ISSN: 2230-9926

Available online at http://www.journalijdr.com

IJDR

International Journal of
DEVELOPMENT RESEARCH

International Journal of Development Research
Vol. 4, Issue, 11, pp. 2212-2214, November, 2014

Full Length Research Article

EVALUATION OF MULBERRY GERMPLASMS (HUNDRED GENOTYPES) FOR THE INCIDENCE OF TWO DEFOLIATOR

Vasudha Prabhakar, K., Narayana Reddy, R., *Pallavi, Sowmya, P. and Chethan Kumar, K.

Department of Sericulture, College of Agriculture, University of Agricultural Sciences, GKVK, Bangalore-65

ARTICLE INFO

Article History:
Received 05th August, 2014
Received in revised form
11th September, 2014
Accepted 19th October, 2014
Published online 18th November, 2014

Key words:
Defoliators,
Genotypes,
Mulberry and
Wingless grasshopper.

ABSTRACT

The present study was undertaken in five years old mulberry germplasm maintained at Sericulture Department, University of Agricultural Sciences, GKVK, The study was conducted in all three seasons of the year *viz.*, pre monsoon (March-June), monsoon (July-October) and post – monsoon (November – February). Two defoliators namely Bihar hairy caterpillar, *Spilarctia obliqua* Walker and Wingless grasshopper, *Neorthacris acuticeps nilgriensis* Uvarov were selected for the study. The Score Index was followed to categorize the pest infested genotypes and defoliator (Bihar hairy caterpillar and Wingless grasshopper) pests were present throughout the study period in varying intensities in different seasons. Wingless grass hopper showed maximum damage in more number of genotypes compared to Bihar hairy caterpillar.

INTRODUCTION

Mulberry is the only source of food for silkworm, *B. mori*. It is a deep rooted perennial crop cultivated in all types of soils as either row, paired row or pit system. Leaf yield can be increased mainly by cultivating pest and disease resistant varieties with better agronomical inputs. The productivity and profitability in commercial sericulture depends on quality and yield of mulberry silk per unit area. The leaf quality mainly affected by attack of insects and non-insects for space or food or both, because of prolific growth and green foliage throughout the year. About 300 insect and non-insect species of pests are known to infest mulberry during different stages of crop growth and seasons (Anonymous, 2010). The major insect species that inflict damage to mulberry crop belong to the Orders Hemiptera - 74 (28.13 %), Thysanoptera - 38 (14.44 %), Lepidoptera - 37 (14.06 %), Coleoptera - 35 (13.30 %), Orthoptera - 18 (6.84 %) and Isoptera - 09 (2.28 %). The defoliators infecting mulberry are Leaf roller *Diaphania pulverulentalis (Hampson)*, (31.18 %), Bihar hairy caterpillar, *Spilarctia obliqua* Walker, (21.72 %), Cut worms *Spodoptera litura F*, (15.09 %) and minor pests are Wingless grasshopper, *Neorthacris acuticeps nilgriensis* Uvarov, Long horned grass hopper, *Cyrtacanthacris ranacea* Stol. The information on mulberry germplasms reaction to Defoliating pests namely Bihar hairy caterpillar, *Spilarctia obliqua* Walker and Wingless grasshopper, *Neorthacris acuticeps nilgriensis* Uvarov was scanty on germplasms, hence the study was undertaken to know the pest intensity (damage) level in all hundred genotypes.

Corresponding author: Pallavi, Sowmya, P.
Department of Sericulture, College of Agriculture, University of Agricultural Sciences, GKVK, Bangalore-65

MATERIALS AND METHODS

The Mulberry Germplasms selected for experiment in the study comprised of hundred mulberry accessions maintained at Sericulture Department, University of Agricultural Sciences, GKVK, Bengaluru. Each mulberry accession was planted in one row with four plants maintained with spacing of 2.4 x 2.5 m established during 2006. The experiments were conducted during three seasons *viz.,* pre-monsoon, monsoon and post-monsoon of 2010-2011. All the normal cultural practices namely irrigation, weeding and fertilizer application were followed as per package of practices for rainfed mulberry (Rama Kant and Bhat, 2010). The pest incidence in all hundred accessions were recorded according to damage level caused by insects to individual plant and were scored as per scale and the pest categorized based on Score Index indicated by Das *et al.* (2009).

0 % ------ ? No incidence, 1.1- 5 %---- Less incidence, 5.1 %- 20 %-- Moderate incidence, 20.1 %- 50 %-- More incidence and 50.1 %- 100 %-- High incidence

Using the same scale but with modified terminologies 0 %- Immune, 0.1- 5 %- Highly resistant, 5.1 %- 20 %- Moderately resistant, 20.1 %- 50 %- Moderately susceptible and 50.1 %- 100 %- Highly susceptible has been adopted in the present study.

$$\text{Per cent incidence} = \frac{\text{Number of plants infested}}{\text{Total number of plants}} \times 100$$

RESULTS AND DISCUSSION

Scoring of genotypes for defoliating pests

The pest attack in mulberry germplasms were recorded for three seasons namely Pre-monsoon (March – June), Monsoon (July – October), Post- monsoon (November – February) of 2010-2011. Scoring of short listed pests into different categories was done at fortnightly intervals.

Pest attack in pre-monsoon season

In all the genotypes, sixty four showed immunity (0 %), Sixteen exhibited highly resistant (0.1 % - 5 %), seventeen exhibited moderately resistant (5.1 % - 20 %), three showed moderately susceptible (20.1 % - 50 %). Whereas, none of the genotypes showed highly susceptible (50.1 % - 100 %) to Bihar hairy caterpillar, *Spilarctia obliqua* Walker (Table: 1). Among all hundred genotypes studied, sixty one showed immunity (0 %), twenty four genotypes exhibited highly resistant (0.1 % - 5 %), ten genotypes showed moderately resistant (5.1 % - 20 %) , five exhibited moderately susceptible (20.1 % - 50 %), whereas none of the genotypes showed highly susceptible (50.1 % - 100 %) to Wingless grasshopper, *Neorthacris acuticeps nilgirensis* Uvarov (Table :1).

Table 1. Pooled reaction of mulberry genotypes to defoliating insect pests in pre-monsoon season

Category/ Score Index	Defoliating pests	
	Bihar hairy Caterpillar	Grasshoppers
Immune (0%)	64	61
Highly resistant (0.1-5.0%)	16	24
Moderately resistant (5.1%-20.0%)	17	10
Moderately susceptible (20.0-50.0%)	3	5
Highly susceptible (50.1-100%)	0	0

The incidence of Bihar hairy caterpillar on mulberry genotypes was lesser in pre monsoon season compared to post monsoon season. Totally thirty six mulberry genotypes were infested by Bihar hairy caterpillar in pre monsoon season. It may be due to maximum wind speed (8.9 Km/hr) in June and maximum temperature (34.2^0 C). These results are in close conformity with the findings of (Rama Kant and Bhat, 2010) who stated that incidence of Bihar hairy caterpillar was minimum in summer season. The incidence of Wingless grasshopper was lesser in pre monsoon compared to post monsoon season. Maximum incidence was observed in the winter season followed by rainy and summer seasons. This may be due to prevailing minimum temperature (34.2^0 C) and maximum wind speed (8.9 Km/hr) in June. The present results are in agreement with the findings of (Rama Kant and Bhat, 2010) who indicated incidence of Wingless grass hopper was lesser in pre monsoon.

Pest attack in monsoon season

Among all the genotypes studied, sixty nine showed immunity (0 %), fifteen exhibited highly resistant (0.1 % - 5 %), ten showed moderately resistant (5.1 % - 20 %), five showed moderately susceptible (20.1 % - 50 %) and only one genotype showed highly susceptible (50.1 % - 100 %) to Bihar hairy caterpillar, *S. obliqua* (Table 4). Among hundred genotypes, sixty six showed immunity (0 %), ten exhibited highly resistant (0.1% - 5 %), fourteen showed moderately resistant (5.1 % - 20 %), eight exhibited moderately susceptible (20.1 % - 50 %), two showed highly susceptible (50.1 % - 100 %) to Wingless Grass hopper, *N. acuticeps nilgirensis* (Table 2).

Table 2. Pooled reaction of number of mulberry genotypes to defoliating insect pests in monsoon season

Category/Score Index	Defoliating pests	
	Bihar hairy Caterpillar	Grasshoppers*
Immune (0 %)	69	66
Highly resistant (0.1 – 5.0 %)	15	10
Moderately resistant (5.1% - 20.0%)	10	14
Moderately susceptible (20.1%- 50.0%)	5	8
Highly susceptible (50.1-100%).	1	2

The incidence of Bihar hairy caterpillar was significantly minimum in monsoon season, which may be due to environmental factors namely wind speed 86.00 Km/hr, and maximum rain (142.2mm) received in July and August (158.4 mm). These results are similar to the findings of (Rama Kant and Bhat, 2010) who indicated infestation of Bihar hairy caterpillar was minimum in monsoon. The incidence of Wingless grass hopper was minimum in monsoon season which may be due to effect of low temperature (27^0C and 28 ^{0}C), maximum rainfall (158.4 mm), high relative humidity (94 % and 58 %) and wind velocity of 8.6 Km/hr. this may result in minimum incidence of Wingless grasshopper.

Pest Attack in the Post-Monsoon Season

Among all the genotypes studied, forty genotypes showed immunity (0 %), twenty six exhibited highly resistant (0.1 % - 5 %), twenty three showed moderately resistant (5.1 % - 20 %), nine showed moderately susceptible (20.1 % - 50 %) and two genotypes showed highly susceptible (50.1 % - 100 %) to Bihar hairy caterpillar, *S. obliqua* (Table: 3). Among mulberry genotypes, thirty three showed immunity (0 %), ninteen exhibited highly resistant (0.1 % - 5 %), forty four showed moderately resistant (5.1 % - 20 %), three exhibited moderately susceptible (20.1 % - 50 %) and only one showed highly susceptible (50.1 % - 100 %) to Wingless grasshopper, *N. acuticeps nilgirensis* (Table: 3). The infestation of Bihar hairy caterpillar was maximum in the post monsoon season 2010-2011. The incidence of Bihar hairy caterpillar has negative correlation with the atmospheric temperature (25.7). The present results are supported by the findings of (Rama Kant and Bhat, 2010) who indicated maximum number of

genotypes were attacked by Bihar hairy caterpillar in the post monsoon season. This may be due to favorable environment condition like low temperature and high relative humidity, as favorable condition encourages pest multiplication rapidly. The incidence of Wingless grasshopper was maximum in post monsoon season, which may be due to minimum rainfall (0 mm) and low temperature (27.4), this showed that Wingless grasshopper has positive relationship with temperature and rainfall.

Table 3. Pooled reaction of number of mulberry genotypes to defoliating insect pests in post-monsoon season

Category/Score Index	Defoliating pests	
	Bihar hairy Caterpillar	Grasshoppers
Immune (0%)	40	33
Highly resistant (0.1%-5.0%)	26	19
Moderately resistant (5.1% - 20.0%)	23	44
Moderately susceptible (20.1% - 50.0%)	09	3
High susceptible (50.1 % - 100%)	2	1

Cumulative incidence throughout the year

Bihar hairy caterpillar, *S. obliqua* and Wingless grasshopper, *N. acuticeps nilgirensis* infestation occurred throughout year (Table: 4). The infestation levels varied monthly due to abiotic factors like temperature, relative humidity, rainfall and sunshine, due to seasonal effect, seasonal nature of pests and also due to availability of foliage. The infestation of Bihar hairy caterpillar was maximum in October and minimum in May. The incidence of Bihar hairy caterpillar was very low when the temperature was high. It shows that Bihar hairy caterpillar has negative correlation with temperature. These results are confirmed the findings of (Rama Kant and Bhat, 2010) who indicated maximum number of genotypes were attacked by Bihar hairy caterpillar in the post monsoon season. This may be due to favorable environmental condition like low temperature and high relative humidity, as favorable condition encourages pest multiplication rapidly. The damage caused by Wingless grasshopper, was very less throughout the year, whereas maximum was observed in November (11.25 %), December, January (15.00 %) and (February 12.75 %).

Table 4. Average incidence (%) of pests in mulberry germplasm

Months *	Bihar hairy caterpillar	Wingless grass hopper
March 2010	7.50	7.50
April	7.50	6.00
May	4.50	9.00
June	7.50	3.00
July	7.50	7.50
August	4.50	6.00
September	9.00	7.50
October	6.00	4.50
November	9.00	11.25
December	6.75	11.25
January 2011	8.25	15.00
February	6.75	12.75
F test	*	*
SEm ±	0.23	0.44
CD (p=0.05)	0.67	1.30
CV (%)	5.61	9.01

* Significant at 5 %

The pest incidence in different months were lower than economic threshold level. The present result has close conformity with the findings of (Anonymous, 2010) who indicated sucking pests Pink mealy bug and Thrips and defoliators Bihar hairy caterpillar and Wingless grasshopper had not reached economic threshold level.

REFERANCES

Anonymous, 2010, *www.csb.in*

Katiyar, R.L., Sathya Prasad, K. and Shivpuje, P.R., 2002, Integrated management of Bihar hairy caterpillar. *Indian silk,* pp.15-16.

Rama Kant and Bhat, M.M., 2010, Mulberry foliar fungal diseases and insect pests calendar in Uttarakand. *Indian Silk*, 45: 10-13.

****