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Short Communication

Resistance of exotic germplasm to the Asian maize stalk borer, *Chilo partellus* (Swinhoe)

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In recent years, at CIMMYT, Mexico, the Entomology Unit in collaboration with CIMMYT breeding program developed lines/hybrids with reasonable level of tolerance against sugarcane borer, *Diatraea saccharalis* Fabricius, Southwestern corn borer, *Diatraea grandiosella* Dyar and Fall armyworm, *Spodoptera frugiperda* J. E. Smith. The differential reaction of exotic maize germplasms to *C. partellus* has been reported by various workers in the past [1-8]. In the present investigation the promising exotic borer resistant CIMMYT (bred for borer resistance there) lines were evaluated for their reaction to *C. partellus* under artificial infestation.

The seeds of sixty-two CIMMYT-IR (insect resistant) lines and two Indian checks (one resistant, Antigua Gr. I and one susceptible, CM-300) were sown in a randomized block design (RBD) on 19th July, 2000 during *kharif* (rainy) season. Each row was 5 m long and formed one plot replicated twice. Row and plant spacing was kept at 75 and 20 cm, to achieve 66,000 plant/ha. When the plants were 14-15 days old, 20-25 eggs (black-head stage) of *C. partellus* pinned on a tissue paper were introduced into the whorls of ten plants in each replication after 17 hrs by slightly tilting the pins and inserting them in leaf tissue. Next morning, the eggs were examined for viability and found that the hatching was 90-95 per cent. The leaf injury data were recorded 30 days after the insect release. The plants were rated on leaf injury rating scale 1-9 (1 = healthy plant, 9 = dead-heart) [9]. The mean leaf injury damage in each replication for each entry were transformed to scores according to inter-plot values for ranked data [10] and subjected to analysis of variance.

The leaf damage ratings (Table 1) revealed that there were significant differences amongst the various genotypes. The leaf injury rating ranged from 4.3 to 9.0 on rating scale 1-9. The maize lines bred for borer complex (Sugarcane borer, *D. saccharalis*, Southwestern corn borer, *D. grandiosella* and Fall armyworm, *S. frugiperda*) in Mexico showed differential reaction to the Asian maize borer, *C. partellus*. Three distinct categories namely, tolerant, moderately tolerant and highly susceptible were exemplified. The maize lines *viz.*, MIRTC4Am F 36-B-2-2-B, MIRTC4Am F 101-B-2-2-B, MIRTC4Am F 28-B-1-1-B, MIRTC4Am F 110-B-1-1-B were found tolerant to maize stalk borer, *C. partellus*. These lines have been derived from population 390 and may be designated as multiple sources of borer resistance. In addition to differential reaction observed by earlier work, reduced leaf damage of resistant genotypes should be less susceptible to borer damage which delayed days to 50% silk, lowered the placement of ears and reduced the plant height thereby affecting various breeding parameters [4]. Grain yield losses ranged from 0.4 to 35.4 per cent in various maize cultivars under borer infestation. Exotic maize germplasm resistant to *C. partellus* can reduce grain yield losses and should be utilized in the Indian maize breeding programme.

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Table 1. Comparative tolerance of CIMMYT-IR lines against Asian maize borer, *C. partellus* during *kharif* (rainy) season

Entry	Pedigree	Mean leaf injury score/plant	
		Original	Transformed
1	MIRTC4Am F 3-B-1-1-B	6.6	0.488
2	MIRTC4Am F 28-B-1-3-B	6.9	0.574
3	MIRTC4A F 36-B-1-1-B	6.9	0.631
4	MIRTC4Am F 36-B-2-2-B	5.0	–0.015
5	MIRTC4Am F 86-B-3-1-B	8.8	1.350
6	MIRTC4Am F 101-B-2-1-B	6.3	0.407
7	MIETC4Am F 101-B-2-2-B	5.3	0.090
8	MIRTC4Am F 150-B-1-3-B	7.3	0.813
9	MIRTC4Am F 150-B-1-3-B	8.0	1.030
10	MIRTC4Am F 150-B-3-1-B	6.3	0.360
11	MIRTC4Am F 166-B-1-1-B	6.6	0.637
12	MIETC4Am F 166-B-1-2-B	9.0	1.490
13	P391c2 F 21-1-2-1-1-B-B	8.9	1.434
14	P391c2 F 147-2-2-1-1-B-B	8.8	1.350
15	P391c2 F 147-2-2-4-1-B-B	7.7	0.925
16	MIRTC4 Bco F 39-B-1-B-B	8.3	1.070
17	MIRTC4 Bco F 105-B-3-B-B	7.1	0.615
18	MIRTC4 Bco F 132-B-2-B-B	6.6	0.479
19	MIRTC4 Bco F 140-B-1-B-B	7.8	0.970
20	P3911C2 Bc F 3-1-1-2-1-B-B	7.7	0.822
21	P3911C2 Bc F 5-1-2-2-1-B-B	8.6	1.238
22	MIRTC4Am F 1-B-2-2-B	7.2	0.642
23	MIRTC4Am F 1-B-2-3-B	7.6	0.845
24	MIRTC4Am F 20-B-1-1-B	8.6	1.238
25	MIRTC4Am F 20-B-1-2-B	7.9	0.926
26	MIRTC4Am F 20-B-2-1-B	7.0	0.658
27	MIRTC4Am F 28-B-1-1-B	5.3	0.075
28	MIRTC4Am F 36-B-1-2-B	8.5	1.192
29	MIRTC4Am F 110-B-1-1-B	4.3	–0.197
30	P391c2 F 136-2-1-1-2-B-B	8.5	1.210
31	P391C2BcF 138-1-1-1-1-B-B	8.5	1.210
32	PT 933220-B-B-B-B-B-B	8.3	1.120
33	PT 963228-1-B-B-B-B-B	8.4	1.156
34	PT 963298-1-B-B-B-B-B	9.0	1.490
35	PT 963328-1-B-B-B-B-B	9.0	1.490
36	PT 963032-1-B-B-B-B-B	7.3	0.826
37	PT 963034-B-B-B-B-B-B	8.1	1.048
38	PT 963036-1-B-B-B-B-B	8.5	1.210
39	PT 963042-B-B-B-B-B-B	8.2	1.084
40	PT 963164-B-B-B-B-B-B	9.0	1.490
41	PT 963204-1-B-B-B-B-B	8.3	1.120
42	PT 963208-B-B-B-B-B-B	9.0	1.490
43	PT 963216-B-B-B-B-B-B	8.7	1.294
44	PT 963218-B-B-B-B-B-B	8.8	1.350
45	PT 963224-1-B-B-B-B-B	9.0	1.490
46	PT 963300-B-B-B-B-B-B	8.2	1.084
47	PT 963304-1-B-B-B-B-B	9.0	1.490
48	PT 963330-1-B-B-B-B-B	8.8	1.378
49	PT 963332-B-B-B-B-B-B	9.0	1.490
50	PT 963006-B-B-B-B-B-B	8.3	1.090
51	PT 963008-B-B-B-B-B-B	9.0	1.490
52	PT 963010-B-B-B-B-B-B	9.0	1.490
53	PT 963018-1-B-B-B-B-B	8.1	1.066
54	PT 963024-1-B-B-B-B-B	9.0	1.490
55	PT 963040-B-B-B-B-B-B	9.0	1.490
56	PT 963056-1-B-B-B-B-B	9.0	1.490
57	PT 963080-B-B-B-B-B-B	8.3	1.090
58	PT 963094-B-B-B-B-B-B	8.1	1.056
59	PT 963098-B-B-B-B-B-B	8.8	1.378
60	PT 963112-B-B-B-B-B-B	8.9	1.434
61	PT 963126-1-B-B-B-B-B	7.9	1.000
62	PT 963128-B-B-B-B-B-B	7.6	0.910
63	Antigua Gr. I (check-Resistant)	4.7	–0.090
64	CM-300 (check-susceptible)	9.0	1.462
S.E.M. ±			0.305
C.D. (P = 0.05)			0.863

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