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First report of invasive rugose spiraling whitefly, *Aleurodicus rugioeperculatus* Martin (Hemiptera: Aleyrodidae) on coconut in Bastar, Chhattisgarh, India

Rajesh Kumar Patel, PK Salam, Beena Singh and Vandana Chadar

Abstract

The rugose spiraling whitefly (RSW) was first time observed on coconut palm (*Cocos nucifera* L.) from Bastar plateau of Chhattisgarh during month of September. During survey the occurrence of this pest is not found in the farmer's field of Kondagaon and Dantewada districts. Average population of RSW on different coconut cultivar reveals that varies from 14.2 to 30.6 RSW / cm². Highest population was recorded in Gautami Ganga (30.6 / cm²) followed by Kera Bastar (23.2 / cm²) while the minimum population was found in Kalpa Raksha (14.2 / cm²). This investigation is first report of occurrence of RSW on coconut in Chhattisgarh.

Keywords: Spiraling whitefly, *Aleurodicus rugioeperculatus*, invasive, coconut, Bastar, Chhattisgarh

1. Introduction

Whiteflies belong to the order Hemiptera and the suborder Sternorrhyncha with a single superfamily, Aleyrodoidea, within the whitefly genus *Aleurodicus* Douglas comprises 35 species. Of which only the spiraling whitefly *Aleurodicus dispersus* Russel was so far known to occur in India [1]. The Rugose Spiraling Whitefly (RSW) was first described from Belize by Martin on coconut (*Cocos nucifera* L.) during 2004 [2]. The infestation of RSW on coconut was reported from Pollalchi, Tamil Nadu and Palakkad, Kerala during 2016 based on the specimen collected by Mr. John Mahesh from Deejay Coconut Nursery Farm in Pollalchi [3] and also in Karnataka [4], Assam [5] and Gujarat [6]. This pest is polyphagous devouring wide range of hosts including ornamentals, palms, fruits and weed flora [7-11]. The taxonomic identification keys for RSW are broadly cordate vasiform orifice, operculum ventro-basally spinulose and dorsally characteristically rugose, with a pair of ventro-median fine setae; lingula head protruding beyond vasiform orifice, finely spinulose, apically acute, its four setae situated close to apex. Anterior marginal, cephalic and first abdominal setae absent, Posterior marginal, and 12 pairs of outer submarginal setae present (including nominal caudal pair); single submedian pairs of pro, meso, and metathroacic setae and eighth abdominal setae situated fully anterior to vasiform orifice, opposite anterior corners of operculum present. Cephalic and anterior 4 pairs of abdominal compound pores distinct, 2 pairs of much smaller pores present on abdominal segments VII and VIII. Submargin defined by zone of crowded, widerimmed pores that stand proud from puparial surface, inner boundary of zone forming mesally-directed lobes, the pore band interrupted immediately posterior to lingular apex [2]. The body reticulation, it was not prominently visible in the mounted slides as it varies with the level of bleaching and reticulation/ tuberculation are known to vary within a species [12]. The presence of a pair of small compound pores on each of abdominal segments VII and VIII in puparium with characteristically rugose operculum and atypically narrowly acute lingula apex makes RWS different from other known species of *Aleurodicus* in India. RSW adults large sized with a pair of irregular light brown bands across the wings. Males with the long pincer like structures at the end of their abdomen [13]. The management of RSW which included conservatory biological control using the aphelinid parasitoid, *Encarsia guadeloupae* as well as habitat preservation of the sooty mould feeding Leiochrinid beetle, *Leiochrinus nilgiranus* [14-15].

2. Materials and Methods

A survey and monitoring for rugose spiraling whitefly in coconut were carried out in AICRP on Palms, S. G. College of Agriculture and Research Station, Jagdalpur and farmers field of Kondagaon and Dantewada districts of Chhattisgarh. The survey is based on typical characteristic such as spiraling pattern or concentric circular egg laying which is covered with white woolly waxy matter underside of the leaflets and fruit and presence of nymphs and adults of the RSW. The adults are lethargic, larger in size than other common white flies and remain congregated on abaxial surface of leaves. The upper side of the leaflets shows development of black sooty mould due to the secretion of glistening liquid *i.e.* honey dew by RSW [6]. The samples were collected and studied in the Entomology laboratory of S. G. College of Agriculture and Research Station, Jagdalpur. This investigation is done by visual observations as well as counting population of immature stage on leaves.

3. Results and Discussion

The rugose spiraling whitefly (RSW) was first time observed on coconut palm (*Cocos nucifera* L.) from Bastar plateau of Chhattisgarh during month of September. During survey the occurrence of this pest is not found in the farmers field of Kondagaon and Dantewada districts. Average population of RSW on different coconut cultivar reveals that varies from 14.2 to 30.6 RSW / cm². Highest population was recorded in Gautami Ganga (30.6 / cm²) followed by Kera Bastar (23.2 / cm²) while the minimum population was found in Kalpa Raksha (14.2 / cm²) (Table 1) (Fig.1-5). The findings of Sundararaj R. and Selvaraj K., 2017 revealed that the infestation was very severe on lower leaves as compared to that of the middle and upper young leaves in dwarf and hybrid coconut palm which are about 4 to 6 years old. Population ranged from 18 to 37 nymphs/cm² of leaflet [3] which is almost similar to the present investigation with RSW population varies from 14.2 to 30.6 RSW / cm² hence, the findings of Sundararaj R. and Selvaraj K., 2017 support the present investigation.

Table 1: Average population of RSW on different coconut cultivar in Bastar

S. No.	Varieties of coconut	Average population of RSW/ cm ²
1.	Kalyani Coconut-1	15.5
2.	Gautami Ganga	30.6
3.	Konkan Bhatye Coconut Hybrid-1	20.2
4.	Kalpa Dhenu	21.9
5.	Kera Keralam	19.3
6.	Kera Bastar	23.2
7.	Kalpa Pratibha	17.9
8.	Kalpa Mitra	18.0
9.	Kalpa Raksha	14.2
10.	Kahikuchi Hybrid-1	18.2



Fig 1: Eggs and Nymphs of RSW



Fig 2: Adults of RSW



Fig 3: Spiral Patter of Egg Laying



Fig 4: Sooty Mould Development



Fig 5: Infested tree

4. Conclusion

The invasive pest, *A. rugioeperculatus* has already reported to cause significant damage in the India. Currently, this pest has invaded mainly in coconut fields of Bastar region of Chhattisgarh state. This investigation is first report of occurrence of RSW on coconut in Chhattisgarh. This pest is polyphagous nature hence current incidence of RSW in Chhattisgarh is alarming as it has a great potential to extend its host range and spread to other coconut growing areas in the Chhattisgarh state.

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