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Efficacy and evaluation of Solomon 300 OD (betacyfluthrin 90% + imidacloprid 210%) for management of insect pest in cashew

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Abstract
The production and productivity of cashew influenced by many of the factor among them insect pest one of the major factor. Cashew tea mosquito bug (*Helopiltis antonii)* and thrips (*Scirtothrips dorsalis* Hood.) are the important pests of cashew influencing the yield and quality of cashew nut. The experiment was carried out at Regional Fruit Research Station, Vengurla for management of cashew tea mosquito bug and thrips during 2016-17 to 2017-18. The data obtained indicated that among the different doses of Solomon tested against cashew tea mosquito bug and thrpis, the treatment T_2 Solomon 300 OD (Betacyfluthrin 90% + Imidacloprid 210%) 1.5ml/10 lit found most effective for management of tea mosquito bug and thrips and also recorded the highest yield. There is no phytotoxic effect observed on cashew during the investigation period.

Keywords: Cashew pest, tea mosquito bug, thrips and chemical management Solomon 300 OD

1. Introduction
Cashew is one of the most important commercial crop grown in India. Growing realization of its economic potential necessitated systematic and scientific investigations both on the production and protection technologies of cashew. With the rapid expansion of cashew crop acreage, the insect-pest problems also increased, which is quite apparent from the fact that the production is not in pace with the increase in area. The productivity of cashew in India is greatly influenced by the incidence of many insect pests. In Maharashtra 58 insect pests reported on cashew [1]. Out of which cashew tea mosquito bug (*H. antonii*) and thrips (*Scirtothrips dorsalis*) are the most important pests causing more economic losses.
The tea mosquito bug (*Helopeltis antonii*) is the most divesting pest of cashew causes yield losses by damaging tender shoot, inflorescences and immature nuts at various stages of development [2]. The adults and immature stages of this pest suck the sap from tender shoots, leaves, floral branches; developing nuts and apples the injury made by the suctorial mouth parts of the insect causes the tender shoots to exude the resinous gummy substan.
The tissue round the point of entry of stylets become necrotized and brown or black scabs formed presumably due to the action of the phytotoxin present in saliva of the insect injected to the plant tissue at the time of feeding.
Among the sucking pests of cashew the flower thrips has become a serious threat now days. About six species of thrips are known to attack cashew in India. In Maharashtra reported that *S. dorsalis* is the predominant species of cashew thrips in Konkan region [3]. The cashew tea mosquito bug and thrips are managed by three rounds of sprays of chemical insecticides. It was hoped that chemical control measures will effectively control or even eliminate the insect pests. But the experience with pesticides has shown that extensive pesticide application leads to increase in cost of production of crops, reduces the population of natural enemies of insect pests, leads to the development of pesticide resistant races of insects, and pollutes the environment. Owing to the development of pest resistance to insecticide use of combi products having a different mode of action is found effective and it reduces the spray application for management of different pest. Considering the importance of combi product an experiment was conducted to study the efficacy of Solomon for management of insect pest of cashew.

2. Materials and Methods
A field experiment was conducted at Cashew Farm Regional Fruit Research Station Vengurle

during the year 2016-17 and 2017-18 with view to find out the bio efficacy of combi-product of insecticide betacyfluthrin 90 and imidacloprid 210 OD against insect pest of cashew.

The experiment was laid out in RBD design with nine treatments in three replications. The treatment detail is as below.

Table 1: Treatment Details

T. No.	Treatment	Dosage/10 lit of water	
		a.i.(g)	Forml.(ml)
T_1	Untreated Control		
T_2	Solomon 300 OD (Betacyfluthrin 90% + Imidacloprid 210%	0.013.5+0.0315	1.5
T_3	Solomon 300 OD (Betacyfluthrin 90% + Imidacloprid 210%	0.018+0.042	2.0
T_4	Solomon 300 OD (Betacyfluthrin 90% + Imidacloprid 210%	0.0225+0.0525	2.5
T_5	Beta-Cyfluthrin 25 SC (Betecyfluthrin 2.45 % w/w SC)	0.0225	9.0
T_6	Imidacloprid 200 SL (Imidacloprid 17.8 % w/w SL)	0.0525	2.5
T_7	Dichlorvos 76% EC	7.6	10.0
T_8	Thiamethoxam	0.025	10.0
T_9	Solomon 300 OD (Betacyfluthrin 90% + Imidacloprid 210%	0.045+1.05	5.0

2.1 Method of Recording Observation

For recording of per cent incidence of tea mosquito bug infestation, 52 leader shoots of cashew tree in four directions ((E,W,N,S) were randomly selected and tagged during first fortnight of October. The extent of damage to the shoot and panicle was scored in 0-4 scale on the basis of the number and nature of necrotic lesion [4].

0	No lesion/streak
1	Up to 3 necrotic lesions/streaks
2	4-6 coalescing or non- coalescing lesion/streak
3	Above 6 coalescing or non- coalescing lesions
4	Lesions/streak confluent – complete drying of affected shoot/panicle

Similarly for recording the per cent incidence of thrips (corky growth or presence of scabs) 100 nuts as well as apples per tree were selected randomly and recorded damage score in 0-4 scale [5] as given below.

0	No Damage
1	1-25 per cent nut or apple surface damaged (up to 1/4 of the damaged surface area)
2	26-50 per cent nut or apple surface damaged (up to 1/2 of the damaged surface area)
3	51-75 per cent nut or apple surface damaged (up to 3/4 of the damaged surface area)
4	76-100 per cent nut or apple surface damaged (more than 3/4 of the damaged surface area)

The recorded data were converted into percent incidence on the basis of formula given below,

$$\text{Percent incidence} = \frac{\text{Sum of all numerical ratings}}{\text{No. of shoots observed x maximum rating}} \text{ x } 100$$

2.2. Stasticial Analysis

After the transformation of percent incidence of pest of cashew the data were stastisticaly analysed by standerd analysis of variance method [6]

3. Result and Discussion

Result on bioefficacy of Solomon against insect pest was observed significant after Ist, IInd and IIIrd spray during both the years and presented in Table 2. In year 2016-17 the data revealed that, the insecticidal treatment T2 (Betacyfluthrin 90% + Imidacloprid 210% @ 1.5 ml/ 10 lit of water) recorded the lowest incidence of tea mosquito bug in cashew. However, it was at par with treatments T_3 (Betacyfluthrin 90% + Imidacloprid 210% @ 2.0 ml/10 lit of water) and T_4 (Betacyfluthrin 90% + Imidacloprid 210% @ 2.5 ml/10 lit of water).

For the year 2017-18 (Table 2) the data revealed that, the insecticidal treatment T_2 (Betacyfluthrin 90% + Imidacloprid 210% @ 1.5 ml/ 10 lit of water) recorded the lowest incidence of tea mosquito bug in cashew. However, it was at par with treatment T_3 (Betacyfluthrin 90% + Imidacloprid 210% @ 2.0 ml/10 lit of water).

The data on the incidence of thrips were recorded one month after third spray presented (Table 2) revealed that the treatment T_2 (Betacyfluthrin 90% + Imidacloprid 210% @ 1.5 ml/ 10 lit of water) recorded the lowest incidence of thrips cashew. However, it was at par with treatment T_3 (Betacyfluthrin 90% + Imidacloprid 210% @ 2.0 ml/10 lit of water) T_4 (Betacyfluthrin 90% + Imidacloprid 210% @ 2.5 ml/10 lit of water) and significantly superior over control.

In the year 2017-18 the data revealed that the treatment T_3 (Betacyfluthrin 90% + Imidacloprid 210% @ 2.0 ml/ 10 lit of water) recorded the lowest incidence of thrips cashew. However, it was at par with treatment T_2 (Betacyfluthrin 90% + Imidacloprid 210% @ 1.5 ml/10 lit of water) T_4 (Betacyfluthrin 90% + Imidacloprid 210% @ 2.5 ml/10 lit of water) and significantly superior over control.

The data on raw cashew nut (RCH) recorded in different insecticidal treatments during both the years noticed that, the treatment T_2 (Betacyfluthrin 90% + Imidacloprid 210% @ 1.5 ml/ 10 lit of water) recorded the highest yield of cashew nut 2.37 t/ha and 2.84 t/ha for the year 2016-17 and 2017-18 respectively and it was at par with treatments T_3 (Betacyfluthrin 90% + Imidacloprid 210% @ 2.0 ml/10 lit of water) T_4 (Betacyfluthrin 90% + Imidacloprid 210% @ 2.5 ml/10 lit of water) during both the year (Table 3).

Table 2: Incidence of cashew tea mosquito bug in different treatments

Sr. No.	Treatments	TMB damage after three spray		Thrips incidence after third spray	
		2016-17	2017-18	2016-17	2017-18
1	Untreated Control	6.61 (14.82)*	5.55 (13.54)	9.13 (17.91)	7.53 (15.87)
2	Solomon 300 OD (Betacyfluthrin 90% + Imidacloprid 210%	1.38 (6.54)	0.90 (5.13)	4.32 (7.44)	1.60 (6.78)
3	Solomon 300 OD (Betacyfluthrin 90% + Imidacloprid 210%	1.65 (6.66)	0.96 (5.28)	2.88 (8.23)	1.44 (6.71)
4	Solomon 300 OD (Betacyfluthrin 90% + Imidacloprid 210%	1.6 (7.02)	1.33 (6.46)	3.36 (7.96)	2.08 (8.25)
5	Betacyfluthrin 25SC (Betacyfluthrin 2.45 % w/w SC)	3.36 (10.44)	2.66 (9.28)	5.28 (13.21)	3.68 (10.98)
6	Imidacloprid 200SL (Imidacloprid 17.8 % w/w SL)	3.89 (11.45)	2.93 (9.73)	6.73 (14.99)	3.52 (10.68)
7	Dichlorvos 76% EC	3.77 (11.05)	3.04 (9.92)	7.37 (15.64)	3.65 (10.30)
8	Thiamethoxam	3.94 (11.54)	3.04 (9.93)	6.24 (14.20)	3.04 (9.92)
9	Solomon 300 OD (Beta-Cyfluthrin 90% + Imidacloprid 210%	2.88 (6.86)	1.17 (5.33)	2.88 (7.42)	1.60 (7.01)
	SE ±	0.891	0.351	1.45	0.949
	CD @ 0.5	2.67	1.05	4.35	2.84

(* figures in parenthesis are arc sine transformed values)

Table 3: Yield of cashew nut after application of Solomon 300 OD (Betacyfluthrin 90 % + Imidacloprid 210 %) for control of Tea mosquito bug and thrips

Sr. No.	Treatments	Yield t/ha	
1	Untreated Control	1.49	0.28
2	Solomon 300 OD (Betacyfluthrin 90% + Imidacloprid 210%	2.37	2.84
3	Solomon 300 OD (Betacyfluthrin 90% + Imidacloprid 210%	2.32	2.39
4	Solomon 300 OD (Betacyfluthrin 90% + Imidacloprid 210%	2.28	2.36
5	Betacyfluthrin 25SC (Betacyfluthrin 2.45 % w/w SC)	1.64	1.45
6	Imidacloprid 200SL (Imidacloprid 17.8 % w/w SL)	1.72	1.71
7	Dichlorvos 76% EC	1.77	1.74
8	Thiamethoxam	1.68	1.74
9	Solomon 300 OD (Betacyfluthrin 90% + Imidacloprid 210%	2.14	2.31
	SE ±	0.043	0.122
	CD @ 0.5	0.128	0.366

3.1 Discussion

Pest of cashew managed by three round of spray which was economic and difficult in hilly area use of combi product for the management of different insect pests reduces the no of spray as it manage two pest in single spray. A Combi product Solomon 300 OD was tested against tea mosquito bug and thrips in cashew found very effective in a single spray. A good control of insect pests on the crop life cycle in various treatments was reflected in yield of cashew nut. Use of single insecticide for the management of different insect pest increases the application of insecticide and expensive to the farmer and also causes environmental pollution. Application of pesticide mixture results in to the reduction in the number of application due to long lasting residual effect that ultimately reduces the labour cost [7]. Solomon 300 OD contains time tested Imidacloprid and Beta- Cyfluthrin in an innovative oil dispersion formulation. It has a combination of systemic and contact properties which gives quick knockdown and anti-feeding effects. It is thus a broad segment insecticide for sucking and biting pests. Beta-Cyfluthrin is an insecticide of the synthetic pyrethroid group. Beta-Cyfluthrin is acting by contact and ingestion. It acts on the insects' nervous system as sodium channel blocker. In the pest, rapid excitation and impairment of coordination are the first visible symptoms of intoxication, followed by knockdown and death. Imidacloprid is antagonist to the nicotinic acetyl choline receptor in the central nervous system. It disturbs the proper signal transmission system leading to excitation of nerve cell. Consequently a disorder of the nervous system occurs leading finally to the death of the treated insect. [8].

4. Conclusion

Insect pest of cashew was managed by three round of spray which was economic and difficult in hilly area on the basis results of the present study, it is concluded that the use of combi product for the management of pest of cashew found effective also it reduces the spray application, as single spray manage two pest. Also there is no phytotoxic effect on cashew.

5. References

1. Godse SK, Bhole SR, Patil RP, Shivpuje PR, Sapkal BB. Status of Management of insect pests of cashew in Maharashtra. Report Presented in National Group Meeting of Scientists of AICRP on Cashew at NRC for cashew, Puttur, Karnataka, India, 2004.
2. Devasahayam S, Nair CPR. Tea mosquito bug (*Helopeltis antonii* signoret) on cashew in India. J Plantation Crops. 1986; 14(1):1-10.
3. Patil PD, Dumbre RB. An unusual occurrence of thrips on cashew. Proceeding of the International Cashew Symposium held at Cochin, 1979, 136.
4. Ambika B, Abraham CC, Vidyadharan KK. Relative susceptibility of cashew type to infestation by *Helopeltis antonii* Sign. (Hemiptera: Miridae) In Proceeding of PLACROSYM-II, Ootacamund, India, 1979, 513-516.
5. Godase SK, Dumbare RB, Kharat SB. Chemical control of flower thrips on cashew (*Anacardiium occidental* L.). The Cashew. 1990; 25(IV):14-15.
6. Panse VG, Sukhatme PV. Statistical Method for agricultural workers. New Delhi: Indian council of Agricultural research, 1967.
7. Cloyd RA. Pesticide Mixtures. Pesticides - Formulations, Effects, Fate, Prof. Margarita Stoytcheva (Ed.), 2011, ISBN: 978-953-307-532-7, In Tech. Available from: http://www.intechopen.com/books/pesticides
8. https://www.cropscience.bayer.in/Products-H/Brands/Crop-Protection/Insecticide-Solomon.aspx