

Short Communication

**AGRONOMIC EVALUATION AND CHARACTERIZATION OF LOCAL  
LANDRACES RESISTANT TO SHOOT AND FRUIT BORER IN  
BRINJAL (*SOLANUM MELONGINA* L.)**

S.J. ARASKESARY<sup>1</sup>, B. BAVALEESWARAN<sup>2</sup>, P. ATHPUTHACHANDRAN<sup>3</sup>  
AND S. VIJAYARATNAM<sup>2</sup>.

<sup>1</sup> *Regional Agricultural Research and Development Centre, Killinotchchi, Sri Lanka*

<sup>2</sup> *Agricultural Research Station, Thirunelvley, Sri Lanka*

<sup>3</sup> *District Agriculture Extension Office, Mannar, Sri Lanka*

**INTRODUCTION**

Brinjal, *Solanum melongena* L. is a member of the family Solanaceae and grown extensively in central, southern and southeastern Asia and in number of African countries (Kalloo, 1993). It is a good source of minerals and vitamins and is important to human nutrition. The availability of genetic resources is vital for breeders in generating new cultivars or to further improve the existing varieties to meet the changing consumer demands or challenges during growth conditions such as resistance attributes (Demir, 2010). Several landraces are being cultivated in Sri Lanka even though few Brinjal varieties have been released by the Department of Agriculture for general cultivation. Fruit and shoot borer, *Leucinodes orbonalis*, is a serious pest of Brinjal in south and southeast Asia (Dhankar, 1988). At present, shoot and fruit borer and little leaf disease caused by Phytoplasma like organism are major problems for cultivation and more than 50 % of the total cost for pesticide usage is spent on to manage shoot and fruit borer. No cultivar or variety has been identified with resistant to shoot and fruit borer in Sri Lanka. Therefore, it is important to characterize the available landraces to identify sources of resistance for incorporation in the future breeding programmes.

**MATERIALS AND METHODS**

Twelve genotypes collected from various parts in northern region of Sri Lanka are used in the characterization. Details of the collected germplasm are given in Table 1. Twenty five day old seedlings from each genotype were planted as single plant per hill in 3.6 x 3 m plots with a spacing of 90 cm x 60 cm during the *maha* 2008/09 and *yala* 2009 seasons. First experiment was conducted with appropriate management condition for agronomic evaluation and characterization using Thinneveli purple as the standard variety. The second experiment was conducted in two seasons with five high yielding landraces selected from the first season but managed under minimum spraying condition

for assessing shoot and fruit borer incidence and the yield using a RBCD designed with three replicates. Weights of healthy fruits, infested fruits by shoot and fruit borer and number of the shoot and fruit borer /plant were recorded at weekly interval. Twelve harvests were taken for the analysis. The data were analysed using ANOVA procedure and means were separated by DMRT.

**Table 1.** Detail of the Germplasm used in the study.

<i>Name of the collection</i>	<i>Site of collection</i>	<i>Remarks</i>
Green calyx(long)	Sanguvely north, Jaffna	Pods with green calyx.
Green calyx	Sanguvely north, Jaffna	Pods with green calyx.
Green calyx (extra-long)	Sanguvely south, Jaffna	Pods with green calyx.
Green calyx	Mattuvil, Chavkachcheri	Prickles present on calyx
<i>Eerku vellai, Thin</i>	Kachchai, Kodikamam	Long thin white
<i>Eerku vellai, long</i>	Mattuvil, Chavkachcheri	Thick white
<i>Kathipiddiyan</i>	Mattivul east,Chavkachcheri	Like Handle of the knife
<i>Big katthipiddiyan</i>	Sangathani,Chavaecheri	big handle of a knife
<i>Madduvil mutty</i>	Mattuvi,Chavkachcheri	Round like vessel
<i>Mallapae</i>	Puthoor,Jaffna	Name of a place, uniform fruit size.
<i>Thinnavelly purple</i>	ARS,Thinnalvely	Released variety from ARS.TV
<i>Madduvil purple</i>	Madduvil, Chavkachcheri	Purple but different from TVP
<i>Madduvil vellai</i>	Madduvil, Chavkachcheri	
<i>Indian mutty</i>	Pandatheripu, Chankani	Originated from introduced hybrid from India.

## RESULTS AND DISCUSSION

### Characterization and agronomic evaluation

Among genotypes *Indian mutty* showed prostrate growth habit whereas *Eerku vellai* showed intermediate growth while others had upright fruits. Petiole colour differed as dark violet in *Mallapae* and *Madduvil mutty* and *Indian mutty* were green. Sanguvelly collection had violet and *Eerkkevellai* had greenish violet petiole. Leaf blade colour varied from light to dark green, greenish violet and violet among the lines tested but *Mallapae* appeared with prominent violet with strong lobbing (Table 2).

### Shoot and Fruit borer incidence

Shoot and fruit borer incidence varied significantly (Table 3) among these germplasm in both seasons. It was found that the cultivars *Madduvil purple* and *Mallapae* had a greater degree of tolerance having less number of shoot and fruit borer infestation

during two seasons. *Kathypiddian* and *Indian mutty* were found to be susceptible in comparison with all others.

**Table 2.** Details of morphological characters observed in Brinjal landraces collected from northern region of Sri Lanka (average of five plants).

Name of the land race	LBL	LBW	PHF	DF	LMF	FD	NF	FY	CC
Green calyx(long)	20	14.1	80	50	21.6	50	246	13.75	PV
Green calyx (extra long)	20	13	86	50	21.2	5.5	256	11.09	PV
Green calyx	24.4	17.8	78	53	20.1	5.3	273	10.89	PV
<i>Eeerku vellai, Thin</i>	20.6	12.9	69	48	19	4.0	533	13.33	PV
<i>Eeerku vellai, long</i>	24.6	13.8	56	48	20	4.1	358	15.4	PV
<i>Kathypiddiyan</i>	22.5	15.5	70.1	48	18.6	4.7	390	16.21	PV
<i>Big kathypiddiyan</i>	24.8	14	88	48	18.4	6.0	457	22.21	PV
<i>Madduvil mutty</i>	18.8	12.1	50.6	58	10.7	7.1	223	11.85	White
<i>Mallapae</i>	21.2	13.5	73	51	16.0	6.0	199	11.01	PV
<i>Thinnavelly purple</i>	29.7	16	82	49	16.8	6.0	222	11.94	PV
<i>Madduvil purple</i>	28.58	13.7	87	57	16.4	5.3	257	10.78	PV
<i>Madduvil vellai</i>	25.8	14.2	71	50	15.6	5.0	412	17.22	PV
<i>Indian mutty</i>	17.7	13.4	60	38	6.7	6.0	1313	18.66	PV

Note: LB=Leaf blade length (cm); LBW=Leaf blade width (cm); PHF=Plant height at flowering (cm); DF=Days to flower; LMF=Length of mature fruit (cm); FD=Fruit diameter (cm); NF=Number of fruits; FY=Fruit yield t/ha; and CC=Corolla colour (PV=Pale violet).

Significant differences were also observed among six cultivars with respect to the infested fruit yield during *maha* 2008/2009 and *yala* 2009. It was observed that weight of shoot and fruit borer infested fruits were significantly higher in the cultivars of *Kathypiddian* and *Indian mutty* than the other cultivars tested during seasons. Yields of six brinjal cultivars differed significantly between seasons. Despite heavy infestation, the highest yield was recorded in *Kathypiddiyan* during *maha* 2008/2009. Lowest yield recorded was from check variety *Thinnavelly purple* during the two seasons. Results indicated that none of the cultivars showed free from the attack of shoot and fruit borer. The cultivars *Mallapae* and *Madduvil purple* were less infected compared to other cultivars tested showing considerable degree of tolerance to fruit and shoot borer of Brinjal.

**Table 3. Incidence of infested shoot and pod borer per plant, weight of shoot and fruit borer infested fruits and the marketable yield.**

<i>Land race</i>	<i>Infested Shoot and pod/plant</i>		<i>Weight of infested fruits (t/ha)</i>		<i>Marketable yield (t/ha)</i>	
	<i>Maha 2008/2009</i>	<i>Yala 2009</i>	<i>Maha 2008/2009</i>	<i>Yala 2009</i>	<i>Maha 2008/2009</i>	<i>Yala 2009</i>
Green calyx	20.1 b	27.0 c	7.6 b	8.7 b	7.7 b	10.6 bc
Kathippiddiyan	26.8 a	39.4 b	14.1 a	19.1 a	14.6 a	14.2 b
Mallapae	15.2 c	26.7 c	6.2 b	8.0 b	5.1 b	8.7 cd
Mattuvil purple	14.0 c	23.0 c	5.8 b	6.8 b	8.8 b	8.0 cd
Inndian mutty	28.7 a	53.5 a	14.3 a	20.8 a	9.5 b	19.6 a
Thinnavelly purple	20.7 b	24.9 c	7.2 b	10.0 b	5.0 b	7.9 cd
CV%	18.5	12.5	10.2	16.9	9.8	14.3

### CONCLUSIONS

*Mallapae* and *Madduvil mutty purple* showed considerable tolerance to fruit and shoot borer incidence and fruit traits of these two land races are preferred by the local consumers. These two landraces will be useful in seed production and further improvement of brinjal in Sri Lanka.

### REFERENCES

- Dhanker, B.S. 1988. Progress in resistance studies in eggplant (*Solanum mlongena* L.) against shoot and fruit borer (*Leucinoids orbanalis*) infestation. *Tropical Pest Management*, 34: 343-345.
- Kaloo, P. 1988. Solanaceous crops. In: *Vegetable breeding Vol. II*. CRC. Press Inc. Boca Raton, Florida.
- Prodhan, S. 1969. *Insect pests of crops*. National Book Trust, India.