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RESIDUAL EFFECT OF PRE-HARVEST SPRAY OF MH AND STORAGE CONDITIONS OF BULBS FOR SUCCEEDING CROP OF SPIDER LILY (*Hymenocallis littoralis* L.) CV. LOCAL

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ABSTRACT : The experiment to find out residual effect of pre-harvest spray of MH and storage conditions of bulbs for succeeding crop of spider lily (*Hymenocallis littoralis* L.) cv. Local was carried out at Department of Horticulture, College of Agriculture, Junagadh Agricultural University, Junagadh during 2012-2013. The experiment consisted of six levels of pre-harvest MH spray with four levels of storage conditions and it was laid out in Factorial Randomized Block Design (FCRD) with three replications. Minimum days taken to sprouting, maximum number of leaves at 1st flowering stage and leaf area were found in control (no maleic hydrazide spray, and bulbs stored in plastic carets at an ambient temperature). But, minimum days to first flower emergence were found in control (no maleic hydrazide spray) and net bags at an ambient temperature. Maximum plant height at 1st flowering stage was found in the MH 500 ppm with net bags at an ambient temperature. Maximum length of flower stalk was found in the MH 500 ppm with plastic carets at an ambient temperature. Maximum chlorophyll content in leaves, number of flower stalks/plant, number of flowers harvested per net plot and yield of flowers were found in MH 3000 ppm with plastic carets at an ambient temperature.

Key words : *Spider lily bulbs, field planting, pre- harvest MH spray, storage conditions,*

Spider lily (*Hymenocallis littorallis* L.) is native to South America and belongs to the family Amaryllidaceae. It is bulbous ornamental plant which grows upto 45-60 cm tall. It has long, broad and strap shaped light green leaves. It is cultivated for its white, fragrant spidery shaped flowers for varied used as loose flower for making decoration, bridal car decoration, bouquets preparation etc. An umbel produced 9-10 flowers on its head. 2-3 flower umbels are produced at a time on a single well developed plant. It is suitable for growing in the field as well as in pots. Also as cut flower it is attractive but the flowers do not last long. These are most suitable as plants for border plantings in the greenhouse, alongside the boundary walls and water channels, in herbaceous border, alongside the lawn and also in beds in the gardens but these prefer sunny situations. As they are propagated through bulbs, during storage pre-planting sprouting and decay of bulbs are the serious problems. MH is a growth-regulatory substance that disrupts cell division. It spreads upwards and downwards in stored bulbs and it suppresses sprouting and root growth. MH penetrates extensively into the plant and is transported in the phloem to actively growing tissues including the bulbs and tubers. Residues persist in these parts sufficiently to induce dormancy and hamper sprouting for fairly.

MATERIALS AND METHODS

The experiment was carried out at Department of Horticulture, College of Agriculture, Junagadh Agricultural University, Junagadh during 2012-2013. Three years old standing crop of spider lily was selected for pre harvest treatments. During the pre harvest spray the standing crop was under rest (leg phase of flowering). Spray of maleic hydrazide (MH) at different concentration was done as per treatments, one month before uplifting of bulbs. The bulbs were carefully dug out and uplifted and cleaned and separated from upper plant portion. Bavistin as fungicide treatment was given to these bulbs before storage for five months period. The experiment consisted of six levels of pre-harvest MH spray *i.e.,* P0- Control (No MH treatment), P_1- 500 ppm, P_2- 1000 ppm, P_3- 2000 ppm, P_4- 3000 ppm and P_5- 4000 ppm MH with four levels of storage conditions S_1- Plastic carets at 12°C, S_2- Net bags at 12°C, S_3- Plastic carets at an ambient temperature and S_4- Net bags at an ambient temperature. Five months stored bulbs were planted in the field according to the treatment combinations to see the residual effect of MH and

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storage conditions on vegetative growth, flowering behaviour flower quality and flower yield.

RESULTS AND DISCUSSION

Effect of Pre-Harvest Spray of MH

Vegetative parameters

Days taken to bulbs sprouting were maximum (35.58 days) in 4000 MH which was found at par with 1000 to 3000 ppm MH. The earliest sprouting (27.42 days) was noticed in control (P_0). This may be due to fact that the MH spray had suppressed the activity of GA_3, which is growth promoter and might be resulted in delayed in sprouting (Weaver, 7). The height of plant was decreased linearly with every increase in concentration of MH. The maximum plant height of 30.25 cm was recorded with spray of 500 ppm MH (Table 1). Minimum plant height at 1st flowering stage (17.08 cm) was found in the MH 4000 ppm (P_5) which was at par with MH 3000 and 2000 ppm. The suppression in plant height might be due to residual effect of MH which inhibited to sprouting and shoot growth of modified plant organs on storage (Wittwer *et al.,* 8). Delay in flowering and reduced plant height due to exogenous application of growth retardants like ethrel as reported by Kumar and Singh (2) also confirms the present findings. Similarly, number of leaves at 1st flowering stage as well as leaf area were also decreased linearly with every increase in MH concentration. The maximum number of leaves (6.61) and maximum leaf area (330.75 cm^2) were found in control (P_0) which was at par with P_1 and P_2. This might be due to good plant growth at low level of growth inhibitors like MH as pre-harvest spray which might had increased sink levels and subsequently resulted in maximum number of leaves (Raja and Palanisamy, 4; Weaver, 7). The maximum chlorophyll content (55.37µg/g) was found with MH 3000 ppm (P_4) being at par with P_5 confirming to the reports of Dhua *et al.* (1).

Flowering parameters

A perusal of data (Table 2) revealed that days to first flower emergence was significantly lowest (40.86 days) in control. This might be due to good plant growth in absence of MH, a growth retardant, might had increased sink level and subsequently in early flower emergence which are in line of Raja and Palanisamy (4) in tuberose. Maximum number of flower stalks/plant (9.27) was found in MH 3000 ppm (P_4). The results showing effectiveness of MH treatment which might have kept stored bulbs healthy and sufficient food reserve and acceleration of flowering

Table 1: Effect of pre harvest spray of MH and storage conditions of bulbs on growth parameters during succeeding crop of spider lily.

Treatment	Storage condition				
	Days taken to sprouting (days)	Plant height at first flowering (cm)	Number of leaves at 1st flowering	Leaf Area (cm^2)	Chlorophyll content (µg/g)
Pre-harvest spray treatments					
P_0- 0 (control)	27.42	28.58	6.61	330.75	43.59
P_1- 500 ppm MH	30.67	30.25	6.00	318.75	49.31
P_2- 1000 ppm MH	34.17	25.42	5.91	300.40	49.23
P_3- 2000 ppm MH	34.25	19.02	5.82	278.69	52.11
P_4 - 3000 ppm MH	34.50	18.42	5.74	292.31	55.37
P_5- 4000 ppm MH	35.58	17.08	5.24	277.69	54.08
C. D. (P=0.05)	2.26	5.13	0.75	34.47	5.28
Storage conditions					
S_1- Plastic carets at 12ºC	37.50	20.17	5.29	284.99	48.16
S_2- Net bags at 12ºC	37.78	21.06	5.49	292.21	48.68
S_3- Plastic carets at ambient temp.	24.72	22.72	6.51	325.26	55.79
S_4- Net bags at an ambient temp.	28.17	28.56	6.31	296.21	49.76
C. D. (P=0.05)	1.85	4.19	0.61	28.14	4.31
Interactions: P × S					
C. D. (P=0.05)	NS	NS	NS	NS	NS
C.V.%	8.40	10.66	15.54	13.98	12.70

Table 2 : Effect of pre harvest spray of MH and storage conditions on flowering parameter of during succeeding crop of spider lily.

Treatment	Storage condition					
	Days to first flower emergence	Number of flower stalks / plant	Length of flower stalk (cm)	Number of flowers / plant	Number of flowers harvested/ net plot (1.80 × 0.9 cm^2)	Yield of flowers harvested (bundles/ha)
Pre-harvest spray treatments						
P_0- 0 (control)	40.86	7.96	53.39	89.32	535.92	62518
P_1- 500 ppm MH	42.25	8.01	57.28	92.32	552.72	64481
P_2- 1000 ppm MH	41.93	7.88	54.28	91.96	551.76	64372
P_3- 2000 ppm MH	41.46	8.03	49.05	93.71	562.26	65597
P_4 - 3000 ppm MH	48.83	9.27	48.91	106.98	641.88	74886
P_5- 4000 ppm MH	47.50	8.23	49.05	102.01	612.06	69305
C. D. (P=0.05)	5.66	0.91	5.57	9.54	38.12	8850
Storage conditions :						
S_1- Plastic carets at 12ºC	48.72	7.72	49.38	89.24	589.44	62470
S_2- Net bags at 12ºC	47.67	7.33	51.47	86.27	517.62	60392
S_3- Plastic carets at ambient temp.	41.23	8.88	54.37	109.76	658.56	76830
S_4- Net bags at an ambient temp.	37.60	7.80	52.85	99.02	594.12	67123
C. D. (P=0.05)	4.62	1.04	NS	11.51	72.02	2636
Interactions: P x S						
C. D. (P=0.05)	NS	NS	NS	NS	NS	NS
C.V.%	15.70	13.79	12.79	10.13	11.25	15.60

might be due to increased amount of endogenous MH like substances and also better development of flower primordials. This might be due to its effect on causing growth of several bud primordial (Singh *et al.,* 5).Reduction in flower stalk length and increase in number of flower stalks due to application of ethrel (Umrao *et al.*, 6) confirms present results. Length of flower stalk was maximum (57.28cm) with MH 500 ppm (P_1) and the length of flower stalk was decreased by increasing levels of MH. The results are in consonance with Maurya and Nagda (3). Whereas, number of flowers/ plant (106.98) and number of flowers harvested per net plot (641.88) were highest in MH 3000 ppm (P_4) but it was found at par with 4000 ppm (P_5). Here, MH might had been absorbed and stopped cell division but not cell expansion. Effective means of controlling sprouting and moisture loss during long term cold storage of bulbs and these healthy and vigorous bulbs might be expressed maximum number of flowers due to stimulation of endogenous substances in the treated plants. Similarly, highest yield of flowers harvested (74886 bundles/ha) was obtained with MH 3000 ppm (P_4) being at par with P5. This might be due to its effect on causing growth of several buds primordial; hence, number of flowers per plant and number of flower stalks per plant are converted in to maximum yield per hectare.

Effect of Storage Conditions

Vegetative parameters

The pre harvest MH treated bulbs when stored in plastic carets at an ambient temperature (S_3) resulted in positive outstanding in most of the vegetative parameters (Table 1) when these bulbs are planted in field. Days taken to sprouting (24.72 days) were significantly minimum in plastic carets at an ambient temperature (S_3). Plant height at 1^{st} flowering stage (28.56 cm) was significantly highest in net bags at an ambient temperature (S_4). Significantly maximum number of leaves at 1st flowering stage (6.51) and leaf area (325.26 cm^2) were found the highest in bulbs stored in plastic carets at an ambient temperature (S_3). This storage condition kept bulbs more healthy and viable for next generation. Bulbs storage in net bags at ambient conditions (S_4) might had decreased growth inhibitors, ultimately resulted in maximum leaf area. Chlorophyll content was found maximum (55.79 µg/g) in plants grown from bulbs stored in plastic carets at an ambient temperature (S_3). This might be due to decrease in food material in bulbs during summer and

stored for four to six months in ambient condition of high temperature and high humidity due to monsoon rains. During this period, the bulbs sprout very easily and development of chlorophyll content in leaves might get congenial condition in field grown lily plants.

Flowering parameters

Packing of bulbs in different type of bags had also exhibited significant effects on flowering parameters (Table 2). Significantly the earliest flower emergence (37.60 days) was observed in bulbs stored in net bags at an ambient temperature (S_4).Packing of bulbs in plastic carets (S_1) delayed first flower emergence by about 10 days over S_3. Maximum number of flower stalks/plant (8.88) and maximum length of flower stalk (54.37 cm) as well as number of flowers/ plant (109.76) were found in bulbs packed in plastic carets and stored at an ambient temperature (S_3). This might be due to good plant growth had increased sink level and subsequently resulted in early floret emergence (Dhua *et al.,* 1). Maximum number of flowers harvested per net plot (658.56) was highest in bulbs packed in plastic carets and stored under ambient temperature (S_3), but it was at par with (S_4). Similarly, highest yield of flowers harvested (76830 bundles/ha) was found in bulbs stored in plastic carets at an ambient temperature (S_3).

From foregoing discussion, it can be inferred that for better growth, flowering and flower yield of spider lily under field condition, the pre-harvest spray of MH 3000 ppm was found best when bulbs were stored in plastic carets at an ambient temperature having good circulation of air in the store room during five months of storage.

REFERENCES

1. Dhua, R. S., Ghosh, S. K., Mitra, S. K., Yadav, L. P. and Bose T. K. (1987). Effect of bulb size, temperature treatment of bulbs and chemicals on growth and flower production in tuberose (*Polianthes tuberosa* L.). *Acta Hort.,* **205**. 121-128.
2. Kumar, V. and Singh, R.P. (2005).Effect of soaking of mother corms with plant growth regulators on vegetative growth, flowering and corm production in gladiolus. *J. Orna. Hort.,* **8** (4): 306-308.
3. Maurya, R. P. and Nagda, C. L. (2002). Effect of growth substances on growth and flowering of gladiolus (*Gladiolus grandiflorus* L.) cv. 'Friendship'. *Haryana J. Hortic. Sci.,* **31** (3&4): 203-204.
4. Raja, K. and Palanisamy, V. (2001). Effect of dormancy breaking treatments of bulbs to enhance early emergence in tuberose. *Madras Agric. J.,* **88** (4/6): 338-339.
5. Singh, A., Kumar, J. and Kumar, P. (2008). Effects of plant growth regulators and sucrose on post harvest physiology, membrane stability and vase life of cut spikes of gladiolus. *Plant Growth Regul.,* **55**(3): 221-229.
6. Umrao, V.K., Singh, R.P. and Singh, A.R. (2006). Influence of ethrel and sand on growth and corm yield of gladiolus cv. Congo Song. *Prog. Agric*., **6** (2): 143-145.
7. Weaver, R. J. (1972). *Plant Growth Substances in Agriculture.* W. H. Freeman and Company. San Francisco. pp. 106-179.
8. Wittwer, S. H., Sharma, R. C., Weller, L. E. and Sell, H. M. (1950). The effect of pre-harvest foliage sprays of certain growth regulators on sprout inhibition and storage quality of carrots and onions. *Plant Physiol.,* **25**: 539-549.

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