OnLine Journal of Biological Sciences 1 (4): 289-290, 2001

Influence of Environmental Factors on *Rhipiphorothrips cruentatus* Hood (Thysanoptera: Heliothripidae) Feeding on *Rosa indica* Var. Iceberg, (Rosaceae)

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Abstract: The influence of environmental factors including temperature and relative humidity was observed on thrips feeding on Rose, *Rosa indica* Var. Iceberg, (Rosaceae) planted at the main campus of University of Arid Agriculture Rawalpindi. The results revealed that there was a negative correlation between the population density and temperature, which meant that the number of thrips decreased with increase in temperature and positive correlation existed between the population density of thrips and relative humidity meaning increase in thrips population with increase in relative humidity level. The studies concluded that environmental factors play very significant role in regulating the population of thrips attacking the flowers of this important plant (the rose).

Key words: Correlation, *Rhipiphorothrips cruentatus*, Hood, temperature, relative humidity, queen of flowers, cut flowers

Introduction

The Rose (*Rosa indica*) is very popular flower because of its beauty and fragrance and is rightly called the queen of flowers. No other flower is symbol of love, odoration, innocence and other virtues than rose (Sujatha and Gowda, 1997).Roses are the largest traded flowers in the World worth 1.5 billion dollars globally (Reddy .1997).It is attacked by a number of insect pests including thrips. About 13 species of thrips have been found common on rose (Sauer,1997). The most common species in the sub continent include "*Rhipiphorothrips cruentatus*",followed by "*Retithrips syricus*, *Scirtothrips dorsalis*, *Thrips florum*, *Frankniella schultzei*_and *Thrips tabaci* (Dash and Naik,1998). The study of distribution of thrips population on rose showed that egg density was highest on the petals. The nymphs and adults were found on the terminals while adults exploited the tender tissues of the flowers to reproduce (Onkarapa *et al*, 1998). The most liked rose colors are white and yellow while red and orange are least liked by thrips (Bergh,et *al*, 1997). Roses are damaged through consumption,oviposition and brown spot formation on rose petals (Wang and Wenje, 1997). The population dynamic studies in conventional green house in Germany in different cultivars showed definite variations in colonizing density of thrips. (Sauer,1997). The present work was undertaken to see the influence of the climatic factors i.e. temperature and humidity on the number of thrips attacking rose cultivar "Rose Iceberg" under field conditions at the campus of University of Arid Agriculture Rawalpindi.

Materials and Methods

The study on the population dynamics of thrips (*Rhipiphorothrips cruentatus* Hood (Thysanoptera: Heliothripidae) in relation to climatic factors including temperature and humidity was done at the main campus lawns of University of Arid Agriculture Rawalpindi. The observations were recorded at various temperature and humidity levels over the duration of more than 2 months. The flowers to be observed were selected at random (Fig.1) The population of thrips was counted on several hundred flowers of rose Iceberg (an ornamental and commercial cultivar of rose) at various levels of temperature and relative humidity. The data for the temperature and humidity were collected from the Agro-meteorological Center Rawalpindi. The observations were made on five days interval and study started from the month of April and continued up to mid June. The flowers were removed from the pedicel of the inflorescence and number of thrips found were calculated and an average of 50 flowers were observed at random for single observation. The data collected were compiled and the average number of thrips per flower was calculated and also the correlation between temperature and thrips and humidity and thrips were computed. The data on the population density of thrips and their relation with temperature and relative humidity were analyzed using SPSS 7.5 for windows (1996).

Results and Discussion

The climatic factors i.e. temperature and relative humidity have considerable effect on the population density of thrips. The relation between the mean population of thrips and mean temperature and average relative humidity is given in the Table 1.

Table 1: Influence of Temperature and Relative Humidity on the number of Thrips *Rhipiphorothrips cruentatus*

No. of observation	Means number	Mean Temperature (°C)	Relative Humidity in (%)
1	4.06	20.3	30.5
2	3.62	21.4	25.0
3	9.24	20.2	37.5
4	9.32	21.6	40.0
5	4.66	23.3	21.5
6	5.8	25.2	29.0
7	4.18	26.2	34.0
8	4.28	26.5	39.0
9	5.12	24.1	40.5
10	4.88	29.3	36.5

With increase in temperature, the thrips population decreased and there was an increase in thrips population with decrease in temperature level. It was observed that with increase in relative humidity, thrips population increased and vice versa (Table 1). The regression correlation and covariance among the population density of thrips, temperature and relative humidity

Table 2: Correlation And Covariance of Thrips Population with Temperature And Relative Humidity

Name of Observation	Correlation	Covariance
Temperature-Thrips population	-0.33176	-2.14827
Humidity-Thrips population	0.462151	5.6954

Fig. 1: Rose flowers infested with thrips

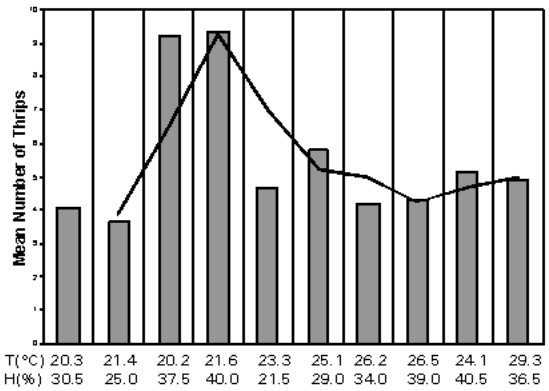

Fig. 2: Effect of temperature (T) and humidity (H) on the number of thrips

is given in Table 2. The above results also revealed that there existed a negative correlation and covariance among the temperature and population density of thrips, meaning that there was decrease in thrips population with increase in temperature level and vice versa.The correlation and covariance relation between population density of thrips and average relative humidity level was highly positive showing that there was increase in population density of thrips with increase in relative humidity level and vice versa. In open green house in dry summer, total number of thrips was 5791 on 1793 flowers while in mild and cold summer, the total thrips population was 6428 on 1788 flowers (Sauer, 1997). It was observed that thrips feed on about 20 species of rose and no physical and biocontrol was effective against thrips, Only rose types which were tolerant and resistant to thrips were suitable source for plant breeding (Sauer, 1997).The elements of an IPM program for rose thrips are being investigated in California. The decision making and population levels for implementation of physical, chemical and biocontrol are being investigated (Parella. *et al.*, 1996).The graphical representation of mean number of thrips with moving average trend line is shown as Fig 2. The graph shows that temperature and relative humidity effect simultaneously and their effect can not be measured singly.This cumulative effect of temperature and relative humidity on population density of thrips is also expressed through the moving average trend line. This fluctuation in the trend line shows the effect of various levels of temperature and relative humidity. This study is helpful in adopting this as a control measure. The chemical control implementation is hazardous and phytotoxicity may occur, so integrated pest management including chemical, physical and biocontrol should be adopted (Raspudic *et al.*, 1998).

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