusa* is one of the most destructive, alone causing yield losses of 60 to 80 per cent. Conventional control measures, especially the repeated use of chemical insecticides have led to concerns related to environmental safety, insecticidal resistance and residue hazards. In this context, identifying and utilizing host plant resistance through morphological traits offers a sustainable and eco-friendly approach to pest management. A field experiment was conducted to identify the morphological basis of resistance of pigeonpea genotypes/varieties against pod fly at Agricultural Research Station, Anand Agricultural University, Derol during *Kharif,* 2022-23 and 2023-24. Considering the morphological parameters, pod fly incidence and its infestation had significant positive correlation with pod length and seed breadth. While highly significant negative association found with pod wall thickness and trichome density.

Keywords: Pigeonpea, Morphological, Pod fly, *Melanagromyza obtusa,* Geonotypes

Oral Presentation

BISP(O)-22

Multistage Predator, Multipest Solution: Unveiling the IPM Potential of *Geocoris ochropterus*

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Geocoris ochropterus is a promising predatory bug with significant potential for biological control of key agricultural pests. Laboratory and semi-field evaluations demonstrated its predatory efficacy against *Helicoverpa armigera, Spodoptera litura, Spodoptera frugiperda* (fall armyworm), and *Thrips parvispinus*. The bug successfully completed its development from first instar to adult when reared on eggs and larvae of *S. litura* and *S. frugiperda*. Laboratory studies revealed that the third to fifth instar nymphs and adult stages exhibit active predation on *S. frugiperda* eggs and young larvae, Functional response studies revealed higher attack rate and lower handling time for adult female and thus confirmed their potency against T. parvispinus. Field-cage experiments in chilli, using two bugs per plant, resulted in a significant and sustained reduction of thrips populations, highlighting the practical utility of this predator. Naturally associated with crops like maize, chilli, and sunflower, *G. ochropterus* demonstrates ecological adaptability and effectiveness, making it a strong candidate for integration into pest management strategies targeting invasive and economically important pests.

Keywords: *Geocoris ochropterus*, Integrated Pest Management, Maize, Chilli, *Thrips parvispinus*

Oral Presentation

BISP(O)-23

Screening of Nematicidal Activity of Leaf Extracts of against *Meloidogyne incognita*

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This study investigates the potential of plant-derived extracts as environmentally sustainable alternatives to synthetic nematicides for the management of plant-parasitic nematodes, with a specific focus on *Meloidogyne incognita*, a major agricultural pest. The reliance on chemical nematicides is increasingly scrutinized due to their environmental impact, high costs, and potential human health risks, thereby creating a demand for safer and more sustainable control strategies. This research explores the nematicidal properties of aqueous and alcoholic leaf extracts from *Datura metel*, *Azadirachta indica*, and *Calotropis procera* against *M. incognita* juveniles under laboratory conditions.The methodology involved the preparation of plant extracts using both aqueous and alcoholic solvents, followed by qualitative phytochemical analysis to identify key secondary metabolites present in the extracts. These metabolites, including alkaloids, flavonoids, saponins, and terpenoids, are known for their pesticidal and defensive properties. Nematicidal activity was assessed by exposing M. incognita juveniles to varying concentrations (0.5%, 1.0%, 1.5%, and 2.0%) of the plant extracts and monitoring mortality rates at 24, 48, and 72-hour intervals.Results demonstrated that both aqueous and alcoholic extracts exhibited significant nematicidal activity against *M. incognita*. Notably, Datura metel extracts induced 100% mortality of nematode juveniles at all tested concentrations after 72 hours of exposure. *Calotropis procera* and *Azadirachta indica* extracts also showed considerable nematicidal effects, albeit at slightly lower concentrations. The higher efficacy observed with alcoholic extracts may be attributed to the enhanced solubility and extraction of bioactive compounds in organic solvents. These findings suggest that plant-derived extracts from *Datura metel, Calotropis procera*, and *Azadirachta indica* represent promising, eco-friendly alternatives to synthetic nematicides for controlling *M. incognita* and other plant-parasitic nematodes. Further research should focus on the isolation and characterization of the specific nematicidal compounds, as well as field trials to validate their efficacy under real-world agricultural conditions.

Keywords: Nematicides, *Meloidogyne incognita*, Plant Extracts, Sustainable

Oral Presentation

BISP(O)-24

Sustainable Management Strategies for *Bactrocera cucurbitae* (Coquillett) in Long Melon Cultivation under Semi-Arid Conditions of Rajasthan

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Investigations on "Eco-friendly Management of Fruit Fly, *Bactrocera cucurbitae* (Coquillett) on Long Melon in Semi-Arid Region of Rajasthan" were carried out at Rajasthan Agricultural Research Institute, SKNAU, Durgapura, Jaipur during 2017 and 2018. Among the IPM modules, module 3 (Acephate 75SP @ 0.8 g/l- Acephate 75SP @ 0.8 g/l - Acephate 75SP @ 0.8 g/l) was most effective followed by Module 8 (Malathion 50EC @ 1.0 ml/l- Malathion 50EC @1.0 ml/l- Malathion 50EC @1.0 ml/l). While, module 1 (Repeated soil raking after every 10 days in the early stage of the crop up to one month- NSKE 10%- DLE10%) was least effective. Rest of the modules *viz.*, module 2 (NSKE 10%- Malathion 50EC@ 1.0 ml/l - NSKE10%), module 4 (DLE10%- Acephate 75SP @ 0.8 g/l - Thiacloprid 240SC @1 ml/l), module 5 (Cartap hydrochloride 50SP @ 0.8 ml/l - Flubendiamide 480SC @0.2 ml/l- DLE10%) module 6 (Thiodicarb 75 WP @1.5 ml/l - Neem oil 10ml/ l - Diflubenzuron @ 0.8 g/l) and module 7 (Neem oil 10ml/ l - Neem gold 5 ml/l- NSKE10%) were moderately effective against fruit fly in long melon. The maximum marketable yield of long melon fruit was obtained in module M3 followed by M8 whereas; minimum yield was recorded in module M1. Maximum net profit of Rs. 67098 ha^{-1} was computed in M3 followed by Rs. 62496 ha^{-1} in M8. The minimum net profit of 14789 ha^{-1} was recorded in the M1. The highest incremented benefit cost ratio/return per rupee (1:33.60) was computed in M8 and minimum (1:1.88) was obtained in M7.

Keywords: Fruit fly, IPM and NSKE

Oral Presentation

BISP(O)-25

Validation and Promotion of IPM Modules for Cucumber Crop Under Protected Cultivation System

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Cucumber (*Cucumis sativus*) is one of the most important high-value vegetable crops suited for protected cultivation in India. Under protected conditions, cucumber is infested by various sucking insects (Thrips, mites and whitefly) and diseases (cucumber mosaic virus and wilt disease) which are affected the crop and reduce the yield and quality of cucumber fruits. To manage these pests, farmers often resort to cocktail of chemical pesticides without achieving the desired result. Hence, Integrated Pest Management (IPM) practices in cucumber were implemented during 2022-23 and 2023-24 in Jaipur district, Rajasthan. Results revealed that, population of thrips was recorded in range of 0.71 to 2.70/leaf in IPM compared to 1.19 to 5.48 in Farmer practice (FP). Similarly, the population of whitefly and mite was recorded (2.67/leaf and 1.50/leaf) in IPM compared to (3.72/leaf and 6.31/leaf) in FP. The severity of cucumber mosaic virus from 5th to 9th SMW was recorded as 7.13% in IPM compared to 11.83% in FP. The wilt disease incidence was also observed 5% in IPM polyhouses compared to 11.16% in FP polyhouses. The effect of the IPM module was greater in suppressing the pests and diseases and enhancing the yield in the IPM-adapted polyhouse compared to farmer practice (FP).

Keywords: Cucumber, Thrips, Whitefly, IPM strategy

Oral Presentation

BISP(O)-26

Validation of Integrated Pest Management Strategies in Maize for Enhanced Productivity and Sustainability

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The fall army worm *Spodoptera frugiperda* (J. E. Smith) (Lepidoptera:Noctuidae), an invasive pest and is difficult to control, manage, or eradicate, because it is polyphagous and trans-boundary, multiplies fast, has a short life cycle and migrates easily. Therefore, the IPM strategy was formulated and a validation trial was carried out in in winter maize at Telangana during 2019-2022. The findings revealed that the effect of the IPM package in reducing *Spodoptera frugiperda* infestation was quite promising in all the experimental trials. The performance of the IPM module was on par with the Farmers' practice (calendar-based application of chemical pesticides) in reducing *Spodoptera frugiperda* infestation, without any compromise in the marketable yield. The FAW infestation was recorded 23-28 % in IPM field, 38 per cent in FP (farmer practice) and 68 per cent in untreated control. Population of natural enemies (predatory insects) were recorded highest in the untreated control (>10.7/50 plants) followed by IPM (1.28 to 2.0 predators/50 plants) and FP (<0.30/50 plants) fields. The data on yield and economics indicated the highest yield in IPM (72q/ha), followed by FP (65q/ha),and in control (36q/ha). IPM fields recorded benefit-cost ratio of 6.24 where in FP the ratio was 4.84 and in untreated contral it was 3.37. Hence, the IPM package was prooved to be effective can be considered as effective and economical in managing invasive *Spodoptera frugiperda* in winter maize along with conservation of natural enemies.

Keywords*:* Maize, Invasive pest, Fall army worm IPM, Natural enemies.

Oral Presentation

BISP(O)-27

Validation, Refinement and Popularization of IPM in Direct Seeded Rice

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A study on synthesis, validation and popularization of IPM in Direct Seeded Rice was carried out in collaboration with KVK, Bathinda, Punjab in farmer's participatory mode in 80-acre area. The trial included 70 acre as DSR-IPM, 05 acre as DSR-FP and 05 acre as transplanted rice-FP. IPM strategy was practiced *viz.*, Seed treatment with *Trichoderma asperellum* @ 10g/kg, application of pre-emergence herbicide pendimethalin 30% EC @ 1 kg/ha 3 days after sowing (DAS) for early weed management, application of bispyribac sodium 10% SC @ 250 ml/ha 25 DAS, installation of pheromone traps @ 5 trap/ha for monitoring of YSB moth, pest and natural monitoring at weekly interval in Z/W manner of field by selecting of 20 hills with the help of field scouts and need based application of label claim safer pesticides based on economic threshold level (ETL). The major inset-pest was yellow stem borer [DSR-IPM (3.06 %), DSR-FP (3.43 %) and transplanted rice (3.45 %)], leaf folder [DSR-IPM (5.44 %), DSR-FP (5.7 %) and transplanted rice (5.25 %)], brown plant hopper [DSR-IPM (0.94 nymph or adult/hill), DSR-FP (1.66 nymph or adult/hill) and transplanted rice (1.41 nymph or adult/hill)], spiders population [DSR-IPM (5.12/hill), DSR-FP (5.74/hill) and transplanted rice (4.98/hill)]. Yield in DSR-IPM 57q/ha, 55q/ha in DSR-FP and 58q/ha in transplanted rice-FP with b:c ratio 3.56 in DSR-IPM, 3.45 in DSR-FP and 1.53 in transplanted rice, respectively. It is evidence from the present investigation, DSR can be an alternative to transplanted rice if implement in IPM mode.

Keywords: IPM, DSR, ETL

Oral Presentation

BISP(P)-01

Advances in Integrated Pest Management

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Previous models of Integrated Pest Management primarily concentrated on the ecological dimensions of pest control. However, with the advent of new agricultural technologies, modern communication methods, evolving consumer preferences, heightened awareness of sustainably produced food systems, and the globalization of trade and travel, there is a pressing need to reassess the IPM framework to align it with contemporary requirements. IPM embodies a holistic and sustainable strategy for pest control, aiming to mitigate the economic, environmental, and health-related risks associated with pest management practices. IPM employs a diverse array of strategies, including cultural, biological, physical, chemical, and behavioural controls, to effectively manage pest populations while minimizing dependence on chemical pesticides. Essential elements of IPM encompass regular monitoring, establishing action thresholds, executing preventive strategies, and coordinating multiple control methods. Recent technological advancements, such as precision agriculture, remote sensing, and data analytics, have significantly improved the monitoring and decision-making capabilities within IPM. Additionally, the emergence of new biological control agents, microbiome-based strategies, and eco-friendly pesticides has broadened the resources available to growers for pest management. By fostering sustainability, resilience, and innovation, IPM presents a viable solution to the multifaceted challenges confronting modern agriculture, including climate change, pest resistance, and food security.

Keywords: Integrated Pest Management, Cultural, Agriculture, Advancements, Climate change

Poster Presentation

BISP(P)-02

Assessment of Agniastra 3% against *Helicoverrpa armigera* of Gram in Malwa Region of M.P.

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Chickpea is a major pulse crop in India and an important host of the gram pod borer (*Helicoverpa armigera*), a polyphagous pest causing severe yield losses. The efficacy of chemical control has declined due to insecticidal resistance and its adverse effects on non-target organisms and the environment, necessitating Integrated Pest Management (IPM). An On-Farm Trial (OFT) was conducted during the *Rabi* season 2023–24 at seven farmers' fields in Hanumantia Panwar village, Neemuch district (M.P.), covering 1.05 ha. Three treatments were evaluated: T_1 – farmers' practice (chemical spray), T_2 – Ha NPV 250 LE, and T_3 – Agniastra 3% (as per NCOF, 2015) applied at pod borer incidence. Observations were recorded on pod damage (five plants per plot) and yield. Results indicated higher yields in T_3 (1,370 kg/ha) and T_2 (1,367 kg/ha) compared to T_1 (1,284 kg/ha). Pod damage per plant was lower in T_2 (1.57) and T_3 (1.57) than in T1 (2.48). The findings suggest that Ha NPV and Agniastra are effective eco-friendly alternatives to chemical control for managing *H. armigera* in chickpea.

Keywords: Gram pod borer, Agniastra, Gram, Ha NPV.

Poster Presentation

BISP(P)-03

Assessment of Avoidable Losses due to Pod Borer, *Helicoverpa armigera* (Hub.) in Chickpea and Economics of the Treatments

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Chickpea, *Cicer arietinum* (L.), is a vital *Rabi* season pulse crop, renowned for its nutritional composition, serving as a rich source of protein (18-22%), carbohydrates (52-70%), fats (4-10%), minerals (calcium, phosphorus, iron), and vitamins B and C. However, this crop faces challenges from more than 36 species of insect pests, with the pod borer, *Helicoverpa armigera* (Hub.), emerging as a significant threat. *H. armigera* inflicts damage throughout various growth stages, causing substantial yield losses ranging from 20 to 80 per cent, particularly during flowering and pod formation stages. To develop management stategy for pod borer in chickpea crop it is essential to asses the avoidable losses and increase in yield over untreated control in the different treatments used for the management of pest as well as economics of the treatments. Therefore, in the present study the avoidable losses due to pod borer in chickpea was estimated in the diffrent treatments of some novel insecticides and biopesticides. The experiment was conducted at Agronomy Farm, College of Agriculture, Swami Keshwanad Rajasthan Agricultural University, Bikaner, for assessment of avoidable losses due to pod borer, *Helicoverpa armigera* in chickpea. Results indicated that in the most effective treatment, chlorantraniliprole 18.5 SC the total and per cent avoidable loss were zero. The minimum total and per cent avoidable loss was recorded in the treatment of flubendiamide 480 SC (0.30 q ha^{-1} and 1.62 %), followed by emamectin benzoate 5 SG (0.86 q ha^{-1} and 4.65 %) and indoxacarb 14.5 SC (1.40 q ha^{-1} and 7.57 %). The maximum total avoidable loss (5.39 q ha^{-1}) and per cent avoidable loss (29.14 %) was recorded in untreated control plots which was followed by *Verticillium lecani* 1.15 WP (4.16 q ha^{-1} and 22.49 %), *Beauveria bassiana* 1.15 (3.56 q ha^{-1} and 19.73 %), Azadirachtin 3000 ppm (2.89 q ha^{-1} and 15.62 %) and NSKE (2.57 q ha^{-1} and 13.89 %). The maximum benefit cost ratio of 6.54 was obtained in plots treated with indoxacarb 14.5 SC followed by emamectin benzoate 5 SG (6.48), chlorantraniliprole 18.5 SC (6.26), Azadirachtin 3000 ppm (6.21) and flubendiamide 480 SC (4.85).

Keywords: Chickpea, Avoidable losses, Pod Borer, Treatments.

Poster Presentation

BISP(P)-04

Bio and Physical Approach of Fruit Fly Management in the Guava Orchard

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Guava is an important orchard crop in Bundi district of Rajasthan. However, there is high infestation of fruit fly resulting in yield loss KVK, Bundi conducted on farm trial in the village Nanakpuriya to assess the technology brought from NCIPM, New Delhi for the management of fruit fly. The technology to manage the fruit fly with Biophysical method such as use the fruit fly trap at the time of fruit formation and repeated spray of Neem based insecticide @ 3ml/L at 10 days interval during fruiting stage.An assessment trial was conducted by KVK, Bundi during Mrigbahar season 2024 for the management of fruit fly in Guava orchard. Where T1: farmer's practice is Placed on fruit fly trap in orchard between 15 plant before fruit setting stage**.** T2 : T1+ Repeated spray of Neem based insecticide (1500 PPM) @ 3m/L at 10 days interval during fruiting stage. The Results of Trial revealed that highest yield (23908 kg/ha), Maximum gross return Rs. 717240/ ha. and B:C ratio 5.58 was obtained under T2 as compare to T1 (19460 kg/ha, Rs 583800 /ha and BCR 4.62) respectively. The technology assessed Placed on fruit fly trap in orchard between 15 plant before fruit setting stage and Repeated spray of Neem based insecticide (1500 PPM) @ 3m/L at 10 days interval during fruiting stage. reduced the percentage infestation of fruit fly from 17.20 to 4.30 and yield was increased by 22.85 percent.

Keywords: Fruit fly, Biophysical, Guava, Fruiting stage, Yields.

Poster Presentation

BISP(P)-05

Bio-ecology of Melon Fruit Fly, *Bactrocera cucurbitae* (Coquillett) Infesting Cucumber

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An experiment was conducted to study the biology of melon fruit fly, *Bactrocera cucurbitae* (Coquillett) under laboratory conditions while investigations about the seasonal abundance of *B. cucurbitae* in cucumber were carried out in a farmer's field at Navsari, Gujarat using Nauroji Stonehouse fruit fly trap containing cue-lure baited wooden block during summer 2022-23. The studies on biology revealed that the female fly laid shiny white, nearly flat on the ventral surface eggs inside cucumber fruits and their length and breadth were 1.29±0.05 and 0.27±0.02 mm, respectively while the incubation period was 1.50±0.51 days with 81.41±3.61% hatching. The apodous maggot was creamy-whitish and measured 8.45±0.40 and 1.62±0.15 mm in length and breadth, respectively while the total maggot period was 6.70±0.66 days. The puparium measured 5.70±0.47 and 2.39±0.22 mm in length and breadth, respectively. The length and breadth with expanded wings of the male were 6.42±0.55 and 13.50±0.66 mm, respectively whereas in the case of the female these were 7.89±0.58 and 14.32±0.65 mm, respectively. Moreover, the total life period of the female fly was recorded as 38.23±2.80 days, while for the male it was 34.78±1.56 days. In addition, studies on seasonal abundance revealed that in cucumber the activity of adults of *B. cucurbitae* commenced from 13th Standard Meteorological Week (SMW) *i.e.*, 4th week of March and continued till 19th SMW (1st week of May) which ranged from 38.00 to 59.75 with an average of 45.11 male fruit flies per four traps while, the peak adult population was observed during 17th SMW *i.e.*, 4th week of April (59.75 mean male fruit flies/4 traps). Moreover, adult population of melon fruit fly showed a positive and significant correlation with maximum temperature and a negative and significant correlation with morning relative humidity. Overall, morphological and morphometrical studies will be useful to distinguish *B. cucurbitae* from other species of fruit flies while the information about maggot and adult life span, nature of damage,

Poster Presentation

damaging stages and weak link will be useful for planning of an integrated management strategy under field conditions. Moreover, knowledge of seasonal abundance helps in deciding the timing of application of appropriate management practices.

Keywords: Biology; Seasonal abundance; Melon fruit fly; *Bactrocera cucurbitae*; Cucumber

BISP(P)-06

Bio-efficacy of *Metarhizium anisopliae* (Metchnikoff) Sorokin with Insecticides against Mango Hopper, *Idioscopus nitidulus* Walker

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The bio-efficacy of *Metarhizium anisopliae* (Metchnikoff) Sorokin, in combination with five insecticides *viz.,* flonicamid 50 WG, buprofezin 25 SC, thiamethoxam 25 WG, tolfenpyrad 15 EC, and imidacloprid 17.8 SL was evaluated against the mango hopper (*Idioscopus nitidulus* Walker) at the Horticulture Farm of B.A. College of Agriculture, Anand Agricultural University, Anand, during the *rabi* season of 2021–22. Among the different treatments, *Metarhizium anisopliae* 1% WP combined with flonicamid 50 WG and buprofezin 25 SC proved most effective, recording the lowest hopper populations of 3.46 and 3.74 hoppers per panicle, respectively. In contrast, *Metarhizium anisopliae* 1% WP combined with imidacloprid 17.8 SL, thiamethoxam 25 WG, and tolfenpyrad 15 EC showed moderate efficacy. However, *Metarhizium anisopliae* 1% WP applied alone was least effective in reducing the incidence of *Idioscopus nitidulus* infesting mango.

Keywords: Bio-efficacy, *Metarhizium anisopliae*, *Idioscopus nitidulus*, Mango hopper.

Poster Presentation

BISP(P)-07

Bio-Intensive Management of Fall Armyworm, *Spodoptera frugiperda* (J.E. Smith) on Maize

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Fall armyworm, *Spodoptera frugiperda* (J.E. Smith) is a devastating lepidopteran pest of maize with potential to cause up to 70 per cent yield losses (Ayala *et al* 2013). The indiscriminate and broadly unscientific application of various synthetic chemicals to control this invasive pest may lead to many ecological backlashes. Due to this, there is need to identify effective eco-friendly approaches and rationale for bio-intensive integrated pest management (BIPM) is irrefutable. We, therefore, conducted field experiments during 2022 and 2023 to evaluate different bio-intensive modules with three interventions (i) collection and destruction of egg batches from leaves; (ii) two releases of egg parasitoid, *T. remus* @ 10,000 adults ha^{-1} on 7- and 14-days-old crop and (iii) two sprays of different biopesticides at 10 days interval starting from 21-days-old crop. The biopesticides sprayed in different modules were Delfin WG (*Bacillus thuringiensis*) @ 1.0 kg ha^{-1} (BIPM 1), Dipel 8 L (*Bacillus thuringiensis*) @ 1.0 litre ha^{-1} (BIPM 2), Kalichakra 1.0 WP (*Metarhizium anisopliae*) @ 2.5 kg ha^{-1} (BIPM 3), Daman 1.0 WP (*Beauvera bassiana*) @ 2.5 kg ha^{-1} (BIPM 4), and NBAIR *Spfr*NPV (Baculovirus) @ 1.0 litre ha^{-1} (BIPM 5). These modules were compared with chemical control, Delegate 11.7 SC (spinetoram) @ 0.5 ml L^{-1} of water and untreated control. The observations were recorded on larval population, plant damage and damage rating at weekly interval starting from 14 to 49 days after germination and grain yield was recorded at harvest. BIPM modules involving regular collection and destruction of egg masses, two releases of egg parasitoid, *T. remus* @ 10,000 adults ha^{-1} (7- and 14-days-old crop) and two sprays of *B. thuringiensis* var. *kurstaki* (Delfin WG @ 1.0 kg ha^{-1} or Dipel @ 1.0 litre ha^{-1}) at 10 days interval starting from 21-days-old crop were found effective in management of *S. frugiperda* on maize crop and also gave higher grain yield as compared to other modules and untreated control. However, chemical control was the best treatment in reducing the larval population and plant damage. The findings will help in eco-friendly and sustainable management of this invasive pest in maize ecosystem under Punjab conditions.

Keywords: Bio-intensive, Management, BIPM modules, *S. frugiperda*, Biological control

Poster Presentation

BISP(P)-08

Biochar: Eco-Friendly Strategy for Insect Pest Management

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The need for eco-friendly pest management strategies has encouraged the exploration of biochar as a sustainable alternative to chemical pesticides. Biochar, carbon rich by product of biomass pyrolysis, offers multifunctional benefits in agriculture, including soil fertility improvement, carbon sequestration and insect-pest suppression. Its role in insect management operates through multiple mechanisms such as activation of the jasmonic acid (JA) defence pathway, alteration of host plant nutrient balance that disrupts sap-feeding, physical abrasion and dehydration of insect cuticles, delayed larval development and growth inhibition through ingestion. Laboratory and field studies have demonstrated reduced fecundity, feeding and survival of key pests including plant hoppers, aphids, mites, and stored grain pests. Additionally, biochar indirectly promotes plant resistance by enhancing defence gene expression and modifying biochemical profiles. Beyond pest control, biochar contributes to climate change mitigation, improved soil health and higher crop yields. Future research should emphasize mechanistic insights, biochar standardization, large scale validation, integration with IPM, stored product applications and policy support for wider adoption.

Keywords: Biochar, Sustainable insect-pest management

Poster Presentation

BISP(P)-09

Comparative Biology of Assassin Bug, *Rhynocoris marginatus* on *Corcyra cephalonica* Larvae Reared on Different Diets

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A laboratory study to evaluate the effect of *Corcyra cephalonica* larvae reared on sorghum-based and Vitamin A-fortified diets on biological attributes of *Rhynocoris marginatus* was conducted at the Biological Control Research Laboratory, ICAR Unit-9, Anand Agricultural University, Anand (Gujarat) during 2024–25. The studies revealed that, diet (Sorghum + Groundnut + Powdered yeast + Vit A fed larvae of *C. cephalonica*) exhibited highly significant differences in several biological parameters, including a shorter nymphal development period (55.14 days), total developmental period (183.93 days), extended female (136.71 days) and male (105.14 days) longevity, higher fecundity (344.44 eggs) and an exceptional sex ratio (1.85) compared to those reared on diet (Sorghum + Groundnut + Powdered Yeast fed larvae of *C. cephalonica*). A significantly shorter female developmental period (199.71 days), male developmental period (168.14 days) and preoviposition period (18.14 days) was reported in *R. marginatus* nymphs reared on diet (Sorghum + Groundnut + Powdered yeast + Vit A fed larvae of *C. cephalonica*) compared to those on diet (Sorghum + Groundnut + Powdered yeast fed larvae of *C. cephalonica*). There is no significant difference was observed in the incubation period of *R. marginatus* between (Sorghum + Groundnut + Powdered yeast + Vit A fed larvae of *C. cephalonica*) and (Sorghum + Groundnut + Powdered Yeast fed larvae of *C. cephalonica*) diet.

Keywords: Rice moth, Assassin bug, Vitamins, Biology

Poster Presentation

BISP(P)-10

Economic Feasibility and Bio-intensive Potential of Botanicals against *Spodoptera litura* in Groundnut

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Nine botanical treatments were tested against *Spodoptera litura* on groundnut. The pooled results showed that aqueous tobacco extract (1.32 larvae/plant) gave the lowest larval population, closely followed by NSKE (1.40 larvae/plant) and *Agniastra* (1.46 larvae/plant). *Neemastra*, *Dashparni ark* and *Brahmastra* offered moderate suppression, whereas karanj leaf extract (2.88 larvae/plant), custard apple leaf extract (3.03 larvae/plant) and kalmegh powder (3.15 larvae/plant) were the least effective. Economic evaluation revealed that aqueous tobacco extract was the most profitable option, recording the highest Incremental Cost Benefit Ratio (1:11.33), with NSKE (1:8.97) and *Agniastra* (1:8.21) ranking next. In contrast, custard apple leaf extract and kalmegh powder gave the lowest returns, with kalmegh powder showing the minimum ICBR (1:2.31). Overall, aqueous tobacco extract proved superior both in larval reduction and economic viability for the management of *S. litura* in groundnut.

Keywords: *Agniastra*, Aqueous tobacco extract, Botanical extracts, Groundnut, NSKE

Poster Presentation

BISP(P)-11

Effect of Bioagents on Root Rot of Mungbean Incited by *Rhizoctonia bataticola*

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Mungbean, (*Vigna Rdiata* L. Wilczek), also known as green gram, golden gram, oregon, pea, çhickasano pea, chiroko or simply mung is one of the most important pulse crop grown in India. It is high in potassium and phosphorous and a good source of high-quality proteins. It belongs to family *fabaceae,* sub family *Papilionaceae* is a self-pollinating crop with a chromosome number 2n=22 and native to India. It's affected by various Fungal, Bacterial and Viral diseases. *Rhizoctonia bataticola* fungus is mainly a soil borne in nature with wide range of host and it can survive under the soil as saprophyte up to 15 years. *Rhizoctonia bataticola* infection occurs most frequently at flowering and pod formation stage or seed development stage. Four bioagents *Trichoderma harzianum*, *T. viride*, *Bacillus subtilis* and *Pseudomonas fluorescens* were tested in the field by applying through seed and soil inoculation techniques and *in vitro* conditions (dual culture technique for fungal bioagents and paper disc method for bacterial bioagents). A perusal of data revealed that minimum per cent disease incidence was recorded with seed application of *T. harzianum* @6 g/kg seed followed by *T. viride* as compared to control at 45 days after sowing. Under *in vitro* conditions results revealed that maximum per cent inhibition of mycelial growth of the pathogen was recorded with *T. harzianum* followed by *T. viride* and minimum per cent inhibition of mycelial growth was recorded with *P. fluorescens* and *B. subtilis*.

Keywords: Mungbean, *Trichoderma*, Root rot, *Rhizoctonia bataticola*

Poster Presentation

BISP(P)-12

Effect of Botanicals for the Management of Root-Knot Nematode, *Meloidogyne* spp. in Pomegranate (*Punica granatum* L.) Orchards

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The research trial was conducted at farmer field Bhojpura Khurd, Jobner (Jaipur) during April 2024 to March 2025. The experiment was laid out in a randomized block design with seven treatments replicated tree times. Observation on nematode population (per 200 cc soil), plant height (cm) (At the time of application, At 45 days after application, At 90 days after application, At 135 days after application, At 180 days after application) and fruit yield (Kg per tree). Among the tested six botanicals T1 (Neem @ 10 per cent per plant) significantly reduced nematode population per 200cc soil (376.67, 470.42, 384.74 and 366.45 on 45, 90, 135 and 180 days after application respectively) was reported. This treatment also increase plant height (cm) (249 cm, 261 cm, 271 cm and 279 cm on 45, 90, 135, and 180 days after application respectively) and fruit yield(Kg per plant) (20.33 kg) followed by parthenium, Karanj, Giloy, Wild sunflower, Ardu) at the rate 10 per cent per plant) Whereas maximum nematode population (per 200 cc soil) with minimum plant height (cm) and fruit yield (Kg per plant) reported in untreated check.

Keywords: Pomegranate, *Meloidogyne* Spp., Botanicals, Management.

Poster Presentation

BISP(P)-13

Effect of Different Isolates of *Trichoderma* on Collar rot of Chickpea Incited by *Sclerotium rolfsii*

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Chickpea [*Cicer arientinum* L.], is a significant pulse crop. The genus *Cicer*, which was originally placed in the tribe vicieae of the family *Fabaceae*. This crop is self-pollinated crop. Chickpea is a nutritious feed for animals, a plant that fixes nitrogen and a decent source of protein for humans. Chickpea crop is affected by many biotic disease *viz*., collar rot, chickpea wilt, root rot and aschochyta blight. *Sclerotium rolfsii*, the cause of chickpea collar rot, is common in areas with high soil moisture content and moderate temperatures. It can damage the plant by 10–100%. The antagonistic potential of the *Trichoderma* isolates against soil borne pathogen *S. rolfsii* were tested under in-vitro by dual culture technique. Six isolates were tested against the pathogen *viz* KTI 2 (Ummedganj), KTI 7 (AU, Kota field), KTI 10 (Sultanpur), KTI 13 (Raipura), KTI 17 (Suwana) and KTI 20 (ARS field) and pathogen as control. Among these isolates KTI 17 showed the maximum inhibition of *Sclerotium rolfsii* with 73.93% and compared to the other isolates test, it was determined to be much better. followed by isolates KTI 2 , KTI 10, KTI 20, KTI 13 and KTI 7 were found over control. The efficient antagonist *Trichoderma* isolate (KTI 17) was further got confirmed from division of Plant Pathology, IARI, New Delhi, as *Trichoderma asperellum*.

Keywords: Chickpea, *Trichoderma*, Isolates, Collar rot, *Sclerotium rolfsii*

Poster Presentation

BISP(P)-14

Effect of Insecticides on Second Larval Instar of Predatory Green Lacewing, *Chrysoperla zastrowi sillemi* (Esben-Petersen)

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The lacewing, *C. zastrowi sillemi*, is a predaceous insect that is important in crop pest management. Aiming at a harmonious integration of biological and chemical control in protected cultivation, ecotoxicology studies are required to provide information on insecticide/botanical harmfulness toward natural enemies. To investigated the side effects of five insecticides and one botanical *viz.* cyantraniliprole, diafenthiuron, imidacloprid, spiromesifen, thiamethoxam and azadirachtin were used in the bioassay experiments, respectively. On the basis of LC_{50} values assessed the toxicity for cyantraniliprole, diafenthiuron, imidacloprid, spiromesifen and thiamethoxam for second instar larvae of *C. zastrowi sillemi* were calculated to be 1000.56, 735.86, 150.10, 2209.69 and 67.96 ppm, respectively. In order to assess comparative safety of insecticides/botanicals to the predator the toxicity index and risk ratio were calculated based on the LC_{50} values and field recommended rate. Apart from these results, azadirachtin was observed to be safe to larval stages of the predator when used in their field recommended rates except thiamethoxam which showed high (0.588) risk ratio for larva. These findings allow us to conclude that insecticide/botanical except azadirachtin are caused most striking effect on predator by producing high mortality and risk ratio on larva stage.

Keywords: *Chrysoperla zastrowi sillemi*, Toxicity, Insecticides, $LC_{50,}$ Risk ratio, Toxicity ratio

Poster Presentation

BISP(P)-15

Effect of Intercropping Systems on the Incidence of Whitefly (*Bemisia tabaci* Gennadius) in Mung bean (*Vigna radiata* L.)

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A field experiment was carried out during the *Kharif* season of 2019-2020 to evaluate the effectiveness of different intercropping systems in managing the whitefly (*Bemisia tabaci*) population in mung bean (*Vigna radiata*). The experiment was laid out in a Randomized Block Design (RBD) comprising seven treatments *viz*., T_0 (sole mung bean), T_1 (mung bean + maize), T_2 (mung bean + sun hemp), T_3 (mung bean + dhaincha), T_4 (mung bean + jowar), T_5 (mung bean + bajra) and T_6 (mung bean + okra), each replicated thrice. The results revealed a significant influence of intercropping systems on whitefly infestation. Among the different treatments, T_2 (mung bean + sun hemp) recorded the lowest mean whitefly population (9.32leaves^{-3}), indicating the most effective suppression of whitefly incidence. This was followed by T_5 (mung bean + bajra), T_4 (mung bean + jowar), T_1 (mung bean + maize), T_3 (mung bean + dhaincha) and T_6 (mung bean + okra) with mean value 10.51, 10.61, 10.89, 11.36 and 11.70 leaves^{-3}, respectively. In contrast, the sole mung bean crop (T_0) recorded the highest whitefly population (12.08 leaves^{-3}), significantly higher than all intercropped treatments. These results clearly indicated that intercropping significantly reduces whitefly incidence in mung bean, particularly involving sun hemp as an intercrop, can be effectively integrated into whitefly management programs in mung bean cultivation.

Keywords: *Bemisia tabaci*, Intercropping, *Kharif*, Mung bean, Sun hemp.

Poster Presentation

BISP(P)-16

Effect of various intercrops on incidence of *Plutella xylostella* (L.) on cabbage

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The field trial was carried out in *Rabi*, 2021-22 season at Horticulture Farm, S.K.N. College of Agriculture, Jobner, investigation entitled "Effect of various intercrops on incidence of Diamond back moth, *Plutella xylostella* (L.) on cabbage" An effort has been made to study the influence of intercrops on the incidence of DBM infesting cabbage during *Rabi,* 2021-22. There were four intercrop combinations, *viz.,* tomato, mustard, marigold and onion along with sole crop (cabbage). The infestation was first observed in the third week of December when it ranged from 0.31-0.50 diamond back moth per plant. The minimum population of diamond back moth was observed on cabbage + onion (0.31 DBM/ plant) followed by cabbage + tomato (0.37 DBM/plant) intercrop combinations which were at par with each other. Maximum infestation was observed on sole crop (0.50 DBM/ plant) which differed significantly with cabbage + mustard (0.49 DBM/plant) and cabbage + marigold (0.42 DBM/plant) intercrop combinations. The peak activity of diamond back moth was observed in the first week of February ranged from 2.39-3.50 per plant. The minimum population of diamond back moth was observed on cabbage + onion (2.39 DBM/plant) followed by cabbage + tomato (2.69 DBM/plant) intercrop combinations and both were statistically at par with each other of the intercrop combinations. The maximum population of diamond back moth was recorded on sole crop (3.50 DBM/plant) followed by the cabbage + mustard (2.91 DBM/plant) and cabbage + marigold (2.82 DBM/plant) intercrop combinations which was statistically at par with each other. The mean diamond back moth population during the season ranged from 1.29-1.88 DBM/plant. The minimum population of diamond back moth was found in the cabbage + onion (1.29 DBM/plant) followed by cabbage + tomato (1.44 DBM/plant) intercrop combination and whereas, maximum was on sole crop (1.88 DBM/plant) followed by cabbage + mustard (1.66 DBM/plant) and cabbage + marigold (1.58 DBM/plant).

Keywords: Cabbage, Intercrop, DBM, Pests.

Poster Presentation

BISP(P)-17

Efficacy of Bioagents against Root Rot of Cowpea Incited by *Rhizoctonia bataticola* [*Macrophomina phaseolina* (Tassi.) Goid]

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Cowpea [*Vigna unguiculata* (L.) Walp] (diploid, 2n=22) is an annual legume crop. It is also known as lobia, southern pea, black eye pea, crowder pea, barbati, china pea, cowgram etc. Cowpea is a member of family *fabaceae* and introduced from Africa. It's affected by various Fungal, Bacterial and Viral diseases. *Rhizoctonia bataticola* [*Macrophomina phaseolina* (Tassi.) Goid] fungus is mainly a soil borne in nature with wide range of host and it can survive under the soil as saprophyte up to 15 years. *Rhizoctonia bataticola* infection occurs most frequently at flowering and pod formation stage or seed development stage. Four bioagents were tested against the fungus with one control *viz*., *Trichoderma harzianum*, *Trichoderma viride*, *Bacillus subtilis* and *Pseudomonas fluorescens* under *In vivo* and *In vitro* conditions. A field experiment was conducted during kharif 2023 at instructional Farm, SKN College of Agriculture, Jobner in randomized block design (RBD) with four replications, using Local cultivar, under artificial inoculation conditions. The efficacy of four bioagents were tested *In vitro* using dual culture plate method against *Rhizoctonia bataticola* and antagonistic agents both were placed separately at equal distance on the periphery of PDA petri plates. Among four tested bioagents, *Trichoderma harzianum* was found most effective in reducing per cent disease incidence (field conditions) and inhibiting mycelial growth (Dual culture plate method) over control followed by *Trichoderma viride*, *Pseudomonas fluorescens, Bacillus subtilis* was least effective over control.

Keywords: Bioagents, Dual culture plate method, *Rhizoctonia bataticola*

Poster Presentation

BISP(P)-18

Efficacy of Biopesticides and Botanicals against *Carpomyia vesuviana Costa* on Ber

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A field experiment conducted during 2021–22 evaluated the relative efficacy of selected botanical and biopesticides against the ber fruit fly (*Carpomyia vesuviana* Costa). The study revealed that **Spinosad 45 SC** was the most effective treatment in managing the fruit fly population. This was followed by **Azadirachtin 0.03 EC** and **Neem Seed Kernel Extract (NSKE) 5%**, which showed good levels of efficacy. **Neem oil** and **Karanj oil** were the least effective treatments among those tested. In addition, the entomopathogenic fungi **Beauveria bassiana 1.15 WP** and **Metarhizium anisopliae 1.15 WP** exhibited **moderate effectiveness** against the pest. These findings suggest that Spinosad and neem-based formulations, particularly azadirachtin and NSKE, can be integrated into eco-friendly management strategies for ber fruit fly, while biological control agents like *B. bassiana* and *M. anisopliae* show potential as supportive options.

Keywords: *Carpomyia vesuviana*, Ber, Biopesticides, Azadirachtin, Karanj oil

Poster Presentation

BISP(P)-19

Efficacy Test of Four Different Species of *Trichogramma* Used against the *Chilo partellus* under Laboratory Conditions

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The present study evaluated the efficacy of four species of *Trichogramma—T. chilonis*, *T. pretiosum*, *T. japonicum* and *Trichogrammatoidea bactrae* as egg parasitoids against *Chilo partellus*, a major lepidopteran pest of sorghum and maize crop. Under controlled laboratory conditions, each species was assessed for its parasitization rate and developmental period on *C. partellus* eggs. Results indicate marked interspecific differences in parasitism efficiency. *T. chilonis* and *T. bactrae* demonstrated the highest parasitization rates, exceeding 80%, whereas *T. pretiosum* and *T. japonicum* exhibited moderate to low efficacy, with parasitism rates below 60% in most replicates. Adult emergence was also highest for *T. bactrae* and *T. chilonis*, with values reaching above 85%, while the developmental period among the four species remained broadly similar, ranging from approximately 6 to 7 days. These findings suggest that *T. chilonis* and *T. bactrae* are up-and-coming agents for the biological control of *C. partellus*, offering effective egg parasitism and robust adult emergence under laboratory conditions. Incorporating these species into integrated pest management strategies may enhance the sustainable suppression of *C. partellus* populations under field conditions.

Keywords: *Chilo partellus*, Efficacy, Parasitization rate, Sorghum.

Poster Presentation

BISP(P)-20

Egg-laying Preference of Green Lacewing on Different Types of Coloured Paper

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An investigation into the impact of paper type (glossy *v/s* matte) and colour on the egg-laying behaviour of green lacewings at the Biological Control Research Laboratory, ICAR Unit-9, Anand Agricultural University, Anand (Gujarat) revealed that both surface texture and colour had a significant impact on oviposition. Black was the most favoured colour (357.92 eggs), followed by white, light green, and light pink. Glossy papers were found with more numbers of eggs (232.06) than matte papers (201.00). The best combination was glossy black paper, which had the highest egg count (376.52 eggs). This was statistically comparable with matte black (339.78 eggs), glossy white (304.06 eggs), glossy light pink (298.46 eggs), matte white (291.04 eggs) and glossy light green (290.87 eggs). In contrast, matte yellow (133.26 eggs), glossy orange (141.98 eggs) and glossy peach (143.64 eggs) were least preferred. This information can be useful to improve mass-rearing efficiency and aid in designing more effective oviposition substrates for biological control applications.

Keywords: Biological control, Green lacewing, Matte, Glossy, Oviposition

Poster Presentation

BISP(P)-21

Evaluation of Management Practices against the Red Pumpkin Beetle on Bottle Gourd.

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Bottle gourd (*Lagenaria siceraria*), an important cucurbit crop in India, is severely infested by various insect pests of which the red pumpkin beetle *Aulacophora foveicollis* (Lucas) is a major one. This study was conducted during the 2024 rainy season at CCS Haryana Agricultural University, Hisar, to evaluate the efficacy of different management practices against red pumpkin beetle on bottle gourd. Management practices were evaluated through eight treatments involving synthetic insecticides, botanicals, ashes and entomopathogenic fungi. Treatments were given twice, 15 days apart and efficacy was expressed in terms of beetle population decline as well as fruit production. Out of all the treatments, Cyantraniliprole 10.26 OD was the best, recording a mean reduction of 84.84% and 82.79% following the first and second application, respectively. This was closely followed by Cypermethrin 10 EC and non-chemical methods such as dung ash and rice husk ash were also highly effective. Azadirachtin 3000 ppm, Entomopathogenic fungi (*Beauveria bassiana* and *Metarhizium anisopliae*) were moderate in effectiveness. Fruit production was far greater in treated areas than in the control that was not treated. Cyantraniliprole had the highest production (255.41 q/ha) with an increase of 52.65% over control, Cypermethrin had the best benefit-cost ratio (10.89:1), followed by rice husk ash and *B. bassiana*. This study reveals that non-chemical treatments can act as effective alternatives to synthetic chemicals for managing the red pumpkin beetle.

Keywords: Bottle gourd, Red pumpkin beetle, Cyantraniliprole, Rice husk ash

Poster Presentation

BISP(P)-22

Evaluation of Bio-Pesticides against Thrips, *Thrips parvispinus* (Karny) Infesting Chilli

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Chilli (*Capsicum annum* L.) is a member of the Solanaceae family, typically grown in the tropical and warmer temperature regions of the world for its green fruit and pungency. However, it is susceptible to pest infestations owing to its delicate nature, cultivation in intensive farming systems. Numerous kinds of insect-pests have been observed attacking chilli crops at various stages of their growth and causing economic yield loss. Among them, earlier *Scirtothrips dorsalis* (Hood)) only the thrips species was observed to cause considerable yield loss but after the year 2021 another invasive thrips species *i.e. Thrips parvispinus* (Karny) known as black thrips was observed in chilli crop and cause serious damage to flowers and fruits of chilli which leads to shedding of flowers, malformation and dropping of fruits. Bio-pesticides have been regarded safe to ecology and to counter insect resistance. Increasing acceptance of organic agriculture where chemicals are not permitted has led to a quest to scientific community around the globe to either formulate or suggest the safer alternatives for managing insect-pests. Considering the economic importance of new invasive thrips and chilli crop for the country the present study was conducted to evaluate the efficacy of bio-pesticides for managing *T. parvispinus* infesting chilli at two different locations *i.e.,* Farmer`s Field, Rasnol (Var. Picador) and MVRS, AAU, Anand (Var. AVNPC-131) in Randomized Block Design (RBD) with three replications during *Rabi* 2021-22. The application was carried out when the plots were infested by the pest. For recording observations, five plants were randomly selected from each net plot. From each plant three flowers (upper, middle and lower) were observed and total number of thrips were counted from each flower. The observations were recorded one day prior to application and subsequently at 3, 7 and 10 days after application in both locations. The pooled results of both locations indicated that the plots sprayed with azadirachtin 10000 ppm, 0.003% (5.95 thrips/ flower) recorded significantly lower thrips population and it was at par with the treatment *Pseudomonas fluorescens* 1% WP (6.31 thrips/ flower). Neem oil 0.5% (9.61 thrips/ flower), Neem Seed Kernel Extract 5% (9.68 thrips/ flower),

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Lecanicillium lecanii 1.15% WP (9.74 thrips/ flower), *Beauveria bassiana* 5% WP (10.13 thrips/ flower), *Metarhizium anisopliae* 1.15% WP (10.13 thrips/ flower), *Bacillus thuringiensis* 0.5% WP (10.32 thrips/ flower) and castor oil + ethanol (10.66 thrips/ flower) was found least effective but superior than the control against *T. parvispinus* infesting chilli.

Keywords: Chilli, Invasive pest, Black thrips, *Thrips parvispinus* (Karny), Bio-pesticides

Poster Presentation

BISP(P)-23

Evaluation of Management Practices in Predominant Maize–Gram Cropping System

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This study evaluates the impact of three management practices—Farmers' Practice (FP), Integrated Crop Management (ICM), and Organic Farming (OF)—on productivity, economics, and sustainability of the maize–gram cropping system in Rajsamand District, Rajasthan, India. Conducted over two years (2023–24 and 2024–25) across six villages in Delwara and Kumbhalgarh blocks, the experiment employed a Randomized Block Design with 12 farmer replications. Results revealed that ICM achieved the highest maize productivity (1904 kg/ha pooled), gram productivity (945 kg/ha), system productivity (4309 kg/ha), and net returns (Rs. 58,824/ha) with a benefit–cost ratio (BCR) of 1.36. FP followed with system productivity of 3893 kg/ha and net returns of Rs. 53,080/ha (BCR 1.39), while OF recorded the lowest productivity (3731 kg/ha), net returns (Rs. 36,131/ha), and BCR (0.69). ICM demonstrated superior performance, highlighting its potential as a sustainable intensification strategy in semi-arid regions. These findings align with earlier reports emphasizing integrated approaches for balancing productivity, profitability, and ecological sustainability.

Keywords: Maize, Gram, Cropping System, Integrated Crop Management, Organic Farming, Semi-Arid, Productivity, Economics

Poster Presentation

BISP(P)-24

Evaluation of Organic Inputs against Sucking Pest Complex Infesting Potato

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Various organic inputs *viz.,* Neem Seed Kernel Extract 5%, Neem oil 0.5%, *Lecanicillium lecanii* 1.15% WP, *Metarhizium anisopliae* 1.15% WP, *Beauveria bassiana* 5% WP, Cow urine 10%, *Neemastra*, Tobacco decoction 2% were evaluated against sucking insect-pest complex in potato for consecutively two years at Anand Agricultural University, Anand during 2021-22 and 2022-23. The result showed that three sprays of tobacco decoction 2 per cent and neem oil 0.5 per cent were found the most effective against all three sucking insect-pests *i.e.,* jassids, whiteflies and thrips. While, the treatments, cow urine 10 per cent and *Neemastra* were found the least effective for managing pests. Remaining treatments were found moderately effective against evaluated sucking insect-pests. The highest tuber yield was obtained from the plots treated with tobacco decoction 2 per cent (24.18 t/ha) and it was also found at par with the treatments of neem oil 0.5 per cent (23.59 t/ha) and *Beauveria bassiana* 5% WP (21.60 t/ha). The rest of the treatments were registered highest potato tuber yield than control but it was at par with each other. It is concluded that for the management of jassids, whiteflies and thrips in potato, three sprays of tobacco decoction 2% and neem oil 0.5% can reduce the infestation of sucking insect-pest complex along with fetching higher tuber yield.

Keywords: Eco-friendly management, sucking insect-pests complex, potato

Poster Presentation

BISP(P)-25

Exploring the Potential of Endophytic *Beauveria bassiana* and *Metarhizium anisopliae* for the Management of Diamondback Moth in Cabbage

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Entomopathogenic fungi that establish endophytic relationships with plants represent a promising approach for managing insect pests. Endophytic colonization enhances fungal persistence and effectiveness, particularly under dry conditions, while also inducing host plant defenses. Among these fungi, *Beauveria bassiana* and *Metarhizium anisopliae* are notable for their broad host range, antagonistic activity and potential to control both insect pests and plant pathogens. This study, conducted at the Department of Plant Pathology, B. A. College of Agriculture, Anand, and the Biological Control Research Laboratory, AAU, evaluated the efficacy of promising isolates (*M. anisopliae* AAUBC–Ma 26 and *B. bassiana* AAUBC Bb-5a) against the diamondback moth, *Plutella xylostella* in cabbage. Laboratory, net house and field experiments compared these isolates with commercial formulations (*M. anisopliae* 1.5% WP and *B. bassiana* 5% WP). In laboratory assays and net house experiments, the combination of AAU isolates caused the highest larval mortality followed by *B. bassiana* AAUBC Bb-5a while *M. anisopliae* 1.5% WP was least effective. Field trials confirmed the superior performance of the AAU isolate combination, resulting in the lowest larval density and highest yield, followed by *B. bassiana* AAUBC Bb-5a and the combination of commercial formulations. All other treatments showed moderate effects, with commercial *M. anisopliae* 1.5% WP being the least effective. Overall, the study demonstrates that the combination of AAU isolates consistently outperformed individual isolates and commercial products. These findings highlight the potential of endophytic entomopathogenic fungi as effective, environmentally friendly tools for integrated pest management in cabbage and possibly other crops.

Keywords: Endophytes, *Beauveria bassiana*, *Metarhizium anisopliae*

Poster Presentation

BISP(P)-26

Impact of Adjuvants on the Efficacy of Myco-Insecticides against Jassid, *Amrasca biguttula biguttula* Ishida in Okra

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Okra [*Abelmoschus esculentus* (L.) Moench] is one of the most important vegetable crop suffer from numerous kinds of insect-pests at various stages of their growth. Among them, okra is the ideal host for jassid survival and feeding. Nymphs and adults of jassid suck plant sap from the lower surface of the leaves and inject a necrotic toxin causing browning, bronzing, cupping, wilting, and necrosis which result in severe yield losses. In the pursuit of effective and sustainable alternatives of insecticides, there has been a heightened emphasis on myco-insecticides as a prospective solution and their usage poses a reduced risk of pest resistance compared to conventional methods. Moreover, their efficacy can be enhanced by incorporating adjuvants which change their growth characteristics. Keeping this view, an experiment on impact of adjuvants on the efficacy of myco-insecticides against jassid, *Amrasca biguttula biguttula* Ishida in okra was carried out during *Kharif*, 2023. Two entomopathogenic fungi in combination with four adjuvants as well as alone tested under laboratory as well as under field conditions. The results under laboratory on radial growth and sporulation of myco-insecticides indicated that gum acacia 0.1% recorded the highest radial growth (74.60 and 72.64 mm) and sporulation (6.2 x 10^8 and 3.5 x 10^8 and spores/mL) of *L. lecanii* and *M. anisopliae*, respectively followed by guar gum 0.1% showed 72.96 and 68.67 mm radial growth and 5.8 x 10^8 and 2.4 x10^8 spores/mL, respectively. Adjuvants having maximum mean radial growth and spore yield of myco-insecticides in descending order are gum acacia 0.1% > guar gum 0.1% > CMC 0.1% > no adjuvant > silicone spreader 0.1%. Under field conditions, pooled of two sprays indicated that the plots treated with the combination of *L. lecanii* 1% WP + gum acacia 0.1% @ 40 g + 10 g per 10 litre of water (0.75 jassid/leaf) and *L. lecanii* 1% WP + guar gum 0.1% @ 40 g + 10 g per 10 litre of water (0.94 jassid/leaf) had the lowest number of jassid and found significantly superior in managing the pest. The plots having treatment of *M. anisopliae* 1% WP + gum acacia 0.1%, *M. anisopliae* 1% WP + guar gum 0.1%, *L. lecanii* 1% WP + CMC 0.1% and *M. anisopliae* 1% WP + CMC 0.1% recorded 2.78, 3.03, 3.42 and 3.66 jassids/leaf, respectively and found mediocre in efficacy against jassid. Plots

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having treatment of *L. lecanii* 1% WP alone (without any adjuvant), *M. anisopliae* 1% WP alone (without any adjuvant) and *L. lecanii* 1% WP + silicone spreader 0.1% recorded 4.47, 4.88 and 5.45 jassids/leaf, respectively. The highest population of jassid was recorded from plots having treatment of *M. anisopliae* 1% WP + silicone spreader 0.1% (5.80 jassids/leaf) which shows its incompetency in managing jassids in okra.

Keywords: Okra, Jassid, Myco-insecticides, Adjuvants, *Metarhizium anisopliae*, *Lecanicillium lecanii*, Gum acacia, Guar gum

BISP(P)-27

In vitro Evalution of Botanicals against Mycelial Growth of Chickpea Wilt Caused by *Fusarium oxysporum* f. sp. *ciceri*

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Chickpea (*Cicer arientinum* L.) is an important annual legume crop of the family *Fabaceae*. Biotic and Abiotic agents affect adversely chickpea productivity around the world. Chickpea is very sensitive to biotic stresses from a variety of organisms such as fungi, bacteria, viruses, phytoplasma and nematodes. Wilt disease is a major constraint to chickpea production due to the occurrence of wilt of chickpea.For the management of wilt total six plant extracts were tested under laboratory conditions through poisoned food techniques at three concentrations *viz.*, 5, 10 and 15 per cent. All the tested plant extracts showed significantly higher mycelial growth inhibition over the control. Among these, Neem plant leaves extract was found superior. Neem extract recorded maximum mycelial growth inhibition of 53.22, 65.53 and 73.92 per cent at 5, 10 and 15 per cent concentrations, respectively. Datura leaf extract showed 42.76, 54.78 and 65.33 per cent inhibition, turmeric extracts inhibited mycelial growth of 38.35, 47.37 and 59.51 per cent at 5, 10, and 15 per cent concentrations, respectively. Giloy extracts was found moderately effective against *Fusarium oxysporum* f. sp. *ciceri* of (36.62, 42.54 and 51.88 per cent inhibition of growth) at 5, 10 and 15 per cent concentrations, respectively. Ginger extract (26.37, 35.86 and 41.56%) and parthenium extract (10.17, 15.34 and 21.76%) were observed least effective to control the mycelial growth of *Fusarium oxysporum* f. sp. *ciceri* 5, 10 and 15 per cent concentration, respectively.

Keywords: Chickpea wilt, Plant extracts, *Fusarium oxysporum* f. sp. ciceri

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BISP(P)-28

Influence of Sublethal Doses of Emamectin Benzoate on *Spodoptera frugiperda*

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The sublethal effects of Emamectin benzoate on the developmental and reproductive parameters of *Spodoptera frugiperda* were evaluated under laboratory conditions using LC_{10} and LC_{30} concentrations. Third-instar larvae were exposed to treatments, and survivors were reared to assess life history traits. Both sublethal concentrations significantly prolonged larval duration (control: 11.00 d; LC_{10}: 15.33 d; LC_{30}: 18.67 d) and pre-pupal period (control: 2.33 d; LC_{10}: 3.00 d; LC_{30}: 4.33 d). Pupation percentage markedly declined from 96.67% in control to 68.33% (LC_{10}) and 48.33% (LC_{30}). Pupal weight decreased significantly in both sexes, with the lowest values recorded in LC_{30} (male: 0.1848 g; female: 0.1842 g). Pupal duration increased slightly, and sex ratio showed a non-significant downward trend.

Keywords: Emamectin benzoate, Sublethal effects, Fecundity, Hatchability

Poster Presentation

BISP(P)-29

Management of Sucking Insect Pests in Cluster Bean Through Bio-Rational

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The On Farm Trails (OFT) experiments was conduction in the Guar crop at Kumas Poonia (Mandawa) village, Jhunjhunu, Rajasthan (India) during *Kharif*-2022 to investigation "Management of sucking insect pests in cluster bean through bio-rational; increasing crop productivity and profitability" was assessed by Krishi Vigyan Kendra, Jhunjhunu using insecticide and NSKE, Tens farmers were selected for the trials, given as foliar sprayed two times, plot size 80x55 meter (2000sqm) ha date of sowing 25th June, 2022 Var. 1066, T_1 Farmers practices (Dimethate 30EC), T_2 = Recommended of Thiamethoxam 25% (0.025 %) with 5% Neem Seed Kernel Extract (NSKE) 1st spray 30-35 days after sowing of Thiamethoxam (0.025 %) and second spray of the will be made after 20-25 days of the first spray. It was found that farmer practices yield 11.34 quintal per hector and recommended 13.82quintal per hector. T_2 Net profit earned was the highest Rs 69,712 and benefit ratio is 3.24, T_1 Rs 16,253 and yield increased 9.80 percent as compared to (control) farmer practices.

Keywords: Management, Sucking pests, Cluster bean, Bio-rational.

Poster Presentation

BISP(P)-30

On-farm assessment on Integrated management strategies for fall armyworm (*Spodoptera frugiperda*) in maize in the Udaipur district of Rajasthan

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On-farm trials (OFT) on assessment of IPM module against fall armyworm (FAW) in maize were conducted on farmers' fields of Jhadol block of district Udaipur in Rajasthan during Kharif, 2023-24 & 2024-25 by ICAR-NCIPM,New Delhi and Vidya Bhawan Krishi Vigyan Kendra (VBKVK), Udaipur, Rajasthan. The IPM module Farmers participatory mode (FPM) including practices viz.,Deep ploughing, clean cultivation, balanced application of fertilizers, seed treatment with cyantraniliprole 19.8% + thiamethoxam 19.8% (Fortenza Duo) @ 6 ml/kg seed before sowing; installation of Pheromone trap@12/ha; field release of Trichogramma chilonis @ 100000/ha at 15 days after sowing (DAS) for two times at weekly interval; Spray Neem oil 4 ml/lit in whorls at 25 DAS (as soon as one moth/trap is observed);Bird perches @20/ ha (Early stage of crop up to 30 days) ;Hand picking and destruction of egg masses; Application of dry sand /in the whorl of affected plants; need based whorl Spray application of Metarrhizium anisopliae @ 5g/l of water and Emamectin benzoate 5SG @ 0.5g/l if more than 8 adult moths were trapped in the pheromone trap for three consecutive days about at 50-55 DAS significantly reduced FAW infestation to 10.13% resulting in 77.72 per cent reduction in pest incidence compared to the farmers' practice (45.47%) Additionally, the IPM module recorded a 22.38% increase in grain yield (42.43 q/ha) over the farmers' practice (34.67 q/ha) with a benefit-cost ratio (BCR) of 2.22. While the biocontrol module including seed treatment with cyantraniliprole + thiamethoxam @ 6ml /kg seed at sowing, field release of T.chilonis (100000/ha) at 15 days after sowing (DAS) for two times at weekly interval and spray of Metarhizium anisopliae (Bio Magic) @ 5g/L in the leaf whorls at 30, 40 & 50 DAS for 3 times also effectively reduced the incidence of FAW (14.18%) to an extent of 68.81 per cent and recorded 14.42 per cent increase in grain yield (37.15q/ha) compared to the farmers' practice and achieved a BCR of 2.01. These results clearly demonstrate that both IPM and biocontrol modules are effective in managing FAW in maize, with the IPM module showing superior pest suppression and yield enhancement. However,

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the biocontrol module offers an eco-friendly alternative with reasonably high efficacy and profitability, highlighting its potential for sustainable pest management in maize ecosystems.

Keywords: Cyantraniliprole 19.8% + Thiamethoxam 19.8%*1*, Pheromone traps2, Emamectin benzoate 5SG @ 0.5g3, Trichogramma chilonis4, Metarhizium anisopliae5, FAW6 and Maize7.

BISP(P)-31

Parasitism of *Spodoptera frugiperda* (J.E. Smith) eggs by *Telenomus remus* Nixon: Role of Egg Age and Protective Scales

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Fall armyworm, *Spodoptera frugiperda* (J.E. Smith) (Lepidoptera: Noctuidae) is one of the most important lepidopteran pests on maize crop worldwide. Insecticides are frequently used by growers to control fall armyworm outbreaks. As an alternative to conventional chemical control methods, biological control through natural enemies is highly desirable for eco-friendly management of this pest. The egg parasitoid *Telenomus remus* Nixon (Hymenoptera: Scelionidae) has been reported to be the most potential candidate for the biological control of *S. frugiperda* (Kenis *et al* 2019). The aim of study was to know whether and to what extent age and presence of scales on host eggs influence the parasitism by *T. remus*. We investigated the parasitism potential of *T. remus* on 24- and 48- hours-old eggs (with and without scales) of *S. frugiperda*. Significant differences were observed in daily and total parasitism when eggs of *S. frugiperda* with varying age were offered to parasitoid females. The parasitism was comparatively more on 24-hours-old as compared to 48-hours-old eggs. However, presence or absence of scales on the eggs had no significant impact on these parameters. There were no significant differences in adult emergence and proportion of the females in progeny (sex-ratio) from 24- and 48-hours-old eggs offered to the parasitoid for parasitism. Further, the adult emergence was also not influenced by presence of scales on eggs. The present findings will help in mass rearing of this parasitoid and developing augmentative biological control programme under field conditions for this invasive pest.

Keywords: *T. remus*, *S. frugiperda*, Egg parasitoid, Biology, Parasitism, Biological control

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BISP(P)-32

Performance of *Trichoderma harzianum* against Fusarium Wilt Disease of Cumin at Farmers' Field in Pali District of Rajasthan

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Cumin (*Cuminum cyminum* L.) is an important seed spice crop from the Apiaceae family that is native to Western Asia, India is the world's leading producer of this crop. This is a winter-season crop that is considered a profitable cash crop and is grown primarily in India's arid and semi-arid regions. However, cumin production is jeopardised by Fusarium wilt, which is caused by *Fusarium oxysporum* f. sp. *cumini*, a destructive soil-borne pathogen that reduces crop yield and quality significantly. To promote environmentally friendly disease management practices, frontline demonstrations (FLDs) were conducted at farmer's fields in Pali district during Rabi 2021-22 to 2024-25 to show the effectiveness of *Trichoderma harzianum* (CAZRI Marusena 1) as a biopesticide. The soil was inoculated with *T. harzianum* (2.5 kg/ha mixed with farmyard manure) followed by seed treatment @ 10g/kg seed. An average 55 per cent reduction of fusarium wilt was reported during four years. The average yield in the demonstration plots was 827.5 kg ha^{-1}, marking 19.03% increase over the local check (695.2 kg ha^{-1}). Economic analysis showed higher net return (Rs. 99,005 ha^{-1}) with benefit-cost ratio (3.38) in the FLD plots compared to controls (Rs. 75,684 ha^{-1}; B:C ratio 2.78). The farmers were better liking and acceptance towards the use of this biopesticide for the disease management. The study concludes that *T. harzianum* is an effective, sustainable, and economically viable strategy for managing wilt disease in cumin cultivation. Its integration into existing crop management practices can enhance productivity while reducing reliance on chemical fungicides.

Keywords: Cumin, Frontline Demonstration (FLD), *Trichoderma harzianum*, Fusarium wilt, Incidence, Biocontrol agent, Net return, Adoption.

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BISP(P)-33

Prey Preference and Predation Potential of *Chrysoperla zastrowi sillemi* on Different Aphid Species

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Chrysoperla zastrowi sillemi (Esben-Petersen, 1935) is an efficient biological control agent which feeds on soft-bodied insect pests, including aphids, whiteflies, thrips, mealybugs, and early instars of certain lepidopterans. Due to its strong preference for aphids, it is commonly referred to as the "aphidlion." During the spring season, when plants reach peak vegetative and reproductive growth, aphid infestations are commonly observed, leading to significant qualitative and economic crop losses. Major aphid species prevalent during this period include *Lipaphis erysimi* on mustard, *Myzus persicae* on various ornamental and vegetable shrubs, and *Macrosiphum rosae* on rose buds. This study aimed to assess the effect of aphid-based diet on the growth and development of *C. zastrowi sillemi*. Newly hatched larvae were fed a mixed population of aphids until pupation. Biological parameters of the F_1 generation were recorded and compared with those of individuals reared on *Corcyra cephalonica* eggs, a standard laboratory diet for mass rearing. Additionally, the predatory potential and prey preference of third instar larvae were evaluated against the three aphid species. Prior to testing, larvae were starved for 8–10 hours to standardize hunger levels. The findings indicate significant differences in biological performance between *C. zastrowi sillemi* larvae reared on aphid prey and those reared on *C. cephalonica*. Furthermore, in the prey preference assay, *C. zastrowi sillemi* exhibited a clear preference for *Lipaphis erysimi* over *Myzus persicae* and *Macrosiphum rosae*.

Keywords: Aphid species, Predatory potential, Prey preference

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BISP(P)-34

Screening of Different Genotypes/Varieties of Pigeonpea against Pod Fly, *Melanagromyza obtusa* (Malloch)

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Pigeonpea [*Cajanus cajan* (L.) Millspaugh], commonly known as red gram, *Tur*, *Arhar etc*., is an erect and short-lived perennial shrub legume and one of the most important pulse crops. Pigeonpea is generally attacked by more than 300 species of insect pests; however, about 60 per cent of the damage is solely caused by the pod borer complex. Among these pests, the pod fly, *Melanagromyza obtusa*, is recognized as a key pest of pigeonpea throughout South-East Asia. Its maggots feed on developing seeds and pupate within the pods causing 20–80% seed damage (Subharani and Singh, 2009). Under field conditions, indiscriminate use of insecticides has led to resistance, pest resurgence, and secondary outbreaks. To aid in sustainable pest management, an experiment was conducted to screen different genotypes/varieties of pigeonpea against pod fly, *M. obtusa* at Agricultural Research Station, Anand Agricultural University, Derol, Gujarat during 2022-23 and 2023-24. A total of 13 genotypes were evaluated using a randomised block design with two replications. Based on pod fly incidence and damage, the genotypes VPG 126 and VPG 438 were found resistant while, VPG 428, Vaishali, VPG 430 and GT 106 were registered as moderately resistant to *M. obtusa*. The genotypes/varieties of VPG 454, AGT 2 and AAUVT 18-5 fall under moderately susceptible category. While, AAUVT 18-6, VPG 665, VPG 17 and AAUVT 18-4 found susceptible. The highest seed yield (1369 kg/ha) was recorded from GT 106 and it was remained at par vaishali (1304 kg/ha) and AGT 2 (1275 kg/ha).

Keywords: Pigeonpea, Screening, Pod fly, *Melanagromyza obtusa,* Genotypes

Poster Presentation

BISP(P)-35

The Biochemical Modifications Occurring in Green Gram Leaves as a Result of *Cercospora canescens* Infection

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Green gram (*Vigna radiata* L. Wilczek), commonly known as mung bean. It is an important pulse crop in India, valued for its high protein content (18–31%). Green gram is a short-duration crop. It plays a key role in intensive cropping systems and is highly suitable for crop rotation. Additionally, it enhances soil fertility through biological nitrogen fixation. Cercospora leaf spot is a highly destructive disease of Green gram (*Vigna radiata* L.), primarily caused by the pathogen *Cercospora canescens*. Pathogen infects the green gram crop, initially causing water-soaked spots with greyish borders on leaves. As the disease progresses, it leads to tissue death and spreads to petioles, stems and pods. The biochemical data indicate that the content of total phenol in diseased leaf of different genotypes/varieties gradually and significantly increased as compared to healthy leaf of same variety. Protein content were decreased with the infection of pathogen in the diseased leaf sample of different genotypes/varieties. The concentrations of these biochemical parameters were observed to be higher in the resistant genotypes/varieties compared to the susceptible ones.

Keywords: *Cercospora canescens*, Biochemical analysis, Green gram

Poster Presentation

THEME 4

Bio ecology of Pests and Estimation of Losses Caused by them

BPE(O)-01

Assessment of Avoidable Yield Losses in Guava Due to Root-Knot Nematode Infestation

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The root-knot nematode, *Meloidogyne incognita*, is a major concern for guava *(Psidium guajava)* farming in India, leading to considerable economic losses and affecting the quality of the fruit. This tiny soil-dwelling parasites infect the roots, forming characteristic galls that disrupt water and nutrient uptake. Guava trees affected by this nematode often show signs of bronzing in leaves, stunted growth, yellowing leaves, and a decrease in both fruit yield and quality. In severe cases, infestations can result in the decline and death of the trees. Assessment of avoidable yield losses due to nematode infestation is crucial for developing effective management strategies. This evaluation typically involves comparing the yield of nematode-infested plants with healthy or treated plants under similar growing conditions. Factors such as nematode population density, soil type, and environmental conditions are considered in the assessment. Yield parameters, including fruit number, size, and quality, are measured to quantify the economic impact. During the 2023-24 and 2024-25 growing seasons, research was carried out in a guava orchard naturally infested with root-knot nematodes to evaluate the potential yield losses that could be avoided. The initial nematode population of the orchard ranged from 567.25 to 598.25 J2 per 200 cc of soil. The study involved the application of Fluopyram 400 SC (34.48 w/w) at a rate of 625 ml/ha and repeated at 30 days interval, with an untreated plot serving as a control. The findings showed that the presence of *Meloidogyne incognita* led to avoidable yield losses of between 61.58 to 62.01 percent in the guava orchard.

Keywords: *Meloidogyne incognita*, *Psidium guajava*, Fluopyram and Yield losses

Oral Presentation

BPE(O)-02

Bioecology of *Helicoverpa armigera* (Hubner) on Pigeonpea

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An experiment was planned on Bio ecology of *Helicoverpa armigera* (Hubner) on pigeonpean at laboratory of Entomology from October to March during 2021-22 at the Department of Entomology, C. P. College of Agriculture, Sardarkrushinagar Dantiwada Agricultural University, Sardarkrushinagar. The output showed that out of total 100 eggs only the 89 eggs, 77 larvae and 70 pupae survived and finally emerged in to adults. The maximum durations of egg, larva and pupa were recorded as 6, 20 and 8 days, respectively with pre-oviposition period between the 33rd and 35th days of pivotal age. Female started laying eggs after 35th days and ceased after 47th days with lx (Survival of female) values of 0.70 and 0.31 respectively. Females produced the maximum progenies (mx = 48.09) on the 38th day of pivotal age. The net reproductive rate (Ro) was 142.07 times multiplication of population per generation. Adults contributed only 0.76 per cent of the population of stable age, whereas, eggs, larvae, and pupae contributed 59.31, 37.68 and 2.26 per cent, respectively. The expectancy of further life was 4.76 days at the time of adult emergence which showed that life expectancy of *H. armigera* was declined with the advancement of development.

Keywords: Pigeonpea, *Helicoverpa armigera*, Life table, Egg, Oviposition, Adult, Life expectancy

Oral Presentation

BPE(O)-03

Biological Attributes of Niger Aphid, *Uroleucon compositae* (Hemiptera: Aphididae)

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The investigation into the biology of the Niger aphid, *Uroleucon compositae* revealed that the nymph of *U. compositae* went through four distinct instars. In the first nymphal instar, the aphid is wingless, elongated, delicate, and pale brownish in colour. It possesses small compound eyes located just behind the base of the antennae, which appear reddish to black. The first-instar nymph's measurements indicate a length of approximately 0.85 ± 0.04 mm and a breadth of 0.36 ± 0.03 mm. The first instar nymphal period lasts for 2.43 ± 0.67 days. In the second nymphal instar, the aphid darkens in colour, becoming dark brown, oval, and slightly bulged in shape. The compound eyes have three dot-like ommatidia at the posterior end. The nymph measures 1.22 ± 0.06 mm in length and 0.56 ± 0.03 mm in breadth. Hairs are observed on all three pairs of legs, and the cornicles are distinct and cylindrical in shape. The second instar nymphal period lasts for 2.6 ± 0.55 days. In the third nymphal instar, the aphid darkens further to a dark brown colour. The compound eyes become larger, rounder, and reddish-black, and the antennae consist of six segments. The nymph's length is 1.55 ± 0.12 mm, and its breadth is 0.77 ± 0.06 mm. The duration of the third nymphal instar is 2.10 ± 0.70 days. In the fourth nymphal instar, the aphid appears blackish in colour and elongated in shape. The compound eyes are expanded and remain black to reddish, and the antennae are six-segmented. The length and breadth of the fourth nymphal instar are 2.65 ± 0.05 mm and 0.94 ± 0.03 mm, respectively. The total nymphal period for *U. compositae* is 9.43 ± 1.08 days. The adult aphid is shiny and dark black in colour, with a spindle-like to elongated pyriform body. The compound eyes are bulged and reddish-black. Alate adults are similar to apterous adults. The morphometrics of the adult reveal a length of 2.86 ± 0.04 mm and a breadth of 1.25 ± 0.03 mm. The antennae measure 2.68 ± 0.02 mm in length, and the leg measurements are 2.222 ± 0.076 mm (front), 2.328 ± 0.032 mm (middle), and 2.897 ± 0.099 mm (hind). The hind legs are particularly long and stout. The adult lifespan is 9.90 ± 0.98 days. The adult life cycle consists of pre-reproduction, reproduction, and post-reproduction periods, which last for 1.13 ± 0.76, 7.76 ± 1.23,

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and 1.00 ± 0.63 days, respectively. During the reproduction period, *U. compositae* exhibits a fecundity of 52.70 ± 8.41 nymphs, and the total lifespan is 19.33 ± 1.32 days. This particular aphid exhibited a unique phenomenon known as CTKR (Collective Twirling and Kicking Response).

Keywords: Niger aphid, *U. compositae*, Biological Attributes, CTKR, Feeding Habit.

BPE(O)-04

Chemical Ecology of Host, Insect Pest and its Natural Enemies: A Review

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The field of chemical ecology has revolutionized our understanding of tri-trophic interactions involving plants, herbivorous insects, and their natural enemies. Recent advances have elucidated how herbivore-induced plant volatiles (HIPVs) and other semiochemicals mediate complex ecological relationships, influencing behaviors ranging from host selection to predator recruitment. Cutting-edge studies utilizing high-throughput metabolomics and transcriptomics have identified novel volatile organic compounds (VOCs) involved in indirect defense mechanisms, such as (E)-4,8-dimethyl-1,3,7-nonatriene (DMNT) and (E)-β-ocimene, which play critical roles in attracting parasitoid wasps and predatory mites.This comprehensive review synthesizes contemporary research on the molecular mechanisms of VOC biosynthesis, including the jasmonate signaling pathway and its regulation of terpenoid synthase genes.We highlight key studies demonstrating the application of chemical ecology principles in sustainable agriculture through integrated pest management (IPM) strategies. Recent field trials have shown that synthetic HIPV blends can enhance natural enemy recruitment, reducing pest populations in crops like maize and cotton. Furthermore, advances in CRISPR-based gene editing have enabled the development of crop varieties with optimized VOC profiles for improved pest resistance.The review concludes with future research directions, emphasizing the need for multi-disciplinary approaches—combining genomics, synthetic biology, and artificial intelligence-driven volatile profiling—to translate laboratory findings into field applications. Emerging technologies, such as drone-based volatile monitoring and AI-assisted pest prediction models, hold promise for next-generation precision agriculture.

Keywords: Chemical ecology, Tri-trophic, Semiochemicals, Volatile.

Oral Presentation

BPE(O)-05

Functional Response of *Cotesia glomerata* (L.) against Second and Third Instar Larvae of *Pieris brassicae* (L.)

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Cole crops represent a significant source of income for agricultural communities, yet their productivity is frequently compromised by the cabbage white butterfly, *Pieris brassicae* (L.), which inflicts substantial economic damage (Semwal et al.,2020). In the context of developing sustainable agricultural practices, biological control presents a viable alternative to synthetic pesticides. The gregarious endoparasitoid, *Cotesia glomerata* (L.), is a prominent natural enemy of *P. brassicae*. This investigation was designed to characterize the functional response of *C. glomerata* to a range of densities of second and third instar larvae of *P. brassicae* under controlled laboratory conditions. The functional response of the parasitoid was elucidated by fitting parasitism data to a logistic regression model. The analysis revealed a Type II functional response for *C. glomerata* against both larval instars. The signs of the significant linear (negative) and quadratic (positive) parameters from the regression equation confirmed the characteristic sigmoid curve of a Type II response, which is indicative of density-dependent parasitism. The study found that the number of larvae parasitized per female parasitoid increased proportionally with rising host density. The attack rate was determined to be higher for the second instar larvae, whereas the handling time was comparatively longer for this instar than for the third instar. The demonstration of a Type II functional response, a foundational concept in predator-prey ecology affirms the parasitoid's capacity for density-dependent regulation of its host population. Recent research continues to corroborate these dynamics, underscoring the efficiency of *C. glomerata* against *P. brassicae* larvae (Sato and Ohsaki 2004). These results highlight the efficacy of *C. glomerata* as a biological control agent and substantiate its inclusion in integrated pest management (IPM) programs for the sustainable protection of cole crops.

Keywords: *Cotesia glomerata*, *Pieris brassicae*, Functional Response, Biological Control, Sustainable Agriculture, IPM.

Oral Presentation

BPE(O)-06

Influence of Cashew Phenology on *Helopeltis Antonii* (Miridae) Infestation and Pest Induced Changes in Cashew Phenology and Biochemistry

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This study aimed to investigate the influence of phenology of different cashew genotypes on intensity of damage by Tea mosquito bug (TMB), *Helopeltis antonii* (Miridae), which is an important pest of cashew and the associated changes in infested cashew plants. The pest population occurs on cashew during the post -monsoon flushing stage with new flushes, and continues to infest on the inflorescences, immature nuts and apples. The peak population of this pest occurs during December-January and decreases during February-March. Observations on different cashew genotypes indicated that the phenological stages were different for the genotypes and they expressed varying levels of infestation by TMB. Infestation was the highest on the early flowering types like NRC-190, BPP-4, Priyanka, NRC-183 etc, but the mid and late flowering types *viz*., Bhaskara, MDK-2, Ullal-1, V-7 were free of pest attack during initial pest occurrence. Thus, variability in pest damage levels was related to the plant developmental stage at the onset of the pest attack and at later stage dependent on pest intensity. Biochemical analysis of tender and semi-matured cashew shoots indicated higher levels of secondary metabolites like total phenols and flavonoids in the tender shoots. After 24 hours of TMB infestation, an increase in the content of total phenols, total flavonoids and total anti-oxidants was recorded. Highest flavonoids (60.68 QE mg/100g) and total antioxidant activity was recorded in infested tender shoots (159.6 mg/100g). Further, the profiles of phenolic acids and flavonoids of tender and semi matured shoots were also recorded. After severe infestation by TMB, whole shoots dried away and no other pest could survive on the damaged shoots thus it exhibits exploitative competition. The plant phenology after severe TMB infestation widely varied among genotypes. During 2023-24, the phenological growth stage after TMB infestation indicated that the varieties like Taliparamba, VRI-1 and VRI-2 had 50-75 % flowering during January 2024. Comparatively more productive panicles were noticed in Bhaskara, VRI-3, VTH-30/2 and V-7, but very less in Taliparamba, NRC-406, Ullal-2 etc. During 2024-25, old attack was seen in few genotypes and severe TMB incidence occurred again during December 2024. New flushes was noticed only at the

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end of January in freshly infested genotypes and the percentage of flowering varied from 0 to 90 % between the genotypes subsequent to infestation. In the TMB infested nuts, kernels remained free of any damage symptoms, but, reduction in apple weight and nut weight by 15-25 and 6-10 percent, respectively was recorded. Similarly, reduction in total sugars (4.5-7.5 %), protein (14-17 %), fat (15-30 %) and CNSL content (29-41 %) was recorded in the infested cashew nuts. Thus, cashew phenological stage during pest occurrence influences the infestation levels of tea mosquito bug. So, monitoring the infestation dynamics during the cashew phenological stages is substantial to take up timely management measures.

Keywords: Plant Phenology, Cashew, Tea Mosquito Bug, Infestation

BPE(O)-07

The Study Explores the Diversity of Long-Horned Grasshoppers (Orthoptera: Tettigoniidae) in the Sikar District of Rajasthan, India

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Despite their being more closely related to crickets these orthopterans belong to the family Tettigoniidae and are more commonly known as long-horned grasshoppers and katydids. They are widely distributed in the tropical and subtropical climatic zones of the world. The family, Tettigoniidae Krauss, 1902 comprises about 7,163 species grouped into 1,228 genera that have been classified in 23 subfamilies. Of these, only 219 species with a few subspecies, placed in 79 genera and classified into in 8 subfamilies, have been reported from India; however, in the Indian subcontinent an estimated 250 species have been recorded. The specimens studied were field collected during survey trips in the *Kharif*-2024 season, as a part of the PhD research work of the senior author, under the aegis of Maharana Pratap University of Agriculture and Technology, Udaipur, Rajasthan. Collections were made using the sweep net during the day and by hand collection using head lamp at night, which comprise representatives from 5 subfamilies, grouped into 10 genera and 12 species from different locations of district Sikar in Rajasthan that include: *Himertula kinneari* (Uvarov,1923), *Isopsera pedunculata* Brunner von Wattenwyl, 1878, *Phaneroptera gracilis* Burmeister, 1838, *Trigonocorypha unicolor* (Stål, 1813), *Elimaea securigera* Brunner von Wattenwyl, 1878, *Letana rufonotata* (Serville, 1838), *Letana pyrifera* Bey-Bienko, 19561., *Conocephalus maculatus* (Le Guillou, 1841), *Sathrophyllia rugosa* (Linnaeus, 1758), *Hexacentrus mundus* (Walker, 1869) *Euconocephalus incertus* (Walker, 1869) and *Euconocephalus* sp.

Keywords: Orthoptera, Diversity, Tettigoniidae, Survey, Sikar, Rajasthan

Oral Presentation

BCPE(P)-01

Assessment of Crop Yield Losses in Green gram due to Major Insect-pests

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A field study was conducted at the Agricultural Research Station, Sriganganagar during *kharif* 2022 to assess crop yield losses in green gram (*Vigna radiata* L.) due to major insect pests. Using a paired-plot design with protected and unprotected treatments, the incidence of whitefly (*Bemisia tabaci*), thrips (*Caliothrips indicus*), and spotted pod borer (*Maruca testulalis*) was monitored. Results indicated significantly higher pest populations in unprotected plots, leading to substantial reductions in yield attributes. Compared to protected plots, unprotected plots recorded 73.76%, 68.02%, and 67.37% higher incidences of whitefly, thrips, and spotted pod borer, respectively. Corresponding reductions were observed in plant height (3.98%), number of pods (63.98%), number of grains (66.29%), and grain yield (21.01%). The findings highlight the considerable impact of insect pests on green gram productivity and underscore the need for effective pest management strategies to minimize yield losses.

Keywords: Green gram, Yield loss, Insect pests, Whitefly, Thrips, Spotted pod borer.

Poster Presentation

BCPE(P)-02

Bio-ecology of Melon Fruit Fly, *Bactrocera cucurbitae* (Coquillett) Infesting Cucumber

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An experiment was conducted to study the biology of melon fruit fly, *Bactrocera cucurbitae* (Coquillett) under laboratory conditions while investigations about the seasonal abundance of *B. cucurbitae* in cucumber were carried out in a farmer's field at Navsari, Gujarat using Nauroji Stonehouse fruit fly trap containing cue-lure baited wooden block during summer 2022-23. The studies on biology revealed that the female fly laid shiny white, nearly flat on the ventral surface eggs inside cucumber fruits and their length and breadth were 1.29±0.05 and 0.27±0.02 mm, respectively while the incubation period was 1.50±0.51 days with 81.41±3.61% hatching. The apodous maggot was creamy-whitish and measured 8.45±0.40 and 1.62±0.15 mm in length and breadth, respectively while the total maggot period was 6.70±0.66 days. The puparium measured 5.70±0.47 and 2.39±0.22 mm in length and breadth, respectively. The length and breadth with expanded wings of the male were 6.42±0.55 and 13.50±0.66 mm, respectively whereas in the case of the female these were 7.89±0.58 and 14.32±0.65 mm, respectively. Moreover, the total life period of the female fly was recorded as 38.23±2.80 days, while for the male it was 34.78±1.56 days. In addition, studies on seasonal abundance revealed that in cucumber the activity of adults of *B. cucurbitae* commenced from 13th Standard Meteorological Week (SMW) *i.e.*, 4th week of March and continued till 19th SMW (1st week of May) which ranged from 38.00 to 59.75 with an average of 45.11 male fruit flies per four traps while, the peak adult population was observed during 17th SMW *i.e.*, 4th week of April (59.75 mean male fruit flies/4 traps). Moreover, adult population of melon fruit fly showed a positive and significant correlation with maximum temperature and a negative and significant correlation with morning relative humidity. Overall, morphological and morphometrical studies will be useful to distinguish *B. cucurbitae* from other species of fruit flies while the information about maggot and adult life span, nature of damage, damaging stages and weak link will be useful for planning of an integrated management strategy under field conditions. Moreover, knowledge of seasonal

Poster Presentation

abundance helps in deciding the timing of application of appropriate management practices.

Keywords: Biology, Seasonal abundance, Melon fruit fly, *Bactrocera cucurbitae*, Cucumber.

BCPE(P)-03

Field Life Tables of Major Insect Pests of *Rabi* Sorghum

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The field experiment conducted to investigate the stage-specific field life-tables of *rabi* sorghum evidenced that spotted stem borer, *Chilo partellus* (Swinhoe) passed through three generations, while sorghum shoot fly, *Atherigona soccata* (Rondani), pink stem borer, *Sesamia inferens* (Walker), and fall armyworm, *Spodoptera frugiperda* (J.E. Smith), passed through two generations on *rabi* sorghum. However, the Tussock moth completed one generation on *rabi* sorghum during 2020-2021. The field-life studies demonstrated that key mortality factors, such as *Spalangia endius* (pupal parasitoid), were responsible for the natural control of sorghum shoot fly. However, *Callibracon* sp. (larval parasitoid), *Cotesia flavipes* (larval parasitoid) regulated the population of spotted stem borer and pink stem borer. Whereas, *Sf*MNPV (entomopathogenic virus), *Aleiodes* sp. (larval parasitoid), *Coccygidium melleum* (larval parasitoid), Mermithidae nematode (entomopathogenic nematode) and unknown reasons played a significant role in the regulation of fall armyworm population. NPV (entomopathogenic virus) was used to check the population of tussock moth caterpillars. *Trichogramma* sp. (egg parasitoid) and *Ha*NPV (entomopathogenic virus) checked the population of ear head caterpillar infesting *Rabi*. Field-life tables are an effective tool for identifying indigenous natural enemies and developing strategies for mass multiplication techniques of natural enemies under IPM.

Keywords: *Spalangia endius*, *Callibracon* sp., *Aleiodes* sp., Larval parasitoids, Mortality

Poster Presentation

BCPE(P)-04

In-vitro Study on the Biology of Tomato Pinworm, *Tuta absoluta* (Meyrick)

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Biology: Adult *T. absoluta* were collected from the field and separated in a laboratory at Rajasthan College of Agriculture. They were released into Petri dishes with tomato leaves, the biology of *T. absoluta* consisted of four developmental stages: egg, larva, pupa, and adult. The *T. absoluta* completed its life cycle at temperature ranging from 15 to 35 °C. Egg: Pinworm eggs were found to be smooth, shiny, and oval-shaped, with a mean hatching rate of 95.48±1.03 days. The eggs were measured under laboratory conditions, with a mean hatching rate of 94-97%. The length and width of the eggs varied from 0.41-0.48 mm and 0.20-0.24 mm respectively. Larva: The study revealed larval periods of 12.33-13.55 days, instar periods of 2.38-2.57 days, and instar lengths ranging from 0.55-0.65 mm. The larvae changed color after elosion and primarily fed on mesophyll content in leaves, stem, and soft parts. Pupa: The pre-pupa stage is lighter and pink, with the last instar larvae leaving food and creating silk cocoons. The pupal period is 10.95±0.86 days, with octet pupae initially green and transitioning from chestnut brown to dark brown near adult emergence. Adult: *T. absoluta* is a moth with an average development period of 12-14 days, ranging from 10-14 days. Its adult moths are 5.94±0.28 mm long and have a wingspan of 9.54±0.58 mm. They have silvery grey scales, filiform antennae, and well-developed labial palps. Adults are nocturnal and usually hide between leaves during the day. They may overwinter as eggs, pupae, or adults. The adult female lays 250-280 eggs in 10-12 batches, with a total life span of 35.43±3.56 days.

Keywords: *T. absoluta,* Laboratory, Biology,Tomato.

Poster Presentation

BCPE(P)-05

Varietal Screening for Castor Capsule Borer, *Conogethes punctiferalis* Infesting Castor

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A field study was conducted to assess ten castor varieties/inbreds *viz*., GCH 2, GCH 4, GCH 7, GCH 8, GCH 9, GCH 10, 48-1, SKI-215, GAC 11 and GNCH 1 for their resistance to the capsule borer (*Conogethes punctiferalis*) based on morphological and biochemical traits. The data on per cent capsule damage of different varieties/inbreds indicated that genotypes 48-1 and SKI-215 recorded the lowest capsule damage (7.30% and 8.02%), indicating strong resistance, whereas GAC-11 and GCH-9 showed the highest infestation (26.25% and 26.19%), suggesting susceptibility. Correlation between morphological characters of different castor varieties/inbreds and capsule borer incidence indicated that the number of capsules per primary spike (r = 0.843) and inflorescence shoot diameter (r = 0.821) exhibited a highly significant and positive correlation between the damage caused by the capsule borer. This means that when the number of capsules per spike and inflorescence shoot diameter increase the damage caused by capsule borer was also increased and vice versa. The capsule size (r = -0.163) and inflorescence shoot length (r = -0.357) showed a negative and non-significant correlation which means they did not cause much effect on damage caused by the capsule borer. Correlation between biochemical constituents of seeds of different castor varieties/inbreds and capsule borer incidence indicated that the moisture and crude protein exhibited a highly significant and positive correlation with damage caused by capsule borer at 120 days after sowing (r = 0.877 and r = 0.771, respectively). Whereas, total soluble sugar was highly significant and positively correlated (r = 0.692) with the damage caused by capsule borer. This indicated that as moisture, total soluble sugar and crude protein increased, there was a gradual increase observed in capsule damage caused by capsule borer. On the other hand, total phenol content exhibited a highly significant but negative correlation (r = -0.870) with the capsule borer damage at 120 days after sowing. It means that when total phenol content was increased, there was reduction in capsule damage caused by

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capsule borer. Thus, varieties/inbreds 48-1 and SKI-215 emerged as a resistant genotype, offering potential in integrated pest management and breeding programs for capsule borer-resistant castor cultivars.

Keywords: Screening, Capsule borer, *Conogethes punctiferalis,* Castor, varieties/inbreds

THEME 5

Newer Molecules, Formulations and Biotechnological Discoveries in Pest and Disease Management

NMFBD(O)-01

Biogenic Synthesis and Evaluation of Antifungal Activity of Silver Nano Particles

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Nanotechnology is an emerging field that offers innovative solutions in agriculture, medicine, energy, and environmental sustainability. In the present study, biogenic synthesis of silver nanoparticles (AgNPs) was carried out using *Trichoderma viride*. The biosynthesized AgNPs were characterized using UV-Vis spectroscopy, showing surface plasmon resonance (SPR) peaks at 336 nm and 408 nm. Fourier Transform Infrared Spectroscopy (FTIR) revealed that the O–H stretching peak shifted from 3336.53 cm^{-1} in the extract to 3265.12 cm^{-1} in the nanoparticles, suggesting interactions between hydroxyl groups and silver ions. Similarly, the C–H stretching peak shifted from 2950.89 cm^{-1} to 2879.47 cm^{-1}, indicating changes in the hydrocarbon environment during nanoparticle formation. FTIR analysis identified hydroxyl, amide, and carbonyl groups involved in nanoparticle stabilization. Transmission Electron Microscopy (TEM) revealed that the average particle size was approximately 20 nm, with a size range of 10–30 nm. Scanning Electron Microscopy (SEM) confirmed that the nanoparticles were spherical to slightly irregular in shape, with smooth surfaces. A moderate level of aggregation was observed, and zeta potential analysis indicated high stability at −23.3 mV. The antifungal potential of the biosynthesized AgNPs was evaluated using the poisoned food technique against *Fusarium oxysporum f. sp. capsici* and *Sclerotium rolfsii*. The results demonstrated a clear dose-dependent inhibition of mycelial growth. Inhibition of *Fusarium oxysporum f. sp. capsici* was recorded at 32% after 7 days at 100 ppm, while *Sclerotium rolfsii* showed the highest inhibition of 40% after 5 days at the same concentration.

Keywords: Nonotechnology, Trichoderma, *Fusarium oxysporum, Sclerotium rolfsii*.

Oral Presentation

NMFBD(O)-02

Comparative Bio-Efficacy of Different Insecticides against Thrips, *F. occidentalis* on Rose Under Protected Condition in Kashmir

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The current study was carried out between March 2022 and December 2022 at the experimental plot of the Division of Floriculture & Landscaping Architecture at the Sher-e-Kashmir University of Agricultural Sciences and Technology of Kashmir (SKUAST-K), Shalimar campus, Srinagar. The peak thrips incidence on rose leaves were observed- 26th SMW-June (3.85 thrips/leaf). Also, peak thrips incidence on rose flowers was reported in July- 27th SMW (12.65 thrips/flower). the population showed a highly significant positive correlation with minimum and maximum temperature whereas negative correlation with RH (minimum and maximum). The highest per cent protection against thrips on rose provided by T_4 (Fipronil 5% SC @1ml/L) followed by T_7 (Thiamethoxam 25% WDG @ 0.3 g/L), T_6 (Acetamiprid 20% SP @0.2g/L) and T_8 (*Lecanicillium lecanii* @ 5ml/L) was found less effective among all the treatments.

Keywords: Rose, Thrips, Seasonal incidence, Protected condition

Oral Presentation

NMFBD(O)-03

Elicitation of Host Defense Enzymes by Chitosan Nanoparticles in Papaya Infected with *Papaya Ringspot Virus*

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Papaya (*Carica papaya* L.) is an economically significant tropical fruit tree crop prized for its nutritional and economic value. Yet its cultivation is severely devastated by *Papaya ringspot virus*, a very virulent pathogen responsible for typical foliar mosaic, chlorosis, and ring lesions, that eventually induce yield loss and plant decline. In present study, chitosan nanoparticles were synthesized, characterized and used for the induction of resistance in papaya against PRSV. The synthesized chitosan nanoparticles were characterized by an average size of 262.10 nm, moderate uniformity (PDI 0.365), strong positive zeta potential (+33.0 mV) and good dispersion (KCPS 222.64), confirming their suitability for biological use. Pot trials demonstrated a dose-dependent antiviral effect against PRSV with higher concentrations (200, 300 and 400 ppm) completely suppressing disease incidence, while moderate doses (100 and 150 ppm) significantly reduced symptoms. Controls confirmed PRSV virulence and the absence of disease in healthy plants treated with ChNPs, highlighting their potential as an effective resistance-inducing agent. The study also evaluated the induction of defense enzymes peroxidase, polyphenol oxidase and phenylalanine ammonia-lyase in PRSV infected papaya plants treated with various ChNP concentrations. Enzyme activities increased significantly over time, especially at higher doses (200, 300 and 400 ppm), peaking at 7 days post-inoculation. ChNPs treated plants showed enhanced oxidative defense, phenolic oxidation and systemic resistance, while virus-only controls exhibited low enzyme levels.

Keywords: Papaya, PRSV, Chitosan nanoparticles, Induced resistance, Peroxidase (PDO), Polyphenol Oxidase

Oral Presentation

NMFBD(O)-04

Evaluation of Insecticides against Fall Army Worm (*Spodoptera frugiperda* J. E. Smith) in Maize

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The investigation on "Evaluation of insecticides against Fall Army worm (*Spodoptera frugiperda* J. E. Smith) in Maize" were carried out on maize sub-research station, SDAU khedbrahma during *Kharif*, 2019-20, 2020-21 and 2021-22. The occurrence of this pest has also been reported from Anthiyur, Bhavani, Ammapettai and also found in Maharastra and Gujarat. The larvae feed on the growing points by remaining inside the leaf whorl. The symptoms of damage are scrapping of leaves, pin holes, small to medium elongated holes, parallel shot holes, and irregular shaped holes on leaves, loss of top portion of leaves, presence of chewed up frass material and fecal pellets in the leaf whorl, drooping of leave portion above the feeding area, and feeding on tassel. In this investigation, the lowest (0.59 larvae/ plant) was found in plot treated with emamectin benzoate 5 SG @ 0.0031% and it was followed by chlorantraniliprole 18.5 SC @ 0.0069 % (0.80 larvae/ plant), emamectin benzoate 5 SG @ 0.0025% (0.94 larvae/ plant) and spinosad 45 SC @ 0.0168% (1.03 larvae/ plant). Remaining treatments showed more or less similar trend of effectiveness in pooled over year.

Keywords: Evaluation, Insecticides, Fall Army worm, *Spodoptera frugiperda* and Maize.

Oral Presentation

NMFBD(O)-05

Evaluation of the New Molecules of Insecticides against Rice Leaf Folder *C. medinalis* (Guenee)

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An experiment on "Evaluation of the new molecules of insecticides against rice leaf folder *C. medinalis* (Guenee) in Central Uttar Pradesh" was carried out with seven chemical insecticides at Crop research Farm, Nawabganj, C. S. Azad University of Agriculture and Technology, Kanpur during *Kharif*, 2017 and 2018 using appropriate statistical design and tools. The key objective of this experiment is to find out the comparative efficacy of insecticides for effective management of Rice Leaf Folder. A pooled data analysis of both the years was done and it was found that all the treatments were found significantly superior over control. The application of Chlorantraniliprole 18.5 SC @ 30 g a.i./ha numerically proved best among all treatments by reducing per cent mean leaf infestation 1.36 and 0.69/10 hill in 1st and 2nd spray. The second best treatment was Fipronil 5% SC @ 75 g a.i./ha with 0.75/10 hill mean per cent leaf infestation, followed by Thiacloprid 21,7 SC @ 120 g a.i./ha (0.79/10 hill. The highest grain yield of 51.12 and 50.42 q/ha for both years, respectively, were recorded in Chlorantraniliprole 18.5 SC and minimum was 46.30 and 45.90 q/ha observed for both years, respectively, in Chlorpyriphos 20 EC treated field. Based on the economics of the treatment the highest cost benefit ratio 1:5.33 was recorded in Fipronil 5% SC @ 75 g a.i./ha which was superior in terms of economy to overall treatments irrespective of economy with additional yield i.e. 9.75 q/ha and net profit was Rs. 9789/ha. The Second best treatment was Chlorantraniliprole 18.5 SC @ 30 g a.i./ha treated plot that produced 8.32 qtl additional yield worth Rs. 12014 with ICBR 4.72. Efficacy of newer insecticides revealed that the Chlorantraniliprole 18.5 SC @ 30 g a.i./ha and Fipronil 5% SC @ 75 g a.i./ha were found most effective against *C. medinalis* in present study & may be recommended in field conditions due to minimum per cent leaf damage and ultimately produced highest yield.

Keywords: Insecticide, Chlorantraniliprole, Fipronil.

Oral Presentation

NMFBD(O)-06

Green-synthesized Silicon Dioxide Nanoparticles for Post-Harvest Control of *Callosobruchus chinensis* in Black Gram

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The pulse beetle, *Callosobruchus chinensis* (L.), which is an internal feeder and primary pest, is among the more important pests that infest stored pulses. This study aimed to evaluate the insecticidal activities of silicon dioxide nanoparticles (SiO2 NPs) against pulse beetle. Environment-friendly silica solubilising bacteria (*Enterobacter hormaechei*) assisted green synthesis technique was used for the synthesis of SiO2 NPs and characterisation by UV–Vis spectroscopy, EDX, and TEM techniques revealed the formation of spherical and relatively uniform SiO2 nanoparticles ranging from 20-30 nm in size. The in vitro bioefficacy experiment depicted more than 50% mortality in all treatments on the seventh day except the T1 treatment (0.25 g/Kg SiO2 NPs) and the maximum mortality rate (87.5%) of pulse beetle was observed in 1.0 g/Kg SiO2 NPs seeds treatment. The 7th day LC50 value was found as 0.285 (0.097- 0.838) g/Kg SiO2 indicating that even low concentrations of SiO_2 NPs are highly toxic to pulse beetle. Scanning electron microscopy revealed SiO2 NPs treatment-induced damage in the sensilla of the pulse beetle, which has a negative impact on the insect's capacity to survive and reproduce, potentially leading to death. The insecticidal properties of SiO2 NPs synthesized using green techniques open new avenues for the development of natural insecticides, providing a sustainable and renewable substitute for toxic and dangerous chemical control approaches.

Keywords: Green synthesis, SiO_2 nanoparticles, Pulse beetle, Post-harvest management

Oral Presentation

NMFBD(O)-07

Impact of Biodynamic Formulations on Biology of Diamondback Moth, *Plutella xylostella* (L.) on Cabbage under Laboratory Conditions

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Laboratory experiment was carried out at Department of Entomology, College of Agriculture, Professor Jayashankar Telangana State Agricultural University, Rajendranagar, Telangana during *Rabi,* 2020-21 to evaluate the impact of biodynamic formulations on biology of diamondback moth, *P. xylostella* (L.) on cabbage. The results indicated that significantly highest larval duration, was recorded in *Agniastra* (22.55 ± 0.29 days, respectively) followed by *Brahmastra* (21.22 ± 0.11, respectively) and *Neemastra* (21.01 ± 0.33 days, respectively). Similar trend was observed with regards to per cent pupation and pupal period. *Agniastra* found to be significantly superior over other treatments by recording lowest per cent pupation of 43.34% followed by *Brahmastra* (49.00%, respectively) and *Neemastra* (50.66%, respectively). Longest pupal period was recorded in insects fed with foliage treated with *Agniastra* (7.55 ± 0.17 days, respectively). Significant shortest male adult life span (3.00 ± 0.28 days, respectively) was also recorded when insects were fed with *Agniastra* treated food. It was followed by *Brahmastra* (3.50 ± 0.28 days, respectively) and *Neemastra* (3.66 ± 0.33 days, respectively). Similarly, significantly shortest female adult life span was also recorded in *Agniastra* (3.33 ± 0.16 days, respectively) followed by *Brahmastra* (3.33 ± 0.11 days, respectively) and *Neemastra* (3. 33 ± 0.16 days, respectively). However, waste decomposer treatment was found to be least effective by recording lowest larval and pupal duration, highest per cent pupation and longest male and female adult longevity on par with the untreated control.

Keywords: Diamondback moth, *Plutella xylostella*, Biodynamic formulations, Agniastra and Brahmastra

Oral Presentation

NMFBD(O)-08

Management of Root-knot Nematode, *Meloidogyne javanica* in Mungbean, *Vigna radiata* through Newer Nematicides

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The research trial was conducted at Rajasthan Agricultural Research Institute, Durgapura, Jaipur by Division of Nematology for two years *Kharif* 2023 & 2024. In this research trial six treatments were taken each treatment was replicated four times with statistical design RBD. Research findings was recorded with the application of Fluopyram 34.48 % SC @ 0.625 Ltrs. / ha. This chemical was applied in two split doses. First dose was applied at 5 days before sowing (DBS) and second dose was applied at 21 days after germination (DAG) in mungbean crop. Two years pooled data of final nematode population at harvesting was found significantly reduced in treatment. The minimum final nematode population at harvesting 254.75 was observed. Recorded maximum yield 15.50 Qtls./ha, whereas the minimum yield was recorded in untreated check 4.26 Qtls./ha. Recorded 1:7.05, whereas the minimum ICBR was recorded in untreated check 1:3.29. This treatment was found best treatment for the management of root-knot nematode in mungbean. The newer nematicides were significantly decreases the nematode population and improve yield of mungbean per ha. The Initial Nematode Population (INP) 496 J_2 /200 CC soil was recorded before application of chemical and sowing of crop. Carbofuran 3G chemical was used as chemical check @ 33 kg/ha. Untreated check was also maintained as control for comparison.

Keywords: Mungbean, Management, Newer Nematicides and Root-knot Nematode.

Oral Presentation

NMFBD(O)-09

Molecular Profiling of Cellulose: Digesting Gut Bacteria in *Brahmina coriacea* (Coleoptera: Scarabaeidae) Grubs from North-Western Himalaya

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White grubs are known as the "National pest" of India due to their wide distribution and economic damage. *Brahmina coriacea* grubs are restricted to Tibet, China and the Himalayan region in Jammu and Kashmir, Himachal Pradesh and Uttarakhand. The grubs of *B. coriacea* were collected from the soil from different ecosystems of eight different locations in Himachal Pradesh, India, by the pit sampling method. The grubs of *B. coriacea* were identified by examining the raster pattern. There was variation in the morphology and biology among different populations of *B. coriacea* in Himachal Pradesh. The morphological parameters and biological differences were also recorded, such as fecundity rate and damage potential among different ecotypes of B. coriacea collected from various locations. A total of 102 morphologically distinct bacterial isolates were isolated from the gut of different populations of *B. coriacea*. The gut microbial diversity and abundance were recorded as maximum in the hind gut, compared to other gut compartments. A total of 11 cellulolytic bacterial isolates were identified using morphological, biochemical and 16S rRNA molecular methods. The cellulolytic index of bacterial strains ranged from 0.33 to 2.0. The 11 gut cellulolytic bacteria were identified by using morphological, biochemical and 16S rRNA gene analysis. *Bacillus thuringiensis* as a biological agent, *Staphylococcus cohnii*, *Ralstonia mannitolilytica* and some *Bacillus* sp. were reported for the first time from *B. coriacea* grubs in India. The potent cellulose-degrading bacteria can be used in industries for decomposing agricultural waste, in pulp and paper industries and for biofuel production.

Keywords: 16S rRNA, *B. coriacea*, Biofuel, Cellulose, Gut microbiota, White grubs

Oral Presentation

NMFBD(O)-10

Residue and Persistence of Propiconazole 13.9% W/W + Difenconazole 13.9% W/W EC in Mango by Liquid Chromatographic Technique

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Propiconazole and difenconazole combi-product is not yet registered for mango diseases with Indian regulator. Therefore, to generate the data on the residue of these fungicide in/on mango, in house simple and sensitive LC-MS/MS analytical method was developed and validated for the determination of residues of propiconazole + difenconazole from mango fruit and a field experiment conducted to study their dissipation kinetics in raw mango fruits (with peel), ripened mango fruits (with peel), pulp, juice and soil samples following two foliar applications a product containing Propiconazole 13.9% + Difenconazole 13.9% EC at 10-day intervals beginning on 38 days before the harvest of mature ripened mango. Treatments comprised a foliar application at X-dose i.e., 300 g a.i./ha, and 1.25X dose i.e., 375 g a.i./ha. The immature raw mango fruits were sampled at 0 (2 h), 1, 3, 5, 7, 10, 15 and 20 days after the last foliar application, while the mature ripened mango, and soil were sampled 28 days after the last application. Results revealed that following two foliar applications, residues of propiconazole were detected in raw mango fruits (with peel) at all sampling intervals. Concentrations ranged from 0.01 to 0.25 mg/kg at the X dose, and from 0.01 to 0.32 mg/kg at the 1.25X dose. The dissipation of propiconazole in raw mango fruits followed first-order kinetics, with calculated half-lives of 5.2 days (X dose) and 5.6 days (1.25X dose). At 28 days after the last application, propiconazole residues of 0.02 mg/kg (X dose) and 0.04 mg/kg (1.25X dose) were detected in ripened mango fruits. In contrast, propiconazole residues in mango pulp, juice, and soil samples remained below the limit of quantification (LOQ) of 0.01 mg/kg. Additionally, the metabolite of propiconazole, 2,4-dichlorobenzoic acid (2,4-DCBA), was not detected above the LOQ of 0.10 mg/kg in any of the tested matrices at their respective sampling intervals. Similarly, residues of difenoconazole were also detected in raw mango fruits (with peel) at all sampling intervals. Their residue levels ranged from 0.06 to 0.43 mg/kg at the X dose, and from 0.03 to 0.51 mg/kg at the 1.25X dose. The dissipation of

Oral Presentation

difenoconazole in raw mango fruits followed first-order kinetics, with calculated half-lives of 8.2 days (X dose) and 5.6 days (1.25X dose). At 28 days after the last application, difenoconazole residues of 0.08 mg/kg (X dose) and 0.24 mg/kg (1.25X dose) were detected in ripened mango fruits. In contrast, propiconazole residues in mango pulp, juice, and soil samples remained below the limit of quantification (LOQ) of 0.01 mg/kg.

Keywords: Propiconazole, 2,4-DCBA, Difenconazole, Limit of quantification, Metabolite

NMFBD(O)-11

Studies on Morphological and Cultural Variability of *Fusarium oxysporum* f.sp. *radicis-cucumerinum* inciting Root and Stem Rot Disease of Cucumber

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Variability is one of the properties of a living organism to modify its characteristics from one generation to another. In present investigation, variability among ten isolates of *Fusarium oxysporum* f.sp. *radicis-cucumerinum* was studied. The cultural and morphological characters viz., growth characters, colony color, sporulation, number of septa, size of macro and microconidia were studied. Ten isolates of *Fusarium oxysporum* f.sp. *radicis-cucumerinum* causing root and stem rot disease of cucumber were cultured on PDA petri plates and culture characteristics of the isolates were observed and recorded at 7th day of incubation. The results revealed that all the ten isolates showed variations in colony characters on 7th day of incubation. Among all, isolate FORC-U1 showed off-white with yellowish pigmentation fluffy growth pattern, highest colony diameter 90 mm, maximum sporulation 4.8 x 10^6 conidia/mm^2 sporulation. While, isolate FORC-B1 showed pure white with serrated margin and fluffy growth, lowest 70.03 mm diameter, minimum 2.2 x 10^6 conidia/mm^2 sporulation. Among all the ten isolate, FORC-U1 showed largest size macroconidia with length and width of 19.54 ± 0.78 (17.65-21.78) × 5.68 ± 0.26 (5.09-6.12) µm with 3-4 septation. While, the length and width of isolate FORC-B1 measured in lowest size 6.95 ± 0.34 (6.41-8.02) x 2.15 ± 0.10 (1.93-2.32) µm with 1-2 septation and sickle shaped with blunt end of macroconidia in ten isolates. The size of microconidia measured highest in isolate FORC-U1 with length and width of 5.93 ± 0.28 (5.42-6.48) x 3.05 ± 0.14 (2.80-3.25) µm with single septa. Whereas, the length and width of isolate FORC-B1 measured in lowest microconidial size as 4.07 ± 0.16 (3.69-4.33) x 1.10 ± 0.05 (1.01-1.18) µm with single septa and round to oval shaped microconidia.

Keywords: Root and Stem Rot, Macroconidia and Microconidia.

Oral Presentation

NMFBD(P)-01

Advances in Genomic Technologies and Novel Pesticidal Molecules for Sustainable Crop Protection

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Traditional crop protection practices have relied heavily on broad-spectrum chemical pesticides, often leading to environmental degradation, pesticide resistance, non-target effects, and residue issues. These conventional methods, though effective initially, have proven unsustainable in the long term due to their ecological and health related drawbacks. In contrast, genomic tools like CRISPR-Cas gene editing and RNA interference enable highly specific targeting of pest and pathogen genes essential for their survival or virulence, minimizing off-target effects and reducing the risk of resistance development. These technologies facilitate the development of genetically resistant crop varieties or direct pest suppression with minimal environmental impact. Concurrently, new pesticidal molecules such as nanoformulations, peptide-based biopesticides and AI-designed compounds offer enhanced stability, targeted delivery and biodegradability, ensuring effective pest control with reduced chemical residues. Collectively, these advancements enable integrated pest management approaches that prioritize the safety of humans, non-target organisms and the ecosystem, while enhancing crop yield. Ultimately, adopting genomic and molecular based pest control marks the beginning of a sustainable agricultural era that harmonizes the need for food security with environmental conservation.

Keywords: CRISPR, RNA interference, Nanoformulations, and Biopesticides

Poster Presentation

NMFBD(P)-02

Assessment of Thiocloprid 21.7% SC against Girdle Beetles in Soybean of Neemuch District of M.P.

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Madhya Pradesh, known as India's "soya state," is the largest soybean-producing region, with cultivation mainly concentrated in the Malwa region during the *Kharif* season. Soybean productivity is significantly constrained by insect pests, among which the girdle beetle is a major yield-reducing factor. To evaluate management options, an On-Farm Trial (OFT) was conducted during 2023–24 on soybean variety Raj Soya-2024 across seven farmers' fields covering 1.05 ha. Three treatments were tested: T_1 – farmers' practice (Profenophos 50% SC, 1.5 L/ha at 30 DAS), T_2 – Chlorantraniliprole 18.5% SC (150 ml/ha at 35 DAS), and T_3 – Thiocloprid 21.7% SC (750 ml/ha at 35 DAS). Results indicated higher yield in T_3 (1,527 kg/ha), followed by T_2 (1,468 kg/ha) and T_1 (1,350 kg/ha). Thiocloprid recorded a yield advantage of 13.11% over the farmers' practice, suggesting its effectiveness in managing girdle beetle and improving soybean productivity.

Keywords: Thiocloprid, Girdle beetle, Soybean.

Poster Presentation

NMFBD(P)-03

Bio - Efficacy of Insecticidal Seed Treatments for management of *S. oryzae* in Stored Wheat

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Investigations on "Management of *Sitophilus oryzae* (L.) infesting stored wheat" were carried out at Regional Research Station, Anand Agricultural University, Anand during 2024-25. Five insecticides *viz.,* Emamectin benzoate (40.00 mg/1 kg seed), spinosad (0.004 ml/ 1 kg seed), Profenofos (0.004 ml/ 1 kg seed), Chlorpyrifos (0.05 ml/ 1kg seed) and deltamethrin @ 0.04 ml/ 1 kg of wheat seeds were tested for their efficacy in protecting stored wheat grains against *S. oryzae*. Deltamethrin (0.04 ml/ 1 kg seed) and spinosad (0.004 ml/ 1 kg seed) proved to be the most effective insecticides as it recorded highest per cent mortality (85.00% and 81.94%, 95.28% and 93.06%, 98.89% and 97.22% respectively) after 24, 48 and 72 hours of adult release. None of the insecticides tested at doses had hampered the germination of wheat seeds during the initial storage period and cent per cent germination was observed in all the treatment including control after storage for 6 months.

Keywords: Stored wheat, Pest, *Sitophilus oryzae* (L.), Rice weevil, Gujarat

Poster Presentation

NMFBD(P)-04

Bio-efficacy of Insecticides for Management of Fall Armyworm, *Spodoptera frugiperda* (J. E. Smith) on Maize (*Zea mays* L.)

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Bio-efficacy of insecticides *viz.,* spinosad 45 SC, emamectin benzoate 5 SG, thiodicarb 75 WP, chlorantraniliprole 18.5 SC, azadirachtin 10000 ppm, *Metarhizium anisopliae* and *Beauveria bassiana* was evaluated against fall armyworm, *Spodoptera frugiperda* on maize at Agronomy farm, Rajasthan College of Agriculture, Maharana Pratap University of Agriculture and Technology, Udaipur, Rajasthan during *Kharif* 2019 and 2020. The result revealed that three sprays of chlorantraniliprole 18.5 SC was found most effective against *S. frugiperda* with maximum reduction of larval population, lowest plant damage (%), lowest leaf damage (%), lowest cob damage (%) and highest grain yield. However, the maximum incremental benefit cost ratio was obtained from three sprays of emamectin benzoate 5 SG.

Keywords: Bio-efficacy, Newer insecticides, Maize, *Spodoptera frugiperda*

Poster Presentation

NMFBD(P)-05

Dissipation and Persistence of Isotianil, its Metabolite, Trifloxystrobin and its Metabolite in Rice Crop as Seed Treatment

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The residue of different chemical insecticide are a major challenging for rice growers. It is significantly impact on export of rice. Realising the importance of the problem on rice, a field trails were conducted to study the residues of isotianil, trifloxistrobin and their metabolites in rice plant, whole rice grain, polished rice grain, husk, straw and soil following seed treatment of a product containing isotianil 200 g/L + trifloxystrobin 80 g/L FS as wet and dry seed treatments. Treatments comprised a seed treatment at recommended X-dose i.e., 1.5 + 0.6 g a.i./kg seed, and 2X of recommended dose i.e., 3.0 + 1.2 g a.i./kg seed. Rice plants (without roots and panicles) were sampled at 0, 1, 3, 7, 10, 15 and 20 days after transplanting (i.e., 28, 29, 31, 35, 38, 43 and 48 days after seed treatment). Whole rice grains, straw, and soil samples were collected at 96 days after transplanting (i.e., 124 days after seed treatment). Residues of isotianil in rice plants after seed treatments observed below limit of quantitation (LOQ) of 0.01 mg/kg at all sampling intervals. Whereas, the isotianil residues were detected in whole rice grains at 124 days after seed treatment for both X and 2X doses irrespective of seed treatment methods, i.e., respectively 0.042 and 0.117 mg/kg for wet seed treatment, and of 0.037 and 0.113 mg/kg for dry seed treatment. The residues of DCIT acid, i.e., 0.011 mg/kg, were also observed in the rice plant with X-dose of wet seed treatment at 29 days after seed treatment. While with 2X dose of wet seed treatment, residues of DCIT acid were observed in ranges of 0.011-0.025 mg/kg up to 38 days after seed treatment, which were reached below LOQ level of 0.01 mg/kg at 43 days after seed treatment. The residues of trifloxystrobin in rice plants were observed <LOQ at all sampling intervals. Whereas, the trifloxystrobin residues were detected in whole rice grains at 124 days after seed treatment i.e., 0.012 and 0.025 mg/kg wet seed treatment at X and 2X doses, respectively; 0.025 mg/kg for dry seed treatment at 2X dose. While, the residues of CGA 321113 were observed <LOQ in all the sampled matrices for both seed treatment methods.

Keywords: Molecules, Isotianil, Trifloxystrobin, Residues, Limit of quantification.

Poster Presentation

NMFBD(P)-06

Efficacy of Insecticides and Biopesticides against Diamondback Moth, *Plutella xylostella* (L.) on Cabbage

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A field experiment was conducted at Central Research Farm, SHUATS, Prayagraj during *rabi*, 2021-2022 to evaluate the efficacy of insecticide and biopesticide against *P. xylostella*. There was eight treatments including an untreated control and each was replicated thrice in the randomized block design. The treatment chlorantraniliprole 18.5SC @0.3 ml/ l (2.01) was found most effective followed by spinosad 45SC @0.5 ml/ l (2.34), indoxacarb 14.5SC @1 ml/ l (2.68), emamectin benzoate 5SG @0.4 gm/ l (2.94) and *beauveria bassiana* 1.15%WP @4 gm/ l (3.11) whereas, neem oil 1500 ppm (3.30) was found the least effective, followed by NSKE 5% @50 gm/ l (3.59). The highest yield was recorded with chlorantraniliprole 18.5SC (230.83 q ha^{-1}) with cost benefit ratio (1:5.42).

Keywords: Cabbage, Cost benefit ratio, Efficacy, Insecticides, *Plutella xylostella*.

Poster Presentation

NMFBD(P)-07

Efficacy of Insecticides and Biopesticides against Leaf Miner on Tomato

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The present investigation entitled, Efficacy of insecticides and bio pesticides against leaf miner on tomato was carried out at the Entomological Research Field, College of Agriculture, Gwalior, Madhya Pradesh, India during *Rabi* seasons 2022-23 and 2023-24. The field laid in RBD with nine treatments and one controlled plot. The pooled data of two-year (*Rabi* 2022-23 and 2023-24) indicated that all the insecticides and biopesticides treatments were significantly minimized the live mines of leaf miner as compared to control plot (5.08 live mines/three leaves). Among all the treatments the significantly lowest number of live mines was observed in chlorantraniliprole 18.5 SC (1.18 live mines/three leaves), with highest per cent reduction over control (76.79%). The second best treatments were emamectin benzoate 5 SG with mean 1.28 live mines/three leaves and a per cent reduction compared to control (74.74%). The next effective treatments were spinosad 45 SC, indoxacarb 14.5SC, thiodicarb 75WP, imidacloprid 17.8 SL, neem oil and *Beauveria bassiana* with mean live mines and per cent reduction over control *i.e.*, 1.48 live mines/three leaves, 70.80%, 1.64 live mines/three leaves, 67.67%, 1.88 live mines/three leaves, 63.04%, 2.05 live mines/three leaves, 59.62%, 2.28 live mines/three leaves, 55.20%, 2.56 live mines/three leaves, 49.66%, while least effective treatment was *Metarhizium anisopliae* (2.64 live mines/three leaves) with lowest per cent reduction over control (47.95%).

Keywords: Leaf miner, *Rabi,* Per cent, Reduction, Insecticides, Biopesticides.

Poster Presentation

NMFBD(P)-08

Efficacy of Newer Insecticides against Major Insect Pests of Rice and Their Impact on Yield and Natural Enemies

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Rice (*Oryza sativa* L.) is belonging to family Gramineae (Poaceae), which is life and princess among the cereals. Rice contains 80% carbohydrates, 8% protein, 3% fat and 3% fiber. An experiment was conducted to evaluate the efficacy of newer insecticides against two major insect pests of rice—yellow stem borer (*Scirpophaga incertulas*) and leaf folder (*Cnaphalocrocis medinalis*), with a focus on pest control efficiency, impact on natural enemies, yield improvement and economic viability. To investigated the efficacy of insecticides *viz.* Chlorantraniliprole 0.50% GR + Thiamethoxam 1% GR, Chlorantraniliprole 0.40% GR, Dinotefuran 15% SG + Pymetrozine 45% WG, Thiamethoxam 25% WG, Pymetrozine 50% WG, Fipronil 0.60% GR and Dinotefuran 20% SG. Among the tested treatments, Chlorantraniliprole 0.50% GR + Thiamethoxam 1% GR (T2) recorded the lowest white ear head (6.51%) and leaf folder damage (4.88%), followed closely by Chlorantraniliprole 0.40% GR (T6). T2 also exhibited the highest reduction in white ear head (50.02%) and leaf damage (36.83%) over control. Importantly, all treatments showed no adverse effects on key natural enemies, such as spiders, dragonflies and damselflies. In terms of yield enhancement, Chlorantraniliprole 0.40% GR led to the highest increase in grain yield (18.50 q/ha), followed by Chlorantraniliprole 0.50% GR + Thiamethoxam 1% GR (16.30 q/ha), with corresponding net returns of Rs. 35185.50/ha and Rs. 30382.90/ha, respectively. The highest ICBR (1:6.77) was also observed in Chlorantraniliprole 0.40% GR, indicating strong economic viability. The results demonstrate that Chlorantraniliprole-based insecticides, particularly in combination with Thiamethoxam, are highly effective for integrated pest management in rice, offering significant yield gains without compromising ecological safety.

Keywords: *Scirpophaga incertulas, Cnaphalocrocis medinalis,* Insecticides, yield improvement, economic viability

Poster Presentation

NMFBD(P)-09

Evaluation of Insecticides as Seed Treatment and Spray for the Management of Fall Armyworm, *Spodoptera frugiperda* (J.E. Smith) in Maize

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The experiment to evaluate the efficacy of insecticides *viz.*, Thiamethoxam 30 FS @ 8ml/kg seed, Cyantraniliprole 19.8% + Thiomethaxam 19.8% @ 6ml/kg seed, Cyantraniliprole 600 FS @ 2.4 ml, Chlorantraniliprole 50 FS as seed treatment @ 5.6 ml/kg seed, Thiamethoxam 30 FS @ 8ml/kg seed and Chlorantraniliprole 18.5% SC 0.4 ml/litre spray at 3 and 4 weeks after germination, Cyantraniliprole 19.8% + Thiomethaxam 19.8% @ 6ml/kg seed and Chlorantraniliprole 18.5% SC 0.4 ml/litre spray at 3 and 4 weeks after germination, Cyantraniliprole 600 FS @ 2.4 ml and Chlorantraniliprole 18.5% SC 0.4 ml/litre spray at 3 and 4 weeks after germination, Chlorantraniliprole 50 FS as seed treatment @ 5.6 ml/kg seed and Chlorantraniliprole 18.5% SC 0.4 ml/litre spray at 3 and 4 weeks after germination, Chlorantraniliprole 18.5% SC 0.4 ml/litre spray at 10% foliar damage or Davis score 3.0 and Chlorantraniliprole 18.5% SC 0.4 ml/litre spray at 20% foliar damage or Davis score 3.0 against fall armyworm infesting maize under natural infestation conditions was conducted during *Kharif*, 2023 at Agronomy Farm, RCA, Udaipur. The observations were recorded at 10 days after spray and the ear damage rating scale at harvest. The results revealed that the lowest mean whorl feeding injury rating was recorded in treatment application of Chlorantriniliprole 50 FS as seed treatment @5.6 ml/kg seed and Chlorantraniliprole 18.5% SC 0.4 ml/ litre spray at 3 weeks after germination followed by Chlorantriniliprole 50 FS as seed treatment @5.6 ml/kg seed and Chlorantraniliprole 18.5%SC 0.4 ml/ litre spray at 4 weeks after germination. The untreated control recorded the highest plant infestation percentage.

Keywords: Fall armyworm, Chlorantraniliprole, Cyantraniliprole, Thiomethaxam

Poster Presentation

NMFBD(P)-10

Evaluation of Newer Molecules for the Management of Pod Borer Complex on Pigeonpea

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An experiment was planned to evaluation of newer molecules for the management of pod borer complex on pigeonpea at Agronomy Instructional Farm, C. P. College of Agriculture, S. D. Agricultural University, Sardarkrushinagar during kharif season of the year 2022 and 2023. A total of eight insecticidal treatments were tested for management of pod borers. The treatment of flubendiamide 39.35 SC @ 0.008 per cent performed as the best treatment with significantly lowest population of *Maruca vitrata* and *Exelastis atomosa* with 0.44 and 0.17 larva per plant, respectively. The plot treated with chlorantraniliprole 18.5 SC @ 0.006 per cent was significantly superior which recorded the lowest population of *Lampides boeticus* and *Helicoverpa armigera* with 0.17 and 0.31 larva per plant, respectively. The plot treated with chlorantraniliprole 18.5 SC @ 0.006 per cent recorded significantly lowest pod damage caused by lepidopteran pests (7.47%) and seed damage by pod fly (12.69%) at harvest. The significantly higher (1480 kg/ha) seed yield was obtained in plots treated with chlorantraniliprole 18.5 SC @ 0.006 per cent and it remained at par with flubendiamide 39.35 SC @ 0.008 per cent (1367 kg/ha). Maximum increase in yield over untreated control (93.46%) was observed in the treatment of chlorantraniliprole 18.5 SC @ 0.006 per cent and minimum avoidable loss (7.64%) was observed in the treatment of flubendiamide 39.35 SC @ 0.008 per cent.

Keywords: *Cajanus cajan* (L.) Millsp., Pod borers, Lepidopteran pests, Pod fly, *Helicoverpa armigera*

Poster Presentation

NMFBD(P)-11

Novel Insecticide molecules Structure and Mode of Action

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In agriculture protecting crops from pests is an ongoing challenge that lies at the heart of global food security. While methods like cultural practices, biological control, and mechanical techniques play an important role, farmers often rely on insecticides for their quick and reliable results when pests threaten to cause serious damage. Unfortunately, overuse of older chemistries such as organophosphates has led to a major problem insect resistance. In recent years, however, the focus has been shifting toward innovative insecticides with new modes of action that not only tackle resistant pests but also reduce environmental impact. By making the most of these modern solutions, we can create pest management strategies that are both effective and sustainable, ensuring healthier harvests and a more secure future for agriculture. This presentation will explore how these novel insecticides can shape the next chapter of pest control.

Keywords: Novel insecticides, Pest management, Insect resistance, Organophosphates, Resistance management,

Poster Presentation

NMFBD(P)-12

Studies on Genetic Diversity Analysis/Molecular Variability of *Fusarium oxysporum* f.sp. *radicis-cucumerinum* Isolates Causing Root and Stem Rot Disease of Cucumber

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Present investigation was conducted on ten isolates of *Fusarium oxysporum* f.sp. *radicis-cucumerinum* causing root and stem rot disease of cucumber, which were isolated from Udaipur, Rajsamand, Chittorgarh, Dungarpur and Banswara districts of Rajasthan during *Kharif* season 2022 and 2023. Two isolates from each district were used and further, FORC-U1(Udaipur), FORC-U2 (Udaipur), FORC-R1(Rajsamand), FORC-R2(Rajsamand), FORC-C1(Chittorgarh), FORC-C2(Chittorgarh), FORC-D1(Dungarpur), FORC-D2(Dungarpur), FORC-B1(Banswara) and FORC-B2(Banswara). DNA was extracted from fungal mycelium by using CTAB method, described by Doyle and Doyle (1987)with slight modifications. Isolated DNA from various isolates was compared by using RAPD methodology. DNA was amplified with RAPD-PCR method by using random primers in thermal cycler. To find the effectiveness of DNA markers in differentiating genetic variability in *Fusarium oxysporum* f.sp. *radicis-cucumerinum* population, it was assumed that each DNA band position correspond to a locus with two alleles, presence or absence of the band, respectively. In preliminary experiments, a total of 10 primers were used for the present study based on the reproducibility of the PCR amplification. The PCR result from these 10 RAPD primers was repeated three times to assess reproducibily. All the primers were generated score able bands. By using 10 RAPD primers, a total of 119 reproducible bands were amplified, out of which 110 (92.4%) were polymorphic and 9 (7.5%) were monomorphic. Similarity coefficient among the isolates ranged from 0.998 (FORC-C2 and FORC-U2) to 0.001 (FORC-D2 and FORC-U1). Genetic similarity coefficient was relatively low among all the isolates, which ranged from 0.001 to 0.998. The maximum similarity value (0.998) was obtained between isolates FORC-C2 and FORC-U2, both of which belong to Chittorgarh and Udaipur respectively.

Keywords: FORC, Molecular, Variability, Primers and RAPD.

Poster Presentation

NMFBD(P)-13

Toxicity Assessment of Novel Insecticides against *Spodoptera litura* (fabricius)

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The present investigations entitled "Evaluation of toxicity of newer insecticides against *Spodoptera litura* (fabricius) field populations" were undertaken in the Department of Entomology, CSK Himachal Pradesh Krishi Vishvavidyalaya, Palampur. Toxicity of eight different insecticides viz. azadirachtin, cypermethrin, emamectin benzoate, flubendiamide, indoxacarb, novaluron, spinosad and thiodicarb was evaluated by leaf dip method of bioassay against third instar larvae of *S. litura* field populations collected from Berthin, Bara, Palampur and Sundernagar. On the basis of the LC_{50} values obtained, the toxicity order against *S. litura* populations of four different locations was emamectin benzoate followed by indoxacarb, azadirachtin, thiodicarb, novaluron, spinosad, flubendiamide and cypermethrin with LC_{50} values 0.189 to 0.256 ppm followed by 0.937 to 1.219 ppm, 9.537 to 14.371 ppm, 13.661 to 18.073 ppm, 21.062 to 31.211 ppm, 72.443 to 85.388 ppm, 103.731 to 143.799 ppm, and 120.181 to 155.325 ppm respectively. On the basis of LC_{50} values, the relative toxicity of different insecticides to third instar *S. litura* larvae of four different populations indicated that emamectin benzoate was 554.50 to 635.88 times more toxic than cypermethrin followed by indoxacarb, azadirachtin, thiodicarb, novaluron, spinosad and flubendiamide with relative toxicity values 111.59 to 128.26, 10.81 to 13.08, 7.71 to 9.13, 4.08 to 6.26, 1.63 to 1.82 and 0.98 to 1.20 respectively The baseline toxicity data, thus obtained indicated that emamectin benzoate and indoxacarb were the most toxic to *S. litura* while cypermethrin was found to be least toxic against all four populations of the *S. litura*.

Keywords: LC_{50}, *Spodoptera litura*, Toxicity, Bioassay, Novel insecticides

Poster Presentation

THEME 6

IOT and Bioinformatics Approaches in Insects, Diseases and Weed Management

IOTB(O)-01

Application of IoT Technologies in Insect Pest Management: A Step Towards Smart and Sustainable Agriculture

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The Internet of Things has emerged as a transformative force in modern agriculture providing precise and innovative tools for effective insect pest management. Traditional pest control methods often depend on manual monitoring and widespread pesticide application, which can result in economic losses and environmental harm. In contrast, Internet of Things-based systems integrate smart traps, wireless sensor networks, drones, environmental sensors, and cloud-based analytics to deliver real-time pest surveillance and early warning solutions. For example, automated pheromone traps with integrated cameras and image recognition software can identify and count insect pests such as cotton bollworms and armyworms, transmitting data to mobile devices for immediate action. In rice fields, Internet of Things platforms such as electronic monitoring systems combine pest traps with temperature and humidity sensors to forecast outbreaks of planthoppers. Similarly, drones equipped with high-resolution cameras are used to detect locust swarms and other aerial pest threats in arid environments. Advanced applications include mosquito traps powered by artificial intelligence, which classify species like dengue and malaria vectors through deep learning algorithms. Additionally, sound-based systems are employed to detect pest vibrations or wingbeat patterns in greenhouse crops. The integration of Internet of Things with artificial intelligence and machine learning facilitates predictive modeling, precision pesticide use, and resource-efficient interventions. These emerging technologies are reshaping pest management by shifting from reactive, broad-spectrum tactics to proactive, data-driven strategies. Through early detection, continuous monitoring, and targeted responses, Internet of Things solutions significantly minimize pesticide overuse and enhance decision-making. Their synergy with artificial intelligence further strengthens prediction accuracy, supporting site-specific pest control and sustainable agricultural practices. Ultimately, these tools align with the core principles of integrated pest management, offering environmentally responsible and economically viable solutions to modern pest challenges.

Keywords: Internet of things, Pest monitoring, Precision agriculture, Sustainable crop protection, Artificial intelligence

Oral Presentation

IOTB(O)-02

Molecular Identification of South Asian Thrips, *Thrips parvispinus* by qPCR Analysis

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Precise and accurate identification of pests is of paramount importance for taking timely management measures. Identification of thrips is not easy without the taxonomic knowledge and expert taxonomists help with sophisticated microscopes. Molecular techniques are one such help in precise and quick identification within a few hours. South Asian thrips, *Thrips parvispinus*, is one of the recently invaded invasive pests in India. To identify this pest quickly, we have developed species-specific primers that are validated using both PCR and qPCR melting curve analysis. The species-specific primers have no cross-species amplification, have higher resolution at lower DNA concentration, and are validated on field-collected samples. Further, melt curve analysis proved the specificity of the primers even at lower concentrations of DNA. This technique can be applied at quarantine centers for the detection of quarantine pests quickly without sequencing, only with the availability of species-specific primers. South Asian thrips, *Thrips parvispinus*: species-specific primers developed in this study will play a role in identification and control of the pest domestically and internationally.

Keywords: Thrips, PCR, Primers, Sequencing, DNA, Identification

Oral Presentation

IOTB(P)-01

Effect of Trichoderma on Fusarium wilt Diseases of Chickpea

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Chickpea (*Cicer arietinum* L.) belongs to genus Cicer tribe *Cicereae* family *Fabaceae* and sub family Papilionaceae. It is diploid in nature with chromosome number 2n=16. *Fusarium* wilt, caused by *Fusarium oxysporum* f. sp. *ciceris*, is a devastating soil-borne disease significantly limiting chickpea (*Cicer arietinum* L.) production worldwide. The pathogen invades the vascular system, resulting in chlorosis, wilting, and eventual plant death, causing yield losses up to 100% under favorable conditions. Biological control offers an eco-friendly and sustainable alternative to chemical fungicides. Among various biocontrol agents, Trichoderma species have shown considerable potential in managing soil-borne pathogens due to their diverse antagonistic mechanisms. This study investigates the effect of indigenous isolates of *Trichoderma* spp. on the suppression of *Fusarium* wilt in chickpea under controlled and field conditions. Results indicated that seed treatment and soil application of *Trichoderma harzianum* and *Trichoderma viride* significantly reduced disease incidence and increased plant growth parameters such as root length, shoot length, and biomass.The antagonistic effect is attributed to mycoparasitism, production of antifungal metabolites, and enhanced induction of systemic resistance in plants. Furthermore, *Trichoderma*-treated plants exhibited higher germination rates and better nodulation, indicating a positive influence on plant health and soil microflora. The dual role of *Trichoderma* as a plant growth promoter and biocontrol agent highlights its significance in integrated disease management (IDM) strategies for sustainable chickpea cultivation. The study emphasizes the importance of screening efficient native *Trichoderma* strains for field applicability and long-term disease suppression, thereby reducing dependency on hazardous chemical inputs and promoting eco-friendly agriculture.

Keywords: Chickpea, *Trichoderma*, Fusarium wilt.

Poster Presentation

IOTB(P)-02

Effect of *Trichoderma* on Soil borne Diseases of Chickpea

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Chickpea *(Cicer arzetznum* L.) is the most important pulse crop grown in the Indian sub-continent. Chickpea (*Cicer arietinum* L.) belongs to genus Cicer tribe Cicereae family *Fabaceae* and sub family Papilionaceae. It is diploid in nature with chromosome number 2n=16. It is also called by various names such as gram, Bengal gram, Garbanzo, Garbanzo bean, Egyptian pea, Chana and Chhole in various places**.** It's affected by various Fungal, Bacterial and Viral diseases. *Rhizoctonia bataticola* fungus is mainly a soil borne in nature with wide range of host and it can survive under the soil as saprophyte up to 15 years. *Rhizoctonia bataticola* infection occurs most frequently at flowering and pod formation stage or seed development stage. There are different anastomosis groups of *R. solani,* which differ in their sensitivity to fungicides, and extensive use of fungicides may result in development of resistance in pathogen population besides causing environmental pollution. *T. harzianum* and *T. viride* are effective in reducing *Rhizoctonia* damping-off and root rot of chickpea (soil borne diseases). Mechanisms like production of hormone-like metabolites and release of nutrients from soil or organic matter by *Trichoderma* spp. are to be involved in enhanced plant growth in different crops. Soil application of *T. harzianum* helps in better seedling emergence and highest vigour index of chickpea.

Keywords: Chickpea, *Trichoderma*, Root rot and *Rhizoctonia bataticola*

Poster Presentation

IOTB(P)-03

Farmers Perspective Regarding Drone Technology in Bhilwara District of Rajasthan

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Drone technology in Bhilwara district use in two blocks of farmers perspective in agriculture offers significant benefits such as increased operational efficiency, reduced costs, improved crop yields, and enhanced sustainability through precise resource management. However, challenges hindering broader adoption include high initial costs, technical complexities, regulatory barriers, and a lack of awareness among some farmers. Key applications include crop monitoring, soil analysis, precise pesticide and fertilizer application, and yield estimation, with integration of AI and GIS enhancing data-driven decision-making. Government initiatives, subsidies, and training programs are crucial for promoting wider adoption, especially among small and marginal farmers. In Bhilwara district two blocks viz. Mandal and Suwana villages selected for drone technology popularization at 300 farmers fields in 200 ha area for spraying of Nano Urea, Weedicide and Pesticide in Blackgram crop. The observations recorded by farmers regarding drone technology save water, reduce labour cost and more efficiency of spray in crop. Based on the study it is inferred that drone technology at farmers field is achieved more significant result but preset time need to be more awareness camp regarding drone technology at farmers field.

Keywords: Drone Technology, Farmers perceptive, Bhilwara

Poster Presentation

IOTB(P)-04

IoT: Unlocking New Possibilities for Plant Protection

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The Internet of Things (IoT) is revolutionizing modern agriculture by providing automated, real-time monitoring and intelligent management tools to enhance crop health and productivity. This review presents a comprehensive IoT-based system aimed at the early detection and effective control of plant diseases and insect pests. The system deploys sensor-equipped devices in both greenhouse and open-field environments to continuously collect critical data on environmental parameters such as temperature, humidity and leaf colour. These data are transmitted wirelessly via Arduino-based modules to a centralized cloud platform for analysis. The platform compares incoming data against predefined healthy thresholds to classify leaves as either healthy or diseased and detect pest activity promptly. Users can remotely access this information through a user-friendly mobile application and web interface, allowing for timely, data-driven decision-making and scheduling of interventions. By enabling early detection, the system helps reduce manual inspection efforts, pesticide usage, and crop losses, promoting sustainable agricultural practices. Extensive field trials demonstrated the system's scalability, stability, and ease of use across multiple crop types and environmental conditions. Future improvements will integrate advanced image processing and robust AI algorithms to enhance disease classification accuracy and expand applicability to diverse plant species and pest varieties. Overall, this IoT-enabled solution exemplifies how integration of sensor networks, cloud computing, and remote-control technologies can transform precision agriculture, providing farmers with a practical, cost-effective, and environmentally friendly tool to improve crop management and productivity.

Keywords: Internet of Things, Sensor-equipped devices, Mobile application, Arduino-based modules, Cloud computing, Sensor networks, Centralized cloud platform.

Poster Presentation

IOTB(P)-05

LAMP-Based Rapid and Precise Detection of the Invasive Pest, Fall Armyworm, *Spodoptera frugiperda*

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Spodoptera frugiperda (fall armyworm) is a highly invasive and destructive pest affecting maize crops across India, posing serious threats to food security and agricultural sustainability. Rapid and reliable identification of this pest is crucial for effective management and control strategies. In this study, we report the development of a loop-mediated isothermal amplification (LAMP) assay for the specific detection of *S. frugiperda* directly from maize samples. The assay targets a conserved region of the mitochondrial cytochrome oxidase I (COI) gene and demonstrates high specificity, with no cross-reactivity to related lepidopteran pests. The optimized LAMP protocol allows amplification at a constant temperature of 65°C within 30 minutes, and results can be visually interpreted without the need for sophisticated laboratory equipment. Sensitivity tests confirmed that the assay could detect as little as 10 pg of template DNA. The LAMP assay developed here offers a cost-effective, rapid, and field-deployable diagnostic tool, enabling timely detection and surveillance of *S. frugiperda* in maize fields across India.

Keywords: Pest, Fall armyworm, Maize, Gene, Detection

Poster Presentation

IOTB(P)-06

Next Generation Farming: Harnessing IoT and Bioinformatics for Crop Protection

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In this new era of agriculture, the shift toward digital farming has become essential, as conventional farming relies heavily on manual practices, often leading to overuse of chemicals, delayed responses to pests and higher environmental impact. Adopting technologies like IoT and bioinformatics offers smarter, faster and more sustainable solutions to modern agricultural problems. IoT devices like sensors and drones provide real time monitoring of pest activity and environmental conditions, enabling early detection and targeted response. Meanwhile, bioinformatics provides insights into pest genome and crop pest interactions, supporting the development of genetically resistant crops and targeted biopesticides. It also aids in identifying molecular targets for RNAi based control strategies and tracking resistance genes in pest populations. By working together, these technologies allow farmers to manage resources like water, fertilizers and pesticides more efficiently, using them only when and where they are needed. This not only lowers costs but also reduces environmental harm. Crop yields are improved through both precise pest control using IoT and the development of genetically optimized pest resistant crops through bioinformatics. As a result, farming becomes less wasteful, more productive and better equipped to handle challenges such as changes in pest scenario, environmental impact and soil degradation. This marks a shift toward a new era of agriculture that is driven by data and built to be more resilient and adaptable for the future.

Keywords: Digital Farming, Internet of Things (IoT), Sensors and Bioinformatics

Poster Presentation

IOTB(P)-07

The National Pest Surveillance System (NPSS: Empowering Crop Protection through Digital Surveillance

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Correct pest identification and regular pest surveillance/monitoring is the cornerstone of Integrated Pest Management (IPM), through which epidemic situations can be avoided by detecting damage prior to establish at a higher pest population. Early pest identification is of paramount importance in terms of productivity and reduction of the usage of pesticides. Eye/physical observation methods have been used in recent years, but they are not efficient. Application of Artificial Intelligence (AI) approach such as deep learning can help in automating this repetitive task of inspection. Once pest is identified, its regular surveillance is to be done so as to provide ETL based management option to the farmers, that is safer, economical and applicable at field level. Timely availability of expert support on pest identification and pest surveillance-based advice can either result in saving crop worth several crores of rupees or in non-application of pesticides saving cost involved and the environment. Keeping the above in view, National Pest Surveillance System (NPSS), a digital platform for pest identification and surveillance of key pests of selected crops was designed and developed, consisting functional components: Mobile app for pest identification and their surveillance; and web portal for system administration and pest reporting.

NPSS mobile app possesses capability of AI-based pest identification for key pest of 65 crops and functionality of pest surveillance and management advice services for 31 selected major crops. App consists of three modules: pest identification, pest surveillance (quantitative and qualitative) and advisory. Web portal comprises of admin panel; dashboard showing pest surveillance and image data; user activity tracking module; pest reporting and advisory module. Dashboard is very significant component of which shows above ETL and below ETL based pest locations across the country on the map. Pest reporting section provides various kind of pest reports such as general pest report, ETL based report etc. to the experts based on the pest surveillance data recorded. NPSS leverages the digital technologies such as Artificial

Poster Presentation

Intelligence (Al) and smart phones, to speed up and automate the process of providing expert support on pest identification and timely delivery of pest surveillance based advisory to the farmer, specific to his/her need.

NPSS app is available on Apple and Google play stores and Portal at https://npss.dac.gov.in/app/login.

Keywords: NPSS, Pest surveillance, Crop protection, Digital agriculture, Early warning system, Integrated pest management, Food security, ICT in agriculture

THEME 7

Entrepreneurship and Policy Regulations in Plant Protection

EPRP(O)-01

Different Policy Regulations by Indian Government for Plant Protection

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Innovation-driven entrepreneurship in plant protection—encompassing bio-pesticides, microbial plant-health agents, digital pest-management platforms, and precision-technology tools—represents a critical engine for sustainable agriculture. Yet, the trajectory of such ventures depends heavily on the scientific rigor, clarity, and innovation-friendliness of **policy and regulatory frameworks**. In India, the regulatory environment is anchored in the **Destructive Insects & Pests Act (1914)**, the **Plant Quarantine (Import) Order, 2003**, and the **Insecticides Act, 1968**. These shape quarantine standards, registration of crop-protection products, and trade controls. However, they often span legacy provisions that struggle to keep pace with emerging technologies and bio-based solutions. For microbial-based plant protection products—bio-pesticides and plant-health microorganisms—the regulatory requirements remain fragmented and burdensome, with entrepreneurs facing challenges in commercialization due to high compliance costs and limited infrastructure for trials and scaling.

Complementary legislation like the **PPV&FR Act (2001)** and the **Biological Diversity Act (2002)** creates a sui generis IPR ecosystem—balancing breeder innovations with farmers' rights and genetic resource protection. Yet the interplay of intellectual property rights (IPR), traditional knowledge access, competition, and commercialization remains complex and increasingly litigated. Government innovation policy is evolving: the **Anusandhan National Research Foundation Act, 2023** seeks to bolster private-sector R&D across agriculture, while **Startup India** provides incubation, self-certification, rapid patenting, and funding access—but has not yet tailored its framework specifically to agri-biotech ventures in plant protection. Public incubation systems, guided by the Sustainable Development Goals (SDGs), offer lessons for supporting STI-based agri-startups, including those focused on ecosystem health and low-risk plant protection solutions.

Oral Presentation

For the entrepreneurial ecosystem to flourish, regulatory policies must:

- Provide **provisional or tiered authorization** systems to reduce time to market for low-risk biological products.
- Strengthen **testing infrastructure**, field trials, and quality control labs to support product validation.
- Harmonize national standards with **IPPC/ISPMs** and **WTO SPS frameworks** to facilitate trade and phytosanitary compliance
- Enhance **farmer awareness and IPM training**, promoting adoption and risk-informed use of alternatives to chemical pesticides

Keywords: Regulatory policy, DIPA 1914, Insecticide Act 1968, PPV&FR Act, Biological Diversity Act and Sustainable agriculture ecosystem.

Oral Presentation

EPRP(O)-02

Entrepreneurship Development through Oyster Mushroom Cultivation – A Case Study from Tribal Regions of South Gujarat

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India is mainly an agriculture-driven nation, due to diversity in soil and climatic conditions that facilitate the growth of a wide range of crops across different regions. This diversity also creates significant opportunities for mushroom cultivation due to the plentiful supply of raw materials and suitable environmental conditions. Experts recognize mushroom farming as a viable and rewarding opportunity, widely acknowledging its potential for generating higher income, creating job opportunities, and promoting rural development. Mushroom production is simple, low cost and plays a significant role to alleviate poverty and generate employment opportunity for educated unemployed youth in rural and semi-urban areas. There is an urgent need to impart technical knowledge to farm women and youth in order to adopt mushroom production as an income generating activity for enhancing their income. Agriculture Skill Council of India (ASCI) working under the aegis of Ministry of Skill Development & Entrepreneurship (MSDE), works towards capacity building by bridging gaps and upgrading skills of farmers, wage workers, self-employed & extension workers engaged in organized / unorganized segments of Agriculture & Allied Sectors. The ASCI under RKVY has organized various skill development training programs *via* KVK, research stations, and state agricultural universities. In the 2018-19 periods, KVK Tapi was designated to conduct a skill development training program lasting 200 hours titled 'Mushroom Grower (small entrepreneur)' with a total funding of 1.65 lakhs. A total of 20 tribal participants took part actively in the program. According to the guidelines set by MSDE, post-training monitoring and tracking of mushroom growers were also conducted after the training was completed. 40% of the trained participants embraced this technology and began producing oyster mushrooms. The entrepreneurs earned amounts ranging from 0.25 lakh to 4.00 lakh. In this manner, government initiatives aimed at enhancing the skills of farmers and wage workers have successfully promoted self-employment through the ASCI scheme, contributing to the improvement of rural livelihoods.

Keywords: Entrepreneurship, Oyster mushroom, Tribal people, ASCI, MSDE

Oral Presentation

EPRP(P)-01

Sustainable Income Generation through Integrated Farming System of Farmers in Bhilwara District of Rajasthan

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Today's environment, increasing demand for meat in rural and urban areas can help small and part-time farmers earn good profits by trading with the goat and poultry farming. Integrated farming system is a sustainable agricultural system that integrates livestock, crop production, goatry, poultry and other systems that benefit each other. It is based on the concept that 'there is no waste' and 'waste is only a misplaced resource', which means waste from one component, becomes an input for another part of the system. Integrated farming system approach is considered the most powerful tool for enhancing profitability of farming systems especially for small and marginal farmers to make them bountiful. Because of less investment and maintenance costs for shed, it can be done in coordination with agriculture crops. The present study was carried out in Mandalgarh block of Bhilwara district in Rajasthan to find out a sustainable and economically viable mixed farming model by integrating different components like crop, goat and poultry on 1.5-acre land holding. A farming system model having 10 goats + 20 poultry birds along with crop cultivation was found the best suitable with a net income of Rs 60260/- year as compared to crop cultivation alone i.e. Rs 21980/ year with a benefit cost ratio of 1: 2.80 and employment generation of 280 days. Integrated farming system help adequate amount of feed was also available for animals. Based on the study it is inferred that integrated farming system with 10 goats along with other components like; poultry is the most significant and beneficial system which can sustainable the income of farmers to improve their nutritional and livelihood security.

Keywords: Sustainable. Integrated farming, Income, Employment, Land holding

Poster Presentation

ICEP(P)-17

Seasonal Abundance and Temperature-Dependent Biology of Melon Fruit Fly (*Zeugodacus cucurbitae*) on Cucumber

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The melon fruit fly, (*Zeugodacus cucurbitae*), is a major cucurbit pest, causing 30–100% yield loss depending on host and seasonal conditions. A field-laboratory study was carried out at CCSHAU, Hisar, to assess its seasonal abundance and temperature-dependent biology on cucumber. During the rainy season of 2024, adult activity was recorded from the 28th SMW to the 43rd SMW, peaked in the 40th SMW with an average of 62 fruit flies/trap. In the summer of 2025, activity began in the 7th SMW and continued until the 18th SMW, peaked in the 15th SMW with an average of 48 fruit flies/trap. In the rainy season, maximum temperature ($r = 0.56^{*}$) and evaporation ($r = 0.50^{*}$) showed significant positive correlations with trap catches. In summer, maximum ($r = 0.86^{**}$), minimum temperature ($r = 0.71^{**}$) and evaporation ($r = 0.84^{**}$) had highly significant positive correlations, while relative humidity (morning $r = -0.78^{**}$, evening $r = -0.73^{**}$) showed strong negative correlations. Temperature significantly influenced biological traits. At 15 °C, total development required 66.6 days, with low egg hatchability 20.7%, extended adult longevity (female: 48.1 days; male: 46.3 days) and reduced fecundity (22.4 eggs/female). At 25 °C, development duration reduced to 14.6 days, with peak egg hatchability (85.8%) and highest fecundity (77.8 eggs/female). At 35 °C, development was fastest (12.3 days), but with reduced longevity (female: 20.2 days; male: 16.0 days) and fecundity (68.1 eggs/female). Sex ratio remained male-biased across all temperatures but became more balanced at higher temperatures. These findings provide a scientific basis for forecasting pest outbreaks and implementing temperature-based management strategies.

Keywords: Abundance, Biology, Cucumber, Temperature, *Zeugodacus cucurbitae*

Poster Presentation

BISP(P)-36

Evaluation of Organic Inputs Against Sucking Pest Complex Infesting Potato

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Various organic inputs *viz.,* Neem Seed Kernel Extract 5%, Neem oil 0.5%, *Lecanicillium lecanii* 1.15% WP, *Metarhizium anisopliae* 1.15% WP, *Beauveria bassiana* 5% WP, Cow urine 10%, *Neemastra*, Tobacco decoction 2% were evaluated against sucking insect-pest complex in potato for consecutively two years at Anand Agricultural University, Anand during 2021-22 and 2022-23. The result showed that three sprays of tobacco decoction 2 per cent and neem oil 0.5 per cent were found the most effective against all three sucking insect-pests *i.e.,* jassids, whiteflies and thrips. While, the treatments, cow urine 10 per cent and *Neemastra* were found the least effective for managing pests. Remaining treatments were found moderately effective against evaluated sucking insect-pests. The highest tuber yield was obtained from the plots treated with tobacco decoction 2 per cent (24.18 t/ha) and it was also found at par with the treatments of neem oil 0.5 per cent (23.59 t/ha) and *Beauveria bassiana* 5% WP (21.60 t/ha). The rest of the treatments were registered highest potato tuber yield than control but it was at par with each other. It is concluded that for the management of jassids, whiteflies and thrips in potato, three sprays of tobacco decoction 2% and neem oil 0.5% can reduce the infestation of sucking insect-pest complex along with fetching higher tuber yield.

Keywords: Eco-friendly management, sucking insect-pests complex, potato

Poster Presentation

BISP(P)-37

Efficacy of Bioagents Against Root Rot of Cowpea Incited by *Rhizoctonia bataticola* [*Macrophomina phaseolina* (Tassi.) Goid]

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Cowpea [*Vigna unguiculata* (L.) Walp] (diploid, 2n=22) is an annual legume crop. It is also known as lobia, southern pea, black eye pea, crowder pea, barbati, china pea, cowgram etc. Cowpea is a member of family *fabaceae* and introduced from Africa. It's affected by various Fungal, Bacterial and Viral diseases. *Rhizoctonia bataticola* [*Macrophomina phaseolina* (Tassi.) Goid] fungus is mainly a soil borne in nature with wide range of host and it can survive under the soil as saprophyte. *Rhizoctonia bataticola* infection occurs most frequently at flowering and pod formation stage or seed development stage. Four bioagents were tested against the fungus with one control *viz.*, *Trichoderma harzianum*, *Trichoderma viride*, *Bacillus subtilis* and *Pseudomonas fluorescens* under *In vivo* and *In vitro* conditions. A field experiment was conducted in randomized block design (RBD) with four replications, using Local cultivar, under artificial inoculation conditions. The efficacy of four bioagents were tested *In vitro* using dual culture plate method against *Rhizoctonia bataticola* and antagonistic agents both were placed separately at equal distance on the periphery of PDA petri plates. Among four tested bioagents, *Trichoderma harzianum* was found most effective in reducing per cent disease incidence (field conditions) and inhibiting mycelial growth (Dual culture plate method) over control followed by *Trichoderma viride, Pseudomonas fluorescens, Bacillus subtilis* was least effective over control.

Keywords: Bioagents, Dual culture plate method, *Rhizoctonia bataticola*

Poster Presentation

BISP(P)-38

Efficacy Test of Four Different Species of Trichogramma Used Against the Chilo Partellus in Laboratory Conditions

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The present study evaluated the efficacy of four species of Trichogramma—*T. chilonis*, *T. pretiosum, T. japonicum* and *Trichogrammatoidea bactrae* as egg parasitoids against Chilo partellus, a major lepidopteran pest of sorghum and maize crop. Under controlled laboratory conditions, each species was assessed for its parasitization rate and developmental period on *C. partellus* eggs. Results indicate marked interspecific differences in parasitism efficiency. *T. chilonis* and *T. japonicum* demonstrated the highest parasitization rates, exceeding 70%, whereas *T. pretiosum* and *T. bactrae* exhibited moderate to low efficacy, with parasitism rates below 60% in most replicates. Adult emergence was also highest for *T. japonicum* and *T. chilonis*, with values reaching above 85%, while the developmental period among the four species remained broadly similar, ranging from approximately 6 to 7 days. These findings suggest that *T. chilonis* and *T. japonicum* are up-and-coming agents for the biological control of *C. partellus*, offering effective egg parasitism and robust adult emergence under laboratory conditions. Incorporating these species into integrated pest management strategies may enhance the sustainable suppression of *C. partellus* populations under field conditions.

Keywords: *Chilo partellus*, Efficacy, Parasitization rate, Sorghum.

Poster Presentation

IOTB(P)-08

Next Generation Farming: Harnessing IoT and Bioinformatics for Crop Protection

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In this new era of agriculture, the shift toward digital farming has become essential, as conventional farming relies heavily on manual practices, often leading to overuse of chemicals, delayed responses to pests and higher environmental impact. Adopting technologies like IoT and bioinformatics offers smarter, faster and more sustainable solutions to modern agricultural problems. IoT devices like sensors and drones provide real time monitoring of pest activity and environmental conditions, enabling early detection and targeted response. Meanwhile, bioinformatics provides insights into pest genome and crop pest interactions, supporting the development of genetically resistant crops and targeted biopesticides. It also aids in identifying molecular targets for RNAi based control strategies and tracking resistance genes in pest populations. By working together, these technologies allow farmers to manage resources like water, fertilizers and pesticides more efficiently, using them only when and where they are needed. This not only lowers costs but also reduces environmental harm. Crop yields are improved through both precise pest control using IoT and the development of genetically optimized pest resistant crops through bioinformatics. As a result, farming becomes less wasteful, more productive and better equipped to handle challenges such as changes in pest scenario, environmental impact and soil degradation. This marks a shift toward a new era of agriculture that is driven by data and built to be more resilient and adaptable for the future.

Keywords: Digital Farming, Internet of Things (IoT), Sensors and Bioinformatics

Poster Presentation

Novel approached for Integrated Pest Management in Cotton

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Cotton cultivation in India is highly input-intensive, especially in terms of pesticide usage, making it one of the crops most vulnerable to pest-induced yield losses. In the current scenario, key pests affecting cotton include jassids (*Amrasca biguttula biguttula*), whiteflies (*Bemisia tabaci*), thrips (*Thrips tabaci*), and the resurgence of pink bollworm (*Pectinophora gossypiella*). Since 2016, the resurgence of pink bollworm (PBW) has posed a serious threat to cotton production in India. As the season progresses, the late-formed fruiting bodies become increasingly susceptible to PBW infestation, prompting farmers to resort to insecticide sprays. But the conventional insecticides have shown limited effectiveness against PBW due to the internal feeding habit of larva within developing cotton bolls. The baseline information indicated that usually 10-20 sprays (average 14) of pesticides in a cotton crop per season are carried out by the farmers with cocktail of pesticides. Keeping in view, field trial on cotton integrated pest management (IPM) with emphasis on pink bollworm (*Pectinophora gossypiella*) was conducted during Kharif 2022, 2023 and 2024 at Khandwa, Madhya Pradesh in farmers' participatory mode in 50, 100 and 125 acre respectively. IPM strategy included sowing in the month of June along with refugia, bajra/maize/sorghum as border crop and intercropping with cowpea for natural enemy conservation, two sprays of Neem oil (Azadirachtin 1500 ppm) @ 5ml/litre of water mixed with laundry detergent emulsion for sucking pests and pink bollworm, need based application of flonicamid 50 WG (200 g/ha) for sucking pests, use of SPLAT (specialized pheromone and lure application technology) formulation @125g/acre at 400-500 spots 3-4 times at monthly interval for managing pink bollworm, need-based application of Spinetoram 11.7SC @ 0.8ml/l or Emamectin benzoate 5SG @ 0.5g/l, ensuring crop termination by the last week of December and promptly destroying all crop residues to prevent carryover of pests. Adoption of IPM practices resulted in a notable reduction in the infestation levels of key cotton pests (ranging from 46% to 81%) such as jassids, whiteflies, thrips, and pink bollworm. Additionally, there was a notable increase in the population of beneficial insects in IPM fields, supporting the ecological sustainability of the approach. Implementation of IPM led to a nearly 50% reduction in pesticide sprays compared to conventional farmers' practices without compromising crop productivity. In fact, yield increased by 25.38% and net returns improved by over 56% in IPM fields compared to farmers

practices. The participatory nature of the study enhanced farmer involvement, knowledge, and long-term adoption potential. In addition, the study validates IPM as an effective, economical, and environmentally sustainable pest management strategy for cotton cultivation.

Keywords: Bt cotton, pest management, pink bollworm, natural enemies

Yield Loss Assessment of Ber fruit fly (*Carpomyia vesuviana*) in Ber

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One of the most damaging pests of ber (*Ziziphus mauritiana*) is the ber fruit fly, *Carpomyia vesuviana* Costa, which severely reduces yield and quality. Using Leclerg's paired plot approach, field research was carried out in Bikaner, Rajasthan, in 2023–2024 to estimate the number of losses brought on by this pest. Each of the two sets of plots—protected and unprotected—had three replications. Trees in the protected plots received 15-day intervals of dimethoate 30 EC (0.03%) spraying, whereas unprotected plots received no treatment. Marketable production was compared among treatments, and observations were made on both healthy and infested fruits, both by weight and number. The findings showed that compared to unprotected trees (66.12 fruits/twig and 802.0 g/twig), protected trees had substantially more healthy fruits (92.06 fruits/twig) and weight (1343.6 g/twig). On the other hand, compared to protected trees (7.92 fruits/twig and 166.2 g/twig), unprotected trees had much more afflicted fruits in terms of both quantity and weight (33.86 fruits/twig and 420.3 g/twig). Compared to 34.50% in unprotected plots, fruit infestation on a weight basis averaged 8.31% in shielded plots. An unnecessary production loss of 36.69% due to fruit fly infestation was demonstrated by the marketable yield per tree, which was 54.10 kg in protected plots compared to 34.25 kg in unprotected plots. These results unequivocally demonstrate the economic importance of *C. vesuviana* as a significant ber production limitation and emphasize the significance of prompt pest management techniques to reduce yield losses.

Keywords: Ber, Dimethoate 30 EC, Marketable yield, *Carpomyia vesuviana,* Losses

Effect of Intercropping on Incidence of Sorghum Shoot Fly

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Sorghum (Sorghum bicolor L. Moench) is a vital cereal crop in semi-arid regions, but its productivity is often threatened by the sorghum shoot fly (Atherigona soccata Rondani), a key insect pest causing severe yield losses, particularly at the seedling stage. Intercropping, a sustainable pest management strategy, has shown promise in mitigating shoot fly incidence by disrupting host plant location and increasing natural enemy activity. This study examines the influence of different intercropping systems—such as sorghum-legume (e.g., cowpea, pigeon pea) and sorghum-oilseed (e.g., sunflower) combinations—on shoot fly infestation levels. Results from field experiments and past studies suggest a significant reduction in shoot fly damage in intercropped plots compared to sole sorghum, attributed to changes in microclimate, visual masking, and chemical cues that deter oviposition. Moreover, intercropping enhances biodiversity and supports the conservation of natural enemies like parasitoids and predators. The findings underscore intercropping as a viable agroecological approach to manage sorghum shoot fly while improving overall crop productivity.

Keywords: Sorghum, Intercropping, Shoot fly, Pest management, *Atherigona soccata*, Agroecology

Bio-Intensive and IPM Tactics for a Sustainable Future

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Sustainable plant protection necessitates strategies that balance crop productivity with ecological integrity. Bio-intensive approaches, integrated within the framework of Integrated Pest Management (IPM), offer a viable alternative to conventional chemical-based pest control. These methods emphasize ecological balance through techniques such as crop diversification, conservation of natural enemies, biological control agents (*e.g.*, *Trichoderma harzianum*, Beauveria *bassiana*), and cultural practices like trap cropping and intercropping. Research indicates that bio-intensive IPM leads to reduced chemical pesticide use, lower pest resurgence, and enhanced crop yields. In addition, it supports soil health and biodiversity, key components of agroecosystem sustainability. Case studies in vegetable and cereal systems have demonstrated significant pest suppression and increased farmer income when bio-intensive IPM practices are adopted. However, successful implementation faces constraints, including limited access to training, inconsistent policy backing, and variable field efficacy of biocontrol agents. Addressing these through participatory extension, research-backed policy interventions, and localized IPM packages is essential for scalable adoption.

Keywords: Sustainable, IPM, Natural enemies, Bio-intensive.

RNA Interference (RNAi) in Insect Pest Control

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The fast-growing human population requires the development of new agricultural technologies to meet consumers´ demand, while minimizing environmental impacts. Insect pests are one of the main causes for losses in agriculture production, and current control technologies based on pesticide application or the use of transgenic crops expressing *Bacillus thuringiensis* toxin proteins are facing efficacy challenges. Exploiting the RNA interference (RNAi) gene mechanism to silence essential genes in pest insects, leading to toxic effects, has surfaced as a promising new control strategy in the past decade. RNA interference (RNAi) targeting lethal genes in insects has great potential for sustainable crop protection. It is based primarily on gene silencing caused by double-stranded RNA (dsRNA) molecules which are complementary to the target messenger RNA (mRNA) in a highly specific manner. The major components of RNAi involve the presence of enzymes capable of recognizing the dsRNA molecule, cut it off in smaller fragments and finally binding the generated antisense strands to the target mRNA. However, prior to its exploitation for insect pest control, it is important to consider potential limiting factors, such as immune response and fitness cost, RNAi efficiency and dsRNA degradation, and virus-encoded suppressor of RNAi factors in the development of the RNAi-based pest control strategy. Additional challenges such as lack of feasible dsRNA delivery methods in practice, low efficiency in pest control capacity and evolution of resistance to RNAi have largely constrained the application of RNAi in practice.

Keywords: RNA interference, insect pests, dsRNA, crop protection, *Bacillus thuringiensis*, pesticide, population growth.

Evaluation of liquid formulations for comparative efficiency to mass production of bio-agent *Trichoderma viride*

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Beneficial organism-based bio-pesticides have currently gained high prominence in natural and organic farming systems to ingress and suppress pests and diseases in the realm of modern agriculture. The preparation and evaluation of bio-pesticide formulations are now required for agricultural improvement. Herein, the liquid broth media-based *Trichoderma viride* suspension culture has been elucidated for the biomass production and shelf-life studies.Different four liquid broth medium viz; Jaggery soya broth, Maltose peptone broth, Potato dextrose broth, Saboured dextrose broth and Molasses yeast extract broth was evaluated in the laboratory under controlled condition. Among all broth medium molasses yeast extract broth was found to have maximum biomass production (28.05g fresh and 3.36 g dry weight of mycelium with maximum 179×10^6 CFU/mL). The current findings emphasize the aim of bestowing the different liquid substrates for comparative efficiency of mass multiplication of *T. viride* as a promising antagonist to menace soil borne pathogens and significantly increase disease resistance.

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ABOUT THE VENUE : THE CITY OF LAKES

Udaipur - VENICE OF THE EAST, known as **the City of Lakes**, is famous for its marble palaces, beautiful gardens and placid blue lakes, hemmed in by the lush hills of the Aravalli's. Udaipur is the jewel of Mewar - a kingdom ruled by the Sisodia dynasty for 1200 years. Udaipur and Mount Abu are two such tourist destinations of India's largest state Rajasthan which look as an exception. Rest of the cities and areas of the state have dry ambiance and a which at some time or another cannot be borne by a tourist. Udaipur also has been adjudged as the most sought after tourist destination in India. Founded in the 16th century (1559) by then ruler of the Mewar dynasty Maharana Uday Singh as a capital of the Mewar kingdom, the city houses some of the most spectacular palaces and Lakes in the world. This is why Udaipur is also termed as the Venice of East. Other titles that Udaipur has received over the time are City of Lakes and Palaces, City of Lakes and fountains, and Kashmir of Rajasthan.
People of the city are decent and believe in great hospitality. Tourists keep coming to Udaipur throughout the year, and its the hospitality that pleases them immensely. Smiling face, Mewari and Hindi mixed accent, and cultural values are prime marks of the city. Lakes of the Udaipur city are artificial and were dug by the erstwhile rulers who knew that for the growing population, water will be an issue. And in the state of Rajasthan, water already was an important entity. Water Scenario in Udaipur is normal and average rain, the Lakes get full to their capacity and store a huge amount of water for water needs of the Udaipur dwellers. Over the years the population has grown and then rain has become irregular. This is why there has been years in Udaipur's recent and distant history that the Lakes of Udaipur went dry to the bottom. People could walk and children could play on the soil of Lakes. In order to solve this problem permanently, the Udaipur administration and the State government decided to divert the Dewas water to Udaipur. This was the water that would flow away to Gujrat. The Mansi Wakal, and Dewas are ambitious projects that are now near completion. Once completed, the water woes of Udaipur will become a part of history. Gardens of Udaipur

The City boasts of some artfully created gardens in and around. Each of the gardens is special in some way or other. Gardens in Udaipur were made out of purposes and have interesting stories behind them. Gulab Bagh, the oldest garden for example has some medicated trees and plants that help cure many ailments. Walking in Gulab Bagh is considered useful for health. This garden also has India's sixth oldest zoo which is now being divided into two parts. The bird sanctuary is being developed on the other corner of the city on the foot of Basandhra hills. Historical glory of the Mewar and Udaipur One name that represents entire history of the Udaipur is Maharana Pratap. He was the brave king of Mewar who never accepted the dominance of emperor Akbar. He fought bravely to Akbar and had to live a deserted life in Jungles as well. The famous battle of Haldighati was fought between Mughal emperor and Maharana Pratap at Haldighati. Haldighati, the name was given to the place because enormous amount of bloodshed had happened and the soil turned yellow with that.

A museum has been set up there and the precious artifacts of the fight are preserved. There also are many tableau, paintings, and models that represent and remind about the battle that is mentioned with golden letters on the pages of Mewar and Udaipur's history. In Udaipur, there are numerous institutions and places named after Maharana Pratap. Latest is the Maharana Pratap International airport and Maharana Pratap Khel Gaon. The City Palace of Udaipur also has a museum where the artifact of Maharana Pratap have been preserved.

ABOUT THE RCA, MPUAT

Recognizing the importance of agricultural growth and development in assuring livelihood security of its population, the Government of Rajasthan gave high priority to develop agricultural education, research and extension in the state. The first agriculture college established in the State was SKN College of Agriculture at Jobner. Later on in 1955, Rajasthan College of Agriculture was established at Udaipur. With the establishment of first Agricultural University at Pantnagar in 1960 on the pattern of Land Grant Universities of USA, Rajasthan state had the distinction of being the second in establishment of Agricultural Universities in the country in 1962. It also accepted the model of land grant pattern of education of U.S.A. with trinity of functions i.e. teaching, research and extension education.

The government took the bold decision to transfer the research component to the university which many other states took a long time. Soon the university was converted into multi faculty in 1964. Later on separate Agricultural University was created in 1987 at Bikaner by bifurcating from the Sukhadia University, Udaipur. The selected allied Colleges at Udaipur became constituent colleges of Rajasthan Agricultural University, Bikaner. Maharana Pratap University of Agriculture and Technology, Udaipur (MPUAT), the second Agricultural University of the state, (initially named as Agricultural University, Udaipur) came into existence on 1st November, 1999 by bifurcation of the Rajasthan Agricultural University, Bikaner through promulgation of Government of Rajasthan Ordinance No. 6 of 1999, which became an Act in May, 2000. This has been done in view of wide physiographic variation including crops, cropping pattern, climate, soil parameters, etc. in the largest state of the country. Moreover, it was difficult to manage stipulated task of teaching, research and extension activities as per the mandate set-forth through a single University in the state. Besides this, it provides new fillip to location specific programmes more suited to tribal belt specifically for the southern Rajasthan. The University started functioning in full swing with effect from December 1, 1999. The jurisdiction of the university include constituent colleges, Agricultural Research Stations (ARSs), Agricultural Research Sub Stations (ARSSs), Dryland Farming Research Station (DFRS), and Krishi Vigyan Kendras (KVKs) spread over 8 districts of the south and south eastern part of the state of Rajasthan. These districts are Udaipur, Rajsamand, Dungarpur, Banswara, Chittorgarh, Bhilwara, Pratapgarh and Salumbar.

Rajasthan College of Agriculture is constituent college of MPUAT, Udaipur and is considered as one of the oldest amongst Agricultural Colleges in the country. It was established in July, 1955 as an entity of State Government and remained affiliated to the University of Rajasthan, Rajasthan Agricultural University, University of Udaipur, which was presently renamed as Mohan Lal Sukhadia University (MLSU). The institution is located in the heart of Udaipur city on covering the sprawling area of 98 ha comprising administrative building, various departments and instructional farms. The establishment of Rajsathan College of Agriculture was an important milestone in the history of Udaipur. Standing at the threshold of its Golden Jubilee, it has acquired a status of a premier agricultural institution and stands as a monument of hard work and dedication the esteem of which has from all corners of India. The archery of its success and glory was laid by its founder principal, Late Dr. A. Rathore in 1955. He brought to the college a degree of erudition and wealth of experience rarely found anywhere, which have been emulated by its learned faculty and alumni. This noble institute has been the scholastic field of legendary people like Padmabhushan Dr. R.S. Paroda, Former DG,. ICAR & Secretary DARE; Dr. A.S. Faroda, Former Chairman ASRB and Founder Vice-Chancellor of MPUAT. Dr. S.L. Mehta, Former, Dy. DG, ICAR and National Director NATP and present Vice-Chancellor of MPUAT; Dr. S.S. Acharya, Former Chairman-Commission for Ag. Costs and Prices; Dr. B.S. Chundawat, Vice-Chancellor, SDAU, S.K. Nagar; Dr. S.K. Pancholi, Assoc.

Dean, A&M University, Tallhassee, USA and so on, all of whom have contributed significantly towards food security and self reliance in agriculture.

GUIDELINES TO THE AUTHORS

1. Papers on original research should be submitted for publication in duplicate, typed in double space on white bond paper with margin of 4.0 cm. Full length paper should not exceed 10 typed pages including tables and illustrations, short notes should not exceed 5 typed pages in all.

2. The title should be short, specific and informative. The byline should contain the names, initials of the author(s) and institutional address along with pin code. Change in address should be mentioned as foot note.

3. Paper format should be as follows:

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a. Saxena, R.C. 1981. Observations on some predators and parasites of Thrips tabaci Lind.

b. Bulletin of Entomology. 22:97-100.

c. Kushwaha, K.S. and Bhardwaj, S.C. 1977. Forage and pasture insect Pests of Rajasthan. pp. 1186. Indian Council of Agricultural Research, New Delhi.

d. Dikshit, T.S.S. 1968. Action of DDT on insects. 345-350 in PESTICIDES (ed. Majumder, S.R.). Academy of pest control sciences, Mysore, India.

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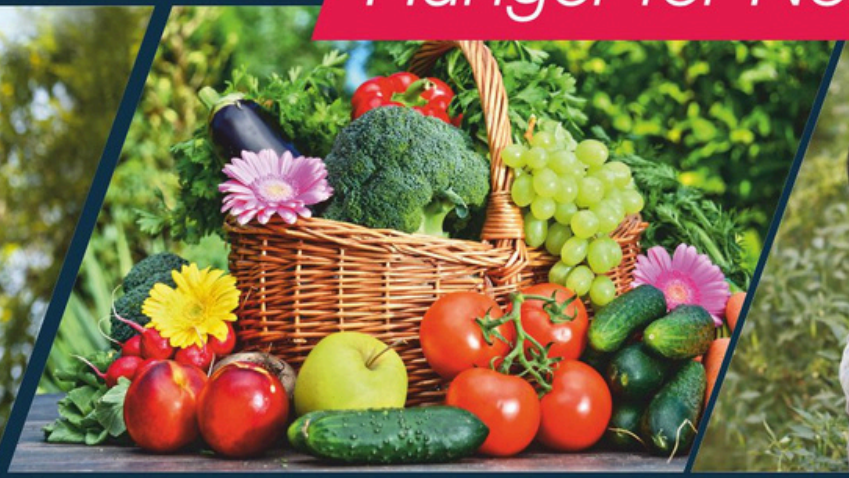

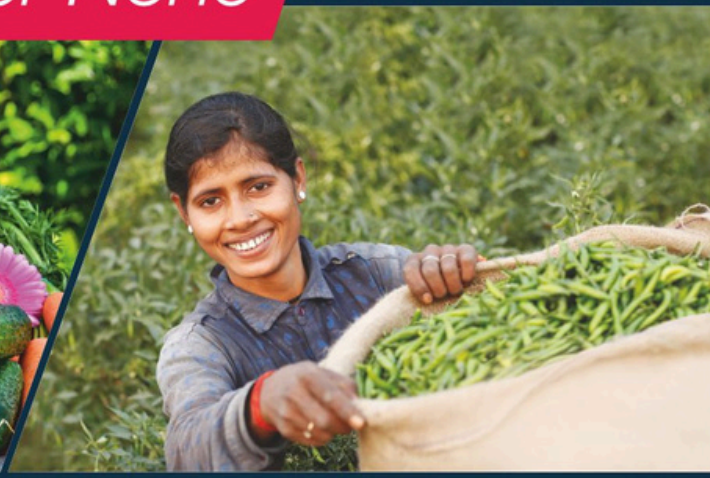

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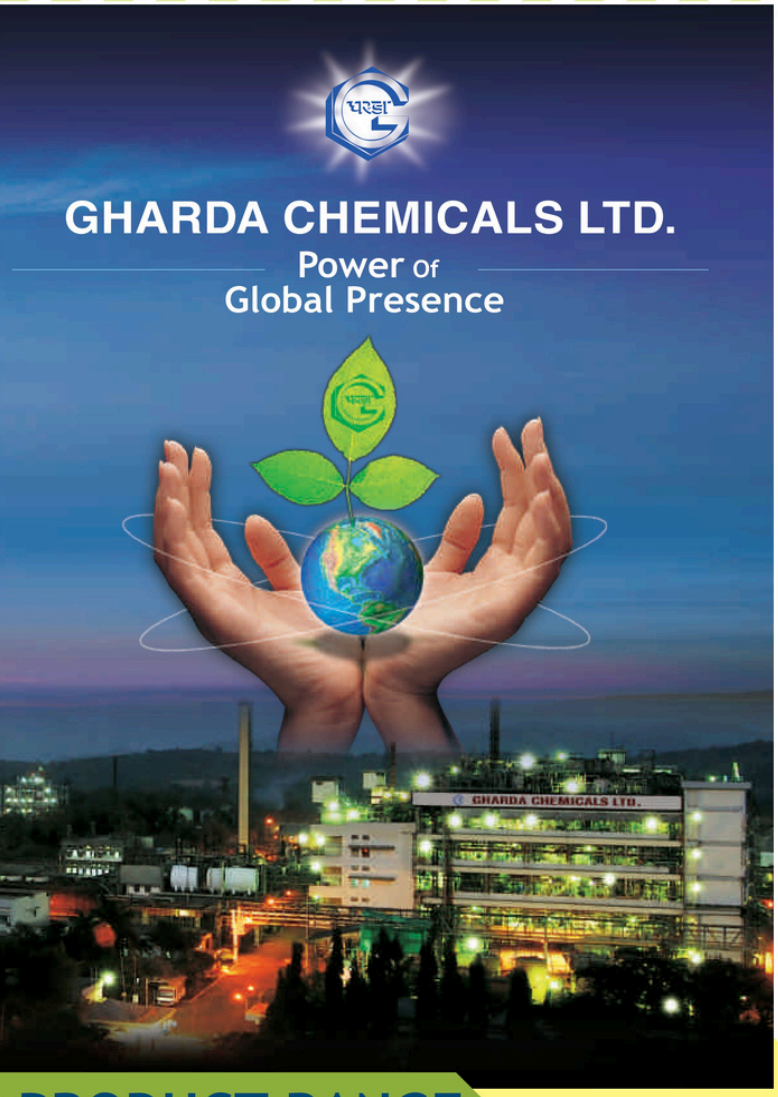

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PRODUCT RANGE

Insecticides

Product Name	Purity
Alpha Cypermethrin Technical	97% +
Cypermethrin Technical	93% +
Deltamethrin Technical	98% +
Permethrin Technical	92%, 94% and 95% +
Chlorpyriphos Technical	98% +
Indoxacarb Technical	67% + and 95% +
Fipronil Technical	97% +
Diflubenzuron Technical	95% +
Quinalphos Technical	70% +
Profenophos Technical	94% +
Temephos Technical	92.5% +

Herbicides

Product Name	Purity
Anilofos Technical	93% +
Isoproturon Technical	97% + and 98% +
Dicamba Technical	97% +
Triclopyr Butoxy Ethyl Ester	97% +
Bispyribac Sodium Technical	98% +
Mesotrione Technical	98% +
Diuron Technical	98% +

Plant Growth Regulator

Mepiquat Chloride	44/50% Aqueous Solution

Vet Products

Product Name
Oxyclozanide
Deltamethrin Technical
Cypermethrin Technical
Permethrin Technical
Fipronil Technical

Public Health Products (WHO approved)

Product Name
Alpha Cyper Technical
Deltamethrin Technical 98.5%
Temephos Technical
Chlorpyriphos Technical

Intermediates

Product Name	Purity
Cypermethric Acid (98:2)	99% +
Cypermethric Acid Chloride (40:60)	99% +
High Trans CMA (2:98)	99% +
High Trans CMAC (2:98)	99% +
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