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<http://orcid.org/0000-0002-4526-4873>

## REPRESENTATIVES OF *ROSACEAE* JUSS LANDSCAPING OF H.S. SKOVORODA'S KNPU BOTANICAL GARDEN

Y.V. Goncharenko, *Ph.D. (biology)*, O.S. Denysova, *maste*,  
E.T. Malichenko, *maste*

*G.S. Skovoroda's Kharkiv National Pedagogical University, Kharkiv, Ukraine*  
[janina6962@gmail.com](mailto:janina6962@gmail.com)

The paper represents the assortment of trees and bushes of *Rosaceae* Family, which are cultivated on the territory of H.S. Skovoroda's KNPU Botanical Garden. The performed inventory allowed establishing the occurrence of 43 species and cultivars, the quantity of each species and cultivar, and their bio-morphs. According to the results of many years long-term survey, the degree of winter and drought resistance of each species were determined. The paper also analyzes the features of decorativeness, reveals the evergreen species, as well as the species with decorative flowering, fruiting, and leaves coloring. The work concludes the investigated species and cultivars of *Rosaceae* to be appropriate for usage in landscaping the territory of H.S. Skovoroda's KNPU.

**Key words:** landscaping, *Rosaceae*, botanical gardens, winter resistance, drought resistance, decorativeness.

**Представники *Rosaceae* Juss. в озелененні ботанічного саду ХНПУ імені Г.С. Сковороди. Гончаренко Я.В., Денисова О.С., Маліченко Є.Т.** – Наведено асортимент дерев і кущів родини *Rosaceae*, що культивуються на території ботанічного саду ХНПУ імені Г.С. Сковороди. Проведена інвентаризація дозволила встановити наявність 43 видів та культиварів, кількість кожного виду та культивару, їх біоморфи. За результатами багаторічних спостережень визначено ступінь зимостійкості та посухостійкості видів. Проаналізовано ознаки декоративності та виявлено вічнозелені види, а також із декоративним квітуванням, декоративним квітуванням та плодоношенням, декоративним забарвленням листків. Виявлено, що види та культивари *Rosaceae* які досліджувалися, доцільно використовувати для озеленення території ХНПУ імені Г.С. Сковороди.

**Ключові слова:** озеленення; *Rosaceae*; ботанічні сади; зимостійкість; посухостійкість; декоративність.

### INTRODUCTION

The representatives of *Rosaceae* Family are highly decorative species with the valuable economic appointment. Autochthonic species, as well as introductive ones, of *Rosaceae* are cultivated on the Ukrainian territory. This evokes the necessity to study their bioecological, cytological, and decorative features [5, 6]. Some Genii are problematic for systematics, for they encompass the enormous quantity of microspecies and hybrids, therefore they need to be investigated thoroughly [2]. A lot of attention is payed at the selective work with the aim of enriching the assortment of decorative plants, which are economically valuable [4]. The researchers admit the present data to be out of date, and point at the necessity of inventory [1, 3, 4]. Besides, the preservation of plant

genetic resources proves to be the problem of the global scale, whereas the plant collections serve as a source of potentially useful genes.

### MATERIALS AND METHODS

The investigation material was represented by the dendroflora of H.S. Skovoroda's KNPU Botanical Garden. During the march-rout surveys, the quality and quantity of plant species and cultivars were established on the areas of the Botanical Garden and plant nursery. Flowering and fruiting were investigated by phenological methods. Winter and drought resistance of plants were evaluated by V.M. Mezhenkiy's unified scales [7].

### RESULTS AND THEIR DISCUSSION

At the beginning of 1992, the H.S. Skovoroda's KNPU Arboretum was founded, which obtained the status of botanical garden in 2006. Its composition of decorative plants gets wider each year [3]. Within 1998-2012, gardening material was obtained from plant nurseries and other botanic gardens mainly in the form of plant nursery transplants. *Prunus persica* (L) Batsh, *Padus maackii* Rupr., 1857 and *Padus ssiori* (F. Schmidt) C.K. Schneid., 1906 were obtained in the form of seedlings. Such species as *Crataegus laevigata* (Poil.) DC, 1825, *Exochorda korolkowii* Lindt, 1858, *Malus niedzwetzkyana* Dieck & Koehne, 1891 are cultivated from seeds. The inventory, which was performed in May, 2017, allowed establishing the availability of 43 species and cultivars of *Rosaceae* Family representatives (tab. 1).

Table 1

#### Characteristics of *Rosaceae* at the conditions of H.S. Skovoroda's KNPU Botanical Garden

#	Species	Bio-morph	Decorativeness	Winter resistance (points)	Drought resistance (points)	Exemplars quantity	Year of material obtaining
1	2	3	4	5	6	7	8
1	<i>Amygdalus nana</i> L.	bush	flowers	9	9	4	2008 transplants
2	<i>Armeniaca vulgaris</i> L., 1753	tree	flowers fruit	8	9	15	2006 transplants
3	<i>Aronia melanocarpa</i> (Michx.) Elliott	bush	flowers fruit	9	4	2	2007, 2012 transplants
4	<i>Cerasus tomentosa</i> (Thunb.) Yas. Endo	bush	flowers fruit	9	9	17	2004 transplants
5	<i>Chaenomeles maulei</i> (Mast.) C.K. Schneid 'Nivalis'	bush	flowers fruit	9	9	1	2007 transplants
6	<i>Ch. maulei</i> (Mast.) C.K. Schneid. 'Red Joy'	bush	flowers fruit	9	9	1	2006 transplants

7	<i>Chaenomeles japonica</i> (Thunb.) Lindl. ex Spach, 1834	bush	flowers fruit	8	9	6	2000 transplants
8	<i>Cotoneaster divaricatus</i> Rehder & E. H. Wilson	bush	flowers fruit	6	4	3	1998 transplants
9	<i>Cotoneaster melanocarpus</i> Fisch & Blytt	bush	flowers fruit	5	8	9	1998 transplants
10	<i>Cotoneaster horizontalis</i> Decne.	semi-bush	flowers fruit	5	9	10	1997 transplants
11	<i>Cotoneaster lucidus</i> Schldl.	bush	flowers fruit	9	9	16	2004 transplants
12	<i>Crataegus sanguinea</i> Pall., 1784	tree	flowers fruit	9	9	9	2007 transplants
13	<i>Crataegus laevigata</i> (Poil.) DC, 1825.	tree	flowers fruit	9	9	2	2008 seeds
14	<i>Crataegus chlorosarca</i> Maxim	tree	flowers fruit	9	9	4	1998 transplants
15	<i>Cydonia oblonga</i> Mill.	bush	flowers fruit	9	9	1	2005 transplants
16	<i>Dasiphora fruticosa</i> (L.) Rydb.	bush	flowers	5	4	5	2006 transplants
17	<i>Exochorda korolkowii</i> Lindt, 1858	bush	flowers	9	9	2	2013 seeds
18	<i>Kerria japonica</i> (L.) DC.	bush	flowers	5	8	10	2005 transplants
19	<i>Louiseania triloba</i> Lindl., 1857	bush	flowers	5	4	4	2009 transplants
20	<i>Malus domestica</i> Borkh., 1803	tree	flowers fruit	9	9	2	2006 transplants
21	<i>Malus niedzwetzkyana</i> Dieck& Koehne, 1891	tree	flowers fruit	9	6	6	2013 seeds
22	<i>Padus maackii</i> Rupr., 1857	tree	flowers fruit	9	9	2	2012 one-year-old seedlings
23	<i>Padus ssiori</i> F. Schmidt) C.K. Schneid., 1906	tree	flowers fruit	9	9	3	2012 one-year-old seedlings
24	<i>Prunus persica</i> (L.) Batsch	tree	flowers fruit	6	5	5	2007 one-year-old seedlings
25	<i>Prunus cerasifera</i> Ehrh., 1785	tree	flowers fruit	9	5	1	2007 transplants
26	<i>Prunus cerasifera</i> Ehrh. 'Nigra'	tree	flowers fruit	8	8	3	2006 transplants

27	<i>Prunus cerasus</i> L.	tree	flowers fruit	9	9	3	2013 transplants
28	<i>Pyrus communis</i> L., 1753	tree	flowers fruit	9	5	4	2013 transplants
29	<i>Pyracantha coccinea</i> M. Roem., 1847	bush	flowers fruit	8	9	2	2009 transplants
30	<i>Rhodotypos scandens</i> (Thunb.) Makino, 1913	bush	flowers fruit	6	9	1	2006 transplants
31	<i>Rosa canina</i> L., 1753	bush	flowers fruit	9	9	1	2004 transplants
32	<i>Rosa amblyotis</i> C.A. Mey.	bush	flowers fruit	9	9	1	2004 transplants
33	<i>Rosa rugosa</i> Thunb.	bush	flowers fruit	9	9	1	2004 transplants
34	<i>Sorbus aucuparia</i> L., 1753	tree	flowers fruit	9	9	7	2005 transplants
35	<i>Sorbus domestica</i> L., 1753	tree	flowers fruit	9	9	2	2013 transplants
36	<i>Spiraea japonica</i> L.f., 1781	bush	flowers	9	9	2	2006 transplants
37	<i>Spiraea japonica</i> L. 'Little Princess'	bush	flowers	9	5	1	2009 transplants
38	<i>Spiraea Japonica</i> L. 'Goldflame'	bush	flowers	9	5	5	2009 transplants
39	<i>Spiraea japonica</i> L. 'Crispa'	semi- bush	flowers	9	5	1	2009 transplants
40	<i>Spiraea japonica</i> L. 'Gold Mound'	semi- bush	flowers	9	5	1	2009 transplants
41	<i>Spiraea ×vanhouttei</i> (Briot) Carrière	bush	flowers	9	9	2	1998 transplants
42	<i>Spiraea ×cinerea</i> Zabel, 1884	bush	flowers	9	7	1	2006 transplants
43	<i>Stephanandra tanakae</i> Franch. & Sav.	bush	flowers	7	5	1	2013 transplants

The family is represented by 22 genii with domination of *Spiraea* (18%), *Cotoneaster* (10%), *Chaenomeles*, *Crataegus*, *Rosa*, and *Prunus* (8%), which is illustrated by figure 1.

The quantity of exemplars of plant species and cultivars significantly varies: 72% are represented by 1-5 exemplars (*Cydonia oblonga* Mill., *Prunus cerasifera* Ehrh., 1785, *Rhodotypos scandens* (Thunb.) Makino, 1913, *Chaenomeles maulei*

(Mast.) C.K. Schneid 'Nivalis', *Spiraea japonica* L. 'Little Princess', 'Crispa', 'Gold Mound'), – 18% from 5 to 10 exemplars, 10% of species and cultivars amount up to more than 10 exemplars.

Bio-morphs analysis showed the occurrence of trees, bushes and semi-bushes, which allows creating various landscape compositions with their participation. The highest quantity of species is represented by bushes and composes 61%. *Pyracantha coccinea* M. Roem., 1847 and *Cotoneaster horizontalis* Decne. are evergreen, which adds to their extra decorativeness.

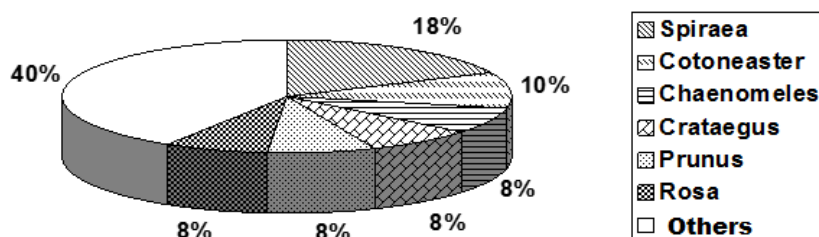


Figure 1. Central *Rosaceae* Genii in landscaping H.S. Skovoroda's KNPU Botanical Garden

Determination of plants field winter resistance allowed concluding almost all the plants to overwinter quite well at the conditions of the Botanical Garden and to be characterized with high winter resistance coefficient (79%). It was only during the severe frosts, that 21% of species were observed to have some one-year-old sprouts impaired, amongst which there were species with average winter resistance, such as *Kerria japonica* (L.) DC., *Dasiphora fruticosa* (L.) Rydb., *Louiseania triloba* Lindl., 1857, *Rhodotypos scandens* (Thunb.) Makino, 1913, *Cotoneaster divaricatus* Rehder & E. H. Wilson.

Since the Botanic garden was founded on alluvial sands, the investigation of plants drought resistance is actual. The performed surveys displayed 70% of plants to have high drought resistance, although, during the summer heat, 30% of species exfoliate if they are not watered artificially (*Aronia melanocarpa* (Michx.) Elliott, *Cotoneaster divaricatus* Rehder & E. H. Wilson, *Dasiphora fruticosa* (L.) Rydb., *Louiseania triloba* Lindl., 1857, *Rubus odoratus* L., 1753, *Malus niedzwetzkyana* Dieck& Koehne, 1891, декоративні форми *Spiraea japonica* L.f., 1781).

Decorativeness of plants is provided by flowering, fruiting, and decorative leaves during their vegetation. We selected 13 species with decorative flowering, amongst them the most interesting were *Amygdalus nana* L., *Louiseania triloba* Lindl., 1857. The decorative flowering and fruiting is observed in other species (30). The leaves of *Malus niedzwetzkyana* Dieck& Koehne, 1891, *Spiraea japonica* L.f.,

1781 have decorative coloring, which is purple-red and yellow, respectively. The foliage color marks the plants on the general background.

### CONCLUSIONS

The performed inventory displayed all 43 species and cultivars of *Rosaceae* Juss. Family plants to successfully grow at the conditions of H.S. Skovoroda's KNPB Botanical Garden. They are represented by trees, bushes, and semi-bushes, which is important for compositions creation. The special decorative value is provided by evergreen semi-bushes *Pyracantha coccinea* M. Roem., 1847, *Cotoneaster horizontalis* Decne., as well as the plants with early decorative flowering – *Amygdalus nana* L., *Chaenomeles maulei* (Mast.) C.K. Schneid 'Nivalis', *Chaenomeles japonica* (Thunb.) Lindl. ex Spach, 1834, *Malus niedzwetzkyana* Dieck & Koehne, 1891. The majority of plants have high winter and drought resistance. The species that could be impaired by low temperatures, regenerate their growth and do not lose their decorativeness.

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**Представители *Rosaceae* Juss. в озеленении ботанического сада ХНПУ имени Г.С. Сковороды. Гончаренко Я.В., Денисова А.С., Маличенко Е.Т.** – Приведён ассортимент деревьев и кустарников семейства *Rosaceae*, которые культивируются на территории ботанического сада ХНПУ имени Г.С. Сковороды. Проведённая инвентаризация позволила установить наличие 43 видов и культиваров, количество каждого вида и культивара, их биоморфы. По результатам многолетних наблюдений определена степень зимостойкости и засухоустойчивости видов. Проведён анализ декоративных признаков и выявлены вечнозелёные виды, а также те, которые имеют декоративное цветение, декоративное цветение и плодоношение, декоративную окраску листьев. Установлено, что исследуемые виды и культивары *Rosaceae* целесообразно использовать для озеленения территории ХНПУ имени Г.С. Сковороды.

**Ключевые слова:** озеленение; *Rosaceae*; ботанические сады; зимостойкость; засухоустойчивость; декоративность.