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Evaluation of different genotypes of gomphrena for their growth and flowering parameters under South Saurashtra region

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Abstract
The present investigation entitled "Evaluation of different genotypes of Gomphrena under South Saurashtra region" was carried out at Jambuvadi, Department of Horticulture, Junagadh Agricultural University, Junagadh during the year 2019-20. A field experiment was laid out in Randomized Block Design, with three replication and seven genotypes namely AGS 1, AGS 3, AGS 4, AGS 5, AGS 8, AGS 14 and Local genotype. Seven genotypes of Bachelor's button (*Gomphrena globosa* L.) were evaluated with an aim to identify suitable genotype based on different characters under South Saurashtra region. The results revealed that the maximum plant height (105.46 cm), number of branch (18.40), plant spread (57.80 cm), length of branches (72.51) and number of leaves per plant (3716.33) were observed in the genotype AGS 4. The minimum days to flower bud initiation (33.07), 50 per cent flowering (42.80) and first flower bud show its color (3.13 days) was noticed under genotype AGS 14 followed by genotype AGS 3 and AGS 4 and maximum days took in genotype AGS 8 with respect to days required for flower bud initiation (46.81), days for 50 per cent flowering (60.87) and days took for first flower bud show its color (6).

Keywords: gomphrena, evaluation, genotypes, quantitative and qualitative trait and vase life

Introduction
The gomphrena (*Gomphrena globosa* L.) or Bachelor's button is native to North America, South America, Myanmar and India. It is one of the hardiest plant known for its bright inflorescence. The genus belongs to the family Amaranthaceae having 65 genera and 900 species. About 18 genera and over 50 species have been reported from India. Bachelor's button is a leading commercial dry flower crop with immense export potential. It occupies seventh position in the world dry flower market. In India, it is grown in Karnataka, Tamil Nadu, Kerala and Andhra Pradesh. It is mainly used as a loose flower, for making garlands and as dry flower. It signifies special importance due to its hardiness, easy in cultivation, salability, short duration as well as their suitability in making of varied products like flower balls, wreath, bouquets, greeting cards and potpourri. Potpourri is a major segment in the global dry flower market. The crop can be grown in beds, borders, rockeries and pots. Mass planting is very effective and instead of using only one color, a combination of pink and white or magenta and white as contrasting color scheme should be planted. Pot grown plants are useful for indoor decoration. It is also grown for cut flowers which last long.

Materials and Methodology
The present investigation was carried out at the Jambuvadi farm, Department of Horticulture, Junagadh Agricultural University, Junagadh (Gujarat) during 2019-2020. Junagadh is situated in Saurashtra region of Gujarat state. Geographically, this place is situated at 21.50 N latitude and 70.50 E longitudes with an altitude of 60 meters above the mean sea level and 80 kilometers away from Arabian Sea. The soil of this region is classified as Vertic Ustochrepts. Physical and chemical properties of the soil of the experimental field were determined with pH 7.85. The experiment was conducted with seven genotypes of gomphrena with the objective to evaluate different genotypes of Gomphrena, to screen out the suitable genotypes for commercial cultivation under South Saurashtra region. A field experiment was laid out in Randomized Block Design, with three replication and seven treatments namely AGS 1, AGS 3, AGS 4, AGS 5, AGS 8, AGS 14 and Local genotype.

Results and Discussion

Vegetative parameter

Plant height: The AGS 4 genotype vigorous in growth terms of plant height was highest (105.46 cm), whereas the genotype AGS 14 was medium in terms of plant height (61.69 cm). These variation in plant height due to the fact that the plant height being genetically controlled factor. Similar observation were made by earlier researcher Ashwini *et al.* (2019) [1] in gomphrena, Dilta *et al.* (2005) [3] in chrysanthemum Kulkarni and Reddy (2004) [4] in chrysanthemum and Poornima (2006) [5] in china aster.

Number of branch and branch Length: With respect to number of branches per plant and branches length varied significantly among the genotypes. Number of branches observed per plant (18.40) were maximum in AGS 4 and also had maximum length of branch (72.51 cm). While the genotype AGS 14 recorded minimum number of branches (8.6) as well as branch length (44.24 cm). The differences in the number of branches could be attributed to the genetic make-up of the genotypes. Similar variation for number of branches were also observed previously by researchers Poornima *et al.* (2006) [5] in china aser, Ashwini *et al.* (2019) [1] in china aster and Baskaran *et al.* (2004) [2] in chrysanthemum.

Plant spread: At different stages of growth, Gomphrena genotypes differ significantly for plant spread. The maximum plant spread (57.80 cm) was recorded in genotype AGS 4, and the minimum plant spread (32.23 cm) was observed in AGS 14. The differences in plant spread is a varietal trait and is probably governed by the genetic make-up. Varietal differences in plant spread was reported by Ashwini *et al.* (2019) [1] in gomphrena, Pramila *et al.* (2011) [6] in marigold and Singh *et al.* (2017) [8] in chrysanthemum.

Number of leaves: The genotype AGS 4 produced maximum number of leaves per plant (3716.33). The leaves production was minimum in genotype AGS 14 (1600.00). However, the lowest flower yield having lower value for number of leaves per plant which indicates that the higher the number of leaves per plant more would be the flower yield. The growth and flowering and flower quality of a crop largely depend on the number of the leaves as the leaves are the functioning unit of photosynthesis. Such variation in number of leaves among genotypes were also observed by earlier workers Thakur *et al.* (2018) [10] in chrysanthemum, Poornima *et al.* (2006) [5] in china aster and Ashwini *et al.* (2019) [1] in gomphrena.

Table 1: Variation in growth parameters of different genotypes of gomphrena

Genotypes	Plant height (cm)	Number of branches	Length of branches (cm)	Plant spread (cm)	Number of leaves
AGS 1	84.40	12.27	57.92	45.69	3300.00
AGS 3	101.61	17.00	68.30	50.07	3373.00
AGS 4	105.46	18.40	72.51	57.80	3716.33
AGS 5	100.54	13.13	65.39	48.40	3303.33
AGS 8	75.54	11.60	54.97	45.23	3053.33
AGS 14	61.69	8.60	44.24	32.23	1600.00
Local genotype	65.92	11.40	47.85	42.71	2720.00
S.Em.±	5.65	0.78	2.92	2.42	147.36
C.D. at 5%	17.39	2.42	9.00	7.47	453.98
C.V.%	11.5	10.29	8.61	9.12	8.48

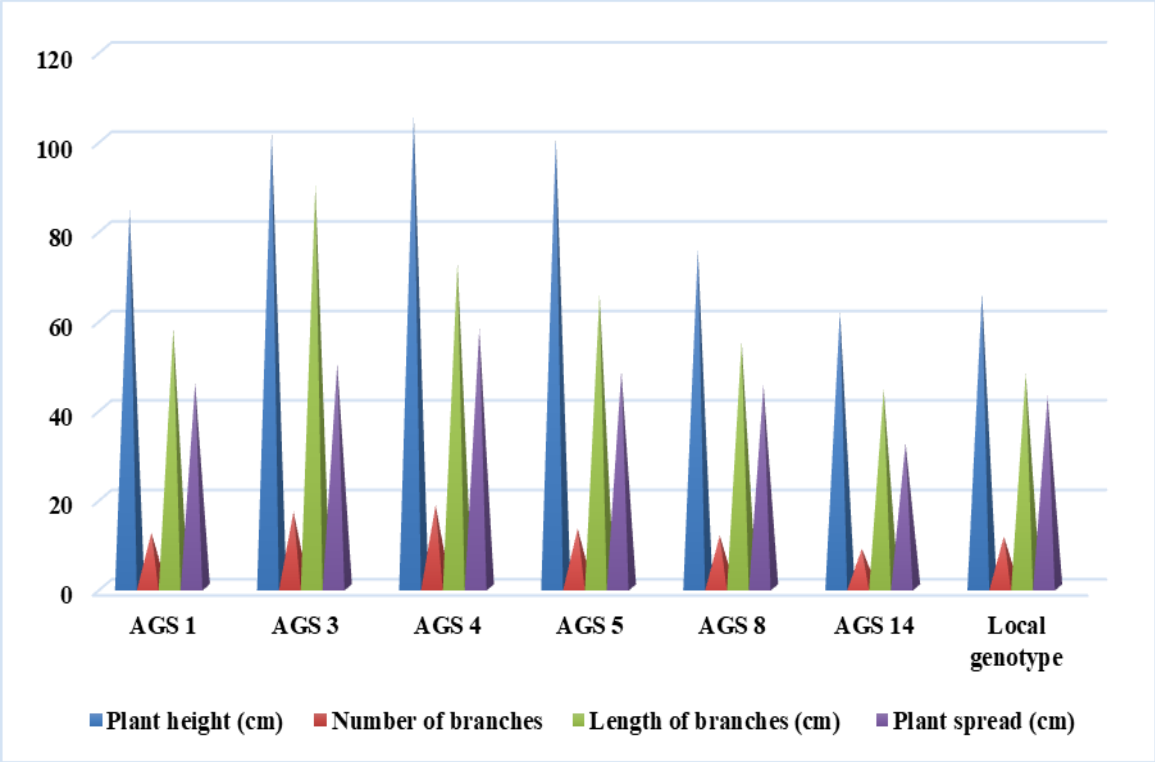

Fig 1: Variation in plant height, number of branches, length of branches and plant spread exhibited by different bachelor's button genotypes

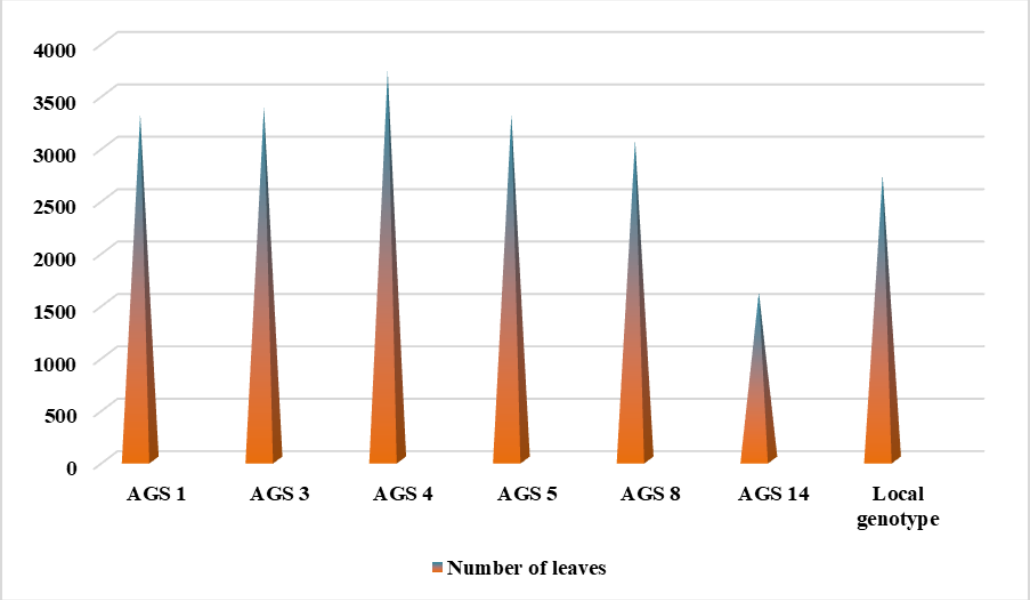

Fig 2: Variation in number of leaves exhibited by different bachelor's button genotype

Flowering parameter

Number of days taken for flower bud initiation: The earlier flower bud initiation was observed in AGS 14 (33.07 days) followed by AGS 3 (34.73 days) and AGS 4 (37.33 days) whereas, more number of days took for flower bud initiation in genotype AGS 8 (46.81 days). The variation in flower bud initiation may be due to genetic trait. Similar findings with respect to these parameter were earlier reported by Suvija *et al.* (2016) [9] in chrysanthemum, Raghuvanshi and sharma (2011) [7] in French marigold and Ashwini *et al.* (2019) [1] in gomphrena.

Days taken to 50% flowering: The AGS 14 followed by AGS 3 and AGS 4 genotypes took lesser days to 50 per cent flowering per plant (42.80 days, 43.67 days, and 49.13 days, respectively) whereas, more number of days took for 50 percent flowering was observed in genotype AGS 8 (60.87days). Similar findings with respect to these parameter were earlier reported by Suvija *et al.* (2016) [9] in chrysanthemum, Raghuvanshi and sharma (2011) [7] in French marigold and Ashwini *et al.* (2019) [1] in gomphrena.

Days to required first flower bud show color: Minimum days took to show flower bud color was noticed in AGS 14 (3.13 days) which was at par with genotypes AGS 3 (3.67 days) and AGS 4 (4.00 days) and maximum days was observed in genotype AGS 8 (6 days). The variation in flower bud color may be due to genetic trait. Similar findings with respect to these parameter were earlier reported by Suvija *et al.* (2016) [9] in chrysanthemum, Raghuvanshi and sharma (2011) [7] in French marigold and Ashwini *et al.* (2019) [1] in gomphrena.

Number of flowers per plant: The maximum number of flowers produced per plant in genotype AGS 4 (217.70) which was followed by genotype AGS 3 (172.20) this was due to the production of more number of branches as well as leaves per plant, while the minimum number of flower per plant in genotype AGS 14 (60.57). Because this genotype recorded less number of branches as well as number of leaves per plant. Similar findings were earlier reported by Baskaran *et al.* (2004) [2] in chrysanthemum, Ashwini *et al.* (2019) [1] in gomphrena and Poornima (2006) [5] in chinaaster.

Number of flowers per plant: The maximum number of flowers per square meter in genotype AGS 4 (4030.00) which was followed by genotype AGS 3 (3620.00), this was due to the production of more number of branches as well as leaves per plant, while the minimum number flowers per square meter was observed in genotype AGS 14 (1166.67). Because this genotype recorded less number of branches as well as number of leaves per plant. Similar findings were earlier reported by Baskaran *et al.* (2004) [2] in chrysanthemum, Ashwini *et al.* (2019) [1] in gomphrena and Poornima (2006) [5] in chinaaster.

Table 1: Variation in flowering parameters of different genotypes of gomphrena

Genotypes	Flower bud initiation (days)	Days taken to 50% flowering	No of days for first flower bud show color	No. of flowers per plant	No. of flower per meter square
AGS 1	40.80	55.40	4.63	160.50	2886.67
AGS 3	34.73	43.67	3.67	172.20	3620.00
AGS 4	37.33	49.13	4.00	217.70	4030.00
AGS 5	42.20	59.00	4.63	169.57	3366.67
AGS 8	46.81	60.87	6.00	141.50	2804.00
AGS 14	33.07	42.80	3.13	60.57	1166.67
Local genotype	39.07	54.20	4.07	139.83	2633.33
S.Em.±	2.62	2.81	0.24	7.76	153.90
C.D. at 5%	8.07	8.66	0.75	23.90	474.15
C.V.%	11.59	9.34	9.83	8.86	9.10

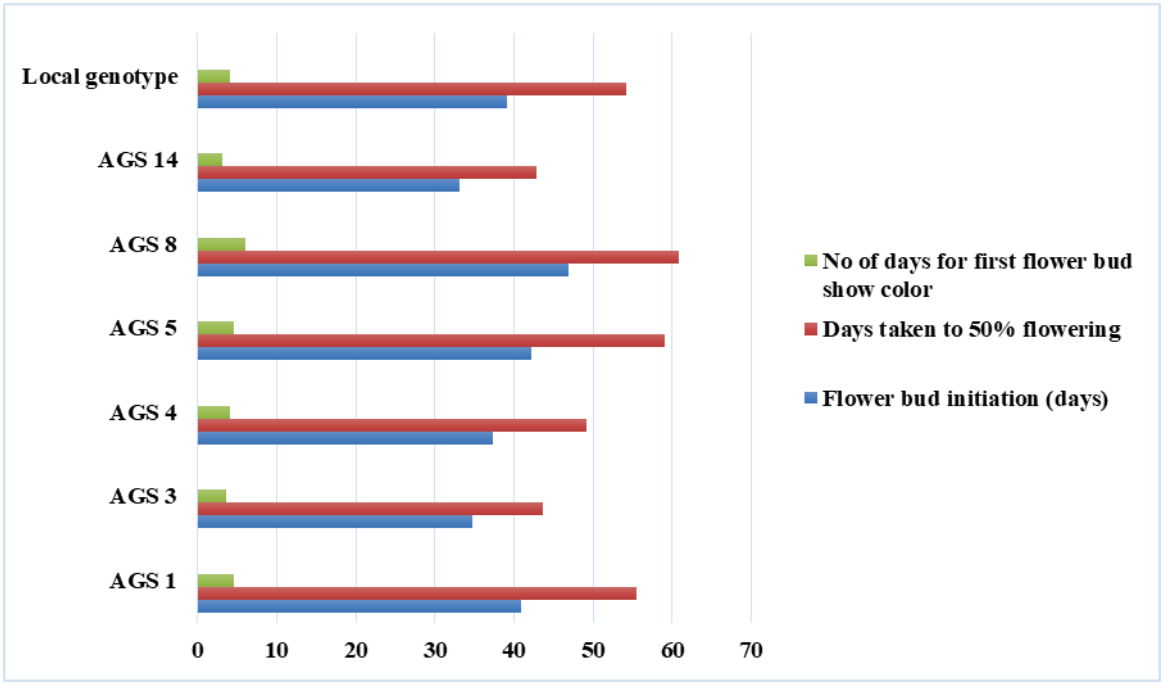

Fig 3: Variation in days to first flower bud show color, days to first flower bud initiation and days for 50 per cent flowering exhibited by different bachelor's button genotypes

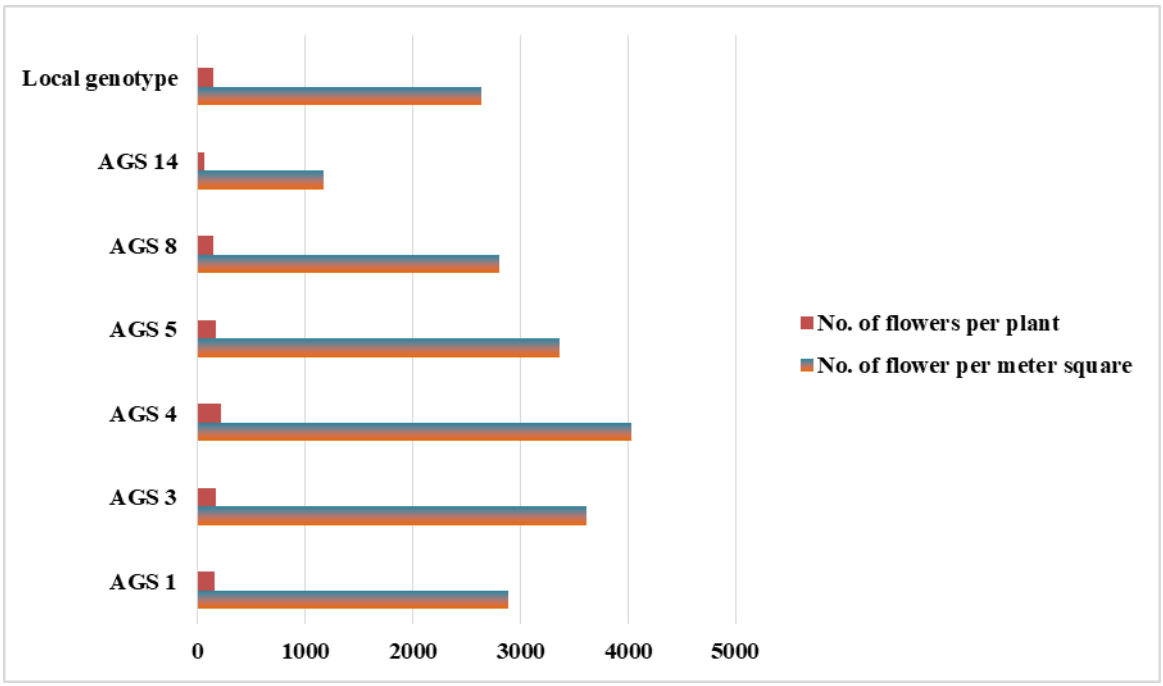

Fig 4: Variation in no. of flowers per plant and no. of flower per meter square exhibited by different bachelor's button genotypes

Conclusion

From the present investigation it can be concluded that, among seven genotypes of gomphrena, genotype AGS 4 found superior for growth and flowering parameters under South Saurashtra region.

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