

RESISTANCE OF LOCAL CASTOR GENOTYPES TO *ACHAEA JANATA* LINN. AND *SPODOPTERA LITURA* FABR.

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ABSTRACT: Four local genotypes of castor, *Ricinus communis* Linn viz. Local red (gloomy), local red (non-gloomy), local green (gloomy), and local green (non-gloomy), evaluated for their resistance to two major defoliators viz. semilooper, *Achaea janata* L. and tobacco caterpillar, *Spodoptera litura* Fabr. under the rainfed agro-ecosystem of Manipur showed significant differences in resistance to the defoliators in different degrees of defoliation. Local red-gloomy genotype emerged was the most resistant with the least mean population record of both the defoliators and consequently, the lowest defoliation to a tune of 39.20%. Local green non-gloomy genotype was found to have the least resistance with highest population record of semilooper (5.15/plant) and tobacco caterpillar (6.75/plant) causing the most severe defoliation of 42.50%. Powdery varieties showed more consistency of resistance to the insects with lower defoliation than the non-gloomy ones.

Key Words: Resistance, tobacco caterpillar, *Achaea janata*, *Spodoptera litura*.

INTRODUCTION

India accounts for nearly 68% of castor area about 76% of world's castor production and ranks first in both area and production in the world (ANONYMOUS, 2003). Besides as an oilseed crop, castor has also been considered as the most preferred and successful host for eri silkworm rearing (SENGUPTA *et al*, 1974). More than 60 species of insect and mite pest have been reported to cause damage to castor in India (RAI, 1976). A number of insect pests, mostly the defoliators and sucking-pests at different growth stages, have also been reported from Manipur by RAM *et al.*(1981). The castor semilooper, *Achaea janata* and tobacco caterpillar, *Spodoptera litura* are the most common and regular pests of castor, which can cause even the complete defoliation (LAKSHMINARAYANA, 2003; SARMA *et al.*, 2005). In North-Eastern India, a traditional belt of ericulture, the eri-rearers mostly depend on the wildy grown castor vegetation and pay less attention to such defoliating insects-pests. Hence, we studied the severity of such insect pests on different local genotypes of castor grown under improved agronomic package of practices under the rainfed conditions of Manipur.

MATERIAL AND METHODS

The experiment was conducted for two consecutive years (2001 & 2002) at four replicated sites in Imphal East and West districts of Manipur, under rainfed conditions. Four local genotypes of castor, viz. red (gloomy), red (non-gloomy), green (gloomy), and green (non-gloomy), were evaluated against *A. janata* and *S. litura*. The seeds of each genotype were sown at a spacing of 45cm X 90cm in a plot of 15m x 10m with a nutritional supplement of NPK @ 60: 40:20 kg/ha. Intercultural operation like weeding and cultural leaf management practices such as nipping, flower bud removal etc. were

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also practiced. The resistance of the genotypes was evaluated on the basis of the number of older larva of semilooper (4th and 5th instar), gregarious stages of tobacco caterpillar and per cent defoliation. Three plants, two from the two ends and one from the middle of each row were selected randomly and tagged for the entire observations. The data were recorded from the 1st week of June to the end of October each year at weekly interval. Every alternate weekly-observation were taken in the morning hours from 9:00 A.M. onwards and other alternate weekly-observations were taken in the afternoon hours from 3:00 P.M. onwards to record the population of defoliators distributed over the crop in relation to the diurnal cycle. The mean of all the records of four replicated sites taken during the entire period of observation on each variety during two years were considered for statistical analysis.

RESULTS AND DISCUSSION

The infestation of both the defoliators was at moderate level. However, the average infestation was higher in the year 2001 than that of 2002 (Table 1). The infestation by semilooper, as measured by its population/plant, was significantly different among the genotypes in both the years (Table-1). The highest mean population was recorded in local green (non-gloomy) genotypes to a tune of 5.15/plant followed by red non-gloomy genotype (4.50/plant). However, the remaining two genotypes were statistically at par. Red gloomy genotype had emerged to be the most resistant variety with the least mean population record (4.25/plant) followed by the green gloomy one (4.30/plant).

The infestation on different castor genotypes by tobacco caterpillar was found to exhibit the significant difference in both the years and highly significant difference at their mean level (Table-1). Red gloomy genotype has been found to the most resistant variety to tobacco caterpillar with the lowest mean population record of 5.70/plant followed by local green gloomy genotype (5.80/plant). Local green non-gloomy genotype showed highest susceptibility to *S. litura* with mean population record of 6.75/plant. The degree of defoliation in different castor genotypes showed significant differences in 2001 and highly significant difference in 2002 and also in mean levels of the two years. The highest mean defoliation of 42.50% was recorded in green non-gloomy genotype followed by red non-gloomy one (41.30%). Red gloomy genotype could resist defoliation to the highest level with a defoliation of 39.20% followed by green-gloomy one (39.60%), both being statistically at par. When compared between the powdery and non-powdery varieties, the gloomy (powdery) genotypes had been consistently superior to non-gloomy ones with lower infestation of the defoliators that caused a mean defoliation of 39.40% as against 41.90% under non- gloomy genotypes (Table 2).

The presence of powdery particles could be the one of the causes of non-preference for consumption by the defoliators resulting in lower population record and lower defoliation. The castor crop could tolerate 25% defoliation without any reduction of yield (ANONYMOUS, 2003). However, the defoliation should be minimized to the extent possible in ericulture where a higher foliage yield is always desired factor to increase the rearing capacity and cocoon yield. All genotypes, under study, had shown defoliation more than 25% indicating the need of suppression of these defoliators.

Table 1: Resistance of local genotypes of castor to *A. janata* and *S. litura*.

Genotype	Average number of defoliators						Degree of defoliation (%)		
	Semilooper/plant			Tobacco caterpillar/plant			2001	2002	Mean
	2001	2002	Mean	2001	2002	Mean			
Red gloomy	4.60 (2.26)	3.90 (2.10)	4.25 (2.18)	6.00 (2.55)	5.40 (2.43)	5.70 (2.49)	40.10	38.30	39.20
Green gloomy	4.70 (2.28)	3.90 (2.10)	4.30 (2.19)	6.30 (2.61)	5.30 (2.41)	5.80 (2.51)	40.80	38.40	39.60
Red non-gloomy	4.80 (2.30)	4.20 (2.18)	4.50 (2.24)	6.70 (2.68)	5.70 (2.49)	6.20 (2.59)	42.20	40.40	41.30
Green non-gloomy	5.60 (2.47)	4.70 (2.28)	5.15 (2.38)	7.20 (2.77)	6.30 (2.61)	6.75 (2.70)	43.80	41.20	42.50
F-Test	*	*	*	*	*	**	*	**	**
LSD $P_{0.05}$	0.13	0.19	0.19	0.11	0.13	0.09	1.74	1.27	0.58

[†] Average of four replicated sites. *Significant; **Highly significant.

(x): Values within parentheses are square root transformed values.

Table 2: Gloomy Vs non-gloomy genotypes.

Geno type	Semilooper/plant			Tobacco caterpillar/plant			% defoliation		
	2001	2002	Mean	2001	2002	Mean	2001	2002	Mean
Gloomy	4.65	3.90	4.28	6.15	5.35	5.75	40.45	38.35	39.40
Non-gloomy	5.20	4.45	4.83	6.95	6.00	6.48	43.00	40.80	41.90

Tabulated data are mean values of particular group of variety

Lesser use of chemical insecticide with more emphasis on cultural and mechanical control such as hand-picking and killing of these defoliators in their caterpillar stage proved to be effective (LAKSHMINARAYANA, 2003) and eco-friendly approach with better safety to eri silkworm. In other words, an IPM module with need-based use of safer insecticide shall be an encouraging step towards managing the defoliators.

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