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Seasonal Incidence of Thrips, *Scirtothrips dorsalis* Hood on Grapes, *Vitis vinifera* L. (cv. Thompson Seedless) in Bijapur

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A B S T R A C T

Insect pests are the important production constraints in grape cultivation next to diseases. Survey of *Scirtohrips dorsalis* Hood at progressive former field for grape, Bijapur during 2013-14 at weekly, revealed that thrips population was observed immediately after both April and October pruning. Highest population of 14.60 thrips/shoot was observed during third week of May after April pruning, which coincided with inflorescence period. Similarly thrips population was observed with highest of 16.25 thrips/inflorescence during first week of December after October pruning. Correlation studies with weather parameters and insect incidence revealed that evening relative humidity was significantly negative correlation with population of thrips (-0.58*) and signifact positive correlation with population of thrips (0.66*) after April pruning. Thrips population was negatively correlated with minimum temperature (-0.35), wind speed (-0.39) and rainfall nil after October pruning.

Introduction

In recent years, two species of phytophagus thrips belonging to the family Thripidae *i.e. Scirtothrips dorsalis* and *Thrips sps* have been found causing serious damage to fruits crop specially Grape, is most common fruits. Bijapur is one of the major districts of Karnataka in grape cultivation (6137 ha) with an annual production of 1.22 lakh tones (Anon., 2012). The fresh grape berries are good source of sugars, carbohydrates, vitamins, proteins and minerals. Fruits are used for table purpose, wine, juice, raisins and canning. Fresh and dried fruits have various uses in Ayurvedic and Unani medicine.

The fruits are considered to be laxative, stomachic, diuretic and cooling agents. The juice of unripe berries is used as astringent in throat infections. Tannins can also be extracted as a byproduct from wine industry. It is an important fruit crop, earning foreign exchange (Dry *et al.*, 2004).

The infestation by thrips species like *R. cruentatus* in grape take whitish hue, acquire a withered appearance and then turn brown. Leaves ultimately curl up and drop off. Such vines either do not bear fruits or fruits drop off prematurely, even matured fruits are of

poor quality. Wherein, the thrips like *S. dorsalis* lacerate and suck the sap from the berries of all stages leading to the formation of black corky surface resulting in scab formation (Reddy, 1957). This results in the hampering of marketability and export.

Among various factors responsible for low production, thrips are one of the major constraints and cause greater loss to the crops (Verma *et al.,* 2012). The information on incidence and population dynamics of thrips infesting grape in Bijapur district is investigated and results thus, obtained are reported herein.

Materials and Methods

The present study was undertaken during 2013-14 season in progressive former field at Khedagi (Bijapur district) and Research plot of UHS Bagalkot. Ten unprotected vines were used for this study. The observations on thrips numbers were recorded as mentioned earlier at weekly interval. Simultaneously, weather parameters *viz*., maximum temperature, minimum temperature, relative humidity, total rainfall and wind speed were collected from RARS Bijapur weather station. These were averaged for a week (except for rainfall, which was summed up for a week) and the mean number of thrips was correlated with the meteorological data. For the correlation studies, weekly mean values of weather parameters *viz*., maximum and minimum temperature in degree Celsius, relative humidity in percentage, wind speed in km/hr and total rainfall in mm were considered.

Results and Discussion

April pruning

The population of thrips after April pruning was recorded from last week of April (18 Standard week) to first week of August (32 Standard week), 2013 (Table 1). The mean population of thrips at different stages of vine in Bijapur district ranged from 0.21 to 14.60 thrips/bud/shoot. Less numbers of thrips were recorded after April pruning at the bud stage (0.21 thrips/bud). However, the number reached peak on third week of May (14.60 thrips/shoot). The present investigation is in close agreement with the findings of Kirk (1985) that higher temperature encourages physiological development of thrips, thus increasing the rate of population growth. The mean population of thrips decreased after third week of May 2013 (21th Standard week).

October pruning

The population of thrips after October pruning was recorded from last week of October (43rd Standard week) to first week of February (5th Standard week), 2014 (Table 1). The mean population of thrips at different stages of vine in Bijapur district ranged from 0.12 to16.25 thrips/shoot/inflorescence. Less numbers of thrips were recorded after October pruning at the bud stage (3.12 thrips/bud). However, the number reached peak on first week of December (16.25 thrips/inflorescence) which coincided with initiation of flowering of grapes. Comparatively higher density of *S. dorsalis* was observed during October pruning in the present investigation, which is in close agreement with the findings of Lewis (1997) and Harish (2002) who observed peak activity of thrips during dry periods, mainly due to suitability of weather for population growth. Mean population of thrips decreased after first week of December 2013 (48th Standard week).

Relation between weather parameters and population of *S. dorsalis* (Bijapur)

The weekly population of thrips was correlated with various weather parameters

(maximum temperature, minimum temperature, morning and evening relative humidity, wind speed and rainfall) to assess the impact of weather parameters on the incidence of thrips.

The incidence of thrips after April pruning was significant and positively correlated (Table 3) with maximum temperature (r= 0.669) but negatively significant correlation was observed with evening relative humidity (r= -0.582). The present results are agreement with Bagle (1993) and Harish (2002) who also observed the positive correlation of temperature with the population of thrips. However, non-significant correlation was found with minimum temperature (r= 0.447), morning relative humidity (r= -0.463), wind speed (r= -0.108) and rainfall (r= -0.353). Rainfall recorded a negative relationship with thrips incidence during April pruning. Patnaik *et al.,* (1986) reported non-significant negative correlation of *S. dorsalis* with rainfall, which is in agreement with the present investigation.

After October pruning the incidence of thrips had positive and non-significant relationship with maximum temperature (r= 0.049), morning relative humidity (r= 0.414) and evening relative humidity (r= 0.063). Whereas, it had negatively non-significant relationship with minimum temperature (r= -0.358) and wind speed (r= -0.391).

Table.1 Seasonal incidence of *S. dorsalis* on grapes in Bijapur during 2013-14

April pruning			**October pruning**		
Stanadard week	**Date of observation**	**Mean number of thrips/ bud/shoot***	**Stanadard week**	**Date of observation**	**Mean number of thrips/ bud/ shoot/ inflorescence/ bunch***
18	28/04/2013	0.21	43	27/10/2013	3.12
19	05/05/2013	9.85	44	03/11/2013	10.25
20	12/05/2013	13.25	45	10/11/2013	15.32
21	19/05/2013	14.60	46	17/11/2013	14.20
22	26/05/2013	12.32	47	24/11/2013	13.28
23	02/06/2013	11.32	48	01/12/2013	16.25
24	09/06/2013	8.20	49	08/12/2013	12.30
25	16/06/2013	9.68	50	15/12/2013	9.25
26	23/06/2013	5.32	51	22/12/2013	8.52
27	30/06/2013	6.24	52	29/12/2013	9.86
28	07/07/2013	3.28	01	05/01/2014**	4.52
29	14/07/2013	5.36	02	12/01/2014**	6.52
30	21/07/2013	3.20	03	19/01/2014**	3.21
31	28/07/2013	1.65	04	26/01/2014**	0.96
32	04/08/2013	0.92	05	02/02/2014**	0.12
Mean		7.02	Mean		8.50

*Mean of Ten vines

** Observation recorded after berry maturation

Table.2 Seasonal incidence of *S. dorsalis* on grapes in Bagalkot during 2013-14

April pruning			October pruning		
Stanadard week	**Date of observation**	**Mean number of thrips/ bud/shoot***	**Stanadard week**	**Date of observation**	**Mean number of thrips/ bud/ shoot/ inflorescence/ bunch***
17	26/04/2013	0.52	43	26/10/2013	2.30
18	03/05/2013	3.51	44	02/11/2013	6.53
19	10/05/2013	8.53	45	09/11/2013	9.35
20	17/05/2013	10.50	46	16/11/2013	13.12
21	24/05/2013	8.60	47	23/11/2013	13.28
22	31/05/2013	6.51	48	30/11/2013	14.24
23	07/06/2013	6.23	49	07/12/2013	5.03
24	14/06/2013	6.03	50	14/12/2013	3.50
25	21/06/2013	8.02	51	21/12/2013	4.32
26	28/06/2013	2.30	52	28/12/2013	5.60
27	05/07/2013	6.02	01	04/01/2014**	3.50
28	12/07/2013	4.60	02	11/01/2014**	4.02
29	19/07/2013	1.25	03	18/01/2014**	1.50
30	26/07/2013	1.09	04	25/01/2014**	0.52
31	02/08/2013	0.20	05	01/02/2014**	0.12
Mean		4.92	Mean		5.79

*Mean of Ten vines

**Observation recorded after berry maturation

Table.3 Correlation between incidence of thrips, *S. dorsalis* with weather parameters during 2013-14 bijapur

Time of pruning	**Correlation coefficient**					
	Max temp (X_1) (^{0}c)	Min temp (X_2) (^{0}c)	R.H.M (X_3) %	R.H.E (X_4) %	WIND SPEED (X_5) (km/hr)	Rainfall (X_6) (mm)
April pruning	0.66**	0.44	-0.46	-0.58*	-0.10	-0.35
October pruning	0.40	-0.35	0.41	0.06	-0.39	-

** Significant at P=0.01%

* Significant at P=0.05%

Max temp = Maximum temperature

Min temp= Minimum temperature

R.H.M= Morning relative Humidity

R.H.E= Evening Relative Humidity

Table.4 Multiple regression between incidence of *S. dorsalis* and weather parameters during 2013-14 (Bijapur)

Time of pruning	Intercept (A)	Max Temp (X_1) (^{0}C)	Min Temp (X_2) (^{O}C)	R.H. M (X_3) (%)	R. H.E (X_4) (%)	Wind speed (X_5) (km/hr)	Rain fall (X6) (mm)	R^2
April pruning	-6.708	2.589	-4.076	0.037	0.235	0.537	-0.062	0.890
October pruning	-83.330	3.564	-1.064	0.041	0.251	-2.674	0.000	0.658

Max Temp – Maximum temperature
Min Temp - Minimum temperature
R.H. M – Morning relative humidity
R. H.E - Evening relative humidity

After regressing the incidence of thrips data with all-weather parameters after April pruning, the following multiple regression equation was obtained (Table 3).

$Y= -6.708 + 2.589 (X_1) - 4.076 (X_2) + 0.037 (X_3) + 0.235 (X_4) + 0.537 (X_5) - 0.062 (X_6)$

Where,

Y= number of thrips
X_1 = Maximum temperature (^{O}C)
X_2= Minimum temperature (^{O}C)
X_3= Morning relative humidity (%)
X_4= Evening relative humidity (%)
X_5= Wind speed (km/hr)
X_6= Rain fall (mm)

The multiple regression equation indicated that, for every unit increase in maximum temperature, morning relative humidity, evening relative humidity and wind speed would result in increased number of thrips by 2.589, 0.037, 0.235 and 0.537 units respectively. Whereas, every unit increase in minimum temperature and rainfall, would decrease the number of thrips by 4.076 and 0.062 units respectively. The weather parameters influenced the incidence of thrips to the extent of 89.05 per cent ($R^2 = 0.8905$).

After regressing the incidence of thrips data with all-weather parameters after October pruning the following multiple regression equation was obtained (Table 4).

$Y= -83.33 + 3.564 (X_1) - 1.064 (X_2) + 0.041 (X_3) + 0.251 (X_4) - 2.674 (X_5) - 0.00 (X_6)$

The multiple regression equation indicated that, for every unit increase in maximum temperature, morning relative humidity and evening relative humidity would increase the number of thrips by 3.564, 0.041 and 0.251 units, respectively. Whereas, every unit increase in minimum temperature and wind speed would decrease the incidence of thrips by 1.064 and 2.674 units, respectively.

The weather parameters during October pruning influenced the incidence of thrips to the extent of 65.80 per cent ($R^2 = 0.6580$).

References

Anonymous, 2012, Package of Practice for fruit crops, UHS, Bagalkot.

Bagle, B. G., 1993, Seasonal incidence and control of thrips *Scirtothrips dorsalis* Hood in pomegranate. *Indian J. Ent.,* 55 (2): 148-153.

Dry, P. R., Hand, P.G., and Ristic, R., 2004, what is Vine Balance? Proceedings of 12th Australian Wine Industry Technical Conference, Melbourne, Victoria, Australia, pp. 68-74.

Harish, B., 2002, Thrips complex studies in Grapes (cv. Bangalore Blue). *M. Sc. (Agri.) Thesis*, Univ. Agric. Sci., Bangalore (India).

Kirk, W. D. J., 1985, Aggregation and mating of thrips in flowers of *Calystega sepium*. *Ecol. Entomol.*, 10: 433-440.

Lewis, T., 1997, Thrips as crop pests. CAB International, New York, pp. 7-45.

Patnaik, N. C., Behera, P. K. and Dash, A. N., 1986, some bio-ecological observations on the chilli thrips, *Scirtothrips dorsalis* Hood in Orissa. *Orissa J. Hort.*, 14: 25-28.

Reddy, D. B., 1957, Scab thrips of grapevine berries, *Proc of the 44th Indian Sci. Cong*, 393.

Verma, S. C., Thakur, M. and Kanwar, H. S., 2012, Efficacy of insecticides against onion thrips, *Thrips tabaci* Lindeman on garlic under mid-hill conditions of Himachal Pradesh. *J. Ins. Sci.*, 25 (1): 76-78.

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