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## Field screening of rice genotypes against yellow stem borer, gundhi bug, green leafhopper and leaf folder

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### Abstract

The thirty-three rice genotypes including four checks: NDR-359 (National check), Karma Mahsuri (Zonal check), HRI-174 (Hybrid check) and Rajeshwari (Local check) were screened under natural environment during *Kharif* - 2021. The experiment was laid down on randomized block design (RBD) with three replications at BTC College of Agriculture and Research Station, Bilaspur (IGKV), Chhattisgarh. The maximum infestation (white ears) was recorded by yellow stem borer in RNR-28399 (6.2%) while TRC- 2020-9 and RNR-28399 recorded maximum infestation percentage (1.9%) against gundhi bug. In case of green leaf hopper Rajeshwari (LC) was recorded maximum infestation percentage (1.9%) whereas RNR-28399 was recorded maximum infestation percentage (1.8%) for leaf folder.

**Keywords:** Yellow stem borer, gundhi bug, green leafhopper, leaf folder

### Introduction

Rice (*Oryza sativa* L.) (2n = 24), belong to the family Gramineae (Poaceae). The genus *Oryza* has two accommodate and 22 wild species. *Oryza sativa* gives a higher yield and it is also known as Asian rice. Rice is grown in variable agro-climatic and agro-ecological systems.

The rice crop is attacked by more than a hundred insect species but only a few causes significant losses. Losses led by the insect pest are the main obstacles to obtaining a higher yield of rice (Rai *et al.*, 2000) [1]. The yellow stem borer (YSB), *S. incertulas* (Crambidae: Lepidoptera), is the most common and devastating pest of rice, causing a 27-34% yearly output loss (Prasad *et al.*, 2007) [2]. It gives damage to tillers during the vegetative stage which accounts for 'Dead heart' (shoots become dry) and damage at the panicle stage leads to 'White ear' (chaffy grains). Gundhi bug makes the grain discoloured, deformed, empty grains and gives qualitative and quantitative losses. Another serious pest is leaf folder which gives scorching symptoms to the leaves of paddy (Bashir *et al.*, 2004) [3]. Leaf hoppers (Cicadellidae: Hemiptera) considered as pest and vectors of economically important crops (Das and Devee, 2017) [4].

Natural resistance in plants against insect pest is important aspects for eco-friendly management. Knowledge of varieties resistance level is also helpful for good management strategies. The interaction between plant-feeding insects and their host plants is known as host plant resistance. It allows plants to avoid, tolerate and recover from insect pest attack and it has proven to be a successful insect tool in many crops.

### Materials and Methods

The research work was conducted on *Kharif*-2021 at research farm of Barrister Thakur Chhedilal College of Agriculture and Research Station, Bilaspur, Indira Gandhi Krishi Vishwavidyalaya, Raipur, Chhattisgarh in Randomized block design (RBD) with 3 replications with the plot size 10 sq. m. The distance between rows was maintained at 20 cm while distance between plots was at 50 cm. Seedlings with age of 21 days old were transplanted in row to row and plant to plant spacing. The N: P: K dose was 100:60:40 kg per ha.

Five randomly selected plants were tagged and used from each replication of the genotype for recorded observation on the basis of symptoms at reproductive stage that was white ears were calculated with help of mentioned formula.

$$\text{White ear (\%)} = \frac{\text{Total number of white ear per hill}}{\text{Total number of ear per hill (infected+healthy)}} \times 100$$

Observation of gundhi bug was recorded by calculated damaged grains during the dough stage (ripening period) and total number of grains.

$$\text{Damaged grains (\%)} = \frac{\text{Number of damaged grains}}{\text{Total number of grains}} \times 100$$

Green leafhopper was recorded by computing total number of damaged leaves (from upward to downward direction leaves become yellowish) and healthy leaves during the panicle initiation stage and percentage had calculated using this formula.

$$\text{Damaged leaves (\%)} = \frac{\text{Number of damaged leaves per hill}}{\text{Total number of leaves per hill}} \times 100$$

Leaf folder was recorded at the panicle initiation stage (reproductive period) by estimating the number of infected leaves (scarping in green tissue of leaves) and healthy leaves.

$$\text{Damaged leaves (\%)} = \frac{\text{Number of damaged leaves per hill}}{\text{Total number of leaves per hill (damaged+healthy)}} \times 100$$

## Result and Discussions

### Yellow stem borer

The total percentage of white ears was reported from 1.3 to 6.2%. The genotype RNR-28399 recorded maximum infestation percentage (6.2%) followed by Kaveri-7425 (6%) and MTU 1347 (4.2%) whereas genotypes KJT 2010-3 and HRI-205 were reported minimum mean of infestation percentage (1.3%).

### Gundhi bug

Out of 33 genotypes, infestation percentage was recorded 0-1.9%. The genotypes TRC- 2020-9 and RNR-28399 recorded maximum infestation percentage (1.9%) followed by Rajeshwari (LC) (1.8%) and MTU-1347 (1.6%) whereas genotypes such as OROI-8-IR 88228-33-3-5-2, PHI-20106, MEPH158, MTU 1275, NWGR 8001, PHI-20108, MEPH-159, AD 16124, PHI-20109, Karma mahsuri (ZC), NRH-30, BPT 3050, PHI-20107, US- 375 and WGL 1377 were reported no infestation.

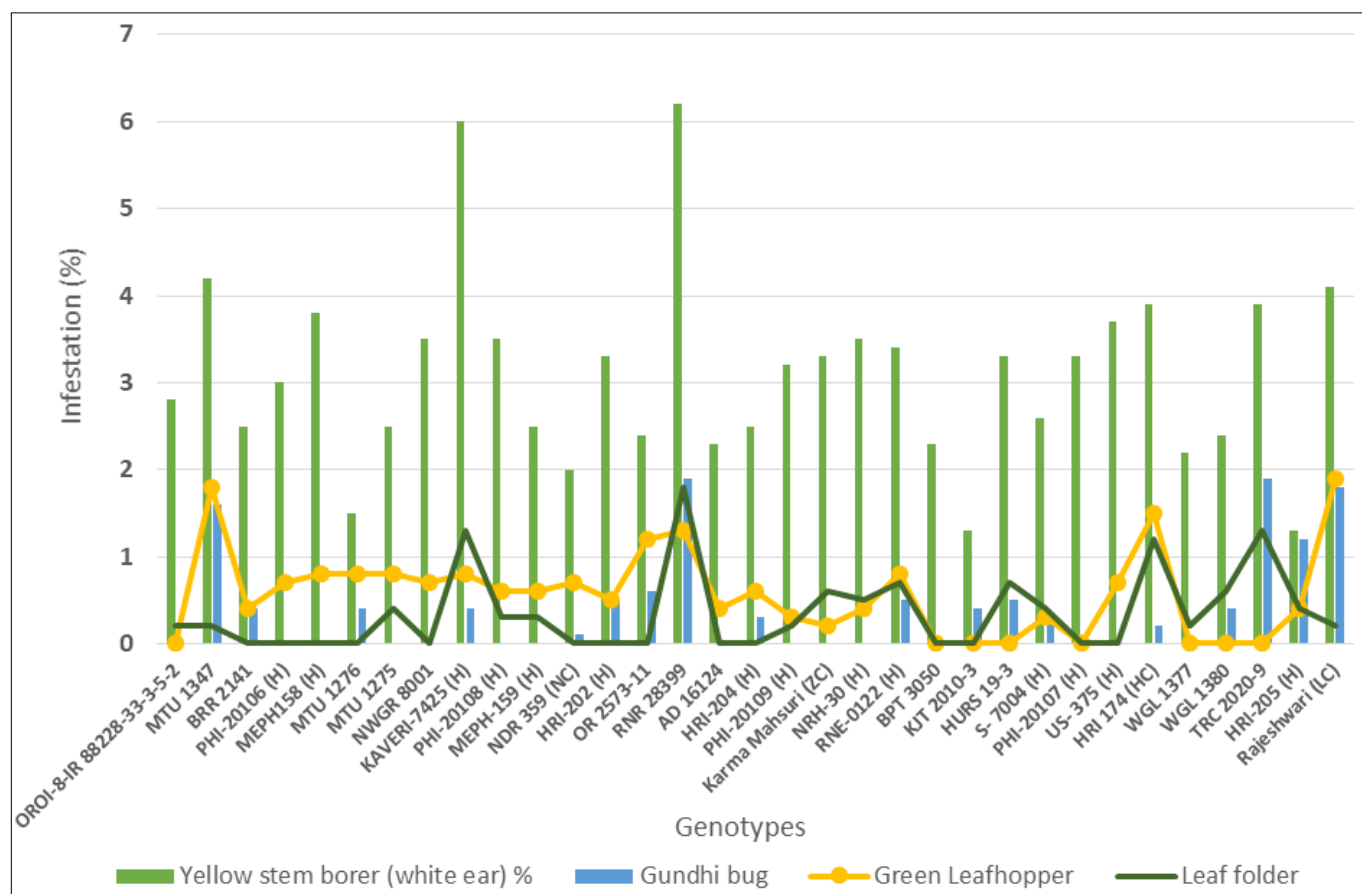
**Green leafhopper:** The total infestation percentage was found 0-1.9%. The genotype Rajeshwari (LC) recorded maximum infestation percentage (1.9%) followed by MTU 1347 (1.8%) and HRI- 174 (HC) (1.5%) whereas genotypes viz., OROI-8-IR 88228-33-3-5-2, BPT 3050, KJT 2010-3, HURS 19-3, PHI-20107, WGL 1377, WGL 1380, TRC 2020-9 were reported no infestation.

**Leaf folder:** The 0-1.8% of infestation was found by leaf folder. The genotype RNR-28399 recorded maximum infestation percentage (1.8%) followed by Kaveri-7425 (1.3%) and HRI- 174 (HC) (1.2%) whereas genotypes such as BRR 2141, PHI-20106, MEPH158, MTU 1276, NWGR 8001, NDR 359 (NC), HRI-202, OR 2573-11, AD 16124, HRI-204, BPT 3050, KJT 2010-3, PHI-20107 and US- 375 were reported no infestation.

Table No. 1 and Fig 1 showed infestation (%) against stem borer, gundhi bug, green leafhopper and leaf folder.

**Table 1:** Infestation percentage (%) of yellow stem borer, gundhi bug, green leafhopper and leaf folder

S. No.	Genotypes	Yellow stem borer (white ear) %	Gundhi bug	Green Leafhopper	Leaf folder
1	OROI-8-IR 88228-33-3-5-2	2.8	0	0	0.2
2	MTU 1347	4.2	1.6	1.8	0.2
3	BRR 2141	2.5	0.4	0.4	0
4	PHI-20106 (H)	3	0	0.7	0
5	MEPH158 (H)	3.8	0	0.8	0
6	MTU 1276	1.5	0.4	0.8	0
7	MTU 1275	2.5	0	0.8	0.4
8	NWGR 8001	3.5	0	0.7	0
9	KAVERI-7425 (H)	6	0.4	0.8	1.3
10	PHI-20108 (H)	3.5	0	0.6	0.3
11	MEPH-159 (H)	2.5	0	0.6	0.3
12	NDR 359 (NC)	2	0.1	0.7	0
13	HRI-202 (H)	3.3	0.5	0.5	0
14	OR 2573-11	2.4	0.6	1.2	0
15	RNR 28399	6.2	1.9	1.3	1.8
16	AD 16124	2.3	0	0.4	0
17	HRI-204 (H)	2.5	0.3	0.6	0
18	PHI-20109 (H)	3.2	0	0.3	0.2
19	Karma Mahsuri (ZC)	3.3	0	0.2	0.6
20	NRH-30 (H)	3.5	0	0.4	0.5
21	RNE-0122 (H)	3.4	0.5	0.8	0.7
22	BPT 3050	2.3	0	0	0
23	KJT 2010-3	1.3	0.4	0	0
24	HURS 19-3	3.3	0.5	0	0.7
25	S- 7004 (H)	2.6	0.3	0.3	0.4
26	PHI-20107 (H)	3.3	0	0	0
27	US- 375 (H)	3.7	0	0.7	0
28	HRI 174 (HC)	3.9	0.2	1.5	1.2
29	WGL 1377	2.2	0	0	0.2
30	WGL 1380	2.4	0.4	0	0.6
31	TRC 2020-9	3.9	1.9	0	1.3
32	HRI-205 (H)	1.3	1.2	0.4	0.4
33	Rajeshwari (LC)	4.1	1.8	1.9	0.2



**Fig 1:** Graphical presentation of infestation percentage (%) for yellow stem borer, gundhi bug, green leafhopper and leaf folder

## Conclusion

Screening against yellow stem borer, gundhi bug, green leafhopper, and leaf folder was done under natural condition. Total percentage of white ears was reported from 1.3 to 6.2% by yellow stem borer while 0-1.9% infestation was obtained by gundhi bug. Infestation percentage was found by green leafhopper about 0-1.9% whereas 0-1.8% of infestation was found by leaf folder. In conclusion maximum infestation was found in yellow stem borer as compared to others.

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