



Incidence of Spider Mites (*Tetranychus urticae* Koch) Infestation on Different Rose Cultivars in Bangladesh

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Abstract: The study was conducted at the farm of Sher-e-Bangla Agricultural University, Dhaka during the period from April to December 2012 to determine the incidence of spider mites on different variety of roses. The experiment included twelve varieties of roses viz. Wild rose, Crazy love bi-color, Yellow star, Missing love, Compassion, Charming lady, Dream bangle, Sleepy moon, Sweet doll, Moon light, Sweet love and Mini moni. Each variety represents as one treatment. The experiment was laid out in Randomized Complete Block Design (RCBD) with three replications. Incidence of spider mites showed significant variation due to the effect of varieties. Among the varieties, Sweet Love was tolerant of pests and the lowest number of spider mites were recorded at vegetative and flowering stages. Varieties of rose significantly influenced the incidence of pests as well as growth characteristics of rose indicating lowest number of infested leaves per plant, lowest number of infested branch per plant and lowest number of infested flower per plant on Sweet Love variety. Sweet Love variety showed tolerant to spider mites of rose and gave better yield among the all varietal treatments while sweet doll variety graded as susceptible mites due to the lowest performance regarding pest incidence and infestation.

Keywords: Rose, Spider Mites, Incidence

1. Introduction

Rose (*Rosa sp.*) is one of the nature's beautiful creations and is universally called as 'queen of flower'. The word rose is derived from the name 'Erose' meaning 'the God of love'. In Sanskrit literature, rose is referred as 'Tarunipushpa', 'Atimanjula' and 'Semantika'. Rose belongs to the family Rosaceae. The genus *Rosa* consists of about 120 species out of which only eight species are cultivated viz., *Rosa chinensis* (Jacq), *Rosa damascene* (Mill), *Rosa foetida*, *Rosa gallica*, *Rosa gigantea*, *Rosa moschata*, *Rosa multiflora*, and *Rosa wischuriana*.

Roses are attacked by numerous insect pests and diseases. Good general care of roses is the first step towards battling these problems. Some cultivars are more resistant to disease than others, but all roses require some protection from pests.

Roses are susceptible to several insects and diseases which reduce flower growth and quality as well as frustrate rose gardeners. In general, these insects do not kill the plant, but may stunt or kill parts, affect flowering, or cause aesthetic damage. According to [1] learning the proper care of roses and management of pest problems increases your success in growing a beautiful rose bush.

Two-spotted spider mite, *Tetranychus urticae* (Koch) (Acari: Tetranychidae) is a serious and regular pest of some vegetables and flowers grown under protected conditions. The spider mites survive and multiply rapidly under high temperature and dry weather in the Poly house conditions [2, 3, 4]. Adults and nymphs of *T. urticae* found in colonies on lower surface of leaves and suck the sap which results in yellowing and discoloration. Severe infestation leads to drying and dropping of attacked leaves [5, 6]. Spider mites of

several species feed on roses, causing loss of leaf chlorophyll and, presumably, loss of vigor. The absence of summer rainfall and daily temperature maximum frequently $>35^{\circ}\text{C}$ favor spider mite development. Generation time can be ≤ 12 days [7]. High populations can cause defoliation, which results in solar injury, rendering plants unmarketable. Spider mites have been the most commonly treated invertebrate pest of roses in Kern County since the 1950s. When thirty cultivars of rose were screened against mite *Tetranychus urticae* Koch, rose cultivar Rajhans was found to be most promising recording the population of mites while rose cultivar Arjun recorded the maximum number of mites [8]. Mite sucks sap from leaves, flower buds and flower resulting in discoloration of flowers, appearance of silvery patches and drying in affected plant parts [9]. The present study was undertaken to find out the tolerant and susceptible varieties of rose against spider mites.

2. Materials and Method

The experiment was conducted at the farm of Sher-e-Bangla Agricultural University, Dhaka during the period from April to December 2011. The location of the site in 23.774° N latitude and 90.335° E longitudes with an elevation of 8.2 meter from sea level. The experimental site is situated in subtropical zone, characterized by heavy rainfall during the months from April to September (Kharif season) and scanty rainfall during the rest of the year (Rabi season). The soil of the experimental area belongs to the Modhupur Tract in Agro ecological zone (AEZ) 28 [10]. The single factor experiment was laid out in Randomized Complete Block Design (RCBD) with 3 replications. Each block was divided into 12 plots, where treatments were allotted at random. Thus, there were 36 (12×3) unit plots altogether in the experiment. The size of each plot was $1\text{m} \times 0.8\text{m}$. The distance between blocks was 0.5m and 0.5m wide drains were made between the plots.

The beds were dug deep during summer and kept open the

soil due to exposed to sun. An appropriate amount of farmyard manure or cow dung manures along with 2kg superphosphate and 1kg BHC (5%) were incorporated into the soil and bed leveled followed by watering/irrigation. Manuring and fertilization was done as per requirements. The rose was planted in pits of 60cm diameter and 60- 75cm depth dug at appropriate distances in a bed. The rose bushes were pruned once a year during second week of October. After about 6-7 weeks of pruning, the plants started flowering. The time off lowering was adjusted according to the date of pruning. The new or so-called "Maiden" plants were not pruned. Irrigation, drainage, Intercultural operation and gap filling was done as per requirements. Ten plants from each of the plots were selected randomly for recording data for different characters. The collected data were compiled and analyzed statistically using the analysis of variance (ANOVA) technique with the help of a computer package program MSTAT-C and the mean differences were compared by Least Significance Difference (LSD) test [11].

3. Results and Discussion

The experiment was conducted to determine the incidence of spider mites on different cultivars of roses. Those pests feed on sap and plant cells.

3.1. Incidence of Spider Mites on Rose

From the table 2, it was found that the sweet doll of rose had the highest number of mites (2.0, 1.67, 2.33, 2.33, 3.33, 2.00, 3.33, 3.00, 2.33 and 2.00 at 7, 14, 21, 28, 35, 42, 49, 56, 63, and 70 days, respectively). Among the rest varieties, Sweet Love was more tolerant against mite and had lowest number of mite was the lowest (0.33, 0.67, 0.33, 0.33, 1.00, 1.33, 1.67, 1.67, 1.67 and 1.67 at 7, 14, 21, 28, 35, 42, 49, 56, 63, and 70 days, respectively) which increased the natural growth and maximized the yield of rose.

Table 1. The incidence of spider mite on different varieties of roses at different days after pruning.

Number of spider mite per plant										
Treatments	7 days	14 Days	21 days	28 days	35 days	42 days	49 days	56 days	63 Days	70 days
Wild rose	1.67ab	1.33ab	1.00bcd	0.67cd	2.33bcd	2.33ab	2.00cd	2.33abc	3.00a	3.00a
Crazy love	1.00bcd	1.67a	1.67abc	2.00ab	2.33bcd	2.33ab	2.67abc	1.67c	2.33abc	3.00a
Yellow star	1.33abc	1.33ab	1.33abcd	2.00ab	1.67def	2.67a	2.00cd	2.67ab	2.67ab	2.67ab
Missinglove	1.00bcd	1.67a	1.67abc	2.67a	3.00ab	2.67a	2.33bcd	2.00bc	2.33abc	2.67ab
Compassion	0.67cd	1.67a	2.00ab	2.00ab	2.00cde	2.00ab	2.33bcd	2.33abc	2.67ab	2.33abc
Charming lady	0.67cd	1.33ab	1.67abc	1.33bc	2.67abc	1.67ab	2.33bcd	1.67c	2.00bc	2.67ab
Dream bangle	1.33abc	1.67a	2.33a	2.33a	3.00ab	2.67a	2.33bcd	2.00bc	2.00bc	3.00a
Sleepy moon	1.00bcd	1.00bc	0.67cd	2.00ab	2.33bcd	2.67a	3.00ab	2.33abc	3.00a	3.00a
Sweet doll	2.00a	1.67a	2.33a	2.33a	3.33a	2.00ab	3.33a	3.00a	2.33abc	2.00bc
Moon light	1.00bcd	1.33ab	2.00ab	2.00ab	2.33bcd	2.00ab	2.33bcd	3.00a	2.67ab	2.00bc
Sweet love	0.33d	0.67c	0.33d	0.33d	1.00f	1.33b	1.67d	1.67c	1.67c	1.67c
Mini moni	1.00bcd	1.67a	1.67abc	2.67a	1.33ef	2.33ab	2.00cd	2.33abc	2.00bc	2.33abc
LSD (0.05)	0.71	0.42	1.04	0.78	0.69	1.02	0.80	0.79	0.78	0.70
CV (%)	14.58	7.89	7.56	8.67	17.0	11.2	7.90	5.67	2.3	7.23

Means having similar letter(s) are statistically identical at 5% level of significance. Values are the mean of three replications.

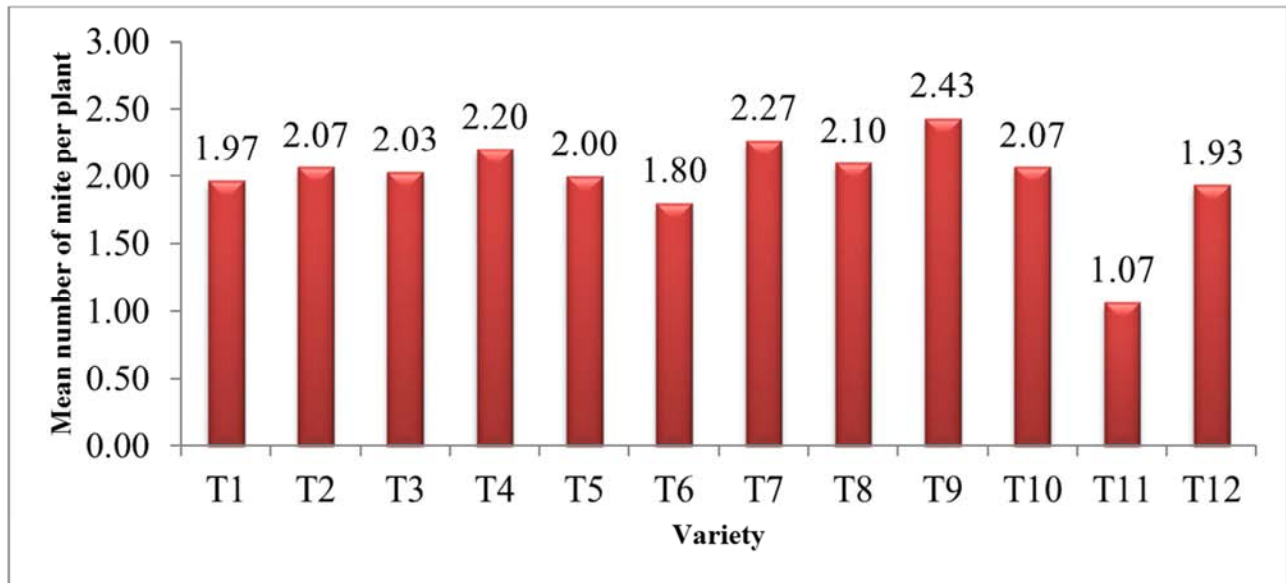


Figure 1. Number of spider mite per plant on different varieties of roses.

The lowest mean number (1.07) of mite was found in Sweet Love (Figure 1). The variety such as Wild rose, Crazy love bi-color, Yellow star, Missing love, Compassion, Charming lady, Dream bangle, Sleepy moon, Moon light, Mini moni was contained 1.97, 2.07, 2.03, 2.20, 2.00, 1.80, 2.27, 2.10, 2.07 and 1.93 number of mite, respectively and data was collected at 7, 14, 21, 28, 35, 42, 49, 56, 63, and 70 days. The highest number of mites was observed in Sweet Doll (2.43) variety of rose.

From the above results on incidence of mite, it was found that the variety of Sweet Love on rose decreased the number of mite at vegetative and flowering stages. Sweet Love

showed tolerant against mite. The remaining varieties showed intermediate incidence of mite compared to varieties having highest and lowest incidence.

3.2. Number of Infested Leaves per Plant

Significant variation loss observed among the values in respect of number of infested leaves plant⁻¹ at different days. Among the treatments, the highest number of infested leaves (4.00, 3.67, 3.00, 3.00, 3.00, 2.33, 2.33, 2.33, 2.00 and 1.00 at 7, 14, 21, 28, 35, 42, 49, 56, 63, and 70 days, respectively) was found from the variety of Sweet Doll.

Table 2. The of infested leaves per plant on different varieties of roses at different days after pruning.

Number of Infested leaves per plant										
Wild rose	7 days	14 days	21 days	28 days	35 days	42 days	49 days	56 days	63 days	70 days
Crazy love	3.08b	3.0ab	2.67ab	2.67ab	2.00c	2.33a	2.00ab	2.00ab	0.33d	0.67ab
Yellow star	3.17b	3.0ab	3.00 a	2.33ab	2.33bc	2.00a	2.33a	2.00ab	1.67ab	1.00a
Missing love	3.0 b	2.6 b	2.00 b	2.00b	2.00c	2.33a	2.00ab	1.00cde	1.67ab	0.67ab
Compassion	2.6bc	3.67a	2.67ab	2.33ab	2.00c	2.33a	2.00ab	1.00de	1.00bcd	0.33ab
Charming lady	2.00c	2.3 b	2.67ab	2.00b	2.00c	2.33a	1.33b	2.00ab	1.00bcd	0.33ab
Dream bangle	3.00b	2.67b	3.00 a	2.00b	2.33bc	2.00a	1.67ab	1.33cd	1.33abc	0.33ab
Sleepy moon	2.67bc	2.67b	3.00 a	2.00b	2.00c	2.00a	2.00ab	2.00ab	0.33d	0.67ab
Sweet doll	2.67bc	3.00ab	2.00 b	3.00a	2.67ab	2.00a	1.67ab	1.00de	1.67ab	0.33ab
Moon light	4.00a	3.6 a	3.00 a	3.00a	3.00a	2.33a	2.33a	2.33a	2.00a	1.00a
Sweet love	3.33ab	2.67b	2.00 b	2.33ab	2.00c	1.00b	1.67ab	0.67ef	0.67cd	0.28ab
Mini moni	0.13d	0.27c	0.21 c	0.24c	0.17d	0.26b	0.26c	0.18f	0.28d	0.00b
Wild rose	2.67bc	3.08ab	2.75	2.33ab	2.25bc	2.25a	2.00ab	1.58bc	1.08abcd	0.42ab
LSD _(0.05)	0.77	0.78	0.62	0.72	0.50	0.77	0.76	0.53	0.82	0.83
CV (%)	7.85	9.54	5.67	8.98	12.58	14.28	10.2	5.69	7.89	23.69

Means having similar letter(s) are statistically identical at 5% level of significance. Values are the mean of three replications.

The lowest number of infested leaves was obtained from variety of Sweet Love (0.13, 0.27, 0.21, 0.24, 0.17, 0.26, 0.26, 0.18, 0.28 and 0.00 at 7, 14, 21, 28, 35, 42, 49, 56, 63, and 70 days, respectively) (Table. 2).

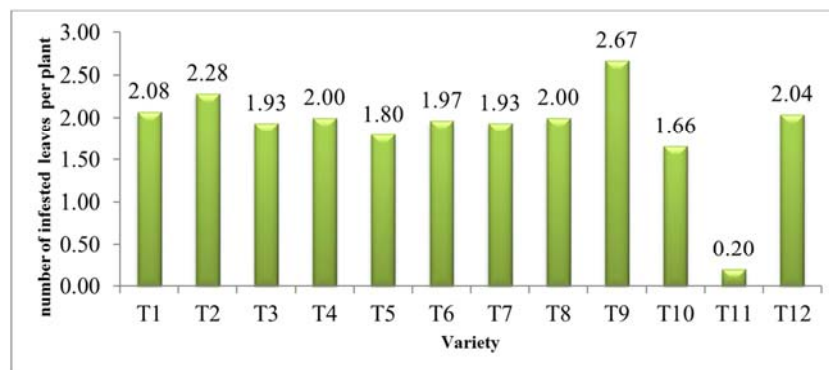


Figure 2. Infested leaves per plant on different varieties of roses.

The lowest mean number (0.20) of infested leaf was found in Sweet Love while the highest number of infested leaf was in Sweet Doll (2.67) variety of rose (Figure 2).

3.3. Number of Infested Branch per Plant

A significant variation was also observed on the number of infested branch per plant among the different varieties of rose. The lowest infested branch per plant (2.00, 1.67, 2.00, 1.67, 1.67, 1.33, 1.33, 1.00, 0.33 and 0.00 at 7, 14, 21, 28, 35, 42, 49,

56, 63, and 70 days, respectively) was found on variety of Sweet Love where the pest was more effective in case of highest tolerant was obtained by Sweet love. However, Sweet doll showed the highest infested branch per plant (4.00, 4.00, 3.67, 3.00, 3.00, 3.00, 2.67, 2.00, 1.67 and 1.00 at 7, 14, 21, 28, 35, 42, 49, 56, 63, and 70 days, respectively) was recorded (Table 3). The lowest mean number (1.30) of infested branch was found in Sweet Love while the highest number of infested branch was observed in Sweet Doll (2.80) variety of rose (Figure 3).

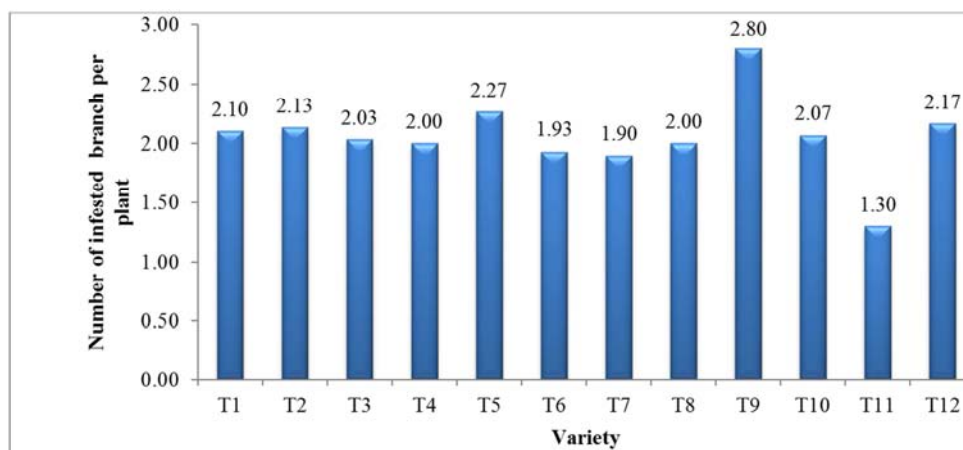


Figure 3. Infested branches per plant on different varieties of roses.

Table 3. The number of infested branches per plant on different varieties of roses at different days after pruning.

Number of Infested branch per plant										
Wild rose	7 days	14 days	21 days	28 days	35 days	42 days	49 days	56 days	63 days	70 days
Crazy love	3.33abc	4.00a	3.00b	2.33abc	2.00bc	1.67cd	1.33c	1.67ab	1.33ab	0.33ab
Yellow star	3.67ab	3.00bcd	2.67c	2.67ab	1.67c	2.33abc	2.00abc	1.33ab	1.00abc	1.00a
Missing love	3.00bcd	2.00ef	2.00e	2.00bc	2.00bc	3.00a	2.00abc	2.00a	1.33ab	1.00a
Compassion	3.00bcd	2.67cde	2.00e	2.67ab	1.67c	2.67ab	2.33ab	1.33ab	1.33ab	0.33ab
Charming lady	2.33de	3.67ab	2.67c	3.00a	2.67ab	2.00bcd	2.33ab	1.67ab	1.67a	0.67ab
Dream bangle	4.00a	2.67cde	2.00e	2.33abc	2.00bc	2.33abc	1.67bc	1.33ab	1.00abc	0.00b
Sleepy moon	2.67cde	2.33def	2.33d	2.00bc	2.33abc	2.00bcd	2.00abc	1.67ab	1.33ab	0.33ab
Sweet doll	2.67cde	2.00ef	3.00b	2.67ab	2.67ab	2.00bcd	2.00abc	2.00a	0.67bc	0.33ab
Moon light	4.00a	4.00a	3.67a	3.00a	3.00a	3.00a	2.67a	2.00a	1.67a	1.00a
Sweet love	3.00bcd	3.67ab	2.67c	2.33abc	2.00bc	1.67cd	2.00abc	2.00a	0.67bc	0.67ab
Mini moni	2.00e	1.67f	2.00e	1.67c	1.67c	1.33d	1.33c	1.00b	0.33c	0.00b
Wild rose	4.00a	3.33abc	2.67c	2.00bc	2.67ab	2.00bcd	2.33ab	2.00a	0.67bc	0.00b
LSD (0.05)	0.83	0.68	0.22	0.72	0.716	0.83	0.74	0.56	0.85	0.73
CV (%)	7.98	5.36	12.85	23.8	7.25	6.98	11.29	12.36	9.68	5.38

Means having similar letter(s) are statistically identical at 5% level of significance. Values are the mean of three replications.

3.4. Number of Infested Flower per Plant

A significant variation was observed on the number of infested flower per plant among different varieties of rose. The lowest infested flower per plant (1.67, 1.33, 1.00, 1.33, 1.33, 1.67, 1.00, 1.00, 0.67 and 0.00 at 7, 14, 21, 28, 35, 42, 49, 56, 63, and 70 days, respectively) was found on the variety of Sweet Love which may be graded as tolerant

variety. However, Sweet doll showed the highest number of infested flower per plant (3.67, 3.33, 3.00, 3.00, 32.67, 2.33, 2.67, 2.33, 1.33 and 1.00 at 7, 14, 21, 28, 35, 42, 49, 56, 63, and 70 days, respectively) (Table 4). The lowest mean number (1.10) of infested flower was found in Sweet Love whereas the highest number of infested flower was observed in Sweet Doll (2.53) variety of rose (Figure 4).

Table 4. The number of infested flowers per plant on different varieties of roses at different days after pruning.

Number of Infested flower per plant										
Wild rose	7 days	14 days	21 days	28 days	35 days	42 days	49 days	56 days	63 days	70 days
Crazy love	3.00abc	3.00ab	2.67ab	2.67ab	2.33a	2.67a	1.33cd	2.00ab	0.67a	0.33ab
Yellow star	2.00de	2.33bc	2.67ab	1.67cd	2.00ab	2.33a	2.00abc	1.00d	0.67a	0.00b
Missing love	2.67bcd	2.67abc	2.33ab	2.00bcd	2.67a	2.00a	2.00abc	2.00ab	1.00a	0.33ab
Compassion	3.00abc	3.00ab	2.67ab	2.67ab	1.33b	2.33a	1.33cd	1.33cd	1.00a	0.33ab
Charming lady	2.33cde	2.67abc	2.33ab	2.33abc	2.00ab	2.00a	2.00abc	2.00ab	1.00a	0.33ab
Dream bangle	3.33ab	2.67abc	2.33ab	2.33abc	2.33a	2.33a	1.33cd	1.67bc	1.00a	0.67ab
Sleepy moon	2.33cde	2.33bc	2.00b	2.00bcd	2.33a	2.67a	2.33ab	1.33cd	1.00a	0.00b
Sweet doll	3.00abc	3.00ab	2.33ab	2.00bcd	2.00ab	2.00a	2.00abc	2.00ab	1.00a	0.33ab
Moon light	3.67a	3.33a	3.00a	3.00a	2.67a	2.33a	2.67a	2.33a	1.33a	1.00a
Sweet love	2.00de	2.67abc	3.00a	2.33abc	2.00ab	2.67a	1.67bcd	2.00ab	1.00a	0.67ab
Mini moni	1.67e	1.33d	1.00c	1.33d	1.33b	1.67a	1.00d	1.00d	0.67a	0.00b
Wild rose	1.67e	2.00cd	1.00c	2.00bcd	2.67a	2.00a	2.00abc	1.00d	0.67a	1.00a
LSD _(0.05)	0.78	0.78	0.78	0.76	0.86	0.88	0.68	0.56	0.87	0.77
CV (%)	7.85	6.97	5.23	23.58	6.79	7.85	5.23	7.8	7.89	12.35

Means having similar letter(s) are statistically identical at 5% level of significance. Values are the mean of three replications.

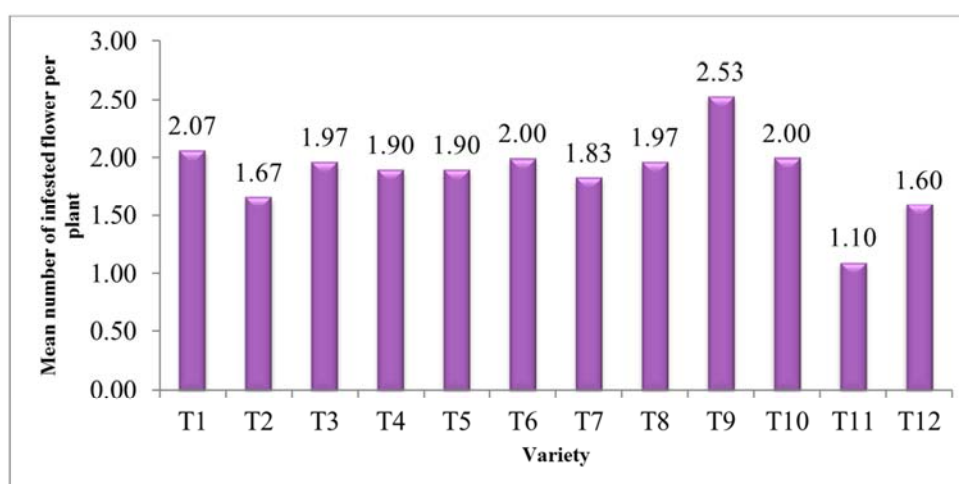


Figure 4. Number of infested flowers per plant on different varieties of roses.

4. Conclusion

From the results of the present study, it can be concluded that sweet love variety of rose had the lowest number of infested leaves per plant, infested branch per plant and lowest number of infested flower per plant due to lower incidence of insect pests among all varieties of rose. The variety sweet love might be graded as tolerant to pests. The variety sweet doll showed the lowest performance regarding the incidence of insect pests, the number of infested leaves, branches and flowers per plant of rose. The variety sweet doll might be graded as susceptible to insect pests.

References

- [1] Stroom, K., Fetzer, J. and Krischik, V. (1997). Insect Pests of Roses. Minnesota extension service. University of Minnesota College of Agricultural, food and Environmental Sciences. FO-6953-D.
- [2] Reddy, E. S. G. (2005). Comparison of pest incidence and management strategies on capsicum and tomato grown under protected and open field cultivation. Ph.D Thesis, University of Agricultural Sciences, Bangalore, India.

- [3] Reddy, E. S. G., and Kumar, K. N. K. (1999). Integrated management of two spotted spider mite, *Tetranychus urticae* (Koch) on tomato grown under poly house, Pesticide Res. J., 18, 162–165.
- [4] Dhooria M. S. (2006), Two spotted spider mite, *Tetranychus urticae* a serious pest of roses in polyhouses and its control, J. Acarol., 14, 84–87.
- [5] Rani J. B. and Sridhar V. (2005). Bio-efficacy of a new acaricide, bifenazate against the two spotted spider-mite, *Tetranychus urticae* Koch on rose under protected cultivation, J. Ornamental Hort., 8, 59–61
- [6] Dhananjaya K. K. S. (2007). Incidence and management of mites and thrips of rose under naturally ventilated Polyhouse condition. Ph.D thesis submitted to University of Agricultural Sciences, Dharwad, India.
- [7] Ohlendorf, B. P. (1985). Integrated pest management for almonds. Univ. of California Div. Agr. And Natural Res. Publ. 3308 Gomez, K. A. and Gomez, A. A. (1984). Statistical procedures for agricultural Research 2nd edition. Jony Wiley and Sons Inc.
- [8] Hole, U. B. and Salunkhe, G. N. (2005). Studies on relative resistance of rose cultivars to two spotted spider mite (*Tetranychus urticae* Koch). Journal of Maharashtra Agricultural Universities 30 (3): 316-317.
- [9] McCaffery, A. R.; King, A. B. S.; Walker, A. J. and Nayir, H. (1989). Resistance to synthetic pyrethroids in *Heliothis armigera* in Andhra Pradesh, India. Pesticide Science, 27 (1): 65-76.
- [10] UNDP, (1988). Office of Civil Rights, Room 326-W, Whitten Building, 1400 Independence Avenue, SW, Washington, DC 20250-9410 or call 202-720-5964 (voice and TDD).
- [11] Gomez, K. A. and Gomez, A. A. (1984). Statistical procedures for agricultural Research 2nd edition. Jony Wiley and Sons Inc.