

¹Mitel-Dumitru TOMA, ¹Floarea BURNICHI, ¹Vasilica MANEA,
¹Emilian MIREA, ¹Alexandru TOADER, ¹Bogdan STAICU,
¹Florentina-Ionela VASILE, ¹Lenuta PANTAZI, ¹Auras NITA

RESEARCH ON ROOTING PELARGONIUM CUTS USING DIFFERENT TYPES OF SUBSTRATES

¹ Vegetable Research and Development Station Buzau, no 23 Mestecanului Street, Buzau, ROMANIA

Abstract: The geraniums are rich in flowers, brightly colored, with rounded leaves and slightly fragrant. These are known scientifically as Pelargonium. It is distinguished by the fact that it has irregularly shaped flower buds, fewer fertile stamens and a tube of nectar, compared to other species in the Geraniaceae family. Pelargonium plants are widely used for decorative purposes, both inside and outside our homes. The genus Pelargonium comprises about 300 species and varieties of perennials, most of which are native to South Africa. These plants are part of the Geraniaceae family. The geranium is a plant, able to bloom continuously from May until the appearance of the first autumn frosts, provided that they benefit from a strong sunshine and a moderate watering. The establishment of the experiment was intended to obtain a culture technology of these plants, as optimal as possible, in order to provide scientific information, mainly to flower producers, but also to enthusiasts of this branch. The experiment was set up at the Buzau Vegetable Research and Development Station in the fall of 2019. This experiment involved making twelve cuttings of Pelargonium Calliope Dark Red, which were placed in different soil substrates.

Keywords: cuttings, rooting, Pelargonium, substrate

INTRODUCTION

The geraniums are rich in flowers, brightly colored, with rounded leaves and slightly fragrant. These are known scientifically as Pelargonium. It is distinguished by the fact that it has irregularly shaped flower buds, fewer fertile stamens and a tube of nectar, compared to other species in the Geraniaceae family.

The flies are of different sizes, from 30 to 100 cm high, with various shapes of flowers and leaves, more intense or less colored. Licorice can have the scent of mint, pine, cinnamon, lemon, pineapple, orange, etc. The genus Pelargonium (The Geraniaceae family), with more than 200 species, has considerable economic importance on the ornamental plant market (García-Sogo et al., 2012). Geraniums are popular pot plants with attractive flowers, a wide range of colors, flowers, blooms and leaves (Kheenizy, 2016). Pelargonium, as balcony plants, has a relatively high nutrient requirement (Farkas Zsuzsa et al., 2018).

The family groups numerous grass species, which have aerial organs covered with glandular bristles, which produce ethereal oils with repellent effect against biotic factors (phytophagi) (Tomescu, 2020). Pelargonium species are important in the perfume industry and are grown and distilled for their fragrance (García-Sogo et al., 2012). The stems are branched, swollen at knots, erect or ascending, with alternating or opposite leaves, simple or composed, accompanied by stipes. Flowers are actinomorphic or zigomorphic, hermaphrodite, type 5, solitary or arranged in umbels (Tomescu, 2020).

Geraniums multiply vegetatively through cuttings of stems (Toma, 2020). The cuttings are obtained from the mother plant by segmenting the stems, being under observation for

a period of time, with a view to rooting (Molenaar et al, 2017). The absence of symptoms of senescence in the leaves of Pelargonium cuttings, their ability to root, grow and develop harmoniously and not in the end the absence of diseases and pests, represent the impoetante quality criteria (Mutuia et al., 2012).

The storage of cuttings in dark areas for certain periods of time had no effect on the percentage of rooting and the number of roots. In some species, dark storage reduced the total root lengths and reduced the mass of the fresh root (Mutui et al. 2010).

The addition of zeolite induced a considerable increase in Tagetes sp and improvement of germination, number of plants and flowers to hybrids of Gladiolus sp. (Kolar et al 2010) Buzău is located in the southeastern region of Romania, in the central area of Buzău County, on the right bank of the Buzău River, at an altitude of 101 m above sea level, with coordinates 45°09" north latitude and 25°5" east longitude (<https://www.primariabuzau.ro>)

Calliope Dark Red, the specific color of this geranium is dark red, large, round plant, flower shape is of very rich medium size, compact semi-flowing growth with a very good branching (Toma, 2014). It is a hybrid of geranium, super vigorous plant, particularly attractive in suspended pot, loves light. Flowering is extremely abundant. Dress the edges very well (Toma, 2014).

The establishment of the experiment was intended to obtain a culture technology of these plants, as optimal as possible, in order to provide scientific information, mainly to flower producers, but also to enthusiasts of this branch.

MATERIALS AND METHODS

The experiment was set up at the Buzau Vegetable Research and Development Station in the fall of 2019. This experiment involved making twelve cuttings of Pelargonium Calliope Dark Red, which were placed in different soil substrates, as follows:

- water, biostimulator solution - Atonik, perlite,
- perlite + Micoseeds (prepared for rooting stimulation),
- sand + peat + perlite + Micoseeds,
- sand + peat + perlite,
- sand + Micoseeds,
- sand + peat + Micoseeds,
- sand, peat + sand,
- peat + Micoseeds,
- peat.

The plants were exposed to the following environmental factors: temperature 18-20 degrees Celsius, moderate humidity, positioned in a very well lit area. Observations were made on the twelve plants 25 days after the establishment of the experiment.



Figure 1- Preparing Calliope Dark Red Geranium Cuttings at SCDL Buzau, 2019

For the purpose of experimenting, it was chosen to choose vegetable matter, a hybrid with a semi-flowing port, with flowers of an intense red and a rich bloom (Calliope Dark Red). As can be observed in Figure 1 A, the experiments have

made plant propagation material (mother plants), these being the source of obtaining new plants by a well-established process, as can be seen in Figure 1 B and C, the end of the process being the obtaining of quality cuttings, from a plant protection and vegetative point of view. Prepare the Calliope Dark Red geranium cuttings by cutting. A cutting, according to the quality standards of the plant propagation material, was between 8-10 cm long or about 3 knots. Basically, cut about 60-70% of the plant (Toma, 2014).

RESULTS

Based on research carried out on the vegetative propagation plant material of the genus Pelargonium, it was found that cuttings belonging to this genus root in a shorter period of time, in the following substrates or combinations of substrates, in the order presented

1. Sand + peat +perlite;
2. Peat +micoseed,
3. Peat,
4. Sand. (Figure No 2).

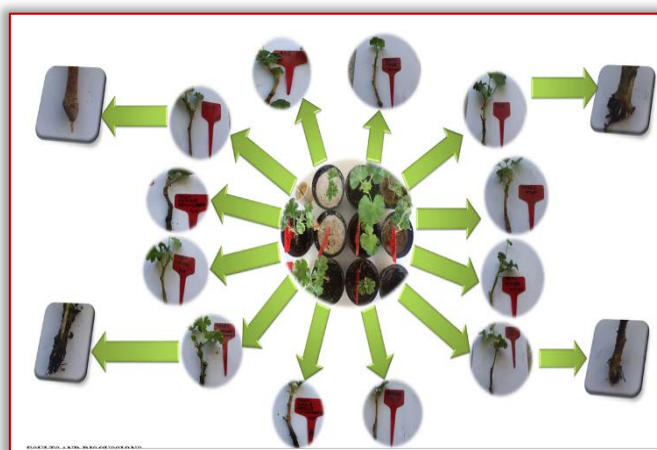


Figure 2. Rooting of Calliope Dark Red geranium cuttings
Rooting of Calliope Dark Red geranium cuttings, use the following substrate variants/substrate combinations:

- water, biostimulator solution - Atonik, perlite,
- perlite + Micoseeds (prepared for rooting stimulation),
- sand + peat + perlite + Micoseeds,
- sand + peat + perlite,
- sand + Micoseeds,
- sand + peat + Micoseeds,
- sand, peat + sand,
- peat + Micoseeds,
- peat.

In order to obtain healthy plants, according to the quality standards of the plant propagation material, research has been done on the establishment of the most optimal environment and substrate of culture to shorten the period of rooting of cuttings, a process that influences the period of plant vegetation. Following the establishment of optimal conditions and substrates for the rapid rooting of cuttings the recovery period, which is very important for manufacturers is considerably reduced.



(a)



(b)

Figure 3- Geranium seedlings (a) (Toma, 2019).

(b) Detail geraniums (Toma, 2019).

After performing the process on the mother plants, the new cuttings were obtained which were planted in alveolar pallets, benefiting from a nutrient substrate suitable for the new plants, a factor that helps the optimal vegetative development of the plant, as can be seen in image 3A. The post-working work of this process is successive transplantation into vessels suitable for the size of the plant, as shown in image 3B.



Figure 4- Rooted geranium cuttings, ready to plant in pots (Toma, 2019).

The optimal time of transplantation of rooted cuttings is determined according to several characteristics: when their roots begin to develop circularly at the base of the vessel and when the leaf surface begins to develop, as can be seen in the image above (Figure 4). In the case of cuttings with very long and thin roots, the cutting work is carried out, which helps to catch and develop the new plant.

CONCLUSIONS

Observations were made on the twelve types of plants 25 days after the establishment of the experiment. Pelargonium

cuttings have visibly taken root 25 days after planting, in certain substrates, the root being vigorous and with visible signs of branching (over 1 cm in root length).

The experiment was set up to establish a substrate (or combination of several substrates), suitable for a more efficient rooting of these plants, which can be used frequently by growers.

Acknowledgement

The experiments performed in the article were financed by the Romanian Ministry of Education and Research through the component project 4 ECOLEG, from the complex project PN-III-PI-1.2-PCCDI-2017-0659 Contract II PCCDI / 2018 LEGCLIM, in 2019, at SCDL Buzau.

Note:

This paper is based on the paper presented at ISB-INMA TEH' 2020 International Symposium (Agricultural and Mechanical Engineering), organized by Politehnica University of Bucharest – Faculty of Biotechnical Systems Engineering (ISB), National Institute of Research-Development for Machines and Installations Designed to Agriculture and Food Industry (INMA Bucharest), Romanian Agricultural Mechanical Engineers Society (SIMAR), National Research & Development Institute for Food Bioresources (IBA Bucharest), National Institute for Research and Development in Environmental Protection (INCDDPM), Research-Development Institute for Plant Protection (ICDPP), Research and Development Institute for Processing and Marketing of the Horticultural Products (HORTING), Hydraulics and Pneumatics Research Institute (INOE 2000 IHP) and "Food for Life Technological Platform", in Bucharest, ROMANIA, 30 October, 2020.

References

- [1] Farkas Zsuzsa T., Peto J., Huvely A., 2018, „The effect of different magnesium supply on growth of Pelargonium”, Agricultural Management / Lucrari Stiintifice Seria I, Management Agricol, 2018, Vol. 20 Issue I, p31-36. 6p;
- [2] García-Sogo B., Pineda B., Roque E., Antón T., Atarés A., Borja M., Beltrán J. P., Moreno V., Cañas L. A., (2012), Production of engineered long-life and male sterile Pelargonium plants”, BMC Plant Biology, vol.12, Article number:156 (2012);
- [3] Khenizy, S.,(2016), Improving Rooted Cuttings Quality of Pelargonium zonale cv. "Belmonte Red" after Planting and Cold Storage Journal of Plant Production Article 5, Volume 7, Issue 10, Page 1073-1084 DOI:10.21608/jpp.2016.46938;
- [4] Kolar M., Dubský M., Šrámek F., Pintar M., (2010), The Effect of Natural Zeolite in Peat Based Growing Media on Pelargonium zonale, Plants Europ.J.Hort.Sci., 75 (5). S. 226–230, 2010, ISSN 1611-4426. Europ.J.Hort.Sci. 5/2010;
- [5] Molenaar H., Glawe M., Boehm R., Piepho H.-P., (2017), Selection for production-related traits in Pelargonium zonale: improved design and analysis make all the difference, Horticulture Research Vol 4, Article number: 17004;
- [6] Mutui T., Mibus H., Serek M., (2010), The influence of plant growth regulators and storage on root induction

- and growth in *Pelargonium zonale* cuttings, *Plant Growth Regulation*, vol.61, p.185–193;
- [7] Mutuia T., Mibus H., Serek M., (2012), Effect of metatopolin on leaf senescence and rooting in *Pelargonium × hortorum* cuttings, *Postharvest Biology and Technology*, Volume 63, Issue 1, January 2012, pp.107–110;
- [8] Toma D.M., (2019), *Muscata -Pelargonium*, prezentare orală, SCDL Buzau 2019, Ziua portilor deschise la SCDL Buzau;
- [9] Toma F., (2014), *Curs Floricultura*, Facultatea Horticultura, Specializarea Peisagistica, USAMV, Bucuresti, anul scolar 2013/2014;
- [10] Toma F., (2020), *Curs Floricultura*, Master Tehnologii integrate si valorificarea produselor horticole, Facultatea Horticultura USAMV, Bucuresti, anul scolar 2020/2021;
- [11] https://www.primariabuzau.ro/UserFiles/File/Strategia/Strategia_Buzau_2014_2020.pdf;



ISSN: 2067-3809

copyright © University POLITEHNICA Timisoara,
Faculty of Engineering Hunedoara,
5, Revolutiei, 331128, Hunedoara, ROMANIA
<http://acta.fih.upt.ro>