



# Plant Archives

Journal homepage: <http://www.plantarchives.org>  
 DOI Url : <https://doi.org/10.51470/PLANTARCHIVES.2023.v23.no1.011>

## CHARACTERIZATION AND EVALUATION OF FEW GENOTYPES FROM THE COMPOSITE POPULATION OF *LIMONIUM SINUATUM*

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(Date of Receiving : 04-09-2022; Date of Acceptance : 13-12-2022)

### ABSTRACT

In the present study conducted in the Experimental Farm, Department of Horticulture, Assam Agricultural University in 2021-22, *Limonium sinuatum* cv. Pacific Mix was grown from which 4 component genotypes were derived. These genotypes were characterized and evaluated on the basis of their growth and floral characters. The experiment was laid in Randomized Block Design with 5 replications. Comparison of flower colours with the RHS colour chart showed that Genotype 1 flowers exhibited dark blue violet (93 B) colour, while those of Genotypes 2, 3 and 4 showed Medium yellow (3 A), White (155 D) and Medium violet blue (94 C) colours respectively. Genotype 1 recorded the maximum plant population (37.33 %) among the four genotypes. Genotype 2 recorded the maximum plant height (88.33 cm) and plant spread (54.33 cm). The maximum leaf production was recorded in genotype 1. Genotype 1 showed the earliest flowering (66.63 days), maximum number of spikes per plant (11.88), better Spike quality in terms of number of florets per spike (18.75), rachis length (3.63 cm), floret diameter (0.76 cm), stalk diameter (0.93 cm) and inflorescence diameter (7.22 cm). Genotype 2 recorded the maximum spike length (78.15 cm) and longest flowering duration (64.00 days).

**Keywords :** Characterization, evaluation, genotype, limonium and spike.

### Introduction

*Limonium sinuatum* L. is an important commercial flowering crop usually used as a dry flower. It belongs to the family Plumbaginaceae and is commonly known as statice, notch leaf marsh rosemary, pink sea and sea lavender. It is also known as 'Everlasting flower'. *Limonium spp.* is an annual herb with a height of 50-90 cm, consisting of a slender leathery stems emerging from a basal rosette hairy leaves (Zhang *et al.*, 2015). The inflorescences are corymbose forming a panicle. The small funnel shaped white or yellow corolla of the true flower is surrounded by a colourful showy trumpet shaped calyx. Native to the Mediterranean region, *Limonium* is distributed widely in different regions of the world especially on saline and desert environments (Steven, 2008). Due to its attractive papery calyx which dry easily and retain their original colour for a long period, statice is ideally suited for dry flower arrangement, wreaths, potpourri and as well as fresh cut filler flowers. It is also found to be suitable as bedding plant and in herbaceous borders in the landscape gardens. The available varieties produce flowers with pastel colours ranging from yellow, purple, white, purple, etc. Statice, along with *Helichrysum*, *Globe amaranth*, *Gypsophila* etc. are increasing demand in the global dry flower market abroad as well as India for large scale production due to attractive flowers and able to retain its original colour. Statice is a newly introduced flower crop in India. Commercial cultivation of statice for

dried flowers by small and medium farmers can prove to be a sustainable livelihood option and will definitely contribute to the economy of the country. The yield and quality of statice is influenced by the variety selected (Bhurci *et al.*, 2006), (Nataraj *et al.*, 2009), (Mellesse *et al.*, 2013).

A composite variety is a variety developed by mixing the seeds of the different genotypes with superior characters. By cultivating a composite mixed variety, enterprising flower growers can effortlessly obtain flowers with multiple attractive colours in the same time and effort, instead of investing in different varieties having single flower colours.

### Materials and Methods

The present study was carried out in Experimental Farm, Department of Horticulture, AAU, Jorhat, Assam (26° 43' N, 94° 12' E, 86.6 m amsl) during the Rabi season of 2021-22. The experiment was laid out in Randomised Block Design (RBD) with 5 replications. A mix variety of Statice var. Pacific mix were taken for study. The seeds were sown in the nursery bed in the 1<sup>st</sup> week of November, 2021. One month old seedlings from the nursery were transplanted in the main field in rows at a distance of 30cm from plant to plant where each row serves as a replication. When the flowers started to show their colours, the flower colours of individual genotypes from the composite population were compared using Royal Horticultural Society (RHS) colour chart (Table 1). The plants were also evaluated for the

growth and floral characters. The 4 genotypes were denoted as genotype 1: LG1, genotype 2: LG2, genotype 3: LG3 and Genotype 4: LG4. Parameters such as population percentage, plant height, plant spread, number of leaves, days to first flowering, number of spikes per plant, spike length, rachis length, number of florets per spike, flowering duration, floret diameter, stalk diameter and inflorescence or corymb diameter were recorded during the growth period. The freshly cut spikes were made into bunches and were hung upside down in a cool dark place for 1 week till they were completely dried and turn papery. Colour intensity of the fresh as well as air dried calyxes and corolla was recorded by using the Royal Horticultural Society (RHS) Colour chart, in order to see if there was any noticeable change in colour after air drying.

**Table 1 :** Genotypes along with their flower colour recorded by using RHS colour chart.

Genotypes	Flower colour
LG1	Dark blue violet (93 B)
LG2	Medium Yellow (3 A)
LG3	White (155 D)
LG4	Medium violet blue (94 C)

## Results and Discussion

Table 2 showed that there is a significant difference in plant population percentage among the genotypes. The genotype LG1 recorded the maximum population percentage (37.33 %). However, the least population percentage (13.33 %) was observed in the genotype LG3.

**Table 2 :** Variation in Population percentage among the genotypes of *Stalice*.

Genotypes	Population (%)
LG1	37.33
LG2	28.00
LG3	13.33
LG4	21.33
CD (0.05)	7.06
S.Ed (±)	2.83

There was considerable variation in plant height of *Limonium sinuatum* cv. Pacific Mixed (Table 3) in the different genotypes. The tallest plants (88.33 cm) were recorded in LG1 (Dark blue violet flowers). On the other hand, the shortest plants (57.34 cm) was recorded in LG4 (Medium violet blue flowers) which was at par with LG1. The difference in plant height among the different genotypes might be due to the genetic variation among the genotypes. Plant height of limonium might be controlled by the genetic factor. Similar observations were reported by Nataraj *et al.* (2009) in *stalice*, Rathava *et al.* (2021) in *gomphrena*, and Patil *et al.* (2022) in *chrysanthemum*.

A perusal of Table 3 showed the significant influence of genotype on plant spread. LG2 (Medium Yellow flowers) recorded the maximum plant spread (54.33 cm) whereas LG3 (White flowers) recorded the minimum (36.67 cm) which is at par with LG4. The variation in plant spread among the different genotypes might be due to the variation in genetic-makeup among the genotypes. The results are in conformity with the findings of Nataraj *et al.* (2009) in *stalice*, Choudhary *et al.* (2014) in *marigold* and Bhusaraddi *et al.* (2022) in *french marigold*.

Leaf production in *Limonium sinuatum* cv. was found to be significantly influenced by the different genotypes (Table 3). The maximum number of leaves (75.00/plant) was recorded in LG1; the least (33.33/plant) was recorded in LG3. Variation in the leaf production might be determined by the genetic makeup of the individual component genotypes of cv. Pacific Mixed. Similar results were reported by Nataraj *et al.* (2009) in *stalice*.

**Table 3 :** Variation in vegetative parameters among the genotypes of *Stalice*.

Genotypes	Plant height (cm)	Plant spread (cm)	Number of leaves
LG1	57.67	46.25	75.00
LG2	88.33	54.33	45.67
LG3	67.55	36.67	33.33
LG4	57.34	37.00	60.65
CD (0.05)	4.34	5.33	13.42
S.Ed (±)	1.97	2.42	6.09

The earliest flowering (within 66.63 days of transplanting) was observed in LG1 (Dark blue violet flowers); this is statistically at par with LG4 (Medium violet blue flowers), blooming within 66.85 days after transplanting). Plants of genotype designated as LG3 (White flowers) took the maximum time to first flowering (as long as 73.70 days after transplanting). The variation in days to flowering among the different component genotypes of *stalice* cv. Pacific Mixed might be due to the genetic factor that influence the flowering.

Maximum number of spikes per plant (11.88) was produced by genotype LG1, followed by plants of LG2 (10.78). On the other hand, minimum number of spikes per plant (8.25) was recorded in LG4.

Significantly longer spikes (averaging 78.15 cm) were produced by plants of LG2 followed by LG3 (55.90 cm). However, the minimum spike length (53.50 cm) was recorded in LG4 which is at par with LG1 (53.75 cm).

Plants of genotype LG1 produced the longest rachis (3.63 cm length) as well as the maximum number of florets per spike (18.75). The minimum rachis length (2.78 cm) was recorded in LG2 whereas, the minimum number of florets per spike (8.23) was recorded in LG4.

Genotype LG1 recorded the maximum floret diameter (0.76 cm), inflorescence diameter (7.22 cm) and stalk diameter (0.93 cm). However, the genotype LG4 recorded the minimum floret diameter (0.63 cm) whereas, LG2 recorded the minimum inflorescence diameter (4.32 cm) and minimum stalk diameter (0.51 cm).

Maximum flowering duration (64.00 days) was recorded in the genotype LG2. On the other hand, the minimum flowering duration (54.95 days) was recorded in LG1 which is at par with LG3 (55.90 days).

The variation of floral characters (Table 4) among the different genotypes might be due to the genetic and environmental factor and might be the reason for variation. The similar observations were reported by Nataraj *et al.* (2009) in *stalice* cultivar Turbo white and Turbo carmine. Mellese *et al.* (2013) also reported good performance of *stalice* varieties Yellow Sun Bird and Giant Blue Bird.

**Table 4 :** Variation in floral parameters among the genotypes of *Statice*.

Genotypes	Days to first flowering	Number of spikes per plant	Spike length (cm)	Rachis length (cm)	Number of florets per spike	Floret diameter (cm)	inflorescence or corymb diameter (cm)	Stalk diameter (cm)	Flowering duration
LG1	66.63	11.88	53.75	3.63	18.75	0.76	7.22	0.93	54.95
LG2	69.25	10.78	78.15	2.78	11.00	0.69	4.32	0.51	64.00
LG3	73.70	9.65	55.90	3.53	11.40	0.69	5.94	0.69	55.90
LG4	66.85	8.25	53.50	3.13	8.23	0.63	5.36	0.53	57.83
CD (0.05)	2.42	0.84	4.80	0.37	3.49	0.05	1.14	0.06	3.49
S.Ed ( $\pm$ )	1.10	0.38	2.18	0.17	1.59	0.02	0.52	0.03	1.58

The colour intensity of the calyxes and corolla of fresh and air dried spikes of the different genotypes were presented in Table 5. In genotype LG1, the initial colour intensity of calyx (fresh cut spikes immediately after harvest) were observed to be Dark blue violet (93 B) with White (155 D) true flower. After air drying, the colour of outer petals faded slightly to Dark blue violet (93 C). In case of genotype LG2, colour intensity of both calyx as well as inner corolla of freshly harvested flowers were recorded to be Medium Yellow (3 A); no change in colour intensity was noticed after air drying for 1 week. LG3 produced flowers in which both

the calyx and corolla were determined to be White (155 D). Similarly, there was no change in colour after air drying. Lastly, plants of genotype LG4 produced flowers in which initial colour intensity of calyx was observed to be Medium violet blue (94 C) with white (155 D) corolla. The air dried calyxes faded to Light violet blue (94 D) while the colour of corolla remained unchanged.

The variation in the flower colour among the genotypes might be due to the genetic factor that regulates the production of different pigments in different genotypes.

**Table 5 :** Variation in flower colour intensity of fresh and air dried flowers.

Colour Intensity (RHS Colour chart)				
Genotypes	Initial colour (freshly harvested)		Colour after air drying	
	Calyx	Corolla	Calyx	Corolla
LG1	Dark blue violet (93 B)	White (155 D)	Dark blue violet (93 C)	White (155 D)
LG2	Medium Yellow (3 A)	Medium Yellow (3 A)	Medium yellow (3 C)	Medium Yellow (3 A)
LG3	White (155 D)	White (155 D)	White (155 D)	White (155 D)
LG4	Medium violet blue (94 C)	White (155 D)	Light violet blue (94 D)	White (155 D)

### Conclusion

From this experiment, it can be concluded that the vegetative as well as the floral characters showed significant variations among the different genotypes. Plants belonging to the genotype designated as LG1 producing flowers with outer petals showing colour intensity Dark blue violet (93 B) and white (155D) inner petals. This showed superiority in most of the floral characters such as earliest flowering, higher spike production, florets per spike, rachis length, floret diameter, inflorescence diameter and stalk diameter.

*Statice* can be easily cultivated in the soil and agroclimatic conditions of Assam as a winter season annual. Thus this crop can prove to be a boon for dried flower growers in Assam.

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