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SEASONAL FLUCTUATION OF PEST AND PREDATORY MITE ON SEM (*DOLICHOS LABLAB*) CROP IN RELATION TO ABIOTIC FACTORS.

DR. ANUPAM SEHRA*[1] DR. SUSHILA SANGWAN AND DR. NIRMALA RATHHEE*[2]**

*Department of Zoology, Government College Hisar-125001

**Department of Botany, Government College Hisar-125001

[1] e-mail:: dranupamsehra@gmail.com

[2] Corresponding Author, e-mail: drnirmalrathee@gmail.com

ABSTRACT

Mites are small organisms; belong to subclass acari, rich in diversity with more than 40,000 species and approximately 1800 genera described in detail. In recent years mites are gaining attention and attract the attention of cultivators as well as scientists. In Agriculture, problem of phytophagous mites became intense after the introduction of large scale use of insecticides for the control of many insect pests but at the same time they also destroyed the natural enemies of phytophagus mites which resulted in resurgence problem as well as toxic residues. DDT, Cabaryl ,Pyrethroids increase mite population as well as kill their natural enemies. Mono-culturing over large areas is known to intensify mite pest problems. Improper field sanitation enhance mite problem. Several mite species have weeds as alternate hosts therefore removal and destruction of these hosts is important. Based on their damage and feeding activities mites can be classified in different groups.

Key Words: Phytophagous Mites, Predatory Mites.

INTRODUCTION

Mites play an important role in agriculture like insects; mite species known as pest few years ago have assumed pest status. Mite has also attained the status of major pest. They may cause serious damage to livestock, agriculture crops, ornamental plants and stored products. Many species of mites are plants feeder causing various type of direct damage like loss of chlorophyll, stunted growth, burnt appearance of leaves & heavy leaf fall (Dhooria 1999). On Sem crops pests and predatory mites were found on leaves in different months of the year. Pest mites of my case study belonged to the family tetranychiidae, class Arachnida and Phylum Arthropoda.

Predatory mites of this case study belonged to the family Phytoseiidae. Pest mites were found present only on the lower surface of the leaves. Thin webs entangled with dust particles were seen on the leaves. In September, October, January &February of 1999&November &December of1998 mites were absent. During survey pest mites were seen in March 1999(5.2mites/sq cm).Mite population showed an increasing trend in April &May 7.7&9.2 mites/sq cm respectively .Maximum population was seen during May(9.2)After that the population declined. Phytoseiid mites were absent throughout the observation period. The data was subjected to statistical analysis and found that pest & predatory mite had no correlation with each other (as Phytoseiid mites were found to be Zero). Temperature was having positive and non-significant correlation with the pest mite(r=0.40).Relative humidity and pest mites were negatively & significantly correlated with each other (r=-0.56) sunshine hours had positive but no significant correlation with pest mite population. (r=0.36)

Contrary to the injurious mites there are some beneficial mites too which act as our friends by predating upon these phytophagous mites. These predatory mites belong to the families Phytoseiidae, Cheyletidae, Stigmaeidae& Tydeidae etc. Phytoseiid mites are recognized as best predator of pest mitesThus, they play a very important role in biological control programme and have become one of the most important ingredients in (IPM) stratigies(Onzo etal., 2012) In the present study, we have identified some pest & predatory mites on Sem crop & find out the effect of seasonal fluctuation on them.

MATERIAL AND METHODS

Leaves fromvegetable crop were collected from three canopies of the plant and brought to the laboratory in individual labeled polythene bags. Mites were collected with the help of needle or brush and preserved in 70% alcohol. Permanent slides were prepared in Hoyer's medium. Hoyer's medium is made up of 50 ml distilled water, 30 gms gum Arabica, 200 gms chloral hydrate and 20 gms glycerine. Prior dehydration in grades of Alcohol and cleaning is not essential in most of the plant mites. Small cover slips should be used. Slides are then kept at 40ºC in oven for some days. Then the slides are ringed by nail polish or any other fixing medium like quick-fix. All the slides should be labeled with details of collection data and identification of mites as and when done by a specialist, should also

be noted. Good specimens of mites are taken up for taxonomic studies. With the help of ocular and stage micrometer specimens are measured. Drying of mites can be done with the help of camera Lucid. These can be traced out with the help of projection microscope or CCTV fitted with trinocular research microscope. Identification of mites was made with the help of keys & literature. But they should be finally checked by a specialist, Acaorlogist with taxonomic background. Culture of pest and predatory mites were raised in the laboratory. These mites were reared in the laboratory on the small leaves which were kept on wet filter paper and wet cotton in petridishes. Water was added periodically so as to keep the cotton supersaturated and thereby keeping the leaf disc in a turgid condition.Athin film of water was maintained which acted as a barrier & thus prevented the escape of mites.These petridishes.were kept in BOD incubator at constant temperature of 30±1ºC and 70% Relative Humidity.Predatory mites were further studied for finding feeding potential. Meterological data comprising temperature, relative humidity, rainfall and sunshine hours were obtained from Meterological department of CCS HAU , Hisar. Seasonal incidence of pest and predatory mites were studied through weekly sampling of young (top), mature (middle) and old (bottom) leaves. Statistical analysis of field data was done through correlation matrix, ANOVA and t-test.

RESULT & DISCUSSION

The dominated species of pest mite found on *Dolichos lablab* (sem) crop was *T.ludeni* of the family Tetranychidae. The other species harboured were *Brevipalpus californicus* of the family Tenuipalpide and *Tarsonemus confuses* of Tarsonemidae. The predatory mites were *Bdella* sp., *Agistemus fleschneri* and *Cunaxa setirostris*. No Phytoseiid mite(of family Phytoseiide) was found present.On Sem crop pest and predatory mites were found on leaves in different months of the year. .. Pest mites were found present only on the lower surface of the leaves.Thin webs entangled with dust particles were seen on the leaves.In September,October, January &February of 1999&November &December of1998 mites were absent. During survey,pest mites were seen inMarch 1999(5.2mites/sq cm).Mite population showed an increasing trend in April &May 7.7&9.2 mites/sq cm respectively.Maximum population was seen during May(9.2)After that the population declined...Phytoseiid mites were absent throughout the observation period. The data was subjected to statistical analysis and found that pest&predatory mite had no correlation with

each other (as Phytoseiid mites were found to be Zero). Temperature was having positive and non-significant correlation with thepest mite(r=0.40).Relative humidity and pest mites were negatively &significantly correlated with each other (r=-0.56) sunshine hours had positive but no significant correlation with pest mite population.(r=0.36)

Fig. 1 and Table 1 represent the population trend of pest mite as influenced by temperature, relative humidity and sunshine hours. Phytoseiid mite were absent. The pest population had negative but significant relation with relative humidity i.e. higher the relative humidity, the lower was the pest mite population and vice-versa (Mallikarjunappa and Nageshchandra, 1989, Das and Gupta, 1991, Desai et al. Gupta, 1991) observed a similar trend in mite population. Rai and Singh (1999), Sobha and Haq (1999), Rai et al. (1999) also observed a similar trend in population. Turi *et al*.,2012 studied the influence of abiotic factors like tempt, rainfall ,humidity, ,photo period and wind direction on pest mite population.Li Young Tao et al .(2015) studied effect of temperature .on development &reproduction of predatory mite.Manju Devi and Nalini Challa(2019) studied impact of weather parameters on population dynamics, distribution, abundance and feeding behavior of mites.

Table 1: Correlation coefficient between biotic and abiotic factors in *Dolichos lablab*

	1	2	3	4	5
1	1	0.00	0.40	-0.56*	0.36
2	0.00	1	0.00	0.00	0.00
3	0.40	0.00	1	0.00	0.00
4	-0.56*	0.00	-0.78*	1	-0.58*
5	0.36	0.00	0.58*	-0.78*	1

*Significant

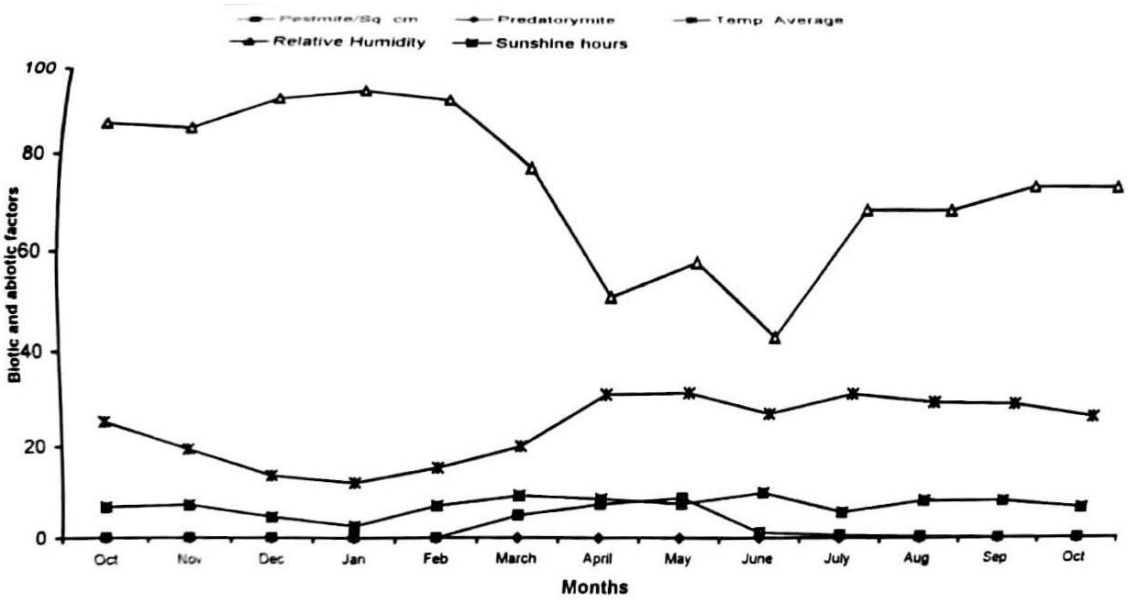

Fig. 11. Seasonal Occurrence of Pest and predatory mite on Sem in relation to abiotic factors (1998-99)

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