A STUDY OF THE TEA PEST PREVALENCE AND PLANT PROTECTION MEASURES ADOPTED IN SOME PARTS OF SONITPUR DISTRICT OF ASSAM

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Abstract:

The study was aimed at obtaining information pertaining to the tea pest prevalence in some tea gardens of Tezpur sub-division of Sonitpur district of Assam with reference to the plant protection measures adopted in those gardens. For this study, a sampling survey of ten tea gardens of the district was carried out. The study shows that altogether six types of pests are found to affect tea plantations and 22 types of pest control agents are used for controlling different types of tea pests. Organochloriones, Pyrethroids, fungicides and pesticides of other categories are used by 100% gardens with application percentages of 4.55, 13.6, 13.6 and 27.3 respectively. Biopesticides and stickers are used by 80% gardens with application percentage of 9.09, Herbicides are used by 60% gardens with application percentage of 9.09, Microbials are used by 20% gardens with application percentage of 4.55 and Organophosphates are used by 10% gardens with application percentage of 9.09.

Key words: plant protection measures, Organophosphates. Organochloriones, Pyrethroids, fungicides, Microbials, Herbicides,

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Introduction:

Nature has ungrudgingly blessed Assam with a congenial climate for tea cultivation. But, at the same time several tea pests have been found to affect tea plantations in different tea gardens, causing huge crop loss every year. To eradicate or control these pests in different tea gardens, wide varieties of pesticides are used as per recommendations of Tea Research Association (TRA) as a measure of protecting tea plantations apart from cultural, mechanical and biological control practices. Nevertheless, tea pest management becomes an uphill task for the tea planters as some major pests have been found to develop resistance against adverse environmental conditions like heavy rainfall, temperature and also against certain pesticides. As such, the future of tea pest management lies in developing an information-based system in which prevention and therapy are combined to reduce the damage/loss caused by pests. (Hazarika et.al. 278).

Materials and methods:

With a view to studying the pest prevalence and application of pest control agents in different regions of Sonitpur district of Assam, ten tea gardens of Tezpur sub-division of the district were selected. The lottery method was adopted to select the names of the gardens as samples of research. The list of tea gardens selected for study in the Tezpur sub-division of the district is shown in the table: 1.

Names of the gardens	Distance (approx)from Tezpur town	Area(in hectares)
1. Sonabheel T.E	13kms	480
2. Tezpore and Gogra T.E	15 kms	517.18
3.Durrung T.E	16 kms	380
4. Sessa T.E	20 kms	662.59
5. Dhullapadung T.E	25 kms	626.55
6. Harchurah T.E	25 kms	403
7. Phulbari T.E	26 kms	782
8. Naharani T.E	27 kms	706
9. Borjuli T.E	25 kms	570
10.Ghairali T.E	30 kms	580

Table: 1 showing tea gardens selected for study in Tezpur sub-division of Sonitpur district.

The primary data relating to the (a) pest attack on tea plantations and (b) types of pest control agents used were collected during the period July, 2011 to March, 2012 through the following methods.

i. Roving survey: Survey routes based upon endemic areas were identified during peak period of infestation (June-July, 2011).After that roving was undertaken at every 1 km distance initially at weekly intervals and thereafter at 10 days intervals in the selected gardens. Every day, 20 spots were observed with the aid of garden laborers and field officers.

ii. Field scouting : Based on the results of roving surveys, field scouting was initiated for tea pests once in 3-5 days in the concerned gardens to observe pest occurrence with prior permission from the garden authorities and with the help of garden labourers and field officers.

ii. Semi structured interviews*:* The managerial staff viz. manager and assistant managers were contacted personally to know about cultural, mechanical, chemical and biological control practices adopted in the gardens.

iii. Questionnaires: Questionnaires were prepared separately for the managerial staff and field officers (welfare officers) to know about the efficacy of specific pesticides belonging to various chemical classes in controlling tea pests.

Results:

Pest infestation in tea gardens of Tezpur sub-division of Sonitpur district:

From survey it was found that in all the ten tea gardens of Sonitpur district, three pests namely Helopeltis, Red spider mite and Looper caterpillar are primarily found to affect the tea plantations. However, in four gardens (Garden no: 5, 7, 9 and 10) Red slugs, in one garden (Garden no: 4) green fly and in another garden (Garden no:2) Aphids are also found to infect plantations. Major tea pests affecting different gardens during July, 2011 to March, 2012 are shown in the table: 2 and 3.

Table: 2. showing major tea pests affecting different gardens. (July, 2011 to March, 2012).

Tea gardens:	Pests affecting tea plantations:

1. Sonabheel	Helopeltis, Red spider mite, Looper caterpillar.
2.Tezpore & Gogra	Helopeltis, Red spider mite, Looper caterpillar, Aphids.
3.Durrung	Helopeltis, Looper caterpillar, Red spider mite
4. Sessa	Helopeltis, Looper caterpillar, Red spider mite, Green fly
5.Dhullapadung	Looper caterpillar and Red spider mite (maximum), Red slug and Helopeltis (minimum infestation).
6. Harchurah	Helopeltis (max^m), Red spider mite, Looper caterpillar
7. Phulbari.	Helopeltis, Looper caterpillar, Red spider mite and Red slug.
8. Naharani.	Helopeltis (max^m), Looper caterpillar and Red spider mites
9. Borjuli.	Helopeltis,Red spider mite, Looper caterpillar and Red slug.
10. Ghairali.	Helopeltis,Redspider mite, Looper caterpillar and Red slug.

Tea pests	Gardens infected:										Total no. of gardens infected
	1	2	3	4	5	6	7	8	9	10	
Helopeltis theivora.	√	√	√	√	√	√	√	√	√	√	10
Oligonichus coffeae. (Red spider mite)	√	√	√	√	√	√	√	√	√	√	10
Buzura suppressaria (Looper caterpillar)	√	√	√	√	√	√	√	√	√	√	10
Eterusia magnifica (Red slug)	--	--	--	--	√	--	√	--	√	√	4
Empoasca flavens (Greenfly)	--	--	--	√	--	--	--	--	--	--	1
Toxoptera aurantil (Aphids)	--	√	--	--	--	--	--	--	--	--	1

Table: 3 showing total number of gardens infected by various tea pests.

Name of the pests:	Gardens infected:	% of infestation:	Area at the centre of the circle:
Helopeltis theivora.	10	10/36X100=27.77%	$27.77X3.6^0 = 99.97^0$
Oligonichus coffeae. (Red spider mite)	10	10/36X100=27.77%	$27.77X3.6^0 = 99.97^0$
Buzura suppressaria (Looper caterpillar)	10	10/36X100=27.77%	$27.77X3.6^0 = 99.97^0$
Eterusia magnifica (Red slug)	4	4/36X100=11.11%	$11.11X3.6^0 = 39.99^0$
Empoasca flavens(Greenfly)	1	1/36X100=2.77%	$2.77X3.6^0 = 9.97^0$

Toxoptera aurantil (Aphids)	1	1/36X100=2.77%	$2.77X3.6^0=9.97^0$

Based on the above data relating to pest attack on tea plantatuions, percentage of pest infestation in the gardens is shown in the table: 4 and Fig.1(Pie chart).

Total	36	= 99.96% (approx. 100%)	$=359.84^0$ (approx. 360^0)

Table: 4 showing tea pests and perecentages of infestation in the gardens.

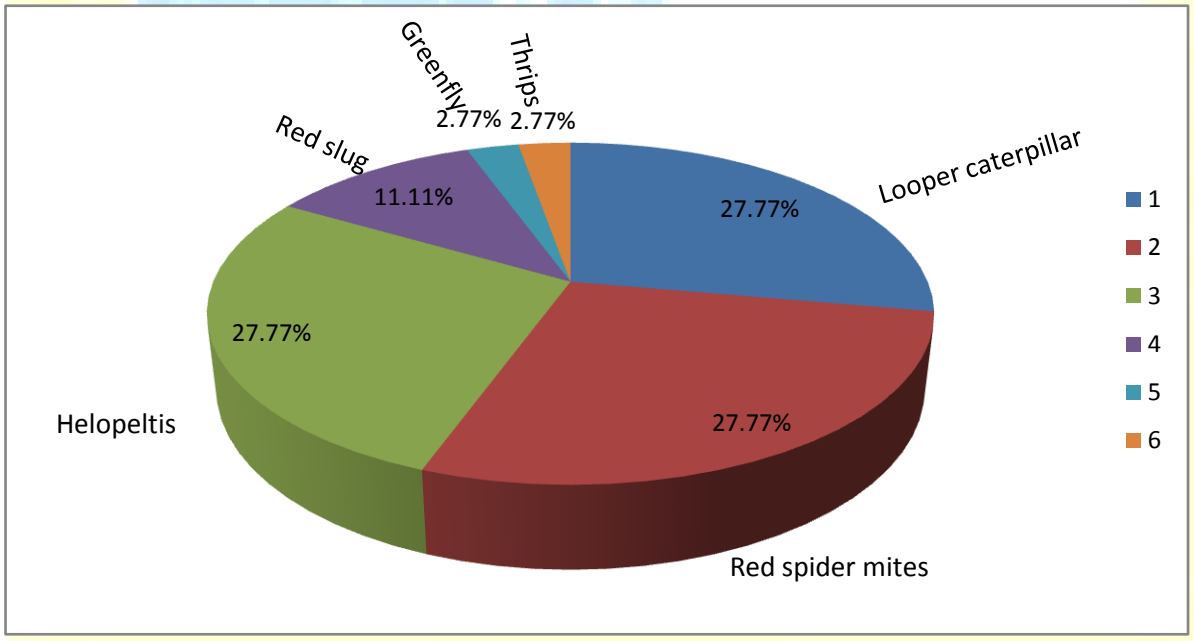

Fig.1 showing various tea pests and perecentages of infestation in the gardens.

Climatic conditions affecting tea pest prevalence:

From survey, it is found that *Helopeltis theivora* becomes more adapted to rainy and humid condition. The resurgence of certain pests like Looper caterpillar attack was noticed 15-20 broods during the season. The main reason behind this is

- Deforestation of jungles which forced them to migrate to Tea estates.
- Soils having poor nutritional status which makes the tea bushes weak and susceptible to pest.

Moreover, drought & raise in atmospheric temperature have contributed to the occurrence of Red Spider mites for multiplication due to short incubation period.

Regarding resistance to the pesticides it is noticed that the Looper caterpillar became resistant to Deltramithrin (Decis),one of the commonly used pesticide (a pyrethroid)

Plant protection measures in the tea gardens surveyed:

In 10 tea gardens of Tezpur subdivision of Sonitpur district, altogether 22 types of TRA approved pest control agents including pesticides of different kinds (both chemical and biopesticides) and microbials are used as a measure of protecting tea plants. Of them, organochloriones, Pyrethroids, fungicides and pesticides of other categories are used by 100% gardens with application percentages of 4.55, 13.6, 13.6 and 27.3 respectively. Biopesticides and stickers are used by 80% gardens with application percentage of 9.09, Herbicides are used by 60% gardens with application percentage of 9.09, Microbials are used by 20% gardens with application percentage of 4.55 and Organophosphates are used by 10% gardens with application percentage of 9.09. Types of pest control agents and their application in the gardens surveyed during the period July, 2011 to March, 2012 are shown in percentages in the table: 5 and Fig.2.

Pest control agents (Pesticides etc.):	% of application:
1.Organophosphates	9.09%
2Organochlorine.	4.55%
3. Pyrethroids	13.6%
4. Others.	27.3%
5. Herbicides.	9.09%
6. Fungicides.	13.6%

7. Microbials	4.55%
8. Biopesticides.	9.09%
9. Stickers.	9.09%

Table: 5 showing % of different Pest control agents used in the gardens.

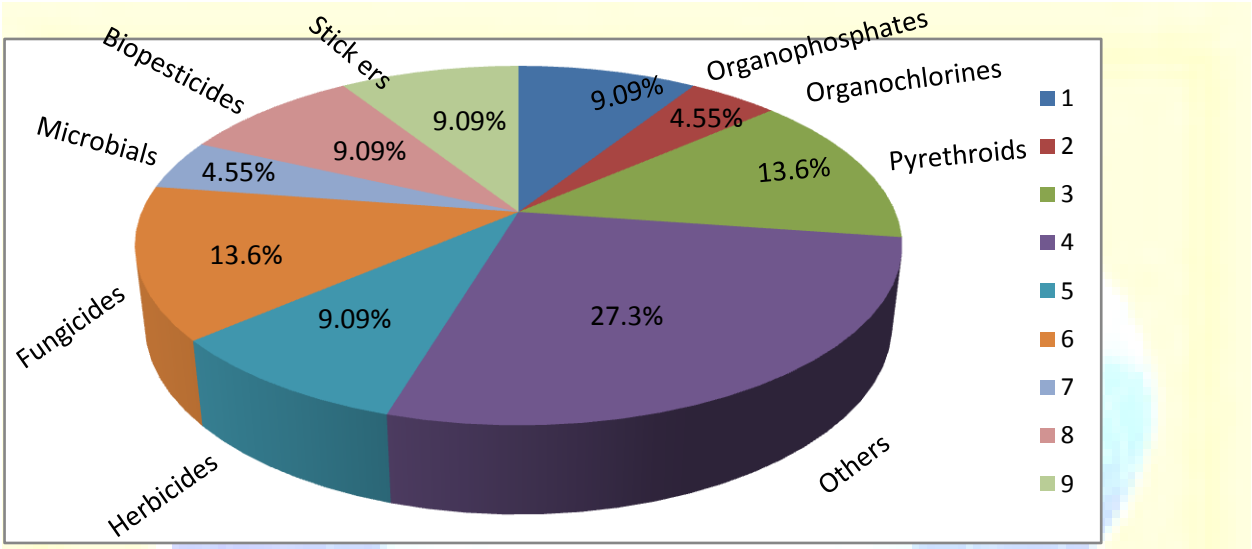

Fig. 2 showing application of various Pest control agents in percentages (approx) in the tea gardens surveyed.

Conclusion:

It is needless to mention the relevance of pesticides in controlling pests of different kinds, be it an insect, mite or mammals like rats or mice. Tea plants (bushes) are susceptible to infestation by a large number of insect and mite pests and wide varieties of pesticides are being used for controlling them. As such, pesticide residues (maximum residual level) in the processed tea which is consumed as a beverage is to be constantly monitored to reduce the chances of human health hazards. We may go for the use of biopesticides which are found to be less toxic and possess significant oviposition deterrence or antifeedant or toxic effects on selected tea pests. But studies have shown that biopesticides alone cannot control tea pests effectively and must be applied in conjunction with other comparatively less toxic approved chemical pesticides. Moreover, it is

found that some pests particularly Helopeltis has developed resistance to adverse climatic conditions like incessant rain and humid conditions, drought & raise in atmospheric temperature have contributed to the occurrence of Red Spider mites. Certain pests like Looper caterpillar became resistant to Deltamethrin(Decis), a commonly used pyrethroid pesticide. Such adaptations are reported to have arisen since 2010 and continuing till date. As such, pesticide application is no more restricted to 5-6 times/year as suitable in yester years; instead the same is needed throughout the year in most of the gardens except the pruning months which is usually done from late December till January. Therefore, it becomes very important to select appropriate pesticide categories which can destroy only the target pests effectively thereby increasing crop production. In addition, the formulation of new policies by the government for maintaining strictly the existing norms of pesticide application against pests of tea and other food crops to minimize health hazards is an urgent need at the moment.

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