

Survey of Coconut Eriophyid Mite *Aceria guerreronis* (Keifer) (Acarina: Eriophyidae) in Ratnagiri District of Konkan Region of Maharashtra

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Abstract The study on Survey of Coconut Eriophyid Mite *Aceria guerreronis* (Keifer) (Acarina: Eriophyidae) in Ratnagiri District of Konkan Region of Maharashtra was conducted to observe per cent eriophyid mite distribution and for conducting management study. The survey was conducted in nine

tahsils viz., Mandangad, Dapoli, Khed, Chiplun, Guhaghar, Sangmeshwar, Ratnagiri, Lanja and Rajapur of Ratnagiri district having maximum coconut plantation for recording the incidence of coconut eriophyid mite. The data revealed that, in Mandangad tahsil (37.27%), Dapoli (40.65%), Khed (37.77%), Chiplun (47.57%), Guhaghar (35.69%), Sangmeshwar (33.18%), Lanja (53.57%), Ratnagiri (38.07%) and Rajapur (34.84%) per cent eriophyid mite infestation was recorded. The overall data on per cent infestation of eriophyid mite in Ratnagiri district revealed that, the maximum per cent infestation of eriophyid mite was in Lanja tahsil (53.57%), whereas the minimum infestation was observed in Sangmeshwar tahsil (33.18%). In grade I, grade II and grade III the maximum per cent grade wise eriophyid mite infestation 27.38, 15.88 and 8.40%, respectively was recorded in Lanja tahsil. While, in grade IV maximum per cent grade wise infestation of eriophyid mite of 3.00 was recorded in Dapoli tahsil and minimum in Rajapur tahsil 0.64%.

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Introduction

Coconut palm, *Cocos nucifera* L. called Kalpavriksha and grown in more than 93 countries worldwide. World production of coconut is 12.29 MT with a total production in terms of copra equivalent of 11.04 million MT. India ranks number one among the coconut grow-

ing countries with productivity of 10,122 nuts per ha and area of about 2140.50 thousand ha with a production of 21,665.19 million tons. Total area under coconut in Maharashtra is about 28000 ha with a production of 187.47 million tons and productivity is 6,676 nuts/ ha [1]. Eriophyid mite is becoming a serious problem now a days. First time it was observed by Keifer at Mexico from Guerrero state in 1965. In India it was first reported in Ernakulam district of Kerala in 1998 and in Maharashtra from Vasai tahsil of Thane district in 2002. Coconut Eriophyid mites are worm-like, fusiform, microscopic, whitish to pale yellowish in color. The adult measures 200 to 250 μ in length and 36.52 μ wide. Yield loss was found to up to 30% while it may increase up to 75 to 80%.

In future it could be a very dangerous pest if not managed well at present and can cause tremendous loss in nut yield. Therefore, for better understanding of this pest, its geographical and climatically distribution for effective management practices this research trail was conducted.

Materials and Methods

The survey of coconut eriophyid mite was conducted in Ratnagiri district viz., Mandangad, Dapoli, Khed, Chiplun, Guhagar, Sangameshwar, Ratnagiri, Lanja and Rajapur. Three villages from each tahsil were selected for the survey. From each village 100 coconut palms were surveyed once during the course of investigation. The observations on total number of palms, infested palms and grade wise infestation was recorded. The per cent infestation was calculated by using following formula.

$$\% \text{ Infestation} = \frac{\text{Total number of infested palms}}{\text{Total number of palms}} \times 100$$

The village wise and taluka wise infestation of coconut eriophyid mite was calculated. The per cent infestation was worked out. Similarly the grade wise nut infestation was also recorded. The observations were recorded from 3rd bunch of the palm at monthly interval. The following scale index of Devi and Umopathy [2] was used to record intensity index.

0 – No infestation, 1 – 1 to 25% nut area infested, 2 – 26 to 50% nut area infested, 3 – 51 to 75% nut area infested, 4 – More than 75% nut area infested.

Results and Discussion

The data of survey revealed that, in case of Mandangad tahsil three villages viz., Velas, Shipole and Harihareshwar were selected for recording per cent eriophyid mite infestation. The total number of 5,552 nuts were observed out of that 2,069 nuts were infested by eriophyid mite. The total per cent eriophyid mite infestation was found to be 37.27. The infestation was higher in Harihareshwar (52.66%) followed by Velas (37.11%) and Shipole (24.74%). In the view of total grade wise infestation in Mandangad tahsil, the maximum nuts were under grade zero (47.34%) whereas 21.90% nuts in grade I, 20.06% nuts in grade II, 8.72% nuts in grade III and 1.98% nuts in grade IV were recorded. The highest grade wise infestation was observed in Harihareshwar, where the nuts under grade I, grade II and grade III were 21.90, 20.06 and 8.72%, respectively. The minimum grade wise infestation was found in village Shipole.

In Dapoli tahsil, Ladghar, Anjarle and Kelashi villages were surveyed for observing eriophyid mite infestation. Among total 8,204 nuts, 3,335 nuts were infested by mite, while 4,868 nuts were free from mite infestation. The total 40.65% eriophyid mite infestation was recorded. The highest per cent infestation was observed in village Kelashi (49.26%) followed by Ladghar (44.25%) and Anjarle (29.54%). The data on total per cent grade wise infestation of Dapoli tahsil revealed that 58.97% nuts under grade zero, 20.45% under grade I, 10.92% under grade II, 6.66% in grade III and 3.00% in grade IV were recorded. The lowest infestation was observed in village Anjarle, where the nuts under grade zero were 70.46%.

In tahsil Khed, 37.77% total eriophyid mite infestation was recorded from three village's viz., Furus, Natunagar and Bijaghar. The total of 11,047 nuts were observed among which 4,172 nut found to be infested by mite and 6,875 nuts were found healthy. The minimum per cent infestation was recorded in Natunagar village (31.97%) followed by Furus (32.44%) and

Table 1. Survey of eriophyid mite infestation in Ratnagiri district of Konkan region.

Sl. No.	Tahsil	Village	Total no. of palms observed	Number of nuts observed	No. of Healthy nuts	Infested nuts	Per cent (%) infestation
1	Mandangad	Velas	100	2439	1534	905	37.11
		Shipole	100	1702	1281	421	24.74
		Harihareshwar	100	1411	668	743	52.66
		Total	300	5552	3483	2069	37.27
2	Dapoli	Ladghar	100	3209	1789	1420	44.25
		Anjarle	100	2766	1949	817	29.54
		Kelashi	100	2229	1130	1098	49.26
		Total	300	8204	4868	3335	40.65
3	Khed	Furus	100	3792	2562	1230	32.44
		Natunagar	100	3234	2200	1034	31.97
		Bijaghar	100	4021	2113	1908	47.45
		Total	300	11047	6875	4172	37.77
4	Chiplun	Awashi	100	3982	2241	1749	43.92
		Bhile	100	3146	1663	1483	47.14
		Kaluste-Khurd	100	3814	1840	1974	51.76
		Total	300	10942	5744	5206	47.58
5	Guhaghar	Baug	100	2681	1885	796	29.69
		Dodari	100	2368	1289	1079	45.57
		Velhal	100	2499	1680	819	32.77
		Total	300	7548	4854	2694	35.69
6	Sangmeshwar	Dhamani	100	3848	3186	662	17.20
		Asurde	100	4785	3160	1622	33.90
		Parchuri	100	3153	1526	1627	51.60
		Total	300	11786	7872	3911	33.18
7	Ratnagiri	Bhatye	100	4484	2905	1578	35.20
		Karla	100	2440	1451	987	40.45
		Someshwar	100	2780	1651	1129	40.61
		Total	300	9704	6007	3694	38.07
8	Lanja	Kelambe	100	2640	957	1686	63.86
		Kheravshi	100	3146	1663	1483	47.14
		Kolhawade	100	3814	1840	1974	51.76
		Total	300	9600	4460	5143	53.57
9	Rajapur	Kasheli	100	2614	1631	983	37.61
		Bhalavali	100	3632	2363	1269	34.94
		Pangare	100	2618	1780	836	31.93
		Total	300	8864	5774	3088	34.84
Grand total			2700	83247	49937	33312	39.85

Bijaghar (47.45%). The total per cent grade wise infestation was recorded in grade I (19.01%), grade II (11.67%), grade III (4.68%) and grade IV (1.92%). In grade zero 62.71% nuts were found free from mite infestation. The maximum infestation was found in village Bijaghar, where the nuts under grade I, II, III and IV were 21.74, 15.07, 7.86 and 2.79% respectively. The lowest per cent grade wise infestation was noticed in Natunagar village (68.03%) under grade zero.

In Chiplun tahsil, the total per cent eriophyid mite

infestation was higher in village Kaluste-Khurd (51.76%) followed by village Bhile (47.14%) and village Awashi (43.93%). The total 47.57% eriophyid mite infestation was recorded in surveyed Chiplun tahsil. The total of 10,942 nuts were observed in that 5,206 were infested and 5,744 were free from eriophyid mite infestation. In Chiplun the maximum per cent grade wise infestation was recorded in grade I (22.55%), whereas 14.99% under grade II, 7.52% under grade III and 2.48% under grade IV. The highest per cent grade wise infestation was found in grade zero (52.46%). In

Table 2. Survey of per cent(%) Grade wise infestation of eriophyid mite in Ratnagiri district of Konkan region. Figures in parentheses are percentage values whereas the outside values are number of nuts.

Sl. No.	Tahsil	Village	Per cent (%) Grade wise infestation				
			0 (zero)	I (1-25%)	II (26-50%)	III (51-75%)	IV (76-100%)
1	Mandangad	Velas	1534 (62.89)	458 (18.78)	256 (10.50)	137 (5.62)	54 (2.21)
		Shipole	1281 (75.26)	276 (16.22)	101 (5.93)	37 (2.17)	7 (0.41)
		Harihareshwar	668 (47.34)	309 (21.90)	283 (20.06)	123 (8.72)	28 1.98
		Total	(61.83)	(18.96)	(12.16)	(5.50)	(1.54)
2	Dapoli	Ladghar	1789 (55.75)	1001 (31.19)	337 (10.50)	78 (2.43)	4 (0.12)
		Anjarle	1949 (70.46)	525 (18.98)	211 (7.63)	71 (2.57)	10 (0.36)
		Kelashi	1130 (50.70)	249 (11.17)	326 (14.63)	334 (14.98)	190 (8.52)
		Total	(58.97)	(20.45)	(10.92)	(6.66)	(3.00)
3	Khed	Furus	2562 (67.56)	751 (19.80)	314 (8.28)	86 (2.27)	79 (2.08)
		Natunagar	2200 (68.03)	501 (15.49)	377 (11.66)	127 (3.93)	29 (0.90)
		Bijaghar	2113 (52.55)	874 (21.74)	606 (15.07)	316 (7.86)	112 (2.79)
		Total	(62.71)	(19.01)	(11.67)	(4.68)	(1.92)
4	Chiplun	Awashi	2241 (56.28)	656 (16.47)	681 (17.10)	273 (6.86)	131 (3.29)
		Bhile	1663 (52.86)	789 (25.08)	433 (13.76)	209 (6.64)	52 (1.65)
		Kaluste-Khurd	1840 (48.24)	995 (26.09)	538 (14.11)	346 (9.07)	95 (2.49)
		Total	(52.46)	(22.55)	(14.99)	(7.52)	(2.48)
5	Guhaghar	Baug	1885 (70.31)	307 (11.45)	283 (10.56)	121 (4.51)	85 (3.17)
		Dodari	1289 (54.60)	355 (15.04)	406 (17.20)	243 (10.29)	68 (2.88)
		Velhal	1680 (67.23)	328 (13.13)	365 (14.61)	112 (4.48)	14 (0.56)
		Total	(64.04)	(13.20)	(14.12)	(6.43)	(2.20)
6	Sangmeshwar	Dhamani	3186 (82.80)	438 (11.38)	172 (4.47)	33 (0.86)	19 (0.49)
		Asurde	3160 (66.04)	1142 (23.87)	409 (8.55)	63 (1.32)	11 (0.23)
		Parchuri	1526 (48.40)	759 (24.07)	535 (16.97)	244 (7.74)	89 (2.82)
		Total	(65.74)	(19.77)	(10.00)	(3.30)	(1.18)

Table 2. Continued.

Sl. No.	Tahsil	Village	Per cent (%) Grade wise infestation				
			0 (zero)	I (1-25%)	II (26-50%)	III (51-75%)	IV (76-100%)
7	Ratnagiri	Bhatye	2915 (65.02)	795 (17.73)	554 (12.36)	152 (3.39)	67 (1.49)
		Karla	1451 (59.47)	512 (20.98)	239 (9.80)	169 (6.93)	69 (2.83)
		Someshwar	1651 (59.39)	577 (20.76)	340 (12.23)	168 (6.04)	44 (1.58)
		Total	(61.29)	(19.82)	(11.46)	(5.45)	(1.97)
8	Lanja	Kelambe	957 (36.25)	820 (31.06)	523 (19.81)	247 (9.36)	93 (3.52)
		Kheravshi	1663 (52.86)	789 (25.08)	431 (13.70)	211 (6.71)	52 (1.65)
		Kolhawade	1840 (48.24)	992 (26.01)	539 (14.13)	348 (9.12)	95 (2.49)
		Total	(45.78)	(27.38)	(15.88)	(8.40)	(2.56)
9	Rajapur	Kasheli	1631 (62.39)	471 (18.02)	341 (13.05)	140 (5.36)	31 (1.19)
		Bhalavali	2363 (65.06)	814 (22.41)	351 (9.66)	91 (2.51)	13 (0.36)
		Pangare	1780 (67.99)	509 (19.44)	258 (9.85)	61 (2.33)	10 (0.38)
		Total	(65.15)	(19.96)	(10.85)	(3.40)	(0.64)
Grand total			(59.78)	(20.12)	(12.45)	(5.71)	(1.94)

village Kaluste-Khurd the maximum per cent grade wise infestation under grade I (26.09%) was recorded whereas, in village Awashi the maximum number of nuts were recorded under grade zero (56.28%).

In case of Guhaghar tahsil three villages viz., Baug, Dodari and Velhal were selected for recording per cent eriophyid mite infestation. The total number of 7,548 nuts were observed out of that 2694 nuts were infested by eriophyid mite. The total per cent eriophyid mite infestation was found to be 35.69. The infestation was higher in Dodari (45.57%) followed by Velhal (32.77%) and Baug (29.69%). The data on total per cent grade wise infestation of Guhaghar tahsil revealed that, 64.04% nuts under grade zero, 13.20% under grade I, 14.12% under grade II, 6.43% in grade III and 2.20% in grade IV were recorded. The lowest

infestation was observed in village Baug, where the nuts under grade zero were 70.31%.

In Sangmeshwar tahsil, Dhamani, Asurde and Parchuri villages were surveyed for observing eriophyid mite infestation. Among total 11,786 nuts, 3,911 nuts were infested by mite, while 7,872 nuts were free from mite infestation. The total 33.18% eriophyid mite infestation was recorded. The highest per cent infestation was observed in village Parchuri (51.60) followed by Asurde (33.90%) and Dhamani (17.20%). The total per cent grade wise infestation was recorded in grade I (19.77%), grade II (10.00%), grade III (3.30%) and grade IV (1.18%). In grade zero, 65.74% nuts were found free from mite infestation. The maximum infestation was found in village Parchuri, where the nuts under grade I, II, III and IV were 24.07, 16.97, 7.74 and 2.82%, respectively. The per cent minimum grade

wise infestation under zero grade was noticed in village Dhamani (82.80%).

As the Ratnagiri tahsil was concerned, the total per cent eriophyid mite infestation was higher in village Someshwar (40.61%) after that village Karla (40.45%) and village Bhatye (35.20%). The total 38.07% eriophyid mite infestation was recorded in surveyed tahsil Ratnagiri. The total numbers of nuts i.e. 9,704 were observed in that 3694 were infested and 6007 were free from eriophyid mite infestation. Considering the total grade wise infestation in Ratnagiri tahsil, the maximum nuts were under grade zero (61.29%) whereas 19.82% nuts in grade I, 11.86% nuts in grade II, 5.45% nuts in grade III and 1.97% nuts in grade IV. The highest grade wise infestation was recorded in Karla village under grade I (20.98%). The minimum per cent grade wise infestation was found in village Bhatye.

In Lanja tahsil, Kelambe, Kherawshi and Kolhawade villages were surveyed for observing eriophyid mite infestation. Among total 9,600 nuts, 5,143 nuts were infested by mite, while 4,460 nuts were free from mite infestation. The total 53.57% eriophyid mite infestation was recorded. The highest per cent infestation was observed in village Kelambe (63.86%) followed by Kolhawade (51.76%) and Kherawshi (47.14%). The total per cent grade wise infestation was recorded in grade I (27.38%), grade II (15.88%), grade III (8.40%) and grade IV (2.56%). In grade zero 45.78% nuts were found free from mite infestation. The maximum infestation was found in village Kelambe, where the nuts under grade I, II, III and IV were 31.06, 19.81, 9.36 and 3.52%, respectively. The per cent minimum grade wise infestation under zero grade was noticed in village Kherawshi (52.86%).

The survey in Rajapur tahsil revealed that, 34.84% total eriophyid mite infestation was recorded from three villages viz., Kasheli, Bhalawali and Pangare. Total of 8,864 nuts were observed among which 3088 nut found to be infested by mite and 5,774 nuts were found healthy. The minimum per cent infestation was recorded in Pangare village (31.93%) followed by Bhalawali (34.94%) and Kasheli (37.61%). By observing data on total per cent grade wise infestation of Rajapur tahsil revealed that, 65.15% nuts under grade

zero, 19.96% under grade I, 10.85% under grade II, 3.40% in grade III and 0.64% in grade IV were recorded. The lowest infestation was observed in village Pangare, where the nuts under grade zero were 67.99%.

The overall data on per cent infestation of eriophyid mite in Ratnagiri district revealed that, the maximum per cent infestation of eriophyid mite was in Lanja tahsil (53.57%), whereas the minimum infestation was observed in Sangmeshwar tahsil (33.18%). In grade I, grade II and grade III the maximum per cent grade wise eriophyid mite infestation of 27.38, 15.88 and 8.40%, respectively was recorded in Lanja tahsil. While, in grade IV maximum per cent grade wise infestation of eriophyid mite 3.00 was recorded in Dapoli tahsil and minimum in Rajapur tahsil 0.64%.

Finally the whole data on survey of per cent infestation of eriophyid mite revealed that, total eriophyid mite infestation of Ratnagiri district was 39.85% (Table 1).

Above findings conformation with Bagde and Pashte [3] the infestation of eriophyid mites on the basis of per cent palm infestation as well as on the basis of nut infestation was more in Thane district (ranges between 73.23 to 84.40%) followed by Sindhudurg district (33.03 to 86.80%). The nut infestation in Thane district was mostly belongs to Grade III and range between 64.16 to 89.42%. However, during survey (2007-08) the highest nut infestation in Grade III in Revedanda, Malgund and Dodamarg villages of Raigad, Ratanagiri and Sindhudurg districts, respectively with 43.45, 30.43 and 69.11% infestation. Also findings related with Gurav et al. [4] the eriophyid mite infestation was in the range of 43.95 to 48.47% in all coconut growing districts of Konkan region but intensity of mite was mild to medium in all the districts (Table 2). Desai et al. [5] also surveyed and reported that the infestation of eriophyid mites was higher in Thane district followed by Sindhudurg district. The highest infestation was recorded in Vasai i.e. 78.35, 82.23 and 77.66% in April 2004, October 2004 and March 2005, respectively. The level of infestation increased in October 2004 but it showed steady decreasing trend in March 2005. On the contrary the

scale of infestation increased from II to IV in Vasai tahasil.

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