AIRO JOURNALS

Free / Unpaid
Peer Reviewed
Multidisciplinary
National

ISSN: 2321-3914
Volume 3 Issue 3
September 2021
Impact Factor: 11.9
Subject: Zoology

An exploration on Common agricultural pests include insects

Pushpanjali Kumari Singh

M.Phil, Roll No: 142149

Session: 2014-15

University Department of Zoology

B.R.A Bihar University, Muzzaffarpur

AIRO JOURNALS
Free / Unpaid
Peer Reviewed
Multidisciplinary
National

ISSN: 2321-3914
Volume 3 Issue 3
September 2021
Impact Factor: 11.9
Subject: Zoology

Abstract

A significant problem for humanity is the danger posed by invasive and developing pests to food security. The likelihood of the introduction of exotic pests has grown due to growing worldwide commerce in agricultural products. One example is the papaya mealybug (Paracoccus marginatus Williams and Granara de Willink), which also includes the cotton mealybug (Phenacoccus solenopsis Tinsley), the coconut mite (Aceria guerreronis Keifer), the serpentine leaf miner (Liriomyza trifolii Burgess), and the tomato leaf miner (Tuta absoluta (Meyrick)). In general, it is believed that insect pests reduce yields of important key food and cash crops by 15% to 20%. An emerging pest is one whose position has been shifting from minor to major or secondary to main pest. The last ten years have seen an increase in the severity of several pests, including Bemisia tabaci (Gennadius) on cotton, Helicoverpa armigera (Hubner) on vegetables and pulses, Spodoptera litura (F.) on vegetables, cotton, and oilseeds, Pieris brassicae L. on crucifers, L. trifolii on vegetables, and Atherigonia spp. on spring maize. On wheat, barley, and oat, an increase in the occurrence of the aphid complex, which includes Sitobion avenae (F.), Rhopalosiphum maidis (Fitch, and Schizaphis graminum (Rondani), has been noted. In Northern India, mites from the families Eriophyiidae and Tetranychidae have become significant pests of bean, brinjal, cotton, cucurbits, okra, apple, ber, citrus, and mango. In all parts of India where pigeonpea and cowpea are grown, Maruca vitrata Geyer has become a major pest in recent years, inflicting up to 42% damage.

Keywords: agricultural pests, Insects, Ecosystem

Introduction

The major causes of biotic stress on crops are insect pests. Chemical pesticides, which are the primary causes of pollution and which are responsible for a variety of health issues in both people and animals, are used to control the hundreds of insects that may seriously harm crops. Scientists are always looking for new strategies to combat pests that undermine sustainable agriculture as a result of these issues. It was revealed that the Bacillus thuringiensis had insecticidal action more than a century ago. Several insect-resistant genes were subsequently discovered. The method to

AIRO JOURNALS
Free / Unpaid
Peer Reviewed
Multidisciplinary
National
ISSN: 2321-3914
Volume 3 Issue 3
September 2021
Impact Factor: 11.9
Subject: Zoology

introduce these Bacillus thuringiensis genes into agricultural plants was created in 1980. These genes were developed to confer the necessary resistance to crops, enabling them to produce more fruit and have fewer bug infestations while also being resistant to the targeted pests. Since the introduction of the first transgenic plant types in 1996, both farmers in wealthy and developing nations are embracing this technology more and more. Currently, 15 countries are cultivating genetically modified (GM) maize, mostly in wealthy nations.

Pest Insects

Pest insects have the potential to negatively and destructively affect agricultural productivity, market access, the environment, and our way of life. Pest insects may be an issue because they can harm crops and food production, parasitize animals, or bother people and provide a health risk. Some of the most destructive insects in the world are absent from Western Australia. In order to stop the spread of insects on your property, biosecurity precautions are essential.

The Department of Primary Industries and Regional Development offers the following services: information on the state's common pest insects, biosecurity/quarantine procedures at the WA border to prevent the introduction of pest insects, post-border biosecurity measures where appropriate, and biosecurity measures..

Insects in Agriculture

Pests have damaged crops for as long as people have engaged in agricultural cultivation, and insects have generally been seen as rivals in the struggle for existence. Approximately 50% of insect species are herbivorous, with most herbivorous species feeding on plants in one or a few related plant families. The insect-plant connection is the primary biotic interaction. 18% of the world's agricultural productivity is damaged by herbivorous insects, which are mostly managed with chemicals. Despite these harms, less than 0.5 percent of the known bug species are classified as pests. Insects are not considered pests in an ecological or evolutionary context, except from anthropocentric perception and social prejudice.

Since crops cannot be grown without the ecosystem services supplied by insects, insects are essential to human life. The pollination of 72% of the world's crops is carried out by insects. Three-

AIRO JOURNALS
Free / Unpaid
Peer Reviewed
Multidisciplinary
National
ISSN: 2321-3914
Volume 3 Issue 3
September 2021
Impact Factor: 11.9
Subject: Zoology

quarters of all crop kinds worldwide—or one-third of the volume of global agricultural production—have improved or stabilised output thanks to pollinating insects. Numerous bug taxa have been connected to rising seed set. Numerous crop species depend more on wild bee species for pollination than the honeybee, Apis mellifera, including hundreds of species of solitary bees, bumblebees, flies, beetles, and butterflies. Insect pollination services are estimated to provide 9.5% of the world's agricultural output.

Agriculture will inevitably need pest control. By eradicating pest insects from cultivated crops, predatory insects contribute significantly to ecosystem services. Ground beetles are the dominant generalist predators in arable crops, effectively reducing population sizes of economically significant agricultural pests like aphids, slugs, root feeding flies, and phytophagous beetles. This conclusion was reached after reviewing 75% of field studies that generalist predators significantly reduce pest populations in arable farmland.

Additionally crucial to enhancing agricultural soil are insects. Dung beetles work in the soil to raise its levels of nitrogen, phosphorus, potassium, calcium, magnesium, and total proteins, which considerably boosts wheat plants' production in comparison to artificial fertilisers.

Role of Insects in Ecosystem

Ecological services and ecosystem functions are provided by biotic communities. Insects represent several diverse trophic niches and a broad variety of ecological activities in their native habitats, including herbivory, carnivory, and detritus eating. They are the primary form of animal biomass and life on Earth. All terrestrial environments are rich in insects, and they differ greatly across species in practically every area of life. The functional relevance of insects is tremendous, and the ecological services they offer are crucial, due to their abundance and wide intra- and interspecific variation. As important participants in the operation of ecosystem processes, insects are essential elements in a variety of ecosystems. Since most people see insects as pests or potential pests, their ecological significance is often overlooked. Insects' primary ecological roles in ecosystems include pollination, predation/parasitism, decomposition, and ecosystem cycling.

Conclusion

AIRO JOURNALS
Free / Unpaid
Peer Reviewed
Multidisciplinary
National

ISSN: 2321-3914
Volume 3 Issue 3
September 2021
Impact Factor: 11.9
Subject: Zoology

We are running out of choices to assure food security for a rising population since the majority of the world's fertile land is being utilised for agriculture and the extent of arable land cannot be extended further. The only alternative left is to make better use of the current land. In this approach, insects might provide the required fixes. Insects play crucial roles in every ecosystem since they are substantial contributors to ecosystem function on all levels. We must manage agricultural systems such that beneficial insects that provide essential ecosystem services are an integral part of the system. There are numerous ways to describe communities, and species diversity is only one of them. Other factors to consider when thinking about a community include its size and ecological function, the interactions between its many groups, and its structure. The significance of biodiversity for our future food security should not be understated; rather, it should be seen as a crucial component of the agricultural ecosystems that support our food production. Therefore, future studies on sustainable agriculture should concentrate on how insects affect ecosystems. Realizing the utility of insects in agricultural systems requires an awareness of their crucial roles in natural ecosystems. We may accept insects in agricultural systems by altering management techniques to boost the functional diversity in these systems once we are aware of the ecosystem services supplied by insects.

Reference

1. Garibaldi, L.A., Steffan-Dewenter, I., Winfree, R., Aizen, M.A., et al. (2013) Wild Pollinators Enhance Fruit Set of Crops Regardless of Honey Bee Abundance. Science. Gallai, N., Salles, J.M., Settele, J. and Vaissiere, B.E. (2009) Economic Valuation of the Vulnerability of World Agriculture Confronted with Pollinator Decline. Ecological Economics.
2. Symondson, W.O.C., Sunderland, K.D. and Greenstone, M.H. (2002) Can Generalist Predators Be Effective Biocontrol Agents? Annual Review of Entomology.
3. Kromp, B. (1999) Carabid Beetles in Sustainable Agriculture: A Review on Pest Control Efficacy, Cultivation Impacts and Enhancement. Agriculture, Ecosystems & Environment. Robinson, R.A. and Sutherland, W.J. (2002) Post-War Changes in Arable Farming and Biodiversity in Great Britain. Journal of Applied Ecology.

ISSN: 2321-3914
Volume 3 Issue 3
September 2021
Impact Factor: 11.9
Subject: Zoology

4. Losey, J.E. and Vaughan, M. (2006) The Economic Value of Ecological Services Provided by Insects.
5. Tyndalebiscoe, M. and Vogt, W.G. (1991) Effects of Adding Exotic Dung Beetles to Native Fauna on Bush Fly Breeding in the Field.
6. Davis, A.L.V. (1996) Seasonal Dung Beetle Activity and Dung Dispersal in Selected South African Habitats: Implications for Pasture Improvement in Australia. Agriculture, Ecosystems and Environment.
7. Cock, M.J.W., Murphy, S.T., Kairo, M.T.K., Thompson, E., Murphy, R.J. and Francis, A.W. (2016) Trends in the Classical Biological Control of Insect Pests by Insects: An Update of the BIOCAT Database.
Pearce, F. (2016) The New Wild-Why Invasive Species Will Be Nature's Salvation. Icon Books Ltd., UK.
8. Mascaro, J. (2013) Origins of the Novel Ecosystems Concept. In: Hobbs. R., Hall, C.M., et al., Eds., Novel Ecosystems: Intervening in the New Ecological World Order, Wiley-Blackwell, Hoboken.
Richards, E.N. and Goff, M.L. (1997) Arthropod Succession on Exposed Carrion in Three Contrasting Tropical Habitats on Hawaii Island, Hawaii. Journal of Medical Entomology.
9. Farwig, N., Brandl, R., Siemann, S., Wiener, F. and Muller, J. (2014) Decomposition Rate of Carrion Is Dependent on Composition Not Abundance of the Assemblages of Insect Scavengers.
10. Evans, T.A., Dawes, T.Z., Ward, P.R. and Lo, N. (2011) Ants and termites Increase Crop Yield in Dry Climate Nature Communication.
11. Scholtz, C.H. and Mansell, M.W. (2009) Insect Biodiversity in the Afrotropical Region. In: Foottit, R. and Adler, P., Eds., Insect Biodiversity: Science and Society, Blackwell Publishing, Hoboken, NJ.
12. Schoonhoven, L.M., Van Loon, J.J.A. and Dicke, M. (2005) Insect-Plant Biology. Oxford University Press, Oxford, UK.
13. Metcalfe, D.B., Asner, G.P., Martin, R.E., Silva Espejo, J.E., Huaraca Huasco, W., Farfan Amezquita, F.F., Carranza-Jimenez, L., Galiano Cabrera, D.F., Durand Baca, L., Sinca, F.,

ISSN: 2321-3914
Volume 3 Issue 3
September 2021
Impact Factor: 11.9
Subject: Zoology

et al. (2014) Herbivory Makes Major Contributions to Ecosystem Carbon and Nutrient Cycling in Tropical Forests. Ecology Letters,

14. Mattson, W.J. and Addy, N.D. (1975) Phytophagous Insects as Regulators of Forest Primary Production.
15. Nair, M.R.G.K. 1970. Insects and mites of crops in India. New Jack Printing Works Private Limited, Bombay.
16. Naik, O.S., Jayashankar, M. and Sridhar, V. 2016. Incidence of invasive banana skipper, Erionota torus Evans (Lepidoptera: Hesperiidae) in Karnataka.
17. Puri, S.N. and Ramamurthy, V.V. 2009. Insects and integrated pest management in the context of climate change-an overview. Ramamurthy, V.V., Gupta, G.P. and Puri, S.N. (eds.).
18. Mani, M. 2010. Origin, introduction, distribution and management of the invasive spiraling whitefly, Aleurodicus dispersus Russel in India.
19. Jamwal, V.V.S., Ahmad, H., Sharma, D., Srivastava, K. and Kumar, V. 2013. Comparative biological and morphometric attributes of Epilachna vigintioctopunctata Fabr. on brinjal and bitter gourd.
20. Arora, R. and Dhawan, A.K. 2013. Climate change and insect pest management Dhawan, A.K., Singh, B., Bhullar, M.B. and Arora, R. (eds). Insect Pest Management. Scientific Publishers, Jodhpur.

Author's Declaration

I as an author of the above research paper/article, hereby, declare that the content of this paper is prepared by me and if any person having copyright issue or patent or anything otherwise related to the content, I shall always be legally responsible forany issue. For the reason of invisibility of my research paper on the website/amendments /updates, I have resubmitted my paper for publication on the same date. If any data or information given by me is not correct I shall always be legally responsible. With my whole responsibility legally and formally I have intimated the publisher (Publisher) that my paper has been checked by my guide (ifany) or expert to make it sure that paper is technically right and there is no unaccepted plagiarism and the entire content is genuinely mine. If any issue arise related to Plagiarism / Guide Name / Educational Qualification / Designation/Address of my university/college/institution/ Structure or Formatting/ Resubmission / Submission /Copyright / Patent/ Submission for any higher degree or Job/ Primary Data/ Secondary Data Issues, I will be solely/entirely responsible for any legal issues. I have been informed that the most of the data from the website is invisible or shuffled or vanished from the data base due to some technical fault or hacking and therefore the process of resubmission is there for the scholars/students who finds trouble in getting their paperon the website. At the time of resubmission of my paper I take all the legal and formal responsibilities, If I hide or do not submit the copy of my original documents (Aadhar/Driving License/Any Identity Proof and Address Proof and Photo) in spite of demand from the publisher then my paper may be rejected or removed from the website anytime and may not be consider for verification. I accept the fact that as the content of this paper and the resubmission legal responsibilities and reasons are only mine then the Publisher (Airo International Journal/Airo National Research Journal) is

AIRO JOURNALS
Free / Unpaid
Peer Reviewed
Multidisciplinary
National

ISSN: 2321-3914
Volume 3 Issue 3
September 2021
Impact Factor: 11.9
Subject: Zoology

never responsible. I also declare that if publisher finds any complication or error or anything hidden or implemented otherwise, my paper may be removed from the website or the watermark of remark/actuality may be mentioned on my paper. Even if anything is found illegal publisher may also take legal action against me

Pushpanjali Kumari Singh