Biological Forum – An International Journal **(SI-AAEBSSD-2021) 13(3b): 84-88(2021)**

ISSN No. (Print): 0975-1130
ISSN No. (Online): 2249-3239

Screening, Morphological and Biochemical Evaluation of Cashew Variety in Relation to Tea Mosquito Bug, *Helopeltis Antonii* Signoret Infestation

Damasia D.M.[1*], Patel Z.P.[2], Bambharolia R.P.[1] and Makvana A.I.[3]
[1]*Assistant Professor, College of Agriculture,*
Navsari Agricultural University, Waghai-394730, Distt., The Dangs, (Gujarat), India.
[2]*Vice-Chancellor, Navsari Agricultural University, Navsari, (Gujarat), India.*
[3]*Assistant Professor, Polytechnic in Horticulture,*
Navsari Agricultural University, Paria-396145, Distt., Valsad, (Gujarat), India.

(Corresponding author: Damasia D.M.)*
(Received 01 July 2021, Accepted 25 September, 2021)
(Published by Research Trend, Website: www.researchtrend.net)

ABSTRACT: Tea mosquito bug (*Helopeltis antonii* Signoret) is one of the most important pests of cashew (*Anacardium occidentale* L.) in India and is highly prone to damage by this pest worldwide. Seven varieties of cashew were screened against tea mosquito bug under field conditions at Agriculture Experimental Station, Navsari Agricultural University, Paria, Gujarat, India. The average of shoot and panicle damage scale was ranged from 0.71 to 1.26.Among the different varieties screened, Vengurla-3 and 7 were classified under moderately susceptible category, whereas Vengurla-1, 2, 4, 5 and 6 were categorized as highly susceptible. Early flowering varieties suffer more damage than mid flowering varieties. Susceptibility increased with increase in starch, total amino acid and total sugar while, decreased with increase in total phenol content in tender shoot of cashew.

Keywords: Cashew, damage scale, tea mosquito bug, screening, vengurla.

INTRODUCTION

Cashew, (*Anacardium occidentale* L)is an important profitable nut crop of India. The nuts, apple and other derivatives of this crop are of commercial importance. Its commercial importance and adaptive ability in a wide range of agro climatic conditions, it has become a crop of high economy and attained the status of an export oriented commodity bringing considerable foreign exchange to the country (Zote *et al*. 2016).

India is the largest processor, consumer and exporter of cashew kernel in the world. But the production of cashew in our country is not sufficient to meet the requirements of industry. Therefore, there is acrucial need to increase the cashew production in our country. On the other hand, this challenge of improving the indigenous production is being challenged with many constraints of various kinds ranging from biotic to abiotic factor. Amongthe bioticfactors, tea mosquito bug alone has a potential to cause 40 to 50 per cent yield loss in cashew (Saroj *et al*., 2016).

None of the cashew varieties are resistant to this pest, although, some of the accessions show low incidence of the tea mosquito bug (Ambika *et al*., 1979; Saroj *et al*., 2016). Further, the pest population density and intensity of incidence varies from tree to tree, some being heavily infested and some are practically free from infestation (Pillai, 1980; Pillai *et al*., 1984).

Looking to the importance of different components of integrated pest management, resistant cultivars are better among all components, as it is safer to natural enemies and ultimately to the entire ecosystem. With this background, present study aimed to identify the source of resistance by the screening of the available varieties.

MATERIALS AND METHODS

Field experiment was conducted during 2017-18 and 2018-19 at Agriculture Experimental Station, Navsari Agricultural University, Paria (20º26'39" N, 72º55'58" E, 15 mmsl) to screen out different seven varieties of cashew for their susceptibility to tea mosquito bug.The varieties were evaluated based on damage score.

The amount of damage to the shoots and panicles were recorded on a 0-4 scale on the basis of the number and nature of necrotic lesions (Ambika *et al*., 1979) as given below:

0	No damage
1	1 to 3 necrotic streaks/lesions on the shoot/panicle involving apple and nut
2	4 to 6 coalescing or non-coalescing lesions/streaks on the shoot/panicle involving apple and nut
3	Beyond six coalescing or non-coalescing lesions/streaks on the shoot/panicle involving apple and nut
4	Lesions/streaks confluent or wilting or drying of affected shoot /panicle involving apple and nut

Two trees in each variety were selected for observations. Scoring for tea mosquito bug infestation was done during the regular flushing and flowering season. *i.e.,* October to March. On each tree, an area of 0.5 m × 0.5 m quadrant was marked on four side's *viz.,* East, West, North and South. Observations were recorded on total number of shoots and panicles in each quadrant and the damage score of tea mosquito bug affected shoot and panicle. The mean score per tree was worked out from the total score values of four quadrants divided by the total number of shoots and panicles. The mean score values recorded at fortnightly intervals on shoots and panicles from two sample trees per variety was assessed separately for each year. Three observations were recorded for the shoots and panicles separately during each year. The pooled mean of two years data were used for comparison.

The varieties were grouped into a two-way matrix, based on their mean damaged scores to shoots and panicles as developed by Beevi and Mahapatro (2007).

Two-way matrix (Shoots × Panicles) for TMB susceptibility classification.

Shoots/ Panicles	0 to 0.50	0.51 to 1.0 or more
0 to 0.50	Less Susceptible	Susceptible
0.51 to 1.0 or more	Moderately Susceptible	Highly Susceptible

The data on certain morphological characteristics of tested varieties, such as tree habit, leaf shape, color of young leaves, season of flowering and flowering duration were recorded from each varieties in order to study the relationship of these traits with tea mosquito bug. Treehabit: Three trees of each variety were observed and grouped as per the cashew descriptors such as upright and compact, upright and open and spreading. Leafshape: Twenty leaves of each varieties were observed and grouped as per the cashew descriptors such as oblong, obovate (club-shaped) and oval. Colour of young leaves: Twenty leaves of each variety were observed and grouped as per the cashew descriptors such as red, yellow red, green yellow and purple. Season of flowering: Two selected tree of each variety were observed and seasons of flowering was recorded from the date of flowering initiation to date of full bloom and grouped as per the cashew descriptors such as early (Nov-Dec), Mid (Dec-Jan) and Late (Jan-Feb).Flowering duration: Four panicles of each variety were tagged and the duration of flowering was recorded from the day of first flower opening to the day of last flower opening and grouped as per the cashew descriptors such as short (<60 days), medium (60-90 days) and long (>90 days).

For biochemical analysis, new shoots from each variety were collected at the flushing stage. Such new shoots were kept in marked paper bags. The samples brought to the laboratory and washed with distilled water, oven dried at 50°C for 48 hours, powdered into fine powder using pestle and mortar and analyzed for the starch, total amino acid and total phenol by the method of Thimmaiah (1999) and total sugar by the method of Sadasivam and Manikkam (1996). The biochemical traits were analyzed in Agricultural Chemistry and Soil Science Laboratory, College of Agriculture, Navsari Agricultural University, Waghai during 2018.

Data of morphological and biochemical parameters were correlated with damage score of tea mosquito bug in various cashew varieties using standard statistical procedure as suggested by Steel and Torrie (1980).

RESULTS AND DISCUSSION

The data on shoot damage scale of tea mosquito bug during 2017-18 (Table 1) was in the range of 0.98 to 1.53 in different varieties. Vengurla-3 recorded lowest shoot damage scale (0.98) followed by Vengurla-7 (1.06), Vengurla-5 (1.13), Vengurla-6 (1.22), Vengurla-2 (1.38) and Vengurla-1 (1.44). While, Vengurla-4 recorded highest shoot damage scale (1.53). The data on panicle damage scale of tea mosquito bug (Table 1) was in the range of 0.44 to 1.22 in different varieties. Vengurla-7 recorded lowest panicle damage scale (0.44) followed by Vengurla-3 (0.48), Vengurla-6 (0.68), Vengurla-4 (1.10), Vengurla-5 (1.10) and Vengurla-1 (1.11). While, Vengurla-2 recorded highest panicle damage scale (1.22).

Table 1: Tea mosquito bug damage scale on different cashew varieties.

Sr. No.	Variety	2017-18 Damage scale		2018-19 Damage scale		Pooled damage scale		Average of shoot & panicle	Category
		Shoots	Panicles	Shoots	Panicles	Shoots	Panicles		
1.	Vengurla-1	1.44	1.11	1.51	0.97	1.48	1.04	1.26	HS
2.	Vengurla-2	1.38	1.22	1.20	1.03	1.29	1.13	1.21	HS
3.	Vengurla-3	0.98	0.48	0.92	0.44	0.95	0.46	0.71	MS
4.	Vengurla-4	1.53	1.10	1.39	0.88	1.46	0.99	1.23	HS
5.	Vengurla-5	1.13	1.10	1.00	0.88	1.06	0.99	1.03	HS
6.	Vengurla-6	1.22	0.68	1.03	0.66	1.13	0.67	0.90	HS
7.	Vengurla-7	1.06	0.44	0.90	0.43	0.98	0.44	0.71	MS

MS-Moderatoly susceptible HS-Highly susceptible

The data on shoot damage scale of tea mosquito bug during 2018-19 (Table 1) was in the range of 0.90 to 1.51 in different varieties. Vengurla-7 recorded lowest shoot damage scale (0.90) followed by Vengurla-3 (0.92), Vengurla-5 (1.00), Vengurla-6 (1.03), Vengurla-2 (1.20) and Vengurla-4(1.39). While, Vengurla-1 recorded highest shoot damage scale (1.51). The data on panicle damage scale of tea mosquito bug during 2018-19 (Table 1) was in the range of 0.43 to 1.03 in different varieties. Vengurla-7 recorded lowest panicle damage scale (0.43) followed by Vengurla-3 (0.44), Vengurla-6 (0.66), Vengurla-4 (0.88), Vengurla-5 (0.88) and Vengurla-1 (0.97). While, Vengurla-2 recorded highest panicle damage scale (1.03).

The pooled result of two years on shoot damage scale of tea mosquito bug (Table 1) was in the range of 0.95 to 1.46 in different varieties. Vengurla-3 recorded lowest shoot damage scale (0.95) followed by Vengurla-7 (0.98), Vengurla-5 (1.06), Vengurla-6 (1.13), Vengurla-2 (1.29) and Vengurla-4 (1.46). While, Vengurla-1 recorded highest shoot damage scale (1.48).

The pooled data on panicle damage scale of tea mosquito bug (Table 1) was in the range of 0.44 to 1.13 in different varieties. Vengurla-7 recorded lowest panicle damage scale (0.44) followed by Vengurla-3 (0.46), Vengurla-6 (0.67), Vengurla-4 (0.99), Vengurla-5 (0.99) and Vengurla-1 (1.04). While, Vengurla-2 recorded highest panicle damage scale (1.13).

Two years average of shoot and panicle damage scale of tea mosquito bug was in the range of 0.71 to 1.26 in different varieties. Vengurla-3 and Vengurla-7 recorded lowest damage scale (0.71) followed by Vengurla-6 (0.90), Vengurla-5 (1.03), Vengurla-2 (1.21) and Vengurla-4 (1.23). While, Vengurla-1 recorded highest average damage scale (1.26). Based on mean damage scales to shoots and panicles due to tea mosquito bug, varieties Vengurla-3 and Vengurla-7 found moderately susceptible. While, Vengurla-1, Vengurla-2, Vengurla-4, Vengurla-5 and Vengurla-6 found highly susceptible.

Various researchers have screened the different cashew varieties for their reaction to tea mosquito bug and reported that none of the varieties were free from the attack of tea mosquito bug. However, degree of susceptibility was varying among different varieties (Sathiamma, 1979; Ambika, *et al*., 1979; Sundararaju, 1999). Thiramalaraju *et al.,* (2002) at Bangalore, Karnataka reported that Vengurla-1 was highly susceptible, whereas Vengurla-3 was least susceptible and Vengurla-2, Vengurla-4 and

Vengurla-5 were moderately susceptible. Naik *et al*. (2013) at Bengaluru, Karnataka observed that Vengurla-7 was promising, Vengurla-1 was susceptible and Vengurla-4 was highly susceptible. Saroj *et al*. (2016) reported that Vengurla-7 and Vengurla-3 were moderately susceptible and Vengurla-4 highly susceptible. According to report of Directorate of Cashew Research, Puttur, Karnataka, Vengurla-4 recorded higher damage scale of 1.38 (Anonymous, 2019). Above report are supports to the present findings.

Morphological characters

The results pertaining to variation in morphological character of different varieties of cashew are presented in Table 2. All the tested varieties of cashew had upright and compact habit except Vengurla-4 had upright and open type tree habit. Among the tested varieties, Vengurla-1, 4, 5 and 7 had obovate shape leaf, while Vengurla-2, 3 and 6 had oblong shape leaf. Among the tested varieties, Vengurla-1 had red coloured young leaves while, Vengurla-2, 3, 4, 5, 6 and 8 had green yellow coloured young leaves. Among the tested varieties, Vengurla-1, 2 and 4 were of early type and Vengurla-3, 5, 6, and 7 were of mid-season flowering. All the tested varieties had medium flowering duration except Vengurla-1 which had short flowering duration.

Table 2: Morphological characters of different cashew varieties.

Sr. No.	Variety	Tree habit	Leaf shape	Colour of young leaves	Season of flowering	Flowering duration
1.	Vengurla-1	Upright and compact	Obovate	Red	Early	Short
2.	Vengurla-2	Upright and compact	Oblong	Green yellow	Early	Medium
3.	Vengurla-3	Upright and compact	Oblong	Green yellow	Mid	Medium
4.	Vengurla-4	Upright and open	Obovate	Green yellow	Early	Medium
5.	Vengurla-5	Upright and compact	Obovate	Green yellow	Mid	Medium
6.	Vengurla-6	Upright and compact	Oblong	Green yellow	Mid	Medium
7.	Vengurla-7	Upright and compact	Obovate	Green yellow	Mid	Medium

Correlation between shoots, panicles and average damage scale of tea mosquito bug and different plant characters *viz*., tree habit, leaf shape, colour of young leaves and flowering duration indicated that there were no or negligible impacts of different plant characters on tea mosquito bug as the results were non-significant. Only, season of flowering and tea mosquito bug show significant relationship. There is significant negative correlation between tea mosquito bug damage scale on shoot and panicle and flowering seasons (Table 3). It indicated that, early season flowering varieties suffer more damage than mid-season flowering varieties. The present findings are in close agreement with the findings of Millanzi (1997); Uthaiah *et al*. (1989; 1994), Sundararaju (1999); Sundararaju *et al*. (2006) who reported that the early flowering types suffer more damage than the late flowering ones.

Table 3: Correlation between different morphological characters with tea mosquito bug damage scale.

Particulars	Tree habit	Leaf shape	Colour of young leaves	Flowering season	Flowering duration
TMB Damage scale on shoot	0.537	-0.296	-0.576	-0.925**	-0.577
TMB Damage scale on panicle	0.264	-0.207	-0.340	-0.766*	-0.341
Average scale of shoot and panicle	0.410	-0.263	-0.466	-0.884**	-0.466

* Significant at 5% level, ** Significant at 1% level

Biochemical components of different cashew varieties

The data on biochemical traits of different cashew varieties are presented in Table 4 indicated that, the total starch content ranged between 7.52 mg/100mg to 19.22 mg/100mg of sample. The quantum of starch was high in the variety Vengurla-4 (19.22 mg/100mg) followed by Vengurla-1 (18.22mg/100mg), Vengurla-5 (13.22 mg/100mg), Vengurla-2 (12.22 mg/100mg), Vengurla-6 (11.88 mg/100mg) and Vengurla-7(10.30 mg/100mg). While, Vengurla-3 recorded least starch content (7.52 mg/100mg).

The total amino acid content ranged between 0.01 mg/100mg to 0.06 mg/100mg of sample. The variety Vengurla-2 recorded highest total amino acid content (0.06 mg/100mg) followed by Vengurla-1 (0.05 mg/100mg), Vengurla-4 (0.03 mg/100mg), Vengurla-6 (0.03 mg/100mg), Vengurla-5 (0.02 mg/100mg) and Vengurla-7(0.02 mg/100mg). While, Vengurla-3 recorded least total amino acid content (0.01 mg/100mg).

Table 4: Quantities of different biochemical constituents present in the tested cashew varieties.

Sr. No.	Variety	Starch (mg/100mg)	Total amino acid (mg/100mg)	Total sugar (mg/100mg)	Total phenol (mg/100mg)
1.	Vengurla-1	18.22	0.05	2.82	0.38
2.	Vengurla-2	12.22	0.06	2.08	0.51
3.	Vengurla-3	7.52	0.01	1.89	0.91
4.	Vengurla-4	19.22	0.03	2.76	0.32
5.	Vengurla-5	13.22	0.02	2.38	0.48
6.	Vengurla-6	11.88	0.03	2.15	0.55
7.	Vengurla-7	10.30	0.02	1.98	0.80

The total sugar content ranged between 1.89 mg/100mg to 2.82 mg/100mg of sample. The variety Vengurla-1 recorded highest total sugar content (2.82 mg/100mg) followed by Vengurla-4 (2.76 mg/100mg), Vengurla-5 (2.38 mg/100mg), Vengurla-6 (2.15 mg/100mg), Vengurla-2 (2.08 mg/100mg) and Vengurla-7(1.98 mg/100mg). While, Vengurla-3 recorded lowest total sugar content (1.89 mg/100mg).

The total phenol content ranged between 0.32 mg/100mg to 0.91mg/100mg of sample. The variety Vengurla-3 recorded highest phenol content (0.91mg/100mg) followed by Vengurla-7 (0.80mg/100mg), Vengurla-6 (0.55mg/100mg), Vengurla-2 (0.51 mg/100mg), Vengurla-5 (0.48mg/100mg) and Vengurla-1 (0.38mg/100mg). While, Vengurla-4 recorded least phenol content (0.32mg/100mg).

The correlation coefficient data are presented in Table 5 indicated that there were significant positive association between starch and tea mosquito bug damage scale on shoot and average scale of shoot and panicle. It indicated that increase in starch content increase tea mosquito bug damage and vice versa. A significant positive relationship between total amino acid and average damage scale of shoot and panicle indicated the increase in total amino acid content in plant increases damage of tea mosquito bug and vice versa. Significant positive relationship between total sugar and tea mosquito bug damage scale on shoot and average scale of shoot and panicle was found during the studies. It also indicated the increase in total sugar increases the pest damage and vice versa. Significant negative association between total phenol and tea mosquito bug damage scale on shoot, panicle and average damage scale of shoot and panicle indicated decrease in phenol content increases the pest damage and vice versa.

Table 5: Correlation between biochemicalparameters with tea mosquito bug damage scale

Particulars	Starch(mg/100mg)	Total amino acid(mg/100mg)	Total sugar (mg/100mg)	Total phenol (mg/100mg)
TMB damage scale on shoot	0.914**	0.727	0.852*	-0.864*
TMB damage scale on panicle	0.715	0.751	0.668	-0.871*
Average scale of shoot and panicle	0.850*	0.779*	0.795*	-0.922**

* Significant at 5% level , ** Significant at 1% level

According to Annapoorna and Nagaraja (1988), the total phenol content of tender shoots in the least susceptible accessions was significantly higher as compared to that of highly susceptible accessions. Bindu and Beevi (2002) observed that, higher quantities of phenol and low sugar content was noticed in most of the less susceptible cashew types, as compared to susceptible types. Thirumalaraju (2002) and Naik (2010) found significant positive association between per cent TMB damage and content of starch, total sugar and total amino acids, while total phenol content had significant negative correlation with per cent TMB damage in cashew. The above reports are in close agreement with the present findings.

CONCLUSION

It can be concluded from the present investigation that, Vengurla-3 and Vengurla-7 was registered as moderately susceptible varieties. The Vengurla-1, Vengurla-2, Vengurla-4, Vengurla-5 and Vengurla-6 were reported highly susceptible varieties. The biochemical trait such as total phenol was noticed significantly highest and starch, total amino acid and total sugar were significantly lowest in the moderately susceptible (V-3 and V-7) compared to the highly susceptible varieties (V-1, V-2, V-4, V-5 and V-6).

FUTURE SCOPE

Morphological trait such as mid or late season flowering and biochemical trait such as total phenol, starch, total amino acid and total sugar are responsible for impart resistance against tea mosquito bug. These traits could be used for developing resistant cashew varieties against tea mosquito bug in the near future.

Acknowledgements. The authors wish to express sincere thanks to Research Scientist of Agriculture Experimental Station, Navsari Agricultural University, Paria, Gujarat, India for laboratory and field facilities during research work.

Conflict of interest. The authors declare no conflict of interest.

REFERENCES

Ambika, B., Abraham, C. C. and Vidyadharan, K. K. (1979). Relative susceptibility of cashew types to infestation by *Helopeltis antonii* Signoret (Heteroptera: Miridae). *Proceedings of placrosym II, India*, 513-516.

Annapoorna, R. K. and Nagaraja, K. V. (1988). Tea mosquito (*Helopeltis antonii* Signoret) induced chemical changes in cashew. *Cashew Bulletin*, *25*(1):8-11.

Anonymous (2019). Annual Report 2018-2019, ICAR-Directorate of Cashew Research, Puttur, Karnataka, India, *pp.* 18-19.

Beevi, S. P. and Mahapatro, G. K. (2007). A new field screening methodology for cashew genotypes against tea mosquito bug, *Helopeltis antonii* Signoret. *Journal of Plantation Crops*, *35*(3): 139-145.

Bindu, N. and Beevi, S. P. (2002). Comparative evaluation of biochemical constituents in susceptible and less susceptible cashew types: a case study induced by TMB infestation. *The Cashew*, *16*(1): 29-36.

Millanzi, K. J. K. (1997). Screening of cashew clones for reaction to *Helopeltis*. *Proceeding of International Cashew and Coconut Conference, Dar Es Salaam, Tanzania, pp.* 117-120.

Naik, M. C. (2010). Bioecology and management of *Helopeltis antonii* Signoret (Hemiptera:Miridae) on cashew in coastal Karnataka, *Ph.D. Thesis, University of Agricultural Sciences, Bangalore,pp*. 66-97.

Naik, M. C., Pramod, B. Sasivihally, K., Kalavathi and Chakravarthy, A. K. (2013). Screening cashew varieties against *Helopeltis antonii* Signoret (Hemiptera: Miridae) in coastal Karnataka, *Insect Environment*, *19*(2): 121-122.

Pillai, G. B. (1980). Pest problem of cashew. *Cashew Causeri, 2*(2): 3-10.

Pillai, G. B., Singh, V., Dubey, O. P. and Abraham, V. A. (1984). Seasonal abundance of tea mosquito, *Helopeltis antonii* Signoret on cashew in relation to meteorological factors. *International Society for Horticultural Sciences, Kerala, India, pp.* 103-110.

Sadasivam, S. and Manikkam, A.(1996). Biochemical Methods, *2nd Edition, New Age International (P) Limited Publisher, New Delhi*. *pp*. 193–194.

Saroj, P. L., Bhat, P. S. and Srikumar, K. K. (2016). Tea mosquito bug (*Helopeltis* spp.)-A devasting pest of cashew plantations in India: A review. *Indian Journal of Agricultural Sciences*, *86*(2): 151-162.

Sathiamma, B. (1979). Varietal reaction of cashew to tea mosquito, *Helopeltis antonii* S. (Hemiptera: Miridae), a major pest of cashew. *Proceeding of Plantation Crops Symposium II. pp*. 530-534.

Steel, R. G. D. and Torrie, J. H. (1980). Principles and procedures of statistics. Publ. *McGraw-Hill Book Company, New York, pp.* 25-31.

Sundararaju, D. (1999). Screening of cashew accessions to tea mosquito bug, *Helopeltis antonii* Sign. (Heteroptera: Miridae). *The Cashew, 13*(4):20-26.
Sundararaju, D., Yadukumar, N., Bhat, P. S., Raviprasad, T. N., Venkatakumar, R. and Sreenath D. (2006). Yield performance of 'Bhaskara' cashew variety in coastal Karnataka. *Journal of Plantation Crops, 34*: 216-219.
Thimmaiah, S. R. (1999). Standard methods of biochemical analysis. *Publ.Kalyani publishers, New Delhi, pp*. 61-95.
Thirumalaraju, G. T. (2002). Ecology and management of Tea mosquito bug, *Helopeltis antonii* Signoret (Hemiptera: Miridae) on cashew. *Ph.D. Thesis, University of Agricultural Sciences, Bangalore, pp.* 88-97.
Uthaiah, B. C., Herle, P. S., Khan, M. M., Hiremath, I. G., Kumar, D. P. and Rao, K. B. (1989). Pre bearing performance of some cashew types of coastal Karnataka. *The Cashew, 3*(3): 9-11.
Uthaiah, B. C., Rai, P. S., Sridharaherle, P. S., Balakrishna Rao, K. and Indiresh, K. M. (1994). Preliminary evaluation of cashew types for tea mosquito (*Helopeltis antonii* Signoret) infestation. *The Cashew, 8*(3): 10-17.
Zote, V. K., Salvi, S. P. and Gajbhiye, R. C. (2016). Seasonal diversity of insect pests of cashew (*Anacardium occidentale* L.) in west coast of Maharastra. *Pestology, 40*(10): 30-33.