
Reaction of gerbera cultivars to spider mite, *Tetranychus urticae* Koch (Tetranychidae: Acari) under polyhouse conditions

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(Received: 20 August 2013; Accepted: 20 September 2013)

ABSTRACT

Five gerbera cultivars were screened for their reaction against spider mite, *Tetranychus urticae* Koch under the polyhouse conditions. Results showed that the gerbera cultivar Cherany was highly tolerant with lowest mite population (1.62mites/plant) whereas Venezia and Fana were tolerant to spider mite with 7.72 and 9.67 mites per plant, respectively. The gerbera cultivar C. F. Gold (13.31 mites/plant) and Stanza (15.56 mites/plant) were medium tolerant under polyhouse conditions. On the basis of biomorphological characters cultivar stanza has maximum mite population having green coloured leaves and red coloured flowers, while the highly tolerant cultivar Cherany with dark green leaves and pink coloured flower.

Keywords: Reaction, gerbera, cultivar, *Tetranychus urticae* Koch, polyhouse

Introduction

Production of ornamental flowers combines economic returns with satisfaction to the grower and has recently experienced expressive growth. India has great potential to gain and keep international markets in ornamental flowers due to its diversity in soil and climate environments, which allows the growth of a large number of flower species of good quality and beauty, tropical flowers among others. *Gerbera jamesonii* Bolus and Hook, popularly known as gerbera or Transvaal daisy, is a herbaceous, Asteraceae (Compositae) that produces showy capitula of variable colors of high commercial value. More than 20 species of arthropods are known to cause economic injury to gerbera and the two-spotted mite, *Tetranychus urticae* Koch (Acari: Tetranychidae) is considered a key pest of this and other ornamental plants. Several pests are known to be resistant to one or more pesticides used in

flower cultivation, including gerbera, including *T. urticae* in some parts of the world. This species feeds on the lower leaf surface, where it lives in colonies underneath a webbing structure that it produces. It sucks the cells content, turning leaves chlorotic, if the attack is continuous, leaves may fall and the number of flowers produced may be reduced considerably. In addition to yield reduction, there may be a reduction in quality of the flowers produced. The search for resistant varieties begins with screening of available plant material of diverse origin. The present study is an attempt to identify the possible resistant varieties against infestation of spider mite *T. urticae* under polyhouse condition.

Materials and Methods

Five gerbera cultivars viz., Stanza, Fana, C.F. Gold, Venezia and Cherany were evaluated for their preference to *Tetranychus urticae* under polyhouse conditions at Department of

Floriculture and Landscaping, ASPEE College of Horticulture and Forestry, Navsari Agricultural University, Navsari from January 2013 to December 2013. Numerical counts of spider mite, *T. urticae* were made on three leaves each from top, middle and lower canopy of five randomly selected plants from each repetition of each cultivar at weekly interval. The experimental area was kept free from any pesticide spray throughout the year. On the basis of the average number of mites present on each leaf of gerbera, the reactions of plant were worked out to spider mite. The following scale of reaction to spider mite was adopted: highly tolerant (0-5 mites/ leaf), tolerant (6-10 mites/ leaf), medium tolerant (11-20 mites/leaf), susceptible (21-30 mites/ leaf) and highly susceptible (31 onwards mites/ leaf) (Jagtap 2004).

The morphological parameters of the plant viz., Number of leaves per plant, leaf area as well as leaf colour and flowering characters viz., days to flower bud emergence, days to first harvest and flower colour were also considered to determine the reaction of gerbera cultivars to *T. urticae*.

Results and Discussion

During the period of present investigations, five gerbera cultivars were screened for their reaction to spider mite, *T. urticae* Koch. under polyhouse conditions. The observations on the population of *T. urticae* were recorded at weekly interval from 2 January, 2013 to 26 December 2013 (1 to 52 SMW) and presented in Table 1. It is seen from the population data

presented in Table-1, that in the 1st meteorological week i.e. on 2nd January 2013, the presence of pest were noticed on all the five gerbera cultivars but the lowest mite population i.e. 1.66 mites per plant was recorded on Cherany cultivar. In the 2nd meteorological week the incidence of the pest increased in four cultivars but it was low i.e. 1.00 mite/plant in Cherany cultivar. In the 3rd meteorological week the mite population was highest in C. F. Gold cultivar i.e. 24 mites/plant. In 4th meteorological week the population fluctuated and the mite population per week varies from 1.33 to 9.66 on different cultivars. Lowest mean mite population per leaf was seen on Cherany (1.33 mites / plant) and maximum mean mite population per leaf was seen on Stanza (9.66 mites / plant) followed by C. F. Gold (8.33 mites / plant), Fana (6.00 mites / plant) and Venezia (5.00 mites / plant). During 5th meteorological week showed the mite population between 2.33 to 10.33 mites per plant. Cultivar Cherany recorded least population (2.33 mites / plant). At the 6th meteorological week the minimum number of mites recorded on Cherany (2.33 mites / plant) while in 7th meteorological week population varied between 2.66 to 12 mites/ plant with highest on Stanza (12 mites / plant) and lowest on Cherany (2.66 mites / plant). During 8th meteorological week mite population ranged between 2.66 to 12 mites/plant, while in 9th meteorological week Cherany showed least population (2.60 mites / plant). In 10th meteorological week population was in between 2.33 to 12.33 mites / plant with least popula-

tion in case of Cherany (2.33 mites/plant). During 11th meteorological week similar conditions of least and maximum population of Cherany and Stanza were recorded. In 12th meteorological week same trend were recorded. In 13th meteorological week the mite population was ranging between 2.00 to 13 mites/ plant with maximum on Stanza (13 mites/ plant). In 14th meteorological week, the least population (2 mites/plant) and maximum population (13 mites/ plant) recorded in case of Cherany and Stanza, respectively. Similar condition of least and maximum population recorded in the 15th meteorological week. Observations recorded during 16th and 17th meteorological week revealed that Cherany had least population (2.33 and 2 mites/ plant) and Stanza had maximum population (14.33 and 16.33 mites/plant). In 18th meteorological week same trend was recorded while in 19th and 20th meteorological week the population varied between 2 to 18.66 and 2 to 19.33 mites per plant. At 21st and 22nd meteorological week the maximum mite population was recorded on Stanza cultivar (20.33 and 21 mites/ plant) while lowest mite population per plant were recorded on Cherany (2 mites/ plant). From 23rd to 30th meteorological week same trends were observed. Further, during 31st meteorological week the mite population reached to its maximum levels and varied between 2 to 25 mites/plant and it was maximum on Stanza and C. F. Gold (25.00 mites/ plant), while it was least on Cherany (2.00 mites/plant). Same trends were recorded from 32nd to 45th meteorological week where Cher-

any cultivar recorded least mite population and Stanza recorded maximum mite population. The mite population reached to its lowest level *i.e.* 0.66 mite per plant on Cherany cultivar during 46th meteorological week. The mite population on cultivar Stanza was 9.00 mites per plant. The same trends were also recorded during rest of the period, where Cherany showed least mite population and Stanza showed highest mite incidence among the five gerbera cultivars. Highest mite population recorded in case of Stanza and least in case of Cherany with overall seasonal mean of 15.56 ± 5.535 and 1.62 ± 0.587 mites/plant. In past no attempts seems to have been made to search for pest resistance in available cultivars of gerbera and there is no published information available. In the present study where in five cultivars have been screened for their reaction to mite, *T. urticae*, the intensity of infestation ranged from 1.62 to 15.56 mites/leaf and it was found that Cherany was highly tolerant, Venezia and Fana were tolerant whereas C. F. Gold and Stanza were medium tolerant to the mite attack under polyhouse conditions, but the present finding were compared to the similar type of work carried out by various workers on flower crops under polyhouse and open conditions. Ramireddy *et al.* (2004) recorded incidence of *T. urticae* on leaves was the lowest in Angel Bell and highest in collection No.10 of chrysanthemum germplasm. Sudhir Kumar and Shelke (2008) reported that the varieties Spinex and Temptation were found to be moderately susceptible while the variety Confity, Noblesse, Grand

Gala, Passionm, Milwa, Gold strikes, Aqna and Bigance recorded susceptible reaction and the cultivar First Red was highly susceptible. According to Hole and Salunkhe (2005) the rose cultivars like Rajhans was found to be the most promising recording the lowest population of mites, while cultivar Arjun recorded the maximum number of mites (*T. urticae*). Bhusal (2011) reported Jaya and IIHR-6 varieties of chrysanthemum less susceptible to *T. urticae*. Toke (2010) also reported that Shakira variety of rose was tolerant to *T. urticae* under polyhouse conditions.

Biomorphological character of gerbera cultivars

During the experiment period, the various morphological characters of five varieties of gerbera were recorded. These various characters represented in the Table 3. They were just discussed in the light of incidence of mean number of mite population. The mite population and the number of leaves per plant of different varieties were recorded and it is evident from the Table-3 that the mean mite population was highest on Stanza (15.56 mites/plant) having maximum number of leaves (34.00) among all the gerbera cultivar, while the mite population was recorded minimum (1.62 mites/plant) in Cherany cultivar having 24.50 leaves per plant. Other leaf character viz., leaf area also showed that the maximum mite population was recorded on Stanza having the maximum leaf area (212cm²) and lowest on Cherany (180cm²). It is also evident from the data that the green leaf colour attract more number of mites as compare to dark green leaves as in case of all varieties except Cherany.

Further, maximum mite population was recorded on Stanza cultivar having highest plant height and plant spread (38.00 cm and 42.00 cm², respectively) as compared to Cherany where the plant height (35.00 cm) and plant spread (37.00 cm²) was less as compare to other gerbera cultivars. So, on the basis of the present observations recorded on biomorphological character of five gerbera cultivars, it can be concluded that mite population were maximum in those cultivars having higher number of leaves, more leaf area, green in colour, tall in height and spread more as compared to those having less number of leaves, lower leaf area, dark green in colour, less height and spread as seen in Stanza and Cherany cultivars of gerbera. The perusal of literature in relation of gerbera cultivars to mites revealed that there is no published information available, therefore, the present investigation could not be compared with other findings.

The flowering characters of five gerbera cultivars were presented in Table-4. It is evident that the mean mite population was higher in Stanza cultivar which took 35.00 days to flower bud initiation and 73.00 days were required for first harvest as compared to Cherany which registered lowest mite population where flower bud initiation take place in 38.00 days and first harvest done in 83.00 days. The mite population was minimum on Cherany cultivar having pink flowers as compared to red colour Stanza cultivar which registered highest mean mite population in the present study.

Table 1.
Screening of gerbera cultivars against *T. urticae* under polyhouse condition

Standard meteorological week	Varieties of gerbera (mite/2cm ² leaf surface)				
	Venezia	Fana	C. F. Gold	Stanza	Chernay
01	4.00	5.00	21.00	26.00	1.66
02	4.33	5.66	7.33	9.33	1.00
03	4.66	6.00	24.00	9.66	2.00
04	5.00	6.00	8.33	9.66	1.33
05	4.66	6.33	7.66	10.33	2.33
06	5.33	6.66	8.33	11.00	2.33
07	5.66	7.33	9.33	12.00	2.66
08	4.66	8.00	10.00	12.00	2.66
09	5.00	8.00	10.00	12.33	2.66
10	5.66	8.00	10.33	12.33	2.33
11	6.33	8.33	11.33	12.66	2.66
12	6.33	8.00	10.66	12.00	2.66
13	7.00	8.33	10.66	13.00	2.00
14	7.00	8.66	11.33	14.66	2.33
15	7.66	9.00	11.00	14.33	2.33
16	8.66	9.33	11.66	14.33	2.33
17	9.33	13.33	14.66	16.33	2.00
18	9.00	13.66	15.33	18.00	1.66
19	10.66	14.00	15.66	18.66	2.00
20	8.66	14.33	16.66	19.33	2.00
21	9.00	14.33	17.00	20.33	2.00
22	9.66	15.00	17.66	21.00	1.33
23	10.33	15.00	17.66	20.33	1.66
24	10.33	15.00	18.66	20.66	2.00
25	12.33	14.66	19.00	21.33	1.66
26	11.00	15.33	19.66	22.00	1.33
27	12.00	15.66	20.00	23.00	1.66
28	13.66	17.00	21.33	23.33	1.33
29	13.00	16.66	17.66	23.00	1.33
30	13.66	16.66	22.33	23.66	1.66
31	13.66	17.00	25.00	25.00	2.00
32	9.33	13.66	20.66	23.33	1.33
33	10.00	13.00	20.00	21.66	1.00
34	10.66	12.33	17.66	20.66	1.33
35	9.33	11.00	16.66	20.00	1.33
36	8.66	10.33	15.00	19.33	1.33
37	8.00	6.33	14.33	18.00	1.33
38	8.33	9.00	13.33	16.66	1.33
39	8.00	8.33	12.66	15.00	1.33
40	7.66	8.00	12.00	14.00	1.00
41	7.66	8.33	11.33	12.66	1.00
42	8.66	4.66	10.33	12.33	1.33
43	7.33	7.66	9.66	11.33	1.33
44	7.00	6.66	8.66	10.33	1.00
45	6.66	7.33	8.33	10.00	1.00
46	6.00	7.33	8.00	9.00	0.66
47	4.66	6.00	7.00	8.66	1.00
48	4.00	2.00	6.00	8.00	0.66
49	3.33	4.33	5.33	7.33	0.66
50	3.00	3.66	4.66	7.00	0.66
51	3.00	3.00	4.00	6.66	1.00
52	2.00	3.66	5.66	7.66	1.33
Seasonal Mean	7.72± 2.973	9.67± 4.083	13.31± 5.427	15.56± 5.535	1.62± 0.587

Table 2.
Reaction of gerbera cultivars to *T. urticae*

Cultivars	Range	Mean mite population± SD	Reaction to spider mite
Stanza	6.66-26.00	15.56± 5.535	Medium tolerant
Fana	3.00-17.00	9.67± 4.083	Tolerant
C. F. Gold	4.00-25.00	13.31± 5.427	Medium tolerant
Venezia	2.00-13.66	7.72± 2.973	Tolerant
Cherany	0.66- 2.66	1.62± 0.587	Highly tolerant

Table 3.
Biomorphological character of gerbera cultivars

Name of Cultivars	Mean mite population ± SD	No. of leaves per plant	Leaf area (cm ²)	Leaf colour	Plant height (cm)	Plant spread (cm ²)
Stanza	15.56± 5.53	34.00	212.00	Green	38.00	42.00
Fana	9.67± 4.08	28.00	193.00	Green	36.00	38.50
C.F. Gold	13.31± 5.42	33.50	204.00	Green	37.00	40.00
Venezia	7.72± 2.97	28.50	192.00	Green	36.00	38.00
Cherany	1.62± 0.58	24.50	180.00	Dark green	35.00	37.00

Table 4.
Flower characters of gerbera cultivars

Cultivars	Mean mite population± S. D.	Days to flower bud initiation	Days to first harvest	Flower colour
Stanza	15.56± 5.535	35.00	73.00	Red
Fana	9.67± 4.083	37.00	80.00	Red
C.F. Gold	13.31± 5.427	36.00	78.00	Yellow
Venezia	7.72± 2.973	37.00	80.00	White
Cherany	1.62± 0.587	38.00	83.00	Pink

Acknowledgement

Authors are thankful to Professor and Head, Department of Entomology, N.M. College of Agriculture, Navsari, Principal and Dean, N.M. College of Agriculture, Navsari as well as Director of Research and Dean Post Graduate Studies, Navsari Agricultural University, Navsari for providing all the necessary facilities during the course of the study.

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