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Performance of promising genotypes of gaillardia (*Gaillardia pulchella* L.) in respect of growth and flowering attributes

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Abstract
Gaillardia is hardiest annual can be grown in a wide range of tropical to temperate climate. It is important flower crop of Maharashtra grown on commercial scale as loose flower for substitute to China aster and chrysanthemum. The present investigation was conducted at Horticulture section, college of Agriculture, Pune with objectives to assess the promising genotypes of gaillardia (*Gaillardia pulchella* L.). Based on the results obtained from the investigation the genotype MG-9-1, MG-2-2 and MG-6-2 showed better performance for plant height, spread and branches per plant ad flowering attributes.

Keywords: promising genotypes, gaillardia, attributes, *Gaillardia pulchella*

Introduction
Gaillardia (*Gaillardia pulchella* L.) is popularly known as 'blanket flower'. It belongs to asteraceae family and the central and western united states are considered to be its origin. The generic name *Gaillardia* was proposed in honour of Mr. M. Gaillard, a French patron of botany, who cultivated it first. *Gaillardia pulchella* is useful in reducing erosion in coastal dune areas (Carig, 1977) [5]. This is substitute flower crop for chrysanthemum and china aster. (Bose *et al.* 2003) [4]. *Gaillardia aristata* is suitable for dry land and requires low maintenance (Cox and Klett, 1984; Robinson and Schultz, 1995) [6, 13]. Panchaude (1990) [12] reported the nematicidal property when grown as catch crop and green manure. Gaillardia flourishes well in any garden soil and can withstand high light intensities, high temperature and drought better than most of the flowering plants. It is also tolerant to salinity (Tija and Rose, 1988) [15]. The country has strength of having an availability of different climatic zones, good climate and soil, cheap labour, enough land and skilled manpower.

Material and Methods
The present investigation was carried out during 2016-17 at the Horticulture Section, College of Agriculture, Pune. The experiment was laid out in Randomized Block Design (RBD) with three replications. The experiment having 12 genotypes *viz.* MG-2-2, MG-3-1, MG-3-2, MG-5-5, MG-6-1, MG-6-2, MG-7-1, MG-7-2, MG-9-1, MG-10-2, MG-10-4 and Local check. The raised beds of a size 2.0m x 1.0m x 0.15m were prepared for raising the gaillardia seedling of different genotypes after adding sufficient FYM. The beds were applied with phorate granules to avoid the ants attacking the seeds. Seeds were sown in second week of June in lines 10 cm apart and 1.0 cm deep on raised beds. Seeds were sown shallow to get uniform and early germination and covered with fine sand. Water was applied immediately after seed sowing with rose water can. Then daily irrigation was done at morning or evening as per need. The land was prepared in usual manner and was brought to a fine tilth by ploughing, clod crushing and cross harrowing. The FYM was applied at the rate of 15 t/ha before last harrowing for uniform mixing in the soil. The furrow was opened at the distance of 60 cm, and proper irrigation channels were made for easy supply of water. Paths were kept at convenient places for easy harvesting and other cultural operations and for ease in recording the observations.

Results and Discussion
The genotype MG-2-2 recorded significantly highest plant height (83.40 cm), (103.60 cm) and (110.00 cm) at 90, 120 and 150 days after transplanting respectively. The present findings in respect of plant height, in general are in agreement with those reported by Agale (2012) [1] and

Gawade (2016) in gaillardia, Palai *et al*. (2009) [11] in chrysanthemum, Swaroop *et al*. (2004) [14] in China aster and Bhati and Chitkara (1989) [2] in marigold. The genotype MG-9-1 recorded significantly maximum plant spread at (E-W) direction (68.17 cm) and at (N-S) direction (59.40 cm) at 90 DAT. The experimental results are in line with the findings reported by Agale (2012) [1] and Gawade (2016) in gaillardia and Jagtap (2013) [8] in China aster. Significantly maximum number of primary branches per plant was recorded in the genotype MG-10-4 (19.15) and the maximum number of secondary branches per plant was recorded in the genotype MG-9-1 (54.51). These findings were confounded by Agale (2012) [1] in gaillardia. In his study the primary branches were ranged from 17.40 to 20.47. Also these findings are similar to Kale (2002) [9] in gaillardia.

The genotype MG-10-2 showed significantly early initiation of flowering (51.33 days) after transplanting. The genotype MG-10-4 required significantly maximum days for commencement of flowering (64.12 days). Early or late flowering behavior is a genotypic characteristic with support of genetic base as well as physiological characteristics. Similar observations have been reported by Gawade (2016) in gaillardia, Zosiamliana *et al.* (2011) [16] and Jagtap (2013) [8] in China aster and Mohanty *et al.* (2003) [10] in marigold. The genotype MG-6-2 showed early 50 percent flowering (62.24 days) after transplanting. These findings were confounded by Agale (2012) [1] and Gawade (2016) in gaillardia and Bhuyar *et al.* (2004) [3] in gerbera. The genotype MG-2-2 recorded significantly maximum flower stalk length (17.92 cm). The flower stalk thickness of different genotypes of gaillardia ranged from 2.8 to 3.0 mm but the treatment differences were non-significant for this character. Similar results have been reported by Agale (2012) [1] and Gawade (2016) in gaillardia.

Table 1: Table show height DAP and days

Genotype	Plant Height 90 DAP (cm)	Plant Height 120 DAP (cm)	Plant Height 150 DAP (cm)	Plant Spread N-S (cm)	Plant Spread E-W (cm)	No. of Primary Branches	No. of Sec. Branches	Flower Initiation (Days)	50% Flowering (Days)	Flower stalk length (cm)	Flower stalk thickness (mm)
MG-2-2	83.40	103.60	110.00	54.30	58.42	16.34	50.10	60.10	70.17	17.92	2.90
MG-3-1	49.20	62.60	64.00	54.71	51.44	15.28	32.41	59.46	73.81	9.94	2.90
MG-3-2	72.56	84.40	85.80	37.12	35.69	9.10	28.10	54.47	68.25	16.68	2.90
MG-5-5	58.60	69.40	78.80	55.90	61.31	16.20	44.90	53.32	72.56	15.52	3.00
MG-6-1	62.39	76.00	79.40	51.90	56.91	15.80	44.70	52.61	73.00	14.80	2.80
MG-6-2	77.40	93.00	96.40	54.60	61.74	18.96	50.90	56.36	61.13	17.30	3.00
MG-7-1	79.20	96.00	101.00	53.00	47.44	15.65	41.93	61.72	71.13	14.30	2.90
MG-7-2	78.53	102.21	107.60	58.80	66.52	15.05	41.30	53.84	62.24	16.62	2.90
MG-9-1	81.80	100.40	106.60	59.40	68.17	17.70	54.51	57.17	66.28	16.92	2.80
MG-10-2	78.40	93.60	102.31	50.89	53.23	17.45	46.51	51.33	66.22	11.10	2.80
MG-10-4	81.40	96.20	101.60	51.10	56.51	19.15	53.40	64.12	76.57	16.22	2.80
Local (C)	56.40	71.80	82.60	54.71	57.17	16.55	45.30	63.14	75.19	16.32	2.90
SE (m)	3.09	3.19	3.21	3.76	5.62	1.59	4.52	2.36	0.71	0.58	0.059
C.D.±	9.14	9.44	9.49	11.12	16.59	4.70	13.36	6.98	2.12	1.73	NS

Conclusion

Based on the results obtained from the present one year experimentation, it is concluded that, the genotypes *viz*., MG-9-1, MG-2-2 and MG-6-2 showed better growth performance for plant height, spread, branches per plant and flowering characters. All these genotypes showed promise for further improvement in gaillardia.

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