

Article history :

Received : 26.06.2017

Revised : 02.11.2017

Accepted : 09.11.2017

Screening of mango germplasm for its varietal preference towards mango nut weevil, *Sternochetus mangiferae* (Fabricius)

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ABSTRACT : A study on the screening of mango germplasm for the varietal preference towards mango nut weevil infestation was carried out under field condition for a period of two years (2015 and 2016). The grub and the pupal population was observed during the month of June and the highest grub population was recorded in Panchadarakalasa (3.33 No.s / fruit) followed by Salem Bangalora (2.33 No.s/fruit). The highest pupal population was recorded in Paiyur 1 (2.33 No.s per fruit) and in Kal Neelum and Swarna Jehangir 1.67 No.s per fruit. There was no significant difference in the grub population from April to June months among the various germplasms tested during the second season, even though the grub population varied from zero population to 1.67 No.s per fruit. Among the various germplasms tested, the per cent stone damage varied from 5.15 to 67.52 and the highest damage was recorded in Panchadarakalasa followed by Paiyur 1 (57.50 %), Kalepad (47.21 %) and Swarna Jehangir (41.55 %) with the lowest damage in Mulgoa recording 5.15 per cent.

KEY WORDS : Mango, Mango nut weevil, *Sternochetus mangiferae*, Varietal preference studies

HOW TO CITE THIS ARTICLE : Thilagam, P. (2017). Screening of mango germplasm for its varietal preference towards mango nut weevil, *Sternochetus mangiferae* (Fabricius). *Asian J. Hort.*, 12(2) : 185-188, DOI : 10.15740/HAS/TAJH/12.2/185-188.

Mango, (*Mangifera indica* L.) is an important fruit crop of India. Its spread has gained momentum in recent years because of its export potential. It is the national fruit of India and Philippines and national tree of Bangladesh. India ranks first among world's mango producing countries accounting for about 50 per cent of the world's mango production. The mango growing states are North-eastern regions, Tamil Nadu, Andhrapradesh, Orissa, Karnataka, Maharashtra, Kerala and Gujarat (Shukla and Tandon, 1985). India is also a prominent exporter of fresh mangoes to the world. The country has exported 55.41 thousand MT of fresh mangoes to the world for the worth of Rs. 264.74 crores during the year 2012-13. It is being cultivated in about 80,000 ha in Tamil Nadu and the area

under mango in Krishnagiri and Dharmapuri districts accounts for 37,862 ha of which, Krishnagiri district alone accounts for 31,000 ha with the annual production of 2.4 lakh tones. Krishnagiri district is the second largest mango pulp producer in the country after Chittor in Andhrapradesh and generates 400 to 500 crores of foreign exchange annually.

The mango nut weevil, *Sternochetus mangiferae* (Fabricius) is a monophagous and one of the major pests of mango and found in almost all the major mango producing areas of the world. Shukla and Prasad (1981) reported that 46.5 to 92.7 per cent fruits are damaged in different cultivars. The larvae cause direct damage by feeding on the endocarp and converting the seed inside it into black frass, the seed is useless for propagation

and the infested fruits become unfit for processing and direct consumption owing to presence of excreta and emergence holes in the pulp. At present, nutweevil is one of the major constraints in the export of fresh mango fruits. Hence, the present study was aimed at identifying the sources of resistance / tolerance genotypes towards the infestation of mango nut weevil.

RESEARCH METHODS

Screening of different available mango germplasms was carried out in Mango orchards in Regional Research Station, Paiyur. Totally seventeen mango germplasm viz., Subramaniapuram, Erwadi Neelum, Panchadarakalasa, Badam, Selelction Rumani, K.Rumani, PKM 1, Kalepad, Banganapalli, Arkapuneet, Paiyur 1, Nadupaiyur selection, Mulgoa, Sendura, KalNeelum, Salem Bangalora and Swarna Jehangir were screened for the incidence of different life stages viz., grub, pupae and adult MNW stages. During the both year of screening (March- July 2015 and 2016), under each germplasm, three trees were selected and each tree served as a replication. Sampling of fruits was done in 5 different spots representing four directions and from each tree five fruits were collected. The collected fruits from each tree and germplasm were subjected to destructive sampling and observed for the presence of MNW and its stages. The data were then subjected to statistical analysis using AGRES.

During the second season (2016), when there was a significant difference in the grub population of MNW was taken in to account to assess few physical, morphological and biochemical characters of selected mango germplasms (12 No.s) and the physical and morphological characters viz., skin and flesh texture, stone weight without insect damage in selected mango germplasms and also the stone weight with the grub population damage at the time of observation were taken in to account and per cent stone damage due to MNW damage was worked out. At the time of observation, total soluble sugars were also recorded using hand refractometer and measured in terms of Brix. The various parameters taken in to account were analyzed using AGRES.

$$\text{Stone weight (\%)} = \frac{\text{Stone weight without - Stone weight with insect damage (g)}}{\text{Stone weight without insect damage (g)}} \times 100$$

RESEARCH FINDINGS AND DISCUSSION

Totally seventeen mango germplasms was screened

for the presence of different stages of *S.mangiferae* and the population in all the mango germplasms was recorded from the months of April to July. During the month of April, eventhough the grub population ranged from 0.00 – 0.67 number per fruit the results indicated that there was no significant difference statistically in the preference of the mango germplasms tested. During the month of May, the grub population ranged from 0.00 – 1.33 numbers per fruit in selection Rumani and PKM 1 varieties. Both the grub and the pupae population was observed during the month of June and the highest grub population was recorded in Panchadarakalasa recorded 3.33 numbers per fruit followed by Salem Bangalora (2.33 numbers/fruit). The highest pupae population was recorded in Paiyur 1 recording 2.33 numbers per fruit and in Kal Neelum and Swarna Jehangir 1.67 numbers per fruit with none of its stages in five germplasms tested (Salem Bangalora, Selelction Rumani, Nadupaiyur selection, K. Rumani and Arka puneet) (Table 1). An adult stage was recorded during the month of July with its highest population recorded in Swarna Jehangir (2.33 numbers per fruit) and in Kalneelum (2.00 numbers per fruit) with its zero population recorded in four germplasms. Among the 17 germplasms tested, only one germplasm, K. Rumani is left without infestation / preference by MNW throughout the observation period.

There was no significant difference in the grub population from April to June months among the various germplasms tested during the second season, eventhough the grub population varied from zero population to 1.67 numbers per fruit. There existed a significant difference in the pupal population noticed during the month of July with its highest population recorded in Panchadarakalasa (3.67 numbers/ fruit) followed by 2.67 numbers per fruit in Erwadi neelum and 2.33 numbers per fruit in Kalepad and Paiyur 1 (Table 1). However, the same trend of significance could not be found in the adult population recorded during the month of August and the adult population ranged from zero to 1.67 per fruit in Erwadi neelum. Among the seventeen germplasms tested, the zero population was recorded in Banganapalli, Arkapuneet, Nadupaiyur selection and Sendura.

The results of the selected mango germplasms showed that there was a difference in the skin texture for each germplasm varying from smooth to moderately thick and thick texture and likewise, the flesh texture varied from soft, fibreless to firm fibreless and fibre and juicy varieties. The highest population of MNW grub was

observed in Panchadarakalasa (3.67 numbers / fruit) followed by KalNeelum (2.67 numbers / fruit) and 2.33 numbers/ fruit in Kalepad and Paiyur 1. Among the various germplasms tested, there was a significant

Table 1 : Screening of mango germplasm towards mango nut weevil, *S.mangiferae* under field condition

Sr. No.	Germplasms	I season					II season				
		April	May	June	July	April	May	June	July		
		Grub / fruit (No.)		Pupae / fruit (No.)	Adult fruit (No.)		Grub / fruit (No.)	Pupae / fruit (No.)	Adult fruit (No.)		
1.	Subramaniapuram	0.00	0.00	1.33	1.33	0.67	0.00	0.00	0.34	1.00	0.67
2.	Erwadi Neelum	0.00	0.00	1.00	1.33	1.67	0.00	0.34	1.33	2.67	1.67
3.	Panchadarakalasa	0.00	1.00	3.33	0.67	0.67	0.00	0.00	1.67	3.67	1.00
4.	Badaam	0.00	0.00	0.00	0.33	0.67	0.00	0.00	1.67	1.67	0.67
5.	Selection Rumani	0.00	1.33	0.00	0.00	0.00	0.00	0.00	1.00	1.33	0.67
6.	K. Rumani	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	1.33	0.67
7.	PKM 1	0.00	1.33	0.33	1.33	1.67	0.34	0.34	1.67	2.00	1.00
8.	Swarna Jehangir	0.67	1.00	0.00	1.67	2.33	0.34	0.34	1.33	1.33	1.00
9.	Kalepad	0.00	1.00	0.00	0.33	0.33	0.00	0.34	1.33	2.33	0.67
10.	Banganapalli	0.00	1.00	0.67	1.33	1.33	0.34	0.34	0.67	0.67	0.00
11.	Arka Puneet	0.00	0.67	0.00	0.00	0.33	0.00	0.34	1.00	0.34	0.00
12.	Paiyur 1	0.00	0.67	0.00	2.33	2.67	0.67	1.00	1.33	2.33	0.67
13.	Nadupaiyur selection	0.00	0.33	1.00	0.00	0.33	0.00	0.34	0.67	0.67	0.00
14.	Mulgoa	0.33	0.67	0.00	0.33	0.33	0.34	0.67	0.67	1.00	0.67
15.	Sendura	0.67	0.67	1.00	0.33	0.00	0.67	1.00	1.33	0.67	0.00
16.	Kal Neelum	0.00	0.67	0.00	1.67	2.00	0.00	0.67	1.33	2.67	1.67
17.	Salem Bangalora	0.00	0.67	2.33	0.00	0.00	0.34	0.34	1.33	1.33	1.00
	S.E.±	NS	0.41	0.55	0.59	0.58		NS		0.52	NS
	C.D. (P < 0.1)		0.83	1.10	1.19	1.18				1.06	

NS= Non-significant

Table 2 : Physical, morphological and biochemical characters of selected mango germplasms

Mango germplasms	Skin texture	Flesh texture	MNW pupae (No./ fruit)	Stone weight (g)	Stone weight with insect damage (g)	Stone damage (%)	TSS (°Brix)
Panchadarakalasa	MT	Firm fibreless	3.67	46.7	15.2	67.52	16.0
Swarna Jehangir	MT	Moderately firm fibreless juicy	1.33	39.4	23.0	41.55	24.5
Kalepad	S	Soft	2.33	21.5	11.4	47.21	18.8
Paiyur1	S	Fibreless	2.33	35.0	14.9	57.50	19.3
Mulgoa	S	Soft	1.00	40.5	38.3	5.56	21.0
Sendura	MT	Firm fibre	0.67	36.2	30.0	17.01	20.8
ArkaPuneet	S	Firm fibreless	0.34	29.2	27.7	5.15	19.3
KalNeelum	MT	Fibreless	2.67	36.5	22.3	38.90	17.3
Salem Bangalora	T	Firm fibreless	1.33	32.6	23.5	27.96	19.8
Banganapalli	S	Firm fibreless	0.67	30.2	27.0	10.45	21.0
Nadupaiyur selection	T	Firm fibreless	0.67	16.7	13.9	17.07	16.8
Badaam	T	Firm fibreless	1.67	24.4	19.1	21.56	19.3
S.E.±			0.52	1.27	1.03		0.64
C.D. (P<0.05)			1.06	2.78	2.24		1.40

MT – Moderately thick; S – Smooth; T – Thick

difference in the stone weight taken without the insect damage ranged from 16.7 g in Nadupaiyur selection and 46.7 g in Panchadarakalasa and the stone weight damage recorded with the field population also exhibited the significant difference among the mango germplasm tested. The per cent stone damage varied from 5.15 to 67.52 and the highest damage was recorded in Panchadarakalasa followed by Paiyur 1 (57.50 %), Kalepad (47.21 %) and SwarnaJehangir (41.55 %) with the lowest damage in Mulgoa recording 5.52 (Table 2). The total soluble sugars varied from 16.0 – 24.5° Brix, the germplasm which recorded the highest stone weight damage had low TSS and with lowest damage germplasm recorded 21° Brix and these parameters along with the other parameters has to be studied in detail and needs further investigation to derive the solid result on the varietal preference its relationship with biochemical parameters.

The results on the varietal preference of mango nut weevil obtained by Kannan and Venugopal Rao (2007) showed that variety Swarna Jehangir showed less infestation (15.5%) while Neelum (64.65%) and Cherakurasam, Rumani, Mulgoa, Baneshan, Bangalora adn Neelisahan have moderate level of damage. Apart from that, Mohanasundaram *et al.* (1979); Sundara Babu (1969); Baegle and Prasad (1985); Singh (1988) and Verghese (2000) found that all the locally available varieties succumb to mango nut weevil with only little variation. However, in the present study the zero population of MNW reported in K. Rumani, Banganapalli, Arkapuneet, Nadupaiyur selection and Sendura might be further exploited for the identification of factors for non-preference in the future research to combat the

mango nut weevil in mango ecosystem.

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