

## Screening and grading of brinjal (*Solanum melongena*) accessions for resistance to spotted beetle (*Henosepilachna vigintioctopunctata*)

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Received: 22 October 1996

### ABSTRACT

Brinjal or egg plant (*Solanum melongena* L.) is attacked by the spotted leaf beetle (*Henosepilachna vigintioctopunctata* Fab : Coccinellidae : Coleoptera). Both adults and larvae feed on the leaves and under severe epidemic, the crop yield is highly reduced (Krishnamurti and Appana 1951). It is also polyphagous on hosts like potato (*Solanum tuberosum* L.), tomato (*Lycopersicon esculentum* Mill) and bittergourd (*Momordica charantia* L.) (Rajagopalan and Trivedi 1989). Since insecticide usage is highly disfavoured in egg plant, alternatively identifying resistance for spotted beetle was attempted earlier (Sambandam *et al.* 1972). Screening method involving in vitro method was utilized by Natarajan (1971). The mean leaf-area fed by known number of beetles for specific period was taken as a basis for evaluating the entries earlier. In this method, the intensity of leaf-damage was alone taken as the criterion for grading and the percentage incidence of damage under field conditions was not taken into account. The number of leaves affected in a plant also contributed towards yield potential of the plant. Hence in the present method, both the incidence (percentage of leaves affected) under field conditions and intensity (leaf area damage/unit time) were assessed and damage index computed for grading of resistance.

**Key words :** Brinjal, leaf beetle, screening, *Solanum melongena*, *Henosepilachna vigintioctopunctata*

The experiment was carried out during 1993-94. The brinjal seed samples of different accessions for screening were collected from the adjoining vegetable research station, Palur, Tamil Nadu. In total 78 accessions, 15 hybrids and 10 wild *Solanum* spp were evaluated for resistance to the spotted beetle.

A continuous culture of the test insect, *Henosepilachna vigintioctopunctata* was maintained in the wire mesh screen house of the station. The newly emerged beetles were used for the cage experiment. Both field damage (percentage of leaves affected) representing incidence as well as leaf area damage in an unit time through cage studies representing intensity were combined for assessing the resistance potential of different entries. This is a new approach for field screening involving natural field damage as well as controlled cage studies in the field itself.

The field trail was conducted during June 1993-94. Seedlings at 40 days were transplanted in the field with a spacing of 75 cm x 60 cm. Each accession was planted in 3 rows of 10 m each. In the border rows susceptible control 'Annamalai' was planted to attract the beetles. The cultivation practices were followed as per local standards. The field

crop was screened at the age of 100-110 days and when the susceptible check 'Annamalai' was completely damaged by the beetle. All the leaves in which the insects had scrapped more than 1 cm<sup>2</sup> area was classified damaged. The mean percentage of leaves affected was then arrived with the total number of leaves vs affected leaves. The intensity of leaf damage was judged by cage studies in field. For each entry 3 plants were taken and the middle leaf from the terminal end was inserted through a muslin cloth sleeve attached to one end of a transparent mylar film cage measuring 8 cm in diameter and 10 cm in height. Through a slit in the mylar film cage a newly emerged beetle prestarved for 6 hr was introduced into the cage. The leaf area scrapped in 24 hr by a single beetle was then measured using the graph sheet technique (Sambandam *et al.* 1972).

The mean per cent of leaves affected in each entry and the mean leaf area damaged by a beetle in 24 hr were taken as the criterion for resistance. Based on these data, the damage index was computed as follows.

$$\text{Damage index (DI)} = \frac{\text{incidence (\% leaves affected)} \times \text{intensity (leaf area damage/beetle (24 hr) (cm)}}{100}$$

Based on the damage index grading was assigned as follows

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Table 1. Field and cage screening of brinjal accessions for resistance to spotted beetle (1993–94).

Category of screened accession	Grade	Accession No.
<i>Solanum melongena</i>	Resistant	Nil
	Moderately resistant	'EP 19', 'EP 32', 'EP 45', 'EP 49', 'EP 53', 'EP 68', 'EP 73', 'EP 82', 'EP 83', 'EP 106', 'EP 112', 'EP 115', 'EP 142', 'EP 143', 'EP 148'
	Susceptible	63
Hybrids	Resistant	Nil
	Moderately resistant	EP 24 x 65
	Susceptible	14
Wild types	Resistant	<i>Ghana type</i> 'EP 157' <i>Solanum integrifolium</i> 'EP 110' <i>S khasianum</i> 'EP 109' <i>S. aethiopicum</i> 'EP 153', 'EP 145' <i>S. microcarpum</i> 'EP 160', 'EP 156' <i>S. gilo</i> 'EP 158', 'EP 159'
	Moderately resistant	<i>S macrocarpum</i> 'EP 154'

in 1–3 point scale, viz grade 1, resistant (DI 0.0 – 0.10); grade 2, moderately resistant (DI 0.11 – 0.30) and grade 3, susceptible (DI 0.31 and above).

Among the 103 accessions screened against *Henosepilachna vigintioctopunctata*, 9 entries were graded as resistant, 17 as moderately resistant and 77 as susceptible (Table 1). Among the hybrids, 'EP 24 x 65' alone was moderately resistant to this beetle and others were susceptible. All the wild accessions were resistant except *S. macrocarpum* 'BE-046/EP 154' which was moderately resistant. In toto, 77 accessions of *S. melongena* recorded susceptibility to leaf beetle. The mean per cent of leaves affected in the moderately resistant entries varied from 22.5 – 42.5. Similarly the mean leaf area damaged in 24 hr under caged studies ranged from 0.52 – 0.68 cm<sup>2</sup>.

In the present investigation, the assessment of damage index and grading is an improved modification over the previous method employed by Natarajan (1971), Sambandam *et al.* (1972) and Jayalakshmi (1994). Among the cultivable *S. melongena* accessions screened, none were resistant to leaf beetle. Only 15 accessions in this group were moderately resistant. This implied different degrees of resistance in plants. All the wild types except *S. macrocarpum* were resistant. The resistance characters of wild accessions, viz *S. khasianum*, *S. torvum* and *S. aethiopicum* had already been reported by Chelliah *et al.* (1970), Natarajan (1971) and Sambandam *et al.* (1969 and 1970). Sambandam *et al.* (1972) also found out 2 indigenous accessions, viz 'Apple Green Flesh' and 'Pusa Purple Round' as moderately resistant to leaf beetle. Jayalakshmi (1994) also identified egg plant accessions 'AC 17' as moderately resistant and 'AC 26' as highly resistant to this beetle. Computation of damage index and grading for spotted beetle resistance is a new approach by the authors.

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