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Storage study of cut and loose flowers (Days) of different genotypes of gaillardia (*Gaillardia pulchella* L.)

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Abstract
The present investigation for storage study of different genotypes of gaillardia (*Gaillardia pulchella* L.) was carried out during the year 2015-2016 at College of Agriculture, Pune. The experiment was laid out in Randomized Block Design with forty genotypes and two replications. Significantly maximum vase life of cut flowers was recorded in the genotype MG-5-5 (4.73 days) followed the genotype MG-9-1 (4.52 days), MG-5-3 (4.51 days), MG-6-2 (4.49 days) for cut flowers. Significantly maximum shelf life of loose flowers was recorded in the genotype MG-5-5 (2.52 days). Genotypes MG-2-2 (2.49 days), MG-9-1 (2.39 days), MG-7-2 (2.30 days), MG-13-1 (2.27 days), MG-6-2 (2.21 days) and MG-10-2 (2.20 days) were at par with the genotype MG-5-5.

Keywords: Genotypes, vase life, shelf life

Introduction
Gaillardia (*Gaillardia pulchella* L.) is one of the important flower crop of Maharashtra grown on commercial scale as loose flower. In India, Gaillardia is grown all the year around. The generic name Gaillardia was proposed in honour of Mr. M. Gaillard, a French patron of botany, who cultivated it first. The Central and Western United states are considered to be its origin. It is popularly known as 'blanket flower' and belongs to family asteraceae. It is diploid (2n=36) as reported by Morinaga *et al*. (1929). It is one of the hardiest annual can be grown in a wide range of tropical to temperate climate. This is substitute flower crop for chrysanthemum and china aster. (Bose *et al*. 2003) [3]. Gaillardia are grown in herbaceous borders, beds and are also suitable for cut flowers. Gaillardia flowers are extensively used in bouquets, garlands and floral decoration. Besides, its utility in landscape Gaillardia pulchella is useful in reducing erosion in coastal dune areas (Carig, 1977) [4]. Gaillardia aristata is suitable for dryland and requires low maintenance, (Cox and Klett, 1984; Robinson and Schultz, 1995) [5, 16]. Panchaude (1990) [14] reported the nematicidal property of gaillardia, when grown as catch crop and green manure. In India floriculture industry is gaining importance for domestic and export market. Gaillardia flowers are extensively used in bouquets, garlands and floral decoration. The growth habit, importance and popularity of the crop, there is a lot of scope for breeding of new varieties with superior quality of flowers. With a view, to find out superior genotypes having good quality flowers, the present investigation on storage study of cut and loose flowers (days) of different genotypes of gaillardia (*Gaillardia pulchella* L.)" is planned at Horticulture section, College of Agriculture, Pune.

Material and Methods
The present investigation on Storage study of cut and loose flowers (days) of different genotypes of gaillardia was conducted at Department of Horticulture, College of Agriculture, Pune during 2015-2016. The average annual rainfall in this area is 650-750 mm. The average maximum and minimum temperature recorded during the period of experiment was 39.1^{0}C and 14.4^{0}C, respectively. The relative humidity during crop growth period ranged between 45 percent to 85 percent.
The crop improvement breeding work in gaillardia was already initiated in 2011-12 at Department of Horticulture, College of Agriculture, Pune. The trial on to assess the performance of different fourteen genotypes of gaillardia was carried out by Mr. M. G. Agale. In his study he selected and selfed promising 40 individual plants on the basis of growth, yield and storage life of flowers. The material for the present investigation comprised of 40 pure lines of individual selfed plant progenies having selected for the further study. The experiment was laid out in randomized block design (RBD) with forty treatments and two replications. The nomenclature of these genotypes is given below in Table no. 1.

The vase life was counted in terms of days from the days of keeping stalk in water to the day of they were found unfit for vase. The vase life of the flower stalk was considered to be over when the ray florets started fading of colour and wilting. The vase life of cut flower was recorded for five randomly selected observational flowers in plain water. The basal portion of the flower stalk was defoliated and cleaned. The stalks were kept in conical flask having equal quantity (250 ml) of water. The water in the flask was changed on alternate days. The shelf life of loose flower was recorded by randomly selected flowers from five observational plants and kept in wetted gunny bags at room temperature. Vase life of the observational flowers was considered to be over when the ray florets started fading of colour and wilting.

Table 1: Treatment details

Treatments	Name of genotypes	Treatments	Name of genotypes
T_1	MG-1-3	T_{21}	MG-7-2
T_2	MG-1-4	T_{22}	MG-7-3
T_3	MG-2-1	T_{23}	MG-8-1
T_4	MG-2-2	T_{24}	MG-8-2
T_5	MG-3-1	T_{25}	MG-9-1
T_6	MG-3-2	T_{26}	MG-9-2
T_7	MG-3-3	T_{27}	MG-9-3
T_8	MG-3-4	T_{28}	MG-9-4
T_9	MG-4-1	T_{29}	MG-10-1
T_{10}	MG-4-2	T_{30}	MG-10-2
T_{11}	MG-4-3	T_{31}	MG-10-3
T_{12}	MG-4-4	T_{32}	MG-10-4
T_{13}	MG-5-1	T_{33}	MG-10-5
T_{14}	MG-5-2	T_{34}	MG-11-1
T_{15}	MG-5-3	T_{35}	MG-12-1
T_{16}	MG-5-4	T_{36}	MG-12-2
T_{17}	MG-5-5	T_{37}	MG-12-3
T_{18}	MG-6-1	T_{38}	MG-13-1
T_{19}	MG-6-2	T_{39}	MG-14-1
T_{20}	MG-7-1	T_{40}	Local (C)

Results and Discussion

The experiment entitled the Storage study of cut and loose flowers (days) of different genotypes of gaillardia (*Gaillardia pulchella* L.)" was laid out in randomized block design (RBD) with forty treatments and two replications. The data regarding the observation on vase life of cut flowers and shelf life of loose flowers are presented in Table 2 and graphically illustrated in Fig. 1.

The data indicates that the vase life of the cut flowers varied significantly with different genotypes. Significantly maximum vase life was observed in the genotype MG-5-5 (4.73 days) followed by the genotypes MG-9-1 (4.52 days), MG-5-3 (4.51 days), MG-6-2 (4.49 days), MG-13-1 (4.47 days), MG-4-2 (4.44 days), MG-2-2 (4.43 days), MG-2-1 (4.39 days), MG-5-2 (4.39 days), MG-3-1 (4.37 days), MG-7-2 (4.37 days) and MG-6-1 (4.33 days) were at par with genotype MG-5-5. The minimum vase life was observed in the genotype MG-11-1 (3.65 days). In loose flowers significantly maximum shelf life was observed in the genotype MG-5-5 (2.52 days) followed by the genotypes MG-2-2 (2.49 days), MG-9-1 (2.39 days), MG-7-2 (2.30 days), MG-13-1 (2.27 days), MG-6-2 (2.21 days) and MG-10-2 (2.20 days) were at par with genotype MG-5-5. The minimum shelf life was observed in the genotype MG-12-2 (1.78 days). The variation in vase life of cut flowers as well as shelf life of loose flowers may be due to genetic trait.

These findings were confounded by Agale (2012) [1] in gaillardia and showed the vase life of genotypes MG-3, MG-5 and MG-13 had maximum vase life (4.00 days). The other genotypes ranged from 3.33 to 3.66. Khanvilkar *et al.* (2003) [9] assessed the performance of African Marigold and observed that the highest flower vase life was recorded in variety Orange Boom (8.27 days) while minimum in check Local variety (4.72 days). Baskaran *et al.* (2009) [2] evaluated post-harvest quality of some cultivars of chrysanthemum and reported that maximum vase life (16 days) was noticed in cv. Arka Swara, followed by cv. Ravikiran (10 days) and cv. Nilima (9 days). While minimum vase life was observed in cv. Cassa (4 days), followed by cv. Chandrika (6 days) in chrysanthemum.

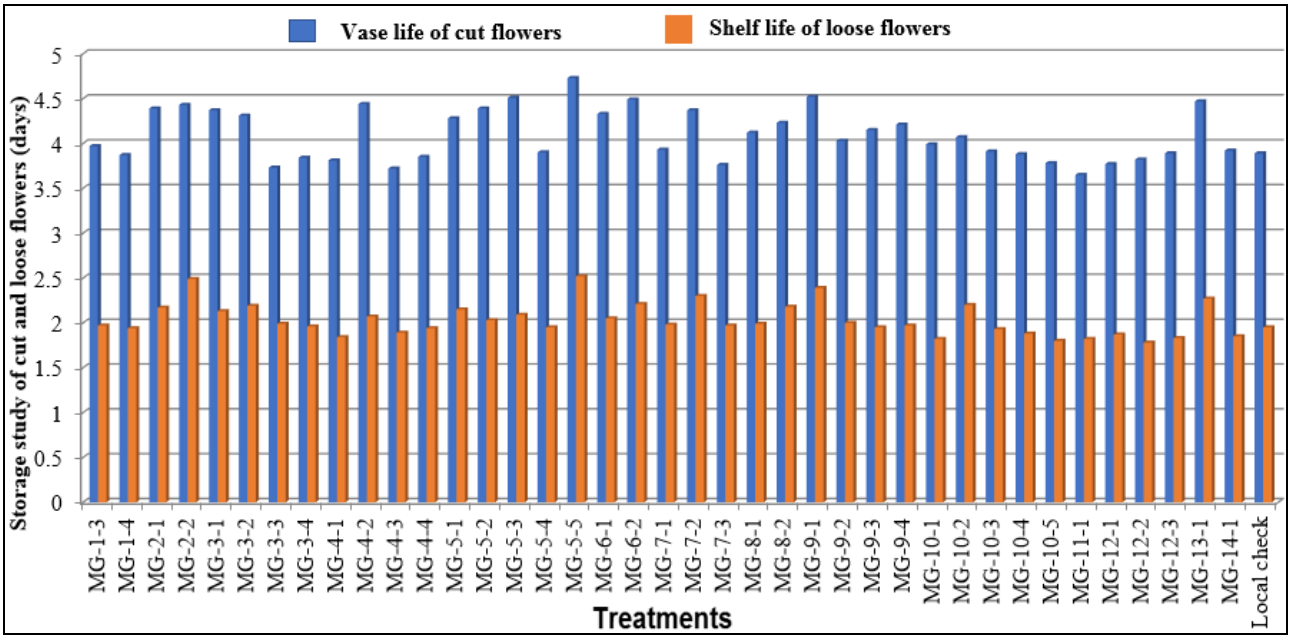

Fig 1

Table 2: Storage study of cut and loose flowers (days) of different genotypes of gaillardia

Genotypes	Cut flowers (Days)	Loose flowers (Days)	Genotypes	Cut flowers (Days)	Loose flowers (Days)
MG-1-3	3.97	1.97	MG-7-3	3.76	1.97
MG-1-4	3.87	1.94	MG-8-1	4.12	1.99
MG-2-1	4.39	2.17	MG-8-2	4.23	2.18
MG-2-2	4.43	2.49	MG-9-1	4.52	2.39
MG-3-1	4.37	2.13	MG-9-2	4.03	2.00
MG-3-2	4.31	2.19	MG-9-3	4.15	1.95
MG-3-3	3.73	1.99	MG-9-4	4.21	1.97
MG-3-4	3.84	1.96	MG-10-1	3.99	1.82
MG-4-1	3.81	1.84	MG-10-2	4.07	2.20
MG-4-2	4.44	2.07	MG-10-3	3.91	1.93
MG-4-3	3.72	1.89	MG-10-4	3.88	1.88
MG-4-4	3.85	1.94	MG-10-5	3.78	1.80
MG-5-1	4.28	2.15	MG-11-1	3.65	1.82
MG-5-2	4.39	2.03	MG-12-1	3.77	1.87
MG-5-3	4.51	2.09	MG-12-2	3.82	1.78
MG-5-4	3.90	1.95	MG-12-3	3.89	1.83
MG-5-5	4.73	2.52	MG-13-1	4.47	2.27
MG-6-1	4.33	2.05	MG-14-1	3.92	1.85
MG-6-2	4.49	2.21	Local (C)	3.89	1.95
MG-7-1	3.93	1.98	SEm ±	0.14	0.11
MG-7-2	4.37	2.30	CD at 5%	0.41	0.32

Conclusion

Among the genotypes evaluated, MG-5-5 (4.73 days) was recorded significantly maximum vase life in cut flowers and about eleven genotypes were at par with this genotype. Genotype MG-11-1 (3.65 days) was least in vase life. In loose flowers maximum shelf life was recorded by the genotype MG-5-5 (2.52 days) and about six genotypes were at with this genotype. The minimum shelf life was observed in the genotype MG-12-2 (1.78 days).

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