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Short Communication

Reaction to certain disease-insect complexes of the breeding lines derived from two interspecific crosses of soybean [*Glycine max* (L.) Merr.]

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The soybean has been one of the most important *kharif* crops of *Tarai* and *Bhabar* areas of Uttar Pradesh. In *Kharif* 1994, a wide spread premature drying (Fungal complex) of soybean was noticed at farmers field in this area resulting in severe reduction of soybean yield. The crop was apparently normal upto flowering stage (R_1 and R_2 stage) but thereafter, drying of the plants started in patches. The disease started with yellowing of foliage and wilting of the plants and finally plants dried and were killed before maturity. The pods were few in number mostly empty or having only a few small shriveled grains. Petioles with or without leaves remained attached to the dead stem, stem had lesions on them. The root system was destroyed and charcoal rot symptom were seen on majority of plants. On isolation, in additon to *Macrophomina phaseolina* (Charcol rot), species of *Colletrotrichum Fusarium* and *Rhizoctonia* were found associated with fungal complex affecting the plant. In some fields, root knot symptoms were also observed and in some other fields, nematode larvae were also seen on root system of the infected plants.

Apparently it is a complex problem where more than one pathogen may be involved and the severity may be dependent on interaction of these pathogens along with insect pests infestation. To some extent the symptoms of this problem resembled with sudden death syndrome (SDS) caused by soil borne fungus *Fusarium solani* as reported by Roy *et al.* [1] and Rupe [2] in USA. As of today, fungal complex (particularly in *Tarai* and *Bhabar*) has been considered most important disease followed by yellow mosaic virus, *rhizoctonia* aerial blight and bacterial pustules in that order. These are the major constraints for soybean production in northern parts of India.

Ninety four F_3 progeneis derived from two interspecific crosses namely, (PK 472 × *Glycine soja*)

Table 1. Reaction of progenies derived from two interspecific crosses to fungal complex (1997, 1998)

Cross I. (PK472 × *Glycine soja*) × PK472	
Disease score	Progenies
Resistant (1)	PGS-1, PGS-2, PGS-3, PGS-6, PGS-9, PGS-13, PGS-23, PGS-28, PGS-32, PGS-45, PGS-46 *Glycine soja*
Moderately resistant (3)	PGS-5, PGS-17, PGS-26, PGS-30, PGS-34, PGS-47
Tolerant (5)	PGS-7, PGS-10, PGS-11, PGS-14, PGS-18, PGS-19, PGS-20, PGS-21, PGS-24, PGS-25, PGS-31, PGS-33, PGS-41, PGS-43, PGS-44, PGS-48
Moderately susceptible (7)	PGS-8, PGS-16, PGS-22, PGS-27, PGS-29, PGS-35, PGS-37, PGS-38, PGS-39, PK 472
Highly susceptible (9)	PGS-4, PGS-12, PGS-15, PGS-36, PGS-37, PGS- 40, PGS-42
Progenies free from fungal complex, yellow mosaic virus, Bacterial pustules (BP), *rhizoctonia* aerial blight and Bihar Hairy Caterpillar PGS-9, PGS-13, PGS-23, PGS-28, PGS-32	
Cross II. (Bragg × *G. soja*) × Bragg	
Resistant (1)	BGS-1, BGS-3, BGS-4, BGS-9, BGS-10, BGS-12, BGS-15, BGS-16, BGS-19, BGS-25, BGS-27, BGS-28, BGS-29, BGS-34, BGS-35, BGS-37, BGS- 38, BGS-39, BGS-45
Maturity resistant (3)	BGS-5, BGS-6, BGS-8, BGS-11, BGS-13, BGS-14, BGS-17, BGS-18, BGS-20, BGS-21, BGS-23, BGS-33, BGS-40, BGS-44, BGS-45, BGS-46
Tolerant (5)	BGS-2, BGS-7, BGS-22, BGS-26, BGS-41, BGS-42, BGS-43, Bragg
Moderately susceptible (7)	BGS-24, BGS-32, BGS-36
High' susceptibility (9)	BGS-30, BGS-31
Progenies free from fungal complex, yellow mosaic virus, bacterial pustules, *rhizoctonia* aerial blight and Bihar hairy caterpillar BGS-1, BGS-3, BGS-4, BGS-9, BGS-10, BGS-12, BGS-15, BGS-16, BGS-19, BGS-25, BGS-27, BGS-29, BGS-35, BGS-37, BGS-38 and BGS-39	

× PK 472 and (Bragg × *Glycine soja*) × Bragg constituted the experimental material for screening against fungal complex. These progenies were developed by utilizing *Glycine soja* (a wild progenitor of cultivated soybean) resistant to yellow mosaic virus and hairy caterpillar [3] following the back cross approach. The progenies (46 from cross I and 43 from cross II) were planted in a randomized block design with two replications under hot spot situation (fungal complex) in the farm at Crop Research Centre, G.B.P.U.A.&T., Pantnagar.

Each progeny was planted in a single row of 4 m long, spaced 60 cm apart and plant to plant distance was 5 cm. One row of PK 1024, a highly sysceptible line to fungal complex and one row of Jupitor which is susceptible to yellow mosaic were planted as infector rows at a regular interval after 10 rows respectively. Artificial inoculum for fungal complex was also applied as foliar spray as well as by covering the ground on the test lines at pod filling stage (R_2 and R_3 phase). Observations were recorded for fungal complex, yellow mosaic virus, bacterial pustules, *rhizoctonia* aerial blight and Bihar hairy caterpillar (*Spilosoma obliqua*) on 1-9 scale for disease ratings, where I - resistant, 3 moderately resistant, 5-tolerant, 7-moderately susceptible and 9 highly susceptible.

Based on two years performance, detailed description with regards to reaction against the diseases are summarized in Table 1. perusal of the table indicated that more number of resistant progenies were recovered in (Bragg × *Glycine soja*) × Bragg for yellow mosaic, bacterial pustules, *rhizoctonia* aerial blight and fungal complex. In cross I i.e., (PK 472 × *Glycine soja*) × PK 472, out of 48 progenies, 30 were resistant to yellow mosaic, 29 for bacterial pustules, 33 for *rhizoctonia* aerial blight, 15 for fungal complex and 35 progenies were resistant to Bihar hairy caterpillar, whereas, in cross II i.e., (Bragg × *Glycine soja*) × Bragg, out of 46 progenies, 41 were resistant to yellow mosaic virus, 44 for bacterial pustules, 39 for *rhizoctonia* aerial blight, 24 for fungal complex and 40 for Bihar hairy caterpillar. PS 1024 exhibited a score of 7 for fungal complex indicating that field screening was fairly effective in discarding the susceptible lines. Both the cultivated parental lines, PK 472 and Bragg were moderately susceptible/tolerant respectively whereas, *Glycine soja* was free from yellow mosaic virus fungal complex and Bihar hairy caterpillar. Interestingly, a few progenies viz., PGS-9, PGS-13, PGS-23, PGS28, PGS-32 from cross I, and BGS-1, BGS-3, BGS-4, BGS-9, BGS-10, BGS-12, BGS-15, BGS- 16, BGS-17, BGS-19, BGS-23, BGS-25, BGS-27, BGS-28, BGS-29, BGS- 35, BGS-37, BGS-38, BGS-39, BGS-46 from cross II were free from yellow mosaic virus, bacterial pustules, *rhizoctonia* aerial blight, fungal complex and Bihar hairy caterpillar. These lines could be utilized as donors in the breeding programme to transfer these desirable traits in agronomically superior cultivars.

References

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