

Study on the incidence of Red Banded Thrips in different cashew accessions of germplasm

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Abstract: Studies on foliage thrips of Cashew with special reference to Red Banded Thrips (*Selenothrips rubrocinctus* Giard.) was conducted at the Cashew Research Station (CRS), All India Coordinated Research Project (AICRP) on Cashew, Orissa University of Agriculture and Technology (OUAT), Bhubaneswar during 2016-17 and 2017-18. Periodical observations on the Red Banded Thrips infestation were recorded from unsprayed cashew plants in the germplasm block of 15-16 years old and the thrips incidence was correlated with corresponding weather parameters during the period of sampling. During 2016-17 the incidence of thrips was observed from February to May with highest 25.4 thrips per leaf on the 2nd fortnight of March. During 2017-18 the incidence continued for a longer period from November to May. The highest being observed on the 2nd fortnight of March. 100 germplasms were evaluated for reaction to Red Banded Thrips where 20 germplasms were having the incidence of thrips, highest incidence was recorded in tree No. 21 (Accession num-OC 63) (95.032%) while the lowest thrips incidence was recorded in tree No. 78 (Accession num- OC140) (25.83%).

Keywords: Cashew, Red banded thrips, Germplasm

Introduction:

Cashew (*Anacardium occidentale* L.) is native of South America (Brazil) and is now found in many tropical areas. The English name cashew is derived from the Portuguese name "caju". The cashew tree was first described by Thivet (1558). In the 16th century cashew was introduced to India (Goa) by the Portuguese and it spread all along the laterite hill slopes in the Western area from Mumbai to Cape Comorian and to the sandy soil on the Eastern coast as well as over inland areas in the Southern states. The major cashew producing states in India are Kerala, Karnataka, Tamil Nadu, Andhra Pradesh, Odisha, Maharashtra, Goa and West Bengal and interior tracts of Chhattisgarh, Andaman and Nicobar Islands, Gujarat, Jharkhand and North Eastern regions. Cashew is a highly economical crop which can be grown on a variety of land such as laterite, loamy, and sandy soils except black soils. Cashew gained commercial importance in the beginning of 1950, when some private processors exported cashew kernels to European countries. At present in India among the various agricultural commodities involved in the global trade cashew has attained a prominent place (Hubballi, 2018). Cashew kernels derived by the processing of raw nuts are highly nutritious. Cashew kernel is a rich source of protein, carbohydrate and fat which is comparable with the almond, with respect to protein, carbohydrate, fiber and minerals. Apart from cashew kernel, cashew nut shell liquid (CNSL) expelled during processing is a valuable industrial raw material and has a number of uses in the industries as friction lining, paints, varnishes etc. Cashew apple is a rich source of vitamin-C and fiber. It also contains free soluble sugar. The total cashew nut area in the country is 10.11 lakh ha producing annually 7.25 lakh ton of cashew. India occupies 1st position in area, 2nd in production or else productivity is 5th among the cashew growing countries. In Odisha the total area of cashew is 1.8 lakh ha with production of 85.5 metric tons. The state occupies 3rd in area and production, the productivity is 474 kg/ha (Quinquennial report, AICRP on Cashew, 2015). Cashew kernel is obtained by processing the raw cashew nut in the processing plant. At present 3940 processing units are functioning in India with a processing capacity of 16.48 lakh metric tons. On the contrary, the total annual nut production in the country is 7.25 lakh ton. Thus there is a shortfall of 7-8 lakh tons of cashew nuts to run the processing plants and the country has to depend on other cashew producing countries by importing nuts to run its plants throughout the year as mentioned by Guruprasad (2018). Therefore, the Govt of India has taken a massive step to increase the domestic production of cashew twice by 2020 through area expansion programme in order to reduce the gap between cashew domestic production and demand of the cashew domestic production and demand of the cashew processing plants as raw materials. Cashew yield is highly influenced by adopting scientific management practices. However the crop suffers from biotic and abiotic stress situations for which the cashew yield is drastically affected if not attended in time. Earlier many workers have done intensive studies on the influence of environmental factors on crop physiology and yield of this crop. The crop is also reported to be attacked by a number of insect pests as well as microbial pathogens causing diseases. About 400 species of arthropods are known to infest cashew till now (Technical Bulletin, DCR, 2015) while 70 species of insect pests have been reported to infest cashew in different stages of crop growth in India (Pillai et al., 1979). Among these several insect pests cashew stem and root borer is the most important pest of this region followed by the incidence of Tea Mosquito Bug. Besides this Shoot Tip Caterpillar, Leaf Miner, Leaf and Blossom Webber, Apple and Nut Borer and Thrips also cause yield reduction in unmanaged plantations. Since the last two years (2015-16) foliage thrips (*Selenothrips rubrocinctus*) have been recorded from Bhubaneswar seriously affecting the growth and yield of the cashew plants. Some cashew varieties in the germplasm block were observed to be highly susceptible to the pest. The affected trees showed leaf sheddings and drying of the branches and panicles. Red Banded Thrips was first reported in the Cacao (Cocoa) plant in the country West Indies by Broadway (1898). The pest was found in the leaf with a high population of 70-80 nymphs and adults per leaf and in high infestation, all the leaves are affected. Both nymphs and adults scrap and suck the cell content. Under severe conditions the leaves turn silvery white and shed off. 3 Red Banded Thrips were also found attacking grape, mango, avocado, guava along with cashew and cocoa. However available literature on

seasonal incidence, biology and management of the pest in cashew are very scanty. Therefore it was decided to conduct a thorough investigation of this pest in cashew at Cashew Research Station, Bhubaneswar.

Materials and methods:

“Studies on foliage thrips of cashew (*Anacardium occidentale L.*) with special reference to Red Banded Thrips (*Selenothrips rubrocinctus*) under Bhubaneswar conditions” were conducted during the cropping season 2016-17 and 2017-18 under field conditions at Cashew Research Station (CRS), Orissa University of Agriculture and Technology (OUAT), Ranasinghpur, Bhubaneswar (BBSR). The various materials used and methods adopted during the course of study are presented in the chapter. 3.1 Experimental site The All India Coordinated Research Project (AICRP) on Cashew, OUAT, BBSR having the Cashew research station is situated 10 km away from the main campus of OUAT in almost all a table and upland geographical location. The latitude and the longitude of the research station are 21° 15' N and 85° 15' E respectively and 45 m high from MSL. The total area of CRS is 45 acres having a good collection of more than 8,000 cashew plants, all being rainfed type. 3.2 Soil type The soil of CRS is sandy loam type, slightly acidic in reaction having pH 5.5- 6.0. The soil is rich in organic carbon and potassium content. 3.3 Climate and weather conditions The climate of the BBSR locality is warm and humid. Basically, there are three distinct seasons observed in BBSR such as summer, rainy and winter. In addition to this a short span of spring season is also experienced under BBSR conditions. The average annual rainfall is about 1540 mm. The maximum temperature varied from 28.22 °C to 38.18°C and minimum temperature varied from 13.65°C to 26.98°C. The relative humidity varied from 78.13 to 95.60 percent and evening relative humidity ranged from 36.25 to 84.13 percent during the study. 3.4 Meteorological observation The observatory of OUAT is located in the central farm of OUAT, Bhubaneswar and is well equipped with all the weather data recording instruments. The meteorological data on temperature, relative humidity, rainfall and sunshine hours were collected from records of this observatory for compilation of research work. The meteorological data collected during the crop period i.e vegetative phase and reproductive phase of cashew were collected.

Climatic Conditions:

Out of the 10 agro-climatic zones of Odisha, Sakhigopal comes under the East and South Eastern Coastal Zone. The climatic conditions of sakhigopal are characterized by warm and moist climate with hot and humid summer and mild winter. Broadly the climate falls into the “hot and moist sub humid” group.

The sampling of Red Banded Thrips (*Selenothrips rubrocinctus*) was done from the unsprayed germplasm block during the growth period 2016-17 and 2017-18. Observations of the thrips incidence were recorded from 20 germplasm twice in a month starting from 1st fortnight of July to end of June of the next year. 8 laterals (2 per each direction) were selected and the total leaves and the affected leaves were recorded and converted into percentage affected leaves. Observations were taken from the affected trees only. 2 trees per germplasm were selected for recording the pest incidence in the germplasm.



Fig 1 - Germplasm block of Cashew Research Station, AICRP, Bhubaneswar.

Results and discussion :

Incidence of red banded thrips in cashew germplasm is given in Table 1.

Reaction of some cashew germplasm accessions to Red Banded thrips (2017-18)

Sl. No	Tree No.	Accession No.	Variety %	damaged leaf *
1	20	OC59	Dhaulti1	76.33(60.85)
2	22	OC63	T.No.110	75.39(60.20)
3	28	OC77	Sel-8	54.69(47.64)
4	90	OC52	BPP2	52.05(40.23)
5	75	OC137	BPP3/28	66.67(54.70)
6	12	OC137	BPP3/28	66.67(54.70)
7	9	OC36	BBSR-1	64.12(53.19)
8	11	M35/4	OC12	66.67(54.70)
9	15	OC60	OS3	95.02(77.40)
10	13	OC22	M1/2	74.09(59.93)
11	3	OC55	Lokipur-1	61.36(51.53)
12	21	OC56	OS5	79.46(63.03)
13	7	OC65	H 3-13	33.33(35.24)
14	18	OC67	H 1591	64.66(53.49)
15	19	OC140	H 1600	25.83(30.53)
16	23	OC143	V-3	76.33(60.85)
17	25	OC 145	BBSR C-1	46.42(42.94)
18	78	Mysore kotekar OC46	OC46	65.59(54.93)
19	18	M35/4	OC12	66.67(54.70)
20	83	OC55	Lokipur-1	61.36(51.53)
SEm(±)				0.08
CD(0.05) CV				0.243 2.93

**values in parentheses are sine arc transformed values.

*Mean of 10 observations (laterals)

100 germplasms of cashew were screened against Red Banded Thrips and it was observed that 20 germplasms showed susceptibility to the thrips. Highest incidence was recorded in tree No. 21 (OC 63) (95.032%) followed by tree No. 15 (OC50)(93.64%), 19 (OC5)(79.46%) and 20 (OC59)(76.33%) while the lowest thrips incidence was recorded in tree No. 78 (OC140) (25.83%).. However, the rest of the germplasms present in the germplasm block showed low to nil infestation by the pest. It was observed that the insects preferred the young leaves and their feeding caused leaf silvering, distortion and leaf drop. They destroyed the cells on which they fed and caused injury to the fruit, and leaves with dark droplets or blotches of excrements on the leaf surface.

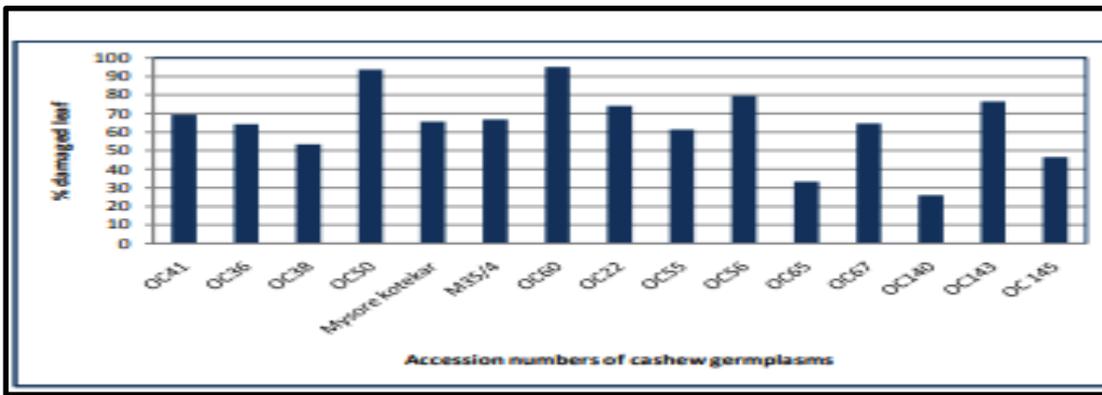


Fig 2 -. Reactions of Cashew germplasms to the incidence of Red Banded thrips.



Fig 3- Heavily infested leaves by Red Banded thrips.



Fig 4- Tagged infested leaves

Reaction of some cashew germplasms to Red Banded thrips (2017-18)

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There was no available literature found regarding the reaction of cashew types to Red Banded thrips and also the scoring of the thrips incidence in the present investigation needed to be streamlined. However it was confirmed that plants having special morphological or biochemical or both factors which played a significant role with respect to thrips incidence. Such special features would be the subject of study in the future plan of work.

CONCLUSION:

Red banded thrips (*Selenothrips rubrocinctus* Giard.) had been regularly observed in Cashew Research Station (CRS), AICRP Cashew, OUAT, BBSR since 2015-16. In the present investigation the incidence was confined for four months i.e February, March, April and May and November, December, January, February, March, April and May during 2017-18. The thrips population was reported as high as 95.02 No./ plant as evident from its incidence in the germplasm. In both the years the weather was very favorable for cashew where both maximum and minimum temperature range was 15-35°C. The study of the life cycle indicated that the pest had completed its life cycle in less than 3 weeks, thus several generations of the pest were completed during the crop growth stage. However the influence of environmental factors played a great role on the seasonal activity indicating low to nil population during the stress periods i.e extreme hot summer months as well as during the cold months of the year. During the rainy season also the lowest population was observed. This species can be managed effectively with insecticides like L-Cyhalothrin, Carbosulfan, and Thiamethoxam etc. During the period of observation some of the cashew germplasms had completely shed up its leaves and the terminal branches along with inflorescence and leaves were dried out, keeping in view of the seriousness of the pest as an emergent pest the future strategy may be planned out to study the resistance. Both morphological and biochemical factors needed to be evaluated.

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