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Evaluation of different genotypes of Peruvian lily (*Alstroemeria hybrida* L) under Nauni, Solan, Himachal Pradesh conditions

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ABSTRACT

The present investigations were carried out at the experimental farm of Department of Floriculture and Landscape Architecture, Dr YS Parmar University of Horticulture and Forestry, Nauni, Solan, Himachal Pradesh during 2014-2015 and 2015-2016. The experiment was laid out in a completely randomized block design with three replications under protected conditions consisting of nine alstroemeria cultivars viz Aladdin, Capri, Cinderella, Pink Panther, Pluto, Piantum, Riana, Serena and Tiara. Based on two years performance and pooled data cultivars Cinderella, Pink Panther, Serena and Capri can be recommended for cultivation under mid-hills of the state.

Keywords: Evaluation; alstroemeria; genotypes; flowering; polyhouse conditions

INTRODUCTION

Alstroemeria (*Alstroemeria hybrida* L) is a recent introduction into the world's floriculture scene and has become a major cut flower. It is commonly known as Peruvian lily and Inca lily (Bailey 1976) and all commercial cultivars available at present are hybrids. It belongs to the family Alstroemeriaceae and has originated from South America especially Chilli, Peru and Brazil and is represented by around 90 species that occupy a diverse range of habitats from sea level to 4500 m altitude. In 1714 Feuillee discovered alstroemeria in Chile and registered it under the genus Hemerocallis. Alstroemeria is named after Swedish botanist Baron Klas Van Alstromer who collected seeds of this flower from Spain in 1753 which in fact came from Chile and Brazil in South America. Later he bought this plant and introduced it in Europe. The name alstroemeria was given by Linnaeus in 1762 (Aker and Healy 1990). Linnaeus combined the information of Feuillee and Alstromer and named the genus *Alstroemeria* and described three species (Buitendijk 1998).

Though it is an important exotic rhizomatous perennial cut flower crop but can also be used as potted flowering plant for the home and as a herbaceous landscape plant for the mild climates. Flower colours range from white to dark yellow to various shades of pink, violet, purple and red. Yellow throats and black dots at the base of the petals and throats are a trademark of alstroemeria (Healy and Wilkins 1985). Vase life of cut flowers is nowadays one of the most important criteria in evaluation of the newly bred cultivars. Due to its good postharvest longevity (up to 2-3 weeks) and a wide colour palette, alstroemeria became one of the most popular cut flowers advancing in 2007 to the sixth position in the rank of 10 most important cut flowers sold by Dutch flower auctions (Yeat et al 2012). It is commonly grown in Netherlands, Colombia, USA, England, Kenya, Japan etc. Alstroemeria flowers are third in terms of popularity and foreign exchange earnings in Kenya after roses and statice. In India alstroemeria was introduced in 2001 by the Ministry of Agriculture, GoI under FAD programme at three Model Floriculture Centres namely Ooty (Tamil Nadu), Chail (Himachal Pradesh) and Srinagar (Jammu and Kashmir). In Himachal Pradesh mid- and high-hills are suitable for growing alstroemeria. It is a potential, low volume and high value crop for hill horticulture. In Himachal Pradesh it showed encouraging results at model floriculture farm, Mahog

Bagh (Chail) and at the department of Floriculture and Landscape Architecture, Nauni, Solan. Nowadays with the increase in economic importance of ornamentals in many countries the international demand for alstroemeria flowers has also rapidly expanded. Since it is comparatively a new cut flower crop for India many private companies, farmers and cooperatives are importing its planting material from abroad. Therefore it has become inevitable to evaluate new cultivars for their qualitative and quantitative characters to identify and finally to recommend the suitable cultivars for the agro-climatic conditions of India so as to match the demand of both the domestic and international markets. Hence the present investigations were carried out to evaluate the performance of different alstroemeria cultivars under Nauni, Solan, Himachal Pradesh conditions.

MATERIAL and METHODS

The present investigations were carried out at the experimental farm of Department of Floriculture and Landscape Architecture, Dr YS Parmar University of Horticulture and Forestry, Nauni, Solan, Himachal Pradesh during 2014-15 and 2015-16 which is situated in hilly area of western Himalayas at an altitude of 1270 m amsl having latitude of 30°520" N and longitude of 77°1130" E. The climate of the area is typically semi-temperate. The experiment was laid out in a completely randomized design with three replications under protected conditions consisting of nine cultivars viz Aladdin, Capri, Cinderella, Pink Panther, Pluto, Piantum, Riana, Serena and Tiara (Plate 1).

The selected healthy and disease free plants of alstroemeria (*Alstroemeria hybrida* L) were planted at a spacing of 50 x 50 cm with a density of four plants per plot having a size of 1 x 1 m containing a growing substrate consisting of sand + soil + FYM (1:1:1, v/v) in the polyhouse in October 2014. Before planting decomposed FYM @ 5 kg/m^2 was applied to maintain the good plant health and obtaining best quality flowering stems. After planting of rhizomes beds were drenched with fungicides. Besides to check the infestation of white flies one yellow trap was placed per plot. The standard cultural practices were followed to raise a successful crop which included irrigation, wiring for support of plants, weeding, hoeing, removal of unwanted shoots etc. In the year 2015 when flowering was over and stems became yellow the plants were cut from the base to encourage the crop for the second year ie 2016. The data were analyzed using the analysis of variance (ANOVA) technique given by Gomez and Gomez (1984).

RESULTS and DISCUSSION

Data given in Table 1 show that during 2014-15 maximum plant height was obtained in cultivar Cinderella (129.66 cm) which was at par with that of Pluto (124.00 cm) whereas minimum was found in Capri (94.00 cm). In the year 2015-16 maximum plant height was obtained in cultivar Serena (156.33 cm) and minimum in Tiara (87.66 cm). Similar trend was found for interaction between year x cultivar. On pooling of data maximum plant height was obtained in cultivar Cinderella (135.50 cm) and minimum in Piantum (97.83 cm). Plant height was also found maximum in Cinderella followed by Serena during 2011-12 under Solan–Nauni conditions (Anon 2012). Cinderella was found to be the best cultivar producing maximum number of flowering shoots in the year 2014-15 (39.00) and in pooled estimation (39.83) followed by Pink Panther (39.00 cm). Maximum flowering shoots were also found in Cinderella and Pink Panther during 2012-13 at Solan centre (Anon 2013). However in the year 2015-16 maximum number of flowering shoots was recorded in Serena (47.66) which was found at par with cultivar Pink Panther (44.00). Minimum number of flowering shoots was recorded in Tiara during both the years and in pooling of data (11.33, 13.66 and 12.50 respectively). In case of interaction year x cultivar, maximum number of flowering shoots was recorded in Serena (47.66) during 2015-16 and minimum in Tiara during 2014-15 (11.33). Similar results were obtained by Singh (2006) in alstroemeria cultivar Serena. During 2014-15 maximum number of leaves was obtained in Pluto (37.66) and minimum in Serena (22.33). In 2015-16 maximum number of leaves was obtained in cultivar Aladdin (39.33) and minimum in Riana (26.00). Interaction, year x cultivar was found to be non-significant.

Data presented in Table 2 show that maximum leaf width was recorded in cultivar Riana (3.60 cm) in the year 2014-15 and pooled data (3.10 cm). In the year 2015-16 leaf width was maximum in cultivar Piantum (3.50 cm) and minimum in Pink Panther (1.36 cm). Under interaction year x cultivar, maximum leaf width was recorded in cultivar Riana (3.60 cm) during 2014-15 and minimum in Pink Panther (1.36 cm) during 2015-16. Non-significant differences for leaf length were observed among different alstroemeria cultivars in 2014-15. In the year 2015-16 maximum leaf length

Aladdian

Capri

Cinderella

Piantum

Pink Panther

Pluto

Riana

Serena

Tiara

Plate 1. Alstroemeria cultivars selected for evaluation at Solan Centre

Table 1. Performance of different genotypes of alstroemeria wrt plant height, number of shoots and number of leaves

Cultivar	Plant height (cm)			Number of flowering shoots (cm)			Number of leaves		
	2014-15	2015-16	Pooled	2014-15	2015-16	Pooled	2014-15	2015-16	Pooled
Aladdin	107.66	118.00	112.83	18.66	24.00	21.33	35.66	39.33	37.50
Capri	94.00	113.00	103.50	21.66	38.00	29.83	30.00	30.66	30.33
Cinderella	129.66	141.33	135.50	39.00	40.66	39.83	33.00	34.33	33.66
Pink Panther	111.66	116.66	114.16	34.00	44.00	39.00	27.33	28.00	27.66
Pluto	124.00	100.33	112.16	13.00	20.66	16.83	37.66	35.66	36.66
Piantum	100.33	95.33	97.83	13.00	14.33	13.66	23.66	32.33	28.00
Riana	110.33	88.00	99.16	19.66	35.66	27.66	24.66	26.00	25.33
Serena	97.33	156.33	126.83	26.00	47.66	36.83	22.33	27.66	25.00
Tiara	116.66	87.66	102.16	11.33	13.66	12.50	30.00	28.33	29.16
Mean	110.18	112.96	-	21.81	30.96		29.37	31.37	-
$CD_{0.05}$									
Cultivar	7.04	13.05	7.13	6.72	3.96	5.51	9.57	6.31	3.7
Year			NS			2.60			1.7
Year x cultivar			10.08			7.80			NS

Table 2. Performance of different genotypes of alstroemeria wrt leaf width, leaf length and number of buds

Cultivar	Leaf width (cm)			Leaf length (cm)			Number of buds		
	2014-15	2015-16	Pooled	2014-15	2015-16	Pooled	2014-15	2015-16	Pooled
Aladdin	2.30	1.93	2.11	12.73	12.00	12.36	10.66	15.66	13.16
Capri	2.26	2.30	2.83	10.93	11.86	11.40	15.33	18.00	16.66
Cinderella	1.70	1.60	1.65	10.50	9.23	9.86	15.66	21.66	18.66
Pink Panther	2.33	1.36	1.85	11.83	10.53	11.18	18.33	18.66	18.50
Pluto	2.03	2.23	2.13	11.00	9.90	10.45	11.00	11.00	11.00
Piantum	2.33	3.50	2.91	11.00	14.43	12.71	16.00	16.00	16.00
Riana	3.60	2.60	3.10	13.13	11.26	12.20	14.33	16.00	15.16
Serena	2.73	1.96	2.35	16.66	10.70	13.68	15.66	21.33	18.50
Tiara	1.76	1.90	1.83	10.83	9.73	10.28	12.00	15.33	13.66
Mean	2.34	2.15	-	12.07	11.07	-	14.33	17.03	-
$CD_{0.05}$									
Cultivar	1.01	0.33	0.51	NS	0.93	2.17	2.31	3.53	2.03
Year			NS			NS			0.95
Year x cultivar			0.72			3.07			2.87

was recorded in cultivar Piantum (14.43) and minimum in Cinderella (9.23 cm). Under pooled data cultivar Serena (13.68) resulted in longer leaves and shorter leaves were observed in cultivar Cinderella (9.86 cm). Among interactions maximum leaf length was recorded in Serena (16.66 cm) during 2014-15 and minimum in Cinderella (9.23 cm) in the year 2015-16. It is evident from the data that maximum number of buds was recorded in cultivar Pink Panther (18.33) during 2014-15 whereas minimum in Aladdin (10.66). During 2015-16 and interaction maximum number of buds was recorded in cultivar Cinderella (21.66) and on pooling also (18.66) whereas minimum number of buds was recorded in cultivar Pluto (11.00) during both years along with pooled estimation.

The data presented in Table 3 reveal that maximum bud size (4.91 cm) was recorded during the year 2015-16 as compared to 2014-15 (4.33 cm). During 2014-15 non-significant differences were recorded for bud size of different cultivars. Bud size was maximum (5.10 cm) in Aladdin during 2015-16 and minimum in Cinderella (4.33 cm). On pooling of data maximum bud size was observed in cultivars Aladdin and Riana (4.76 cm). Under interaction year x cultivar, maximum bud size was recorded in cultivar Aladdin (5.10 cm) during 2015-16 and minimum in Pluto (3.76 cm) during 2014-15.

Data also show that maximum size of flowers was recorded in cultivar Pink Panther (6.66, 6.86 and 6.76 cm) in both the years and pooled estimation respectively. Maximum size of flowers was observed in Pink Panther by Kalimpong Centre during 2014-15 (Anon 2015). Minimum flower size was recorded in cultivar Piantum and Capri (5.13 cm) during 2014-15 and cultivar Piantum (4.60 cm) during 2015-16 along with pooled estimation (4.86 cm). Interaction between year x cultivar showed that maximum flower size was recorded in cultivar Pink Panther (6.86 cm) and minimum in Piantum (4.60 cm) during 2015-16. Data regarding flower colour of different cultivars of alstroemeria as recorded by RHS colour chart are also presented in Table 3.

CONCLUSION

Based on two years performance and pooled data among different cultivars of alstroemeria, Cinderella, Pink Panther, Serena and Capri can be recommended for cultivation under mid-hills of Himachal Pradesh. However other cultivars dicussed in the paper can be grown for their novel colours.

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Table 3. Performance of different genotype of alstroemeria wrt size of buds and size and colour of flowers

Growing medium	Size of bud (cm)			Size of flower (cm)			Colour of flower (2014-2016)
	2014-15	2015-16	Pooled	2014-15	2015-16	Pooled	
Aladdin	4.43	5.10	4.76	6.26	6.66	6.46	Yellow orange group 17B
Capri	4.20	4.90	4.55	5.13	5.16	5.15	Red group 51B
Cinderella	4.13	4.33	4.23	5.78	5.43	5.60	Red purple group 65A
Pink Panther	4.33	4.66	4.50	6.66	6.86	6.76	Red purple group 73D
Pluto	3.76	4.93	4.35	6.13	5.63	5.88	Yellow orange group 17B
Piantum	4.30	4.93	4.61	5.13	4.60	4.86	Yellow orange group 14B
Riana	4.83	4.70	4.76	5.76	5.03	5.40	Red purple group 73B
Serena	4.46	4.80	4.63	5.86	5.03	5.45	Red purple group 64A
Tiara	4.53	4.86	4.69	6.06	5.63	5.85	Red group 44A
Mean	4.33	4.91	-	5.86	5.56	-	-
$CD_{0.05}$							
Cultivar	NS	0.27	0.32	0.49	0.20	0.27	
Year			0.15			0.12	
Year x cultivar			0.46			0.38	

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