**POSSIBILITIES OF USING REPRESENTATIVES
OF THE GENUS *FUCHSIA* L. FROM THE COLLECTION
OF THE “ALEXANDRU CIUBOTARU” NATIONAL BOTANICAL
GARDEN (INSTITUTE) AS OUTDOOR ORNAMENTAL PLANTS
IN THE REPUBLIC OF MOLDOVA**

Natalia TODERAȘ

*“Alexandru Ciubotaru” National Botanical Garden (Institute),
Chisinau, Republic of Moldova*

Abstract: The article discusses the possibility of using representatives of the genus *Fuchsia* L. as outdoor ornamental plants, in summer, in container gardening. The main features of vegetative propagation of several species and hybrids of this genus have been identified. The most promising ones have been identified and evaluated.

Key words: *Fuchsia* L., landscaping, container gardening, vegetative propagation.

**PERSPECTIVELE UTILIZĂRII REPREZENTANȚILOR
GENULUI *FUCHSIA* L. DIN COLECȚIA GRĂDINII BOTANICE
NAȚIONALE (INSTITUT) „ALEXANDRU CIUBOTARU” CA PLANTE
DECORATIVE ÎN TEREN DESCHIS ÎN REPUBLICA MOLDOVA**

Rezumat: Articolul prezintă potențialul de utilizare ai reprezentanților genului *Fuchsia* L. ca plante decorative de teren deschis, în perioada caldă a anului, în cultura de container. Sunt prezentate rezultatele studiului particularităților reproducerii vegetative a mai multor specii și hibrizi din acest gen. Au fost identificați cei mai promițători taxoni.

Cuvinte cheie: *Fuchsia* L., înverzire, cultura de container, reproducere vegetativă.

INTRODUCTION

Currently, the practice of widening the range of outdoor ornamental plants by using representatives of tropical and subtropical flora is becoming more and more common. Obviously, in the more northern areas, with temperate climate, their use is limited to the warm season. The assortment of such plants must meet certain requirements. One of them is, of course, the decorativeness of plants in summer. Another one is the possibility to propagate fast the planting material and get young plants of a certain size by the beginning of the planting season. Some representatives of the genus *Fuchsia* L. meet all these requirements.

The genus *Fuchsia* consists of about 110 species of flowering trees and shrubs, which commonly occur in the Central and South America, New Zealand and the island of Tahiti. It belongs to the willowherb family (Onagraceae) and includes some of the most popular ornamental plants of this family. Charles Plumier named this genus after the outstanding physician and botanist of the 16th century Leonhart Fuchs [4]. The first fuchsias were cultivated in Europe in 1806. *Fuchsia neglecta* L., *Fuchsia magellanica*

Lam., *Fuchsia corymbiflora* Ruiz et Pav. and many other species served as the basis for the creation of more than two thousand cultivars of fuchsia, which are widespread throughout the world [3].

Until recently, fuchsias were used as outdoor ornamental flowering plants only in subtropical and tropical areas of the world. In more northern areas, they were mainly used indoors. Now they are more and more often used outdoors in the warm season, mainly in container gardening. In the Greenhouse Plants Laboratory of the “Alexandru Ciubotaru” National Botanical Garden (Institute), there are 13 taxa of the genus *Fuchsia*, namely, 5 species and cultivars: *Fuchsia paniculata* Lindl., *Fuchsia magellanica* Lam. var. *macrostema* (Ruiz. & Pav), *Fuchsia magellanica* Lam. var. *gracilis*, *Fuchsia magellanica* Lam. cv. Aurea, *Fuchsia magellanica* Lam. cv. Green and Gold, *Fuchsia regia* (Vell.) Munz; and 6 hybrids: *Fuchsia hybrida* cv. Brutus, *Fuchsia hybrida* cv. Deutsche Perle, *Fuchsia hybrida* cv. Genii, *Fuchsia hybrida* cv. Betty Joan, *Fuchsia hybrida* cv. Orange Crush and *Fuchsia hybrida* F1. Of these taxa, the most suitable for container gardening were selected as experimental plants. Container gardening, in turn, imposes certain requirements on the plants. The most important of these requirements is the possibility of obtaining a highly decorative effect using limited amounts of soil. For this reason, *Fuchsia regia* was excluded from the experiment, because this species produces large and numerous shoots and needs rather large amounts of soil for normal development. *Fuchsia hybrida* F1 was also not included in the list of subjects, since this taxon did not bloom under our conditions even in a greenhouse, and it was characterized by poor development. The purpose of our research was to identify, among the selected taxa, the most promising ones to be grown outdoors in containers in the spring-summer season.

MATERIALS AND METHODS

Four taxa were selected as research subjects: *Fuchsia paniculata*, *Fuchsia magellanica* var. *macrostema*, *Fuchsia magellanica* var. *gracilis*, *Fuchsia magellanica* cv. Aurea, *Fuchsia magellanica* cv. Green and Gold and 5 hybrids: *Fuchsia hybrida* cv. Brutus, *Fuchsia hybrida* cv. Deutsche Perle, *Fuchsia hybrida* cv. Genii, *Fuchsia hybrida* cv. Betty Joan, *Fuchsia hybrida* cv. Orange Crush, which are grown in the collection of the Greenhouse Plants Laboratory of the “Alexandru Ciubotaru” National Botanical Garden (Institute). All of them have a bushy habit and were bred relatively long ago.

First of all, we assessed the ability of the studied plants to propagate vegetatively by cuttings, which had been taken in different periods. Cuttings were taken in March, July and October. We took 30 cuttings of each taxon. The cuttings were rooted in a mixture of upper-layer peat and sand (1:1). The ability of cuttings to take roots was assessed by calculating the percentage of rooted cuttings to their total number. The peculiarities of root development were assessed, taking into account the number of roots produced and their length. They were counted 30 days after the start of the experiment.

Then, the rooted plants were planted in pots and the onset of the decorative phase of the plants was noted. As the beginning of the “decorative phase” was considered the moment when the plants were tall enough (at least 15 cm), with several shoots and thick foliage and were ready to be planted in containers. The time of their transition to the

generative stage was also taken into account, depending on the period of propagation. Then, in May, young plants were planted in containers and were taken outdoors and their growth and development were observed during the growing season. These observations helped identifying the most promising taxa.

RESULTS AND DISCUSSIONS

As a result of the studies, it was found that all studied taxa can be propagated by a vegetative method, namely, by cuttings, which confirms the data mentioned in different publications [1,2]. All the plants involved in the experiment had a fairly high percentage of rooting regardless of the time of taking cuttings. The studied taxa were also characterized by intensive root formation and rapid growth of the root system. The data obtained are presented in Table 1.

Table 1. Features of the growth and development of the root system in fuchsia cuttings, depending on the time of taking cuttings

Taxon name	Time of taking cuttings											
	March				July				October			
	% of rooted cuttings (%)	Number of roots per plant (pcs)	Average length of a root (cm)	Length of the root system (cm)	% of rooted cuttings (%)	Number of roots per plant (pcs)	Average length of a root (cm)	Length of the root system (cm)	% of rooted cuttings (%)	Number of roots per plant (pcs)	Average length of a root (cm)	Length of the root system (cm)
<i>F. paniculata</i>	50	12,1	3,5	42,4	40	11,3	3,2	36	45	11,6	3,4	39,4
<i>F. magellanica</i> var. <i>macrostema</i>	70	13,2	2,5	33	100	9,8	3,5	34,3	82	10,2	3	30,6
<i>F. magellanica</i> <i>f. gracilis</i>	66,7	12,2	2,5	31,7	100	11,8	4,4	49,4	88	12	3,3	39,6
<i>F. magellanica</i> <i>f. aurea</i>	80	15,2	2,5	37	100	4,8	3,1	15,3	90	9,8	2,8	27,4
<i>F. hybrida</i> cv. Betti Joan	100	17	2,7	43,8	73	11,6	2,8	31,8	80	14,2	2,7	38,3
<i>F. hybrida</i> cv. Deutche Perl	50	17,2	2,3	45,7	50	11,4	2,8	31,2	50	14,5	2,5	36,3
<i>F. magallanica</i> cv. Green and Gold	92	15,6	2,4	40,9	93	9	2,2	26,4	91	12,1	2,3	27,8
<i>F. hybrida</i> cv. Genii	84,6	10,2	2,9	29,5	100	8,2	4,8	37	92	9,3	3,5	32,5
<i>F. hybrida</i> cv. Brutus	93	13,6	3,1	42,1	75	15,2	5,4	80,8	80	14,1	4,1	57,8
<i>F. hybrida</i> cv. Orange Crush	80	14,8	3,1	46,3	100	16,2	4,0	64,8	92	15,3	3,5	53,6

As presented in Table 1, the lowest percentage of rooted cuttings, regardless of the time of taking cuttings, was observed in *F. paniculata* and in the cultivar *Fuchsia hybrida* cv. Deutsche Perle. The number of rooted cuttings in these species did not exceed 50%, while in *F. paniculata* it was below 50% when cuttings were taken in July and October. In the rest of the studied species, this index was at least 70% in all variants of the experiment. It is generally considered that it is possible to plant young rooted plants if the roots are at least 2 cm long. As can be seen from the presented data, within 30 days, the root system in all studied taxa reached the required size regardless of the time of taking cuttings.

Another indicator of the value of the taxa as ornamental plants in container gardening was, of course, the decorativeness of the aerial part of the plant. Therefore, we assessed the ability of the studied taxa to develop a well-branched shoot system, the decorativeness of leaves and, of course, flowering. A branched shoot system plays an important role in fuchsia not only as an element of the overall decorativeness of the plant, but also affects the abundance of flowering, since flowers in fuchsia are produced only at the tips of the shoots. Accordingly, the more shoot tips, the more abundant the flowering.

We found that, without stimulating this process, the following taxa produced more shoots: *F. magellanica* cv. Aurea, *F. hybrida* cv. Deutsche Perle, *F. hybrida* cv. Green and Gold, *F. hybrida* cv. Orange Crush and *F. hybrida* cv. Genii. After topping (cutting the tips of the shoots) the young plants, well-branched bushes were obtained in *F. magellanica* var. *macrostema* and the listed taxa were also characterized by thick and showy foliage. The species *F. magellanica* cv. Green and Gold and *F. magellanica* cv. Aurea, with leaves of an unusual and bright colour, were particularly decorative. *F. magellanica* var. *gracilis* also didn't need topping to produce well-branched bushes. However, the overall decorative qualities of this variety were not sufficient. The small leaves of these plants, located sparsely on gnarled thin twigs, spoiled the overall appearance. Besides, the young plants of this species did not bloom for 2 years. Therefore, we excluded this variety from the list of promising taxa. *Fuchsia paniculata* was also excluded from this list because it did not bloom during the observation period (3 years). *Fuchsia hybrida* cv. Brutus and *F. magellanica* var. *macrostema* were characterized by high rooting percentage and decorative foliage, but the flowering was abundant enough only in the 3rd year after planting the cuttings, at the same time, they also had a well-developed root system. But in a limited amount of soil, the plants did not bloom. *Fuchsia hybrida* cv. Betty Joan was distinguished by small but well-branched bushes and very decorative leaves and flowers, but it was not stable enough to grow outdoors and the flowering was not too abundant.

The full flowering stage in all fuchsia species occurred mainly in the spring-summer period. According to our observations, fuchsia flowers develop only on the tips of the shoots. That is why we evaluated the ability of young, freshly rooted plants to enter the generative phase of development. The young plants of *F. hybrida* cv. Deutsche Perle were the first to enter the generative phase. Abundant flowering in this species was observed from May to October. *F. hybrida* cv. Orange Crush and *F. hybrida* cv. Genii

bloomed less abundantly, but the bushes maintained their decorative appearance for a long period. We also classified the fuchsias with showy leaves as promising taxa – *F. magellanica* cv. Green and Gold and *F. magellanica* cv. Aurea. Although *F. magellanica* cv. Green and Gold bloomed much later (when planted in May, at the end of July-August) than the above listed species, and *F. magellanica* cv. Aurea did not bloom at all, the highly decorative look of foliage and the small, but spectacular bushes made up for this shortcoming.

Fuchsia hybrida cv. Deutsche Perle (Figure 1) grows up to 50 cm tall, has up-right habit, with medium branched shoots. The leaves are rounded-elliptical, light green, matte, with pink central vein. The flowers are single, simple, with white sepals and dark coral corolla. It blooms from May to autumn, when the frosts begin.

Figure 1. *Fuchsia hybrida*
cv. Deutsche Perle

Figure 2. *Fuchsia hybrida*
cv. Orange Crush

Fuchsia hybrida cv. Orange Crush (Figure 2) grows up to 65 cm in height, has up-right habit, with thick foliage. The leaves are dark green, glossy, oval-shaped with slightly elongated tip, with toothed margin, reddish on the underside. It blooms abundantly from June to autumn, when the frosts begin. The flowers have pink sepals and dark coral corolla.

Fuchsia hybrida cv. Genii (Figure 3) – short, well-branched bushes with dark green foliage. The leaves are ovoid with burgundy petioles. The flowers have red sepals and dark violet corolla. It blooms abundantly from June to autumn, when the frosts begin.

Fuchsia magellanica cv. Green and Gold (Figure 4) – short, well-branched bushes with very decorative foliage. The leaves are oval-ovoid, small, up to 5 cm long and 3 cm

Figure 3. *Fuchsia hybrida*
cv. Genii

Figure 4. *Fuchsia magellanica*
cv. Green and Gold

Figure 5. *Fuchsia magellanica*
cv. Aurea

wide, of a very spectacular colour: light green in the centre and yellow-lime at the edges. It has a decorative aspect even when it is not flowering. It blooms from late July until frosts. Flowers – single, with dark red calyx and violet corolla.

Fuchsia magellanica cv. Aurea (Figure 5) – small plants, only 25-30 cm tall, well-branched, with thick, bright golden-green foliage. The leaves are about 5 cm long and 2.6 cm wide, ovoid-oval.

CONCLUSIONS

Considering the analysed criteria, we classified the following taxa as promising ornamental plants to be grown outdoors in containers: *Fuchsia hybrida* cv. Deutsche Perle, *Fuchsia hybrida* cv. Orange Crush, *Fuchsia hybrida* cv. Genii, *Fuchsia hybrida* cv. Green and Gold, *Fuchsia magellanica* cv. Aurea.

Acknowledgement. The research was conducted within the project 20.80009.7007.14 “Research on mobilizing plant diversity with ornamental potential for ex-situ conservation”.

BIBLIOGRAPHY

1. Приходько С.Н., Яременко Л.М., Черевченко Т.М. Декоративные растения открытого и закрытого грунта / Под общ. ред. Гродзинского А.М.- Киев: Наук. Думка, 1985,- 251с.
2. Энциклопедия комнатного цветоводства/ Сост. Головкин Б.Н.- М.:Колос,1993.-300 с.
3. Жизнь растений Т. V. Часть 2. Цветковые растения / Под ред. А.Л. Тахтаджяна-М. «Просвещение», 1981.-228 с.
4. <https://en.wikipedia.org/wiki/Fuchsia>