



Influence of Iron nutrition on Growth, Quality of Flowers and Corm Yield of Gladiolus variety “Trader-horn”

K S P Rao

A N G R Agricultural University, Rajendranagar, Hyderabad-500 030, A.P

ABSTRACT

Field investigations were carried out to explore the possibilities of improving the growth, qualitative characters of flower and corm yield of gladiolus variety “Trader-horn” through foliar sprays of iron. The experiment was conducted in 3 consecutive years during 1998-99, 1999-2000 and 2000-01 on an alfisol at Agricultural Research Institute, Rajendranagar, Hyderabad. The results showed that the foliar spray of FeSO_4 @ 0.6% concentration at 3-4 leaf stage of crop growth increased the length and weight of spikes. Wilting of 5 flowers/spike occurred significantly later in response to foliar feeding even with low concentration of 0.4%. The corm size did not improve by the application of this nutrient. but, the corm yield increased significantly by spraying FeSO_4 @ 0.6% in all the three years.

Key words :Cormyield, FeSO_4 , Flower quality, Foliar Spray, Gladiolus and Growth.

Iron plays an important role in gladiolus flower crop growth and development. Large differences among varieties in their response and relative susceptibility can be observed. The region of minimum solubility of iron 10^{-10} M occurs between pH 7.50 and 8.50.

However it was reported in general that plants need in excess of 10^{-8} M of soluble-iron(Fe) to supply their nutritional needs (Schwab & Lindsay 1989).

Temperature changes may either enhance or suppress iron deficiency depending upon their effects on the Rate of growth, plant metabolism and the status of other elements in the soil associated with the problem (Brown 1956). High soil temperatures could increase the uptake of ‘P’ by plants and the severity of ‘P’ induced ‘Fe’ deficiency, (Moraghan 1987).

High soil temperatures or aerial temperatures could stimulate relative growth rate and induce ‘Fe’ deficiency (Brown 1956 and Inskeep and Bloom 1986).

Excess of water results in the increased accumulation of Ethylene in soil (Smith & Restall 1971). Accumulation of this gas, some times detrimentally affects root-growth and may increase the severity of Fe-deficiency chlorosis (Perret & Koblet 1984). But foliar spray of this nutrient may probably overcome these difficulties and nourish the sensitive gladiolus flower crop with iron nutrition and improve the performance.

MATERIAL AND METHODS

A field experiment was conducted in 3 consecutive years during 1998-99, 1999-2000 and 2000-2001 at the Agricultural Research Institute, Rajendranagar. The soil was poor textured Alfisol with 7.3 pH and an EC of 0.19 dSm^{-1} . The organic carbon content was 0.35%. The available N, P_2O_5 and K_2O were 146, 245 and 350 Kg ha^{-1} . The available sulphur was 8.5 ppm and iron content was 14.50 mg kg^{-1} . The CEC was $52.3 \text{ me } 100\text{g}^{-1}$.

The gladiolus variety Trader horn was sown during the seasons, 1998, 1999 and 2000. The spacing was 30 cm x 20 cm and there were 5 Replications Fertilizers were applied @ 40N.20P.20K per sqm .

N is applied at 2 to 3 leaf stage, followed by flower spike emergence stage, in splits.

The experimental layout was a randomized block design. There were 4 treatments viz. control, foliar spray of FeSO_4 @ 0.2, 0.4 and 0.6% were administered, when the crop was at 3-4 leaf stage. The data was recorded on plant growth, floral characters and corm production

RESULTS AND DISCUSSION

The results showed that gladiolus was highly responsive to the foliar feeding of iron through the aqueous spray of FeSO_4 . The crop attained a mean plant height of 70.5, 73.2 and 81.3 cm at harvest during 1998-99;1999-2000 and 2000-2001 respectively (Table 1). The crop responded to foliar spray of 0.2% FeSO_4 and significantly grew tall to

Table 1. Influence of foliar spray of FeSO₄ concentrations on growth of gladiolus variety of "Trader-horn"

FeSO ₄ Spray (%)	Plant height (cm)			Spike length (cm)			Spike weight (g)			Days to flower initiation			Flower size (cm)		
	98-99	99-00	00-01	98-99	99-00	00-01	98-99	99-00	00-01	98-99	99-00	00-01	98-99	99-00	00-01
0%	70.5	73.2	81.3	85.0	61.0	74.1	47.0	37.0	59.4	78.5	58.0	55.9	9.5	12.3	10.5
0.2%	79.0	78.8	85.9	95.0	69.0	76.9	55.0	43.0	59.3	78.9	55.0	55.4	11.2	12.6	10.8
0.4%	86.0	83.1	83.9	100.5	69.0	75.9	58.0	47.0	60.6	80.6	55.0	55.3	10.9	13.30	10.6
0.6%	84.0	97.3	84.9	102.0	72.0	80.9	59.3	53.0	68.2	80.5	53.0	53.0	13.2	12.8	11.1
SE±	3.1	1.7	1.8	5.1	3.7	3.0	3.8	4.7	1.5	1.3	2.5	1.0	1.3	0.25	0.35
CD 5%	6.8	3.7	4.0	11.3	8.1	6.4	8.4	10.3	3.3	NS	NS	NS	NS	NS	NS

Table 2. Influence of foliar spray of FeSO₄ concentrations on floral characters and corm production of gladiolus variety "Trader-horn"

FeSO ₄ Spray (%)	No. of Florets/Spike			Flower duration till wilting of 5 florets on the spike			Corm yield (q ha ⁻¹)			Corm size (cm)			Corm weight plant ⁻¹ (g)		
	98-99	99-00	00-01	98-99	99-00	00-01	98-99	99-00	00-01	98-99	99-00	00-01	98-99	99-00	00-01
0%	13.0	11.0	12.6	11.00	12.10	11.30	55.0	59.0	45.0	6.80	7.24	7.16	75.2	80.4	83.1
0.2%	15.0	12.0	12.8	12.10	12.80	12.40	56.0	61.0	72.0	7.20	7.18	7.53	83.4	90.0	96.4
0.4%	14.0	11.0	13.0	13.20	13.70	12.70	64.0	72.0	68.0	7.67	8.02	7.37	95.6	97.3	104.8
0.6%	15.0	11.0	13.0	13.70	14.20	13.00	73.0	77.0	79.0	8.10	7.96	7.42	97.3	98.5	98.7
SE±	0.6	0.2	0.07	0.36	0.52	0.42	2.00	1.90	1.40	0.87	0.73	0.33	6.14	4.8	6.5
CD 5%	NS	NS	NS	0.79	1.20	0.95	4.20	4.20	3.00	NS	NS	NS	13.5	11.3	13.3

a height of 79.0; 78.8 and 85.9 cm in the corresponding years. The crop exhibited further significant increase in height by increasing the concentration to 0.4% in the first year and upto 0.6% in the second year.

The growth and floral characteristics of gladiolus were significantly influenced by the foliar sprays of iron. Maximum length and weight of the spikes was realized by spraying the crop with FeSO_4 @ 0.6% concentration. But, days to flower initiation, flower size and number of flowers and number of florets/spike were not influenced by different concentrations of FeSO_4 in the three years.

The most important quality factor of interest to the grower, dealer and user is to keep the flowers fresh for a longer time before they begin to wilt. The foliar feeding of gladiolus recorded encouraging trends. The spikes took 11.0, 12.1 and 11.3 mean days for wilting of top 5 flowers on the spike in the crop grown without the foliar feeding of iron during 1998-99, 1999-2000, 2000-2001 respectively (Table 2). Foliar spray of FeSO_4 @ 0.4% concentration significantly delayed the time of wilting of top five flowers / spike to 13.2 and 13.7 days in the first and second year. But, a concentration of 0.2% was sufficient to impart significant delay in flower wilting to 12.4 mean days in the third year.

The size of the gladiolus corms was not significantly altered by the foliar feeding of iron. But, the corm weight / plant recorded a significant improvement. The corm weight increased from 75.2 g in control to 95.6 g plant^{-1} by spraying 0.4% FeSO_4 in the first year. It increased from 80.4 to 97.3 g

plant^{-1} in the second year and from 83.1 to 104.8g plant^{-1} in the third year. The corm yield was remarkably increased due to foliar feeding of iron. Maximum yield of 73.0, 77.0 and 79.0 q ha^{-1} was recorded by spraying FeSO_4 @ 0.6% concentration in the three years.

The study indicated that the quality of gladiolus flowers and quantity of corms can be improved by foliar spray of 0.6% FeSO_4 .

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