

PARTIAL RESULTS OBTAINED ON PROPAGATING HERBACEOUS PEONY FROM GREEN SHOOTS CUTTINGS

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Abstract

The research work conducted is of great importance both to professional growers and peonies lovers who like to admire them in gardens and parks, because of the method of herbaceous peony propagation that it presents and because of the measurements, observations and determinations made during the research. It is especially important because its outcomes. This experience brings new information regarding peony propagation by different methods. It contributes to the scientific enrichment regarding the culture technology and the propagation of the herbaceous peony through the studies conducted on this method of propagation. It brings in the contributions and benefits of the herbaceous peony cultivators regarding the propagation rate, percentage of rooting, rooting substrate, use of different solutions and rooting substances but also on the peony cultivars that can influence the rooting percentage. The research conducted is of topical importance, especially since the peony flower has a significant and high ornamental value regarding the culture and marketing of peony flowers which is growing on the flower production market, bringing information and solutions to the problems encountered in the culture. and peony marketing. The present research presents some results obtained: the propagation rate is high between 10 seedlings/plant in Kansas cultivar and 26 seedlings/plant in Dorren cultivar; although in this experience the rooting rate was below 30%, this method of propagation cannot be neglected but improved in the future; the method can be recommended with a high propagation rate; from the partial data obtained so far, this method can be recommended in order to propagate the herbaceous peony.

Key words: cuttings, peony, rooting, shoots.

INTRODUCTION

The research work conducted is of great importance both to professional growers and peonies lovers who like to admire them in gardens and parks, because of the method of herbaceous peony propagation that it presents and because of the measurements, observations and determinations made during the research. It is especially important because its outcomes. The propagation rate by this method is higher than the propagation rate obtained by applying other methods. For example, from one plant, one can obtain up to 30 cuttings that can be rooted, after which 30 plants can be obtained if the rooting percentage is 100%.

This method does not disturb the root of the plants, the cuttings being made from green shoots.

This experience brings new information regarding peony propagation by different methods. It contributes to the scientific enrichment regarding the culture technology

and the propagation of the herb peony through the studies conducted on this method of propagation. It brings in the contributions and benefits of the herbaceous peony cultivators in terms of propagation rate, percentage of rooting, rooting substrate, use of different solutions and rooting substances but also on the peony cultivars that can influence the rooting percentage.

The research conducted is of topical importance, especially since peonies have significant and high ornamental value given that their growing and marketing are nowadays increasing on the flowers production market. This research brings information and solutions to the problems faced in peonies' growing and marketing.

Peonies are propagated by the division of the shrub, layering, cuttings, grafting, by seeds and in vitro.

Herbaceous peony species are propagated by the division of the shrub, an operation carried out on mature plants, 4-5 years old. After partly

removing the soil from the roots, the mother plants are cut into pieces with a very sharp knife or divided by bare hand in 3-6 parts, depending on the size of the mother plant (Toma Florin, 2005).

Division of peony shrubes may be annually made in intensive flowering plants (*Aster*, *Chrysanthemum*), once 2-3 years (*Delphinium*) and once 5-6 years in slow growing or sensitive to separation plants (*Paeonia*) (Cantor Maria, 2009).

In temperate climate areas in the Northern hemisphere, peonies flower between May and July. Modern propagation researches conducted in the last years allowed growers to obtain some cultivars with various flowers and forms (Cantor Maria, 2016).

MATERIALS AND METHODS

The research was conducted in 2018 at USAMV Bucharest, in the experimental field of the department of floriculture, in the University's botanical garden, in the greenhouse, and in the bower. The greenhouse and the experimental field of the department of floriculture were arranged for conducting the experiment.

The research material used in this experiment consists of herbaceous peony cultivars from both private garden and the university's collection.

This research is bifactorial and has two components: factor A and factor B.

Factor A includes the following herbaceous peony cultivars: Festiva Maxima, Dorren, Pink Giant and Kansas.

Factor B is represented by the following solutions used for rooting: Rootip Basic, Rootip Mix, Kerafol Evo, Fighter Phos and Atonik. The 4 variants presented in Table 1 resulted from the combination of the two factors. Between May and April, cuttings were taken and planted in alveolar pallets. The substrate used for planting the cuttings is a mixture made of 60% peat and 40% perlite with 4 mm granulation.

Throughout the research period, biometric measurements, and visual determinations and observations were used as research methods.

Biometric measurements were done by means of the following indicators:

- Length of cuttings;
- Diameter of cuttings;
- Diameter of the passing area located between root and base of the stem;
- Diameter of earth bale around the roots;
- Length of formed roots.

Visual observations based on the following indicators:

- Propagation rate;
- Rooting percentage;
- Percentage of young/lignified roots.

Table 1. Experimental variants, herbaceous peony cultivars and rooting solutions

Variant	Cultivar	Rooting solution
V1	Festiva Maxima, Dorren, Pink Giant, Kansas	Rootip Basic
V2	Festiva Maxima, Dorren, Pink Giant, Kansas	Rootip Mix
V3	Festiva Maxima, Dorren, Pink Giant, Kansas	Rootip Basic 50 ml+ Kerafol Evo 25 ml + 10 ml Fighter Phos la 10 l apa
V4	Festiva Maxima, Dorren, Pink Giant, Kansas	Atonik

RESULTS AND DISCUSSIONS

By the research studies conducted, this experiment brings partial outcomes regarding peonies' propagation by cuttings green shoots highlighting the variants experienced in terms of cultivars and solutions that have been used, but also the rate of propagation, the percentage of rooting and the characteristics of the roots formed.

By analysing the data in Table 2 we observe a minimum propagation rate of 6 cuttings/ plant related to the Kansas cultivar and a maximum rate of propagation of 26 cuttings/plant related to the Dorren cultivar. Regarding the dimensions of the cuttings, we have obtained cuttings with length between 4 and 13 cm, and diameter between 2 and 5 mm.

Table 2. Propagation rate and characteristics of green shoots cuttings of some herbaceous peonies cultivars, 2018

Cultivar I	Propagation rate Number of cuttings per plant		Length of cuttings (cm)		Diameter of cuttings (mm)	
	min	max	min	max	min	max
Festiva Maxima	12	22	5	11	2	5
Dorren	14	26	6	13	2	4
Pink Giant	8	12	4	9	2	3
Kansas	6	10	5	10	2	4



Figure 1. Types of green shoots cuttings



Figure 2. Cuttings before being planted



Figure 3. Trimming of cuttings before root



Figure 4. Bathing of cuttings in solutions for rooting before planting



Figure 5. Putting of cuttings in various solutions for rooting before planting



Figure 6. Planting of cuttings in the rooting substrate



Figure 7. Placing pallets with cuttings under arches covered with canvas in the greenhouse



Figure 8. Putting of cuttings in the greenhouse and their covering with a canvas



Figure 9. Cuttings during the rooting phase



Figure 10. Cuttings during the rooting phase

The determinations regarding the characteristics of the rooted cuttings are presented both in Table 3 and Figure 11. Thus, the maximum root length was between 8 cm in the Dorren cultivar in the V3 variant and 17 cm in the Kansas cultivar in the V3 variant. The diameter of the passing area between the root and the base of the stem was between 2 mm in the Pink Giant cultivar in the V3 variant and 15 mm in the Kansas cultivar in the V2 variant. The earth bale around the root diameter was between 1 cm in the Pink Giant cultivar in the V3 variant and 4.5 cm in the Dorren and Kansas cultivars in the V3 variant.

The percentage of young roots was between 40% in the Kansas cultivar in the V2 variant and 100% in the Pink Giant cultivar in the V3 variant, and the percentage of lignified roots was between 10% in the Kansas cultivar in the V3 variant and 60% in the Kansas cultivar in the variant V2.

Rooting percentage in all cultivars was below 25%.

Table 3. Characteristics of rooted cuttings of some herbaceous peonies cultivars

Variant	Cultivar	Maximum length of the root (cm)	Diameter of the passing area between the root and the stem base (mm)	Diameter of the earth bale around the root (cm)	Percentage of roots	
					Young	Lignified
V1	Festiva maxima	9 cm	8 mm	2.5 cm	70%	30%
V2	Kansas	11 cm	15 mm	4 cm	40%	60%
	Dorren	8 cm	10 mm	4.5 cm	80%	20%
V3	Kansas	17 cm	14 mm	4.5 cm	90%	10%
	Pink Giant	4.7 cm	2 mm	1 cm	100%	-

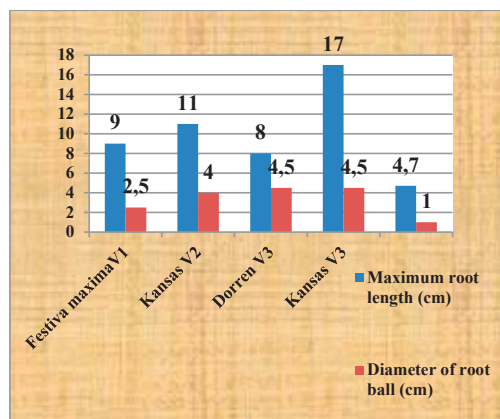


Figure 11. Dimensions of cuttings' roots of some herbaceous peony cultivars



Figure 12. Cuttings during rooting phase, Dorren cultivar



Figure 13. Cuttings during rooting phase, Pink Giant cultivar



Figure 14. Cuttings during rooting phase, Festiva maxima cultivar



Figure 15. Cuttings during rooting phase by variants



Figure 16. Cuttings during rooting phase by variants, 2018



Figure 17. Cutting during rooting phase



Figure 18. Appearance and characteristics of rooted cuttings, 2018



Figure 19. Root appearance, cultivar, Kansas, V3, 2018



Figure 20. Cutting and root, Kansas cultivar, V2, 2018



Figure 21. Rooted cutting, cultivar, Festiva maxima, V1, 2018



Figure 22. Rooted cutting, cultivar Dorren, V3, 2018



Figure 23. Rooted cutting cultivar, Festiva maxima, V1, 2018



Figure 24. Rooted cutting, cultivar Kansas, V3, 2018



Figure 25. Cutting and root, Pink Giant cultivar, V3, 2018



Figure 26. Planting of rooted cuttings in pots, 2018

CONCLUSIONS

Through the observations, determinations and measurements made this research led to the following conclusions:

- the propagation rate is high between 10 cuttings/plant in Kansas cultivar and 26 cuttings/plant in Dorren cultivar;

- the rooting solution in V3 variant, Rootip Basic 50 ml + Kerafol Evo 25 ml + 10 ml Fighter Phos per 10 l water was the most effective regarding the rooting of peonies cuttings green shoots;
- albeit during the first experiment the rooting percentage was below 30%, this method of propagation cannot be neglected but improved in the future; the method can be recommended because of its high propagation rate;
- the maximum length of cuttings roots was obtained in V3 variant;
- the maximum diameter of the passing area located between the root and the stem base, and of the earth bale around the formed roots was obtained in variant V3, too;
- the best percentage in terms of young roots was obtained V3 variant, too;
- based on the partial data obtained so far, this method may be recommended for propagating herbaceous peonies.

REFERENCES

- Cantor Maria (2009). *Floricultura Generala Universitatea de Stiinte Agricole si Medicina Veterinara Cluj-Napoca*, Cluj-Napoca, pag. 73.
- Cantor Maria (2016). *Floricultură special*. Ed. AcademicPres, Cluj Napoca.
- Toma Florin (2005). *Ingrijirea si pregatirea pentru iarna a speciilor floricole din parcuri si gradini*, Editura Lucman, Bucuresti, 2005.

