

Impact of Coconut Mite on the Coconut Industry

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- The loss of annual national coconut production due to coconut mite infestation is (2-3)%.
- The loss for the grower in selling 10,000 nuts (@ 15/= per nut) is Rs. 9595/=.
- The loss of DC from 10,000 nuts is 195 Kg.

The coconut mite was reported for the first time in Sri Lanka in late 1997 in the Kalpitiya peninsula of the Puttalam District. Since then CRI has been involved in various research activities to control the pest, including development of biological control methods. In recent past, various quantifications were reported by different persons about the economic loss due to coconut mite infestation. This article shows scientific approach taken to assess the impact of coconut mite infestation on the coconut industry.

Trend in Annual National Coconut Production (ANCP)

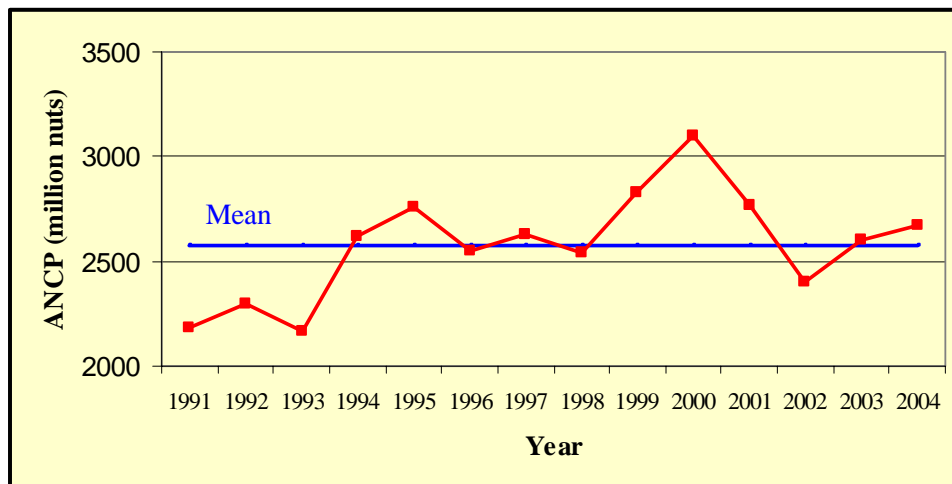


Figure 1. ANCP prior to mite infestation and after mite infestation.

Figure 1 clearly indicates that the ANCP after mite infestation is above the long-term mean except during 2002, a year followed by drought year 2001. The mean ANCP during 1991 to 1997 and 1998 to 2004 was 2457 and 2701 million nuts respectively, resulting 10% increase after mite infestation was reported. The above results reveal that ANCP has not gone down due to mite infestation, in spite of 11% reduction in the total national coconut extent, as per 2002 censuses (394836 ha) with respect to 1992. This could be due to the increase of productivity of the coconut lands. However, in the next sections, the amount of nut loss due to mite infestation is described.

Estimation of Crop Loss due to Coconut Mite

Percentage of mite infested nuts

The survey carried out by the CRI revealed that the percentages of mite infested nuts in the Anuradhapura, Pollonnaruwa, Rajangane, Puttalam and Kurunegala are 94.4, 94.5, 90.5, 81.1 and 69.8 respectively with a mean of 77.9. In this study harvested nuts were monitored for one year at monthly intervals and grouped into ‘mite free (undamaged)’ and ‘mite infested (damaged)’ nuts.

Type of harvested nuts

Feeding of coconut mites beneath the perianth of developing nuts causes scarring of nut surface. In severe infestations reduction in nut size and malformation of nuts occur. In the survey both mite free and infested nuts were grouped into ‘large size’ and ‘small size’ nuts. Nuts were further grouped into ‘normal shape’, ‘deformed’ and ‘puhu’ nuts (Fig. 2). In Figure 2, deformed and puhu nuts (irrespective of size and mite status) were pooled.

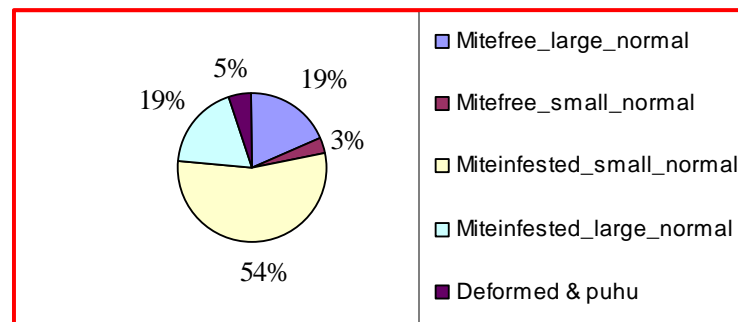


Figure 2. Percentage of nuts in different groups.

Nut loss per palm per year

All nuts are not damaged by coconut mite and all mite damaged nuts do not contribute economic loss to the grower. Generally large sized nuts, except puhu nuts, could be sold at a normal price irrespective of the mite damage. Small sized nuts fetch a lower price while puhu nuts are rejected. Small sized nuts are sold at half of the price of normal sized nuts, but small sized deformed nuts can not be sold.

Nut loss due to mite damage at the time of harvest (harvested nuts) was defined as the percentage of mite damaged nuts that can not be sold at the price of a full size nut. The percentage of nut loss among the harvested nuts due to mite damage was highest in Puttalam followed by Anuradhapura (Fig. 3). The mean nut loss of the harvested nuts per mite infested palm per year was 12.9%.

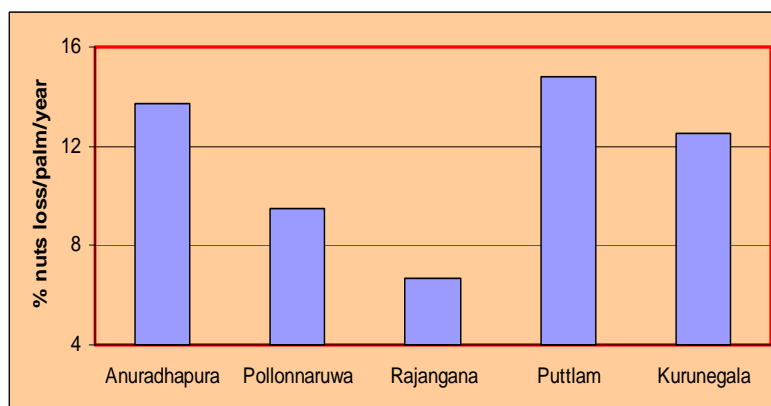


Figure 3. Percentage loss of the harvested nuts due to mite damaged.

Nut losses due to mite can happen during the nut development process as well. In the survey, button nuts shed and immature nut fall were also monitored for one year in 27 sites (5 palms/site) in Kalpitiya peninsula and revealed that the nut loss due to mite infestation prior to harvest was 2.9%. Therefore, the total nut loss due to coconut mite per infested palm per year is 15.8%.

Impact on national yield

All the palms in the coconut growing areas are not infested with coconut mite. As per information received from the growers by early 2004, the extent affected by coconut mite with respect to the total national coconut extent was 14.2%. The loss of national yield was computed by varying the percentage of extent affected by coconut mite from 14 to 18% with an increment of 2% and the national yield achieved from 2500 to 2950 million nuts with an increment of 150 million nuts to consider various cases. The results of the two extreme cases are shown in Table 1.

Table 1. Amount of nut loss in the annual national coconut production

| % coconut extent affected with mite infestation | Observed yield under mite infested scenario (mln nuts) | Expected yield under mite free scenario (mln nuts) | Loss of total nuts (mln nuts) | % national loss |
|---|--|--|-------------------------------|-----------------|
| 14 | 2500 | 2555.3 | 55.3 | 2.2 |
| 18 | 2950 | 3033.9 | 83.9 | 2.8 |

Results indicate that if the actual mite infested extent is 14% of the total national coconut extent and the yield achieved is 2500 million nuts, we would have got an extra 55.3 million nuts, if there is not mite infestation. Similarly if the mite infestation is 18% of the total extent and the achieved national production is 2950 million nuts, we would have got an additional 83.9 million nuts, if there is no mite infestation. In summary, for a wide range of scenarios, the impact of coconut mite on the national coconut production is the reduction of the nut production by 55 - 85 million nuts. This is about 2-3% of the mean national yield. This amount is approximately equivalent to the number of nuts used for coconut milk power, coconut cream and fresh nut export.

Impact on the coconut grower

Coconut grower is affected if the nuts are small or rejected due to mite damaged. The percentage of large sized, small sized and rejected nuts under mite free and mite infested scenarios is shown in Figure 4.

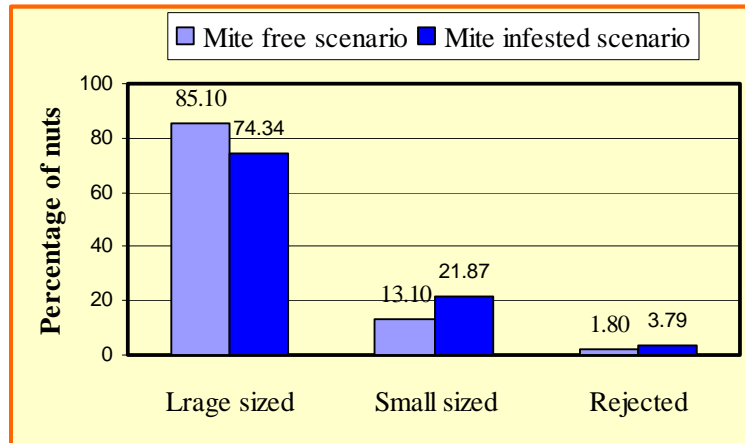


Figure 4. Percentage of nuts among large, small and rejected nuts

Results reveal that randomly selected 10,000 nuts in a mite free scenario could have 8510 large size nuts, 1310 small size nuts and 180 rejected nuts. Accordingly his income by selling 10,000 nuts (@ 15/= per nut) is Rs.137,475/=. Similarly in mite infested scenario, 10,000 nuts could have 7434 large size nuts, 2187 small size nuts and 379 rejected nuts and the corresponding income is Rs. 127,913/=. Therefore, loss to the grower in selling 10,000 nuts is Rs. 9563/=.

Impact on the DC industry

Puhu nuts are not purchased by the DC millers. Thus, in the survey de-husk weight per nut in all groups was monitored at monthly intervals throughout the year. It was found that de-husk weight of a mite free large normal nut and mite infested large normal nut is 0.764 and 0.665 kg resulting 13% loss. The percentage of loss in de-husk weight of small size normal nut is 10.6%. The ratio between large size and small size nuts (by pooling both normal shape or puhu) under mite free and mite infested scenario is shown in Figure 5.

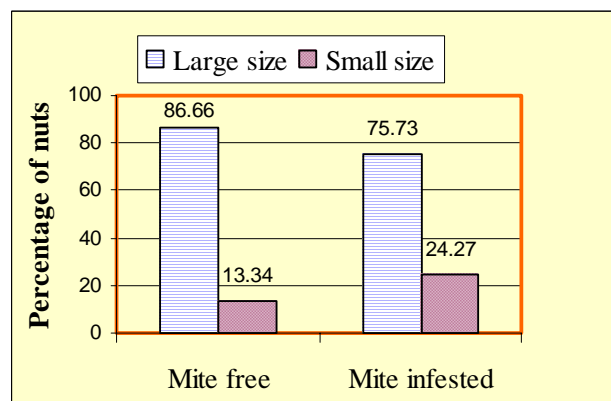


Figure 5. Percentage of nuts between large and small size groups (after puhu nuts are rejected).

Based on the de-husk weight of each category, the total de-husk weight of randomly selected 10,000 nuts in a mite free scenario was 7289.8 kg as against 6316.5 kg in a mite infested scenario. By interviewing several DC millers, it was revealed that 140 kg of DC can be produced from nuts of 700 kg of de-husk weight. Consequently the amount of DC loss from 10,000 nuts is 195 kg. As explained above from a randomly selected 10,000 (excluding puhu) the buyer has to pay Rs. 139995/= (@ 15/= per nut) in a mite free scenario as against Rs. 131798/= in a mite infested scenario. Therefore, though the DC miller can save Rs. 8192/= from 10,000 nuts in a mite infested scenario, he losses 195 kg of DC due to purchase of nuts under mite infested scenario.

Impact on the coir industry

The amount of fresh husk weight is a good indicator to assess the impact on the coir industry. The fresh husk weight was also monitored in all types of nuts (excluding puhu) assuming fresh husk can be purchased from the nuts taken to DC mills. The fresh husk weight of randomly selected 10,000 nuts is 8711.6 kg in a mite free scenario as against 7542.4 kg in mite infested scenario resulting the overall drop is 13.4%. The percentage drop of fresh husk weight (irrespective of nut size and nut shape) is highly varied spatially as depicted in Fig. 6. The highest drop is in Polonnaruwa followed by Rajangana. The analysis of fresh husk weight indicates that coconut husk from Rajangana and Polonnaruwa areas would be more beneficial for coir industry than from traditional areas like Puttlam or Kurunegala.

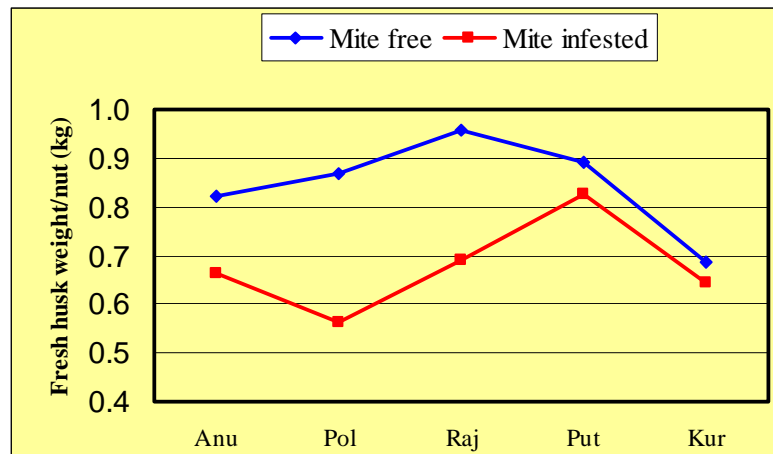


Figure 6. Fresh husk weight per nut (irrespective of size and shape).