STUDIES CONCERNING BASIC FERTILIZATION EFFECTS ON YIELD AND QUALITY OF THE CULTIVATED GLADIOLUS FLOWERS

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Abstract

The beauty of Gladiolus flowers makes them to be highly appreciated and purchased in Romania. The polls conducted among flower buyers and growers in Europe place Gladiolus on 6thposition after carnations, roses, chrysanthemums, Gerbera and tulips (Vlad, 2011). Gladiolus cultivars grown at present are hybrids known under the common designation Gladiolus hybridus (Preda, 1979). During the vegetation period, old corm is shrinking and one or several new corms appear: they bear at the base 20-30 up to 200-300 cormlets (Gasner, 1998).

Due to the fact than in Romania these flowers are highly appreciated and there is high a demand on the markets, we initiated studiesinvestigating the possibilities of increasing the flower yield and grade.

Key words: *Gladiolus hybridus*, corms, garden soil, organic fertilizers

INTRODUCTION

Gladiolus are herbaceous, perennial, semi-rustic geophytes presenting globular or flattened corms underground from which emerge elongated, sword-shaped leaves. The flowers are funnel-shaped and grouped in a spike. The number of flowers within a spike varies depending on the cultivar in the range 12 to 30 flowers. Floral stem reaches 80-140 cm height (Şelaru, 1989). For high grade flowers, only corms over 3 cm in diameter are recommended to be planted (Rovenţo, 1989).

MATERIAL AND METHOD

The employed cultivar was Eurovision, of red color: flowering period begins after 70-80 days from setting the corms in the soil, the flower stalk reaches 1.2-1.5 m and contains15-22 individual flowers per spike.

Experimental blocks were:

V_1 – blank experimental block

V_2 – fertilization employing 200 kg/ha of ammonium nitrate, 200 kg/ha double Pi super-phosphate and 300 kg/ha potassium sulphate.

V_3 – fertilization with 150kg/ha ammonium nitrate, 150 kg/ha double Pi super-phosphate, 200 kg/ha potassium sulphate and 10 t/ha garden soil.

V_4 - fertilization with 100kg/ha ammonium nitrate, 100 kg/ha double Pi super-phosphate, 100 kg/ha potassium sulphate and 20 t/ha garden soil.

V_5 – fertilization with 40t/ha garden soil.

Planting was performed in 14 and 15 April, 2011 and in 11-12 April, 2012 when soil temperature at planting depth (12 cm) reached 10-12ºC. Plantation distances were 18 cm between rows and 12 cm within the row. Shallow planting causes plants to be overthrown by strong winds while too deep planting induces late emergence and blooming.

Maintenance works consisted of weeding, soil mulching with straw, watering and supplemental fertilization with 0.1% Foliar Feed, once a week.

RESULTS AND DISCUSSIONS

Table 1 depicts the results with regard to *Gladiolus* flowers yield: it consisted of 30 stalks/m^2 in block no. 1(unfertilized), 35 stalks/m^2in block no.2 (fertilized only with inorganic fertilizers), 39 stalks/m^2in block no. 3 (fertilized with inorganic fertilizers + 10 t/ha of organic fertilizer), 41 stalks/m^2 in block no. 4 (fertilized with inorganic fertilizers + 20t/ha organic fertilizer) and 46 stalks/m^2 in block no. 5 (fertilized with organic fertilizer exclusively).

Table 1

Total yield of *Gladiolus hybridus* flowers under the influence of basic fertilizations

Blocks	**Flower yield**		**±D**	**Significance of the difference**
	Absolute Stalks/m^2	**Relative %**		
V_1 – blank (unfertilized)	30	100	-	-
V_2 – fertilized 200 kg/ha of ammonium nitrate, 200 kg/ha double Pi super-phosphate and 300 kg/ha potassium sulphate.	35	116	32	*
V_3- fertilization with 150kg/ha ammonium nitrate, 150 kg/ha double Pi super-phosphate, 200 kg/ha potassium sulphate and 10 t/ha garden soil.	39	130	9	**
V_4- fertilization with 100kg/ha ammonium nitrate, 100 kg/ha double Pi super-phosphate, 100 kg/ha potassium sulphate and 20 t/ha garden soil	41	137	11	***
V_5- fertilization with 40t/ha garden soil	46	153	16	***

DL 5% - 4.5
1% - 6.8
0.5% - 10.42

From a relative point of view, the yield was exceeded by 35% in block no. 6 and by 37% in block no. 5, showing a very significant difference as compared to the blank, by 30% in block no. 3, a distinctly significant difference compared to the blank and by 16% in block no. 2, a significant difference compared to the blank.

Basic fertilization influences the amount of the yield but also its quality through the quantity and the type of fertilizers applied per unit area (table 2).

Table 2

The influence of basic fertilizers upon the quality of *Gladiolus hybridus* flowers

Blocks	**Flower yield in *Gladiolus hybridus***		
	Totals of stalks/m^2	**Of which, first quality**	
		Absolute stalks/m^2	**Relative %**
V_1 – blank (unfertilized)	30	24	80
V_2 – fertilized 200 kg/ha of ammonium nitrate, 200 kg/ha double Pi super-phosphate and 300 kg/ha potassium sulphate.	35	29	83
V_3- fertilization with 150kg/ha ammonium nitrate, 150 kg/ha double Pi super-phosphate, 200 kg/ha potassium sulphate and 10 t/ha garden soil.	39	35	89
V_4- fertilization with 100kg/ha ammonium nitrate, 100 kg/ha double Pi super-phosphate, 100 kg/ha potassium sulphate and 20 t/ha garden soil	41	37	90
V_5- fertilization with 40t/ha garden soil	46	44	96

The proportion of first grade flowers varied in the range of 80% in block no. 1 (unfertilized blank) and 96% in block no. 5 (fertilized only with organic fertilizer.

In block no. 2, (fertilization employing 200 kg/ha of ammonium nitrate, 200 kg/ha double Pi super-phosphate and 300 kg/ha potassium sulphate) this proportion reached 83% while in block no. 3 (fertilization with 150 kg/ha ammonium nitrate, 150 kg/ha double Pi super-phosphate, 200 kg/ha potassium sulphate and 10 t/ha garden soil) the proportion of first grade flowers reached 89%.

In block no. 4, (fertilization with 40 t/ha garden soil) the first grade flowers represented 90% of the total yield.

Economical efficiency as high for all 5 experimental blocks, the highest value being reported for the block no. 5 where only organic fertilizer was employed (table 3).

Table 3

Economical efficiency of *Gladiolus* hybridus culture

Blocks	**Expenses RON/m^2**	**Flower yield Stalks/m^2**	**Yield value RON/m^2**	**Profit RON/m^2**
V_1 – blank (unfertilized)	90	30	180	90
V_2 – fertilized 200 kg/ha of ammonium nitrate, 200 kg/ha double Pi super-phosphate and 300 kg/ha potassium sulphate.	101	35	227	126
V_3- fertilization with 150kg/ha ammonium nitrate, 150 kg/ha double Pi super-phosphate, 200 kg/ha potassium sulphate and 10 t/ha garden soil.	105	39	273	166
V_4- fertilization with 100kg/ha ammonium nitrate, 100 kg/ha double Pi super-phosphate, 100 kg/ha potassium sulphate and 20 t/ha garden soil	106	41	307.5	201.5
V_5- fertilization with 40t/ha garden soil	108	46	368	260

CONCLUSIONS

Gladiolus hybridus cultivation is a profitable activity, depending on the cultivation technology applied.

Thermal and water regime were more favorable in the soil fertilized with increased amounts of garden soil therefore plant growth and quality were enhanced.

Improved amount and quality of the flower yield led to an increased profit expressed in terms of money per unit area: 3680000RON/ha in the block with the highest yield.

However, production expenses were higher in block no. 5 (V_5-fertilization with 40t/ha garden soil) compensated by increased yield and flower grade expressed by the net profit reaching 2.6 mil. RON/ha, with 1.7 mil RON/ha more compared to block no.1 representing the unfertilized blank.

Considerable profit was obtained from the yield in block no. 3 (1.6mil. RON/ha) and block no. 4 (2.0 mil. RON/ha) both being fertilized with inorganic and organic fertilizers.

A lesser profit was obtained from the block no. 2 where only inorganic fertilizers were applied, with 0.36 mil. RON/ha less compared to the blank.

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