

SPIDER FAUNA ON THE COCONUT PALM AND THEIR ROLE IN THE BIOLOGICAL SUPPRESSION OF *OPISINA ARENOSELLA* WLK.

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Spiders are widely distributed in all *Opisina* infested tracts of Kerala. Twenty six species of spiders belonging to twelve genera and six families were identified. The species listed include *Argiope*, *Cheiracanthium*, *Clubiona*, *Larinia*, *Marpissa*, *Neoseona*, *Phidippus*, *Plexippus*, *Poecilochrou*, *Rhene*, *Sparassus* and *Tetragnatha*. *Cheiracanthium*, sp. was more commonly observed. *Cheiracanthium*, *Rhene* and *Sparassus* were some of the major predacious species on *O. arenosella*. Rate of prey consumption by these ranged from 0.7 to 1.5 *Opisina* caterpillars per day. Spider population particularly that of the predacious ones was maximum during July and August, but remained at a minimum level during February-March. But they were present in the field almost throughout the year. *Rhene indicus* completed its immature stages within 98 days in six instars and *Cheiracanthium* sp. in 224 days in twelve instars. Females of *R. indicus* lived for a period of 296 days whereas those of *Cheiracanthium* sp. lived only up to 127 days under laboratory conditions.

Keywords: Spider; *Opisina arenosella*, coconut, biological pest suppression.

1. Introduction

Spiders are predominant biocontrol agents exerting suppression of a number of arthropod pests of many crop plants. They are polyphagous predators and are ubiquitous in distribution.

The leaf eating caterpillar, *Opisina arenosella* Wlk. is one of the key pests of the coconut palm distributed in Kerala, Karnataka, Tamil Nadu, Andhra Pradesh, Orissa, Gujrat and Maharashtra. Under natural conditions the pest is kept under check by a variety of species of parasitoids and predators. Among the predators, the spiders and the carabid beetles play a dominant role in the natural suppression of the pest. Nirula (1956), Menon and Pandalai (1958) and Dharmaraju (1962) observed a number of spiders associated with *O. arenosella*. A detailed study was undertaken to conserve the natural spider fauna associated with the larval galleries of this pest so that they could play their role in the integrated management of the coconut caterpillar.

Materials and methods

Occurrence and seasonal abundance

An *Opisina* - infested garden comprising nearly 800 cocount palms of the age group of 5 to 10 years was selected for the study. Observations on the population of *O. arenosella* and spiders were recorded from 20% sample leaves of 20% sample palms at fortnightly intervals for a period of two years.

Feeding potential

For feeding trials the spiders were maintained separately in glass jar cages of size 17 x 6.5 cm in the laboratory, Coconut leaf bits infested with known number of *Opisina* caterpillars were provided in each of the cages containing the spiders. Number of caterpillars preyed upon and their feeding habits were recorded every day.

Biology

Test spiders were reared separately in glass jar cages in the laboratory under a temperature range of 22-34°C and relative humidity range of 32-96%. They were fed with the early instar caterpillars of *O. arenosella*. Data on the duration of the immature stages and longevity were recorded daily.

Results

Occurrence and seasonal abundance

Six families of spiders belonging to twelve genera and twenty-six species were (Table 1). The economic importance of all the species is not fully known. All are predacious on different stages of *O. arenosella*. Three of them viz. *Rhene indicus*, *Cheiracanthium* and *Sparassus* were quite predominant and they consumed the immature and adult stages of *Opisina*. Among the spider fauna, *Cheiracanthium* spp. dominated and comprised nearly 21% of the total spider population on the coconut palm,

Table 1
Spider fauna (Order Araneae) associated with
Opisina arenosella infested coconut palms

S. No.	Family	Name of spider
1	Araneidae	<i>Argiope catenulata</i> (Dolleschall)
2	"	<i>Larinia</i> sp.
3	"	<i>Neoscona bengalensis</i> Tikader & Bal
4	"	<i>N. elliptica</i> Tikader & Bal
5	Clubionidae	<i>Cheiracanthium melanostoma</i> (Thorell)
6	"	<i>Cheiracanthium</i> sp.
7	"	<i>Clubiona drassodes</i> Cambridge
8	Gnaphosidae	<i>Poecilochroa barmani</i> Tikader
9	Salticidae	<i>Marpissa anusuae</i> Tikader & Biswas
10	"	<i>M. dhakuriensis</i> Tikader
11	"	<i>M. tigrina</i> Tikader
12	"	<i>Marpissa</i> spp.
13	"	<i>Phidippus benghlensis</i> Tikader
14	"	<i>Phidippus</i> spp.
15	"	<i>Plexippus paykulli</i> (Aud.)
16	"	<i>Rhene danieli</i> Tikader
17	"	<i>R. indicus</i> Tikader
18	"	<i>R. khandalensis</i> Tikader
19	Sparassidae	<i>Sparassus</i> sp.
20	Tetragnathidae	<i>Tetragnatha andamanensis</i> Tikader

Spiders are found on coconut palms in association with the larval galleries of *O. arenosella* during all the months of the year. Maximum population of spiders occurred during July to August period and minimum during February to March. An interesting observation made during the course of the present study was that during July and August, when the spiders particularly the highly predacious ones such as

Rhene indicus, *Cheiracanthium*, *Sparassus* and *Marpissa tigrina* were abundant, the population of *O. arenosella* remained at a lower level. However, during February-March, when *Opisina* population was maximum the spider remained at a low population level.

Feeding potential

Eighteen species of spiders were studied for their feeding potential under laboratory conditions. All of them fed on *Opisina* caterpillars and the rate of consumption ranged from 0.05 to 1.54 caterpillars per day. Four of these species were highly predacious. In the order of feeding potential, *Sparassus* sp. consumed at the rate of 1.54; *Cheiracanthium* sp. 1.19; *Rhene khandalensis* 0.71 and *R. indicus* 0.70 full grown *Opisina* caterpillars, respectively, per day. Consumption was more in the case of the female spiders as compared to that of their male counterpart. As, for example, *Cheiracanthium* female consumed 1.2 caterpillars per day whereas their males consumed 0.7 and *Rhene indicus* female 0.7 caterpillar while the male consumed only 0.3 caterpillar per day.

Biology

Rhene indicus reached adulthood after six moults and the period required from hatching of eggs to maturity was 71-98 days in the case of the male and 70-98 in the case of the female. The male spider lived for a period of 25-77 days and female 71-296 days.

Cheiracanthium reached adulthood after 12 moults and the period from hatching to maturity was 204 - 224 days for males and 194-206 days for females. The males lived for 35 to 122 days and females 51-127 days.

Discussion

Spiders are important biocontrol agents exerting natural suppression of the coconut leaf eating caterpillar. These predators occur in the field through out the year and many of them have a long life span. The spiders are not "specialist predators" (Reichert and Lockley, 1984) and hence they can survive on any kind of prey available on the coconut palm ecosystem. Hence, conservation of these important group of predators is of great significance. If insecticides are to be used for the suppression of *Opisina* infestations only those chemicals which are less toxic to the spider fauna should be selected and used.

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