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Pest incidence of maize crop in regions of Ranchi and Khunti

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Abstract

The occurrence and per cent infestation of several insect pests on maize (*Zea mays L.*) was examined with survey of different eight locations of farmer's fields during kharif in 2010-11. The survey is done at research farm BAU and in different villages - Thakurgaon, Pithoriya, Mandar, Manatu, Ormanjhi & Chandewe of Ranchi district and village Khunti of Khunti district in Jharkhand state. The five pests were observed under surveyed area stem borer (*Chilo partellus* Swinhoe), leaf folder (*Marasmia trapezalis* Guenee), grasshopper (*Hieroglyphus nigrorepletus* Bolivar), termite (*Odontotermes obesus* Rambur) and cob borer (*Helicoverpa armigera* Hubner). The observations are taken by visually according to the leaf injury rating scale (1-9) in the case of stem borer. For grasshopper observations are taken by ten sweep net methods and counted for record. Observations of leaf hoppers recorded by examining the leaves terminal, central and basal parts of the plants (crop sampling). The termite occurrence recorded by presence of termite mounds. Incidence of cob borer was recorded by randomly selected 5 spots of crop field and count total plants & 5 plants randomly selected having cob damage at that spots. The cob damage was converted into per cent cob damage. The occurrence of stem borer, leaf folder, grasshopper, termite and cob borer was recorded in these locations. The maximum per cent infestation was recorded by stem borer (19.6), leaf folder (8.6) and termite (4.6) at research farm BAU and grasshopper (5.3) at Khunti and cob borer (3.2) at Manatu.

Keywords: Maize (*Zea mays L.*), Stem borer (*Chilo partellus* Swinhoe)

Introduction

Maize (*Zea mays L.*) is a versatile crop, can be grown across a range of agro-ecological zones. Every part of maize plant has economic value the grain, leaves, stalk, tassel and cob can all be used to produce a large variety of food and non food products. Maize has varied usages from food preparation to poultry feed. The potential contribution of maize is high towards more nutritive food for human consumption (UN, 2000). In India, it is the third most important cereal after wheat and rice. In India, about 28% of maize produced is used for food purpose, about 11% as livestock feed, 48% as poultry feed, 12% in wet milling industry (for example starch and oil production) and 1% as seed (AICRP on Maize, 2007).

During the year 2010-11, India registered a production of 14.06 mt with an average productivity of 1959 kg/ha from an area of 7.18 mha (Anon., 2010-11). Important maize growing states in India are Andhra Pradesh, Bihar, Madhya Pradesh, Maharashtra, Karnataka, Punjab, Rajasthan and West Bengal. In Andhra Pradesh, maize occupies an area of 7.56 lakh hectare with annual production of about 31.94 lakh metric tonnes (Department of Agriculture, Govt. of Andhra Pradesh, 2009-10). Due to pests, yield loss is recorded 26.7 to 80.4 per cent in different agro climatic regions of India (Chatterji *et al.*, 1969, Singh and Kanta 2006). Stem borers are important pests which alone can cause a yield loss of 12.9 per cent estimating to 0.39MT of corn (CIMMYT, 2002).

In spite of increase in the area under this crop, the productivity is still considerably low which may be due to several reasons. Insect pests are one of the major limiting factors for low yield of maize. More than 130 insect pests have been reported to cause damage to maize in India but only about a dozen cause economic loss (Sarup *et al.* 1978, Zaidi & Singh 2005). Kumar and co-workers (2001) were studied the incidence of 31 pests in field conditions along with storage at Bajaura district Kullu in maize and reported that under field conditions, the crop was damaged by soil dwellers, foliage feeders, stem borers, flower feeders and cob feeders. Biradar *et al.* (2011) studied seasonal incidence of various pests of maize at Dharwad, and reported that aphid and cobworm were noticed in rabi crop and stem borer were maximum in kharif maize.

In different agro climatic region the insect pests incidence of maize varies. The insect pest complex changes in time and space.

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Keeping this view the survey was conducted to record incidence of insect pests of maize in some of the region of Ranchi and Khunti of Jharkhand.

Materials and methods

The occurrence and per cent infestation of several insect pests on maize (*Zea mays L.*) was examined with survey of different eight locations of farmer's fields during kharif in 2010-11. The survey is done at research farm BAU and in different villages - Thakurgaon, Pithoriya, Mandar, Manatu, Ormanjhi & Chandewe of Ranchi district and village Khunti of Khunti district in Jharkhand state.

The observations are taken by visually according to the leaf injury rating scale (1-9) in the case of stem borer (Tab.1). For grasshopper observations are taken by ten sweep net methods and counted for record. Observations of leaf hoppers recorded by examining the leaves terminal, central and basal parts of the plants (crop sampling). The termite occurrence recorded by presence of termite mounds along damaged plants. Incidence of cob borer was recorded by randomly selected 5 spots of crop field and count total plants & 5 plants randomly selected having cob damage at that spots. The cob damage was converted into per cent cob damage.

Table 1: Rating scale for plant infestation

Visual rating	Description
1	Apparently healthy plant.
2	Plant showing slightest damage on leaf or few pinholes on 1-2 leaves.
3	Plant showing more pin holes or shot holes on 3-4 leaves.
4	Plants showing injury (pin holes, shot holes, slits) in about one-third of total number of leaves and mid-rib tunneling on 1-2 leaves, if any.
5	Plants showing 50% of leaf damage (pin-holes, shot-holes, slits, streaks) and mid-rib damage, if any.
6	Plants showing varied types of leaf injury in about two-third of the total number of leaves.
7	Plants with every type of leaf injury and almost all the leaves damaged.
8	The entire plant showing maximum leaf injury and likely to form dead-heart (such plants usually show stunted growth).
9	Dead-heart

Result and discussion

The occurrence of stem borer, leaf folder, grasshopper, termite and cob borer was recorded in these locations (Tab. 2). The maximum per cent infestation was recorded by stem borer (19.6), leaf folder (8.6) and termite (4.6) at research farm BAU and grasshopper (5.3) at Khunti and cob borer (3.2) at Manatu. The next maximum per cent infestation was recorded by stem borer (18.6) at Manatu, leaf folder (8.0) at mandar, termite (3.6) at Khunti and grasshopper (4.6) at Chandewe. Biradar *et al.* (2011) were revealed data that the

infestation by *C. partellus* was higher in comparison of other insect pests. The minimum per cent infestations were obtained by stem borer (11.5), grasshopper (1.2), termite (1.0) and cob borer (2.3) at Khunti, Pithoriya, Thakurgaon, Manatu, and Chandewe respectively. Leaf folder (1.2%) was presented as minimum infestation at Manatu and Khunti. The survey was earlier carried out by various workers (Sinha and Verma, 1978; Saeed, 1979; Naz *et al.* 2003) who reported stem borer damage in field up to 50 per cent which finds similarity with present findings.

Table 2: Incidence of insect pests of maize showing with survey in different villages of Ranchi and Khunti area during kharif 2010-11

Location	Plant damage by different insect pests (%)				
	Stem borer	Leaf folder	Grass hopper	Termite	Cob borer
Research Farm BAU	19.6	8.6	-	4.6	-
Thakurgaun	15.5	6.3	1.2	2.3	-
Pithoriya	15.0	5.6	-	3.2	-
Mandar	13.6	8.0	1.6	1.2	-
Manatu	18.6	6.5	2.6	1.0	3.2
Ormanjhi	16.6	5.3	2.2	1.6	-
Chandewe	13.2	7.2	4.6	2.1	2.3
Khunti	11.5	4.2	5.3	3.6	-

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