

THE GROWTH, DEVELOPMENT AND USE OF NEW TAXA OF THE GENUS *WEIGELA* THUNB. IN GREEN SPACE DESIGN IN THE REPUBLIC OF MOLDOVA

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Abstract: The peculiarities of growth, development and use of 5 new taxa of the genus *Weigela* Thunb. have been described. The studied taxa – *Weigela florida* 'Alexandra', 'Carlton', 'Caricature', 'Minor Black' and 'Pink Princess' – differ in size, crown diameter, annual growth, density of flowering stalks per shoot from the previous year, flower density per 20-cm-long shoot, abundance of flowering, colour of flowers and leaves. All of them can be used successfully in landscaping in the Republic of Moldova.

Keywords: development, introduction, taxa, use, *Weigela* Thunb.

Introduction

The introduction and ecobiological research on the new taxa of woody plants will contribute to the modernization and diversification of their range in green space design in the Republic of Moldova. The new taxa, as well as species of the genus *Weigela* Thunb. that have been recently introduced in our country are plants of high ornamental value, which stand out due to the specific foliage of various shades, the abundance and duration of the flowering, the multitude of shades of the petals and the habit of the shrubs. The genus *Weigela* Thunb., of the family Caprifoliaceae Juss., includes 15 species, widespread in East Asia [PALANCEAN & COMĂNICI, 2009]. In the territory of the former USSR, 3 species occur in the wild and 9 species and a large number of varieties are cultivated [Derevia i kustarnichi SSSR, 1962]. In Europe, there are 3 species and many cultivars, which differ in habit, foliage and flower colour. Implementing the Global Biodiversity Conservation Strategy, we have set ourselves the goal of mobilizing and diversifying the *Weigela* Thunb. gene pool. In the “Alexandru Ciubotaru” National Botanical Garden (Institute) (hereinafter NBGI), two species and several cultivars have been introduced recently [ROȘCA & al. 2021]. In Moldova, most of the planting material of ornamental species has been brought from Europe, then researched, acclimatized and used in landscaping different types of green spaces designed as areas for passive and active rest.

The goal of this research was to determine and describe the peculiarities of growth, development and use of 5 new taxa of *Weigela florida*, namely: 'Alexandra', 'Carlton', 'Caricature', 'Minor Black' and 'Pink Princess', under the pedoclimatic conditions of the Republic of Moldova.

Material and methods

The new taxa of *Weigela florida* – 'Alexandra', 'Carlton', 'Caricature', 'Minor Black', 'Pink Princess' – were introduced in the autumn of 2018, in the nursery of the Dendrology Laboratory of NBGI.

The research was carried out in the introduction nursery of the Dendrology Laboratory as part of the research project 20.80009.7007.19 „Introduction and elaboration of technologies of multiplication and cultivation by conventional techniques and tissue culture of new woody plant species”. Five new taxa of *Weigela* in the third and fourth growing seasons, which grow in the collection of NBGI, have served as research subjects. Morphological parameters were determined in 10 plants, 100 flowers and shoots. The phenological observations were made according to the methodology [ILIESCU, 2002; Metodica fenologhiceshih nabliodenii v botaniceshih sadah SSSR, 1979] that was perfected by Dr. hab. A. Palancean [PALANCEAN & COMĂNICI, 2009]. The landscaping was carried out according to the principles described in the monograph written by the researchers of the University of Agricultural Sciences and Veterinary Medicine from Cluj-Napoca [DUMITRAȘ & al. 2008].

Results and discussions

Weigela florida (Bge.) A. DC. is native to northern China and Korea. It is an erect shrub, growing about 2-3 m tall. The shoots have 2 rows of hairs. The leaves are elliptical to oblong-ovate, sometimes obovate, acute, serrate, 5-10 cm long, short petiolate, pubescent on the midrib, on the underside – pubescent on all veins. The leaves develop in April-May, change colour in September-October and fall in October. The flowers with fused sepals are mostly arranged at the top of the plant. The corolla is funnel-shaped, 2.5-3 cm long, with rounded petals, patent, uneven, of different shades from bright red to orange, depending on the biotype. The ovary is pubescent and the stigma bilobed. The shrub is of high ornamental value due to the abundance of flowering and the long flowering period. It blooms in May-June; sometimes repeated flowering takes place in July-August. The fruit is a capsule with 2 valves; their maturation takes place in August-October depending on the weather conditions during the process of ontomorphogenesis of the fruit.

The shrub is resistant to frost, dust, toxins, withstands urban conditions, it is sometimes affected by prolonged heat (leaves partially fall and the abundance of flowering decreases) if the cultivation techniques are not observed. It grows well on rich, light soils, requires minimal care, only loosening the soil around the plant and regular trims to maintain its shape and decorativeness for a longer period.

It is recommended to cultivate *W. florida* plants in the foreground, alone or in small groups, at the edges of woody plantations in most areas of the Republic of Moldova.

Weigela x hybrida Jaeg. is a shrub of hybrid origin commonly grown by amateurs in private gardens. It is characterised by abundant and colourful pink, red, purple or white flowers, as well as by green, purple, motley foliage. It is recommended for parks and gardens, in sunny places, since the pastel shades can please the eye and cheer up visitors.

Weigela florida 'Alexandra' – is a shrub with a moderate growth, on average 25 cm per year (Figure 3), with a dense and neat crown. The leaves are lanceolate, dark bronze-purple. The bright pink, funnel-shaped, short petiolate flowers are arranged at the base of the leaves (Figure 1a).

It grows well in full sun and does not need additional irrigation. It tolerates well winter conditions, without additional protection. It is an ornamental shrub of regular and compact shape. The shrub is particularly showy in May-June, when it is abundantly covered with flowers. The density of flowers per shoot is on average 12 pcs. on 20 cm (Figure 3). Due to the colourful foliage, the plant maintains its ornamental value even after the flowering stage. This shrub can be planted either alone or in small groups of the same species or mixed with other species with lighter foliage. This cultivar is particularly impressive if used to create fences, which can delight the visitors and evoke positive emotions.

Weigela florida 'Carlton' – this shrub is a special one due to its foliage, which starts as light green and then turns into a radiant yellow-green. The growth of annual shoots is quite intense (45 cm) and abundant (Figure 3). It grows branches down to ground level, forming a compact hemisphere, and among the bright foliage, flowers of an extremely showy red-ruby colour appear (Figure 1b). The flowers are funnel-shaped, with white anthers, as long as the petals, and bloom in May-June for about a month. This taxon repeatedly blooms in August (Figure 4). The density of flowers per 20-cm-long shoot reaches high values (35 pcs.), as compared with other taxa. It is recommended to plant this cultivar in full sun to obtain a higher abundance of flowers. It is an extremely decorative shrub with exquisite foliage and brightly coloured flowers. It is ideal as a bright accent when forming a group or hedge, but can also be planted alone.

Weigela florida 'Caricature' – is a faster growing shrub (55 cm) as compared with other taxa (Figure 3), with spherical crown with slightly curved shoots. The height of the bush is almost equal to its diameter. The most noteworthy characteristics of this shrub are the raw-green leaves with a cream-white edge, slightly domed in the middle with a somewhat wrinkled appearance. The flowering is very fine, with trumpet-shaped, short-petiolate flowers of several shades of pink. On some shoots, there are pale pink flowers, and on others – more intense pink (Figure 1c). Their number is non-essential, but the appearance is very fine during May-June. The density of flowers per 20-cm-long shoot is lower (10 pcs.) as compared with other taxa (Figure 3). This taxon is particularly showy, attracting all eyes due to its habit and phenotypic variability. Having a fairly long period of decorativeness, it is recommended to plant this cultivar in the foreground when forming mixed or pure groups, but, it is also very attractive solitarily.

Weigela florida 'Minor Black' – dwarf shrub with significantly slower annual growth (20 cm) as compared with other taxa (Figure 3). It has purple-brown foliage that draws attention even if it is a smaller shrub. The leaves maintain their colour throughout the growing season, and the flowering increases its aesthetic value in a green space. The trumpet-shaped, bright pink flowers last for about a month (Figure 2a). According to the density of flowers per shoot (14 pcs.), this taxon occupies an intermediate position, but closer to the cultivar "Alexandra". Being a small shrub, it has multiple recommendations, for example, it is an excellent choice when forming small groups in the foreground, or in small, alpine gardens. It is recommended for container culture, being planted in the middle, surrounded by hanging plants.

Weigela florida 'Pink Princess' – it is one of the most compact-looking taxa. The pale-pink, funnel-shaped, short-petiolate flowers cover the upper part of the shrub (Figure 2b). It blooms in June. A specific feature of this taxon, similar to the 'Carlton' cultivar, is the repeated flowering in August (Figure 4).

The average density of flowers per 20-cm-long shoot is 19 pcs. The light green foliage improves the ornamental value throughout the growing season. The annual growth was quite fast (50 cm) as compared with other taxa (Figure 3).

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This shrub is recommended for sunny places, tolerates and partial shade, is generally undemanding to the soil, but requires a medium drained and moist soil. Any care work is done immediately after flowering, because the shrub blooms on the shoots of the previous year. Its neat and fine appearance allows it to be planted alone or in pure groups. Because the fruits and autumn foliage are less attractive, this cultivar should be accompanied by other species to extend the period of decorativeness. It withstands the winter conditions in our country without major damage, sometimes only the tops of the annual shoots can be slightly affected (Figure 5a, b, c).



Figure 1. Taxa in the flowering stage in the third growing season.

a. *Weigela florida* 'Alexandra'; **b.** *Weigela florida* 'Carlton'; **c.** *Weigela florida* 'Caricature'

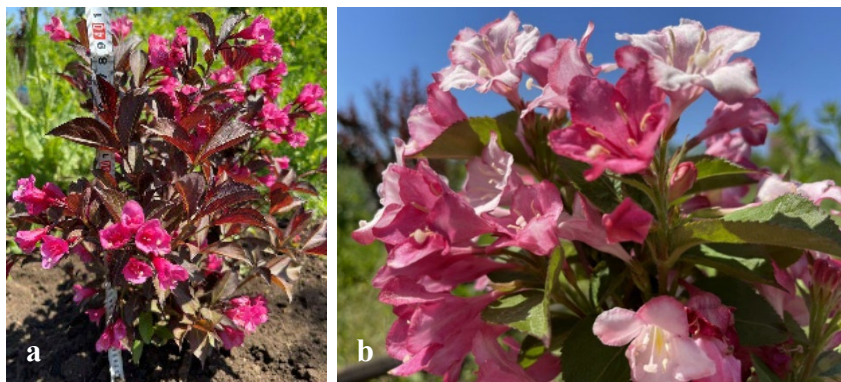


Figure 2. Taxa in the flowering stage in the third growing season.

a. *Weigela florida* 'Minor Black'; **b.** *Weigela florida* 'Pink Princess'

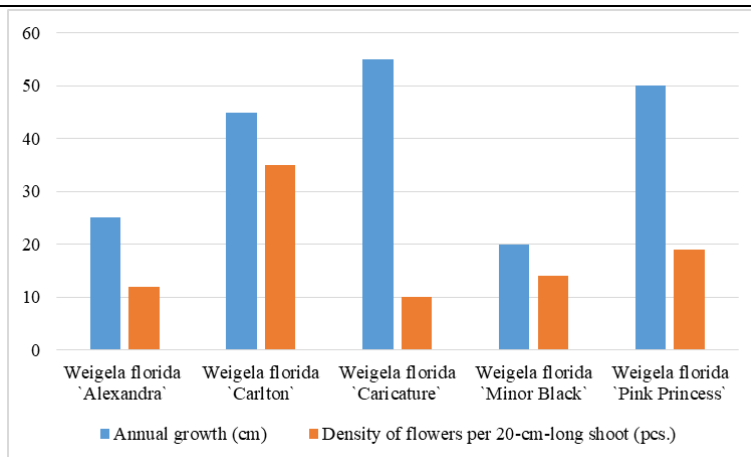


Figure 3. Peculiarities of annual growth and flower density of *Weigela* Thunb. taxa

Luna / decada	IV			V			VI			VII			VIII			IX			X			XI	
Cultivarul	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2
<i>Weigela florida</i> 'Alexandra'																							
<i>Weigela florida</i> 'Carlton'																							
<i>Weigela florida</i> 'Caricature'																							
<i>Weigela florida</i> 'Minor Black'																							
<i>Weigela florida</i> 'Pink Princess'																							

Figure 4. The phenological spectrum of taxa of the genus *Weigela* Thunb.



Figure 5. The use of *Weigela* Thunb. taxa in green spaces in contrast to other species

Conclusions

The researched taxa of the genus *Weigela* Thunb. ('Alexandra', 'Carlton', 'Caricature', 'Minor Black' and 'Pink Princess') differ in plant height, crown diameter, annual growth, density of flowering stalks per shoot from the previous year, flower density per 20-cm-long shoot, abundance of flowering, length of the flowering period, colour of flowers and leaves throughout the growing season.

The introduced taxa are resistant to the pedoclimatic conditions of the Republic of Moldova, do not require special care, only basic care works and pruning to maintain permanent decorativeness, they can diversify and complete the range of ornamental plants for green spaces in cities and rural areas.

Because the studied *Weigela* Thunb. plants maintain their decorative qualities for a long period, they are recommended for planting in the foreground, in pure groups or mixed with other species of ornamental shrubs. The studied taxa are excellent ornamental shrubs, which can be used in all the regions of the Republic of Moldova.

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