

Investigation on population dynamics of hibiscus mealybug, *Phenacoccus solenopsis* Tinsley in relation to biotic factors under South Gujarat condition

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ABSTRACT

Studies on population dynamics of hibiscus mealybug, *Phenacoccus solenopsis* Tinsley in relation to biotic factors were carried on randomly selected hibiscus plants at College Farm, N. M. College of Agriculture, Navsari Agricultural University, Navsari (Gujarat) during 2007-08. Under field condition the observation recorded at fortnightly interval showed that the population of *P. solenopsis* on hibiscus was observed throughout the year with its peak activity from first fortnight of October to first fortnight of December. The highest population of mealybug per plant was found in first fortnight of November (93.68), exhibited the peak activity of mealybug population. During the course of investigation, the nymph and adult female was found to be preyed by two predators *Spalgis epius* (Westwood) and *Scymnus coccivora* (Aiyar). The populations of both predators were directly related to the population of host, *P. solenopsis* and showed significant positive relationship with mealybug population.

Key words: *Phenacoccus solenopsis*, *Scymnus coccivora*, abiotic factors.

INTRODUCTION

Hibiscus rosa-sinensis is one of the important alternate host of mealybug, *Paracoccus solenopsis*. Beside this it also attacks various crops belonging to economically important botanical families such as Malvaceae, Cucurbitaceae, Fabaceae and Solanaceae. The mealybug, infesting hibiscus is found more or less throughout the year. Infestation was associated with noticeable deformation and distortion of the terminal growth, consisting of twisting and curling of stems and leaves, leaf wrinkling and puckering (Osborne, 2005). Parasitoids, predators and pathogens play a great role in the biological suppression of insect pests. There are different bioagents reported on *P. solenopsis* in different parts of the world. In view of this, attempt made to identify population density of *P. solenopsis* in relation to biotic factors in the present investigation.

MATERIALS AND METHODS

Studies were carried on randomly selected hibiscus plants at College Farm, N. M. College of Agriculture, Navsari Agricultural University, Navsari (Gujarat) during 2007-08. To assess the population of mealybug observations were recorded by counting the number of nymphs and adult female of mealybug, on twigs of three portion viz., top, middle and bottom of each randomly selected plant at fortnightly interval throughout the year. The observations of natural enemies

were also recorded, simultaneously and simple correlations were worked out.

RESULTS AND DISCUSSION

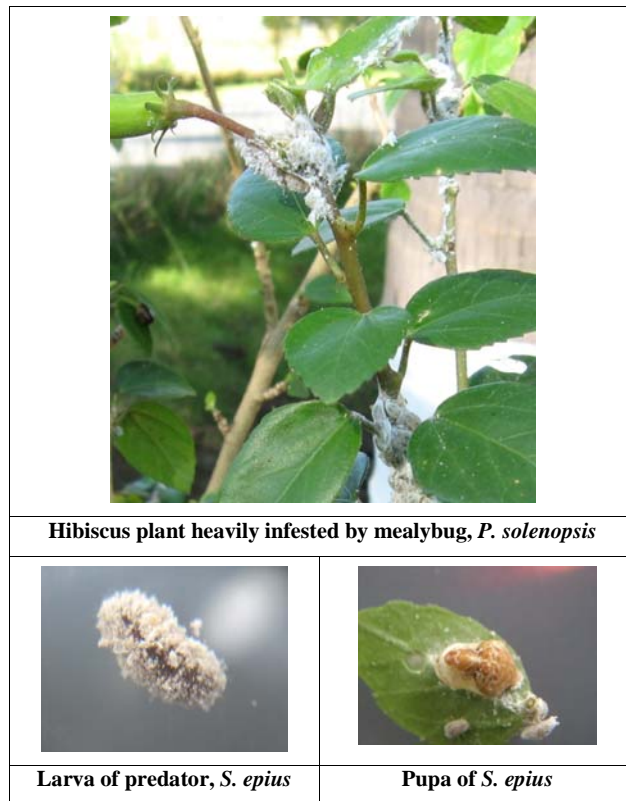
Data collected during the year 2007-08 are presented in Table 1. It is revealed from the data that the mealybug population was observed throughout the year with its peak activity from first fortnight of October to first fortnight of December. The highest population of mealybugs per plant was found in the first fortnight of November (93.68). Mealybug population decreased from January to March. Gautam (2007) reported that the solanum mealybug, *P. solani* would be seen throughout the year in nature but it was more active between April and October on many cultivated plants as well as on weeds at Delhi. They also observed that mealybug had greater adaptability against diverse climatic condition besides thriving on plant roots covered with soil.

The regular survey work on existence of natural enemies on *P. solenopsis* indicated two different predators. Among these, one was a lepidopteran predator *Spalgis epius* (Westwood) (Lepidoptera: Lycaenidae) and another was *Scymnus coccivora* Aiyar (Coleoptera: Coccinellidae) collected from field and reared out during present study.

Earlier, Venkatesha *et al.* (2004) reported that *S. epius* larva was a predator of various species of pseudococcids and

Table 1: Seasonal incidence and correlation matrix of mealybug, *P. solenopsis* population and their predators, *Spalgis epius* and *Scymnus coccivora* (2007-08)

Month	Fort-night	Average no. of mealybugs per plant	Average no. of predators per 25 plant	
			<i>Spalgis</i> larvae	<i>Scymnus</i> adult
October	I	38.06	0.08	0.36
	II	79.58	0.20	0.60
November	I	93.68	0.44	0.96
	II	56.46	0.28	1.12
December	I	38.98	0.12	0.24
	II	15.46	0.08	0.28
January	I	9.22	0.0	0.0
	II	5.66	0.0	0.0
February	I	1.23	0.0	0.0
	II	0.30	0.0	0.0
March	I	0.25	0.0	0.0
	II	7.33	0.0	0.0
April	I	9.25	0.0	0.0
	II	6.29	0.0	0.0
May	I	18.48	0.0	0.0
	II	22.86	0.0	0.0
June	I	12.06	0.0	0.0
	II	2.58	0.0	0.0
July	I	1.35	0.0	0.0
	II	0.53	0.0	0.0
August	I	0.20	0.0	0.0
	II	5.26	0.0	0.0
September	I	17.48	0.08	0.0
	II	25.46	0.0	0.0
Total		468.01	1.28	3.56
Correlation matrix with meanlybug population			0.9245*	0.8698
* Significant 5% level (r = + 0.4034)				



coccids. The butterfly flew rapidly and erratically in the vicinity of bushes infested with mealybug and swiftly deposited eggs in the mass of the mealybug. The larva of the butterfly was short, slug like and covered with white wax coating. The pupa showed clear eye spots, nose, mouth, cheeks and forehead on the dorso-lateral side.

It can be seen from Table 1 that the population of *Spalgis epius* (0.08) and *Scymnus coccivora* (0.36) commenced from the first fortnight of October and gradually increased to its peak in the first fortnight of November (0.44) in case of *S. epius* while in *S. coccivora* it was in the second fortnight of November (1.12). Thereafter it declined in the second fortnight of December and minimal.

The correlation study revealed that both predators *S. epius* and *S. coccivora* had significant positive relationship with mealybug population.

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