

Diversity of insect pest in rice crop at Nawargaon, dist Chandrapur (Maharashtra)

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Abstract

Several hundred species of Insects attack defeat the rice crop. Present study was undertaken in rice crops at the farmer field of Nawargaon, in Chandrapur District during kharif sessions (July to December) of the years 2019 and 2020. Sweep nets and light traps were used to catch the insects. In all 965 insects belonging to 28 specimens representing 14 families and 6 orders were collected during that time.

Keywords: Diversity, Insect pest, Rice crop, Economic loss, Nawargaon

Introduction

Since the green revolution, there has been a steady increase in the number of insect pests in India. (Sain & Prakash, 2008) [19]. In India, reports of 300 different insect species attacking rice crops at various stages have been made. Of these, 20 species have been identified as the main pests, producing yield losses ranging from 21 to 51% (Singh and Dhaliwal, 1994). In the Chandrapur District's rice ecology, 28 insect pests have been identified by Jadhao and Khurad (2011). The main Examining the variety and number of insect pests during various paddy plant growth stages was the main objective of the current experiment. Therefore, the rice fields in Nawargaon, District Chandrapur, Maharashtra State were used for the current study. The primary goal is to investigate the variety and population of insect pests during the rice plants' growth phases in connection to integrated pest management of the paddy crop. The current study was carried out in Nawargaon, Chandrapur District, Maharashtra, where paddy is grown for food.

Method and materials

The investigation was done in a rice field that was privately held in Nawargaon. The study period was of 4 months, from August –December, 2019 and 2020. With the help of fine forceps, the insects were removed from flower petals, dried leaves, leaf blades, and the ground layer. Additionally, the ground next to the plants was combed. (Hill, 2008) [7] At regular intervals, insects were collected using sweep nets (Noyes, 1982) [12], and they were then promptly transferred

to polythene bags. Insects that are drawn to light were also caught using the light trap method. The light attracted insects, which passed through the glass vials in 70% ethyl alcohol in the Lab Department of Zoology, Shri Dnyanesh Mahavidyalaya Nawargaon. The collected specimens were counted and then sorted into different taxonomic units, and observed under stereo-zoom microscope. The insects thus collected were critically identified following identification key suggested by R F Chapman 2013 [3].

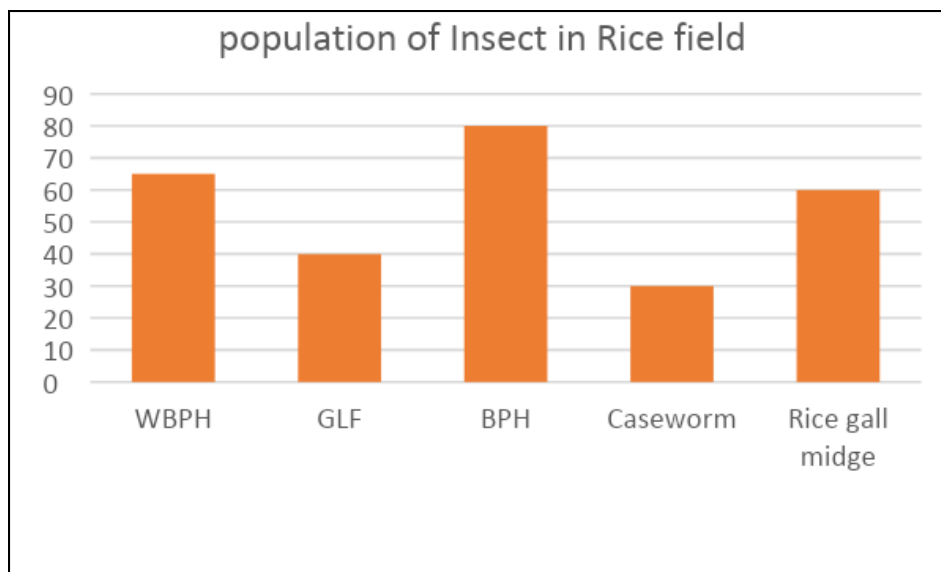
Results & discussion

In the present study of 28 insect pests were collected in the paddy region; they were gathered, recognized, and documented in various phases. There were discovered to be 22 minor pest species and 6 significant pest species. The existence of a wide variety of insect pests in the Nawargaon area is shown by (Table no. 1). The main insect pests that attack rice produce distinct symptoms in the field, which allow us to locate the infected area. Every plot was scrutinized in great detail. Insects that cause damage were gathered from the field and preserved correctly. Damage was done to paddy from the nursery stage to the milking or grain production stage by the yellow stem borer. Rao and Chalam (2007) [18] investigated the planthopper fauna's diversity in South India's rice and sugarcane crop ecosystems (Delphacidae: Hemiptera). During the 1970s and 1980s, outbreaks of the pest were documented in a number of regions of the nation (Subramanian, 1992) [22].

Table 1: Collection species in rice field during 2019-2020

Sr.no.	Common name	Scientific name	Family	Order
1	Rice worm	<i>Menida versicolor</i>	Pentatomidae	Hemiptera
2	Odorous bug	<i>Cletus rubidiventris</i>	Coreidae	Hemiptera
3	Green solidier bug	<i>Nezara viridula</i>	Pentatomidae	Hemiptera
4	Green beetle	<i>Anomala grandis</i>	Scarabaeidae	Coleoptera
5	Leaf hooper	<i>Bothrogonia tibetana</i>	Cicadellidae	Hemiptera
6	Stem borer	<i>S.incertulus</i>	Crambidae	Lepidoptera
7	Gundhi bug	<i>Leptocoris vericorins</i>	Laydidae	Hemiptera
8	Rice case worm	<i>Paraponyx stagnalis</i>	Crambidae	Lepidoptera
9	Rice leaf folder	<i>Cnaphalopropis medinalis</i>	Crambidae	Lepidoptera
10	Corn earworm	<i>Hlicoverpa armigera</i>	Nocpuidae	Lepidoptera
11	Bird Cherry aphid	<i>Rhopalosiphum padi</i>	Aphididae	Hemiptera
12	Padi corn aphid	<i>Rhopalosiphum maidis</i>	Aphididae	Hemiptera
13	Condinenpal swift	<i>Parnara ganga</i>	Hesteriidae	Lepidoptera

14	White grub	<i>Lucopholis lepidophora</i>	Scaravabaeidae	Coleoptera
15	Elephant beetle	<i>Xylotrupes siamensis</i>	Scarabaeidae	Coleoptera
16	Rice whorl maggot	<i>Hydrellia Philippina</i>	Ephydriidae	Diptera
17	Common evening butterfly	<i>Melanitis leda</i>	Nymphalidae	Lepidoptera
18	Rice grasshopper	<i>Oxya hyla</i>	Acrididae	Orthoptera
19	Leaf beetle	<i>Monolepta quadriguttata</i>	Shryaomelidae	Coleoptera
20	Rice Green leaf hopper	<i>Nephotettix nigropictus</i>	Cicadellidae	Hemiptera
21	Brown Plant Hopper	<i>Nilaparvata lugens</i>	Delphacidae	Hemiptera
22	White backed plant hopper	<i>Sogatella furcifera</i>	Delphacidae	Hemiptera
23	White leaf hooper	<i>Cofana lineata</i>	Cicadellidae	Hemiptera
24	Dark rice field mosquito	<i>Psorophora Columbiae</i>	Culicidae	Diptera
25	Green leaf hopper	<i>Nephotettix virescens</i>	Cicadellidae	Hemiptera
26	Zigzag leaf hopper	<i>Recilia darsalis</i>	Cicadellidae	Hemiptera
27	Rice gall midge	<i>Orseolia oryzae</i>	Crambidae	Diptera
28	Rice thrips	<i>Stenchaetothrips biformis</i>	Thripidae	Thysanoptera



Based on the extent of the damage, the insect pest species in the rice fields were divided into major and minor pest. The main pests during the kharif season of the years 2019 and 2020 were the Corn earworm (*Helicoverpa armigera*) Rice caseworm (*Paraponyx stagnalis*), brown plant hopper (*Nilaparvata lugens*), rice gundhi bug (*Leptocoris varicornis*), stem borer (*Chilo partellus*), and Rice leaf folder (*Cnaphalocrocis mendinalis*) corn earworm (*Helicoverpa armigera*) are some of the pests that can affect crops. White leafhoppers (*Cofana lineata*), rice bugs (*Menida versicolor*), and stink bugs (*Cletus rubidiventris*) are examples of minor pests. Elephant beetle (*Xylotrupes siamensis*), Green sting bug (*Nezara viridula*) rice grasshopper (*Oxya hyla hyla*), green beetle (*Anomala grandis*), and hopper (*bothrogonia tibetana* and *Diostrombus* sp. nr. *carnosa*), bird cherry-oat aphid (*Rhopalosiphum padi*), continental swift (*Parnara ganga*), white grub (*Leucopholis lepidophora*), leaf beetle (*Monolepta quadriguttata*) common evening butterfly (*Melanitis leda*) corn aphid (*Rhopalosiphum padi*) and green leafhopper (*Nephotettix nigropictus*, *N. virescens*) were further noted in the area.

In temperate and tropical countries in Asia, Australia, and Africa, rice fields are frequently infested by the insect known as the rice leaf folder (*Cnaphalocrocis medinalis*). As early as 2009^[24], 2013, and 2010 (Prakash *et al.*, Tanwar *et al.*, and Prakash), early indications of this pest were identified. Rice gundhi bug (*Leptocoris varicornis*) is most abundant pest in subtropical and tropical rice.

The morning and evening hours are when it is most active (Akbar, 1958)^[1].

In China, Japan, South and Southeast Asia, Brown plant hoppers (*Nilaparvata lugens*), a species that can inflict severe damage, are common. Additionally, the bulk of known rice virus infections are spread by planthoppers and leafhoppers. The viral diseases grassy stunt and ragged stunt are disseminated throughout South and Southeast Asia by *Nilaparvata lugens* (Suenaga, 1963)^[23]. According to Chantaraprapha and Litsinger (1986)^[4], the rice caseworm (*Paraponyx stagnalis*) infects rice plants from July to November and is found in India, Australia, Sri Lanka, Africa, and South America.

In West Asia, Africa, and upland savannas, stem borers (*Chilo partellus*) are reported to infest plants from the seedling stage to maturity. The five most prevalent rice stem borer species in India are found in populations in Kerala, Punjab, and Haryana (Prakash *et al.*, 2005)^[14]. In the kharif seasons of 2019 and 2020, the corn earworm (*Helicoverpa armigera*) was discovered to be a significant pest. Similar results were found by Shylesha *et al.* (2006)^[20] who investigated the variety of insects in rice crops and identified leaf folder, case worm, and gundhi bug as significant pests in the region. Other regions with pests include Australia, Africa, China, South and Southeast Asia, and the white leafhopper (*Cofana lineata*). In an Asian rice field, the rice insect (*Menida versicolor*) population is quite variable, and damage only lasts a short period and spreads slowly.

stink bug (*Cletus rubdiventris*) pest occurs in Asia, Africa and USA. When a rice grain is at the milk and dough stage of development, both adults and nymphs feed on it, leaving some or all of the grain empty (Ito, 1978) ^[8].

Bothrogonia tibetana and *Diostrombus* sp. nr. *carnosa* with *Anomala grandis* and *Melanitis leda* are minor pest in the region, According to Ghosh and Singh (2000) ^[6], the Indian aphididae family consists of roughly 653 species in 208 genera, with 414 subspecies most abundant in Northeast India.

The current study led to the discovery of the avian cherry-oat aphid (*Rhopalosiphum padi*) and the maize aphid (*Rhopalosiphum maidis*). Typically found in temperate and tropical Asia's rice-growing regions are the elephant beetle (*Xylotrupes siamensis*), rice grasshopper (*Oxya hyla hyla*), continental swift (*Parnara ganga*), white grub (*Leucopholis lepidophora*), green stink bug (*Nezara viridula*), leaf beetle (*Monolepta quadriguttata*), and green leafhopper (*Nephotettix virescens*).

Chowdhury *et al.* (2011) ^[5] conducted research on the leafhopper fauna related to the Tripura region's rice ecology. More than a hundred different bug species have been found to harm rice worldwide, according to Pathak (1968) ^[13].

Thus, the current study showed that, in relation to variations in weather, paddy insects have a particular impact on various rice kinds. In Karnataka's rice habitats, the *Nilaparvta lugens* (Stal.) were the dominating species in South India. Between 1958 and 1962, the brown plant hopper (*Nilaparvata lugens* (Stal)) made its intermittent appearance in India. However, in 1973, Kerala experienced its first serious outbreak, which reduced grain output by 10–70% (Puri and Mote, 2003) ^[17]. Several outbreaks in various rice-growing regions across the country occurred after that. According to estimates from Kataki *et al.* (2001) ^[10], this pest affects output by 40–57%. In Punjab, India, the white-backed planthopper *Sogatella Sogatella furcifera* (Horwath), a white-backed planthopper, was found on rice. *furcifera* (Horwath) was discovered on rice. In contrast to what Nasiruddin and Roy (2012) ^[11] observed, Orthoptera was the most abundant order in the current study. Hemiptera, Lepidoptera, and Coleoptera were the next most abundant orders. The geographic and climatic diversity in these study sites may be the cause of this. In this field area, the widest variety of paddy insect pests were seen. The highest population record for the *Nilaparvata lugens*, White backed PlantHopper, green leaf Hopper and their serious damage in rice fields is about 70-80% damage. Insects that may be to blame for financial losses include grasshoppers and brown plant hoppers, which were more prevalent in rice fields. It aids in taxonomy and the development of diagnostic tools for identifying pest species and implementing the best management strategies to keep them at a normal economic level. The variety of insects shows their capacity for environmental adaptation, and their dominance has an impact on the make-up of their communities.

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