Plant Protection for Nation's Prosperity

"बालीको सुरक्षा, देशको समृद्धि"

National Plant Protection Workshop 2025

Asar 17, 2082 (July 1, 2025)
Kathmandu, Nepal

ABSTRACT BOOK

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Editorial

Message from the President

It is my great pleasure to welcome you to the *National Plant Protection Workshop 2025*, organized by the Plant Protection Society Nepal (PPSN) in collaboration with the Department of Agriculture (DoA), under the Ministry of Agriculture and Livestock Development. This national-level workshop serves as a vibrant platform for the exchange of scientific knowledge, practical experiences, and innovative strategies in plant protection across Nepal. In this era of rapid agricultural transformation, safeguarding plant health is more critical than ever. This year's workshop, themed *"Plant Protection for Nation's Prosperity"*, reflects our collective commitment to addressing current and emerging challenges in crop protection, invasive pests, pesticide regulation, and climate-resilient farming practices. With the participation of experts from government agencies, academia, research institutions, development partners, and the private sector, the event brings together diverse perspectives to foster integrated and forward-looking plant protection systems.

The workshop features fifty-four technical abstracts thoughtfully categorized into key thematic areas—pest and disease surveillance, invasive species management, biological control, pesticide governance, and digital innovation in agriculture. These contributions embody the dedication and expertise of our plant protection community and will undoubtedly serve as a valuable knowledge base for future interventions and collaborations. I encourage all participants to actively engage in the sessions, share insights, and build partnerships that go beyond this event. Let this be a space not only for academic exchange but also for shaping policies, empowering farmers, and promoting environmentally sound practices that contribute to food security and sustainable development.

I express my sincere appreciation to DoA, our partner institutions, dedicated organizing committees, abstract contributors, and every participant who has supported this initiative. Your energy and collaboration are the driving forces behind the success of this national workshop. Together, let us reaffirm our shared responsibility to protect plant health and to build a resilient agricultural future for Nepal.

Warm regards,
Dr. Dilli Ram Sharma
President, Plant Protection Society Nepal (PPSN)

Editorial Message

It is with great pleasure and responsibility that I present this Abstract Book of the National Plant Protection Workshop 2025, jointly organized by the Department of Agriculture and the Plant Protection Society Nepal (PPSN). Held on Asar 17, 2082 (July 1, 2025) in Kathmandu, the workshop marks another step toward strengthening Nepal's plant protection systems. Centered on the theme *"नेपाली बालीको सुरक्षा, देशको समृद्धि — Plant Protection for Nation's Prosperity"*, it highlights the vital link between crop health and national well-being. In the face of transboundary pests, climate-driven disease outbreaks, pesticide risks, and the need for sustainable solutions, this workshop is both timely and forward-looking.

Healthy plants produce safe, nutritious food essential for human and animal health. Plant protection is key to managing pests and reducing crop losses both in the field and post-harvest which can reach up to 30% globally, costing billions. By preventing such losses, it supports food security, economic stability, environmental sustainability, and helps safeguard biodiversity from invasive pests. Plant health is thus central to the well-being of people, animals, and the environment.

This abstract book compiles 34 oral and 20 poster presentations, highlighting recent research, innovations, and field experiences in plant protection from Nepal and beyond. Topics span diagnostics, bio-rational pest control, policy analysis, quarantine reviews, and eco-friendly, farmer-focused solutions that support sustainable production and responsible pesticide use. These contributions reflect the scientific community's dedication to crop health and food security. Sincere thanks to all authors, presenters, reviewers, organizers, technical teams, sponsors, and especially the young researchers whose energy and fresh ideas shape the future of plant protection.

The Technical Committee and Editorial Team declare that the information gathered in this abstract book are solely those of the respective author(s). The Committee has remained neutral regarding these views and has made only general editorial adjustments to the submitted abstracts for this workshop. We hope this compilation serves as a source of inspiration, collaboration, and continued research and development. Let us move forward together to build a resilient and prosperous Nepal through science, policy, and partnership.

Warm regards,
Prof. Resham Bahadur Thapa, Ph.D.
Editor-in-Chief

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Key Note Presentation

NPPW_2025_045_KNP_01

Redefining Plant Protection: Innovation, Policy, and Sustainability for Food Security in Nepal

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Over the past two decades, Nepal has made notable progress in Integrated Pest Management (IPM), pesticide regulations, and biopesticide innovations, strengthening sustainable farming. AI-driven pest monitoring has improved early detection, though its adoption remains limited. Despite advancements, pesticide overuse, weak quarantine legislation enforcement, insufficient research funding, and climate change continue to threaten agricultural resilience. Adopting international best practices from regional and global level innovations like precision agriculture, AI monitoring, including AI-powered drones, AI-driven pest monitoring from China and the Netherlands, successful biopesticide adoption in Europe, and climate-smart pest management from Israel and Kenya can strengthen Nepal's framework. Local innovations, such as digital agriculture platforms like Smart Krishi and GeoKrishi, have already enhanced farmers' access to critical resources.

Nanotechnology is emerging as a game-changer in agriculture, with nano-fertilizers, precision pesticides, and smart sensors optimizing efficiency while reducing environmental risks. However, ethical concerns regarding bioaccumulation warrant further research. To secure Nepal's agricultural future, AI-driven innovations, predictive modeling, and precision agriculture must be integrated to minimize pesticide dependency while promoting ecological balance. Strengthening regulatory frameworks, incentivizing sustainable farming practices, and fostering collaboration among policymakers, scientists, and farmers will be key.

ABSTRACT

This paper explores an integrated approach that emphasizes innovation, policy reform, and sustainable practices to strengthen Nepal's plant protection framework. Technological advancements including digital pest surveillance, biopesticides, and precision agriculture offer promising tools to enhance early warning systems and reduce reliance on harmful chemicals. Simultaneously, coherent and responsive policy support is essential to facilitate the adoption of these innovations and ensure farmer inclusivity. Sustainability, through eco-friendly practices and resilient crop systems, remains central to safeguarding biodiversity and long-term productivity. By harmonizing these three pillars—innovation, policy, and sustainability—Nepal can build a more resilient and secure agricultural system that meets both current and future food security needs.

ABSTRACT

NPPW_2025_050_KNP_02

Plant Protection: University Academia

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The field of Plant Protection is vast and constantly evolving. University Academia such as education, research and publications are spanning in various disciplines of plant health, including pest management, disease control, and quarantine. The University Academia in agriculture aims to: i) Produce competent human resource in agriculture, livestock, veterinary and forestry sectors, ii) Use safely and accurately all agricultural chemicals, products, equipment and industry products relating to the plant protection and food security, iii) Demonstrate an orderly performance of all tasks and skills, establishing methodical habits from the perspectives of national and international protection laws and regulations, and iv) Apply necessary national health and safety policy, act, rules and regulation to maintain public health safety, pollution free biodiversity and appropriate communications skills. Therefore, all disciplines of agriculture academia have to remain alert of unforeseeable pest outbreaks and be ready with appropriate management tools, involving in continuous education, research and development to play vital role in plant protection. It is concluded that the plant protection discipline and protection products has always been in the top priority for ensuring food security in the past, at present and may remain in the foreseeable future. The bio-products has emerged as potential alternative to chemical use and varieties of products are available in the market, which are compatible in Integrated Management, and even in smart farming they may remain in hand of new generation.

ABSTRACT

Oral Presentations

Technical Session I

NPPW_2025_001_OR_01

Banned but not Gone: Persistent Mortality from Aluminum Phosphide Poisoning in Nepal

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Aluminum phosphide (AlP) is a hazardous toxic chemical that in contact with water produces toxic phosphine gas. It is used as an insecticide, rodenticide, and fumigant, and has been reported as a cause of many accidental, occupational, and intentional poisonings, particularly in low- and middle-income countries. In 2019, AlP was identified as one of the most common means of intentional poisonings in Nepal, prevalent in urban as well rural settings. From 2019 to 2021, the most commonly used formulation – 3 g 56% tablet – was phased out, with other formulations registered. Two studies conducted by the Centre for Pesticide Suicide Prevention (CPSP) at the University of Edinburgh aimed to examine the trends in AlP poisoning and use in Nepal, following the ban of the 3 g 56% tablet. Based on the poisoning data from toxicology laboratories over a seven-year period (2017-2024), there has not been significant decrease in deaths after 2019 ban of the 3 g tablet. Further investigation is needed to determine whether the persistent mortality due to AlP is caused by other AlP products or by ongoing use of the banned 3 g tablet. As experiences from other countries suggest, banning the 3 g tablet has the potential to reduce intentional poisonings, particularly in regions where access to lethal pesticides is a major contributing factor. It remains to be seen whether AlP mortality will decline in Nepal in the future.

ABSTRACT

NPPW_2025_007_OR_02

Cryphonectria parasitica, the Fungal Disease that Causes Bark Cancer of Sweet Chestnut (*Castanea sativa*) and Its Possible Control Methods

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European chestnut (*Castanea sativa*) is a very important tree species in Europe and in some areas of Asia. It is also cultivated in the north-western part of India and in the western provinces of Nepal. The most important disease of this tree species is the chestnut blight caused by the fungus *Cryphonectria parasitica* (Murrill) Barr. The pathogen is also able to infect other tree species from *Fagaceae* plant family (eg., beech, oak species). Control of the fungus is very difficult. Chemical control is not really used, it is difficult to implement because of the size and habits of the trees and the biology of the pathogen. However, it may be an option in younger stands and in the case of smaller trees, if effective fungicides are available. There are attempts to use resistant hybrids (*Castanea sativa* x *C. crenata*), but even this has not been able to give adequate results in Europe. In Asian conditions, their cultivation may be more successful. There are experiments with antagonist microorganisms (eg, *Trichoderma* spp.) and biopreparations (eg, essential oils) that can theoretically also be effective control methods. A really effective method that has been developed and applied in Europe is a biological control with hypovirulent fungal strains of *C. parasitica*. Hypovirulent strain is a special fungal strain with reduced virulence caused by a mycovirus encoded in the RNA of its cytoplasm. This virus-like particle (VLP) causes significant changes in the virulence of the fungus. Artificial spreading of hypovirulent fungal strains can be used for biological control actions. In Hungary, we have been working on the research and practical application of this method for many years. This biological control method can only be applied in practice by adapting it to

the growing site. We assessed the prevalence of the disease in the country and identified its prevalent VCGs by laboratory tests. We have developed and established the practical biological control of *C. parasitica* using its hypovirulent strains. This method was applied on many occasions on sweet chestnuts in Hungary, Slovakia, and Romania. We also carried out experiments to develop chemical and other biological control options. For more effective control, it would be necessary to apply all possible control methods in accordance with the principles of integrated pest management. Carrying out mechanical control works helps to slow down the spread of the disease. In our work, this was also developed. *Trichoderma* species as hyperparasitic control agents were also examined against the pathogen. We also tested *in vitro* chemical fungicides and nanoparticles, examining their effect on the development of the pathogen. All of the control options tested showed some positive results, and each may have significance and a role in the practical integrated control of *Cryphonectria parasitica* fungus.

ABSTRACT

NPPW_2025_010_OR_03

Status and Issues on the Sanitary and Phytosanitary (SPS) Measures in Asia and Pacific Region

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Developing countries in the Asia-Pacific region face persistent challenges in meeting Sanitary and Phytosanitary (SPS) requirements that are critical for agricultural trade. While SPS measures are essential for protecting human, animal, and plant health, their increasing stringency, particularly from developed economies as well as lack of harmonization has created significant barriers for agri-exporters in low and middle-income nations. This study, jointly undertaken by FAO RAP and CABI South Asia examined SPS-related trade impediments in eight countries: Bangladesh, Bhutan, Kiribati, Laos, Nepal, Pakistan, Solomon Islands, and Vietnam. Drawing on both primary and secondary data, the study identified key and recurring issues such as inadequate infrastructure, limited technical and diagnostic capacity, fragmented stakeholder communication and weak policy implementation. Landlocked and island nations were particularly affected due to logistical constraints and disjointed trade routes. While digital innovations such as ePhyto, CABI Digital Tools etc and regional learning platforms present promising solutions, adoption remains uneven due to outdated systems and limited awareness. The study calls for harmonization of production standards, institutional capacity enhancement, broader use of digital platforms, and promoting inter-regional trade diversification. Strengthening national SPS frameworks and fostering regional collaboration and dialogues are essential to ensuring safer food systems, boosting compliance, and increasing access to high-value global markets. The study report provides actionable recommendations to guide policy reforms, capacity-building initiatives, and private-sector engagement for improved SPS compliance and agricultural trade facilitation in the region.

ABSTRACT

NPPW_2025_008_OR_04

Study of Acute Pesticide Poisoning among Rural Farming Communities in the Gandaki Provinces of Nepal

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This study investigates acute pesticide poisoning (APP) among rural farming communities across nine districts in Gandaki Province. The study was conducted by the Ministry of Land Management, Agriculture, Cooperatives, Gandaki Province in collaboration with the Centre for Pesticide Suicide Prevention (CPSP), University of Edinburgh, Scotland, with technical support from PAN-UK. A cross-sectional survey was carried out in 2024, involving 613 respondents - 354 males and 259 females. The survey focused on pesticide usage patterns, protective practices, and health outcomes. Findings revealed a significant lack of awareness regarding the specific pesticides applied, with many farmers unable to identify the products used. Notably, 77% of participants reported not using any form of personal protective equipment (PPE) during pesticide application. The backpack sprayer was the most commonly used method, employed by 61% of farmers. Only 23% of respondents had received training on the importance and proper use of PPE. Among the 128 respondents reporting symptoms consistent with unintentional acute pesticide poisoning (UAPP), the severity of symptoms was categorized as severe (6%), moderate (30%), and mild (64%). Dimethoate, emamectin, and chlorantraniliprole were the most frequently implicated active ingredients in poisoning incidents. The most frequently reported active ingredients used for agriculture purposes in the last 12 months were dimethoate (product name Rogor) and mancozeb

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(product name Uthane-M-45) followed by emamectin benzoate. Respondents also reported frequent use of neem-based and biopesticide products. Furthermore, pesticide mixtures, commonly referred to as "cocktails," were frequently associated with more severe poisoning cases. The study also highlights that only 22% of those experiencing poisoning symptoms sought medical treatment. Tomatoes and potatoes were the crops receiving the highest pesticide applications, primarily targeting pests like aphids and blight. These findings underscore a critical need for enhanced education and training on safe pesticide handling and PPE usage among farmers in Gandaki Province. Implementing targeted interventions could significantly reduce the incidence of APP and improve overall occupational health in these communities.

ABSTRACT

NPPW_2025_006_OR_05

First Detection of Stem Rust Pathogen *Puccinia graminis* f. sp. *graminis* (PGT) Clade IV in Nepal using Marple Diagnostics

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Following first detection of stem rust *Puccinia graminis* f. sp. *tritici* (Pgt) race TTKTT (Ug99 race group) in Nepal from samples collected in Nov 2023, monitoring any occurrence of stem rust has become a high priority. In May 2024 and June 2025 unusual stem rust infections were observed in wheat trials at the Khumaltar of the Nepal Agricultural Research Council (NARC). A total of nine wheat stem rust samples were collected during the 2024 and 2025 seasons. Infected wheat lines had severity ranging from 20 to 40%. All samples were analyzed promptly in both years using nanopore sequencing and MARPLE diagnostics. Representative samples were also sent to the Global Rust Reference Center (GRRC) in Denmark for pathotyping and genotyping. Large single pustule samples were cut into small pieces and used for MARPLE diagnostics. The samples were stored in RNAlater solution at 4°C until further processing at the National Plant Pathology Research Center, Khumaltar. DNA was extracted from macerated infected tissue using lysis buffer and purified with SeraSil magnetic beads (Cytiva, USA). A total of 283 highly variable genes were amplified in four primer pools following MARPLE diagnostics protocol. Amplicons were sequenced using a MinION sequencer on a FLO-MIN114 (R10.4.1) flow cell with the MinKNOW software. The sequencing library

was prepared using the Rapid Barcoding Kit V14 (SQK-RBK114.24) and run for 48 hours. Base calling was performed using Guppy v 7.1.4, included in the MinKNOW v23.07.12 software, with the super-accurate base calling model. All MARPLE diagnostics results were obtained within seven days of sampling. Results indicated that all stem rust samples from Khumaltar in both 2024 and 2025 clustered with Clade IV in the MARPLE stem rust Pgt phylogenetic tree. None of the samples clustered with Clade 1 (Ug99 clade). Results from GRRC also confirmed Clade IV, identifying two Clade IV-F races - TKFTF and TKKTF, in the 2024 Khumaltar samples. Both races were new to Nepal. Results from GRRC for the 2025 samples are yet to come. The use of MARPLE diagnostics has enabled extremely rapid monitoring of stem rust in Nepal. The results have consistent with independent analyses conducted at GRRC, Denmark. The 2025 MARPLE results confirmed the persistence of Pgt Clade IV at Khumaltar in multiple years and showed no presence of Clade 1 (Ug99). Accurate and timely detection of new Pgt race incursions into South Asia supports accelerated breeding and screening efforts to safeguard wheat crops in Nepal and the wider South Asia region.

ABSTRACT

NPPW_2025_011_OR_06

Assessment of Damage and Yield Loss in Maize Varieties by Fall Armyworm (*Spodoptera frugiperda* J. E. Smith) and the Effectiveness of Insecticidal Control

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Fall armyworm (*Spodoptera frugiperda* J. E. Smith) is one of the most damaging pests, significantly reducing maize yield. Field experiments were conducted to assess the extent of damage and yield loss caused by fall armyworm infestation in maize following a randomized complete block design with three replications at the National Maize Research Program in Rampur, Chitwan, Nepal, during the consecutive spring seasons of 2022 and 2023. Ten maize varieties - Rampur Hybrid (RH)-8, RH-10, RH-12 (CAH-1715), RH-14 (RML-86/RML-96), RH-16 (RML-95/RML-96), TX-369, Arun-2, ZM-401, ZM-627, and Rampur Composite were used as test varieties (first factor), and pest control conditions (sprayed vs. non-sprayed) served as the second factor. The sprayed plots (protected) were kept completely free from fall armyworm infestation through three applications of a standard dose of insecticide (spinosad 45% EC @ 0.3 mL/L) at 10-day intervals. Conversely, the non-spray (unprotected) were exposed to natural infestation. Standard agronomic practices such as planting time, row spacing, seed rate, irrigation, weeding, and fertilizer application were uniformly applied across all plots. Among the tested varieties, Arun-2 was the most susceptible to fall armyworm in both years, resulting in the highest percentage of dead hearts and increased foliage damage before the tasseling stage. Conversely, Rampur Hybrid-14

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exhibited the lowest infestation and percentage of dead heart percentages. Grain yield loss due to fall armyworm infestation varied by variety, ranging from 25.34% to 44.61%. The highest grain yield loss was observed in the open-pollinated variety ZM-401 (44.61%), followed by Rampur Composite (41.39%) and Arun-2 (41.22%). Spraying insecticide enables the recently introduced maize hybrid RH-14 to achieve a higher grain yields and showed less vulnerability to fall armyworm damage.

ABSTRACT

NPPW_2025_014_OR_07

Suppression of Chinese Citrus Fly, *Bactrocera minax* (Diptera: Tephritidae) through Area-Wide Control Program in Nepal

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Chinese citrus fly, *Bactrocera minax* (Enderlein, 1920) infestation has been a major constraint in citrus production in Nepal, particularly in key growing areas of Sindhuli district. Prime Minister Agriculture Modernization Project (PMAMP), Sweet Orange Superzone, Sindhuli introduced an Area-Wide Control Program (AWCP) for mass use of protein bait composed of 25% protein hydrolyses and 0.1% Abamectin and sanitation measures in 2018 against this fruit fly. This presentation highlights the impact of this intervention in reducing infestation level of Chinese citrus fly in citrus orchards. Prior to the intervention, infestation rate was 56.7% in 2017. After introduction of AWCP program in Sindhuli district, fruit infestation by Chinese citrus fly has been sharply dropped to 10.9% in 2018 and less than 1% in 2024. The effectiveness and scope of scale-up of this approach have been recognized for its widely adoption across the citrus-growing regions in the country. This integrated pest management strategy not only safeguards fruit quality and yield but also promotes sustainable citrus production practices.

ABSTRACT

NPPW_2025_005_OR_08

Current Scenario of Nepal's Plant Quarantine System in a Global Context

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Plant quarantine plays an increasingly vital role in safeguarding agricultural systems amid expanding global trade and emerging pest threats. This review evaluates Nepal's plant quarantine system within a global context, focusing on its historical development, organizational structure, operational strategies, inspection protocols, trade-related processes, and recent developments. Drawing on research articles, theoretical frameworks, surveys, and empirical evidence, the study highlights that Nepal's plant quarantine system was established in 1975—significantly later than those of countries such as France (1860), Germany (1873), the United Kingdom (1877), the United States (1881), and India (1937). Currently, only 0.24% of Nepal's agricultural budget is allocated to quarantine regulation, compared to 0.80% in India. Despite limited resources, Nepal shares several common features with global counterparts, including the use of web-based systems and mandatory phytosanitary certification for imports. Comparative insights reveal stringent state-level implementation in Australia and detailed classification systems for plant and plant products in countries like India and Japan. The United States adopts advanced hypergeometric and risk-based sampling techniques. Additionally, pest detection statistics from China and Indonesia underscore the operational scale and the challenges involved in managing quarantine risks. This review emphasizes the need for increased investment, capacity building, and international collaboration to enhance the effectiveness of Nepal's plant quarantine system.

ABSTRACT

Technical Session II

NPPW_2025_015_OR_09

Assessing the Population Dynamics of Tomato Leaf Miner, *Tuta absoluta* (Meyrick) in Various Locations of Surkhet, Karnali, Nepal

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Tomato leaf miner, *Tuta absoluta* is a devastating pest of tomato and other solanaceous crops in vegetable growing areas of South Asia including Nepal. Various management strategies have been developed and implemented to manage this pest, but none of these strategies are effective. Understanding their population dynamics, spatial and temporal distribution, ecology, and biology including appropriate integrated management strategies are suggested to reduce *T. absoluta* population below economic threshold level and reduce their infestation. Hence, this study was conducted to understand the population dynamics of the species in various locations of Surkhet district of Nepal. Weekly monitoring was organized over 54 weeks from December 2024 to June 2025 across nine sites in an altitude range of 598 to 724 masl in Birendranagar, Bheriganga, and Gurvakot municipalities of Surkhet district. Field data on pest dynamics, field conditions (inside/outside tunnels), and tomato cultivars were analyzed using descriptive statistics, correlation analysis, and t-tests. Protected tunnel cultivation reduced pest populations by 49% compared to open fields ($t=4.32$, $p<0.01$). Altitude showed a strong negative correlation with infestation intensity ($r = -0.78$, $p<0.001$), with 100 m elevation gain decreasing populations by 27%. Tomato cultivars VL 443 showed 59% lower susceptibility than Heemsohna ($F=15.3$, $p<0.001$). Climate correlations revealed that temperature (25-35°C) and rainfall >20mm is the

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primary driver ($r=0.71$, $p<0.0001$) of population decline, while high humidity (>85%) accelerated the pest outbreaks. Protected cultivation, resistant cultivars (*Nabin*, *Manisha*), and management interventions during peak infestation periods are suggested for the sustainable management of this pest.

ABSTRACT

NPPW_2025_017_OR_10

Community Learning Center: A Farmer-Centric Approach to Promote Climate-Resilient and Sustainable Pest Management Solutions in Agriculture

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The impact of climate change is significantly affecting pest dynamics, leading to the new emergence, resurgence, and shifting in feeding pattern of pest that pose critical threats to agricultural productivity and food security. Addressing these evolving challenges require a sustainable, adaptive, and farmer-centric approaches. This paper highlights the role of Community Learning Centers (CLCs) as an innovative and inclusive platform to promote climate-resilient pest management techniques at the farmer's level. The CLC model is rooted in participatory, on-farm experimentation and the principle of "seeing is believing" and "learning by doing." It directly engages farmers in identifying pest-related challenges, testing locally relevant and research-backed pest management solutions, and generating evidence through farmer-led data collection. The technologies promoted through CLCs are low-cost, durable, effective, and easily adoptable, ensuring that adoption decisions are based on farmers' preferences, experiences, and contextual needs. Sustainable pest management is a critical focus area within the CLC approach, particularly in piloting climate-resilient and nature-based solutions such as bio-pesticides, pest-resistant varieties, agroecological practices, and habitat management strategies. The paper will present successful case examples of pest management technologies that have been tested and adopted at the farm level through the CLC model. It also explore the barriers to adoption, including knowledge gaps, resource constraints, and institutional limitations. Finally, the paper will propose strategic pathways to scale up and integrate these climate-resilient pest management solutions into local, provincial, and national agricultural systems, thereby contributing to more adaptive and sustainable pest management strategies in the context of a changing climate.

ABSTRACT

NPPW_2025_018_OR_11

Host Resistance to *Uromyces appendiculatus* in Common Bean Landraces and Genotypes

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Bean rust, caused by the fungus *Uromyces appendiculatus* (Pers.) Unger (1816), is one of the serious diseases affecting common beans in a global scale. The present study evaluated rust resistance in common bean genotypes, including nine landraces from Jumla and one genotype from Chitwan during the 2020-2021 under natural epiphytotic conditions following 1-9 scale disease scoring (CIAT, 1987). Percent disease severity (PDS) and area under disease progress curve (AUDPC) values were calculated. All landraces from Jumla and the genotype Rato Chhirke Simi from Chitwan showed rust symptoms under field conditions. Disease severity and total grain yield showed significant differences ($P<0.001$) among the genotypes and landraces. A negative correlation was observed between yield and AUDPC ($r=-0.76$, $P<0.001$). Rust severity and yield losses were highest in Fusro Chhirke Simi which was at par with Kalo Sano Simi, Khairo Sada Simi and Rato Sano Chhirke Simi. These landraces showed highly susceptible reaction to the disease. Similarly, lowest rust severity and yield losses were recorded in Rato Sano Simi which was significantly similar with Pahelo Besare Simi, Rato Lamo Simi and Rato Male Simi with resistant reaction. In conclusion, the bean genotypes identified as rust resistant would be valuable in developing disease management strategies and rust-resistant common bean varieties.

ABSTRACT

NPPW_2025_021_OR_12

Biology and Morphometric Study of Pumpkin Fruit Fly, *Zeugodacus tau* (Walker, 1849) on Selected Cucurbit Hosts under Laboratory Conditions

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The pumpkin fruit fly, *Zeugodacus tau* (Walker) is a major pest of cucurbitaceous crops, threatening vegetable production in tropical and subtropical regions. Understanding its host-dependent biology and morphology is vital for its management. A study on the biology and morphometrics of *Z. tau* across six selected cucurbit hosts (bitter gourd, bottle gourd, cucumber, pumpkin, sponge gourd, and squash) was conducted in Hariharbhawan, Lalitpur from April to October 2024. For biology study, 50 eggs were placed in petri dishes and newly hatched maggots were fed same selected hosts. The fully matured maggots were placed in soil-filled glass jars for adult emergence. Egg incubation, larval, pupal periods, and adult longevity were recorded. For morphometric analysis, body length, breadth, and weight at different stages were measured. The total life cycle was the shortest on pumpkin (13.69 ± 0.07 days), and the longest on bitter gourd (17.38 ± 0.03 days). The female longevity was longer on pumpkin (119.00 ± 0.33 days) and shorter on bitter gourd (113.60 ± 1.23 days), while male longevity was shorter on bitter gourd (102.00 ± 1.05 days) and longer on cucumber (106.45 ± 0.95 days). The fruit flies reared on pumpkin and squash were consistently larger and heavier than those on bitter gourd. The female body was consistently larger and heavier than the male body in all selected hosts. The study concluded that host plants significantly influence *Z. tau* development.

ABSTRACT

NPPW_2025_022_OR_13

An Overview on Current Status and Management Strategies of Thrips Species Complex in Nepal

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Thrips (Thysanoptera: Thripidae), a minute insect with fringed wings and asymmetrical mouthparts, poses an economic threat to a wide range of ornamental and vegetable crops globally including Nepal. This species feeds on all plant parts but preferably young buds, leaves and fruits, and are also reported as a vector of virus. In Nepal, various species of thrips are reported and their losses have been recorded up to 80%. The common thrips species in Nepal are: *Thrips tabaci* Lindeman, *Frankliniella schultzei* (Trybom), *Frankliniella occidentalis* (Pergande), *Scirtothrips dorsalis* Hood, and *Thrips parvispinus* Karny. They infest a broad range of hosts, such as onion, garlic, chilli, bell pepper, tomato, and many other vegetables, fruits and ornamental crops. Despite increasing reports of thrips infestations, research on their biology, ecology, taxonomy, population dynamics, and integrated management strategies remains insufficient in Nepal. Hence, this systematic review aims to understand the species taxonomy, species variations, their biology, seasonal dynamics, including appropriate management strategies to mitigate crop losses caused by thrips.

ABSTRACT

NPPW_2025_024_OR_14

Agri-insect: Scope, Status and Conservation Strategies

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Insects are one of the six most important and diverse components of agricultural biodiversity. The insect kingdom represents about 80 percent of the world's communities, of which less than 1 percent are insect pest. From an agricultural perspective, insects are classified into two types: Agri-insect and pest insects. Agri-insects encompass all insects that do not harm agricultural systems, farmers, or humans and including all beneficial insects. Agri-insects provide direct or indirect benefits to ecosystems and agriculture. Agri- insects can be grouped into 14 functional groups: i) Insect natural enemies (predators, parasitoids, parasites), ii) Weed management insects iii) Productive insects, iv) Edible insects, v) Feed insects, vi) Pollinators insect, vii) Decomposers insect, viii) Traded insects, ix) Entertainment insects, x) Researchable insects, xi) Medicinal insects, xii) Cleaner insects, xiii) Soil-dwelling beneficial insects, and xiv) Seed disperser insects. Insects have been utilized since ancient times. However, although Nepal has over 3,500 agri-insect species, many insects (around 20%) have disappeared or are now endangered. This decline stems from our failure to recognize native insects and their associated technologies as foundational to our livelihoods and economic advancement. Furthermore, many agri-insect species in Nepal remain unidentified. To address this problem, Nepal must prioritize insect conservation at the national level. Promoting organic farming while adopting alternatives to chemical fertilizers and pesticides, protecting natural habitats of insects (forests, rivers, agricultural fields), and raising awareness among local farmers could help. Additionally, investing in insect research and technology development will enable us to assess their economic and ecological significance. Insects are invaluable natural assets; failure to conserve them will inevitably have severe impacts on both agricultural production and ecosystems.

ABSTRACT

NPPW_2025_025_OR_15

Dynamics of Asian Citrus Psyllid (*Diaphorina citri* Kuwayama) in Nepal

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The Asian Citrus Psyllid (ACP), *Diaphorina citri* Kuwayama (Hompotera: Psyllidae) is a pest of citrus and a vector of *Candidatus Liberibacter asiaticus*, that spread Huanglongbing (HLB), a deadly bacterial disease of citrus. Citrus orchards get infected with this bacterium either by grafting or vector-mediated transmission. Understanding the altitudinal and seasonal dynamics, as well as the host preference of this heat-sensitive insect, is crucial for the management of HLB disease in Nepal. Hence, a study was carried out to investigate the altitudinal and seasonal dynamics as well as the host preference of ACP in selected districts of Nepal. To assess altitudinal dynamics, ACP potential hosts such as different cultivars of citrus and curry trees (*Bergera koenigii*) at different altitudes ranging from 300 to 1652 masl were monitored. Similarly, to study the seasonal dynamics of ACP in citrus, weekly monitoring of a citrus orchard in the Pokhara valley was done from February 2024 to January 2025. The results showed that the presence of ACP was recorded in a citrus orchard located at 1501 masl. The highest number of ACP nymphs and adults were recorded in the first week of May and third week of July, respectively. Regarding the host preferences, acid lime (*Citrus aurantifolia*) was identified as the most preferred host, followed by unshiu (*Citrus unshiu*), mandarin (*Citrus reticulata*), kinnow (*Citrus reticulata* 'Blanco') and sweet orange (*Citrus sinensis*). This study highlights the potential for establishing citrus nurseries above the 1500 masl and emphasizes the importance of targeted pest management practices before the onset of rainy season. Such practices include removing potential host such as lime and other citrus crops from main orchards to reduce ACP population density and dynamics for supporting the sustainable management of the pest.

ABSTRACT

NPPW_2025_026_OR_16

Fall Armyworm, *Spodoptera frugiperda* (J.E. Smith) Infestation and Damage Severity in Maize Fields of Kathmandu Valley

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Field survey was carried in six major maize-growing areas of Kathmandu valley - Kathmandu, Bhaktapur and Lalitpur districts to assess the fall armyworm, *Spodoptera frugiperda* (J.E. Smith) incidence, severity and farmers' management practices during maize growing season in 2024. Semi-structured questionnaires were used with face to face interview of farmer and damage assessment in the field was recorded using a score ranging from 1 to 9 scale based on the reference damage on the scaling of the leaf lesions, scraping of leaf surfaces and visual observations of the damage symptoms. Statistical data analysis and result interpretation were carried out using MS Excel 2016 and SPSS version 29.0.2.0 (20). Results indicated that damage incidence and severity varied significantly ($p<0.05$) with $p<0.001$ in vegetative and $p=0.005$ in reproductive stage. Damage severity was found the highest in V11 stage during vegetative stage and dough (R4) stage during reproductive stage of maize crop. Similarly, in relation to temperature the damage was higher in temperature range of 25°C to 27°C. The highest infestation (91%) was observed in Kathmandu compared to other two districts. Study indicated that farmers have to focus on adopting agro-ecological approaches for the management of this pest.

ABSTRACT

Technical Session III

NPPW_2025_054_OR_17

Potential Quarantine Insect and Mite Pests in an Imported Dragon Fruit Commodity in Nepal

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Dragon fruit is comparatively a very recently introduced fruit crop in Nepal. Most of the consumption purpose dragon fruits are imported into Nepal with inbuilt risks of introduction and spread of their country-absentee insect and mite pests in the country. A preliminary part of Pest Risk Assessment mainly based on literary global survey of dragon fruit insect and mite pests revealed 53 potential quarantine pests out of 76 global pests. Quarantine status of these pests needs to be investigated through commodity Pest Risk Analysis before a bulk dragon fruits and their planting materials imports in the county.

ABSTRACT

NPPW_2025_029_OR_18

Insecticidal Plant Materials Increase the Fall Armyworm Larval Mortality and Reduces Field Infestation: A Laboratory and Field Bioassay in Timor-Leste

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Fall armyworm, *Spodoptera frugiperda* (Lepidoptera: Noctuidae) is a global threat to maize production. In Timor-Leste country, 80-100 per cent fall armyworm infestation was recorded in maize field when it was first reported in late 2019. Such degree of infestation was stagnant for many years in Timor-Leste because of the limited government capacity and availability of management inputs to the maize growers. Hence, FAO Timor-Leste with the collaboration of Ministry of Agriculture, Livestock, Fisheries, and Forestry (MALFF) jointly conducted a fall armyworm management bioassay utilizing insecticidal plant materials and their mixture solutions in laboratory and open-field experiment in Betano Agriculture Research Centre of Manufahi Municipality from July to September 2024. The tested plant materials were neem (*Azadirachta indica*), Jatropha (*Jatropha gossypifolia*), tobacco (*Nicotiana tabacum*), derris (*Derris elliptica*), Ciam weed (*Chromolaena odorata*), lantana (*Lantana camera*), extract from the mixture of all above plant materials, mixture of cow urine plus extract of insecticidal plant materials, and control (no-spray). Each treatment was replicated eleven times in a completely randomized design (CRD) design in a laboratory leaf-dip

bioassay, and replicated four times in randomized complete block design (RCBD) in open-field. The abnormal data was normalize utilizing square-root transformation, and ANOVA was performed for both experiments to determine whether treatment means are significantly different among the treatments. Treatment means were significantly different in both experiments ($p<0.001$). In laboratory bioassay, mortality percentage was recorded as: *A. indica* (6.59%) > extract of insecticidal plant materials plus cow urine (6.40%) > *D. elliptica* (4.97 %) > *N. tabacum* (4.50%) > *C. odorata* (4.37%) > *L. camera* (4.35%) > extract from the mixture of all above plant materials (4.07%) > *J. gossypifolia* (3.23%) > control (0.56%), respectively. In open-field experiment, lowest field infestation was recorded in *D. elliptica* (39.0 %), *A. indica* (40.2%) and cow urine plus extract of insecticidal plant materials (43.4%) sprayed fields. Maximum field infestation was recorded in control field (89.0%). Both lab and field experiment provide an opportunity for the potential use of insecticidal plant materials such as neem, derris plant and mixture of cow urine and plant materials as a IPM strategy of fall armyworm management.

ABSTRACT

NPPW_2025_030_OR_19

Mobile Plant Clinics in Nepal: Bringing Crop Health Solutions to Rural Farmers

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Agriculture is the backbone of Nepal's economy, engaging approximately two-thirds of the population and contributing one-fourth of the nation's GDP. For many smallholder farmers, particularly women, who make up a substantial portion of the agricultural workforce, agriculture is not just a means of livelihood, but a way of life. However, they are facing multifaceted challenges such as rugged terrain, unpredictable weather, and limited access to agricultural technologies, which hinder sustainable crop production. Since 2008, the Plant Clinic program has become instrumental in addressing these issues by training women and youth extension officers as plant doctors. In 2024, the IPM farmers association (JYSBKS), in collaboration with CAB International, started mobile plant clinics to provide on-site crop health advisories to farmers. By offering immediate, tailored solutions to crop problems, the clinics help farmers manage pests and diseases more effectively. From May to December 2024, sixty-six plant clinic sessions were conducted across the Chitwan, Makwanpur, and Kavre districts, reaching over 1807 farmers and issuing 993 prescriptions. Farmers brought samples of their problematic crops, including paddy, okra, cucurbits, tomatoes, maize, brinjal, and chilies for diagnosis and received tailored advice. The active participation of local leaders and government officials underscores the program's significance and fosters a sense of shared responsibility in safeguarding food security. The combined efforts of local governments, IPM associations, and plant doctors ensure that these initiatives will have a lasting impact on plant health.

ABSTRACT

NPPW_2025_051_OR_20

Government Collaboration: A Key to Unlocking Nepal's Digital Agriculture Potential

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A concerted, multi-faceted collaborative effort among the government, private sector, and civil society is crucial for formulating and implementing effective policies that drive the agricultural digitalisation of agriculture in Nepal. This is essential towards enhancing food security, improving rural livelihoods, and achieving the nation's economic growth. Nepal's "Digital Nepal Framework" (draft of Digital Nepal Framework 2.0 (DNF 2.0): 2025) rightly identifies key areas to work on, i.e. 1. Strengthening Digital Infrastructure 2. Expanding Digital Service Access 3. Enhancing Digital Skills & Literacy 4. Boosting the Digital Economy. As agriculture is a priority sector for the country, several digital initiatives are already being implemented, including “mobile-based advisories,” “digital soil mapping,” and “e-extension services.” Yet, challenges impede widespread adoption, such as a stark digital divide, limited digital literacy among farmers, inadequate rural infrastructure, and a nascent regulatory environment. To address these complexities, a strategic approach involving partnership with the right national/international firm/s works well, as it offers a dynamic mechanism to leverage innovation, investment, and expertise. MoALD has taken a few initiatives, and last year, in partnership with CAB International, many approaches, like professional training, academic collaboration, and information sharing on government websites, have been adopted. In 2024, this collaboration encouraged various stakeholders to use CABI’s digital advisory tools and resources to manage plant health problems, making scientific information available to all. This also led to increased adoption, and CABI’s analytics system validates the resultant correlated usages, providing clear evidence of how collaborative

approaches can enhance the country's future digital vision, especially considering the current roadblocks and implementation. By fostering synergistic partnerships with various organisations and actively engaging with CABI, Nepal can create a fertile ground for inclusive, sustainable, and transformative digital agriculture.

ABSTRACT

NPPW_2025_033_OR_21

Screening for Genetic Resistance to Alternaria Blight in Winter Oilseed Crops (Rapeseed, Mustard, and Sarsoon) in Nepal: A Multi-Year Pathological Evaluation

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Alternaria blight is a major constraint in winter oilseed production, causing significant yield losses in Nepal. This study aimed to identify resistant genotypes of rapeseed (*Brassica napus*), mustard (*Brassica juncea*), and sarsoon (*Brassica campestris*) through systematic pathological screening over four consecutive fiscal years (2021–2024). A total of 190 rapeseed, 120 mustard, and 16 sarsoon genotypes were evaluated for disease severity under natural field conditions in Alternaria blight hotspots at Oilseed Research Program, Sarlahi, Nepal. Moderately resistant genotypes were identified across all three crops, with rapeseed showing the highest frequency of promising lines, including ACC#9109, NGRC 2752, and ICT 2003-10. Mustard exhibited greater variability in resistance, while sarsoon demonstrated stable performance, with genotypes like Binoy, Ulta Sarsoon, and Shampad consistently displaying moderate resistance. The findings highlight the potential of these genotypes for breeding programs aimed at enhancing Alternaria blight resistance. Given the economic importance of oilseed crops in Nepal, this research provides a critical foundation for developing resilient varieties to mitigate disease-related losses and improve productivity. Further validation and incorporation of these resistant lines into breeding pipelines could significantly contribute to sustainable oilseed production in the region.

ABSTRACT

NPPW_2025_034_OR_22

Mid-October Sowing: An Eco-Friendly Strategy for Managing Alternaria Blight and Enhancing Yield in Rapeseed (*Brassica napus* L.)

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Alternaria blight, caused by *Alternaria* spp., severely constrains rapeseed production, prompting heavy reliance on chemical pesticides that pose health hazards issues and environmental degradation including soil toxicity and biodiversity loss. In this context, a two-year (2023–2024) field study at Alternaria blight hotspot in Oilseed Research Program, Sarlahi evaluated sowing date adjustments for eco-friendly disease and yield management. Using Nawalpur Tori-4 rapeseed variety in an RCBD with nine sowing dates (mid-September to mid-November), disease severity was quantified, and yield attributes were analyzed. Results demonstrated that sowing dates significantly influenced disease severity and productivity. Mid-October sowing (October 15) minimized Percent Disease Index (PDI: 24.75%) and maximized grain yield (1375 kg/ha), followed by October 23 (PDI: 28.35%; yield: 1295 kg/ha). Early September sowings escaped disease but yielded sub-optimally (1165 kg/ha), while late sowings (late October–November) suffered severe blight (PDI: 75.65%) and yield loss (865 kg/ha). This study establishes mid-October as the optimal sowing window, reducing disease pressure and boosting yield without chemical interventions, thereby offering a sustainable, farmer- and eco-friendly alternative to hazardous pesticides.

ABSTRACT

NPPW_2025_047_OR_23

Potential Control of Banana Fusarium Wilt TR4 in Nepal: Cyclobutrifluram and Olyshield Show Efficacy in Greenhouse Study

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Banana Fusarium wilt, caused by *Fusarium oxysporum* f. sp. *cubense* Tropical Race 4 (Foc TR4), poses a severe threat to global banana production. With the recent detection of Foc TR4 in Nepal, there is an urgent need for effective management strategies. This study evaluated the efficacy of novel fungicides and biorational products against Foc TR4 in a greenhouse trial using tissue-cultured banana plants (cv. Grand Nain). Treatments included three fungicides (fluazinam, carbendazim, cyclobutrifluram), two biorationals (Wilt Free, Olyshield), a biocontrol consortium (*Bacillus* spp. + *Trichoderma asperellum*), and inoculated/non-inoculated controls. Plants were inoculated with Foc TR4 (10^4 spores/g soil) three times at 30-day intervals, and disease severity was assessed over 35 days after onset of disease symptoms. Results showed that cyclobutrifluram, Olyshield, and the biocontrol treatment significantly reduced disease progression (*p = 0.0723*), as measured by the area under the disease progress curve (AUDPC). In contrast, Wilt Free, carbendazim, and fluazinam did not provide significant suppression compared to the inoculated control. These findings suggest that cyclobutrifluram and Olyshield could be promising options for managing Foc TR4 in banana production systems, particularly in newly affected regions like Nepal. Further field validation is recommended to confirm their effectiveness under real-world conditions.

ABSTRACT

NPPW_2025_053_OR_24

Incidence, Varietal Preference and Farmer's Management Practices of *Liriomyza huidobrensis* (Blanchard) on Potato in Kavre and Makawanpur

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Potato (*Solanum tuberosum* L.) is the second most important staple crop and has significant potential for production in diverse agro-climatic zones of Nepal, contributing significantly to food security and livelihoods. This study assessed the extent of damage, yield loss, varietal preference and farmer's management practices against the leaf miner, *Liriomyza huidobrensis* (Blanchard) in Kavre and Makawanpur districts. A purposive survey of 30 potato farmers revealed that leaf miner infestation was a major production constraint. Among the cultivated potatoes, Purple Black Round was the most damaged variety, while MS 42.3 (Kavre) and Khumal Rato and Khumal Upahar (Makawanpur) were the least affected varieties. Among management strategies, 53% respondents relied on chemical control (5% Emamectin benzoate), 32% adopted cultural practices (early sowing, varietal changes), and 15% combined chemical, mechanical, and physical methods, while 20% fallowed no control due to knowledge gaps. Although 92% of the respondents recognized infestations, only 65% could accurately identify the pest. The findings emphasize the need for integrated pest management (IPM) strategies and farmer awareness to mitigate *L. huidobrensis* impacts in Nepal's mid-hill potato agroecosystems.

ABSTRACT

Technical Session IV

NPPW_2025_048_OR_25

Native bees and their conservation

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Bees are fascinating creatures for maintaining biodiversity through pollination, and using their products in nutrition, health and industry. All stakeholders such as beekeepers, crop pollinators, honey hunters, traders and even consumers are benefitted from beekeeping and their conservation practices. In the contexts of climate change, pesticide poisoning and anthropogenic activities, bee population and their diversities are declining. Therefore, the aim of this review and guideline is to conserve native bees, following safety in honey hunting and quality honey collection assuring sustainable management of bees, and biodiversity conservation in response to present climate change scenario. Based on technical reviews, long experience and learnings, this initiative is a step toward conservation of native bees creating awareness among rural communities, honey hunters, beekeepers because they have been recognized for enhancing rural economy through the collection and sale of hive products there by supporting national food security. The Honey Bee Promotion Policy 2073 recognizes the beekeeping as one of the important means of enhancing rural economy in a sustainable way and sharing information to local level is necessary to aware the farming communities and other stakeholders and practice accordingly respecting the national policy by all stakeholders. In this regard, all native bees including domesticated *A. mellifera* and *A. cerana* colonies are important to local community, and their conservation must be in priority.

ABSTRACT

NPPW_2025_027_OR_26

Biology of Melon Fruit Fly, *Zeugodacus cucurbitae* (Coquillett, 1899) on Selected Cucurbit Hosts under Laboratory Condition

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The melon fruit fly, *Zeugodacus cucurbitae* (Diptera: Tephritidae) is a significant pest of cucurbit crops, leading to substantial yield losses. Biology study of *Z. cucurbitae* across six selected cucurbit hosts namely, cucumber, squash, bitter gourd, bottle gourd, sponge gourd and pumpkin was carried out in Hariharbhawan, Lalitpur, Nepal during April to September, 2024. The experiment was conducted using a Completely Randomized Design (CRD) with four replications. For biology study, fifty eggs were placed in petridishes from each host, and newly hatched maggots were fed on the respective host. The third instar maggots were transferred into saw dust filled containers to facilitate pupation. Egg incubation, maggot (I, II, and III instar), pupal period and the adult longevity including morphometric measurements of different developmental stages were recorded. Mean pupal duration was observed the shortest on squash (8.98 ± 0.06 days) and the longest on bottle gourd (9.66 ± 0.10 days). The egg to adult development period was longest in cucumber (17.46 ± 0.27 days) and the shortest in sponge gourd (16.88 ± 0.18days). The pre-oviposition, oviposition and post-oviposition periods varied significantly among hosts. The adult longevity was the longest on squash, whereas the shortest longevity was recorded on bitter gourd. The different developmental stages were larger and heavier on squash than on bottle gourd. The findings highlight the development of fruit flies significantly dependent on available hosts.

ABSTRACT

NPPW_2025_049_OR_27

Laboratory Study on the Settlement Response of Fall Armyworm, *Spodoptera frugiperda* (J.E. Smith) on a Range of Potential Host Crops

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Fall armyworm (FAW), *Spodoptera frugiperda* (Noctuidae: Lepidoptera) is an invasive pest in almost all maize growing countries. More than 353 plant species are recorded as the host crops of fall armyworm with maize being the most preferred crops followed by sweet corn, sorghum, rice, wheat, and many other cultivated crops. The information on the preferences level of *S. frugiperda* on various crops can provide the information on the pest manipulation by clearing or maintaining such host crops in- and off- the main field. Hence, a host preference study was carried out using first to fourth stages *S. frugiperda* larvae to observe the host selection behavior on a wide host range such as maize (cv. Rampur Composite), cowpea (cv. Surya), wheat (cv. Vijay), soybean (cv. Puja), napier (cv. Super Napier), rice (cv. Sabitri) and buckwheat (cv. Mithe phapar) in a laboratory experiment along with the study of their developmental period and oviposition preference on different hosts. The laboratory design used was Completely Randomized Design (CRD) with six replications. The study showed that initially the selection of host crops by *S. frugiperda* larva was random. But at the end of the twenty-four hours, the larvae settled on the host plant of their preference. The highest

preference was on wheat followed by maize whereas the lowest preference was observed on cowpea, soybean, and buckwheat, respectively. Similarly, oviposition preference was higher on maize followed by wheat and no oviposition in buckwheat. Here, highly preferred crops can be used as trap crops and less preferred crops can be used as intercrops in agroecological pest management strategy.

ABSTRACT

NPPW_2025_031_OR_28

Comparison of Parasitism of *Trichogramma chilonis* on Eggs of *Corcyra cephalonica*, *Spodoptera frugiperda* and *Chilo partellus*

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The egg parasitoid *Trichogramma* wasps are commonly used as biocontrol agents of lepidopteran pests in maize fields. The present study evaluated parasitism potential of *Trichogramma chilonis* on eggs of three lepidopteran pests, *Corcyra cephalonica, Spodoptera frugiperda* and *Chilo partellus* under controlled room conditions of 26 ± 2°C temperature and 60 ± 10 % relative humidity, and a photoperiod of 14: 10 (L: D). Results have shown significant differences in parasitism and adult emergence rates across the host species. *Trichogramma chilonis* exhibited lower rate of parasitism on the eggs of *S. frugiperda* (21.53 ± 3.44%) compared to the eggs of *C. cephalonica* (79.30 ± 3.38%) and *C. partellus* (63.61 ± 3.30%). The lower rate of parasitism of *T. chilonis* on *S. frugiperda* might be due to multi-layered and scale covered eggs. The results show the prospects of *C. cephalonica* as a suitable surrogate host for mass production of *T. chilonis*.

ABSTRACT

NPPW_2025_032_OR_29

Efficacy of Biological Management Strategies for Cabbage Butterfly (*Peris brassicae nepalensis*) on Cabbage at Bajura, Nepal

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The cabbage butterfly (*Peris brassicae nepalensis*) significantly impacts crucifers, leading to average annual productivity losses of 40-100% in late-season cultivars. At Budhinanda Municipality-10 Bajura, the realm of research was conducted to assess the efficacy of various biological management strategies for controlling the cabbage butterfly on cabbage. For this, the treatments were T_1 (*Metarhizium anisopliae*, 1×10^9 CFU/ml), T_2 (*Beauveria bassiana*, 1×10^9 CFU/ml), T_3 (Jholmal-3: Water, 1:5), T_4 (Neem oil 0.03% E.C.), and T_5 (Control). Moreover, pre- and post-treatment data were observed on a randomized complete block design (RCBD) in the field condition, and a completely randomized design (CRD) in the laboratory, each with four replications. After treatment with specified concentrations, in a meticulous way, the number of alive and dead larvae was counted at 24, 48, and 72 hours. As a consequence, in the field condition, neem oil was the most effective against cabbage butterfly larvae, experiencing 62.96% mortality, followed by *Beauveria* (45.26%), *Metarhizium* (37.03%), and Jholmal-3 (31.27%), with the lowest mortality (6.42%) at the control. Similarly, in the lab condition, neem oil had 79.17% mortality and overshadowed *Beauveria* (59.17%), *Metarhizium* (55.06%), Jholmal-3 (48.89%), and the control (14.17%). However, in terms of yield, neem oil with 31.62 mt/ha and Jholmal-3 with 30.21 mt/ha significantly outperformed with yield increases over control by 28.84% and 26.82%, respectively. Hence, Neem oil showed promising results against cabbage butterfly larvae at Bajura. So, farmers are suggested to apply neem oil for the control and management of cabbage butterfly to boost the production and productivity of cabbage.

ABSTRACT

NPPW_2025_039_OR_30

Oviposition Preference and Survival Rate of *Zeugodacus cucurbitae* (Coq.) and *Zeugodacus tau* (Walker) in Cucurbit Crops

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Zeugodacus cucurbitae (Coquillett) and *Zeugodacus tau* (Walker) are the major tephritid pests of cucurbit crops causing losses up to 100% depending on hosts and growing season. This experiment was conducted at the Plant Quarantine and Pesticide Management Center, Lalitpur, Nepal, during May-October 2024. Fruit fly infested cucurbit fruits were collected and cultured to rear the fruit flies under control conditions. Choice and no-choice tests were conducted considering six hosts (pumpkin, cucumber, bitter gourd, sponge gourd, bottle gourd and squash). In the choice test, *Z. tau* preferred pumpkin > cucumber > sponge gourd > squash > bottle gourd > bitter gourd in order while *Z. cucurbitae* preferred squash > bitter gourd > cucumber > sponge gourd > pumpkin > bottle gourd for oviposition. The oviposition period of *Z. tau* was 43-74% longer than *Z. cucurbitae*, however, the egg laying rate was higher in *Z. cucurbitae* (4.6±2.4 eggs/female/day) than *Z. tau* (2.9±0.9 eggs/female/day). In the no-choice test, squash and cucumber were the most preferred hosts by *Z. cucurbitae* and *Z. tau*, respectively. The highest egg hatchability and adult emergence percentage were found on squash in both of the fruit fly species; however, the least percentage was recorded on bottle gourd by *Z. cucurbitae*; and bitter gourd and bottle gourd by *Z. tau*. Almost all maggots turned into pupa, however, 10% of eggs or pupae failed to enter the succeeding stage. Hence, this study indicates the need of host preference for applying management strategies of different fruit fly species for sustainable cucurbit production.

ABSTRACT

NPPW_2025_042_OR_31

A Fungicide Resistant *Phytophthora infestans* (Mont.) de Bary Potato Late Blight Pathogen: Global Food Security Threat

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Potato (*Solanum tuberosum)* is the fourth most valuable crop after rice, maize and wheat, consumed by over a billion populace worldwide. Globally, potatoes are grown in 23.5 million hectares, yielding about 493 million tonnes annually. The world potato industry, however, has been threatened by several biotic constraints. The critical one is potato late blight (PLB) caused by *Phytophthora infestans* (Mont.) deBary. This disease has been well-known for over a century and is still a re-evolving oomycete. The coexistence of A1 and A2 mating-type populations triggered the frequent genetic shift due to recombination and crossing over, resulting in more virulent and broader adaptive strains of *P. infestans*. The frequent genetic shift compounded the usual fungicide resistance development in *P. infestans* and affected the fungicides-based integrated disease management strategy. So, how could we tackle those fungicide-resistant *P. infestans super strains*? This paper reviewed the fungicide resistance trend in *P. infestans* and tactics to overcome that temporal resistance. It critically analysed the temporal evolution of *P. infestans* resistant to various fungicide groups and suggested possible means to overcome those resistances to manage the disease effectively. The findings support the fungicide industry in developing effective fungicides against novel *P. infestans* strains, and benefit to potato growers. Ultimately, it will sustain global potato production and minimize the food security threats caused by PLB in the future.

ABSTRACT

NPPW_2025_052_OR_32

Evaluation of Efficacy of Different Conventional and Traditional Acaricides against the Two-spotted Spider Mite (*Tetranychus urticae* Koch) on Strawberry (*Fragaria* X *ananassa*) in Chitwan, Nepal

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Strawberry (Fragaria × ananassa), a new crop for the tropical and subtropical regions of Nepal, is a significant horticultural crop cultivated in sub-tropical regions globally. The two-spotted spider mite, *Tetranychus urticae* Koch, is one of the most economically important arthropod pests that requires frequent population monitoring and control for better production of strawberry. *T. urticae* has shown resistance to most of the acaricides globally. Field studies were conducted to evaluate the efficacy of chemical and organic insecticides against *T. urticae* on strawberry at Chitwan, Nepal during 2022/23 and 2023/24 season. Eleven acaricides (various conventional and traditional acaricides) and a non-treated control were evaluated using a randomized complete block design (RCBD) with four replications. In both the seasons, Bifenazate 24% SC, Cyenopyrafen 30% SC, Hexythiazox 5.45% EC, Cyflumetofen 20% SC, Chlorfenapyr 10% SC, Spiromesifen 24% SC, Fenpyrioximate 5% EC, Abamectin 1.9% EC, and mineral oil significantly reduced the population of *T. urticae* motiles compared to the untreated control. Botanical formulations containing *Allium sativum* 9% + *Piper nigrum* 8% and Azadirachtin 0.15% also demonstrated lower motile numbers as compared to non-treated control. Numbers of motiles appeared to be reduced with each of the 5 spray dates. The population of mites appeared to be more effectively controlled at 2 days after treatment than after 7 days at most of the study period. These results can be useful in developing a sustainable approach for the management of *T. urticae* by alternating acaricide while limiting the instances of development of resistance.

ABSTRACT

Poster Presentation

NPPW_2025_002_PO_01

Efficacy of Selected Insecticides against Fall Armyworm, *Spodoptera frugiperda* (J.E. Smith) under Laboratory Conditions

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Fall armyworm, *Spodoptera frugiperda* (J.E. Smith), a major lepidopteran moth pest of maize, is native to the tropical and subtropical regions of the Americas. In Nepal, pest management is largely chemical-based, often involving the indiscriminate use of pesticide mixtures, which are frequently over- or under-applied and insufficient to manage infestations effectively. This study aimed to evaluate the efficacy of selected insecticides against fall armyworm under laboratory conditions at the Entomology Laboratory of Rampur Campus, Khairahani-5, Chitwan, from May to July 2024. The study consisted of two components: i) A life cycle study of FAW and ii) A laboratory bioassay of third instar larvae using insecticides. The complete development period of fall armyworm from egg to adult was recorded as 25 ± 2 days at 30 ± 4°C and 60 ± 10% relative humidity. The bioassay was done using leaf dip method. Seven different treatments, including six insecticides (spinetoram 11.7% SC, emamectin benzoate 5% SG, spinosad 45% SC, chlorantraniliprole 18.5% SC, imidacloprid 17.8% SL, and profenofos 40% + cypermethrin 4% EC) and control (water) were tested in a completely randomized design (CRD) with ten replications. Mortality was assessed at 12, 24, 36, 48, 60, and 72 hours after exposure. Spinetoram, emamectin benzoate, and spinosad were the most effective, causing over 50% mortality within 12 hours and more than 80% within 24 hours. Chlorantraniliprole achieved over 80% mortality by 60 hours, while profenofos + cypermethrin resulted in approximately 60% mortality. Imidacloprid had no effect. These results indicate significant variation in insecticide effectiveness against fall armyworm. The findings are valuable in guiding farmers and extension agents toward more effective and targeted pest management strategies to control fall armyworm and enhance maize productivity.

ABSTRACT

NPPW_2025_003_PO_02

Evaluation of Hybrid Maize Varieties for Grain Yield and Resistance to Northern Corn Leaf Blight (*Exserohilum turcicum* (Passerini) Leonard and Suggs.) at Chandradangi, Jhapa, Nepal

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Northern corn leaf blight (NCLB), caused by *Exserohilum turcicum* (Passerini) Leonard and Suggs.), is a significant disease affecting maize (*Zea mays*) production, often resulting in yield losses of up to 40% during epidemic. This study was conducted to evaluate the morphological traits, disease resistance, and yield performance of seven hybrid maize varieties (Super King 4455, NMH 8352, All-Rounder, PL 3300, NMH 589, and C.P. 808) among with a open-pollinated variety Rampur Composite under field conditions at the Agriculture Development Farm, Chandradangi, Jhapa, Nepal, during the winter season of 2023/2024. The hybrids were evaluated in a randomized complete block design with three replications. Disease scoring was done by visual observation of the leaf area infected in each plant using a 1-5 rating system of CIMMYT, and the percent disease index was calculated. The analysis revealed significant differences in key morphological traits such as plant height, ear placement height, flowering time (days to 50% tasseling and silking), and yield components among the tested maize hybrids. NMH 589 exhibited the tallest plant height (204.9 cm) and the highest ear placement height (112.0 cm), whereas Rampur Composite and Super King 4455 showed relatively shorter plants. C.P. 808, All-Rounder, and NMH 8352 showed lower PDI values, with moderately resistant (MR) disease reaction against NCLB. Rampur Composite, Super King 4455, and NMH 589 were moderately susceptible

ABSTRACT

to the disease**.** Yield analysis showed that NMH 8352 produced the highest grain yield (11.96 mt/ha), followed by C. P. 808 (11.90 mt/ha) and Super King 4455 (11.02 mt/ha), while Rampur Composite yielded the lowest (8.90 t/ha). A weak negative correlation (-0.094) between grain yield and PDI suggested that higher disease incidence had a marginal impact on yield reduction. Overall, the results suggest that NMH 8352, All Rounder, and C.P. 808 are promising hybrids for cultivation in disease-prone areas due to their higher yield potentials and moderate resistance to northern corn leaf blight.

ABSTRACT

NPPW_2025_004_PO_03

Chemical Management of Rice Blast (*Magnaporthe oryzae* (B. C. Couch) Disease on Spring Rice (Hardinath-1) at Chandradangi, Jhapa, Nepal

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Rice blast disease, caused by *Pyricularia oryzae* Cav. ING'(teleomoph *Magnaporthe oryzae* B.C. Couch), is the most economically important disease affecting rice production in Nepal. This study was conducted to evaluate the efficacy of commonly available synthetic fungicides in managing rice blast disease. The experiment was conducted at the Agriculture Development Farm, Shivasatakshi-7, Chandradangi, Jhapa, from March 2024 to July 2024. Blast susceptible rice cultivar Hardinath-1 was used, and the experiment was laid out in a randomized complete block design (RCBD). The tested fungicides King Blast (tricyclazole 75% WP), SAAF (mancozeb 63% + carbendazim 12%), Kingmil 72% WP (cymoxanil + mancozeb), Kingsin M (thiophanate methyl 70% WP), King's M 80 (mancozeb 80%), and Protector ZN (chlorothalonil 75% WP) were sprayed thrice at weekly intervals starting from the booting stage. All the fungicide treatments significantly reduced blast disease compared to the untreated control ($p < 0.001$). Among the tested fungicides, King Blast was the most effective, resulting in the lowest disease severity (13.20%) followed by SAAF (20.10%), King's M 80 (21.60%), Kingmil 72 WP (23.10%), and Kingsin M (25.80%). King Blast treatment also gave the

highest number of effective tillers per plant (22.87), the highest number of filled grains per panicle (142.1), a thousand-grain weight of 23.12 g, and a grain yield of 7.50 mt/ha. Based on these results, it is concluded that King Blast (tricyclazole 75% WP) is highly effective for controlling rice blast when applied at weekly intervals starting from the booting stage.

ABSTRACT

NPPW_2025_009_PO_04

Life Cycle Study and Growth Performance of Black Soldier Fly (*Hermetia illucens* l.) Raised on Varying Levels of Potato Peel Substrate Feeding under Laboratory Conditions in Chitwan

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Black Soldier Fly (BSF), *Hermetia illucens* (L.) is an emerging alternative protein source for livestock and a promising medium for organic solid waste management. For commercial-scale expansion, there is a need to develop a suitable rearing system for large-scale production of this insect. This study aims to identify the optimal feeding level for maximizing larval yield. The experiment was conducted in a completely randomized design (CRD) with replications under controlled conditions of 28 ± 2°C temperature and 65 ± 5% relative humidity. The study investigates the effects of feeding locally available household waste (potato peel) at varying levels on the growth and development of larvae. The feeding levels applied on a dry matter (DM) basis were: i) 9 mg DM/larva/day (T1), ii) 18 mg DM/larva/day (T2), iii) 27 mg DM/larva/day (T3), and iv) 36 mg DM/larva/day (T4). Each replicate consisted of 2600 larvae. A sample of 10 larvae was measured and weighed every two days to assess morphometric traits until 50% of the larvae developed into prepupae. Growth rate (GR%), larval mortality (LM%) and substrate reduction (SR%) were also calculated. The results showed that feeding levels had significant effect on the average length, breadth and weight of the larvae. The optimal feeding rate was found to be 27 mg DM/larva/day, which yielded larvae with an average length of 1.9 cm, breadth of 0.5 cm, and weight of 0.25 g. At this feeding level, GR%, SR%, and LM% were 2.09%, 37%, 22.75%, respectively. No significant differences were observed between the treatments T3 and T4. Feeding above T3 had no significant

increase in morphometric traits and only marginal improvement in survival, thus not justifying the additional feed input. Feeding below T3 had detrimental effects on larval performance. Therefore, a feeding rate of 27mg DM/larva/day can be considered as the optimal level when using potato peel as a substrate.

ABSTRACT

NPPW_2025_012_PO_05

Response of Rice Breeding Pipelines to Sheath Blight under Artificial Inoculation

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Rice (*Oryza sativa* L.) is the most important and number one cereal crop both in terms of area and production in Nepal. However, its average productivity low than the potential yield, largely due to various biotic constraints. Among these, sheath blight, caused by *Rhizoctonia solani* Kühn, is a major disease limiting rice productivity. This study aimed to evaluate the resistance levels of 18 rice breeding pipelines, along with susceptible and resistant checks, against sheath blight under controlled glasshouse conditions using artificial inoculation. The experiment was conducted in 2025 at the National Rice Research Program, Hardinath, Dhanusha. Seeds of each breeding pipeline were sown separately in three pots as replicates, following a randomized complete block design. Disease severity was recorded through three consecutive ratings at weekly intervals, starting from seven days post-inoculation, using the Standard Evaluation System (SES) for rice on a 0-9 scale. Based on final disease response, 2 genotypes exhibited resistant (R) reactions, 7 were moderately resistant (MR), and 7 were moderately susceptible (MS). The identified resistant breeding lines represent promising candidates for advancement in the National Rice Improvement and Varietal Development Program aimed at enhancing sheath blight resistance in rice.

ABSTRACT

NPPW_2025_013_PO_06

Influence of Different Ovitraps on Oviposition Performance: A Comprehensive Study on the Life Cycle of Black Soldier Fly, *Hermetia Illucens* (L.) in Chitwan, Nepal

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The adult female Black Soldier Fly (BSF), *Hermetia illucens* L, typically lays eggs near decaying organic matter, often selection cracks in dry areas. In laboratory condition, BSF females typically oviposit on ovitraps made from different materials. A study to investigate the oviposition preference of BSF using locally available ovitraps along with their life cycle study was conducted in Chitwan from March to April 2024. The oviposition experiment followed a randomized complete block design with four replications, using ovitraps made from sal (*Shorea robusta*), sissoo (*Dalbergia sissoo*), cardboard and egg crates. A total of 3600 BSF samples were reared on bakery waste and their developmental stages were observed. They completed their life cycle in approximately 43±2 days at 28±2℃ and 65±5% relative humidity. The results revealed that ovitrap made of cardboard had the highest number of egg clusters, number of eggs, and total weight of eggs. *S. robusta* ovitrap demonstrated the second highest number of egg clusters while *D. sissoo* ovitrap ranked second in terms of both total egg weight and total number of eggs. Also, the effective time period for egg laying was from around 12:00-3:00 pm. The preference of female BSF for cardboard and wooden ovitraps may be attributed to the dry, rough texture and visible gaps in these materials, which provide warmer micro-environments. Therefore, cardboard as well as wooden ovitraps are suggested for BSF rearing to enhance egg-laying efficiency.

ABSTRACT

NPPW_2025_016_PO_07

Farmers' Knowledge and Perception of Walnut Insect Pest and Disease Management in Rukum East, Nepal

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A survey research study on farmers' knowledge and perception of walnut insect pest and disease management was undertaken in Rukum East, Nepal. The study aimed to evaluate the farmers' knowledge and perception level regarding the identification and management of insect pests and diseases of walnuts. A total of 125 respondents were randomly selected for the interview using semi-structured questionnaires, and field verification was made based on the direct field observations. Study showed that the Jumlish variety of walnut was more popular and large area cultivated than the Turkish variety. Out of the total respondents, 79.2% were aware of the presence of insects and diseases in their field, while 20.8% were not familiar. The walnut weevil has been reported as a most occurring insect, followed by the shoot borer, whereas dieback was the most prevalent disease in the walnut saplings. The presence of insects and diseases primarily damaged the leaves, then the stems and fruits. Many of the respondents followed the cultural method of management, a few followed the physical method, and very few used bio-pesticides. Farmers believed that susceptibility varies with variety, and the Turkish variety was more insect pest and diseases susceptible than the local variety. This study provides an opportunity to explore the potential insect pest and diseases of walnut along with utilizing integrated pest management strategies.

ABSTRACT

NPPW_2025_019_PO_08

Assessment of Diseases Prevalence in Dhading District and In-vitro Efficacy Testing of Fungicides against Gummy Stem Blight (*Didymella bryoniae*, Rehm) in Cucurbits

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Gummy stem blight, *Didymella bryoniae* is one of the destructive diseases of cucurbits and causes considerable loss in the yield and quality of the produce. An experiment was conducted in in-vitro to evaluate the efficacy of seven commercial chemical fungicides at three concentrations such as 50ppm, 100ppm and 200ppm. The study was conducted using poison food technique in Completely Randomized Design (CRD). The study consisted of 8 treatments (seven fungicides and one control) with 5 replications. The treatments were Nativo (tebuconazole 50% + trifloxystrobin 25%), Saizox (azoxystrobin 18.2% + difenoconazole 11.4%), Ridomil (mancozeb 64% + metalaxyl 4%), G-surakshya (chlorothalonil 75%), Saaf (carbendazim 12% + mancozeb 63%), Green copper (copper oxychloride 50%), Bavistin (carbendazim 50%) and control. At the end of tenth day, the research revealed that Bavistin showed complete inhibition of pathogen at 50ppm, 100ppm and 200ppm followed by Nativo which showed 81.01%, 84.61% & 85.48% of inhibition at 50ppm, 100ppm and 200ppm, respectively, followed by Saizox showed 81.51%, 84.11% and 84.98% of inhibition at 50ppm, 100ppm and 200ppm, respectively and by Saaf showed 96.52% at 200ppm. Copper oxychloride at 50ppm, 100ppm and 200ppm showed least effective among all chemicals used. The mycelial growth inhibition increased with an increase in chemical concentration.

ABSTRACT

NPPW_2025_020_PO_09

Parasitism of Fall Armyworm, *Spodoptera frugiperda* (J.E. Smith) by Egg Parasitoids (*Telenomus remus* Nixon and *Trichogramma chilonis* Ishii)

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Fall armyworm, *Spodoptera frugiperda,* (J.E. Smith) is an invasive and destructive pest in maize growing areas. Frequent and inappropriate application of chemical pesticides has developed the insect resistance and resurgence. Biological control, being sustainable, biodegradable and environment-friendly, can be an alternative to chemical pesticides. This study assessed the parasitism of two parasitoids (*Telenomus remus* Nixon and *Trichogramma chilonis* Ishii) over different ages of semi-covered eggs. The experiment was conducted at 25.9±0.18^{0}C temperature and 77.6±0.67% relative humidity in the Entomological Laboratory of National Maize Research Program, Rampur, Chitwan during April to September, 2024. The experiment was conducted in two factor Completely Randomized Design that comprised two egg parasitoids (*T. remus* and *T. chilonis*) and three age-groups of eggs (less than 12 hrs, 24-36 hrs and 48-60 hrs) which were replicated five times. The parasitism percentage, parasitoid emergence, fall armyworm emergence, female progeny percentage and developmental period of parasitoids were analyzed to evaluate their efficiency in controlling fall armyworm. The parasitism percentage of *T. remus* was higher than that of *T. chilonis* in different age group of fall armyworm eggs (60.5% vs. 19.6%) which decreased with the increase in the age of egg for both parasitoids. The parasitoid of *T. remus* was higher adult emergence than *T. chilonis* (51.8% vs. 48.3%) which also

declined for both parasitoids with increase in age of egg. The female progeny of *T. remus* was higher as compared to *T. chilonis* which also lowered with the increase in egg age. The developmental period was similar for both parasitoids. Hence, *T. remus* is a more potential biological control agent than *T. chilonis* for managing fall armyworm eggs.

ABSTRACT

NPPW_2025_023_PO_10

Bio-Rational Management of Fall Armyworm (*Spodoptera frugiperda* (J.E. Smith)) in Maize, Baitadi

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Fall armyworm, *Spodoptera frugiperda* (J.E. Smith) is an invasive and widespread pest of maize in many countries, and recently introduced pest in Nepal. Their infestations reduce the quantity and quality of maize yield. Chemical pesticides have been the common choice in farmers' fields for their control in Nepal. Repeated application of chemicals with similar modes of action would hasten the development of insect resistance and resurgence. Hence, to identify the efficacy of biopesticides against fall armyworm in maize, field research was conducted during May to September 2023, in Baitadi. Seven different management treatments: i) *Bacillus thuringiensis* (2 g/l), ii) *Bacillus thuringiensis* (4 g/l), iii) *Beauveria bassiana* (4 ml*/l),* iv) *Beauveria bassiana* (*6* ml/l), v) *Azadirachtin* (6 ml/l), vi) *Azadirachtin* (8 ml/l), and vii) control (no management) were replicated three times in the Randomized Complete Block Design. The first spray treatment was made twenty days after sowing (DAS) and the second and the third sprays were done following the fifteen days interval. Observations on plant height, number of leaf, larval population, percent reduction of larva over control, plant damage score, cob damage percentage, and grain yield were recorded. *Beauveria bassiana* (6 ml/l) treated plots recorded the lowest average larval population 0.43, 0.26, and 0.03 larvae per plant after 1st, 2nd and 3rd sprays, respectively. Comparing with control, there was up to 97.50% reduction of larvae over control. *Beauveria bassiana* (6 ml/l) was also effective for reducing plant damage by fall armyworm and recorded the lowest plant damage score of 1.76 out of 9 scale. Plant damage score and cob damage percentages were

negatively correlated with yield. The highest plant damage score (3.33) and cob damage percentage (12.33%) were recorded in control plots. *Beauveria bassiana* (6 ml/l) treated plot had 1.17 mt/ha greater yield than the control plot with only one percent cob damage. Hence, the application of *Beauveria bassiana* (6 ml/l) was effective against fall armyworm management in Baitadi condition during summer-rainy season. However, multilocation trial for this biopesticides is suggested before recommendation to farmer's field.

ABSTRACT

NPPW_2025_028_PO_11

Antagonistic Effect of Different *Trichoderma spp*. against Pestalotia Leaf Spot of Strawberry under Laboratory Conditions

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Pestalotia leaf spot caused by a fungus *Pestalotia longisetula*, is one of the economically important diseases of strawberry *(Fragaria ananassa* Duch*). Trichoderma* spp. are known to suppress pathogens through multiple mechanisms, including mycoparasitism, production of antifungal compounds, enzymatic degradation, and induction of host plant resistance. Diseased strawberry leaves were collected from the farm of Nepal Agrovine Pvt. Ltd. in Chitwan for pathogen isolation and identification. A laboratory experiment was conducted at Nepal Plant Disease and Agro Associates (NPDA), Balaju, Kathmandu during June, 2024 to evaluate the efficacy of *Trichoderma* spp. isolates against *P. longisetula*. The different isolates of *Trichoderma:* Nuwakot (TL 1-2A), Illam (I8-1, I8-2), Chitwan (HN4-4A), Lamjung (LML-2B), and Kailali (K-7) were evaluated *in-vitro* against *P. longisetula* by dual culture technique on Potato Dextrose Agar (PDA). All isolates exhibited significant antagonistic effects, with the Nuwakot isolate (TL 1-2A) showing the highest mycelial growth inhibition of 81.15%, and the Ilam isolate (I8-1) showed the lowest at 65.33%. Statistical analysis revealed a highly significant differences among the treatments ($p < 0.001$) on the mycelial growth inhibition of the pathogen *P. longisetula*. These finding underscores the strong inhibitory potential of various *Trichoderma* isolates, supporting their use as promising biocontrol agents against *Pestalotia* leaf spot in strawberry not only under laboratory conditions but also as a potential component of integrated disease management strategies in field conditions.

ABSTRACT

NPPW_2025_035_PO_12

Efficacy of Lure and Bait Traps for Monitoring and Identification of Fruit Flies in Cucurbit Crops at Khokana, Lalitpur

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This study evaluated the efficacy of various lure and bait traps for monitoring of fruit fly species infesting cucurbit crops at Khokana, Lalitpur during May-July, 2024. Field experiments assessed the capture rates of *Zeugodacus cucurbitae* (Coquillett), *Zeugodacus tau* (Walker), *Bactrocera zonata* (Coquillett), and *Bactrocera dorsalis* (Hendel) using Cue Lure (CL), Gel Lure (GL), and Melon Fly Tablet Lure (MFTL) traps. CL-traps captured the highest mean number of *Z. cucurbitae* (3.7 flies/trap/week), while GL-traps was the most effective for *Z. tau* (4.4 flies/trap/week). MFTL-traps also attracted significantly higher number of *Bactrocera* species, with mean catches of 1.25 and 0.63 flies/trap/week for *B. zonata* and *B. dorsalis*, respectively. Environmental factors such as temperature (23–27°C) and humidity (63–92%) showed no significant correlation with trap catches. The results indicate that CL is the most effective bait for monitoring *Z. cucurbitae*, and deploying a combination of species-specific lures enhances accuracy of the fruit fly surveillance. These findings provide practical guidance for integrated pest management programs aimed at reducing fruit fly damage in cucurbit crops.

ABSTRACT

NPPW_2025_036_PO_13

Evaluation of Potential Biopesticides against Aphids of Cabbage in Nepal

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Cabbage aphids, *Brevicoryne brassicae* (Linnaeus, 1758), and Mustard aphids, *Lipaphis erysimi* (Kaltenbach, 1843), are significant economic pests of major crucifer crops in Nepal. Chemical insecticides are the common practice of aphid management, but unfortunately, these practices have raised concerns regarding food safety, pest resistance, human health, and the environment. Therefore, alternative safe management practices are necessary to reduce pesticide use in cabbage crops. Consequently, both field and laboratory experiments were conducted in Dailekh and Chitwan, respectively, to evaluate the efficacy of market-available biopesticides, including other safe alternatives, against aphids. The field experiment was laid out in a Randomized Complete Block Design (RCBD) with eight treatments and three replications. Among the treatments, the least leaf damage, the lowest mean aphid population, and the highest yield with maximum benefit-cost ratio were observed in Azadirachtin 1500 ppm spray. Azadirachtin 3000 ppm also showed the highest population reduction over the control. None of the treatments had a detrimental effect on the natural enemies' population. Furthermore, the laboratory bioassay study showed the highest aphid mortality (59%) in Azadirachtin 3000 ppm by the end of 72 hours. Also, the median lethal time (LT50) in Azadirachtin 3000 ppm was found to be a minimum of 2.46 days. Hence, this study provides the efficiency of neem-based pesticides and other botanicals over synthetic chemical pesticides.

ABSTRACT

NPPW_2025_038_PO_14

Study on Incubation Period of Coffee White Stem Borer, *Xylotrechus quadripes* (Chevrolat, 1863) Eggs under Laboratory Condition

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Coffee white stem borer, *Xylotrechus quadripes* (Chevrolat, 1863) (Coleoptera: Cerambycidae) a serious pest of arabica coffee in mid hills was first reported from Nepal in 1972. To understand the early development stage, a laboratory study was conducted to assess incubation period of eggs under controlled condition. Eggs were collected from breeding boxes in pairs (n=20) from dry cut pieces of coffee stems with scaly barks, used as egg laying substrates. For each pair, number of eggs laid per pair, days to first hatch, days to final hatch and incubation period in days. Average number of eggs in each batch was found 37, mean hatching percentage was found 62.35 % (±4.39), mean days to first hatch was found 3.80 (±0.31) and mean days to last hatch was found 6.33 ((±0.30). Due to the destructive damaging nature and life stages out of the stem, its understanding is important to derive the strategic management of this pest. This study provides insight into the incubation period of *X. quadripes* under controlled conditions and will help future research on its life stages in both laboratory and field condition.

ABSTRACT

NPPW_2025_040_PO_15

Effect of Different Substrates on the Emergence Rate of Adult Black Soldier Flies

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Black Soldier Fly (BSF) larvae are rich in protein and fat, can grow on diverse organic wastes, and efficiently convert those wastes into high quality biomass for use as a livestock and aqua-culture feed ingredient. The emergence of adult BSF from pupae is influenced by various environmental and substrate related factors. This study investigated the impact of different substrates on pupal development and adult emergence. Seven substrates were used namely, coarse soil, fine soil, soil with moisture, sand, canteen waste, compost waste and dry matter waste. A total of 20 pupae were kept in each substrates and pupae reared in each substrate were monitored for emergence success and time to emergence. First emergence of adult was seen in soil with moisture, maximum adults emergence were seen in dry waste matter, whereas no adults were seen in sand, coarse soil and fine soil. The adults emergence success was due to favourable environment and high nutrient availability. These findings highlight the critical role of substrate composition in optimizing BSF rearing systems for sustainable waste management and insect biomass production.

ABSTRACT

NPPW_2025_041_PO_16

Botanical Pesticides for the *Spodoptera frugiperda* (JE Smith, 1797) Management under Laboratory Conditions

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Fall armyworm (FAW), *Spodoptera frugiperda* (JE Smith, 1797), an invasive insect since 2016, has become a major pest of maize in global agriculture. Primarily, chemical insecticides are prioritized to manage FAW due to their immediate control. However, non-target effects multiply the insecticidal impacts. Botanicals can be a sustainable alternative if they are effective. Therefore, laboratory studies were conducted at the Agriculture and Forestry University, Nepal, to assess the efficacy of eleven potential botanical pesticides when compared to spinosad and water-treated control. In the laboratory experiment, FAW larval mortality, antifeedant activity, ovicidal activity, and growth metrics were studied. The experiment was laid out in a Complete Randomized Design (CRD). Among botanicals, a maximum of 40% larval mortality was exerted by fruit and seed extract of *Melia azedarach* L. @5ml/l water and *Ricinus communis* L. @ 5ml/l water within 72 hours, which was 100% in spinosad 45% SC @ 0.3 ml/l water and 6.66% in water-treated control. The highest antifeedant activity (44%) was observed in *Azadirachta indica* L. @0.5ml/l followed by *Justicia adhatoda* L. @5ml/l water (41.73%) and *Tagetes erecta* L. (41.17%). Concurrently, none of the treatments showed ovicidal activity. However, all the botanicals influenced the larval and pupal weight, duration of stages, and adult sizes; ultimately compromising the individual fitness. In this regard, botanical insecticides can be incorporated into integrated pest management practices rather than their standalone use.

ABSTRACT

NPPW_2025_043_PO_17

Incidence of Corky Root Rot Caused by *Colletotrichum* spp. in Tomato in Nepal

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Tomato (*Lycopersicon esculentum* Mill.) is widely cultivated around the world for its edible fruits. In March 2024, tomato plants uprooted from a plastic house in Chauthe, Pokhara, exhibited root symptoms characterized by dark brown, swollen lesions; necrotic bands; and typical corky rot on the bark, often cracked longitudinally. The affected root systems appeared dull, with few rootlets or lateral roots—many of which were atrophied or completely decayed. Fungal isolations from these symptomatic tissues consistently produced a species morphologically consistent with *Colletotrichum* sp. Pathogenicity tests, performed by soil drenching 14-day-old healthy tomato seedlings under controlled conditions, reproduced identical symptoms within 60 days, thereby fulfilling Koch's postulates. Similar symptomatic samples were also collected from other tomato-growing regions, including Bara, Kailali, Nuwakot, and Dhading, yielding fungal isolates with consistent morphological traits. To the best of our knowledge, this represents the first documented report of corky root rot caused by *Colletotrichum* spp. in Nepal. This emerging fungal disease poses a significant threat to the sustainability of tomato cultivation in high-tunnel and plastic house environments.

ABSTRACT

NPPW_2025_044_PO_18

Evaluation of Native and Exotic Tomato and Eggplant Rootstock Genotypes against Root-knot Nematode (*Meloidogyne javanica*) for Grafting

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Root-Knot Nematodes, genus *Meloidogyne* poses a significant threat to solanaceous crops with serious loss. Soil-borne nature of pathogen makes them persistent and difficult to diagnose from the foliar symptom. Grafting on the resistant rootstock being a sustainable and eco-friendly practice, is currently emerging as an improved practice, mainly for soil-borne disease management and extension of crop productive period. To identify resistant rootstock genotypes of tomato and pepper, a total of 27 genotypes that included wild relatives, domestic breeding lines, AVRDC genotypes, commercial varieties, and local checks were screened against *M. javanica* under greenhouse conditions. Thirty-day-old seedlings were transplanted into plastic pots (22 cm diameter). *M. javanica* eggs were inoculated (3500 eggs/ pot) and maintained in the greenhouse until 150 days. Galls number, reproduction factor and root knot severities were recorded for all genotypes at 45 and 120 days after inoculation. Based on these values, the genotypes were categorized into highly resistant (HR), resistant (R), moderately resistant (MR), moderately susceptible (MS), susceptible (S), and highly susceptible (HS) categories. *Solanum sysimbrifolium* and *S. turvum* were highly resistant against nematode infection with reproduction factor and severity 0. Pusa Ruby (96.94), Hawaii (33.10), and Srijana (26.37) were highly susceptible tomato genotypes, whereas Pusa Purple long (84), *S. solmel* (92.74), and NGRCO 10601 (52.89) were highly susceptible eggplant genotypes with the highest reproduction factor. These findings, further validated with the presence of molecular markers, would be useful for the selection of resistant/tolerant rootstocks for grafting purposes and also utilizing resistance genes for further breeding program.

ABSTRACT

NPPW_2025_037_PO_19

Monitoring Fruit Fly Species Using Different Cue Lure Traps in Pumpkin Field at Mahalaxmi, Lalitpur

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The experiment assessed the effectiveness of five different fruit fly traps (a homemade and four commercial) in pumpkin (*Cucurbita pepo*) field at Mahalaxmi municipality-6, Lalitpur district, Nepal from April to June 2024. Yellow sticky trap, plastic bottle trap, bucket trap, steiner trap and plastic glass trap were used as treatments. Each trap was provided with a cotton wick soaked in 0.5 ml of cue lure (except yellow sticky trap) placed at 1 m height on a standing stick in the pumpkin field. Then the collected fruit flies were assessed based on species and number. Throughout the collection, *Zeugodacus cucurbitae* was the most abundant, with a total of 1300 flies, followed by *Zeugodacus tau* with the total collection of 110. Likewise, *Bactrocera dorsalis* totaled 47 and *Bactrocera nigrotibialis* only 3 in number throughout the collection. In total, the highest average capture was led by the steiner trap, followed by the bucket trap, while the yellow sticky trap was the least effective.

ABSTRACT

NPPW_2025_046_PO_20

Evaluation of Native and Exotic Tomato and Eggplant Rootstock Genotypes against Root-knot Nematode (*Meloidogyne javanica*) for Grafting

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Root-Knot nematodes, genus *Meloidogyne* poses a significant threat to solanaceous crops with serious loss. Soil-borne nature of the pathogen makes them persistent and difficult to diagnose from the foliar symptom. Grafting on the resistant rootstock being a sustainable and eco-friendly practice, is currently emerging as an improved practice, mainly for soil-borne disease management and extension of crop productive period. To identify resistant rootstock genotypes of tomato and eggplant, a total of 27 genotypes that included wild relatives, domestic breeding lines, AVRDC genotypes, commercial varieties, and local checks (Pusa Ruby) were screened against *M. javanica* under greenhouse conditions. Thirty-day-old seedlings were transplanted into plastic pots (22 cm diameter). *Meloidogyne javanica* eggs were inoculated (3500 eggs/pot) and maintained in the greenhouse until 120 days. Galls number; reproduction factor and root-knot severities were recorded for all genotypes at 45 DAI and 120 days after inoculation. Based on these values, the genotypes were categorized into highly resistant (HR), resistant (R), moderately resistant (MR), moderately susceptible (MS), susceptible (S), and highly susceptible (HS) categories. *Solanum sysimbrifolium* and *S. turvum* were highly resistant against nematode infection with reproduction factor and severity 0. Pusa Ruby (96.94), Hawaii (33.10), and Srijana (26.37) were highly susceptible tomato genotypes, whereas Pusa Purple long (84), *S. solmel* (92.74), and NGRCO 10601 (52.89) were highly susceptible eggplant genotypes with the highest reproduction factor. These findings, further validated with the presence of molecular markers, would be useful for the selection of resistant/tolerant rootstocks for grafting purposes and also utilize resistance genes for further breeding program.