

**SCREENING OF CARNATION VARIETIES AGAINST THRIPS,
Thrips tabaci (LINDERMAN) IN PROTECTED CULTIVATION**K. P. MANJU¹, R. S. GIRADDI², S. M. MANTUR³¹Department of Entomology, PJTSAU, Hyderabad²Department of Agricultural Entomology, UAS, Dharwad³Hi-tech horticulture unit, UAS, Dharwad**Abstract**

Thrips (Thrips tabaci) are one of the most destructive insect pest, which impair plant growth, quality and yield of carnation. Incidence and damage aspects of Thrips tabaci investigated on five carnation varieties viz., Lisa, Gaudina, Liberty, Charmant, Rendez vous at Hi-tech horticulture unit, Saidapur Farm, MARS, UAS, Dharwad under polyhouse conditions. Among the varieties, Rendez Vous, Liberty and Lisa were identified as the best varieties by recording lowest thrips population. Conversely Charmant and Gaudina were found susceptible, recorded the highest thrips population. Lowest petal distortion by thrips was noticed on the variety Rendez vous (12.87%) followed by variety Liberty (20.63%) and Lisa (25.14%) which registered less crop damage indicated that these varieties are significantly superior to other varieties for suppressing the thrips population. Significantly highest petal distortion observed in variety Charmant (61.59%) and Gaudina (52.55%) found to be susceptible to thrips infestation.

Key words: *Thrips tabaci, carnation, Hi-tech horticulture, petal distortion*

I. INTRODUCTION

Carnation (*Dianthus caryophyllus* L.) being native of southern Europe is one of the most important commercial flowers of the world belonging to the family caryophyllaceae. The common name, Carnation, is likely derived from 'coronation', as the Greeks wove *Dianthus* flowers into crowns for their athletes. It is genetically a quantitative long day plant (Blake, 1955). Himachal Pradesh, Punjab, West Bengal, Jammu and Kashmir and Karnataka are the major states producing carnation. Carnations are grown commercially in India in places having mild climate such as Solan, Shimla, Kalimpong, Kodaikanal, Mandi, Kullu, Srinagar, Ooty. In Pune and Bangalore, it is grown under controlled condition (Shiragur *et al.*, 2004).

Thrips (*Thrips tabaci* (Linderman)) are one of the most common pests of carnation which are severely responsible for decreasing plant growth, crop quality, yield, vase life.. Thrips suck the sap from the leaves, causing them to turn yellow and patchy often with black streaks and slight crinkling. They also cause streaks in the flowers making them unmarketable. A severe attack adversely affects the growth.

At present, there is no information available on host preference and the factors governing host preference of *Thrips tabaci*. Hence, the present investigation was carried out to evaluate the host preference of *Thrips tabaci* by documenting the incidence and damage aspects of *Thrips tabaci* on different carnation varieties.

II. MATERIAL AND METHODS

A field study for the screening of carnation varieties against thrips was conducted at Hi-tech horticulture unit, Saidapur Farm, MARS, UAS, Dharwad. Five varieties of carnation *viz.*, Lisa, Gaudina, Liberty, Charmant, Rendez vous grown in polyhouse were selected for the study. The experiment was laid out in randomized complete block design (RCBD) with each of the variety as one treatment and each treatment was replicated 4 times. The size of the treatment plot was of 12.5×1m. 1m² consisting 33 plants with a spacing of 15 cm and 20 cm between the plants and rows respectively. For recording observations, five plants were selected randomly from each replication and from each plant, population of thrips and plant damage symptoms were recorded at monthly intervals. The data were subjected to statistical analysis.

Plant damage symptoms for example; Percent flower damage (petal distortion), for thrips were observed and scored in 0-4 scale as per the standard procedure (Niles, 1980) are presented in Table 1.

Table 1: Scoring procedure for thrips damage

Score	Symptoms (Per cent damage)
0	No symptoms
1	1-25% leaves or bud per plant showing damage
2	26-50% leaves or bud per plant showing damage
3	51-75% leaves or bud per plant showing damage
4	>75% leaves or bud per plant showing damage

Visual observation was made on flower colour of different varieties of carnation and categorized as white, red, yellow, pink and purple bordered (white flower) varieties. Correlation coefficient was calculated between flower colour of carnation and the thrips population.

III. RESULTS AND DISCUSSION

3.1. Thrips population on flowers

Five carnation varieties *viz.*, Lisa, Gaudina, Liberty, Charmant, Rendez vous were screened against the thrips under naturally ventilated polyhouse condition and the results obtained are presented in Table 3.

During May 2012, Rendez Vous recorded the lowest thrips population (20.68 thrips/flower), which was followed by Liberty (26.69 thrips/flower) and Lisa (31.97 thrips/flower). Charmant (41.55 thrips/flower) and Gaudina (35.92 thrips/flower) recorded the highest thrips population as compared to other varieties. Rendez Vous maintained its superiority during June 2012 also by recording lowest

thrips population (16.61 thrips/flower), which was found on par with Liberty (18.04 thrips/flower). Charmant (36.36 thrips/flower) and Gaudina (33.07 thrips/flower) recorded significantly highest thrips population as compared to other varieties. During July 2012, significant difference was observed among the varieties in recording thrips population. Rendez Vous was free from thrips infestation. The next best varieties were Liberty followed by Lisa recorded an lowest thrips population of 3.95 and 4.25 thrips per flower. Rendez Vous retained its superiority by recording least number of thrips (14.82 thrips/flower) on August 2012. The next best varieties were Liberty and Lisa. Similar trend was observed during March and April 2013 in recording the thrips population as that of previous observation.

Mean data shown that among the varieties screened against thrips, the varieties viz., Rendez Vous and Liberty were superior by harbouring less thrips population of 15.68 and 19.72 thrips per flower respectively. Charmant and Gaudina sustained high population of 33.54 and 29.83 thrips per flower, respectively as compared to other varieties.

3.2. Thrips population on Leaves

The data on the incidence of thrips on leaves of five carnation varieties are presented in Table 3.

During May 2012, among five varieties, screened against thrips, the variety Rendez Vous recorded significantly lowest thrips population (1.61 thrips/leaf) which was followed by Liberty (1.73 thrips/leaf). During June 2012, Rendez Vous, again proved its superiority by recording lowest thrips population (1.06 thrips/leaf), which was followed by Liberty and Lisa and the later varieties were on par with each other. Rendez Vous and Liberty was free from thrips infestation during July 2012 whereas Charmant (0.78 thrips/leaf) and Gaudina (0.77 thrips/leaf) recorded significantly highest population of thrips as compared to other varieties. The varieties Rendez Vous and Liberty recorded significantly lowest thrips population of 0.59 and 0.74 thrips per leaf, respectively during August 2012. Charmant and Gaudina recorded the significantly highest population of thrips than other varieties. Similar trend was observed in March and April, 2013.

Mean data showed that, the varieties Rendez Vous and Liberty recorded the lowest thrips population of 1.06 and 1.29 thrips per leaf, respectively followed by Lisa (1.71 thrips/leaf). Charmant and Gaudina recorded the highest thrips population of 2.25 and 2.05 thrips per leaf as compared to other varieties.

3.3. Crop damage (Per cent petal distortion)

Five carnation varieties viz., Lisa, Gaudina, Liberty, Charmant, Rendez vous were screened against the thrips damage (per cent petal distortion) under naturally ventilated polyhouse condition and the results obtained are presented in Table 4.

During May 2012, Rendez Vous recorded the lowest petal distortion (20.03 %), which was followed by Liberty (36.03%) and Lisa (38.01%). Charmant (84.15%) and Gaudina (76.25%) recorded the highest petal distortion as compared to other varieties. Rendez Vous maintained its superiority during June 2012 also by recording lowest petal distortion (11.04%), followed by Lisa (14.15%) and Liberty (17.48%). Charmant (47.08%) and Gaudina (32.04) recorded significantly highest petal distortion as compared to other varieties. Significant difference was observed among the varieties in recording petal distortion during July 2012, Rendez Vous and Liberty were free from crop damage followed by Lisa (12.08%). During August 2012, Rendez Vous retained its superiority

by recording lowest petal distortion (9.03%). The next best varieties were Liberty (11.07%) and Lisa 17.16%. Similar trend was observed during March and April 2013 in recording the petal distortion as that of previous observation.

Mean data showed that among the varieties screened against petal distortion by thrips, significantly lowest damage due to thrips was observed on the variety *Rendez vous* (12.87%) followed by variety Liberty (20.63%) and Lisa (25.14%) which registered less crop damage indicated that these varieties are significantly superior to other varieties for suppressing the thrips population. Significantly highest petal distortion observed in variety *Charmant* (61.59%) and *Gaudina* (52.55%) found to be susceptible to thrips infestation (Table 3).

No published information is available on the screening of carnation varieties against thrips in protected cultivation for further discussion on this aspect.

The correlation study between flower colour and thrips population revealed that there was a negative and non significant relationship ($r = -0.257$) between flower colour and thrips population. However, varieties which recorded lowest thrips population (white (purple bordered) – *Rendez Vous*, yellow – Liberty, white – Lisa) had either white or yellow flowers. While, those varieties which recorded highest thrips population *Charmant* and *Gaudina*, possessed pink and red coloured flowers respectively. This indicates that the colour of the flowers possibly is the factor that attracts the pest to crop.

Present findings are in agreement with findings of Gahukar (2003) reported that more thrips were attracted to red (27 thrips/flowers) than orange (17 thrips/flower) and yellow (9.7 thrips/flower) coloured flowers in rose.

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Table 2: Thrips population on flowers of different carnation varieties

Varieties	Number of thrips per flower during May - August 2012 and March - April 2013						
	May 2012	June 2012	July 2012	August 2012	March 2013	April 2013	Mean
Lisa	31.97 (5.70) ^b	26.95 (5.24) ^b	4.25 (3.82) ^b	20.68 (4.59) ^a	24.50 (5.02) ^b	34.38 (5.91) ^b	23.75 (4.93) ^c
Gaudina	35.92 (6.03) ^d	33.07 (5.80) ^d	14.55 (5.01) ^d	27.24 (5.27) ^c	31.75 (5.67) ^d	36.95 (6.13) ^d	29.83 (5.54) ^d
Liberty	26.69 (5.24) ^c	18.04 (4.35) ^c	3.95 (3.79) ^c	15.51 (4.02) ^b	21.95 (4.77) ^c	32.17 (5.71) ^c	19.72 (4.42) ^b
Charmant	41.55 (6.50) ^e	36.36 (6.08) ^e	16.75 (5.20) ^c	27.61 (5.29) ^c	34.60 (5.94) ^e	44.4 (6.70) ^e	33.54 (5.88) ^e
Rendz Vous	20.68 (4.66) ^a	16.61 (4.16) ^e	0.00 (0.71) ^a	14.82 (3.95) ^a	17.43 (4.25) ^a	27.03 (5.25) ^a	15.68 (4.00) ^a
S.Em. ±	0.19	0.19	0.21	0.24	0.26	0.17	0.07
C.D. at 5%	0.59	0.59	0.64	0.73	0.79	0.52	0.22

Table 3: Thrips population on leaves of different carnation varieties

Varieties	Number of thrips per leaf during May - August 2012 and March - April 2013						
	May 2012	June 2012	July 2012	August 2012	March 2013	April 2013	Mean
Lisa	2.43 (1.70) ^c	1.26 (1.41) ^c	0.59 (0.98) ^b	1.14 (1.28) ^c	2.11 (1.63) ^c	2.52 (1.74) ^c	1.71 (1.48) ^c
Gaudina	2.36 (1.69) ^c	1.83 (1.53) ^e	0.77 (1.13) ^c	1.45 (1.39) ^d	2.76 (1.81) ^d	3.19 (1.90) ^d	2.05 (1.60) ^d
Liberty	1.73 (1.49) ^a	1.26 (1.33) ^c	0.00 (0.71) ^a	0.74 (1.11) ^b	1.73 (1.49) ^b	2.26 (1.68) ^b	1.29 (1.35) ^b
Charmant	2.55 (1.76) ^d	1.61 (1.45) ^d	0.78 (1.10) ^c	1.65 (1.47) ^e	3.25 (1.93) ^e	3.66 (2.06) ^e	2.25 (1.67) ^e
Rendz Vous	1.61 (1.46) ^a	1.06 (1.25) ^a	0.00 (0.71) ^a	0.59 (1.04) ^a	1.27 (1.33) ^a	1.82 (1.56) ^a	1.06 (1.24) ^a
S.Em. ±	0.05	0.05	0.04	0.04	0.04	0.05	0.02
C.D. at 5%	0.16	0.18	0.18	0.14	0.14	0.17	0.06

Table 4: Percent petal distortion by thrips on different carnation varieties

Percent petal distortion by thrips during May - August 2012 and March – April 2013							
Varieties	May 2012	June 2012	July 2012	August 2012	March 2013	April 2013	Mean
Lisa	38.01 (38.06) ^c	14.15 (22.09) ^b	12.08 (20.30) ^b	17.16 (24.51) ^c	31.43 (34.18) ^c	38.30 (38.26) ^c	25.14 (30.22) ^c
Gaudina	76.25 (60.83) ^d	32.04 (34.47) ^d	23.16 (28.73) ^c	34.03 (35.67) ^d	64.00b (53.13) ^d	85.36 (67.49) ^e	52.55 (46.22) ^e
Liberty	36.03 (36.89) ^b	17.48 (24.78) ^c	0 (0) ^a	11.07 (19.39) ^b	29.13 (32.69) ^b	30.11 (33.28) ^b	20.63 (26.98) ^b
Charmant	84.15 (66.53) ^e	47.08 (43.32) ^e	28.02 (31.96) ^d	53.11 (46.74) ^e	76.03 (60.69) ^e	81.21 (64.31) ^d	61.59 (51.77) ^d
Rendz Vous	20.03 (26.59) ^a	11.04 (19.41) ^a	0 (0) ^a	9.03 (17.49) ^a	16.3 (23.87) ^a	20.52 (26.93) ^a	12.87 (20.78) ^a
S.Em. ±	1.38	1.08	0.83	0.85	0.95	0.94	0.33
C.D. at 5%	4.25	3.34	2.56	2.62	2.92	2.90	1.92