



E-ISSN: 2320-7078

P-ISSN: 2349-6800

JEZS 2018; 6(3): 897-899

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Received: 01-03-2018

Accepted: 02-04-2018

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## Screening for resistance in rose against red spider mite, *Tetranychus urticae* (Linn.)

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**Abstract**

Relative resistance in rose 20 varieties / genotypes against red spider mite, *Tetranychus urticae* (Linn.) were evaluated under the field conditions at the University Research Farm, Sher-e-Kashmir University of Agricultural Sciences and Technology- Jammu, Main Campus, Chatha during 2013. Glory and Golden were found to be low resistant against mite. The varieties Rose Local, Sonika, First Red, Dr. B.P.Pal, Pusa Mohit, Naveen, Angelica, Taj Mahal, Shanti, Pusa Muskan, Black Beauty, Arjun, Australian Gold, Raktima, Sugandha, Pusa Muskan, Jaya and Superstar were found low susceptible with a score of 0.91-1.20, while as only one variety Girija was found moderately susceptible against the pest.

**Keywords:** Rose, *Tetranychus urticae*, screening, varieties, Girija

**Introduction**

Roses (*Rosa*) have a long history of cultivation since they have been cultivated as ornamentals for more than 2,000 years<sup>[1]</sup> and are one of the most popular flowering shrubs in India and other countries. Roses belong to the family Rosaceae and are classified in the genus *Rosa* which includes from 150 to 300 species and thousands of cultivars, out of which only eight are cultivated viz., *Rosa chinensis*, *R. damascena*, *R. foetida*, *R. gallica*, *R. gigantea*, *R. moschata*, *R. multiflora* and *R. wichuraiana*. Garden roses are generally classified as Hybrid Teas, Floribundas, Gladiator, Grandifloras, Polyanthas, Miniatures, Climbers, Ramblers, etc. Grand gala, Sweet Heart, Super Star, First Red, Vivaldi, etc., are the most popular and extensively grown varieties in India<sup>[2]</sup>. Most of the modern roses are complex hybrids derived from only 10-20 genotypes of the former species. It is thought that the selection of this 10-20 species was based on easy availability, attractive characters or favorable seed set<sup>[3]</sup>. Rose is attacked by many pests, red spider mite, *Tetranychus urticae* Koch. being considered as a major pest, formerly known as *Tetranychus cinnabarinus* Boisd. (Tetranychidae: Acarina). As the mites feed on the underside of the leaves, they remove leaf cell contents, including the chlorophyll. Without the chlorophyll, those empty cells appear whitish or bronze. Heavily infested leaves turn completely pale, dry up, and fall off. Large populations can severely defoliate plants. Yield may be greatly reduced as the plants become weak and photosynthetic activity is seriously hampered<sup>[4]</sup>. Exploration of resistance in varieties against the mite and its subsequent incorporation in agronomically suitable varieties through suitable breeding programme is an important IPM approach. Still continuous efforts are required to identify varieties with high level of resistance. The present study is an attempt to evaluate few varieties resistant to mite.

**Materials and Methods**

Twenty varieties of rose were screened for resistance to red spider mite during 2013 at the University Research Farm, Sher-e-Kashmir University of Agricultural Sciences & Technology-Jammu, Main Campus, Chatha, Jammu. The varieties viz., Rose Local, Sonika, First Red, Dr. B. P. Pal, Pusa Mohit, Naveen, Angelica, Black Beauty, Arjun, Australian Gold, Taj Mahal, Shanti, Raktima, Girija, Sugandha, Pusa Muskan, Glory, Jaya, Superstar and Golden Shower were included. These were sown in the plot size of 3 × 1 m<sup>2</sup> with a row to row and plant to plant distance of 45 cm and 20 cm, respectively. The crop was kept free from insecticides application and the rest of the agronomic practices were followed. No plant protection measures were given. Resistance rating based on the mites count / shoot was worked out at fortnightly intervals and graded according to 7 point system as given by<sup>[5]</sup>.

### General scale of the varietal resistance

Resistance scale	Mite index	Rating
0	0.00	Immune
1	0.01-0.30	Highly Resistant
2	0.31-0.60	Moderately Resistant
3	0.61-0.90	Low resistant
4	0.91-1.20	Low Susceptible
5	1.21-1.50	Moderately susceptible
6	>1.50	Highly susceptible

For working out the mite index the methodology described by [6] was used and given below:

#### Mite index:

- 0: Plant free from mite infestation
- 1: Only few mite with very little injury
- 2: Small colonies on few twigs, no curling or yellowing of leaves
- 3: Mite colonies on almost all the twigs, stunted growth, curling and yellowing of leaves
- 4: Very heavy population of mite on inflorescence, leaves, stem and siliqua.

The average Mite index was worked out by using following equation:

$$0N + 1N + 2N + 3N + 4N + 5N$$

$$\text{Average mite index} = \frac{\text{Total number of plants observed}}{\text{Total number of plants observed}}$$

Where, 0, 1, 2, 3, 4, 5 were the mite index

N= Number of plants showing respective mite index.

### Results and Discussion

The reaction of twenty commonly grown rose cultivars against mites during 2013-2014 is given in (Table 1). The

mean mites population per leaf per plant on different varieties varied from 8.47 to 15.01. Among the twenty varieties screened against mites, none was found to be resistant nor moderately resistant to this pest. The varieties which were found low resistant against mites with a score of 0.61-0.90 are Glory and Golden Shower respectively. The varieties Rose Local, Sonika, First Red, Dr. B.P. Pal, Pusa Mohit, Naveen, Angelica, Taj Mahal, Shanti, Pusa Muskan, Black Beauty, Arjun, Australian Gold, Raktima, Sugandha, Pusa Muskan, Jaya and Superstar were found low susceptible with a score of 0.91-1.20. Out of the twenty varieties screened against mites, only one variety Girija was found moderately susceptible against the pest with a score of 1.21-1.50. Our results are in line with that of Dhooria, 1999 [7], who reported that during the month of September all these varieties recorded the lowest mite population as compared to other varieties. Our results are in contradiction with Grzeszkiewicz and Witaszek, 1994 [8] who evaluated 26 rose cultivars for cut flower yield, quality and for resistance against *T. urticae* and reported that Parfait, Lady Rose and Hidalgo cultivars were found most resistant to *T. urticae*. Similarly, Dhooria, 1999 [9] recorded the mite damage on 7 rose varieties under polyhouse condition. Maximum mite damage was noticed on variety Prophyta (53%) followed by Saphire (23%), First Red (17%), Mercedes Long (15%) and Vivaldi (13%) and negligible mite damage was observed in varieties 'Golden Time' and 'Pavarroti'. These contradictions may be due to change in climatic parameters. Kumar *et al.* (2009) [10] evaluated eleven cultivars of rose against two spotted spider mite (*T. urticae*) Spinx and Temptation were found moderately susceptible while Aqua, Passion, Milwa, Noblesse, Confity, Gold Stikes, Grand Gala and Biyanca were susceptible and First Red was highly susceptible. This is in contradiction with our results and this contradiction may be due to climate change.

**Table 1:** Varietal screening of rose against red spider mite infesting rose leaves during 2013

Varieties	April, 13	May, 13	June, 13	Jul., 13	Aug., 13	Sept., 13	Oct., 13	Nov., 13	Dec., 13	Jan., 14	Feb., 14	Mar., 14	Mean	Mites Index	Resistance
Rose Local	18.21	21.05	12.90	0.01	0.00	1.69	0.98	19.91	23.09	16.78	12.04	11.80	11.53	0.91	Low Susceptible
Sonika	16.90	24.90	15.00	0.03	0.00	1.82	0.45	23.09	21.23	19.80	15.78	12.90	12.65	1.00	Low Susceptible
First Red	17.54	24.20	14.60	0.01	0.00	1.54	0.70	19.09	22.30	19.50	16.70	11.70	12.32	0.97	Low Susceptible
Dr. B.P.Pal	17.45	25.60	16.89	0.00	0.01	2.10	0.98	26.00	26.98	21.90	16.87	12.01	13.89	1.01	Low Susceptible
Pusa Mohit	17.89	20.67	17.89	0.00	0.00	1.98	0.10	27.00	27.00	22.50	17.40	11.91	13.69	1.09	Low Susceptible
Naveen	12.56	20.33	15.89	0.02	0.07	0.98	0.10	20.30	21.04	22.12	18.00	12.00	11.95	0.94	Low Susceptible
Angelica	16.20	19.10	17.30	0.01	0.01	0.87	0.98	25.87	19.10	16.70	11.70	11.80	11.63	0.91	Low Susceptible
Black Beauty	16.05	20.58	17.02	0.08	0.06	0.86	0.12	20.36	24.40	26.05	18.05	12.02	12.97	1.03	Low Susceptible
Arjun	18.80	21.70	14.40	0.00	0.00	0.93	0.50	19.60	25.00	20.50	22.20	25.82	14.12	1.12	Low Susceptible
Australian Gold	18.80	21.90	13.21	0.07	0.02	1.20	0.80	20.90	25.90	6.87	22.22	26.02	13.15	1.04	Low Susceptible
Taj Mahal	17.80	23.20	13.50	0.00	0.00	1.20	0.00	20.02	25.82	18.80	15.70	10.70	12.22	0.96	Low Susceptible
Shanti	15.80	21.00	14.50	0.01	0.00	1.09	0.10	20.00	24.00	19.30	13.89	9.07	11.56	0.91	Low Susceptible
Raktima	16.98	23.80	12.90	0.00	0.00	1.60	0.20	21.20	23.25	21.60	22.76	19.08	13.61	1.08	Low Susceptible
Girija	18.50	25.30	17.90	0.02	0.00	1.98	0.20	22.70	26.10	26.90	21.23	20.09	15.07	1.21	Moderately Susceptible
Sugandha	18.80	24.20	14.20	0.00	0.08	1.99	0.90	23.00	25.19	26.12	17.10	11.00	13.54	1.07	Low Susceptible
PusaMuskan	17.20	21.96	12.89	0.07	0.07	1.28	0.90	22.80	27.00	21.60	22.71	11.09	13.29	1.05	Low Susceptible
Glory	16.90	15.67	13.81	0.00	0.20	1.21	0.00	21.98	21.90	19.01	12.45	10.03	11.09	0.87	Low Resistant
Jaya	17.50	20.90	18.20	0.01	0.00	1.45	0.00	21.30	24.40	27.60	18.00	13.30	13.55	1.07	Low Susceptible
Superstar	19.00	23.20	17.80	0.00	0.01	1.21	0.90	20.89	19.06	15.45	12.89	9.09	11.62	0.91	Low Susceptible
Golden Shower	15.76	16.09	13.98	0.01	0.00	4.67	0.00	12.53	13.01	16.51	7.09	5.33	8.74	0.68	Low Resistant

### Conclusions

From the present study it can be concluded that mean mite population per leaf per plant on different varieties varied from 8.47 to 15.01. Among twenty varieties screened against red spider mite, Glory and Golden were found to be low resistant. Jaya and Superstar were found low susceptible with a score of 0.91-1.20, while as only one variety Girija was found

moderately susceptible against the pest.

### Acknowledgements

The authors are thankful to the Professor and Head, Division of Entomology, SKUAST-Jammu for providing facilities to carry out this work.

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