

## RECOMMENDED *ROSA SP. L.* SPECIES IN THE GREEN SPACES OF NITRA CITY ON THE BASIS OF THEIR AESTHETIC VALUE AND ECOLOGICAL REQUIREMENTS

Katarína Rovná,\* Jana Černá

Slovak University of Agriculture in Nitra, Slovak Republic

This paper deals with floristic screening and biological and taxonomical studies of wild roses naturally growing in the selected areas around Nitra. The aim was to demonstrate the variability of botanical species in the locality of Nitra with a focus on the selection of suitable individuals for subsequent use in landscaping. Botanical roses are characterized by unusual shrub shape, rich flowering and some with intense scents. However, they are mostly located in large green areas, especially in city parks and extensive green areas within a city. The study and floristic survey of species which were described by rhodologists such as Větvička and Bertová (1992), Klášterský (1934–1935), Kerényi-Nagy (2010) and others who carried out the botanical screening in the Zobor Hills was conducted during 2010 to 2013.

**Keywords:** ecological requirements, floristic survey, *Rosa L.*, variability

### 1 Introduction

Roses (*Rosa sp. L.*) belong to the oldest grown ornamental plants. The oldest mention of rose growing is reported in the South-East Asia from where roses gradually expanded through the Middle East to the Mediterranean area and Europe (Večeřa et al., 1967; Karahan, 2005; Çinar, 2005). Large development of cultivation was recorded in ancient Rome. They did grow them not only for their beauty but also for the benefit (Joublan et al., 1996; Ježovič and Lukáčik, 2011). The application of roses in planting arrangements does not have a long tradition in Slovakia; even though natural conditions are quite favourable for their cultivation there is a lack of domestic producers of rose seedlings, including botanical species. Nonetheless, we found botanical species regarding the ecological requirement for suitable primarily on degraded soils (Feriancová, Številová 1997). Roses are especially popular with the beauty of flowers, their shape, richness of flowering and colour range. They are variable in shape, too (Večeřa et al., 1967; Karahan, 2005).

The area of roses extends solely to the northern hemisphere. Their spread in individual continents is almost equal, but the most original species still grow in Asia, in China (Větvička, Krejčová, 2001). Some roses have an endemic appearance, like section *Carolinae* in North America, or on the other side, the vast area

is occupied by *Rosa canina L.*, some have only a point occurrence, for example *Rosa glauca* and *Rosa × reversa*.

The Zobor Hills are one of the five separate groups of the Tribeč mountain range. From the floral point of view, they are the richest territories. They represent valuable natural values important from a scientific, conservation and aesthetic points of view. The hill Zobor (587 m above sea level), is almost in the middle of the Tribeč mountain range. Varied geological conditions have given room for the expansion of diverse habitat types with many rare species of plants and animals. From this point of view, the Zobor Hills are the most valuable part in the Protected Landscape Area of Ponitrie (Svobodová, 1980).

The previous floristic surveys of the Zobor Hills were carried out by Knapp in 1863, Klášterský in 1934–1935, Klášterská in 1969, Deyl in 1947, Větvička and Višňovská in 1977, Řehořek et al. (2007), Kerényi-Nagy and Baranec (2008) and Kerényi-Nagy, Eliáš and Baranec (2008). We focused on surveys made by Řehořek et al. (2007), Kerényi-Nagy and Baranec (2008) and Kerényi-Nagy, Eliáš and Baranec (2008).

Roses do not belong to long-lasting woody plants, but they have undoubtedly very high importance in landscaping. Botanical species, which we focused on at evaluated localities, have a great landscape and horticultural potential.



Katarína Rovná, Slovak University of Agriculture in Nitra, Department of Planting Design and Maintenance, Tulipánová 7, Nitra, Slovakia, e-mail: [katarina.rovna@uniag.sk](mailto:katarina.rovna@uniag.sk)

## 2 Material and Methods

The climate of the research area Zobor Hills – Lyžiarska lúka is warm and dry. It is the driest area of the northern part of the Danube Lowland. These conditions suit the wild rose and for this reason the site was selected for the floristic research. The average temperature is 7.5–9° C and the average rainfall is 550–750 mm (Hreško et al., 2006). Phytogeographically, the group of the Zobor Hills belongs to the area of the Slovak pre-Carpathian flora (Řehořek et al., 2007).

Based on the previous floristic surveys Řehořek et al. (2007), Kerényi-Nagy and Baranec (2008) and Kerényi-Nagy, Eliáš and Baranec (2008), we focused on the occurrence of autochthonous and allochthonous species of *Rosa* sp. L. in the studied locality.

In addition to the ecological requirements, the following criteria have been set as the additional criteria for the selection of suitable species for the urban environment: attractiveness of the shape, richness of flowering, colour and fragrance of flowers, shape, and colour of fruits.

For evaluation of the attractiveness of the shape and richness of flowering, the method by Větvička (2001) was used, colour of flowers and fruits were evaluated by Wilson (1941) and variability of fruit shape was evaluated by Bauer (2005). The sensorial method was used to evaluate fragrance of flowers.

The determination of the individual *Rosa* sp. L. taxa has been carried out using the key given in Flora Slovakia IV / 3 (Větvička and Bertová, 1992) and the key for determination of roses by Kerényi-Nagy (2010).

## 3 Results and Discussion

Řehořek et al. (2007) reported the occurrence of botanical roses in the Zobor Hills: *Rosa agrestis* SAVI. reported by Klášterský 1934–1935, *Rosa arvensis* HUDSON reported by Knapp 1863, Deyl 1947 and Klášterská 1969, *Rosa dumalis* BECHST. and *Rosa inodora* FR. Reported by Řehořek, *Rosa gallica* L. and *Rosa pimpinellifolia* L. reported by Benčať and Majer 1976, *Rosa jundzillii* BESS., *Rosa micrantha* BORRER ex SM. and *Rosa tomentosa* reported by Klášterský 1933–1935, Větvička and Bertová 1992, *Rosa rubiginosa* L. reported by Knapp 1865 and *Rosa zalana* WIESB. reported by Klášterskou 1969.

Kerényi-Nagy and Baranec (2008) and Kerényi-Nagy, Eliáš and Baranec (2008) reported occurrence of: *R. arvensis* Hudson, *Rosa caesia* Sm., *Rosa canina* L., *Rosa corymbifera* Borkh., *Rosa dumalis* Bechst., *Rosa gallica* L., *Rosa jundzillii* Bess., *Rosa micrantha* Borrer ex Sm., *Rosa*

*obtusifolia* Desv., *Rosa rubiginosa* L., *Rosa pimpinellifolia* L., *Rosa subcanina* (Christ) Dalla Torre et Sarnth. and *Rosa zalana* Wiesb.

The previous surveys confirmed 17 species. In Figure 1 there are displayed species whose occurrence was confirmed in our research during 2010–2013. Occurrence of 8 species which were observed in the previous surveys held on Lyžiarska lúka was confirmed and 5 different species which were not mentioned by Řehořek et al. (2007), Kerényi-Nagy and Baranec (2008) and Kerényi-Nagy, Eliáš and Baranec (2008) were determined. In our survey we did not confirm the occurrence of 9 species which were mentioned in the previous survey. This result may be due to the fact that our survey was carried out in Lyžiarska lúka only.

The selected and evaluated roses have an importance for cultivation and landscape purposes in Central Europe.

The most widespread species in the Zobor Hills, which was confirmed not only by Řehořek et al. (2007), Kerényi-Nagy and Baranec (2008) and Kerényi-Nagy, Eliáš and Baranec (2008) but also by others is *Rosa canina* L. This rose belongs to the subgenus *Eurosa* and the section *Caninae*. Flowers are usually composed in corymbs. Leaves are composed of 5 to 7 leaflets and branches are covered by thick hooked prickles. This rose flowers on annual shoots, and does not remount. It is the most frequent and the most variable rose of the Slovak nature. According to outer morphological signs we can tell it has contributed to the formation of the oldest European cultural roses, such as *R. damascena*, *R. alba* and *R. centifolia* (Ježovič and Lukáčik, 2011). In modern history, *Rosa canina* is often used in breeding because of its resilience. Rudolf Geschwind has obtained many roses through its hybridization. For urban area it is suitable for parks due to its size. It grows up to 3 m and it can be used as a climber.

*Rosa tomentosa* SMITH belongs to the subgenus *Eurosa* and the section *Caninae*. This shrub is up to 2 m high. Flowers are light pink to white. Leaves are composed of 5–7 leaflets. It is a shrub with arching or climbing stems, which prefers calcareous to mildly acidic soils.

*Rosa dumalis* Bechst. It is a shrub that grows 1–2 m high. It has long, bent thorns. It bears dark or light pink flowers in June and July. The hips are oval and quite soft.

Section *Pimpinellifoliae* is represented by *R. pimpinellifolia* L. and *R. foetida* HERRM. These roses flower separately on short annual shoots which grow out of last year's wood. They flower very early and flowers are white or yellow. Number of leaflets is higher,



■ **Figure 1:** Species confirmed by Řehořek et al. (2007), Kerény-Nagy and Baranec (2008) and Kerény-Nagy, Eliáš and Baranec (2008) and our findings

usually 7 to 13. Prickles are straight acicular. They need low maintenance and are very hardy.

*R. pimpinellifolia* L. is a shrub usually 0.5–1.0 m high. It spreads by basal shoots and can cover large areas. Flowers are cream white, rarely pink. A well-known group of hybrids, as mentioned in Ježovič and Lukáčik (2011) are the so-called spring varieties from *R. Kordes*.

*R. foetida* HERRM. was imported to Europe in 13<sup>th</sup> century and then in 16<sup>th</sup> century. The shrub is 3 m high. Flowers are yellow. It is a very hardy rose.

Section *Gallicanae* is typical with flowers which appear on short annual shoots which grow out of last year's wood, just like the section *Pimpinellifoliae*. Flowers are usually composed in corymbs or appear separately. The colour is usually pink, rarely red or white. Leaves are composed of 3 to 7 leaflets. In Slovak climatic

conditions they are hardy. To this section belong *R. gallica* L. *R. × alba* L. and *R. jundzillii* Besser (Večeřa et al., 1967; Ercisli et al., 2005).

*R. gallica* L. grows on warm limestone slopes. Its shrub is 1 m high. It spreads by basal shoots but not like *R. pimpinellifolia* L. Leaves have only 5 leaflets. Flowers are pink or red. Galician rose is the most important European rose and also the most commonly used in the creation of ancient cultural roses. It is the main starting species in the breeding of European cultural roses (Větvíčka and Krejčová, 2001; Ježovič and Lukáčik 2011).

*R. × alba* L. is probably a hybrid between the sections *Caninae* and *Gallicanae*. It is a shrub to 2 m high. Prickles are variable, hooked. Flowers are white, sometimes light pink, fragrant, most have many petals.



*R. jundzillii* Besser is a shrub 2–4 m high. Flowers are solitary or cluster-formed. Branches are arching, armed with prickles, upright.

Section *Synstylae* species grow as strong shrubs. Because of their origin they are not very hardy. This section is represented by *R. arvensis* (Huds.).

*R. arvensis* (Huds.) is a fast-growing shrub, with arching stems, sometimes 6 m long. It has pure white flowers which are born in July. The flowers are followed by dark red, rounded to oval fleshy hips which enclose the seeds. It can be used in hedges, woodlands. Many insects, including bees, moths and butterflies are attracted to the *R. arvensis* (Huds.)

## 4 Conclusion

Botanical roses belong to an irreplaceable group of ornamental plants that are perfectly adapted to the climatic conditions of Slovakia. The positive features of the botanical species include resistance to pests and diseases, winter hardiness, and low maintenance. Their flowers have long been used for oil production. Fruits are used in a wide variety of food and nutrition products due the content of vitamin C.

They create unusual shapes that excel in some species with rich bloom and intense scent. Applying them, in view of the size of the species, is mainly in larger areas of greenery, in parks, in the countryside, around cycling routes, in recreational areas, in farm facilities or in industrial complexes.

Slovakia has a rich gene pool of botanical roses in different climatic regions. There should be a need for conserving a multiplication of these species.

## Acknowledgements

This paper was created within the project KEGA Development and implementation of the standards for urban greenery management. Project registration number 003SPU-4/2017.

## References

ÇINAR, I. – ÇOLAKOĞLU, A.S. 2005. Potential health benefits of rose hip products. In *Acta Horticulturae*, vol. 690, 2005, pp. 253–258. DOI: [10.17660/ActaHortic.2005.690.10](https://doi.org/10.17660/ActaHortic.2005.690.10)

ERCISLI, S. – GÜLERYÜZ, M. 2005. Rose hip utilization in Turkey. In *Acta Horticulturae*, vol. 690, 2005, pp. 77–82. DOI: [10.17660/ActaHortic.2005.690.10](https://doi.org/10.17660/ActaHortic.2005.690.10)

FERIANCOVÁ, L. – ŠTEVULOVÁ, M. 1997. Krása ruží. Časť 1. Triedenie ruží. Zvolen : ÚV SZZ ZO *Rosa* klub Zvolen, 1997, 62 p. ISBN 80-7125-014-7.

HREŠKO, J. – PUCHEROVÁ, Z. – BALÁŽ, I. 2006. Krajina Nitry a jej okolia – Úvodná etapa výskumu. Nitra : UKF, 2006, 182 p. ISBN 80-8094-066-5.

JEŽOVIČ, V. – LUKÁČIK, I. 2011. Selected species of the genus *Rosa* L. and the possibility of their use in the current landscaping. In *Rostliny v podmínkách meničiho se klimatu*. Lednice : Úroda, 2011, p. 191–202. ISSN 0139-6013.

JOUBLAN, J. P. – BERTI, M. – SERRI, H. – WILCKENS, R. – HEVIA, F. – FIGUEROA, I. 1996. Wild rose germplasm evaluation in Chile. pp. 584–588. In J. Janick (ed.) *Progress in new crops*. ASHS Press, Arlington, VA. Web: <http://www.hort.purdue.edu/newcrop/proceedings1996/v3-584.html>

KARAHAN, F. 2005. Importance of Landscape Characteristics for Plant Diversity and Distribution of *Rosa* Taxa in the North-Eastern Anatolia Ecoregion, Turkey. In *Acta Horticulturae*, vol. 690, 2005, pp. 51–56. DOI: [10.17660/ActaHortic.2005.690.10](https://doi.org/10.17660/ActaHortic.2005.690.10)

KERÉNYI-NAGY, V. 2010. Kľúč na určovanie botanických druhov ruží na európskom kontinente. Nepublikovaný rukopis. 2010.

KERÉNYI-NAGY, V. – BARANEC, T. 2008. A Nyitrai Szlovák Agrártudományi Egyetem Növénytani Tanszékének rózsza-herbáriumuma – *Rose herbarium of the Slovak University of Agriculture in Nitra, Department of Botany*. In XXVII. Vándorgyűlés Előadások összefoglalói, 2008. szeptember 25.–26., Magyar Biológiai Társaság, Budapest, 2008, pp. 91–104.

KERÉNYI-NAGY, V. – ELIÁŠ, P. jun. – BARANEC, T. 2008. Adatok a Zobor-hegység flórájához. Data for flora of the Zobor-mountains. In *Kitaibelia*, vol. 13, 2008, no. 1, p. 109.

KLÁŠTERSKÝ, I. 1969. Komplex *Rosa canina* v Československu. In *Zpravodaj Československé botanické společnosti*, 1969, no. 6, pp. 174–179.

ŘEHOŘEK, V. – SVOBODOVÁ, Z. – ULRICH, L. – KUBINSKÁ, A. – LACKOVIČOVÁ, A. 2007. Lišajníky, machorasty a cievnaté rastliny Zoborských vrchov. Nitra : SPU, 2007, 162 p. ISBN 978-80-8069-897-3.

VEČEŘA, L. – CHORVÁT, F. – MACHOVEC, J. – STAŇKOVÁ-OPOČENSKÁ, E. ŠTURMA, A. 1967. Ruže. Martin : Tlačiarne Slovenského národného povstania, 1967, 199 p.

VĚTVIČKA, V. – BERTO VÁ, L. 1992. *Flora Slovenska IV/3*. Bratislava : VEDA, 1992, 564 p.

VĚTVIČKA, V. – KREJČOVÁ, Z. 2001. Ruže. Praha : Aventium, 2001, 223 p. ISBN 80-7151-183-8.

WILSON, F. 1941. The atlas of colors of Royal horticultural society in london. London : Royal horticultural society in London, 1941.

