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Studies on flowering thrips of cashew and its correlation on nut shedding

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Abstract
The study was conducted at the cashew research station, All India Coordinated Research Project (AICRP) on cashew, Orissa University of Agriculture and Technology, Bhubaneswar, during flowering and fruiting period of five most elite varieties of cashew, 2015 which enumerated two species of thrips, i.e. *Haplothrips ceylonicus* (52%) and *Franklieniella schultzei* (48%), constantly associated within the cashew blossom. They were found to be feeding on both flowers as well as on the developing nuts leading to shedding of nuts at advanced stages. When the population of thrips was correlated with nut shedding among the cashew varieties, it was found that Jagannath was having the least nut shedding followed by Balabhadra, NRC Sel 2, H-1608 and H 2/16 respectively. An attempt was also made to correlate the population of thrips with the abiotic factors which revealed a non-significant negative correlation with minimum temperature (-0.133), relative humidity (-0.247) and rainfall (-0.316) where as a positive correlation with maximum temperature (0.1300), morning humidity (0.410) and sunshine hours (0.013).

Keywords: Cashew, *Haplothrips ceylonicus*, *Franklieniella schultzei*, nut shed

1. Introduction
Cashew (*Anacardium occidentale* L.) belongs to the family Anacardiaceae considered to be a native of Brazil from where it was introduced to the Malabar Coast of India by the early Portuguese settlers during the16th century. In the early stage the plant was utilized in India for the purpose of checking soil erosion through afforestation, but gradually its importance was explored and now it is a magnificent wellspring of food, salary, industrial raw material and outside trade for India. India is leading country in the world in cashew area (10.27 lakh ha) and production (7.25 lakh MT) [1]. Cashew being a snacks food on the contrary cannot divert area for cashew, as food crops get priority in the development programs taken up by government. So increasing productivity of the cash crop remains the only option to increase the yield. But it is observed that the productivity level is not increasing as expected, one of the major causes for which is biotic constraints. More than 70 species of insect pest are accounted for to pervade cashew in various stages of crop growth of which flowering thrips is one of the important pest occurring during flowering and fruiting of cashew and bringing about yield misfortune by nut shedding [2]. However, very few studies have been done on it and the insect needs more extensive research.

Haplothrips ceylonicus and *Franklieniella schultzei* were the two thrips infesting Cashew inflorescence in coastal Odisha damaging 23.3 to 33.3 percent at mustard stage and 15 to 26.7 percent at the pea stage of nut development [3]. The nymphs and adults scraped the epidermis of the developing nuts and suck the oozing sap. The feeding injury lead to the improvement of corky layers and nuts got to be scabby and disfigured (Jalgaokar *et al. 2015*) [4].

2. Materials and methods
Experimental Site: The study was conducted during 2015 at the cashew research station, All India Coordinated Research Project (AICRP) on cashew, Orissa University of Agriculture and Technology, Bhubaneswar, during flowering and fruiting period of five most elite varieties of cashew, *viz.* Jagannath, Balabhadra, H-1608, H 2/16, and NRC Sel 2 Sampling of Flower Thrips: Ten cashew plants were randomly selected and permanently tagged and flowering thrips were sampled from the flowering rachis randomly selected from all four directions during morning hours at weekly interval. The trees were devoid of any insecticidal spray during the entire period of study. A cardboard of size 45x45 sq. cm was covered with a white

muslin cloth for easy location and collection of flowering thrips. The cardboard set-up was taken below a flowering rachis, and the rachis was gently tapped over the board allowing free fall of the flowering thrips over the set-up. The collection of the thrips was then carried out with the help of camel hair brush and was stored in 70% ethanol for further counting. The collected specimen were identified to species level using the key given by Borror *et al.*, (1989) using Trinocular Zoom Stereoscopic microscope (Model BD 42-A)
Nut Shedding Studies: The number of nut shed during each sampling were also recorded from same rachis for correlation studies. Samples were also collected from a protected rachis sprayed with insecticide for comparison. Apart from that the initial nut setting was also recorded during the beginning of the fruiting season. The collected data were then statistically interpreted.

3. Results and Discussion

Many scientists have observed that the flower bud differentiation in cashew starts at November and the flowering period extends till January which includes two flushes [5]. But in case of Odisha condition the flowering time frame in cashew was observed to be from 1st January to 30th April, 2015, its crest being in March, 2015. The crest of flowering coincided with the peak of the flowering thrips population. Similar results were observed by Navik *et.al* [6] who stated that the population of flowering thrips of cashew was noticed at Konkan region of Maharastra during December (1.12 thrips/panicle) but the peak of the incidence was observed during first fortnight of February (3.42 thrips/panicle) and the population then further declined to negligible towards second fortnight of April. On the other hand Zote *et.al* [7] noticed the thrips incidence at vengrula during November and the peak being observed during March. The present study showed that the Thrips encountered in Cashew blossom were *Haplothrips ceylonicus* (58.22%) (Phlaeothripidae) and *Franklieniella schultzei* (41.78%) (Thripidae) which corroborates Pattnaik *et al.* [3] Commencement of the population of both the species of thrips *i.e Haplothrips ceylonicus* and *Franklieniella schultzei* was seen to be mid of February, maintained their establishment in the entire month of March and then deteriorating to negligible in April. The peak for *Haplothrips ceylonicus* (30.8) was in the 1st quarter of March whereas *Franklieniella schultzei* maintained around (20.0) in the entire month of March and then decreased. (Figure 1.)
With respect to cashew varieties the population of *Haplothrips ceylonicus* was highest in Balabhadra (21.2) closely followed by Jagannath (18.4) and fluctuated around 15.0 in the remaining cashew varieties whereas *Franklieniella schultzei* was maximum in Jagannath (15.2) closely followed by Balabhadra (14) while it varied from 9.6 to 11.4 in the remaining varieties.(Figure 2.)

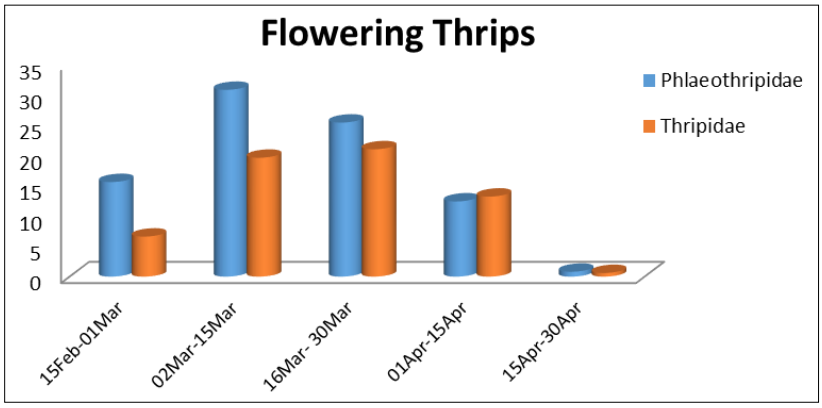

Fig 1: Population of flowering thrips during different samples

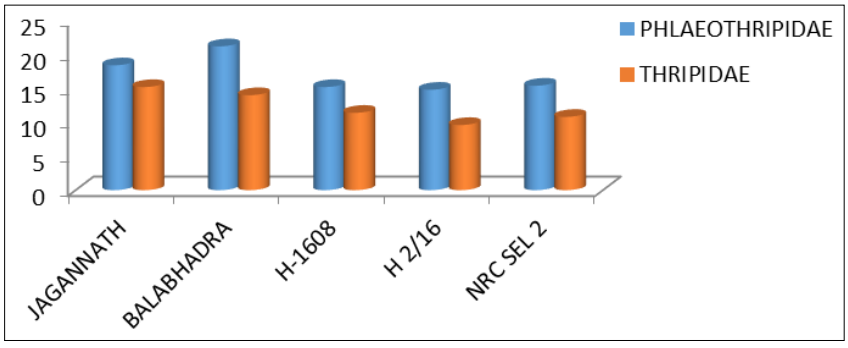

Fig 2: Population of flowering thrips in different varieties of Cashew.

3.1 Correlation of thrips population with environmental factors

Jalgaonkar [4] reported that thrips population were maximum in between minimum temperature range 18±1°C to 21±1°C whereas Zote *et.al* [7] reported that the minimum temperature ranging between 16±1°C to 21±1°C was favorable for multiplication of cashew flower thrips. Both Zote *et.al* [8] and Navik *et.al* [6] had correlated thrips population with weather parameters and found a similar results which stated a negative but significant correlation with minimum temperature, evening humidity and rainfall whereas a significant positive correlation with bright sunshine hours.
In the present study, correlation between thrips population and the environmental factors revealed:

- Positive correlation with maximum temperature (0.1300), morning humidity (0.410) and sunshine hours (0.013)

- Negative correlation with minimum temperature (-0.133), relative humidity (-0.247) and rainfall (-0.316)
- However, none of the correlation was found to be significant.

3.2 Nut Shedding

Jagannath was found to have clusters of nuts in its rachis where the initial nut set was highest (7.4 per rachis) closely followed by Balabhadra (7.2 nuts per rachis). The corresponding thrips attack in both the varieties was 10.5 and 11 per rachis respectively and it was noticed that the nut shed by these varieties were 37.83 and 40.28% respectively. But in the rest of the varieties the initial nut set fluctuated from 3.0 to 4.5 and the percentage of nut shed also fluctuated from 50 to57.77 %. (Table 1)

Table 1: Nut shedding with respect to thrips population in different varieties

S. No	Variety	Initial nut set	Final nut set	Thrips population	% nut shed
1	Jagannath	7.4	4.6	10.5	37.83
2	Balabhadra	7.2	2.9	11	40.28
3	H-1608	4.0	2.1	8.3	52.50
4	H 2/16	4.5	2.6	7.6	57.77
5	NRC Sel 2	3.0	1.5	8.18	50.00

4. Conclusion

The present study confirmed the role of flowering thrips of cashew i.e. *Haplothrips ceylonicus* and *Franklieniella schultzei* in nut shedding. It was seen that both the flower thrips were constantly associated with cashew blossom during the entire flowering and fruiting period. They scrapped the epidermis of the nuts and sucked the oozing sap and at advanced stages led to nut fall.

5. References

1. Area and production of Cahew. http://dccd.gov.in, 14, 2018.
2. Dwomoh EA, Ackonor JB, Afun JK. Survey of insect species associated with cashew (*Anacardium occidentale* Linn.) and their distribution in Ghana. African Journal of Agricultural Research. 2008; 3(3):205-214.
3. Patnaik HP, Satapathy CR., Sontakke BK and Senapathy B. Flower thrips of cashew (*Anacardium occidentale* L.) their seasonal incidence and assessment of damage in costal Orissa. The Cashew. 1987; 1:11-13.
4. Jalgaonkar N, Sawant BN, Chavan SA, Patil PD. Forecasting model for influence of thrips on cashew in Konkan region of Maharashtra. Acta horticulture. 2015 100:373.
5. Sharma D, Sahu KR, Singh J. Studies on flowering behaviour in cashew. Indian Journal of Horticulture. 2009; 66(4):429-432.
6. Navik OS, Godase SK, Turkhade PD. Population fluctuation of cashew thrips under Konkan region of Maharashtra. Journal of Environmental and Ecology. 2016; 4(2A):615-618.
7. Zote VK, Salvi SP, Haldavnekar PC, Narangalkar AL. Influence of abiotic factors on the population dynamics of Cashew pests in Konkan region of Maharashtra. Journal of Entomology and Zoology Studies. 2017; 51:6063.