Asian Journal of Plant Sciences

ISSN 1682-3974

science alert

ANSInet
an open access publisher
http://ansinet.com

Asian Journal of Plant Sciences
Volume 1 Number 6: 670-671, 2002

Effect of Different Media on Growth and Quality of Gladiolus (*Gladiolus hortulanus* cv. Jacksonville Gold)

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Abstract: The study was conducted to find out the affect of different media on growth and quality of gladiolus. Gladiolus (*Gladiolus hortulanus* cv. Jacksonville Gold) was studied in different potting mixtures i.e. sand, silt, clay, leaf mould, sand + silt (1:1), sand + clay (1:1), sand + clay + leaf mould (1:1). Earliest sprouting of 5.33 and 5.66 days was found in sand and sand + leaf mould, and late sprouting of 7.66 days was recorded in clay, silt + clay, clay + leaf mould and leaf mould respectively. Hundred percent sprouting was found in sand, silt, leaf mould, sand + silt, silt + leaf mould and clay + leaf mould, whereas 77.33 % sprouting was noted in clay. The lowest plant survival of 77 and 88.6 % was found in clay and sand respectively. Earliest flowering (87.33 days) was recorded in sand + silt and latest of 122.7 days in sand. Maximum number of flowers (10.0 per plant) was found in leaf mould, sand + leaf mould, silt + leaf mould while least number of flowers (7.33) was observed in sand. Maximum flowering size of 8.43 cm was observed in sand + leaf mould and least of 6.06 cm in clay.

Key words: Gladiolus, media, growth, quality

Introduction

Gladiolus (*Gladiolus hortulanus* L) is a member of monocot family Iridaceae. The plant is very important for its esthetic value because flower has diverse colour, shape and size, whereas this type of diversity is not found in other flowers. The flower is ideal for cut flower production, gladiolus flower is found in all the colours except blue. Gladiolus is basically a corm, which has solid shortened stem with buds systematically arranged, under a paper thin protective layer or scale. Usually one bud sprouts near the top of the corm when planted. It also produces cormlets. Corms are planted 10 cm deep in the soil in warm soil. The basal roots are emerged first followed by others. Shoots from bud near the top of the corm emerge and flower spike is visible, then basal portion of shoot, which begins to swell, and develops into daughter corm. The daughter corm continue to enlarge after flowering and then nutrition is directed downward for storage. The daughter corm do not flower in the same season (Hudson *et al*., 1981). Now-a-days hybrid cultivars of gladiolus are available among which white friendship T-210 (white), friendship, pink parade, traveler, valeria, Interepid, red majesty, jacksonville glod, Jester, goldefield, beverly ann, spic and span. Flamingo and peter peas are the most popular cultivars as reported by Larson (1980).

Dobrzansks (1981) reported that the yield of gladiolus flower was highest in peat and lowest yield was found in lignite soil. Leinfelder and Rober (1989) used peat + clay, rockwool, foam, perlite and clay for raising gladiolus. They found that flower quality was similar in peat + clay, rockwool and foam, but was very inferior in clay. Hagiladi *et al*. (1992) found that bulbs planted in sand at 10 cm depth emerged quickly than the more deep plantings. Sorokina *et al*. (1984) reported that bark and peat mixture was the best media for growing ornamental plants. On the other hand sand particles are loose, water-holding capacity is more. Hence for bulb and corm sand as potting material is ideal. Ahmed (1989) reported that sand + leaf mould, sand + peat enhanced the flowering and number of flower and flower size significantly.

For the propagation of gladiolus very little information is available Therefore, the present studies were conducted to investigate the effect of different low cost available potting media components on the growth and development of gladiolus.

Materials and Methods

Experiment on the culture of gladiolus corms on different potting media was conducted at Ornamental Nursery, Department of Horticulture, NWFP Agricultural University, Peshawar during 1994-95. The gladiolus corms "jacksonville gold" were planted in plots. Three corms were put in each treatment and the experiment was replicated three times in randomized complete block design. There were ten treatments and the media used were as under:

Sand, silt, clay, leaf mould, sand + silt (1:1), sand + clay (1:1), sand + leaf mould (1:1), silt + clay (1:1), silt + leaf mould (1:1), clay + leaf mould (1:1).

Fresh clay pots were washed with water and bulbs were planted 10 cm deep in each pot and the pots were laid out in RCB design. The pots were put in the sun and water was given after ten days. The following parameters were studied.

Days to sprouting, sprouting (% age), plant survival (% age), days to flowering, No. of flowers per plant, flower size (cm).The data recorded were analysed statistically according to RCB design. The analysis of variance and LSD test were employed to determine whether the effects of treatments were significant or not.

Results and Discussions

Days to sprouting: The emergence of corm was very early i.e. 5.33 and 5.66 days respectively in sand, sand + leaf mould. The next early sprouting of 6.66, 6.66, 6.66 days was observed in silt, sand + silt, sand + clay, respectively, whereas maximum of 7.66, 7.33, 7.66, 66.700 and 7.66 days were taken by corm to sprout in clay, leaf mould, silt + clay, silt + leaf mould and clay + leaf mould (Table 1). From the result, it was evident that where sand is used alone or in mixture with other ingredients, it caused sprouting easier. Where as clay alone and in combination caused delay in sprouting. The possible reason is that the sand particles are loose and absorbs water sufficiently, which can be utilized by corm. The clay particles are closely linked, with very little space for aeration and less water holding capacity, hence it hinders the emergence. As for as silt is concerned it is like sand and also contains nutritive elements, hence the corm sown in silt alone or in combination were little late in sprouting than sand, but earlier than clay. Leaf mould was also found delaying sprouting of corm. Leaf mould has more water holding capacity and also friable, but delay in sprouting of corm could not be ascertained. These results are in agreement with those of Main and Ali (1983).

Sprouting (%age): Corm sprouting percentage was maximum i.e. 100.0 percent in the treatments of sand, silt, leaf mould, sand + silt, silt + leaf mould and clay + leaf mould. This is again clear that sand, silt in combination with other was very helpful in increasing sprouting. But clay alone had the least sprouting of 77.33 percent and clay in combination with sand and silt also gave less sprouting of 88.68, 88.66 percent respectively (Table 1).

Plant survival (%): The percentage of survival of plants in different media showed significant variation. Significantly ($P < 0.05$) highest

Table 1: Effect of different media on growth and quality of gladiolus

Media	Day to sprouting	No. of bulbs sprouted	% of plant survival	Days to Flowering per plant	No. of Flower	Flower size (cm)
Sand	5.33a	100.00a	88.66ab	122.70a	7.33f	7.00cde
Silt	6.66ab	100.00a	100.00a	119.70ab	9.00c	7.233cd
Clay	7.66a	7.33a	77.00b	113.30c	8.00e	6.067f
Leaf mould	7.33a	100.00a	100.00a	115.00bc	10.00a	7.900b
Sand + Silt	6.66ab	100.00a	100.00a	87.33e	9.66b	6.567ef
Sand + Clay	6.66ab	88.60ab	100.00a	112.30c	8.00e	6.800de
Sand + Leaf mould	5.66b	88.60ab	100.00a	100.70c	10.00a	8.433a
Silt + Clay	7.66a	88.60ab	100.00a	112.00c	8.66d	6.967cde
Silt + Leaf mould	7.00a	100.00a	100.00a	105.00d	10.00a	7.33c
Clay + Leaf mould	7.66a	100.00a	100.00a	120.70ab	8.66d	7.46bc
LSD (0.05) value	1.80	22.16	18.34	6.326	0.1627	0.520

survival of 100 % was observed in the potting media of silt, leaf mould, sand + silt, sand + clay, sand + leaf mould, silt + clay, silt + leaf mould respectively and there was no significant difference among them (Table 1). The least significant percent of plant survival was 77 % observed in the potting media of clay, followed by 88.66 % in sand. The reason of this may be that sand could not give anchor to the emerged seedlings, whereas sand in combination with clay, silt and leaf mould could provide anchor and moisture to the seedlings, hence higher percentage of seedling. The clay soil due to its compactness and less ability of water holding capacity and lack of aeration could not provide protection to the seedling and mortality occurred. Hence for potting media, sand, silt, leaf mould in combination (1:1) seems to be optimum, leaf mould and silt also provide nutrients to the developing seedlings. Hence leaf mould also is recommended for bulb propagation. Similar results were also reported by Khan (1991) and Kambooh (1984).

Days to flowering: The mean value of days to flowering showed significant variation (Table 1). The maximum significant ($P < 0.05$) higher number of days (122.7) were taken by bulb planted in sand and significantly least days of 87.33 days were taken by bulb planted in sand + silt. Next were 100.7 and 105.0 days in sand + leaf mould and silt + leaf mould. In clay + leaf mould the average days to flowering were 120.7 significantly at par with the average days to flowering in sand. The average days to flowering in silt, clay, leaf mould, sand + clay and silt + clay were 119.7, 113.3, 115.0, 112.3, and 112.0 days significantly at par with each other.

Number of flowers per plant: The maximum number of flowers (10.0 per plant) was found in the treatment leaf mould, silt + leaf mould, sand + leaf mould, followed by 9.0, 9.66 in the treatment of silt, sand + silt and the least number of flowers were observed in the treatment of sand (7.33). This again showed that leaf mould alone and in combination with sand and silt produced maximum number flowers per plant. These results are in close conformity with the findings of Fischer *et al*. (1981).

Flower size (cm): Results (Table 1) revealed that maximum flower size of 8.44 cm was found in the treatment of sand + leaf mould, followed by 7.90, 7.46, 7.33, 7.23, 7.00 cm in the treatments of leaf mould, clay + leaf mould, silt + leaf mould, silt and sand. The least flower size of 6.06, 6.5, 6.8, 6.9 cm was found in clay, sand + silt, silt + clay, silt + clay respectively. This shows that silt, clay and sand restrict flower size. These results are in agreement with the findings of Fischer *et al*. (1981), Dobrazansks (1981) and Ahmed (1989).

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