ORIGINAL RESEARCH PAPER

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IN SEARCH OF SUBSTITUTION OF SYNTHETIC CHEMICAL PESTICIDES TO CONTROL THE PHYTOPHAGOUS MITES ON GUAVA IN WEST BENGAL, INDIA

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ABSTRACT

The phytophagous mites attack the fruit plants and cause substantial economic loss by sucking the plant sap and cause chemical, physiological and mechanical injuries which ultimately lead to reducing yield and economic loss. The use of synthetic chemical pesticides to control the mite problem is long in use in agricultural practices. But these type of pesticides have very hazardous effect on environment. The predatory mites can be an alternative to synthetic chemical pesticides and useful in IPM. In the present study the correlation coefficient has been worked out between the Phytophagous and Predatory mite population occurring on Guava (*Psidium guajavae*) for three consecutive years which are 2009-2010, 2010- 2011 and 2011 -2012 and the correlation coefficient were -0.668, -0.404 and -0.342 respectively. And hence the the predatory mites have been suggested as an alternative to synthetic chemical pesticides.

India is one of the foremost countries in production of fruits and is next only to China. According to National Horticultural Database published by National Horticultural Board, during 2012-2013, India produced 81.285 MT of fruits covering cultivation area of 6.98 million ha. India stands first in the production of Banana (22.04%), Papaya (40.74%) and Mango (32.65%).

The plant inhabiting phytophagous mites feed on plant sap causing mechanical, chemical and physiological damages to the host plants and all these lead to discoloration of fruits and leaves, stunted growth, defoliation, malformation, reducing yield, etc. These causes huge economic loss to the growers. (Gupta 1985, 2012).

The mite problem has become very serious due to several reasons like indiscriminate and injudicious use of synthetic chemical pesticides as the chemical pesticides not only eliminate natural enemies from the crop field, but also lead to developing resistance and invites problems like resurgence and residual effects.

The phytophagous mites which attack horticultural crops are known to inflict damage causing loss to the extent of 5-70% and in some cases, the loss may be far reaching leading to total crop failure. Some of the reported losses in various fruit trees are 50-80% in mango due to Aceria mangiferae, 30% in litchi due to Aceria litchii, 22-25% in ber due to Eriophyes cernuus etc. (Gupta, 2012).

Though, some works have been done on fruit trees and ornamental plants from West Bengal, (Karmakar et.al. 2010, Chatterjee & Gupta 1995) but so far no comprehensive study has been made to find out the natural solution to this mite problem. The objective of the present study was to find out the natural controlling measures of the phytophagous mites which can be used as the alternatives or substitution of chemical pesticides and can be an useful component of Integrated Pest Management .

Materials and Methods:

- **Study Area:** Fruit Orchards of Ramakrishna Mission Ashrama, Narendrapur in South 24 Pargana district of West Bengal (22°26'21" N, 88°23'45" E.).
- **Study Period:** May 2009 - April 2012.
- **Host Plant:** Guava (Psidium guajavae) was selected for statistical analysis in this study.

Data Collection:

To study the interrelationship between phytophagous and predatory mites, 6 Guava plants in the fruit orchards, were selected and tagged. Therefore, for altogether 6 plants, from each plant, 10 leaves were plucked at random from all around the plant and a total of 60 leaves were examined in each month. Population from each leaf was counted from 6.25 cm2 area by placing a card board sheet having a hole of that size on the plucked leaf and counting the population of mites from that area only. Wherever necessary, to determine the correct identity of mites, slides were prepared and examined under microscope.

Result

The phytophagous group included mites belonging to the families -Tetranychidae, Tenuipalpidae, Tarsonemidae and Eriophyidae and Predatory group was represented by the mites belonging to the family Phytoseiidae.

Table: Correlation co-efficient of Phytophagous and Predatory mites on Guava

Study period	Phytophagous X Predatory
2009-2010	-0.668
2010-2011	-0.342
2011-2012	-0.404

Discussion:

As throughout the study period, the phytophagous mite population was negatively correlated with predatory mite population on both the hosts, it can be assumed that :

The predatory mites acted as the factors that reduced the phytophagous mite population Further, these mites can be used as important biocontrol agents in agricultural practices and can be a very important component of Integrated Pest Management (Karmakar et al., 2016, Chakraborty 2010) .

The global scenario

The use of predatory mites is an essential part of biocontrol programs used by both vegetable and ornamental growers around the world (van Lenteren 2003, Schneider 2009). One of the first commercially produced biocontrol agents, back in the late 1960s, was Phytoseiulus persimilis, a predatory mite to control two spotted spider mite (TSSM). Since then several other species of predatory mites have been introduced to control a range of different pests: Amblyseius cucumeris, Amblyseius swirskii, Ambyseius californicus and many others. But unfortunately, no such kind of practices are available in our country so far .

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