

## THE INFLUENCE OF FERTILIZATION ON THE YIELD OF POLYANTHES TUBEROSA

Vlad Ioana Andra\*, Vlad Mariana\*, Vlad Ioan\*

\* University of Oradea, Faculty of Environmental Protection, 26 Gen. Magheru St., 410048 Oradea, Romania, e-mail: [ioanvlad2006@yahoo.com](mailto:ioanvlad2006@yahoo.com)

### Abstract

*The long lasting cut flowers of Polyanthes tuberosa (7-12 days) as well as the beauty and the strong, pleasant fragrance of those determine high consumer demand. Recent polls made among flower growers and consumers in Europe place the species on 6th position after carnations, roses, tulips, Gerbera and Freesia. Therefore, researches were developed in Leș nursery (Bihor County) devised to contribute to the improvement of cultivation technology in order to obtain increased yields of Polyanthes tuberosa flowers.*

**Key words:** *Polyanthes tuberosa*, economic efficiency, fertilizers, flower yield, profit.

### INTRODUCTION

The tuberose is a perennial geophyte, semi-rustic, originating from Mexico (Șelaru, 2007). It presents an underground ovoid bulb, surrounded by numerous bulbils. The leaves are linear (1-2 cm/15-30 cm), distributed in clusters (Zaharia, 2005). The flower shoot reaches 50-110 cm height, is glabrous and red dotted. The inflorescence is a spike reaching 15-20 cm height, supporting 20-25 white or cream colored flowers, dispersing a pleasant fragrance, simple or double, depending on the cultivar (Bossard, 1992).

### MATERIAL AND METHOD

We employed the Romanian cultivar Perla characterized by rich, double white and waxy flowers. The inflorescence reaches 18-20 cm height and the flowers are clustered on the shoot which reaches 80-90 cm height.

The bulbs were planted in 12 April 2011 and in 15 July 2012, in rows separated by 30 cm distance, at 10 cm deep into the soil and 20 bulbs per row.

The experimental design consisted of:

V1 – unfertilized culture (control).

V2 – fertilized culture using 200kg/ha ammonia nitrate, 200kg/ha potassium sulphate, 100kg/ha super phosphate and 100 kg/ha fertilizing complex III.

V3 – fertilized culture using 400kg/ha ammonia nitrate, 400kg/ha potassium sulphate, 200kg/ha super phosphate and 200 kg/ha fertilizing complex III.

V4 – fertilized culture using 50t/ha manure.

V5 – fertilized culture using 100 t/ha manure.

The observations included the assessment of total flowers' yield, the length of flower shoots, number of flowers/inflorescence and inflorescence lengths.

## RESULTS AND DISCUSSION

Table 1 presents the harvested and sold flowers' yield: the values vary in the range of 80,600 spikes/ha in control culture and 100,750 spikes/ha in V5 (fertilized culture using 100t/ha manure).

Table 1

Total yield of *Polyathes tuberosa* flowers obtained under fertilization regime.

| Variants   | Flowers' yield (spikes/ha) |            | ±D     | Significance of the difference |
|--|----------------------------|------------|--------|--------------------------------|
|  | Absolute                   | Relative % |        |                                |
| V1 – control, without fertilization  | 80,600                     | 100        | -      | -                              |
| V2 - fertilized culture using 200kg/ha ammonia nitrate, 200kg/ha potassium sulphate, 100kg/ha super phosphate and 100 kg/ha fertilizing complex III. | 83,900                     | 104        | 3300   | *                              |
| V3 – fertilized culture using 400kg/ha ammonia nitrate, 400kg/ha potassium sulphate, 200kg/ha super phosphate and 200 kg/ha fertilizing complex III. | 88,800                     | 110        | 8,200  | **                             |
| V4 – fertilized culture using 50t/ha manure  | 91,690                     | 114        | 10,090 | ***                            |
| V5 – fertilized culture using 100 t/ha manure.   | 100,750                    | 125        | 20,150 | ***                            |

LSD 5% - 3,164

1% - 5,062

0.1% - 8,210

In relative terms, flowers' yield exceeded the control with 4% in variant 2 (fertilized culture using 200kg/ha ammonia nitrate, 200kg/ha potassium sulphate, 100kg/ha super phosphate and 100 kg/ha fertilizing complex III), with 10% in variant 3 (fertilized culture using 400kg/ha

ammonia nitrate, 400kg/ha potassium sulphate, 200kg/ha super phosphate and 200 kg/ha fertilizing complex III), with 13% in variant 4 (fertilized culture using 50t/ha manure) and with 25% in variant 5 (fertilized culture using 100 t/ha manure). From statistical point of view, the difference is significant between control and variant 2, distinctly significant between control and variant 3, and extremely significant between control and variant 3 and 4.

Economic efficiency of *Polyanthes tuberosa* culture is favorable in the case of all variants but at the highest level for variant 5 (fertilized culture using 100 t/ha manure) (Table 2).

Table 2

Economic efficiency of *Polyanthes tuberosa* culture obtained under fertilization regime.

| Variants   | Spike yield in thousands/ha | Expenses in thousands RON/ha | Yield value thousands RON/ha | Interests Thousands RON/ha |
|--|-----------------------------|------------------------------|------------------------------|----------------------------|
| V1 – control, without fertilization  | 80.6                        | 141.8                        | 282.1                        | 140.3                      |
| V2 – fertilized culture using 200kg/ha ammonia nitrate, 200kg/ha potassium sulphate, 100kg/ha super phosphate and 100 kg/ha fertilizing complex III  | 83.9                        | 151.7                        | 318.9                        | 167.2                      |
| V3 – fertilized culture using 400kg/ha ammonia nitrate, 400kg/ha potassium sulphate, 200kg/ha super phosphate and 200 kg/ha fertilizing complex III. | 88.8                        | 166.4                        | 355.2                        | 188.8                      |
| V4 – fertilized culture using 50t/ha manure  | 91.69                       | 184.2                        | 394.2                        | 210                        |
| V5 – fertilized culture using 100 t/ha manure  | 100.75                      | 222.4                        | 493.6                        | 271.2                      |

## CONCLUSIONS

- A particular feature of the species *Polyanthes tuberosa* is the relatively low proportion, 40-50% of flowering bulbs from the total amount of planted bulbs even under best cultivation conditions.
- The cultivation of this species is a pleasant activity, also profitable but differentiated according to the amount of employed fertilizers.

- The best results were obtained in variant 5 (fertilized culture using 100 t/ha manure) from the point of view of the yield and also, from the point of view of the number of first quality flowers, as well as concerning the obtained interests.
- Good results were obtained also in the case of variant 4 (fertilized culture using 50t/ha manure).
- Tuberoses are demanding with respect to soil conditions; they require good soil aeration and the absence of weeds which implies repeated weeding of the culture.
- The harvest of the flowers must be performed when half of the flowers are blooming. The harvest when flowers are still closed compromises the opening when they are already placed in vases.

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