

# TULIP BULBS PREPARATION BY HEAT TREATMENT FOR FORCED CULTURE IN GREEN HOUSE

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## *Summary.*

*Tulip can be grown in parks as ornamental plant and cut flowers, or possibly in protected areas for cut flowers during winter and early spring.*

*An important condition for the successful cultivation of tulips is the quality of the bulbs that are going to be planted and their biological preparation.*

*Under the quality aspect bulbs have to be uniform and large, preferably with circumference greater than 11 cm and must have good phytosanitarical status.*

*Preparation of organic bulbs for ensuring the continuation of the differentiation process of germs (floral), is made during the storage. It is known that the preparation of organic bulbs are made in interaction with environmental factors, among which temperature plays an important role. At the beginning and throughout the process of biological preparation, temperature is maintained at a higher level then the temperature must be low until planting.*

*The temperature level and the duration of treatment varies by followed objective respectively early or late flowering and staggered flowers production over a longer period of time.*

## INTRODUCTION

Tulip is a perennial flower plant, with bulbs originary from Central Asia and introduced in Europe in 1554, and in Romania in 1559. The plant has large bulbs with brown tunic, linear or linear-broad leaves, with straight or wavy edge. Large colored flowers are held erect on long sticks of 30-50 cm, depending on the variety.

The morphological specificity of the tulips is the type of flower constitution -3 - that sepals are processed into colored tepals. Are blooming at the beginning of spring to early summer in the open and can be made to bloom in winter or summer in the greenhouse scheduled (forced) crops. Tulips are light-lowers but they are good in little shadow. Tulips are growing well on heavier soils, requires moderate water, change of culture place and returning on it only after four years.

Harvesting the flowers is made in the morning when the flower buds reached the maximum size of variety and are well colored.

## MATERIALS AND METHODS

Have been used the variety of Apeldoorn, from Darwin hybrid group which has large flowers red orange color with black base and vigorous floral rod.

Treatments performed on bulbs included two variants, namely:

V1 - bulbs maintained for two weeks at 30 ° C up to the state G (distinct trilobite gynoecia) made on 18 July.

V2 - bulbs maintained at 20 ° C, achieving the state G on July 30. The workload was 600 bulbs / variant and 300 bulbs per variant.

Thereafter half of bulbs were kept at 5 ° C for 12 weeks (immediately after reaching the state G) and those in the second half (variant) were kept on for 11 weeks at 5 ° C and one week at 27 ° C. Planting in the greenhouse was made on 12 October in V1 and October 23 at V2.

After planting the bulbs in the greenhouse, the minimum temperature in air at ground level was maintained on three different levels at 13-14 ° C, 8-9 ° C, 3-4 ° C.

## RESULTS AND DISCUSSIONS

As shown in Table 1 the percentage of bloomed plants shows values close when bulbs were maintained in the initial phase at a temperature of 30° C and 20 ° C.

After going through the phase of differentiation of germs at temperatures of 30° C and 20 ° C and maintain temperature above 5 ° C, raising the temperature to 27 ° C for one week reduce the period of restraint.

Table no. 1

The influence of threshold temperature of the biological preparation period, storage and after bulbs planting in greenhouse on plants growth and flowering

Variants	Treatment after reaching the G stage	Planting date in greenhouse	Temperatura menținută în seră după plantarea bulbilor								
			3-4°C			8-9°C			13-14°C		
			% blooming	Days number from planting to blooming 50%	The length of the floral stick (cm)	% blooming	Days number from planting to blooming 50%	The length of the floral stick (cm)	% blooming	Days number from planting to blooming 50%	The length of the floral stick (cm)
Variant 1	12 weeks on 5°C	12 X	100	73	60	100	61	59	100	58	58
	11 weeks on 5°C + a week on 27°C	12 X	100	55	58	99	48	57	98	42	56
Variant 2	12 weeks on 5°C	23 X	100	88	66	100	75	64	100	64	58
	11 weeks on 5°C + a week on 27°C	23 X	94	73	59	88	29	58	94	51	55

The time from bulbs planting to achieve a proportion of 50% bloomed plants shows values from 42 days when the temperature in the greenhouse was maintained at a higher level (13-14 ° C) until 75 days when was kept at 8-9 ° C and above that bulbs were treated by keeping the temperature at 20 ° C for 12 weeks. Under this last aspect detaches the idea that the temperature in the greenhouse should be maintained at least in the first period at a lower level. A relatively similar conclusion can be the positive influence of lower temperatures on improving the quality factors by length of the floral stick.

The heat treatment on tulip bulbs exercise positive influence on their rooting. As shown in Table 2, bulbs treated at the initial stage at 30 ° C and kept at 5 ° C root after only 7 days. As the temperature decreases with the initial treatment of bulbs and the resumption of the final treatment at 27 ° C the rooting period may be extended up to 17 days.

Table no. 2

Influence of bulbs treatment temperature on their subsequent rooting

Variants	Duration of storage and secondary treatment of bulbs	Number of days until the bulbs rooting
Variant 1	12 weeks on 5°C	7
	11 weeks on 5°C + a week on 27°C	9
Variant 2	12 weeks on 5°C	12
	11 weeks on 5°C + a week on 27°C	17

Table no. 3

Economic efficiency of tulips forced culture under the influence of heat treatment (average values 2007-2008)

Variants	Treatment after reaching the G state	Expenses incurred (lei/ha)	Production value (lei/ha)	Benefit (lei/ha)
Variant 1	12 weeks on 5°C	373700	777800	404100
	11 weeks on 5°C + a week on 27°C	309800	758500	448700
Variant 2	12 weeks on 5°C	386000	779400	393400
	11 weeks on 5°C + a week on 27°C	328200	757800	429600

Economic efficiency is favorable for both variants, but at top parameters to the variant which bulbs were kept 11 weeks at 5 ° C + a week at 27 ° C after reaching the G state that the profit was 248,700 lei / ha. Higher profits obtained here is due to reducing the period of restraint and reducing the heating and maintenance expenses up to 25 days.

## CONCLUSIONS

Preparation of organic tulip bulbs in favor of differentiating the flower germs can be stimulated by heat treatment, at different periods and temperatures

Repetition in the final stage of heat treatment at a temperature of 27 ° C for one week entails a reduction in the duration of restraint, and thereby a reduction of production costs

Heat treatment exercise positive influence on bulbs of tulips rooting too, if they are treated in the initial phase at 30 ° C and below at 5 ° C. Under these conditions the rooting occurs after only 7 days, reducing the duration of restraint and its costs.

## REFERENCES

1. Bossard R. – *Cultures florales*. Ed. J.B. Balliere, Paris, 1995
2. Bossard R. – *Le forçage des plantes ornementales*. Ed. J.B. Balliere, Paris, 1992
3. Bohming F. – *Schnittblumen*. Ed. Neumann, Berlin, 1996
4. Encke F. – *Pareys Blumengartnerei, Band I und II. Paul Parey in Berlin und Hamburg, 1988,1990*
5. Grunert Chr. – *Zimmerblumen*. Ed. Vel Deutscher Land, Berlin, 1984
6. Penningsfeld F. – *Die Ernährung imk Blumen und Zierpfel*. Ed Paul Parey, Berlin, 1992
7. Preda M. – *Lalele si zambile in cultura fortata*. Revista Gradina, via si livada, nr. 3/1983
8. Charron G. – *Encyclopediede jardins*. Ed. Larouse, Paris 1987
9. Foley D. – *Garden Flowers in colors*. Ed. Macmillian, New York, 1976
10. Gassner K. – *Zauberwelt der Zimmerpflanzen*. Ed. Parey, Berlin, 1988
11. Georget P. – *Floriculture*. Ed. Spes Lausanne, 1986
12. Grisvard P. – *Le bon jardinière*, ed. Maison Rustiq, Paris, 1984
13. Herwig Rob. – *Bulbs you can grow*, Collier Macmillan Publisher, London, 1985
14. Laurie A – *ComercialFlower Fareing*. Ed. Mc. Graw hill Book Companie, New York, 1988
15. Muncescu E. – *Protejarea peste iarna a culturilor de Tulipa si Hyacinthus*. Revista de Horticultura, Bucuresti, nr. 10/1988
16. Preda M. – *Lalele*. Editura Agrosilvică, București, 1979
17. Preda M. – *Floricultură*. Editura Ceres, București, 1979
18. Reeker R. – *Torfibel fur Gartner*. Ed. P. Parey, Berlin, 1992
19. Schauenberg P. – *Les plantes bulbeoses*. Ed. Delachaux et Niestle, Neuchatel, 1984
20. selaru e. – *Florile din gradina mea*. Ed. Ceres, Bucuresti, 1988
21. Șelaru Elena, Ceaușescu Maria – *Lalelele*. Editura Ceres, 1980
22. Șonea V., Afrodita Pavel., Ailincăi Natalia, Șelaru Elena – *Floricultură*. Editura Didactică și Pedagogică, București, 1979
23. Schosser G. – *Pflanzenkultur mit dem Pflanzenstrahler Osram Grubtt*, Berlin, 2006
24. Vlad I. – *Floricultură*. Editura Imprimeriei de Vest, Oradea, 2004.
25. Zaharia D. – *Floricultură*. Editura Risoprint Cluj-Napoca, 2005