

BIRD-PESTS OF CASHEW (*ANACARDIUM OCCIDENTALE*) IN GOA

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THE cashew, *Anacardium occidentale* L. is one of the important cash crop of Goa. It occupies the largest area (55.78% = 51,360 hectares) among the plantation crops. The yield of cashew nut in Goa is around 13,000 tons / year. The average yield of cashew in Goa is only 1.0 kg/tree, which is much lower than the national average of 2.1 kg/tree (Sunderaraju, 1984). Cashew apple and cashew nut are the two important commercial products of this plant which are used in various industries. Juice of well ripened cashew apple is used for the production of 'Feni' and other alcoholic liquors. Cashew liquor is reported to have medicinal value also. Cashew kernel is a delicious food with pleasant taste and highly nutritious value which earns a lot of foreign exchange to the state and the country.

Various pests infesting cashew have been described for India and other countries (Pillai, 1979; Rai, 1984). In India, pest problem is one among the factors responsible for low productivity in cashew (Sundararaju, 1993). It (cashew) is prone to infestation at various stages of its growth and development by more than sixty species of insects (Pillai, 1980). In addition, a number of non-insect animal pests were reported to damage cashew crop (Rai, 1984; Thrimurthy and Balashanmugan, 1987; Jacob, 1988; Shyama, 1994). Many rodents are reported to attack cashew either at seedling stage or cashew nuts, both in India and abroad (Ohler, 1979; Nayar, *et al.*, 1983). Marmosets, bats and Roseringed Parakeets are reported to be the other major vertebrate pests of cashew (Ohler, 1979).

The important avian pests causing considerable damage to other crops like cereals and vegetables are summarized by Walker (1975) and Burggers *et al.* (1984). A compilation and upto date list of the various pests of cashew in India is made by Sunderaraju (1993) and accordingly, 180 species (including 151 insects, 8 mites and 21 vertebrate species) of animals were reported to be acting as pests of cashew in our country, both in the field and storage.

Various constraints, especially, 'pests' contribute significantly for low yield of cashew in Goa. Pests, in particular 'tea mosquito bugs' on cashew is a serious problem in Goa, which causes crop losses to the extent of 30-40% in the state (Desai *et al.*, 1979). Sundararaju, (1984) has reported stem and root borer and tea mosquito as the major insect pests and several other species of animals as the pests of cashew in the state of Goa. This list does not include any bird pests. Not many reports are available on the bird-pests for cashew. Many varieties of birds are attracted by the cashew, especially the cashew apple in the stage of ripening and damage them. Fourteen species of birds have been reported to be feeding on the cashew apple and are recorded as major pests of cashew in Bhavanisagar in Tamil Nadu by Thrimurthy and Balashanmugan (1987). House Crows (*Corvus splendens*), Jungle Crows (*Corvus macrorhyncus*) and Roseringed Parakeets (*Psittacula krameri*) were reported to feed on cashew apples by Ohler (1979). Rai (1984) has reported about the damage to cashew fruits by House Crows (*C. splendens*) and

Roseringed Parakeets (*P. krameri*). For the first time the author has reported about the bird pests of cashew in Goa (Shyama, 1994).

Report on the damage to cashew nut is almost lacking. Rai (1984) has reported that the nuts are carried along with the apples whenever House Crows feed on cashew apples. Jacob (1988) in his first and may be the only available report of this kind revealed that Redbreasted Parakeet (*Psittacula alexandrii abbotti*) acts as a serious pest of cashew in Andaman, by feeding on the immature green nuts and dropping them. Further, they cause the shedding of flowers of cashew while attempting feeding. He reported a loss of 87.16% of the total yield of cashew by these bird pests in Andaman.

Although cashew is a very important commercial crop in Goa and the state has plenty of diverse groups of avifauna, there is no scientific study conducted in the state regarding the various bird pests of cashew in Goa and the crop loss incurred by them. Hence, the present study was taken up with these objectives.

MATERIALS AND METHODS

Two areas with cashew plantations were selected in the state and the studies were conducted in these gardens during the period from January to May for two consecutive years, 1995 and 1996. Twelve big trees were selected at random and detailed observations and studies were conducted on the immature green nuts and cashew apples. The immature green nuts, as well as, the cashew apples damaged (eaten up or dropped) by birds were collected daily, counted and recorded. The percentage of loss was estimated based on the number of mature nuts/apples collected/harvested. The total yield of the sample

trees was calculated by adding the number of damaged nuts/apples and the number of harvested nuts and apples.

In the early mornings and late evenings daily the number of damaged cashew nuts/apples and harvested cashew nuts/apples were counted and recorded. Student's 't' test was employed to know the statistical significance of each of the values. The loss incurred due to the destruction of flowers, tender cashew nuts and carrying away of cashew apples by birds to the nearby places are not included in the present study.

RESULTS AND DISCUSSION

Although, a very severe attack and remarkable damage of tender cashew nuts by Redbreasted Parakeets is observed in Andaman by Jacob (1988), the author was not able to observe any such damage caused to the tender cashew nuts by birds, in Goa.

However, various species of birds were seen to feed on cashew apple and damage them. A list of such bird pests of cashew in Goa is given in the Table 1. This is at par with the observations of Thrimurthy and Balashanmugam (1987) in TamilNadu.

Table 1 : List of bird-pests which feed on cashew apple in Goa

Sl. No.	Common name	Scientific name
1. (590)*	Koel	<i>Eudynamis scolopacea</i>
2. (600)	Crow Pheasant or Coucal	<i>Centropus sinensis</i>
3. (1049)	House Crow	<i>Coryus solandens</i>
4. (1057)	Jungle Crow	<i>Coryus macrophynchos</i>
5. (1128)	Redvented Bulbul	<i>Pycnonotus cafer</i>
6. (1265)	Jungle Babbler	<i>Turdoides striatus</i>

* = The numbers given in the parenthesis indicate the Sl.No. of the species as Ali and Ripley (1987).

During the process of attempting on feeding on the apples, few flowers and tender nuts were also damaged by the birds. Crows (*Corvus macrorhyncus* and *Corvus splendens*), while in the process of feeding and damaging the cashew apples, also found to carry away cashew apples along with the nuts. Similar observations were reported by earlier workers (Rai, 1984). However, because of several practical problems it was not possible to record the loss of cashew apple incurred in this way.

The total yield and percentage loss of cashew apple due to damage by birds is given in Table 2.

Table 2 : Total yield and loss of cashew apples due to damage by bird-pests in Goa

Sites	Total no. of damaged apples	Total no. of harvested apple	Total yield (in no.)	Percent loss of apples
Taleigao Plateau	511	34,657	35,168	01.45
Merces	553	30,908	31,461	01.76
Total	1,064	65,546	66,629	01.60

The data indicate that the damage to cashew apple is not significant, even at 10% level. Hence, we can conclude that there is no severe damage to cashew apple in Goa, by bird pests. Although a few reports are available about the damage of cashew apples by bird pests in other parts of India, the loss incurred by this process is not discussed.

Thus it may stated that there is not any severe damage to cashew crop in Goa by bird pests.

SUMMARY

The cashew, *Anacardium occidentale* L. is one of the important cash crop of Goa and is prone to infestation at various stages of its growth and development by plenty of insect and non insect animal pests. A compilation and upto date list of the various pests of cashew in India is made by Sundararaju (1993) and accordingly, 180 species (including 151 insects, 8 mites and 21 vertebrates species) of animals were reported to be acting as pests of cashew in our country, both in the field and storage. Although cashew is a very important commercial crop in Goa and the state has plenty of diverse group of avifauna, there is no scientific study conducted in the state regarding the various bird pests of cashew in Goa and the crop loss incurred by them. Hence, the present study was taken up with these objectives. Two areas with cashew plantations in the state were studied for the bird pest induced damage to cashew apple and nuts, during the period from January to May for two consecutive years, 1995 and 1996. The percentage of loss was estimated based on the number of mature nuts/apples collected / harvested. The total yield of the sample trees was calculated by adding the number of damaged nuts/apples and the number of harvested nuts/apples. Student's 't' test was employed to know the statistical significance of each of the values. The author was not able to observe any damage of cashew nuts (either tender or mature) by birds in the state, whereas many species of birds such as Koel (*Eudynamis scolopacea*), Crow pheasant or Coucal (*Dentropus sinensis*), House Crow (*Corvus splendens*), Jungle Crow (*Corvus macrorhynchos*), Redvented Bulbul (*Pycnonotus cafer*) and Jungle Babbler (*Turdoides striatus*) were seen to feed on cashew apple and damage them. However,

the present observations indicate that the damage to cashew apple is not significant, even at 10% level. Hence, we conclude that there is no sever damage to cashew apple in Goa by bird pests.

REFERENCES

- Bruggers, R.L., Bohl, W.H., Bashir, S.El., Hamza, M., Ali, B., Besser, J.F., DeGrazio, J.W. and Jackson, J.J. 1998. Bird damage to agriculture and crop protection efforts in Sudan. *FAO Plant Prot. Bull.*, **32** : 2-16
- Desai, M.A., Kulkarni, S.V. and Rodrigues, A. 1977. Report on the marketing survey on cashew in Goa, Government of Goa, Daman and Diu, pp. 11-17
- Jacob, T.K. 1988. The Red Breasted Parakeet, *Psittacula alexandri abbotti* Oberholeses (*Psittaciformis* : *Psittacidae*), a serious pest of cashew in Andamans (India). *Cashew Bull.*, **25 (7)** : 9-13
- Nayar, M.N.C., Lila Mathew, K. and George, T.E. 1983. Field rats - A New Pest of Cashew. *Cashew Causerie*, **5** : 13-14
- Ohler, J.G. 1979. Cashew. Department of Agricultural Research, Royal Tropical Institute, Amsterdam. pp. 190
- Pillai, G.B. 1979. Pests pp. 55-72 in cashew (*Anacardium occidentale* L.) Nair, M.K. Rao,, E.V.v.B., Nambiar, K.K.N. and Nambiar, M.C. (Eds.) Central Plantation Crops Research Institute, Kasargod, India
- Pillai, G.B. 1980. Pest problems of cashew. *Cashew causerie*, **2** : 3-10
- Rai, P.B. 1984. Handbook on cashew pest. Research publications, Delhi
- Shyama, S.K. 1994. Survey of the bird pests agricultural crops in Goa, Proceedings the First National Symposium on Birds Agricultural Ecosystem. Hyderabad, p. 12.
- Sudararaju, D. 1984. Studies on cashew pests and their natural enemies in Goa. *Plantation Crops.*, **12** : 38-46
- Sudararaju, D. 1993. Compilation of recent recorded and some new pests of cashew in India. *The cashew*, **7(1)** : 15-19
- Thrimurthy, S. and Balashanmugam, P.V. 1981. Birds associated with fruiting cashew trees. *The cashew*, **1 (2)** : 18
- Walker, P.T. 1975. Pest control problems (Pre harvest) causing major losses in World Food Supplies. *FAO Plant Prot. Bull.*, **23** : 70-77.

[Received for publication on 18th June, 1997]

[Revised MSS on 28th July, 1997]