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GROWTH, FLOWERING AND CORM PRODUCTION IN GLADILOUS CV. OSCAR AS INFLUENCED BY NITROGEN AND SPACING IN ACIDIC SOIL OF NAGALAND

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Gladiolus *(Gladiolus Grandifforns)* is a very popular cut flower in India and extensively grown in Nagaland. However, it had not gained much importance due to lack of appropriate agrotechniques and availability of quality planting materials. So its cultivation is restricted for home consumption. Experimental evidences support cultivation of gladiolus during summer in the low hills of Nagland (Singh *et al.*, 1998). Very little work has so a been done on the development of its agrotechniques under Nagaland condition. Plant population per unit area and proper fertilization of nitrogen are the important factors to determine the vegetative growth, flowering and corm production (Dod *et al*, 1991). Application of nitrogen had striking effect on plant'growth (Shah et al., 1984), while production of corms and cormels greatly increased by application of N in gladiolus (Barma *et al.*, 1998). Spacing had conspicuous effect on plant height, number of leaves and flowering (Mukhopadhyay and Yadav, 19841) and corm and cormels production (Singh and Singh, 2000). The present effort aims to standardize the nitrogen dose and spacing in acidic soil of Nagaland in gladiolus production.

MATERIALS AND METHODS

The experiment was carried out at Horticultural Experimental Farm, School of Agricultural Sciences and Rural Development, Nagaland University, Medziphema during April, 1998 in a factorial randomized block design with three replications. The site falls in subtropical climate with high rainfall and humidity. Soil had pH 4.4 and electrical conductivity 0-10 ds/m. Corms of gladiolus cv. Oscar having 4.5 cm diameter were planted at four spacing (10 x 30, 15 x 30, 20 x 30 and 30 x 30 cm) and three doses of nitrogen (0, 15 and 30 g/M^2) was applied in two equal split doses, i.e., 2 and 4 leaf stage in the form of urea. A basal dose of FYM @ 5 kg/ M^2 was incorporated into the field at 15 days before planting of corms. Phosphorous and potassium each of 20 g/M^2 was applied into the soil before planting. Uniform cultural and plant protection measures were adopted for all the treatments. Observations on growth parameters were recorded at 45 days after planting. Flowering parameters were observed after opening of first floret. Corms and cormels were dug out from the soil when foliage turned yellow to brown and data were recorded after cleaning of corms and cormels.

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RESULTS AND DISCUSSION

Growth and flowering parameters

The results showed significant differences due to various spacing and nitrogen levels on vegetative growth and flowering in gladiolus (Table 1). However, interaction between spacing and N levels did not produce significant effect on any parameters. Application of 30 g N/M^2 significantly increased the number of leaves/plant, plant height, number of florets and diameter of florets, while lower dose of N (15 g/M^2) resulted early flowering. Plants without *N* gave the poorest performance in growth and flowering. Various levels of N did not show striking effect on number of spikes/plant, diameter of spike and vase life of flower. The present findings are in agreement with several workers who observed pronounced effect of nitrogen in increasing plant growth Deswal *et al.*, (1983) and , number and size of florets Shah *et al.*(1991) in gladiolus.

Spacing of 20 x 30 cm significantly increased the number of leaves/plant, height of plant and also early flowering. Further increase in spacing upto 25 x 30 cm did not bring any positive response on growth and flowering. The better performance of appropriate spacing for planting was attributed to reduced level of competition between plants for nutrients and increase in net photosynthesis and availability of metabolites for growth and early flowering. The present findings are in accordance to the earlier observations made by several workers (Mukhopadhyay and Yadav, 1984 and Dod *et al.*, 1991).

Corms and cormels production

The different spacing and N levels failed to exert any conspicuous effect on number of corms and weight of cormels/plant. The higher dose of N (30 g/M2) significantly increased the weight and diameter of corms and number of cormels / plant. The poorest production of corms and cormels was recorded under control. The results are in close conformity with the findings of earlier workers (Dod *et al.*, 1991 and Barma *et al.*, 1998).

Wider spacing (20 x 30 cm) tended to produce maximum weight of corms and number of cormels / plant (Table 2). The availability of more light for synthesis of photosynthates and more area for better root growth and nutrient absorption in wider spacing might have augmented the production of bigger size corm and more number of cormels. Several workers corroborated the fact that wider spacing had favoruable effect on weight of corms and number of cormels in gladiolus (Arora and Khanna, 1987 and Singh and Singh, 2000).

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Table -1, Growth and flowering parameters of gladiolus cv. Oscar as influenced by nitrogen and spacing

Treatments	No. of leaves /plant	Length of leaf (cm)	Height of plant (cm)	Day to opening of first flower	Diame-ter of spike (cm)	No. of floret/ spike	Diame-ter of floret (cm)	No. of spike/ hill	Vase life (days)
Nitrogen									
Control	8.46	44.38	46.24	66.91	0.75	12.99	7.03	1.41	9.93
15 g/M2	9.77	59.09	52.97	65.87	0.81	14.49	8.01	1.82	11.52
30 g/M2	10.91	61.60	57.30	67.58	0.81	14.74	8.63	1.99	11.18
LSD (P=0.05)	1.02'	7.93	3.02	1.02	*NS*	0.95	0.59	*NS*	NS
Spacing									
10 x 30 cm	9.29	54.87	46.73	67.83	0.77	13.77	7.82	1.55	9.69
15x3Ocm	9.84	57.89	51.40	66.22	0.80	14.22	7.88	1.77	10.73
20 x 30 cm	11.21	53.86	56.07	66.10	0.80	14.44	8.14	1.84	11.84
25 x 30 cm	8.51	53.46	54.48	66.99	0.82	13.88	7.72	1.80	11.25
LSD (P=0.05)	0.88	*NS*	2.62	0.88	*NS*	*NS*	NS	NS	*NS*

Table 2 Corms and cormels production in gladiolus cv. Oscar as influenced by nitrogen and spacing

Treatments	No. of corms/plant	Weight of corms/plant	Diameter ofcorms (cm)	No of cormels/plant	Weight of cormels/plant
Nitrogen					
Control	1,71	50.97	5.23	29.66	4.86
15 g/M2	2.10	55.34	6.10	35.20	4.86
30 g/M2	2.15	57.04	6.10	36.96	6.52
LSD(P=O	NS	3.57	0.44	4.16	NS
Spacing					
10 x 30 cm	1.92	50.48	5.85	30.55	5.57
15 x 30 cm	1.99	53.12	5.88	33.69	5.34
2Ox3Ocm	2.06	58.87	5.61	37.77	5.74
25x3Ocm	1.99	55.32	5.90	34.12	6.50
LSD (P=0.05)	NS	3.09	NS	3.60	NS

Indian J. Hill Farmg. 14 (1) : 132 — 135 2001

EFFECT OF NITROGEN, PHOSPHORUS AND POTTASSIUM ON YIELD PERFORMANCE OF MAIZE UNDER MID HILLS OF MIZORAM

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Maize is the second most important crop of Mizoram net to paddy and occupied an area of 8,681 ha with a production of 16,589 mT (Anonymous, 2000). The productivity of maize is very low as compared to other North Easter states is due to non adoption of modem technologies, low and non-judicious use of organic or inorganic sources. The major soil productivity constraints are attributed to shifting cultivation, steep slopes, torrential rainfall, high soil erosion, low fertilizer use efficiency, soil acidity and other associated problems (Patiram *et al.* 1994 and Laxminarayana & Azad Thakur 1999). As the response of various nutrients was not evaluated under mid hill conditions of Mizoram, the present investigation was carried out to study the effect of different graded doses of N, P and K on yield performance of maize.

A field experiment was conducted during kharif (rainy seson) of1998 under upland terraces at ICAR Research Complex for NEH. Region, Mizoram Centre, Kolasib, Mizoram. Initial soil sample was collected, processed and analyzed for textural components (Piper 1966), organic carbon (Walkley and Black 1934) and other chemical constituents (Jackson 1973). The experiment was laid out in three replications in a randomized block design with 10 treatments. (Table 2)

Farmyad manure (FYM) was applied @ 10 t/ha uniformly to all the plots well in advance of sowing of the crop. Nitrogen was applied as per the treatments in the form of urea in three split doses (half at basal, ¼ at crown root initiation and 1/4 at tasseling stages, respectively). Phosphorus and potassium were applied as basal in the form of single super phosphate and muriate of potash, respectively as per the treatments. The maize (cv RCM 1-1) seeds were dibbled at 45 x 30 cmcm spacing and the crop was harvested at 110 days after sowing and the yield parameters were recorded.

The experimental soil is sandy loam in texture (Table 1) and belogs to Typic Hapludults, acidic in nature (pH 5.2), non saline (EC 0.25 dS/m). The soil contains medium status of organc carbon (0.67%), low in available N (224 kg./ha) low in available P_2O_5 (14.7 kg/ha) and medium in available K_2O (292 kg/ha). High intensity and uneven distribution of rainfall at higher altitudes and decrease of temperature slows down the rate of decomposition of organic matter, leading to wider C:N ratio and deficiency of available N in the soils (Nath & Deori 1976; Singh & Datta 1988; patiram et al. 1994). A close perusal of the date in Table 2 revealed that all the yield parmeters were significantly increased with the application of different grade