

Pests status of coconut in managed and unmanaged garden

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ABSTRACT

The major pests incidence and intensity on coconut was recorded during fixed plot survey. It was carried out at bimonthly interval from April, 2018 to February, 2019 at Regional Research Station, Bhatye, Ratnagiri jurisdiction. Two plots were selected for observations, one was well managed (good sanitation, use of fertilizers, etc.) and another unmanaged (poor sanitation, no use of fertilizers). The major pest status in managed garden was minimum which recorded rhinoceros beetle (25.73%), eriophyid mite (41.74%) and mite grade index 0.71. Whereas, maximum infestation of rhinoceros beetle, red palm weevil and eriophyid mite were observed to be 30.31, 0.37, 71.70 per cent, respectively and mite grade index was 1.57 (moderate) in unmanaged garden. The average data of two fixed plots revealed that the incidence of rhinoceros beetle was in the range of 7.64 to 48.00 per cent and maximum infestation was observed in the month of June, 2018 (48.00%), and minimum incidence was observed in February, 2019 (7.64 %). The infestation of red palm weevil and black headed caterpillar were 1.11 and 0.64 per cent only in February, 2019. The infestation of eriophyid mite was in the range of 41.65 to 64.98 per cent and maximum infestation (64.98%) was noticed in the month of April, 2018 and least incidence was observed in October, 2018 (41.65%). The mite damage grade index 1.39 (moderate) was recorded in February, 2019. However, lowest MGI (0.67) was observed in October, 2018.

Key words: Coconut, rhinoceros beetle, red palm weevil, Eriophyid mite, black headed caterpillar

Coconut (*Cocos nucifera* Linn) is the most important versatile tree crop cultivated in the tropics providing livelihood and employment securities to the rural agrarian mass in the region. It is an important plantation crop which is being mainly cultivated by farmers of southern state and states like Goa, Maharashtra, Gujarat, West Bengal, Odisha, Assam, Andaman and Nicobar Islands, Lakshdweep and Minicoy islands are also having considerable area under coconut. Coconut is essentially a crop of marginal and small farmers in India. The low size of the land holding by coconut growers is a serious challenge to both profitability and sustainability of the crop. The coconut palm is attacked by a variety of pests. The majority attack the leaves, while others attack the trunk (stem), inflorescence, young nuts and roots. Some are major pests which cause considerable damage and yield loss, while some are less damaging. Most of these insects remain as minor pests, either because the environmental conditions are not favourable for their rapid multiplication or because they are adequately controlled by natural enemies. The coconut eriophyid mite *Aceria guerreronis* Keifer was first reported as a serious pest in Kerala during 1997-98. Subsequently, the devastating effect of these mites were noticed in Coimbatore and Theni districts of Tamil Nadu and Bangaluru in Karnataka (Sathiamma *et al.*, 1998 and Mohanasundaram *et al.*, 1999). Since extensive damage has been caused to coconut palms in the southern states of India (Nair *et al.*, 2000), Mathen (1962) reported that the red palm weevil, *Rhynchophorus ferrugineus* Oliv, (RPW) (curculionidae, Coleoptera) is a serious pest attacking

different species of palm trees (e.g., date palm, coconut palm and royal palm). Chalapathi Rao *et al.* (2018) found that per cent of leaf damage due to rhinoceros beetles ranged from 12.5 to 35.5 and spindle damage ranged from 33.3 to 45 per cent. By considering economic importance of pest and yield loss of palm, the present investigation was carried out for assessment of major pests in fixed plots during survey to know the exact status of coconut pests in Ratnagiri district of Konkan region of Maharashtra.

MATERIALS AND METHODS

A field survey was carried out as Entomological Experiment under Pest surveillance of coconut at AICRP (Palms), RCRS, Bhatye, Dist. Ratnagiri (M.S.) during 2018-19 for knowing the exact pests status on coconut. Two different plots at different locations were selected with well managed (good sanitation, use of fertilizers, etc.) and unmanaged (poor sanitation, no use of fertilizers). One plot has need based management treatment for major pests and other plot with no management aspect (natural control). Six observations were made per year at 2 months interval, *viz.*, April, June, Aug., Oct., Dec. and February. Major pests like rhinoceros beetle, red palm weevil, black headed caterpillar and eriophyid mite were recorded by using following methods:

Rhinoceros beetle: Per cent of palm infested (out of 100 palms garden⁻¹)- The top 10 fronds in each palm with single/multiple cuts was observed. Per cent leaf damage (25 palms at random garden⁻¹) (infested/total number of leaves x 100).

Eriophyid mite: Per cent nut infested (mite infested nuts/total nuts) (25 palms at random garden⁻¹). Damage grade (mature bunch) (intensity 0-4 scale) (out of minimum 100 nuts garden⁻¹) using CPCRI scales were followed.

CPCRI Scale			
Per cent damage on nut surface	Scale	Grade Index	Intensity
Nuts with no mite damage	0	0	Nil
< 25%	1	0.1-1.0	Mild
25-50%	2	1.1-2.0	Moderate
50-75%	3	2.1-3.0	High
>75%	4	3.1-4.0	Severe

Red palm weevil: Per cent of palms infested (out of total palm (>100) garden⁻¹) with typical symptoms of RPW. Black headed caterpillar: Per cent leaf damage (infested leaf/total leaf) (50 palms garden⁻¹).

RESULTS AND DISCUSSION

The data depicted in Table 1 indicated that minimum per cent incidence of major pest status, *viz.*, rhinoceros beetle

(25.73%), eriophyid mite (41.74%) and mite grade index 0.71 was noticed in managed garden. Whereas, maximum infestation of rhinoceros beetle, red palm weevil and eriophyid mite were observed 30.31, 0.37, 71.70 per cent, respectively with mite grade index of 1.57 (moderate) in unmanaged to be garden (Table 2).

The average data of two fixed plots are presented in Table 3. The data revealed that the incidence of rhinoceros beetle was in the range of 20.00 to 48.00 per cent and maximum infestation was observed in the month of June, 2018 (48.00 %) and minimum incidence was observed in December, 2018 (20.00 %). Chalapathi Rao *et al.* (2018) found that the per cent of leaf damage due to rhinoceros beetles ranged from 12.5 to 35.5 and spindle damage ranged from 33.3 to 45 per cent. The infestation of red palm weevil and black headed caterpillar were not recorded during these surveys. The infestation of eriophyid mite was in the range of 41.65 to 64.98 per cent. Similar results on eriophyid mite

Table 1: Extent of infestation by different pests in fixed plot (managed) during survey in Maharashtra (Plot No. 1)

Month	Rhinoceros beetle			Red palm weevil incidence (%)	Black headed caterpillar incidence (%)	Eriophyid mite	
	Incidence (%)	Leaf damage (%)	Spindle damage (%)			Infestation (%)	MGI
April,18	24.00	2.80	0.00	0.00	0.00	56.58	1.22
June,18	52.00	7.03	0.00	0.00	0.00	53.11	0.92
Aug.,18	36.00	4.00	8.00	0.00	0.00	37.82	0.50
Oct., 18	28.00	3.60	0.00	0.00	0.00	35.82	0.61
Dec., 18	08.00	1.60	0.00	0.00	0.00	30.88	0.54
Feb., 19	06.41	2.00	1.28	0.00	0.00	36.25	0.51
Mean ± SE	25.73 ± 7.72	3.50 ± 0.87	1.54 ± 1.43	0.00 ± 0.00	0.00 ± 0.00	41.74 ± 4.68	0.71 ± 0.13

Table 2: Extent of infestation by different pests in fixed plot (unmanaged) during survey in Maharashtra (Plot No. 2)

Month	Rhinoceros beetle			Red palm weevil incidence (%)	Black headed caterpillar incidence (%)	Eriophyid mite	
	Incidence (%)	Leaf damage (%)	Spindle damage (%)			Infestation (%)	MGI
April,18	25.00	6.00	0.00	0.00	0.00	73.39	1.53
June,18	44.00	7.20	0.00	0.00	0.00	76.09	1.78
Aug.,18	48.00	6.00	4.00	0.00	0.00	72.01	1.39
Oct., 18	24.00	4.40	4.00	0.00	0.00	47.49	0.74
Dec., 18	32.00	5.20	0.00	0.00	0.00	78.80	1.76
Feb., 19	8.88	3.20	3.33	2.22	0.00	82.42	2.27
Mean ± SE	30.31 ± 6.42	5.33 ± 0.62	1.88 ± 0.93	0.37 ± 0.40	0.00 ± 0.00	71.70 ± 5.56	1.57 ± 0.22

Table 3: Average per cent infestation by different pests in fixed plot survey in Maharashtra

Month	Rhinoceros beetle			Red palm weevil incidence (%)	Black headed caterpillar incidence (%)	Eriophyid mite	
	Incidence (%)	Leaf damage (%)	Spindle damage (%)			Infestation (%)	MGI
April,18	24.50	4.40	0.00	0.00	0.00	64.98	1.37
June,18	48.00	7.11	0.00	0.00	0.00	64.60	1.35
Aug.,18	42.00	5.00	6.00	0.00	0.00	54.91	0.94
Oct.,18	26.00	4.00	2.00	0.00	0.00	41.65	0.67
Dec., 18	20.00	3.40	0.00	0.00	0.00	54.84	1.15
Feb., 19	7.64	2.60	2.30	1.11	0.64	59.33	1.39
Mean ± SE	28.02 ± 5.44	4.41 ± 0.63	1.71 ± 1.16	0.18 ± 0.00	0.10 ± 0.00	56.71 ± 4.25	1.14 ± 0.13

infestation was also noticed by Alagar *et al.* (2019). Maximum infestation (64.98 %) was noticed in the month of April, 2018 and least incidence (41.65%) was observed in October, 2018. The mite damage grade index 1.37 (moderate) was recorded in April, 2018. However, lowest MGI (0.67) was observed in October, 2018. Present data was correlated with those of Levin and Mammooty (2003) indicated that most of the infested nuts were in the damage category of two and three and the percentage of mite damage was only 25.4 per cent. Desai *et al.* (2009) reported that the eriophyid mite infestation was higher in Thane district followed by Sindhudurg district. Gurav *et al.* (2018) observed that pest incidence and pest intensity trend showed that peak incidence was recorded during summer months, (April to May) while it decreases from September onwards and reaches to minimum in winter months, (November and December). Muyengi *et al.* (2015) showed that about 46.7 per cent of the farmers experienced the problem of rhinoceros beetle (*Oryctes monoceros*) in their farms and about 4.7 per cent problems with coconut mites (*Aceria guerreronis*). Vanderplank (1959), Bedford (1975), Paul (1985) and Seguni (2010) also reported the same results.

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