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Seasonal incidence of chilli thrips (*Scirtothrips dorsalis* Linn.) on chilli & its correlation with different abiotic factors

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Abstract
The experiment was carried out at horticultural research farm of BTC CARS, Bilaspur during *Rabi* 2019-20. The outcomes revealed that the seasonal incidence of thrips (*Scirtothrips dorsalis* Linn.) on chilli crop was first noticed on fourth week of November 2019 (47th SMW) and reached to its peak population (20.2 thrips/plant) during the second week of April (15th SMW). The results revealed that the significant positive correlation with maximum (r = 0.689), minimum temperature (r = 0.690) and sunshine hours (r = 0.414) while significant negative correlation with morning relative humidity (r = -0.645) was observed with the thrips population.

Keywords: Seasonal incidence, chilli, thrips, correlation, abiotic factors

Introduction
Chilli (*Capsicum annuum* L.) is an important vegetable cum spice crop grown in almost all parts of tropical and subtropical regions of the world. It belongs to the family Solanaceae and originated from South and Central America where it was domesticated around 7000 BC. The genus Capsicum includes 30 species, five of which are cultivated: *Capsicum annuum* L., *C. frutescens* L., *C. chinense* Jacq, *C. pubescens* R. & P. and *C. baccatum* L. (Bosland and Votava, 2000; and Wang and Bosland, 2006) [2, 8].

Chilli serves both the purposes of vegetable and spice. It contains plenty of vitamin A, B and C along with phosphorous, potassium and protein. 100g of green chilli contains as much as 3 mg of vitamin C.

Thrips is a major pest which attacks the buds, leaves and flowers of chilli plant. (Kalshoven, 1981) [4]. The attack of thrips on chili plants starts from a mild attack to heavy. Mild attack begins from damage symptoms on leaves marked with silvery white color. Furthermore, the silvery color changed to be brown. It causes chilli leaf curling to the upward. Paroxysm attack occurs when thrips act as vectors of viruses that cause disease in chilli (Ananthakrishnan, 1993) [1].

The insect pests cause significant damage to the chilli crop. There are 39 genera and 51 species of insects and mite attacking chilli in the field, and in the storage. Aphids (*Aphis gossypii* Glover), Thrips (*Scirtothrips dorsalis* Hood), and Jassids (*Amrasca bigutulla bigutulla*) are the major insect pest of chilli (Jadhav *et al*., 2004) [3].

Materials and Methods
To study the seasonal incidence of thrips (*Scirtothrips dorsalis* Linn.) on chilli crop (var. Shilpa 435/7) and to work out their correlation with prevailing weather parameters, an experiment was laid out in plot size of 9.6 m X 9.45 m with 60 cm row to row distance and 45 cm plant to plant distance during *Rabi* 2019-20. The observations on the incidence of chilli thrips were recorded at weekly intervals after transplanting of the crop during whole cropping season till its maturity. The population of thrips was recorded by using 10x magnifying hand lens from three leaves per plant on each from the upper, middle and lower position on 10 randomly selected plants (Ravikumar and Rafee, 2018) [6].

The weekly meteorological data on temperature, relative humidity, rainfall, sunshine hours and wind velocity were recorded for whole of the cropping season from the meteorological

obsevatory located at BTC CARS Bilaspur (C.G.) The data obtained were correlated with various abiotic factors and correlations coefficients were worked out as suggested by Snedecor and Cochran 1967 [7]. The graphical representation method was also applied to depict the seasonal incidence of the pest.

Results and Discussion

The seasonal incidence of thrips was observed on chilli variety Shilpa (VNR 435/7) starting from third week of November 2019 at vegetative stage which remain up to crop maturity i.e. second week of May 2020.

The prevailing weather condition during the experimental period shown in Fig. 1. The first appearance of chilli thrips was recorded on chilli during fourth week of November 2019 (47th SMW) at vegetative stage. The maximum population (20.2 thrips/plant) of chilli thrips was recorded during second week April (15th SMW). During this period the weather conditions prevailed were maximum temperature (39.49 ºC) and minimum temperature (23.34 ºC), morning relative humidity (95.86 %) and evening relative humidity (71.43 %), rainfall (42.8 mm) and sunshine (10.2 hrs/day).

Correlation coefficient was worked out between the number of chilli thrips and the weather factors viz., temperature (maximum and minimum), relative humidity (morning and evening) rainfall and sunshine hours (Table 2). The results revealed that the significant positive correlation with maximum (r = 0.689) and minimum temperature (r = 0.690), and sunshine hours (r = 0.414) and significant negative correlation with morning relative humidity (r = -0.645) was observed with thrips population. Patel *et al.*, (2009) [5] revealed that the incidence of *S. dorsalis* on chilli crop commenced from first week of September and continued up to harvest of the crop. Peak activity was recorded in November (4.99 to 5.54 thrips/leaf) and February -March (5.29 to 7.38 thrips/leaf). Correlation coefficient values worked out for thrips incidence and weather parameters revealed that significant positive relationship existed with bright sun shine hours and maximum temperature. Whereas significant negative correlation was found with mean relative humidity and rainfall.

The regression equation between chilli thrips and maximum temperature (y= 0.489x + 25.89, R^2 = 0.474) indicating that with an increase in 1^0C temperature there will be increase in population by 0.489 units (Fig. 1), for minimum temperature (y=0.482x + 11.25, R^2 = 0.475) depicts that at every unit increase in minimum temperature, the population level increases by 0.482 units (Fig. 2), for sunshine hours (y=0.095x + 6.633, R^2 = 0.171) depicts that at every unit increase in sunshine hours, the population level increases by 0.095 units (Fig. 3), for morning relative humidity (y= -0.765x + 92.63, R^2 = 0.415) depicts that at every unit increase in morning relative humidity, the population level decreases by 0.765 units (Fig. 4).

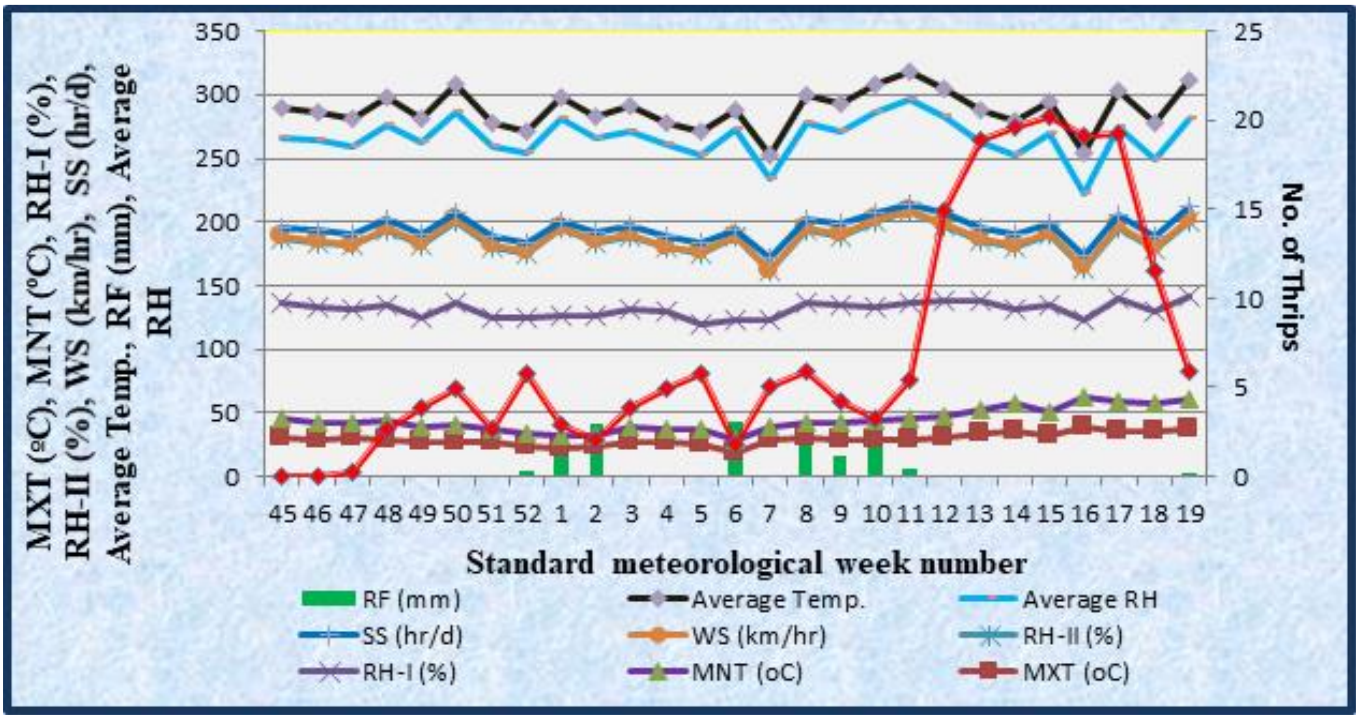

Fig 1: Seasonal incidence of chilli thrips (*Scirtothrips dorsalis*)

Table 1: Correlation (r) and regression (byx) coefficient of meteorological parameters on chilli thrips

Metereological parameters	Thrips	
	r	byx
Maximum Temperature (^{0}C)	0.689**	0.489
Minimum Temperature (^{0}C)	0.690**	0.482
Morning RH (%)	-0.645**	0.765
Evening RH (%)	-0.331 ns	-
Wind Speed (km/hrs)	0.225 ns	-
Rainfall (mm)	-0.299 ns	-
Sunshine (hrs)	0.414*	0.095

ns = non significant, *Significant at 5% level of significance, **significant at 1% level of significance

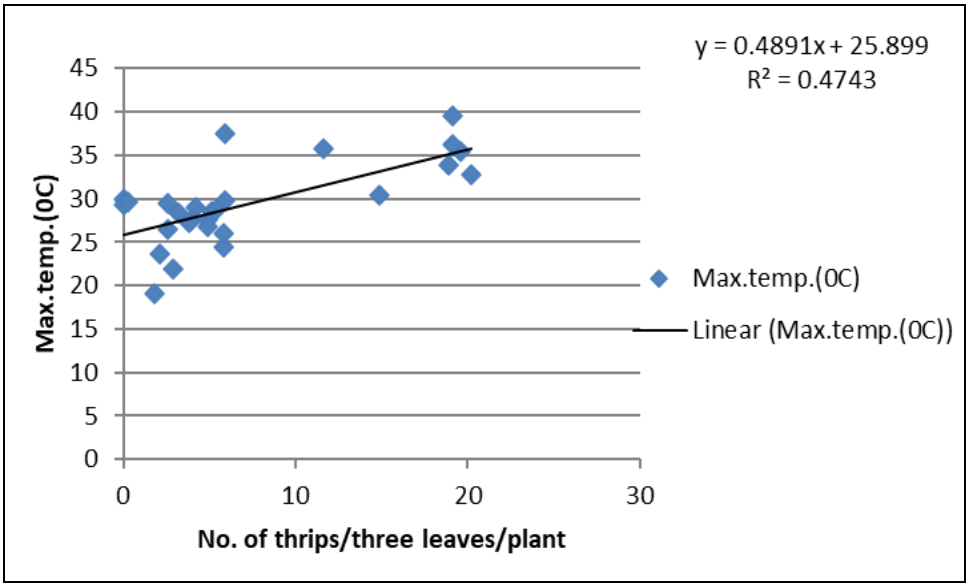

Fig. 2 Regression of thrips on Max. temp. (ºC)

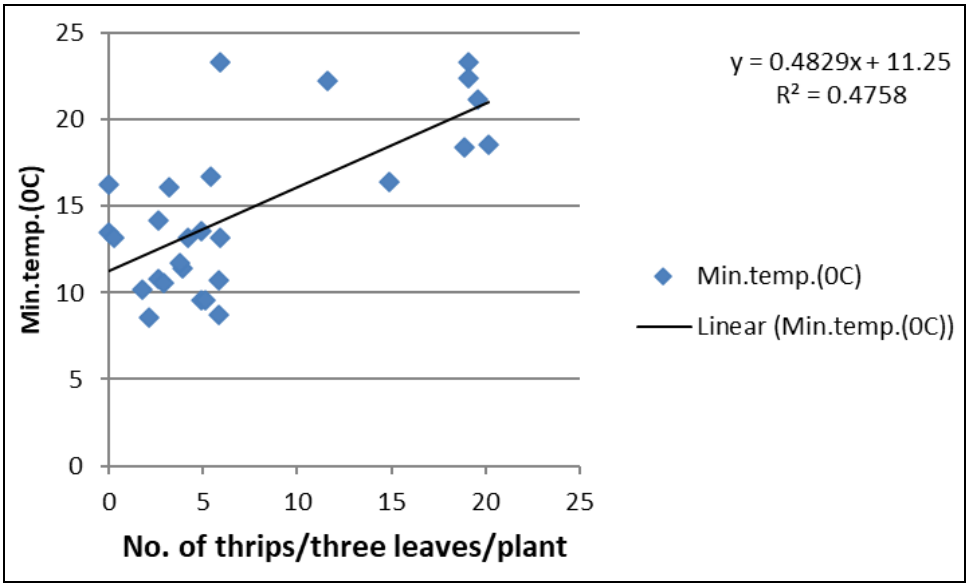

Fig 3: Regression of thrips on Min. temp. (ºC)

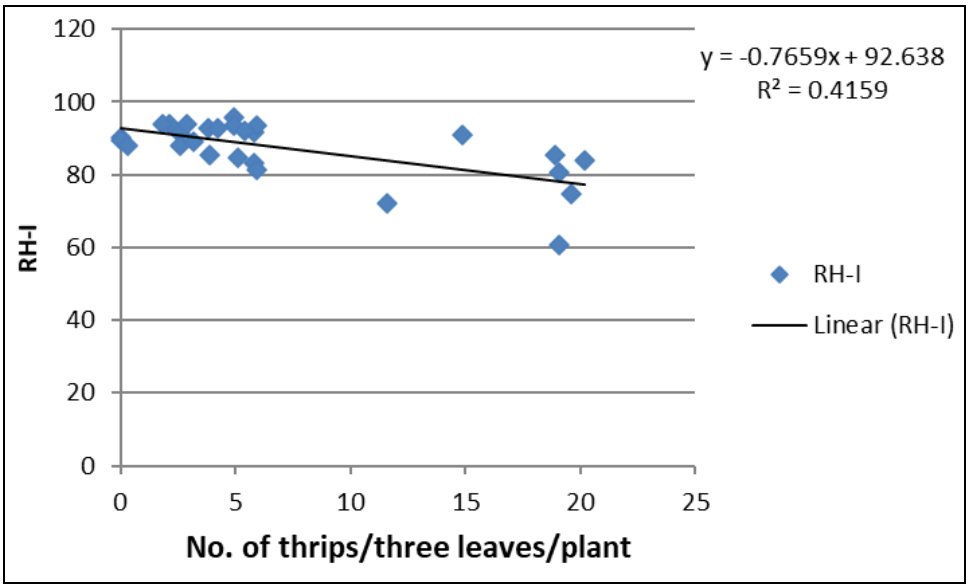

Fig 4: Regression of thrips on morning relative humidity (%)

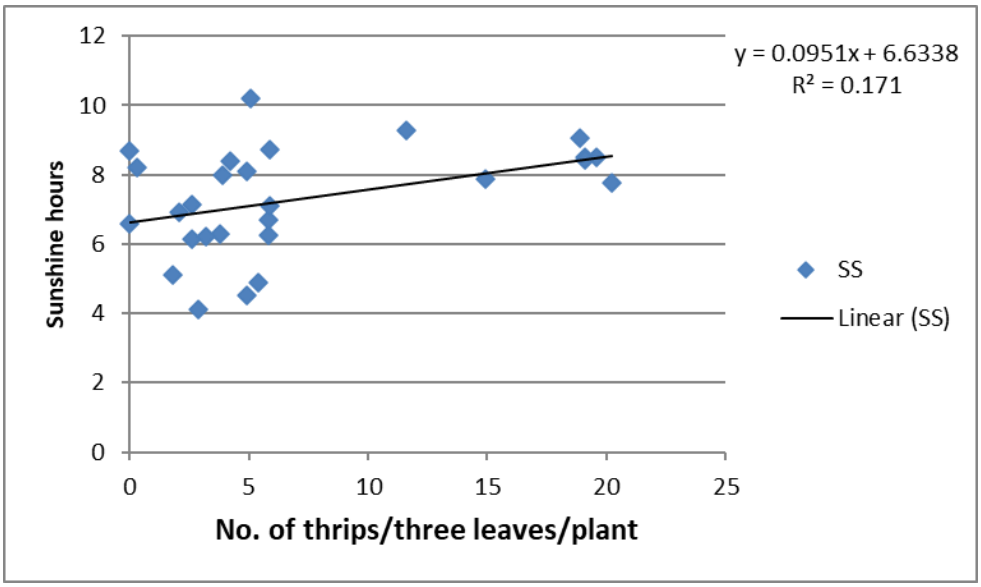

Fig 5: Regression of thrips on Sunshine hours

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