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"BIODIVERSITY AND CONTROL OF BRINJAL INSECT PESTS FROM REWA REGION"

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ABSTRACT

Biodiversity of brinjal refers to the variety of different cultivars of this plant species, each with unique morphological, physiological and agronomic traits. However, these cultivars are often affected by insect pests that can reduce yield and quality of the crop. Common insect pests of brinjal include Fruit & Shoot Borer, Whiteflies, Aphids, Thrips, Red Spider Mites, Cutworms, and Stem Borer. Proper pest management is essential to control these insects and protect the crop. Integrated pest management strategies, such as cultural practices, use of resistant varieties, biological control and selective use of pesticides, can help reduce the impact of insect pests on brinjal production.

KEYWORDS: *Biodiversity, brinjal, Insect Pests and Rewa.*

INTRODUCTION

Biodiversity refers to the variety of living organisms present in a given ecosystem. Brinjal (eggplant) is a widely cultivated crop and is prone to attacks by various insect pests. These pests can cause significant damage to the crop, affecting its yield and quality. The biodiversity of brinjal insect pests includes various species of mites, aphids, beetles, caterpillars, and fruit flies, among others. Effective pest management practices are essential to minimize the damage caused by these pests and ensure a healthy crop.

In India, Brinjal is cultivated since last 4000 years and food production accounted as 8.7 million MTs with an area of 0.53 million hectares (DGCIS, 2008). The prominent species of Brinjal refer to S. melongena, S. aethiopicum and C. macrocarpon are interfertile with their respective wild ancestors (Daunay, et al. 1991). In India, it is widely cultivated in 8 states, practically on all soils from light sand to heavy clay and in almost all eight vegetable growing zones including Maharashtra- Madhya Pradesh ((Zone - VII). Although several varieties of brinjal are cultivated, the expected yield of the crop is not achieved so far because of the crop damage caused by the insect pests. Insect pests are most limiting factor for accelaring crop yield.

The Brinjal is attacked by varieties of insect pests such as fruit and stem borers, defoliators, cell sap suckers, stem girdlers, etc. Review of literature indicates Fletcher (1722), Katiyar et al. (1976), Lall (1964), Subba Rao et al. (1968, 1969), Deshmukh et al. (1977), Patel et al. (1988), Mall et al., (1992), Gapud & Canapi (1994), Dhamdhere et al., (1995), Roy et al., (1995), Sudhakar et al. (1993), Shrinivasan (2009), Shivalingaswamy & Satpathy (2007), Sidhu & Datta (2007), Sathe & Chougule (2014), Sathe & Gangate (2015), Sathe (1998,2003, 2014, 2015), Sathe & Oulkar (2010), Sathe et al. (2015) etc. worked

on insect pest management on egg plant and some other crops. Ecological pest control strategy has great importance in ecofriendly control. The present work will add great relevance in Integrated pest management of Brinjal insect pests.

MATERIALS AND METHODS :

The present study was carried out from Rewa region of Madhya Pradesh during the years 2021-22. Rewa district of India is situated between 24° 18' and 25° 12' north latitudes and 81° 2' and 82° 18'. The district is bounded on the north by Uttar Pradesh, on the east and southeast by Sidhi, on the south by Shahdol, and on the west by Satna. Rewa district is part of Rewa Division and has an area of 6,240 km^2. Rewa district is a district in the state of Madhya Pradesh, India. It is known for its abundant natural resources, including forests, minerals, and fertile agricultural land. The district is also a major producer of crops such as rice, wheat, maize, and brinjal. The cultivation of brinjal in the district is vulnerable to attacks from insect pests, which can cause significant damage to the crop and affect its yield and quality. Effective pest management practices, including the use of integrated pest management (IPM) techniques, are necessary to minimize the impact of insect pests on brinjal cultivation in Rewa district.

Diversity, survey and abundance of insect pests of S. melongena was studied by spot observations and by collecting insect pests which were associated with the above crop by one man one hour search methods from different study spots from Rewa region. The collected insects were identified by consulting appropriate literature. The observations were continued through out the year at weekly interval. Natural enemies have been recorded by spot observations and also by collecting various immature stages of pests from field and later rearing these stages on their natural food plant for screening parasitoids. The microbes from field collected pest stages have been isolated (Sathe & Oulkar, 2010) and identified for making the records. Observations were also taken on the abundance of pests with respect of rainfall, temperature and humidity. A twig of 1 ft length was selected for noting the insects for seasonal abundance. The pests have also been surveyed on other crops and identified consulting appropriate literature.

RESULTS AND DISCUSSION :

Biodiversity of brinjal (aubergine/eggplant) refers to the variety of different types of this plant species. There are many cultivars of brinjal, each with different morphological, physiological and agronomic traits.Insect pests that commonly affect brinjal include:

- Fruit & Shoot Borer (Leucinodes orbonalis)
- Whiteflies (Bemisia tabaci)
- Aphids (Aphis gossypii)
- Thrips (Thrips tabaci)
- Red Spider Mites (Tetranychus spp)
- Cutworms (Agrotis spp)
- Stem Borer (Scirpophaga incertulas)

These insects can cause significant damage to the plant and reduce yield, so proper pest management is important for brinjal growers. Biodiversity can help control insect pests in brinjal crops by providing habitats for natural enemies, reducing pest populations and minimizing the need for chemical pesticides.

Intercropping: Growing multiple crops in the same field can increase diversity, creating habitats for beneficial insects and reducing pest populations.

Crop rotation: Rotating crops can disrupt the life cycles of insect pests and reduce pest populations.
Companion planting: Planting companion crops with brinjal can provide habitats for beneficial insects and reduce pest populations.

Use of natural predators: Encouraging the presence of natural predators, such as ladybugs and lacewings, can help control insect pests.

Integrated pest management: A combination of biological and cultural control methods can effectively manage insect pests and reduce the need for chemical pesticides. It's important to note that biodiversity alone may not fully control all insect pests, and a combination of methods is typically necessary for effective pest management.

Fletcher (1922) reported that the larvae of Spilosoma obliqua (Walker) were found damaging several types of crops including cereals, pulses, oil seeds, fibers, ornament and vegetables. Katiyar et al.(1976) studied the effect of feeding of brinjal, radish, mustard, cauliflower and tomato on larval development of S. obliqua under laboratory conditions. There was a complete inhibition of larval development on tomato leaves and brinjal was consistently significantly inferior to cauliflower, radish and mustard.

Deshmukh et al. (1977) tested 16 host plants for S. obliqua. The pest was not able to complete its life cycle on Cardia myxa, Solanum melongina, Ocimum gratissium, Fiscus bengalensis, Acalypha corarata and Cannabis sativa. According to Mall et al. (1992) S. melongena was infected by a number of insect pests including jassid A. biguttula biguttula ; aphid Aphis gossypii Glover; epilachna beetle E. vigintioctopunctata and shoot and fruit borer L. orbonalis during different stages of its growth in most of the tropical countries including India. The losses caused by these pests vary from season to season depending upon environmental factors (Patel et al., 1988). Seasonal incidence of jassid, aphid, epilachna beetle and shoot and fruit borer were more prevalent during vegetative phase of the crop upto the 3rd week of September when the average temperature and humidity were more than 28oC and 80% respectively. These conditions were more conducive for epilachna beetle and shoot and fruit borer. At the initiation of fruiting stage in October, the intensity of jassid and aphid was increased along with the shifting of borer infestation from shoots to fruits at average temperature and humidity ranging between 20-25oC and 50-72% respectively were responsible for multiplication of jassid and aphid while, rainfall played negative role for these pests. Fruit infestation was maximum at the initial stage of fruiting which declined slowly with the advent of winter during December (Mall et al. 1992).

Sachan and Gangwar (1990) studied the seasonal incidence of insect pests of cabbage, cauliflower and knol khol from Shilong region, India. Their report indicated that the above crops were attacked by cabbage butterfly Pieris brassicae (Linn.), cabbage aphid Brevicoryne brassicae (Linn.), mustard aphid L. erysimi, cutworm Agrotis ipsilon Root. and A. flammatra S.M., cabbage looper Plusia orichalcea, Trichoplusia sp. and diamond back moth Plutella xylostella (Linn.), P. brassicae was found throughout the year with maximum activity during February to October. Cabbage aphid was next to babbage butterfly in damaging the crop and active from November to April while cutworm showed more activity during July to November. In the present study, jassids, fruit borer and scale insects were found through the year on brinjal while jassids, aphids, epilachna beetle, shoot and fruit borers were prevalent during the vegetative phase of the brinjal crop.

According to Mishra (1993) based on the pest control ability, fruit yield and cost : benefit ratio cypermethrin / fenvalerate 0.05 kg.a.i./ha were the best suitable insecticides for control of brinjal fruit and shoot borers. Biotic factors play an important role in ecofriendly pest control (Sathe & Oulkar, 2011). According to Tewari and Sardana (1990) an unusual heavy parasitization of L. orbonalis was noted due to a braconid parasitoid, Bracon sp. During September - October 1985 the survey studies was conducted on the natural enemies mortality factors of L. orbonalis around Bangalore. The parasite pupated easily in the rearing petridishes under laboratory conditions. The minimum 9.21% parasitism was noted with the first picking and was increased in subsequent pickings. Maximum 28.10% was noted in Sixth picking in September then it showed a declined trend. Figure-4. L. orbonalis damage. A. destructor According to Dogra et al. (2001) the peak population of L.erysimi and B. brassicae was recorded during second week of March with maximum and minimum temperature of 22.5oC and 10.3oC and no rainfall was recorded during the same period. The maximum population of Myzus

persicae (Sulzer) was observed during the last week of January with maximum temperature of 4oC, relative humidity 58% and no rainfall.

Bilasini and Singh (2012) noted the larvae as well as adults of C. septumpunetata in colonies from first week of December (0.05 predaotr/ sample) in the first year and its peak population was noted during middle of February which coincided with the peak of aphid population. In the second cropping season (2004-05), the prey population appeared during last week of November with 1.45 aphids/sample.

Singh and Arya (2001) studied insecticidal activity of petroleum ether extract of mustard seeds against mustard aphid, L. erysimi. The extract they tested was found very effective which caused 100% mortality in the pest. Application of phorate or carbofuran along with seed followed by need based application of Carbaryl 0.2% or malathion 0.1% or quinolphos 0.05% were effective in controlling aphids, jassids, epilachna beetles and fruit borers and increased the returns to the farmers (Raghunath et al., 1989). According to Verma (1992) one spray of dicofol followed by one spray with any of endosulfan, monocrotophos and phosphamidon can control jassids, white flies, fruit borers and mites Ant nesting and damage.

According to Shreedevi and Chitra (1993) carbaryl was superior to all the other treatments which recorded 81.47% efficacy. The efficacy of plant extracts was found to be in the following order. RD9 Repellin > Neemicide > Vapenik > Wellgro. Sathe and Gangate (2015) reported the occurrence of A. dispersus on Brinjal from Kolhapur region, throughout the year. However, its population was found increased in hot months and declined in monsoon months. The same trend was confirmed in the present study. According to Wright and Diez (2005) there were distinct seasonal variations in A. destructor numbers on bananas in Hawaii and varietal differences in population densities and proportions of plants infested. The population was found increased during the months from October to February on Cavendish and apple.

CONCLUSION:

Biodiversity can play an important role in controlling insect pests in brinjal cultivation. This can be achieved through intercropping with diverse plant species, providing habitats for beneficial insects, and using natural pest control methods such as biological control. Additionally, integrated pest management strategies that combine chemical and biological control methods can help to minimize pesticide use and maintain biodiversity in agricultural landscapes.

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