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Studies on the incidence of Thrips on gladiolus (*Gladiolus grandiflorus* L.) in relation to abiotic factors

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Abstract

The present investigation entitled 'Studies on the Incidence of Thrips on Gladiolus (*Gladiolus grandiflorus* L.) in relation to abiotic factors' was carried out during 2023 and 2024 at Horticulture Research Center (HRC), Sardar Vallabhbhai Patel University of Agriculture and Technology, Modipuram, Meerut, Uttar Pradesh. The data were recorded on five randomly selected plants once in a standard week. The peak of thrips population was observed in 3rd week of January, 2024 (3rd standard week) with a mean nymph population of 28.00 nymph per plants were recorded. The thrips was active throughout the year with a varying degree of infestation.

Keywords: *Gladiolus grandiflorus*, thrips, abiotic factors

1. Introduction

Gladiolus (*Gladiolu* ssp.) belongs to the plant family Iridaceae, one of the most popular flowers with magnificent inflorescence is a bulbous flowering ornamental plant. It is also known as the "Queen of bulbous flower crops" grown in many parts of the world (Kaikal and Nauriyal, 1964)^[3]. It is native to Mediterranean region and South Africa (Poon *et al.*, 2012)^[7]. The name 'Gladiolus' is derived from the Latin word Gladius, meaning sword, representing the shape of the leaf which resembles that of a sword.

The genus Gladiolus comprises of 260 species, out of which 250 are native to sub-Saharan Africa and 10 belong to Eurasia (Manning and Goldblatt, 2008)^[5] with more than 30,000 varieties evolved in gladiolus (Singh, 2006)^[9] of which about 20 are grown for commercial purposes. Gladiolus is grown from corms for cut flowers as well as garden decoration. It appears that this flower was introduced into cultivation towards the end of the 16th century (Anon., 2011)^[1]. Gladiolus is the most suitable cut-flower due to its long keeping quality. In India its cultivation dates back to 19th century. Gladiolus flowers are in demand for their elegant attractive spikes of different hues and good keeping quality of cut spikes.

Gladiolus can be easily grown with a little care and attention in beds for garden decoration and cut flower production and also in pots for interior and outdoor decoration. It occupies 8th position in the world cut flower trade and first in the domestic bulbous flower trade. In Netherlands and other European countries, it ranks second after tulip as a cut flower among the bulbous flowers (Singh, 2006)^[9]. It is commercially cultivated in all parts of the world. The major gladiolus producing countries are the United States, Holland, France, Poland, Italy, Bulgaria, Brazil, Australia, Israel and India. It occupies a prime position among commercial cut flowers which are in high demand in both the domestic and international market. Gladiolus is the next most important cut flower crop after rose in India.

Gladiolus is grown as a cash crop in Western U.P. with a wide range of cultivars being cultivated. The cropping patterns and management practices vary among different localities depending on factors such as climate, soil type and availability of resources. Typically, gladiolus corms are planted during the August to November. However 1st week of October is the best time and the crop is harvested after 90-120 days of planting. Various agronomic practices such as irrigation, fertilization and weed management are followed to ensure optimum growth and

development of gladiolus plants.

Several pests pose a threat to gladiolus cultivation in Western U.P. based on the surveys conducted in the region. Cut worm, *Agrotis segetum*; Thrips, *Frank liniella schultzei*; Aphids, *Aphis gossypii*; mites, *Tetranychus urticae* and Caterpillars are among the major pests that have been reported to cause damage to gladiolus plants. These pests feed on the leaves, flowers and corms of gladiolus causing symptoms such as stunted growth, leaf curling, flower deformation and corm damage which can result in reduced quality and yield of gladiolus flowers. Among the insect pests, the most damage caused by thrips (Zeier and Wright, 1995)^[10], which pierce the stem, leaves and feed on the cell sap of the gladiolus. Thrips infesting gladiolus are native to Africa and are considered common pest of gladiolus (Milevoj *et al.*, 2008)^[6].

2. Materials and Methods

The field experiments were conducted during 2023 and 2024 at Horticulture Research Center (HRC), Sardar Vallabhbhai Patel University of Agriculture and Technology, Modipuram, Meerut, Uttar Pradesh. The soil of experimental plots was sandy loam with an average fertility level, good drainage and adequate irrigation facility situated at a distance of 10 km from Meerut city on Delhi- Dehradun National Highway (NH- 58). It lies between 29° 17' N latitude and 77° 42' longitude at an altitude of 237 meters above the mean sea level. The total geographical area of Meerut district is 2590 km². Meerut is located at the North-East of Delhi in Western Plain Zone of Uttar Pradesh.

Gladiolus corms were planted in an open field condition. Gladiolus corms were procured from the Amit Floritech, khatauli, Muzaffarnagar, U.P. All the recommended agronomical practices were adopted for raising the crop. The corms were planted at a depth of 5 cm and the distance from row to row and plant to plant was maintained at 30 × 20 cm, respectively.

To study the incidence of thrips on gladiolus, five plants were selected randomly for monitoring thrips upto harvest. Innermost leaves of the plants were observed for the presence of thrips.

Observations were recorded irrespective of the stage of thrips present on the plants. Affected plant parts *viz.*, leaves and flowers were gently tapped on the white sheet of paper to dislodge thrips. Number of thrips present were counted with the help of magnifying lens and monitoring was carried out on

weekly intervals. The Correlation of population of thrips, *Scirtothrips dorsalis* (Hood) on gladiolus, *Gladiolus grandiflorus* L. with weather parameters was worked out by the meteorological data on different abiotic factors during the period of investigation that was obtained from Department of Soil Science, Sardar Vallabhbhai Patel University of Agriculture and Technology, Modipuram, Meerut, Uttar Pradesh. The data generated on the population of thrips on gladiolus was correlated with temperature (°C), relative humidity (%), rainfall (mm).

3. Results and Discussion

The seasonal incidence of Thrips was observed throughout the cropping season. The data were presented in Table.-1 and depicted in (Fig. 1). The first incidence of thrips was observed on in the 3rd week of November,2023 (47th standard meteorological week) with a mean number of nymph 3.33 nymph per plants. The maximum and minimum that prevailed during the initial infestation were 26.10 °C and 10.70°C respectively. Maximum and minimum relative humidity were 87.00 and 63.70 respectively and rainfall was 0.50 mm. The peak of thrips population was observed in 3rd week of January,2024 (3rd standard week) with a mean nymph population of 28.00 nymph per plants were recorded. The maximum and minimum that prevailed during the initial infestation were 14.10 °C and 5.10 °C respectively. Maximum and minimum relative humidity were 94.60 and 79.10 respectively and rainfall was 0.00 mm.

The correlation with weather parameter shows the strong significant negative correlation between the nymph population of thrips with maximum temperature ($r = -0.925$) and minimum temperature ($r = -0.914$), and showed positive correlation with maximum ($r = 0.489$) and minimum ($r = 0.220$) relative humidity as well with rainfall ($r = 0.342$) also.

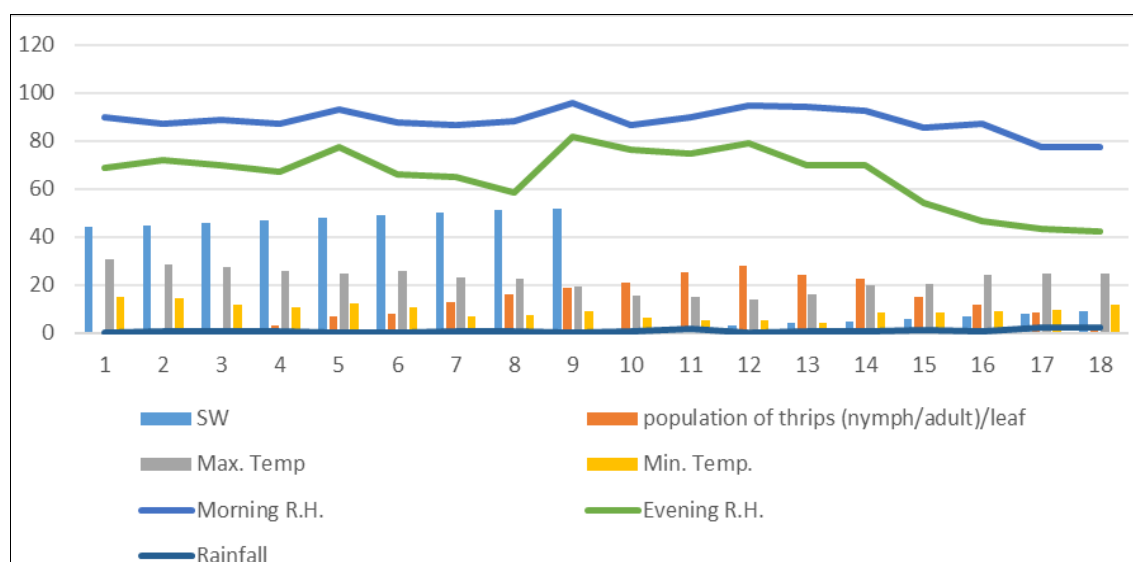
The results of present investigation are in close conformation with past report of Lingeri (1998)^[4] who reported that incidence of *S. dorsalis* was more pronounced during December to January month. He *et al.* (2008)^[2] reported that the largest variation in relative abundance occurred in early December. Roopa and Ashok (2014)^[8] who reported that infestation of thrips was initiated in the third week of September and remained continue up to fourth week of December which showed negative correlation with maximum and minimum temperature.

Table 1: Incidence of Thrips on Gladiolus (*Gladiolus grandiflorus* L.) in relation to abiotic factors

Standard Meteorological Week (SMW)	Mean population of thrips (nymph/adult)/leaf	Meteorological parameters					Rain Fall (mm)
		Temperature (°C)		Relative Humidity (%)			
		Max.	Min.	Morning	Evening		
44	0.00	30.90	14.90	89.70	68.70	0.00	
45	0.00	28.50	14.70	87.00	72.30	0.50	
46	0.00	27.30	120	88.90	70.10	0.50	
47	3.33	26.10	10.70	87.00	67.30	0.50	
48	6.67	24.60	12.10	93.30	77.30	0.00	
49	8.00	25.60	10.60	87.60	66.00	0.00	
50	13.00	23.40	6.80	86.60	65.10	0.50	
51	16.33	22.80	7.40	88.40	58.40	0.80	
52	18.67	19.40	8.90	95.90	81.70	0.00	
1	21.00	15.70	6.50	86.70	76.60	0.70	
2	25.33	14.80	5.50	90.00	74.70	1.60	
3	28.00	14.10	5.10	94.60	79.10	0.00	
4	24.33	16.10	4.20	94.40	70.00	0.50	
5	22.67	19.70	8.40	92.60	70.10	0.80	
6	15.00	20.70	8.30	85.70	54.00	1.10	
7	11.67	24.30	9.00	87.00	46.90	0.80	
8	8.33	24.80	9.80	77.70	43.40	2.10	
9	2.33	24.90	11.80	77.30	42.30	2.10	

Table 2: Correlation of Incidence of Thrips on Gladiolus (*Gladiolus grandiflorus* L.) in relation to abiotic factors

Weather parameter	Max. Tem.	Min. Tem.	Mrn. RH.	Eve. RH.	Rainfall
Mean population of thrips (nymph/adult)/leaf	-0.952**	-0.914**	0.489	0.220	0.342

**Fig 1:** Incidence of Thrips on Gladiolus (*Gladiolus grandiflorus* L.) in relation to abiotic factors

4. Conclusion

It may be concluded from the present study that infestation of thrips started from the 3rd of November in 2023-2024 and continued upto the last week of February in 2024 and reached its peak in the 3rd week of January in Meerut district. The correlation with weather parameter shows the strong significant negative correlation between the nymphal population of thrips with maximum and minimum temperature. These findings can be used by the farmers for developing a sound programme to counter the attack of thrips in gladiolus crop to minimize losses.

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