

## **IDENTIFICATION OF MEALYBUGS AND THEIR PREDATORS IN DIFFERENT TYPES OF PLANTS ACROSS THE TIRUNELVELI DISTRICT AGRO ECOLOGICAL REGION OF TAMILNADU**

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### **ABSTRACT:**

In this research conducted from December 2023 to May 2024 in Tirunelveli District, Tamil Nadu, we investigated mealybug infestations and their management in *Gossypium herbaceum* and *Musa paradisiaca* ecosystems. The study documented various mealybug species, their alternate hosts, and natural predators from the *Coccinellidae* family. We identified 38 host plants infested with mealybugs and highlighted promising predator species for potential mass rearing and biological control. These findings underscore the importance of natural biological control agents in managing economically significant plant diseases in the region.

**KEYWORDS:** Banana ecosystem, Cotton ecosystem, Mealybug species, Natural ecosystem.

### **Introduction:**

Pseudococcidae (*Hemiptera: Coccoomorpha*) is a large family of mealybugs widespread across the globe in terms of species diversity (Huseyin et al., 2023). Historically, mealybugs were not considered major pests of cotton in India (APCoAB, 2006). However, mealybugs (*Pseudococcidae*) have recently caused severe economic damage to *Gossypium herbaceum* and *Musa paradisiaca*, reducing yields by up to 40-50% in several areas of Kalakad in the Tirunelveli region (December 2023 - May 2024). The unexpected occurrence of mealybugs in cotton and weed hosts presents new challenges in cotton cultivation and pest management. There is very limited information on this pest and its associated biotic factors. The present investigation, conducted from December 2023 to May 2024 in *Gossypium herbaceum* and *Musa paradisiaca* growing areas of the Kalakad region, Tirunelveli District, South Tamil Nadu, India, has yielded extensive data. The ladybird *Cryptolaemus montrouzieri*, a known predator, has demonstrated proven effectiveness in controlling mealybug pests (Laura Golsteyn et al., 2021).

## **MATERIALS AND METHODS:**

Intensive surveys were conducted in December 2023, during which samples were collected from the Kalakad region in Tirunelveli District, Tamil Nadu. The surveys involved examining the stems, leaves, and other green parts of plants in these areas. The samples were collected to identify species belonging to the family Pseudococcidae, as well as predatory species from the family *Coccinellidae*, including mealybug destroyers, mealybug *leptomatrix*, and parasitoids. The locations where each sample was collected were also documented.

### **COLLECTION AND IDENTIFICATION OF MEALYBUG PREDATOR SPECIES:**

Field collected mealybugs from *Gossypium* plants were brought to the laboratory, preserved in 70% ethyl alcohol and mounted on slides (Borrer *et.al*.,1992).The specimens were identified by taxonomic keys (Williams and Watson ,1998)and with the respiratory collection of coccids kept in Department of Agricultural Entomology,Tamilnadu Agricultural University,Coimbatore.

### **COLLECTION AND IDENTIFICATION OF ALTERNATE HOSTS:**

Mealybugs are infested weed plants in Banana and Cotton ecosystem were also collected and their identification was accomplished with the help of the agri officers in Kalakad.

### **COLLECTION AND IDENTIFICATION OF NATURAL ENEMIES OF THE MEALYBUG IN KALAKAD REGION:**

#### **PREDATORS:**

*Coccinellid* predators collected from mealybug infested cotton plants were identified by using standard taxonomic keys of common species of coccinellids (poorani 2024).

#### **PARASITES:**

The field collected mealybug species from banana plants were brought to the laboratory and kept in emergence cages . (R.Bharathi andN.Muthukrishnan.,2017) .The parazitoids emerged from the mealybug colonies LTD laboratory, in Tiruchi

## RESULTS AND DISCUSSION:

Managing mealybug infestations presents significant challenges for farmers due to the high diversity of mealybug species and the necessity for precise identification and documentation before implementing control measures. Our research highlights the critical need for thorough species identification to effectively address mealybug problems. The study documented various mealybug species affecting *Gossypium herbaceum* and *Musa paradisiaca* in the Kalakad region of Tirunelveli District. Accurate identification is pivotal, as it enables targeted control strategies, ensuring that pest management practices are both efficient and environmentally sustainable. Without this detailed understanding, control measures may be less effective, leading to prolonged pest issues and potential economic losses for farmers.

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Furthermore, the research underscores the importance of natural enemies in managing mealybug populations. By identifying and studying the predator species from the *Coccinellidae* family, including their interactions with mealybugs, the study supports the role of these natural enemies in pest control. The presence of effective biological control agents, such as the ladybird *Cryptolaemus montrouzieri*, can significantly enhance pest management efforts. This approach not only aids in controlling mealybug populations but also helps in maintaining the ecological balance within agro-ecological areas. Thus, integrating natural enemies into pest management strategies is crucial for sustainable agriculture, promoting both crop protection and environmental health.

Sl. No.	Month (Cropping period)	Standard week	Mealybug Grade)*	No. of samples collected	% of predators		% of predators	
					<i>Cryptolaemus montrouzieri</i> ,	<i>Cryptolaemus montrouzieri</i> larvae	<i>Green lacewings</i>	<i>ladybugs</i>
1	December 2-8	49	0	50	0	0	0	0
2	December 9-15	50	0	50	0	0	0	0
3	December 16-23	51	0	50	0	0	0	0
4	December 24-31	52	0	50	0	0	0	0
5	January 1-7	1	0	50	0	0	0	0
6	January 8-14	2	0	50	0	0	0	0
7	January 15-21	3	0	50	0	0	0	0
8	January 22-28	4	I	50	0	0	0	0
9	January 29 February -4	5	II	50	6	10	6	0
10	February 5-11	6	I	50	16	18	0	8
11	February 12-18	7	I & II	50	18	16	0	2
12	February 19-25	8	I & II	50	10	0	10	0

**Predators on banana mealybug *Pseudococcus elisae* from Tamil Nadu\*Note: Grade-0-No incidence**

**Grade-I-Scattered appearance**

**Grade-II-Full incidence on any one of the branch**

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