

## BOTANICAL ROSES OF ABANDONED VINEYARDS

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Roses are ancient cultural plants. The Slovak flora is very rich in rose species. As Větvička and Bertová (1992) mentioned, the first rose, which was introduced to the culture, was *Rosa gallica* and its cultivars. This study deals with a list of *Rosa* taxa found in the south-eastern area of The Low Carpathian region. *Rosa* taxa are published with their primary description. The aim of our work was to revise species which were described by rhodologists as Holuby (1912) Klášterský (1901–1979) and others who carried out the botanical research in The Low Carpathian region. Our research was executed in the localities of Líščie stráne, Dolné trávniky in the town of Modra and Vimpergy in the town of Pezinok. The data used in the study were obtained from Flora of Slovakia IV/3. In this paper, *Rosa* species found in abandoned vineyards are listed with their characteristics and uses.

**Keywords:** abandoned vineyards, biodiversity, utilisation, *Rosa* species

### 1 Introduction

The history of vine-growing in Slovakia dates back to the Celts, but the role of the founder of the Slovak viticulture is attributed to the Roman Emperor Marcus Aurelius Probus. During his reign in the third century AD, the Roman legions conquered almost whole Europe and established vineyards in the area of the present city of Bratislava (The Low Carpathian region) and in the Tokaj region.

King Andrew II had a great merit in the development of vineyards and viticulture. With the privilege called Golden Bull, he confirmed large freedoms to winegrowers in 1222.

Most of the vineyards were destroyed after the invasion of the Tatars in 1241. However, with the help of colonizers, concerning the Low Carpathian region, they were Germans, the vineyards managed to recover quite quickly (Žudel and Dubovský, 2006).

Since The Middle Ages, the method of a vineyard management has been on a high level. Traditionally, the cultivation of vineyards is associated with a very difficult labour.

The difficulty of the vine-growing as a crop-growing on the northern border of its geographical distribution in Europe was one of the main reasons why some vineyards in Slovakia were not cultivated in the past (Vanya, 2015).

The greatest decline in viticulture in Europe occurred in the second half of the 19<sup>th</sup> century due to the introduction of previously unknown diseases and vine pests (powdery mildews, but mainly phylloxera, which was imported together with the American vine).

In the beginning of the 20<sup>th</sup> century, the first abandoned vineyards, so-called pustáky, appeared and spread. Later, the winegrowers partially reclaimed them and started to use other non-renewed parts in a different way.

The area of the abundant vineyards has gradually increased. Some small vineyards were destroyed and transformed into grassland (grassland) or other cultures. However, many vineyards remained privately owned by co-operatives who had no longer been able to maintain them or have lost interest in them.

The real area of pustáky (the abandoned vineyards) in Slovakia is not known. During the first registration of vineyards (The Central Control Institute of Agriculture, 1996), only 9,300 ha were registered, which equals approximately half of their real area.

The areas of the abandoned vineyards are identified by the orthophotographs using GPS system, for which the geostationary satellites are used over the territory of the Slovak Republic. In this way, not only the cultivated, but also the abandoned vineyards could be registered (Eliáš, 2009).



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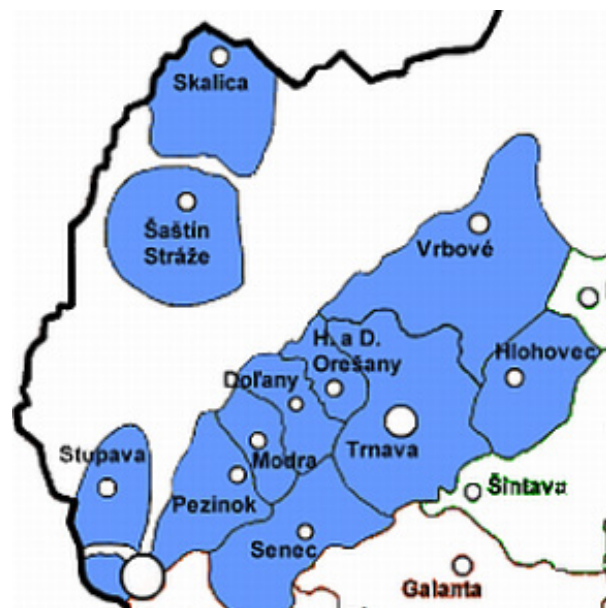
### 1.1 Succession process of the abandoned vineyards

Eliáš (2009) divides the process of succession in the abandoned vineyards into four stages:

1. The first successive stage (one to three years after the abandonment) consists of annuals, winter and two-year types of weeds and ruderals. The number of weeds and ruderal plants increases, in particular the species *Lactuca serriola*, *Conyza canadensis*, *Convolvulus arvensis*, *Cardaria draba*, *Agropyronrepens*, *Achillea millefolium* and *Arrhenatherum elatius*.
2. The second successive stage in the subsequent years (from three to six, up to ten years), perennial herbs and grasses are increasingly used. High perennial herbs, such as *Artemisia vulgaris* and *Tanacetum vulgare* are used predominantly on loamy soils, *Echium vulgare* and *Melilotus officinalis* predominantly on sandy soils and *Agropyron repens* on heavy clay soils.
3. The third successive stage (after more than 10 years) consists of semi-natural and natural communities of perennial grasses, dominated mainly by *Arrhenatherum elatius* on clay soils and *Calamagrostis epigeios* on sandy soils.
4. The fourth successive stage in the abandoned vineyards consists of stands of trees – shrubs and trees. These are usually deciduous and have a xerothermic character (the class *Quercetea pubescentis-petraea*). The coppices of *Pinus sylvestris* and *Robinia pseudacacia* may develop on sandy soils. On the southern slopes of the Low Carpathians near the city of Bratislava and towns of Pezinok and Modra, oak forests of the *Quercus-Fagetes* class grow today.

## 2 Material and methods

The monitoring of *Rosa* sp. in the abandoned vineyards was carried out by field observations in the years 2009–2017. The Low Carpathian region is a very rich floristic area of Slovakia. The observed areas were in the town of Modra and Pezinok. In the town of Modra, there were localities as Líščie stráne (230 m ASL) and



■ **Figure 1:** The Low Carpathian wine growing region  
Source: <http://www.vino.sk/encyklopedia-vina/vinohradnicke-oblasti/slovensko-malokarpatska-vinohradnicka-oblast/>

Dolné trávniky (255 m ASL) and in the town of Pezinok, there was the locality of Vimpergy (226 m ASL). Keys for the identification of roses, set by several authors (Kláštorský, 1969; Větvička, 1992; Kerényi and Nagy, 2010), were used to determine the individual types of roses and also the findings were confronted with Flora of Slovakia IV/3.

The researched areas are situated on the slopes of The Low Carpathian hills, in the town Modra and in the cadastral area of the town of Pezinok. The localities in the town of Modra are exposed to the southeast, as well as the locality in town of Pezinok. According to Pospíšilová et al. (2005), the Low Carpathian vineyards extend on the southwest slopes of the Little Carpathians from the city of Bratislava to the municipality of Horné Orešany. The geological substrates consist mainly of the alluvial cones of the Low Carpathian streams, and there are loamy-sand and medium skeleton soils. In this sub-area, 7 wine growing regions – Bratislava, Pezinok, Modra, Doľany, Orešany, Senec and Trnava are ranked there (see Figure 1).

**Table 1** The climatic characteristics of the studied localities

Locality	Geomorphologic unit	Exposure	Elevation (m)	Average temperature ( °C)	Average rainfall (mm)
<b>Pezinok</b>	Low Carpathians	SE	226	10	750
<b>Modra</b>	Low Carpathians	SE	230–255	8,21	845

Source: [https://zbgis.skgeodesy.sk/mkzbgis/?bm=zbgis&z=11&c=17.259969,48.324955#/detail/ease/igfzIWsbSy\\_Kk5t4oqfH](https://zbgis.skgeodesy.sk/mkzbgis/?bm=zbgis&z=11&c=17.259969,48.324955#/detail/ease/igfzIWsbSy_Kk5t4oqfH)  
[http://www.podnemapy.sk/portal/reg\\_pod\\_infoserwis/klima/klima.aspx](http://www.podnemapy.sk/portal/reg_pod_infoserwis/klima/klima.aspx)



The Low Carpathian wine growing area is the most intensive and one of the in Slovakia. The area of the registered vineyards covers an area of 5,359.2 ha. With its climatic characteristics, it is suitable also for many other species such as *Sorbus domestica*, *Castanea sativa*, *Mespilus germanica*, *Prunus spinosa* and *Rosa* species and many other fruit trees and shrubs.

The typical areas of the European rose sections according to Větvička (2001) are as follows:

- *Cinnamomeae* – forest slopes, forest edges, basin bottoms, inverse positions.
- *Caninae* – forest edges, lighted places.
- *Pimpinellifoliae* and *Rosa* – steppe, rocky scree, rock crevices.
- *Synstylae* – deciduous forests.

### 3 Results and discussion

This paper reports on the information about all the species, their distribution, potentially useful characteristics and the utilization of *Rosa* species in the abandoned vineyards in the Low Carpathian region.

*Rosa* species found in the abandoned vineyards:

■ *Rosa canina* L.

– grows in forests and at the edge of forests as a liana, or in open spaces, where it creates from 1 to 3 m high shrub with short branches. It grows abundantly throughout Slovakia, from lowlands to hilly areas. Secondary, it grows on banks, pastures, abandoned fields and vineyards. Branches are covered with irregularly distributed sharp and hooked prickles. The leaves are pinnate, with 5–7 leaflets. Flowers are usually single and pale pink, sometimes white. Calyx leaves, first three pinnately clipped, the last one only with a half, fall off before fruits ripen. Hypanthium is variable, elliptic, ovoid, pear-shaped, spherical, compressed-spherical, bland or rare, glandular and orange red to brown red (Větvička and Bertová 1992). The flesh contains a high level of antioxidants, mainly polyphenols and ascorbic acid, carotenoids and the vitamins B and E (Nybom and Werlemark, 2017). Fruits are noted for their high content of the vitamin C and are used in tea or marmalade (Vogl et al., 2013). *Rosa canina* L. and its population are most often used as a rootstock (Větvička and Krejčová, 2001; Větvička and Bertová, 1992). It grows well in the sunny and dry locations (Lindtner et al., 1971), mainly on limestone; its maximum reaches 1,700 m ASL. (Ercisli, 2005). Its frequent occurrence is in the town Modra – Líščie stráne and Dolné trávniky and in the town of Pezinok – Vimpergy.

■ *Rosa agrestis* Savi.

– although it is present in the Carpathian and the Pannonian region, it is nowhere particularly abundant. It prefers non forest areas, usually banks, pastures, abandoned fields and vineyards, sunny and dry locations, most frequently on limestone. Its maximum reaches about 1,000 m ASL. Populations consist of a few individuals. It forms a dense, scattered shrub, which is 1.5–2 m high. The shrub creates straight or curved branches. Prickles are strong, banded or hooked. Leaves are pinnate, with 5–7 leaflets and are fragrant (have got an apple fragrance) (Větvička and Bertová, 1992). Small flowers are grouped in sparse white blossoms. Calyx leaves are richly pendant, after flowering bent back. Fruits vary in size and shape. However, they are often small (10 mm), elliptic or wide elliptic, spherical and red. It is a less common rose; the fragrance of its leaves is interesting. Neither economical nor ornamental values are reported (Ercisli, 2005). Small populations were found in the town Modra – Líščie stráne and Dolné trávniky and in the town of Pezinok – Vimpergy.

■ *Rosa rubiginosa* L.

– creates a dense shrub 1.2–2 m high, with upright or bent branches. Branches are densely spiny, prickles are hooked, mixed with thin and almost straight prickles. Leaves are pinnate, 5–7 leaflets, with numerous glandular hairs and strong apple fragrance. The flowers are deep-pink with a white base. Calyx leaves, first three pinnately clipped, last one only on one side, remain upright on mature fruits. Fruits are mostly ovoid, spherical, or narrowly elliptical, small (less than 10 mm) or big (over 15 mm), orange red and when mature, they are soft. Fruits endure well the winter. It grows on limestone, on sunny locations. Its maximum reaches about 1,050 m ASL. Hips are very rich of the vitamin C and are used for tea (Větvička and Bertová, 1992; Nybom and Werlemark, 2017). These were found in the town of Modra – Líščie stráne and Dolné trávniky.

■ *Rosa inodora* Fries.

– a dense shrub, 1.5–2 m high. Spiked branches are both upright and arched. Leaves are pinnate, 5–7 leaflets, with an intensive apple fragrance. Flowers are grouped in sparse blossoms (approx. 3 flowers), that are light-pink or white and slightly fragrant. Calyx leaves are long and narrow, first three only with few pendants. Fruits are spherical, ovoid, pear-shaped, smooth, shiny, orange red and soft when mature. It often grows on sunny slopes (Eliáš ml., 2016) of limestone, or sand, or pastures and forest edges (Větvička and Bertová, 1992). The occurrence is marked in the town Modra – Líščie stráne and Dolné trávniky.

**Table 2** The ethnobotanical features of the rose species found in the abandoned vineyards

	<i>Rosa canina</i>	<i>Rosa agrestis</i>	<i>Rosa jundzillii</i>	<i>Rosa micrantha</i>	<i>Rosa rubiginosa</i>	<i>Rosa inodora</i>	<i>Rosa dumalis</i>
<b>Medicinal uses</b>	+++	-	-	-	+++	-	-
<b>Rootstock</b>	+++	-	-	-	-	-	-
<b>Fresh fruits</b>	+++	-	-	-	+++	-	++
<b>Gardening</b>	++	+++	++	++	+++	+++	+++

Source: Větvička and Bertová, 1992; Lindtner et al., 1971, author's findings  
 +++ high, ++ medium, - low

■ *Rosa micrantha* Borrer ex Sm.

– an irregular, sparse, 1.5–2.5 m high shrub. Prickles are usually hooked, rarely mixed with acicular prickles. Leaves are pinnate, 5–7 leaflets, on the back with thick hair and glands and with an apple fragrance. Flowers are light-pink, single and with longer peduncle; or three that arranged on a short peduncle. Calyx leaves, first three are with pendants, usually with gland. After flowering, they bent backwards and subside shortly afterwards. Hips are ovoid, narrowly elliptical, small, red and soft when mature. It grows on sunny non-forest areas, pasturelands and abandoned vineyards (Větvička and Bertová, 1992) in the north-western and Central Europe. The occurrence was marked in the town of Modra – Líščie stráne, and in the town of Pezinok – Vimpergy.

■ *Rosa dumalis* Bechst.

– this grows like a shrub, having 1–3 m in height; often a dense, multi-stem shrub, with upright or bent branches. Prickles are uniform, of different size, bent or hooked. Leaves are pinnate, 5–7 (9) leaves. Flowers are rarely single; usually 3–5 are arranged together, rarely white, pink, light-pink or deep-pink. First three calyx leaves with one or more pairs of pendants. Hips are big, orange red or deep red and soft when mature (Větvička and Bertová, 1992). It grows in light forests, forest edges, but also in grasslands and open areas. It could reach the maximal elevation of 1,200 m ASL. The occurrence was marked in the town of Modra – Dolné trávniky and in the town of Pezinok – Vimpergy.

■ *Rosa jundzillii* Besser

– this species creates an erect or hanging shrub, which is 1 m high. Prickles are narrow, straight or bent. Leaves are pinnate, 5–7 leaflets. Flowers arranged in a group of 2–3, petals are large, pink or deep-pink. Calyx leaves are pinnately clipped, pendants are long and narrow. Hips are spherical. It is common on open slopes, sloping hillsides along roads, dry hillsides, pastures and abandoned vineyards. It could reach the maximal

elevation of 1,000 m ASL (Větvička and Bertová, 1992; Nilsson 1997).

## 4 Conclusion

The area of the abundant vineyards has gradually increased. Some small vineyards were destroyed and transformed into grassland (grassland) or into other cultures. However, many vineyards have remained privately owned by owners who have no longer been able to maintain them or have lost interest in them.

Vineyards, together with orchards, evoke a special landscape phenomenon – a vine-growing cultural region, which deserves its borders and protection (Eliáš, 2009). The Low Carpathian vineyards, since they create a secondary natural community, are rarely a natural and economic land, which is why its development and protection is needed.

The vineyards' landscape and its beneficiaries may use the natural trails to acknowledge nature. For example, in the area in the town of Pezinok, Wine Nature Trail was established. The abandoned vineyards could also become an attraction of wine roads that pass through Slovakia, as they are witnesses of the time, either the past, or the present one.

Some *Rosa* species have got important ethnobotanical features (Ercisli et al., 2005; Çinar et al., 2005), concerning e.g. a high content of the vitamin C as is in the species of *Rosa canina*, *Rosa rubiginosa*. Moreover, some are glandulous and release an apple fragrance in humid conditions, as for example *Rosa rubiginosa* and *Rosa agrestis*. These characteristics were found interesting for further landscape uses.

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