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A comparative study on growth, flowering and corm production as influenced by cut corms and growth regulators in gladiolus (*Gladiolus grandiflorus* L.)

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Abstract
The present investigation was carried out during *rabi* season of 2019-2020 at field Experiment. Department of Horticulture, Naini Agriculture Institute, Sam Higginbottom University of Agriculture Technology and Science Prayagraj (U.P.), India. The experiment was laid out in randomized block design with three replications**.** Treatments consisted of ½, ⅓, ¼ cut corms and growth regulators (GA_3 150ppm, 200ppm, 250ppm and BA200ppm, 250ppm, 300ppm) along with control (full corms). Among the different cut corms ½ cut corm as planting material gave the best performance in terms of good growth, flowering and number of daughter corms and spikes/ha and for corm yield and spike yield/100 corms is ¼ cut corm performed best. Among the growth regulators, GA_3 @250 ppm performed better with respect to growth quality, flowering and for number of daughter corms and spikes/ha, corm yield and spike yield/100 corms is BA @ 300ppm performed best. Comparison between cut corms and growth regulators, GA_3 @250 ppm performed best. BA @ 300ppm gave maximum B:C ratio followed by ¼ cut corm. Hence, GA_3 @250 ppm can be recommended for good growth, flowering quality and corm production while for corm multiplication, BA @ 300ppm and ¼ cut corms can be used.

Keywords: Gladiolus, cut corms, GA_3, BA

Introduction
Gladiolus (*Gladiolus spp.*) is an important bulbous crop belongs to family Iridaceae, which is originated from South Africa. It is attributed as 'Queen of Bulbous ornamentals' due to its popularity among the bulbous ornamental cultivated in the world. This flower bears an economic and aesthetic value for its beauty and elegance. The long flower spikes are excellent as cut flower for ornamentation when arranged in vases.

Gladiolus is grown as flower bed in gardens and used in floral arrangements for interior decoration as well as making high quality bouquets (Lepcha *et al.* 2007) [1]. In India, it is commercially cultivated in West Bengal, Himachal Pradesh, Sikkim, Karnataka, Uttar Pradesh, Tamil Nadu, Punjab and Delhi over an area of 9.37 thousand ha with a production of 707 million spikes. Presently the crop is trading in domestic and international markets with great demand. Any attempt made to encourage cut flower production in the region not only helps the florists and consumers to get fresh and quality cut flowers regularly, but also helps the small and marginal farmers in the region to improve their economic condition (Naresh *et al.* 2015) [2, 6].

The gladiolus propagation done by cutting the corms into several pieces for increasing plant materials. Division of the corms in this regard is one of the best economical alternatives to increase the yield of corms and cormels. Corm division is mainly based on the size of the mother corms and existing buds on the corms (Gromov, 1972) [4]. Reported that medium corms are divided into 3 to 4 parts depending upon the number of buds. Each division should have a bud and a portion of root. The use of different plant growth regulators induces early flowering, enhances plant growth in terms of plant height, flower number and corm yield in gladiolus (Singh *et al* 2013) [3]. The concentration of GA_3 is highest in mature propagated have also be effective in overcoming both kinds of dormancy, buds as well as seeds. Gibberellic acid stimulates growth, break dormancy and delay senescence. BA it major role in plants like cell division, elongation and enlargement, induction of flowering, apical dormance-over coming in present days different treatment are given to gladiolus crop to improving its physiological characters.

Material and Methods
A field experiment entitled "A Comparative Study on Growth, Flowering and Corm Production as influenced by cut corms and growth regulators in Gladiolus" has been carried

out at Department of Horticulture, Sam Higginbottom University of Agriculture, Science and Technology, Prayagraj-211007.The cut corms treated with fungicide and full corms are treated with GA_3 and BA were planted at spacing of 30cm×30cm at a depth of 5-6 in the month of November. The experiment was laid out in Randomized Block Design (RBD) with three replications.

Results and Discussion

The data presented in Table 1 shows that significantly higher no. of sprouts pre corms in BA @ 300ppm (3.2). Maximum plant height (cm) in 60 DAS in GA_3 @250 ppm (63.5). Maximum number of leaves in 60 DAS in GA_3 @250 ppm (6.74). Significantly minimum Days to spike emergence is GA_3@250ppm (60.1). Significantly minimum Days to opening of first floret is GA_3@250ppm (86.81). Significantly maximum Spike length (cm) (112), Rachis length (cm) (52.6) in GA_3 @ 250 ppm. Significantly maximum Number of florets/ spikes in GA_3 @ 250ppm (12). The maximum vase life (days) in GA_3 @200ppm (14). Significantly maximum Spike yield / 100 corms in ¼ cut corn (400). Significantly maximum Number of spikes /ha in BA @ 300ppm (355555.3). Significantly maximum daughter Corm yield /100 corms in ¼ cut corm (400). Significantly maximum daughter corms / ha in BA @ 300ppm (355555.2).

Table 1: Effect of cut corms and growth regulators on growth, flowering and corm production in gladiolus

Treatment	No. of sprouts per corms	Plant height 60 das	No. of leaves per plant 60 das	Days to spike emergence	Days to opening of first floret
T1 (control full corm)	1.4	58.5	5.36	72.8	89
T2 (1/2 corm)	1.1	59.3	5.19	71.0	92.3
T3 (1/3 corm)	1.0	54.9	4.44	76.4	94.9
T4 (1/4 corm)	1.0	49.8	3.7	83.8	97.1
T5 (GA_3@150ppm)	2.0	578	6.07	71.7	87.4
T6 (GA_3@200ppm)	2.3	60.4	5.96	67.6	86.4
T7 (GA_3@250ppm)	2.9	63.5	6.74	60.1	84.8
T8 (BA@200ppm)	2.1	51.7	5.19	74.0	90.8
T9 (BA@250ppm)	2.8	56.4	4.74	68.7	90.1
T10 (BA@300ppm)	3.2	59.8	6.07	64.6	87.0
Mean	2.0	57.2	5.34	71.12	90.01
f-test	S	S	S	S	S
SE. d (±)	0.19	1.56	0.62	2.50	0.82
CD (P=0.05)	0.40	3.27	1.30	5.26	1.72
CV	71.99	16.40	70.04	22.98	5.67

Treatment	Rachis length (cm)	Spike length (cm)	No. of florets per spike	Vase life (Days)	Spike yield/100 corms	No. of spikes/ha	Daughter corm yield/100 corms	Daughter corm yield/ha
T1	44.5	91	10.06	10	133.3	144444.3	146.6	162962.8
T2	42.0	75.3	10.1	11	213.3	185518.4	233.3	129629
T3	41.0	73.5	10.0	10	300	111111	300	111111
T4	37.7	70	9.3	9	400	111111	400	111111
T5	45.2	101	10.8	12	200	222222	200	222222
T6	47.7	106	11.1	14	216	255555.3	230	255555
T7	52.6	112	12.0	13	256	325925	293	325925
T8	44.6	92	11.3	12	203	237036	213	237036.8
T9	46.5	95	11.0	13	266	314814	283	314814
T10	50.3	103	11.6	14	300	355555	320	355555
Mean	45.2	91.88	10.8	11.8	248.76	226295	261.9	222592
f-test	S	S	S	S	S	S	S	S
SE. d (±)	1.00	0.86	0.61	0.15	17.64	20310.61	23.22	20044.8
CD P=0.05)	2.10	1.81	1.28	0.31	37.06	42367.81	48.78	41812.7
CV	12.65	1.15	32.87	1.54	72.01	12.09	88.86	12.13

Conclusion

From the research conducted, it is concluded that among the different cut corms ½ cut corm as planting material gave the best performance in terms of good growth, flowering and number of daughter corms and spikes/ha and for corm yield and spike yield/100 corms is ¼ cut corm performed best. Among the growth regulators, GA_3@250 ppm performed better with respect to growth quality, flowering and for number of daughter corms and spikes/ha, corm yield and spike yield/100 corms is BA @ 300ppm performed best. Comparing the cut corms and growth regulators, GA_3@250 ppm performed best. BA @ 300ppm gave maximum B:C ratio followed by ¼ cut corm. Hence, GA_3@250 ppm can be recommended for good growth, flowering quality and corm production while for corm multiplication, BA @ 300ppm and ¼ cut corms can be used.

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