

Loss of husk, quality of fibre and coir due to the infestation of coconut eriophyid mite (*Aceria guerreronis* Keifer)

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Aceria guerreronis was first described in 1960 from specimens collected from Guerrero State, Mexico (Cartujano, 1963 and Keifer, 1965). Its first report in India was from Ernakulam district of Kerala during the later part of 1997 and it was the first report of a nut infesting eriophyid mite from Asian countries (Sathiamma *et al.*, 1998).

The quality and quantity of fibre gets deteriorated due to mite infestation. The annual loss of husk was estimated as 41.74 % (Muralidharan *et al.*, 2001). Even the most damaged nuts yielded some copra, but de-husking of these nuts was very difficult and it caused additional labour requirement (Moore *et al.*, 1989, Moore and Howard, 1996 and Rao *et al.*, 2000). No information is available on the quantitative and qualitative losses of husk and fibre due to damage by the mite and its impact on coir industry in coastal areas. Hence an experiment was conducted to assess the effect of mite injury on the quantity of husk and quality of fibre and coir.

An experiment was conducted to study the effect of mite infestation on the percentage loss in weight of husk in different varieties in the Instructional Farm, College of Agriculture, Vellayani for ten consecutive harvest during the period March 2000 to July 2001. For this, five coconut palms were randomly selected from five varieties of coconut viz., West Coast Tall x Malayan Yellow Dwarf, Komadan, Laccadive Ordinary and Chowghat Dwarf Orange. Harvested nuts were divided into five damage categories and classified according to visible surface damage (Julia and Mariau, 1979) (Plate 1).

Category 1 – Nuts with no mite damage (0 %)

Category 2 – Nuts with superficial mite damage (10 %)

Category 3 – Nuts with significant mite damage but not much smaller (11-25 %)

Category 4 – Nuts with significant mite damage, smaller and with some distortion (26-50 %)

Category 5 – Nuts very heavily attacked, very much reduced in size and often greatly distorted (51-100 %)

The percentage of yield loss in husk obtained from nuts coming under damage categories 3, 4 and 5 compared to uninfested nuts was found out by using the following formula:-

Actual husk yield = Total weight of husk obtained from harvested nuts.

Potential husk yield = Mean weight of husk in category 1 (undamaged) x total number of nuts

Yield loss = Potential husk yield - Actual husk yield

Percentage yield loss = $\frac{\text{Yield loss of husk} \times 100}{\text{Potential yield of husk}}$

Correlation studies were carried out between the population of *A. guerreronis* assessed when the mite was in critical stage (80 to 90 days after opening of the spatix), area occupied by the mite colony under the perianth of young nuts and the resulting loss of husk at harvest in 80 palms of WCT and Komadan. Due to mite infestation, the size of the nuts was significantly reduced.

was very difficult to de-husk. The additional labour for dehusking infested nuts was compared to the case of healthy nuts by observing the additional time taken to dehusk the infested nuts.

Husk obtained from 50 harvested nuts representing damage categories 1 to 5 were subjected to natural drying practices in the nearby lake. Husks were taken to water after a period of six months, washed and fibre extracted. Length of the fibre in each damage category was measured. Coir yarn was spun by hand and reduction in quality of coir yarn by mite infestation in each damage category was studied.

The data on percent reduction in weight of husk in popular coconut varieties are presented in Table 2.

Results showed that the mean per cent reduction in weight of husk ranged from 11-40 per cent. The reduction in husk was similar in all varieties except in Chowghat Dwarf Orange. Monthly variation in husk loss indicated that the extent of losses were higher in the harvests done from May to July during 2000 and 2001, when compared with the harvests done during other months.

Population of *A. guerreronis* assessed by cellotape sampling technique (Girija *et al.*, 2001) when nuts were at the critical stage (80 to 90 days after opening of the husk) was positively correlated with yield loss assessed in the same bunch, in terms of reduction in weight of husk (r = 0.6588).

The area of mite colony under the perianth of young nuts also showed positive correlation with losses in husk (r = 0.5374) (Table 2 & 3).

Table 2. Mean, variance and standard errors of population and yield losses of husk

	Mean	Variance	Standard Error
Population	2872.39	2719339	184.37
Percentage reduction in weight of husk	19.84	57.79	0.85
Area of lesion	1.31	0.17	0.05

Table 3. Correlation between population of *A. guerreronis* and yield loss of husk

	Population	Percentage reduction in weight of husk	Area of lesion
	X	Y ₁	Y ₂
X	1.000		
Y ₁	0.6588**	1.0000	
Y ₂	0.6149**	0.5374**	1.0000

** Significant at 1 % level

Muralidharan *et al.*, 2001 reported that quality of fibre deteriorated due to mite infestation. Since Kerala has a long coastal belt with approximately 190 million coconut palms, about half a million people are engaged in coir making and coir industries. Hence any menace on coconut will directly or indirectly affect the life of poor people who depend on retting of husk, coir spinning and coir industry. Increased labour requirement for

Table 4. Mean per cent reduction in fresh weight of husk (mean of category 3, 4 and 5 over category 1) in five coconut varieties

Coconut variety	Mar-2000	May-2000	Jul-2000	Aug-2000	Oct-2000	Dec-2000	Jan-2000	Mar-2001	May-2001	Jul-2001	Mean of 10 harvests
	1	2	3	4	5	6	7	8	9	10	
Tall	21.31 (4.72)	27.77 (5.36)	39.05 (6.33)	28.31 (5.41)	28.50 (5.43)	27.26 (5.32)	24.32 (5.03)	25.05 (5.10)	26.29 (5.22)	37.57 (6.22)	28.45 (5.4)
Orange	22.23 (4.52)	35.13 (6.01)	40.13 (6.41)	26.01 (5.20)	40.13 (6.41)	27.56 (5.34)	30.24 (5.59)	25.03 (5.10)	25.03 (5.10)	37.44 (6.20)	28.72 (5.58)
LO	25.38 (5.14)	29.27 (5.50)	25.00 (5.10)	21.50 (4.74)	33.43 (5.87)	29.29 (5.50)	13.46 (3.50)	22.15 (4.81)	22.15 (4.81)	39.71 (6.38)	26.70 (5.14)
Orange	18.40 (4.43)	26.64 (5.26)	20.05 (4.59)	31.16 (5.67)	18.65 (4.43)	28.78 (5.46)	24.12 (5.01)	11.77 (3.57)	15.69 (4.09)	32.78 (5.81)	23.66 (4.83)
Tall x Yellow	29.81 (5.55)	31.38 (5.96)	24.43 (5.04)	24.43 (5.04)	24.18 (5.02)	28.20 (5.40)	34.39 (5.95)	28.13 (3.40)	27.94 (5.38)	32.93 (5.83)	28.98 (5.23)
(D)	(2.77)	(0.39)	(1.75)	(1.19)	(4.53*)	(0.08)	(5.28*)	(2.26)	(1.93)	(3.10)	(1.14)
	NS	NS	NS	NS	0.89	NSA	1.06	NS	NS	NS	NS

Values in parentheses are value after X+1 transformation

dehusking infested nuts would cause an additional loss, as it would increase economic loss further. This was suggested by Moore *et al.*, 1989, Moore and Howard, 1996 and Rao *et al.*, 2000, though data was not generated. As far as Kerala is concerned, labour is the most expensive input, hence the excess labour requirement and the strain involved for dehusking infested nuts provide an additional burden to farmers. For this reason, many coconut buyers reject the severely infested nuts having size reduction and they offer only $\frac{1}{4}$ to $\frac{1}{3}$ of the market price for these nuts.

The percentage increase of time required for dehusking 100 infested nuts representing different damage categories is presented in Table 4. Severely damaged nuts (category 5) took maximum time for de-husking followed by nuts of 4th and 3rd categories. However, the time required for de-husking nuts coming under category 2 was same as that for un-infested nuts indicating no additional labour requirement.

Mite damage caused significant reduction in quality of fibre in terms of fibre length (Plate 2). Fibre from husks coming under category 4 and 5 suffered 47 per cent and 53 per cent reduction in fibre length when compared with those obtained from uninfested nuts (Table 4).

Table 4. Reduction in length of fibre and time taken to dehusk 100 infested nuts due to infestation of *A. guerreronis*.

Damage category	% reduction in fibre length	% increase in time taken to dehusk 100 nuts over uninfested ones
5	53	63
4	47	50
3	26	40
2	0	0
1	0	0

There was no difference between fibre length of husks obtained from category 1 and 2 nuts. However, nuts under category 3 had 26 per cent reduction in fibre length. Since the fibre obtained from nuts coming under damage categories 4 and 5 was very short and fragile, it was very difficult to spin the coir (Plates 3 and 4). Any

attempt to estimate yield losses due to coconut eriophyid mite should also take into account the losses in husk and fibre as it is a major component of coconut based industries in the coastal areas.

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