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TO CHECK THE BIO-EFFICIENCY OF DEUCE 2.8 (DELTAMETHRIN) AGAINST HELOPELTIS THEIVORA OR MORE COMMONLY KNOWN AS THE TEA MOSQUITO

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Tea is an aromatic beverage commonly prepared by pouring hot or boiling water over cured leaves of the Camellia sinensis, an evergreen shrub native to Asia. After water, it is the most widely consumed drink in the world. There are many different types of tea; some teas, like Darjeeling and Chinese greens, have a cooling, slightly bitter, and astringent flavor, while others have vastly different profiles that include sweet, nutty, floral or grassy notes.

Climatically, tea belongs to the monsoon lands where high temperatures, long growing season and heavy rainfall help the growth of tea plants. A temperature of 21°C during the growing season of not less than eight months is ideal. Warm summers and frequent rains promote rapid leaf reproduction and increase the number of annual pickings. In my country, India, the most ideal conditions for growing tea is found in the eastern state of Assam.

Each tea growing areas has its own distinctive pests and diseases though several of them might have been recorded from more than one region. Number of pests and diseases associated with tea plants in an area depends on the length of time for which it is cultivated in that area. More than one thousand species of arthropod pests and nearly 400 pathogens are known to attack tea all over the world, though only about 300 species of insects and mites and 58 pathogenic fungi are recorded from tea in India. Crop loss due to pest and diseases varies between 15 and 20%. Magnitude of the losses is bound to be higher today in view of the increased production and productivity besides the variations in climatic conditions. Mites are serious pests of tea and they damage the green tissues of leaves, thereby reducing the photosynthetic efficiency resulting in yield reduction. Infestation leads to discoloration of leaves. Most of the species occupy the under surface of the leaves but a few prefer the upper surface also.

Recently the tea production in the state of Assam famous for producing the world renowned Darjeeling tea has taken a major hit as the tea plantations are being infected by tea mosquitoes i.e. HELOPELTIS THEIVORA and tea looper. Adults and nymphs punctures the plant tissues with needle like rostrum and suck the sap from buds, young leaves and tender stems. Punctures appear as reddish brown spots and due to intensive feeding, leaves curl up, badly deformed and remain small. Shoots dry up and crop loss is near total in response to severe incidence. Adults black in color, red thorax, black and white abdomen and greenish brown wings. They were active early mornings and late evenings, more in moist shaded areas. Five nymphal stages and development completed in 15-17 days. Its incidence was high during July to December and low between January and June.

HELOPELTIS THEIVORA is one of the major pests responsible for damaging and reducing the crop production of the Assam tea to the tune of 40% when it attacked the crops in the flushing period. Lots of chemicals in the market have been tested by various industries and companies in order to find out a sustainable solution for the control of HELOPELTIS in tea. ISAGRO ASIA AGROCHEMICALS Pvt. Ltd. is also one such pioneer marketing company in the tea business which is trying to grab huge marketing potentialities in this segment.

When I heard about this tea crisis, i was pretty concerned as well because being an avid tea drinker knowing the harm these pests can cause produce a major threat for one the most staple beverages of the entire world. Crop loss in tea due to pests, diseases and weeds varies between 7 and 15 %. During the last several decades predominantly synthetic chemical pesticides like copper, hexaconazole, propiconazole, carboxin, endosulfan, monoctotophos, chloropyriphos, quinalphos, synthetic pyrethroids etc. have been used for controlling pests diseases and weeds in tea fields but the success rate is quite low.

Concerned by this, ISAGRO ASIA AGROCHEMICAL Pvt. Ltd. conducted a research in this field where a strong market research team led by the R & D department of the organization was deployed to access the bio-efficiency of DEUCE 2.8 i.e. DELTAMETHRIN against HELOPELTIS THEIVORA and TEA LOOPER in the state of Assam. The team members of the project were: -

1. **Mr. P. GOGOI**
2. **Mr. S.K BERA**
3. **Mr. ANUBHAV TEWARI (myself)**

Our entire team worked day and night at different gardens of Upper Assam to evaluate DEUCE 2.8 against HELOPELTIS.

My function as the team leader was that I was responsible for ensuring proper mixing of the chemicals with water in a perfect proportion to maintain the best possible concentration of the pesticide. As far as the compilation of data was concerned, I was responsible for counting the number of pests per leaf.

Research Report- I

Topic: To check the bio-efficiency of DEUCE 2.8 (DELTAMETHRIN) against HELOPELTIS THEIVORA or more commonly known as the TEA MOSQUITO.

Experiment Details: -

Location	:	Tocklai Experimental Station, Jorhat, Assam
Design	:	R. B. D
Treatments	:	As Detailed In Table 1 And 2
Clone	:	Mixed Assam Clones
Shade Status	:	Moderate
Period	:	17.04.2015 (First Session)
	:	11.09.2015 (Second Session)
Plants Per-replication	:	60 Bushes
Sample Size	:	100 Shoot Per Replication
Replication	:	Three
Spraying Technique	:	Two Rounds Of Spraying At 15 Days' Interval With Hand Sprayer @ 400 Liters/Ha As High Volume.
Pest Species	:	Tea Mosquito Bug I.E. Helopeltis Theivora.

The field experiment that was carried out by my team was conducted in order to study whether Deltamethrin 2.8% EC had imparted any taint to black tea leaves or caused any sort of phytotoxicity i.e. injuries on leaf tips, leaf surfaces, leaf wiltings, necrosis, vein clearing, epinasty and hyponasty. Observations were taken up to 28 days after first spraying to assess the virtual phytotoxicity symptoms. We decided to perform two treatments, one as DEUCE 2.8% EC @ 1:2000 dilution and the other one with untreated control. The process of spraying was carried with the help of hand operated knapsak sprayer using a spray volume of 400 liters/ha. Whereas the untreated control block was sprayed with water. Leaves were harvested on the 7th and the 14th day after spraying and processed separately in a mini CTC machine. The samples were then forwarded to a tea taster for further assessment.

For Tea mosquito bug the percentage reduction/increase in population was worked out based on the number of infested shoots per 100 shoots selected randomly from each of the 60 bushes selected previously. Observation on the infestation was taken at a weekly interval for a total time span of up to 4 weeks.

Treatments	Dilutions	% Reduction After			
		I Week	II Week	III Week	IV Week
DEUCE 2.8% EC	1:1600	72.0	66.7	84.2	89.7
BIFENTHRIN 8	1:2000	71.4	57.2	82.2	84.3
Control (untreated)	-	-4.9	-6.7	-1.2	3.3

Table1: Reduction

Results & Conclusions

The findings summarized in table 1 revealed that spraying of DEUCE 2.8% EC @ 1:2000 dilution was found to be effective in reducing the per cent shoot infestation to the extent of 89.7% after four weeks of observation in the first treatment test undertaken by my team. Whereas Bifenthrin 8 SC (used as a standard pesticide) registered 84.3% reduction of shoot infestation and in the second treatment test i.e. in the untreated control, 3.3% reduction was observed.

Research Report- II

TOPIC: The second research deals with the bio-efficiency of DEUCE 2.8 (DELTAMETHRIN) against the pest known as tea looper.

Experiment Details:-

Location : Borkatani T.E

Design : R. B. D

Treatments : As Detailed In the Table

Clone : Mixed Clones

Shade Status : Optimum

Period : 10.05.2015 - 19.05.2015 (First Session)

12.08.2015 - 19.08.2015 (Second Session)

Plants Per-replication : 30 Bushes

Sample Size : 10 Bushes Per-replication

Replication : Three

Spraying Technique : One Round Of Spraying With Hand Sprayer @ 400

Liters/Ha As High Volume. Observation Were Taken Up After 24 Hours And 7 Days Of Treatment.

Pest Species : Tea Looper

In this experiment conducted by me and my team we tried to determine if Deltamethrin 2.8% EC was also effective against tea looper in the same manner as it was again HELOPELTIS THEIVORA. We worked out the percentage of looper population based on the number of loopers recorded per 10 bushes selected randomly from each replication. Observations were made after 24 hours and 7 days of treatment. The process of spraying was carried with the help of hand operated knapsak sprayer using a spray volume of 400 liters/ha. The data on percentage control has been summarized in the following table.

Treatments	**Doses/ 400 Litres**	**Pre-Treatment No. Of Living Loopers**	**Post Treatment Looper And Looper Reduction (In %)**			
			24 Hours	**MR*(%)**	**I WEEK**	**MR (%)**
DEUCE 2.8 EC	200 ml	279	140	49.8	30	89.4
Deltamethrin	200 ml	134	78	41.7	22	83.6
Control	untreated	149	146	2.0	143	2.4

Table 2:

Results & Conclusions

The findings summarized in the above table revealed that the spraying of DEUCE 2.8% 200 ml/400 liters of water were found to be effective in reducing the looper population to the tune of 41.7% to 51.8% and 85.5% to 89.4% after 24 hours and 7 days respectively. However, Deltamethrin 2.8% EC (used as standard) registered 41.7% to 83.6% reduction and in the untreated control a natural reduction of a maximum of 2.4% was observed.

Final Statement

From the research conducted above by me and my team we have reached to a final conclusion that is in complete agreement with all the team members who participated in this research and the expert team from the R & D Department of ISAGRO ASIA AGROCHEMICALS Pvt. Ltd. who have played an immense role in this project by supporting and funding us as per our need and providing us with crucial data very important for concluding this work. We have reached to the conclusion that the compound (pesticide) i.e. DEUCE 2.8 % EC (Deltamethrin) is more efficient than other standard pesticides currently used in the market.