#### Indian J. Hill Farmg. 14 (2) : 88 - 91 2001

# RESPONSE OF GLADIOLUS TO NITROGEN AND PHOSPHORUS UNDER MID HILL CONDITIONS OF HP HIMALAYAS

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## ABSTRACT

An experiment was carried out during 1995-96 and 1996-97 to study the pesponse of gladioli to nitrogen and phosphorus under mid hill conditions of Himachal Prasesh. The results indicated that increasing levels of nitrogen application significantly inproved the growth and flowering in gladiolus up to 150 kg N/ha. Thereafter, non-significant effects were noticed. Although, phosphorus could not influence the germination and numbers of shoot per plant, but 60 kg  $P_2O_5$ /ha was found to be the best recording highest values of growth and flowring attributes. The interactions were significant only for plant height and spike length recording highest values at 150 kg N/ha in the presence of 60 kg  $P_2O_5$ /ha application.

## INTRODUCTION

Gladiolus is an important cut flower of the world. Its cultivation, of late, is gainning impotance in Himachal Pradesh as off-season cut flower. Its attractive spikes, which are available in various colours and prolong vase life, are the main reasons for its increasing popularity. The number of floret which has more market value, can be increased with the increase in plant height and spike length through judicious management of nutriesnts. Among the essential nutrients, nitrogen and phosphorus appear to be resposible for growth and flowering in gladiolus (Singh and Sujatha, 1990). Because of meagre information on nutirent management, the present investigation was carried out to study the response of gladiolus to nitrogen and phosphorus for prodection of quality spike under mid hill conditions of Himachal Pradesh.

## MATREIALS AND METHODS

The experiment was carried out at Horticultural Research Station, UHF, Kandaghate (HP), during 1995-96 and 1996-97 at fixed site. The treatments comprising of five nitrogen levels (0, 50, 100, 150 and 200 kg/ha) and four levels of phosphorus (0, 30, 60 and 90 kg/ha) were laidout in randomized block desigh with three replications. The soil of experiments site was sandy loam in texture, low on nitrogen (210kg/ha), medium in phosphorus and high in potassium (18.5 and 230kg/ha). Gladiolus variety Happyend was sown on 10<sup>th</sup> and 15<sup>th</sup> March, 1995 and 1996, respectively. Treatment

wise half dose of nitrogen and full dose of phosphorus was applies at the time of planting of corms. The fertilizers were placed in furrow just 5 cm bellow the corm. The remaining half nitrogen was top- dressed in two equal split i.e at 2 or 3 leaf stage and at just appearance of spike. Observations on growth and folwering were recorded at the time of harvesting of spikes.

## Response to nitrogen

## **RESULTS AND DISCUSSION**

Application of nitrogen although, did not improve the germination during 1995-96, but during 1996-97 all nitrogen doses being at per with each others significantly improved germination over control. Application of nitrogen at increased level significantlyincreased plant height upto150 kg N/ha during 1995-96 while during 1996-97 maximum plant height recorded at150 kg N/ha which at was par with 100 and 200 kg N/ha. This is ascribed to the favorable effect of nitrogen on growth of the plant (Borrelet, 1984). Similar results in galdiolus have also been reported by Bawaja et al., (2001) spike length and numbers of floret per spike were significantly increased due to incressed levels of nitrogen application up to 150 kg N/ha but the maximum values of these attributes were recorded at 200 and 150 kg N/ha was 5.69, 20.29 and 43.49% higher than 100., 50 and 0 kg N ha, respectively. this may be due to the fact that proper plant growth and devolopment contributed to heigher spike length and number of floret per spike (Mishra and Saini, 1990) as the deficiencey of nitrogen at critical stages of gladioli caused shortening of spike and less number of floret (Singh and Sujatha, 1990).

## Response to phosphorus

All the parameters of gladiolus under study except germination and number of shoots per plant found to increase with the application of phosphorus during both the years of experimentaion. plant height significantly increased only up to 60 kg  $P_2O_5$ /ha during 1995-96 while during 1996-97 maximum plant height (49.22cm) was recorded with 90 kg/ $P_2O_5$ /ha application, closely followed by 30 and 60 kg  $P_2O_5$ /ha. Spike length being at par with 30 and 90 kg  $P_2O_5$ /ha, was maximum with 60 kg  $P_2O_5$ /ha, which was 4.78 and 15.72 per cent higher over 30 and 0 kg  $P_2O_5$ /ha during 1995-96 and 1996-97, respectively. Similarly, highest numbers of floret/spike were recorded at 60 kg  $P_2O_5$ /ha. The findings are in conformity with those reported by Bawaja *et al.* (2001)

Interaction effect of nitrogen and phosphorus were significant only for plant height and spike length (Table 2). Maximum plant height was recorded due to 200 and 150 kg N/ha in the prsence of 90 kg  $P_2O_5$ /ha during 1995-96 and 1996-97, respectively. But the difference between 150 and 200 kg N/ha as well as 60 and 90 kg  $P_2O_5$ /ha was not significant. Like wise the spike length was recorded at 200 and 150 kg N/ha at 60 kg  $P_2O_5$ /ha in the order of the year. It can, therefore, be inferred that Happyend cv of galdiolus produced maximum spike length with sufficient number of floret with the application of 150 kg N/ha and 60 kg  $P_2O_6$ /ha under mid hill conditions of Himachal Pradesh.

## ACKNOWLEDGEMENT

The authors are thankful to the Director of Research, UHF Solas for Providing necessary facilities.

### REFERENCES

- Bawaja, H.S; Panwar, A.S; Kashyap, A.S. and Shukla, Y.R. 2001. Effect of nitrogen and phosphorus on growth and flowering in gladiolus under mid hill conditions of HP. In Proc. of National Seminar "Approaches for increasing agricultural productivity in hill and mountain eco-system" Barapani, Meghalaya October, 18-20, 2001, pp 82-93
- Borrellet, A. 1984. Planting density and nitrogen fertilizing in the cultivation of gladioli in summer and autam. *Rivistadella Ortoflorafrutticoture*. 66:201-210.
- Mishra, R.L. and Saini, H.C. 1990. Correlation and path coefficient studies in gladiolus. Indian Journal of Horticulture, 47:127-132.
- Singh, K.P. and Sujatha, 1990. Influence of different levels of nitrogen and phosphorus in gladioli cv. Meadew corn production. South Indian Horticulture, 38:208-210.

Treat ments	Germination		Plant height (cm)		No of shoots per plant		Spike length (cm)		No of f per s	loret pile
	Y1	Y2	Y1	¥2	Y1	Y2	Y1	Y2	Y1	Y2
Nitrog	en levels	(kg/ha)		1				nicods	0.0152,001-0	encarr.
No	85.24	85.31	41.12	35.56	1.50	1.75	40.48	35.61	8.17	7.88
N 50	86.57	87.24	49.47	40.37	2.40	1.85	49.28	41.50	10.36	9.23
N 100	87.27	88.40	56.65	48.47	2.85	2.41	52.89	50.42	11.43	11.38
N150	86.67	88.53	60.00	52.32	2.87	2.68	55.10	54.10	11.68	11.89
N 200	85.72	86.48	60.78	52.54	2.85	2.75	55.65	53.56	11.29	12.04
CD	NS	0.92	2.01	4.17	0.34	0.58	5.29	4.17	1.53	2.48
Phosp	horus lev	els (kg/h	a)							
P <sub>0</sub>	85.21	85.41	48.54	41.45	2.46	2.10	46.24	42.45	9.45	9.04
P30	886.28	86.85	52.83	45.68	2.58	2.28	50.99	46.96	10.65	10.48
P.60	86.45	88.03	55.86	47.69	2.67	2.37	53.22	49.42	11.12	11.25
P <sub>90</sub>	87.20	88.47	57.18	49.22	2.70	2.39	52.21	49.28	11.07	11.17
CD	NS	NS	1.78	3.72	NS	NS	4.73	3.72	1.41	2.22

Table 1. Effect of nitrogen and phsophorus on growth and flowering in gladiolus

Y1 = 1995-96; Y2 = 1996-97

2.24 -

Table 2. Interaction effect of nitrogen and phosphorus on plant height and spike length

		1995-96					1996-97			
Treamer	at N <sub>o</sub> nts	N <sub>50</sub>	N <sub>100</sub>	N <sub>150</sub>	N <sub>200</sub>	No	N <sub>50</sub>	N <sub>100</sub>	N <sub>150</sub>	N <sub>200</sub>
		diament da	antisin	P	lant heig	ght (cm)		6		
Po	37.54	42.51	51.05	55.25	56.32	32.75	34.41	43.75	48.75	47.82
P30	40.70	48.73	55.15	59.42	60.14	35.49	39.37	48.85	52.15	52.54
P 60	42.75	52.50	59.65	62.12	62.32	36.52	43.73	49.23	54.65	54.39
P.90	43.50	54.14	60.75	63.20	64.35	37.49	43.95	51.49	57.75	55.42
CD	(P=0.05)		4.05		nin in di		enaura. datacios	tis novi toos vetit	8.37	
	110	40800	ie gnige	S	oike len	gth (cm)	n to sta	i évizze	to sitti	
Po	31.42	43.80	50.12	52.72	53.15	30.75	36.32	44.36	49.51	51.32
P30	40.75	49.75	5.15	55.19	56.39	35.42	41.54	51.32	54.32	52.24
P 60	45.32	52.75	54.35	55.80	57.90	37.85	44.62	53.15	56.75	54.75
P <sub>90</sub>	44.42	50.81	53.95	56.72	55.15	38.42	43.51	52.85	55.82	55.80
CD	(P=0, 05)		10.57						8.33	

Interve plus paday spaw viewe (noisperated matched augn other closely. If was observed their thrate the undernate follow two that up groups. The restanteneous infiltration and unitation boloachies in this treatments with resolution compaction were barecard to be 0.75 and 0.02 countin respectively. For easi of the two treatments these were observed to be 0.45 and 0.40 counting cespectively. The result showed to be 0.46 there were appreciable offerences on the grain and store view which anong various treatments differences on the grain and store view which anong various treatments aver control of five per cept for all the mechanical competition of subsoli proved to be the best reading which whereas incorporation of itte results the two fields and the view and and the store and the result of the per cept for all the mechanical competition of an all stream whereas incorporation to an and the result stream when a per test the result of the store of the subsoli proved to be the best reading which whereas incorporation of participation from the treatment (preduce) end of the store provided maximum in testing of grain yielded maximum in testing of grain.

behaviour under compression of subcoil layer and compaction of

#### NOT DELCOMPTUNE

Anoneugo dio contra casarie region (verte) of mana expension region, in very high rainfall during the monitoria newsors yet due to the excessive topos of water due to infertation uniformered the group vertes aspecially if the short apolic of mathemas periods connects with the most seasting growth stages of crop which is quite persetble. In order to avoid this, it is highly desirable that the approximate level of standing valer is always mainterned so as to provide sufficient resistorer to crop when its