Effect of land configuration and planting depth on corm and cormel production of gladiolus (*Gladiolus spp.*)

ABSTRACT

The present experiment was carried out at department of Floriculture and Landscape Architecture, College of Horticulture, Junagadh Agricultural University, Junagadh (Gujarat) during the years 2021-22 and 2022-23 with randomized block design (Factorial) having three replications. The treatment combinations consisting three land configuration methods (L_1- Flat bed, L_2- Raised bed with 2 rows and L_3- Ridge and furrow) and two planting depth (D_1- 3.5 cm and D_2- 5.5 cm). The results indicated that maximum number of corms (1.58), number of cormels (26.98), diameter of corms (63.77 mm), diameter of cormels (3.16 mm), weight of corms (64.13 g) and weight of cormels (22.11 g) were recorded with raised bed with 2 rows (L_2). The variation due to planting depth was also found significant for all the parameters and maximum number of corms (1.46), number of cormels (25.52), diameter of corms (56.43 mm), diameter of cormels (3.09 mm), weight of corms (56.02 g) and weight of cormels (21.78 g) were obtained with planting at 3.5 cm depth (D_1). Raised bed planting had favourable effects on growth and flowering of gladiolus as compared to ridge and furrow and flat bed planting.

Keywords: Corms, Cormels, Gladiolus, Land configuration and Planting depth

Introduction

Gladiolus (*Gladiolus spp.*) is an herbaceous and one of the most cultivated, economically important and common flowering plant worldwide. It belongs to the family Iridaceae having short life cycle of 110 to 120 days. Its canter of origin is South Africa and it is referred to as the “Queen of Bulbous Ornamentals” due to its popularity amongst the bulbous ornamentals cultivated in the world.

Large scale production of gladiolus for cut flowers has been taken up in USA, Holland, Italy, France, Bulgaria, Brazil, Israel and Australia. In India, gladiolus is commercially grown in West Bengal, Odisha, Uttrakhand, Uttar Pradesh, Tamil Nadu, Punjab, Haryana, Madhya Pradesh, and Rajasthan. It can be cultivated on all types of soils and require temperature regime between 10 to 25°C for good growth and spike production. It is a winter crop but can be grown in July-August at low rainfall areas with mild climatic conditions. It is commercially propagated through corms.

Land configuration plays a significant role in minimizing soil erosion, improving water use efficiency and increasing nutrient availability to crops (Chiroma *et al.,* 2008). Better land configuration may ameliorate soil fertility and break the weed cycle and disease complex against the cultivated crop over extended period of time (Indu Bala *et al.,* 2016). Planting on raised beds has an advantage over flat bed under saline and alkali conditions that raised bed leaves a salt free space for good crop stand at early stages of crop growth and facilitates microbial activities. Good aeration leads to easy mineralization with greater nutrient and water use efficiencies (Kumar and Singh, 2014).

Land configuration has prime importance especially in heavy soil which is a barrier for better growth and development of roots. It strongly affect the yield of bulbous crops and help weed and disease control and mechanization (Marcinek *et al.,* 2013). Higher transpiration rate reduced light penetration and low soil temperatures may also be prevalent at different planting systems (Hatfield *et al.,* 1998). For specially gladiolus, very little work has been done to find out the best suitable planting system to be grown.

Planting too shallow may result in poor germination due to low soil moisture retention near the soil surface or seed injury due to insects or disease. Similarly, if placement is too deep, seed may have delayed germination due to lower soil temperatures or result in poor germination or seed injury. So that, corms with good quality, adequately sized and free from pathogens should be planted at proper depth.

MATERIALS AND METHODS

The experiment was carried out at the Instructional farm, Jambuvadi, Department of Floriculture and Landscape Architecture, College of Horticulture, Junagadh Agricultural University, Junagadh (Gujarat) during the years 2021-22 and 2022-23. The gladiolus cv. Summer Sunshine having strong attractive and long spikes with yellow colour were selected for the experiment. Required corms were purchased from well reputed nursery of Anand and acclimatized at ambient temperature for a week.

Before planting, the field was dug thoroughly to get fine tilth and levelled properly. Then the plots with different land configuration methods *viz*. Flat bed, Raised bed with 2 rows and Ridge and furrow were prepare as per the plan with tractor drawn implements. The treatments were randomly allotted to the experimental plots. The corms were planted with 30 cm x 20 cm spacing with two planting depth (D_1- 3.5 cm and D_2- 5.5 cm) in a plot size 1.60 m x 1.20 m. The experimental plots were irrigated with drip system. Standard package of practices were adopted throughout the experiment to grow a healthy crop.

After completion of flowering, irrigation was with hold for around one month. When the leaves turn yellow the corms and cormels were harvested by digging the soil without damaging them. Then these were clean to remove the adhering soil and were treated with 0.1 % Bavistin solution and allowed to dry under shade. These harvested corms are further used to record data on different parameters. Randomly five plants were selected from each treatment and labelled for the purpose of recording different observations. The mean value of the five selected plants from each treatment was taken to represent the treatments.

RESULTS AND DISCUSSION

Effect on propagule parameters

The data pertaining to various propagule parameters were significantly influenced by land configuration and planting depth are presented in Table 1. It showed that maximum number of corms (1.58), number of cormels (26.98), diameter of corms (63.77 mm), diameter of cormels (3.16 mm), weight of corms (64.13 g) and weight of cormels (22.11 g) were recorded with raised bed with 2 rows (L_2).

This might be due to its favourable effects on soil properties, improved supply of required moisture, available nutrients, soil aeration and better soil environment in raised bed planting which ultimately resulted in superior results. The similar findings were also reported by Ardeshna *et al.* (2013) in turmeric, Ahmad *et al.* (2017) in gladiolus and Chawla *et al.* (2018) in tuberose.

The variation due to planting depth was also found significant for all the parameters and maximum number of corms (1.46), number of cormels (25.52), diameter of corms (56.43 mm), diameter of cormels (3.09 mm), weight of corms (56.02 g) and weight of cormels (21.78 g) were obtained with planting at 3.5 cm depth (D_1).

It may be because of providing proper depth allows the plants to have ample space to grow which promoted physiological activity of the corms including uptake of nutrients and moisture which leads to more corms and cormel production. The similar effects were also reported by Sadhu and Das (1978) in tuberose, De and Dhiman (2002) in tuberose and Niranjan *et al.* (2018) in gladiolus.

Table 1. : Propagule parameters of gladiolus as influenced by land configuration and planting depth (Pooled over two years)

Treatments	No. of	No. of	Corm	Cormel	Weight	Weight of

	corms/ plant	cormels/ plant	diameter (mm)	diameter (mm)	of corms (g)	cormels (g)
Land configuration						
L_1	1.25	20.88	41.84	2.75	45.91	19.68
L_2	1.58	26.98	63.77	3.16	64.13	22.11
L_3	1.46	25.95	57.89	3.04	54.81	21.26
C.D. at 5%	0.04	0.88	1.34	0.10	1.15	0.60
Planting depth						
D_1	1.46	25.52	56.43	3.09	56.02	21.78
D_2	1.40	23.69	52.57	2.86	53.88	20.25
C.D. at 5%	0.03	0.72	1.09	0.09	0.94	0.49

CONCLUSION

On the basis of above findings, it may be concluded that different land configuration methods and planting depth had a significant influence on propagule parameters of gladiolus. Planting on raised bed with 2 rows (L_2) at 3.5 cm (D_1) planting depth has shown best results with respect to all the propagule parameters.

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