ACTA AGROBOTANICA
Vol. 67 (3), 2014: 39–52
Original Research Paper
DOI: 10.5586/aa.2014.036

EVALUATION OF GROWTH AND FLOWERING OF HISTORICAL CULTIVARS OF *Rosa gallica* L. GROWING IN THE NATIONAL COLLECTION OF ROSE CULTIVARS IN THE POLISH ACADEMY OF SCIENCE BOTANICAL GARDEN IN POWSIN

Marta Joanna Monder

Polish Academy of Sciences Botanical Garden – Center for Biological Diversity Conservation in Powsin
Department of Botanical and Horticultural Collections
Prawdziwka 2, 02-973 Warsaw, Poland
e-mail: mondermarta@obpan.pl

Received: 02.01.2014

Abstract

Rosa gallica is a native species under strict protection and its cultivars are practically unknown in Poland. The aim of the observations was to evaluate the possibilities of growing the studied cultivars in the climate of Central Poland. In the years 2000–2012, observations were conducted of shrubs derived from the French rose (*R. gallica* L.) gathered in the Collection of Rose Cultivars of the PAS Botanical Garden CBDC in Powsin, Poland. 13 cultivars were studied: 'Ambroise Paré', 'Belle Herminie', 'Camaďeux', 'Cardinal de Richelieu', 'Charles de Mills', 'Complicata', 'Duchesse d'Angoulęme', 'Duchesse de Montebello', 'Officinalis', 'Splendens', 'Tuscany Superb', 'Versicolor', and 'Violacea'. Every year, frost damage to shrubs, the date of bud breaking and leaf development as well as the dates of initial, full and final flowering were recorded and the presence of symptoms of damage from diseases was observed. During the observation years, periods of weather conditions unfavorable for roses often occurred, both in autumn-winter-spring and in summer. Only small differences were observed in winter hardiness, development during the growing season, and blooming period. The majority of the studied rose cultivars overwinter without frost damage, even through severe winters. The shrubs begin their growth late, usually until the second half of April. Gallicas start flowering early, in the third decade of May – first decade of June. Most Gallicas should find a wider application as shrubs or hedges for parks, green areas in cities, historical places, or home gardens. They are recommendable for their high resistance to frost and diseases as well as for their small size.

Key words: Botanical Garden; *Rosa gallica*; 13 cultivars; historical roses; phenology; frost damage; greenery

INTRODUCTION

In the National Collection of Rose Cultivars in the Polish Academy of Sciences Botanical Garden – Center for Biological Diversity Conservation in Powsin, among nearly 750 species, varieties and cultivars, shrubs of the Gallica (*Rosa gallica* L.) and thirteen of its historical cultivars have been planted.

The French rose (*Rosa gallica* L.) belongs to the subgenus *Rosa* (*Eurosa*) in the section *Rosa* (*Gallicanae* DC). It is a self-incompatible native species which occurs in a few forms [1] and also creates hybrids, e.g. *R.* x *pomazensis* Degen in Jav. [1,2]. It grows mainly in southern Poland where the northern border of its range runs [3]. The range covers central and eastern Europe, Crimea, the Caucasus, and Asia Minor [4]. The Gallica dwells in sunny undergrowth of oak forests and xerothermic grasslands on limestone or chalk rendzina soil [5]. As a result of intensive human activity, this taxon has been ousted from its habitats [5] and is in danger of functional extinction (V category of endangerment) [6] and included in the vulnerable category (VU category of endangerment) [7]. In Poland, in 2004 it became a protected species [8] and the Legislative Act of the Minister of Environment of 5th January 2012 provided this species with strict protection with the status of active conservation.

The history of cultivation of this species dates back to ancient times and its share in breeding new groups of roses was large [5,9,10]. Moreover, it is an ancestor species for garden roses of Oriental-European origin, e.g. Centifolias (*R.* ×*centifolia* L.) and Damask (*R.* × *damascena* Mill.) [5]. In the first half of the 19th

century, about one thousand of Gallicas were known, very few of which have remained until today [9]. The role of Gallicas in modern cultivation is not big. A small number of them contributed to the development of some David Austin's English Roses created in the 1960s [11]. Old Gallicas are regarded by gardeners as highly resistant to frost and diseases, tolerant to poor soils, well enduring hot summers and frosty winters [9,12]; however, no scientific studies on the subject have been found. Many Gallicas are among the oldest cultivated varieties of roses; nowadays, however, they are rarely used as ornamental plants. The unspecified full flower forms of *Rosa gallica* were recorded in the old Poznań cemeteries [13].

At present, growing Gallicas is fostered by the trend of looking for plants that are easy to maintain – which is important due to the tendency of lowering investment costs – and do not require using chemical plant protection, the matter referred to by an EU Council Directive (no. 91/414/EEC, OJEU). Moreover, many scientists – which also influences lawmakers – deal with the problem of species of alien origin, both in the natural environment [14] and grown as ornamental plants, and their cultivars [15]. The French rose is a native species for the majority of European countries [5].

Because of their ornamental value and high tolerance to unfavorable growth conditions [16,17], historical roses, including Gallicas, should be used more frequently in revitalizing historical properties and urban greeneries, as well as in maintaining biodiversity and heritage of garden plants. This particularly applies to Eastern Europe, especially Poland, where the condition of many historical gardens is poor [18]. Historical roses have become a fixed part of the product offer of well-known European nurseries, e.g. "Les Roses Anciennes Andre Evé" (France) or ,"The Old Rose Nursery" (United Kingdom). In Poland after the Second World War, the cultivation of Gallica roses was almost completely abandoned, just like the majority of other historical roses. In the recent several years, an interest in them has reappeared, which is visible in their presence in "The Catalogue of Roses recommended by the Polish Nurserymen Association" [19] where three of them can be found: 'Cardinal de Richelieu', 'Charles de Mills', and 'Complicata'.

In the PAS Botanical Garden CBDC in Powsin, Gallicas have been observed since the moment of their planting due to the advantageous features that characterize them. The aim of these observations was to evaluate the possibilities of growing the studied cultivars in the climate of Central Poland. The purpose was to learn in more detail about the fitness for cultivation and decorativeness of 13 Gallica cultivars with a special emphasis on their growth and blooming. All cultivars chosen for observation have visually attractive and fragrant flowers (Fig. 1). 'Officinalis' has been grown for centuries (the exact data are unknown) to modern times in order to obtain rose oil from flower petals [9].

MATERIALS AND METHODS

The observations were conducted in the years 2000–2012 on 13 shrub rose cultivars originating from the Gallica (*Rosa gallica* L.), gathered in the National Collection of Rose Cultivars of the Polish Academy of Sciences Botanical Garden – Center for Biological Diversity Conservation in Powsin (Fig. 1). Table 1 presents the chosen cultivars, their origin, and the number of shrubs in the collection. The origin, as far as parental specimens are concerned, is often unknown, and defining it based on various sources is ambiguous. These cultivars grow from their own roots or on stocks (Table 1). The shrubs were obtained from Polish nurseries ('Ambroise Paré', 'Charles de Mills', 'Officinalis', 'Splendens', 'Versicolor', 'Violacea') or from abroad ('Belle Herminie', 'Camaďeux', 'Complicata', 'Cardinal de Richelieu', 'Duchesse d'Angoulęme', 'Duchesse de Montebello', 'Tuscany Superb').

The shrubs were planted in a space which provided them with appropriate growth conditions. During the growing period of the shrubs, agronomic treatments were carried out according to the current technology of shrub cultivation in soil. The shrubs grow in light, sandy soil, enriched during cultivation with organic materials (sapric peat, manure, bark), with a pH of 6–6.5. The shrubs were not covered (hilled up) for winter, but the beds were mulched with leaves or bark (a layer of 7–10 cm) every 2–3 years. In season, on average 2–3 protective sprayings of plants against pests and fungal diseases were carried out in the collection. The shrubs were observed every year.

Every spring, damage caused by frost was recorded according to the scale put forward by Łukasiewicz [20] for non-evergreen plants (excluding points 2, 8, 9, as they are not applicable to roses). These are:

0 – undamaged plants;
1 – darkened vascular bundles on shoots, but buds develop;
2 – frost-damaged flower buds;
3 – frost-damaged leaf buds;
4 – frost-damaged tips of one-year-old shoots;
5 – frost-damaged one-year-old shoots or only their living bases;
6 – also frost-damaged 2-year-old and older shoots;
7 – shoots frost damaged to the ground (snow) surface, but new shoots grow from undamaged parts (shoot bases or roots);
8 – cracked shoots;
9 – damping off of the stem or boughs;

10 – complete plant frost damage (no signs of regeneration).

The start dates of first leaf bud opening and first leaf blade opening [21] on uncut shoots were recorded every spring.

In addition, the average flowering time was recorded for the shrubs: the dates of initial (the appearance of the first flowers – several full-blown flowers), full (25% of full-blown flowers) and final flowering (100% of flowers overblown), according to Ł u k a s i e w i c z [21] with modification. The height of the shrubs was measured during the flowering period (at the turn of May and June) and at the end of the growing season (the end of October). The condition of foliage was observed and it was noted that it was necessary to carry out cutting in spring and after flowering.

Fig. 1. Flowers, hips and achenes of French rose (*Rosa gallica*) and Gallicas observed in the Collection in the PAS Botanical Garden CBDC in Powsin.

Table 1
The historical cultivars of Gallicas belonging to the Collection of Rose Cultivars of the PAS Botanical Garden CBDC in Powsin

Cultivar	Origin; synonyms	Year of planting in collection	Rootstock	Number of shrubs
'Ambroise Paré'	unknown, Jean-Pierre Vibert 1846[3]	2009	*R. canina* 'Laxa'	3
'Belle Herminie'	unknown, Jean-Pierre Vibert, before 1838[4]/ Cocquerell, (?)[3]	2002	*R. multiflora*	4
'Camaïeux'	unknown, Gendron 1826[4] / Vibert[1,3] 1830[3]	2002	*R. multiflora*	4
'Cardinal de Richelieu'	unknown, Louis-Joseph-Ghislain Parmentier, before 1847[1,3] / Laffay 1840[2]	2000	*R. multiflora*	11
'Charles de Mills'	unknown, Netherlands, intr. before 1790[2]; Netherlands before 1700[1]; Roseraie de l'Ha˙ (?)[3]	2005	*R. canina* 'Laxa'	4
'Complicata'	*R. gallica* L. x *R canina* L. or *R.* 'Gallica Macrantha', unknown before 1800[1]/ unknown[3]	2002	*R. multiflora*	11
'Duchesse d'Angoulême'	unknown, Jean-Pierre Vibert, before 1821[1]/ 1835[3]	2002	*R. multiflora*	12
'Duchesse de Montebello'	Unknown, Jean Laffay 1824[1 /] 1829[2], 1835[3]	2002	*R. multiflora*	6
'Officinalis'	unknown (tetraploid)[4], before 1240[2], 1300[1], syn. 'Apothecary Rose'; syn. *R. gallica* f. *officinalis* Thory[3]	2006	own roots	3
'Splendens'	unknown, before 1583[1] ; syn. *R. gallica* f. *splendens* hort.[3]	2005	own roots	5
'Tuscany Superb'	seedling of 'Tuscany', Thomas Rivers & son 1837[1]/ France before 1848[3]	2002	own roots	5
'Versicolor'	sport of 'Officinalis', before 1176[2]; 1581[4]; syn. *R. gallica* f. *versicolor* L. (*R. gallica* f. *variegata* Andr.)[3]	2003	own roots	8
'Violacea'	unknown, Netherlands, intr. before 1795[4]; introd. Dupont before 1811 in France[1], syn. 'La Belle Sultane'[1]	2009	*R. canina* 'Laxa'	3

[1] – [2]; [2] – [9]; [3] – [31]; [4] – [32].

Weather conditions

Warsaw is situated in the temperate climate zone, which is characterized by transitionality and high changeability of weather conditions. The Botanical Garden (52.6°N, 20.5°E) is located in the mesoregion of the Middle Vistula, separated from the Warsaw Plain by a high fluvial terrace at the border of a post-glacial upland. The area is covered with aeolian sand fields and in some places with dunes, and partially with dust deposits created by periglacial and aeolian processes [22]. During the observation years, periods of weather conditions unfavorable for roses often occurred, both in autumn-winter-spring (2002/2003, 2005/2006, 2009/2010, 2010/2011, 2011/2012) and in summer (drought, excessive rainfall, high air temperatures) (Figs. 2–8). The lowest minimum temperatures were recorded in January: 2003 (-22.0°C), 2009 (-22.5°C), 2010 (-25.0°C), and in February: 2011 (-18.1°C), 2012 (-26.0°C) (Figs. 3–7). Since the winter of 2009/2010, heavy snowfall occurred every year. What is noticeable is the temperature pattern in these years which took different forms, including, among others, sudden temperature jumps (2002/2003), an early beginning of frost (2002/2003, 2009/2010, 2010/2011) or a late beginning (2005/2006, 2011/2012), a period of frost after a few days of warming (2002/2003), prolonged periods of frost (2002/2003, 2005/2006, 2011/2012), sudden spring warming (2009/2010, 2011/2012), or high 24-hour amplitudes of temperature, especially in April (Figs. 3–7). In the season of 2011/2012, an atypical 24-hour average temperature pattern is worth noticing. Mild conditions continued as long as January; then in February a sudden weather break took place and winter conditions persisted throughout March and at the beginning of April.

The average monthly temperatures in the years 2000–2012, the minimum, maximum and twenty-four hour temperatures in the period from October to April in the above-mentioned years (2002/2003, 2005/2006, 2009/2010, 2010/2011, 2011/2012), and the total annual precipitation in these years (2002/2003, 2005/2006, 2009/2010, 2010/2011, 2011/2012), based on the measurements carried out in the PAS Botanical Garden CBDC, are presented in Figures 2–8.

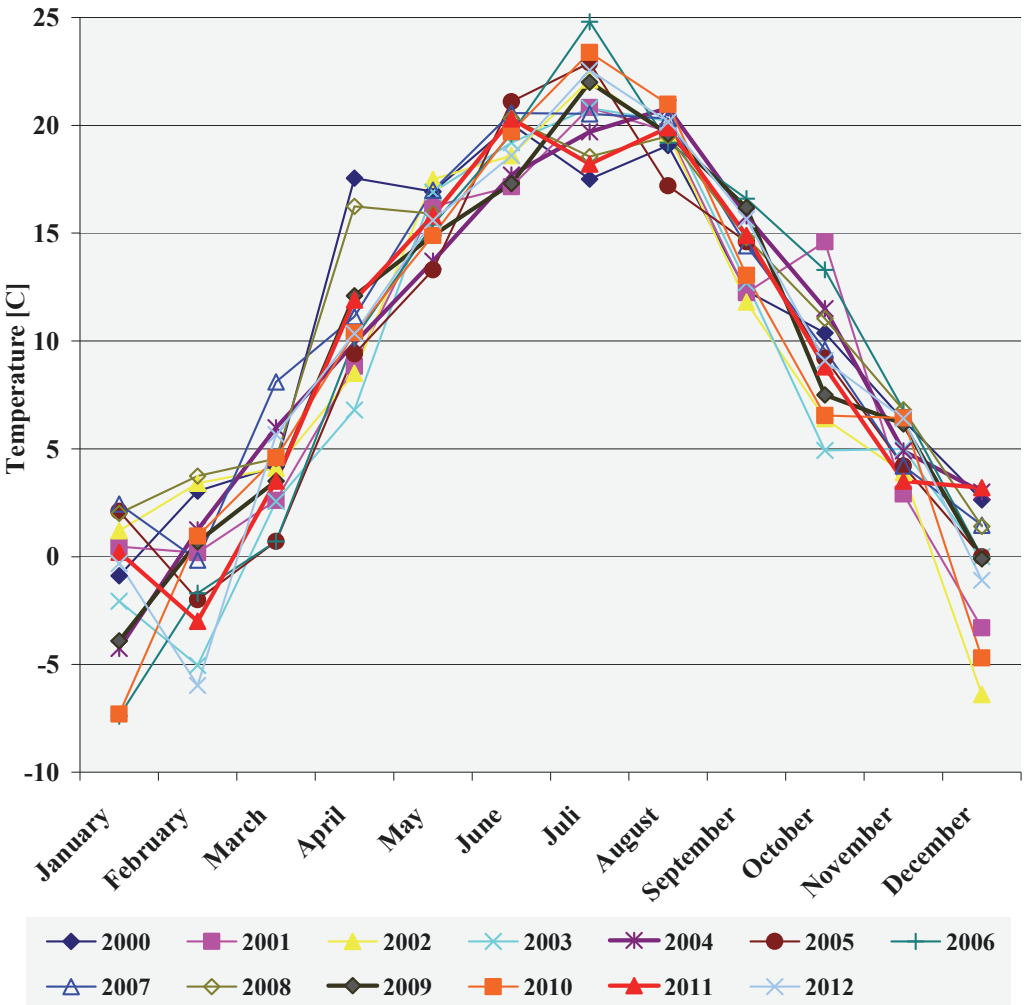

Fig. 2. Average monthly air temperatures [şC] in the years 2000–2012, in the PAS Botanical Garden CBDC in Powsin.

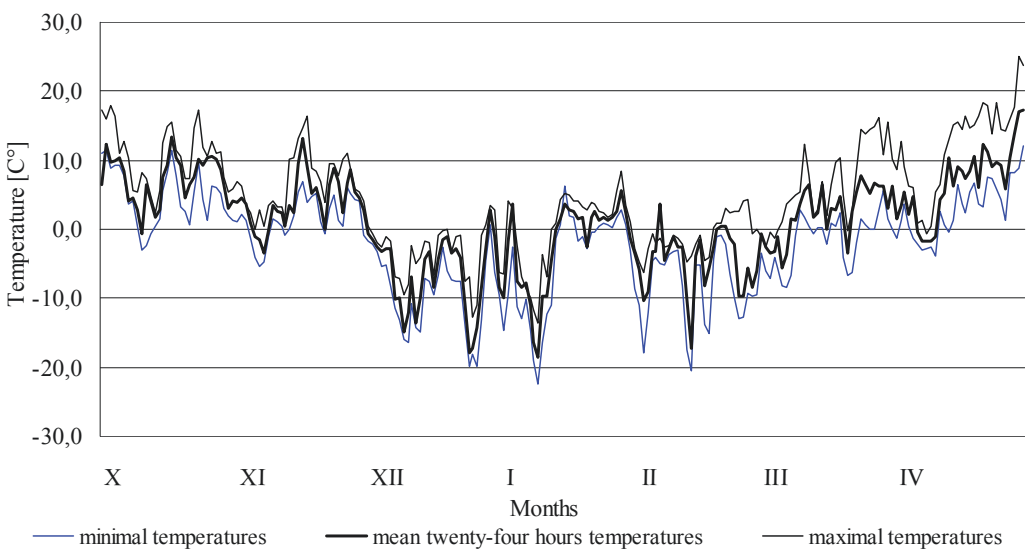

Fig. 3. Minimal, average twenty-four hour and maximal air temperatures [°C] from October to April in the autumn-winter seasons of 2002/2003, in PAS Botanical Garden CBDC in Powsin.

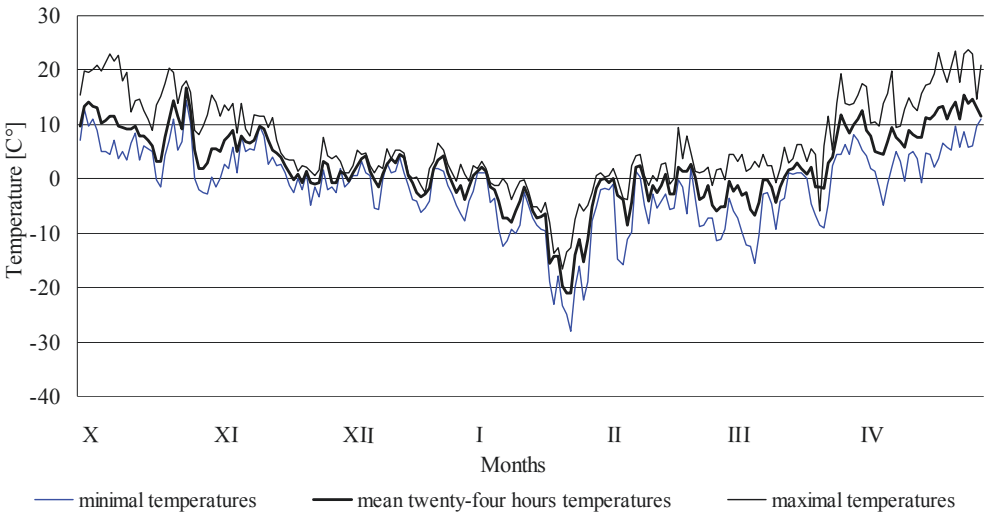

Fig. 4. Minimal, average twenty-four hour and maximal air temperatures [°C] from October to April in the autumn-winter seasons of 2005/2006, in the PAS Botanical Garden CBDC in Powsin.

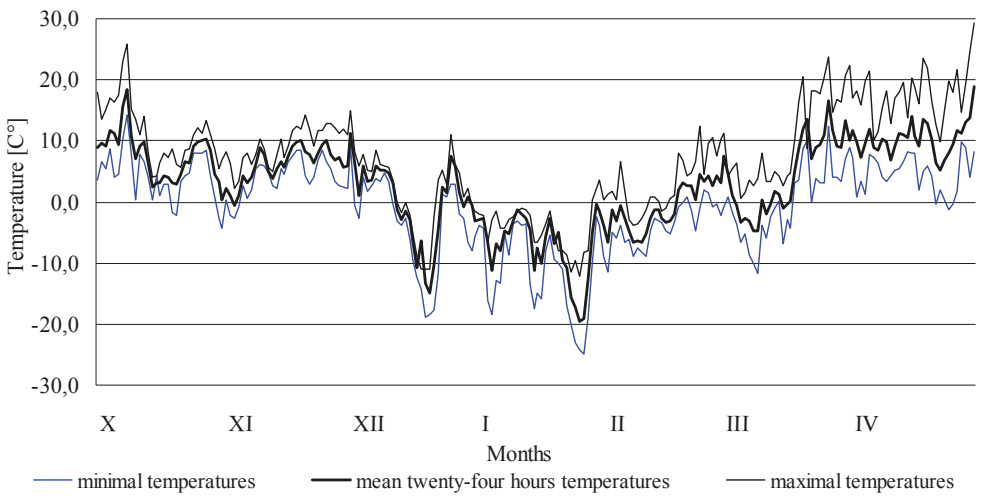

Fig. 5. Minimal, average twenty-four hour and maximal air temperatures [°C] from October to April in the autumn-winter seasons of 2009/2010, in the PAS Botanical Garden CBDC in Powsin.

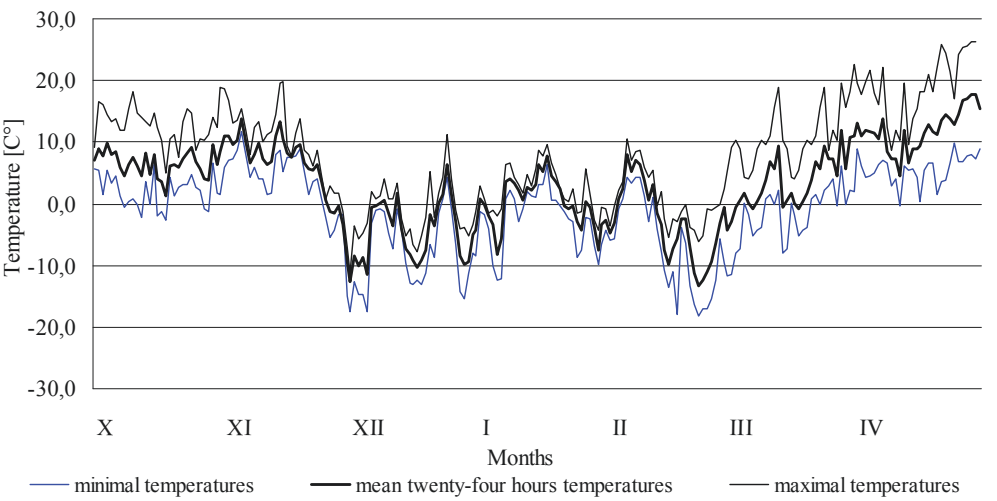

Fig. 6. Minimal, average twenty-four hour and maximal air temperatures [°C] from October to April in the autumn-winter seasons of 2010/2011, in the PAS Botanical Garden CBDC in Powsin.

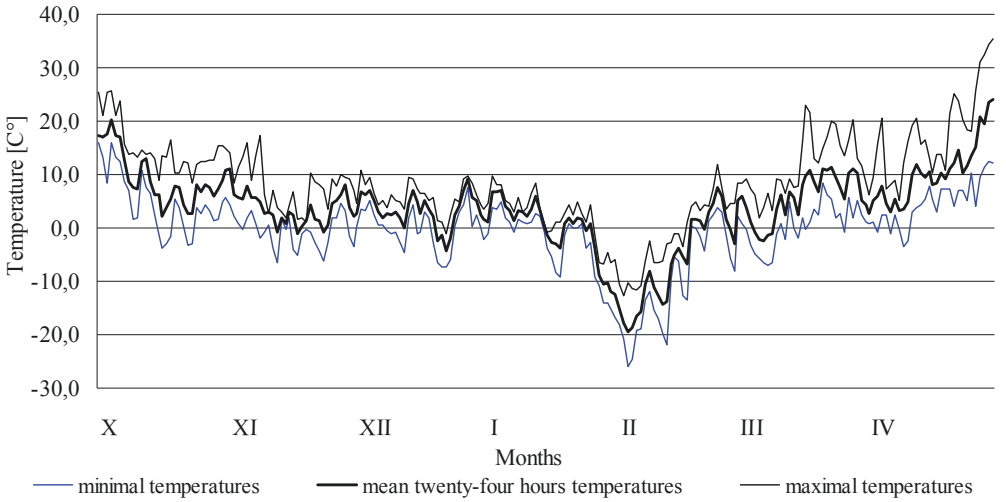

Fig. 7. Minimal, average twenty-four hour and maximal air temperatures [°C] from October to April in the autumn-winter seasons of 2011/2012, in the PAS Botanical Garden CBDC in Powsin.

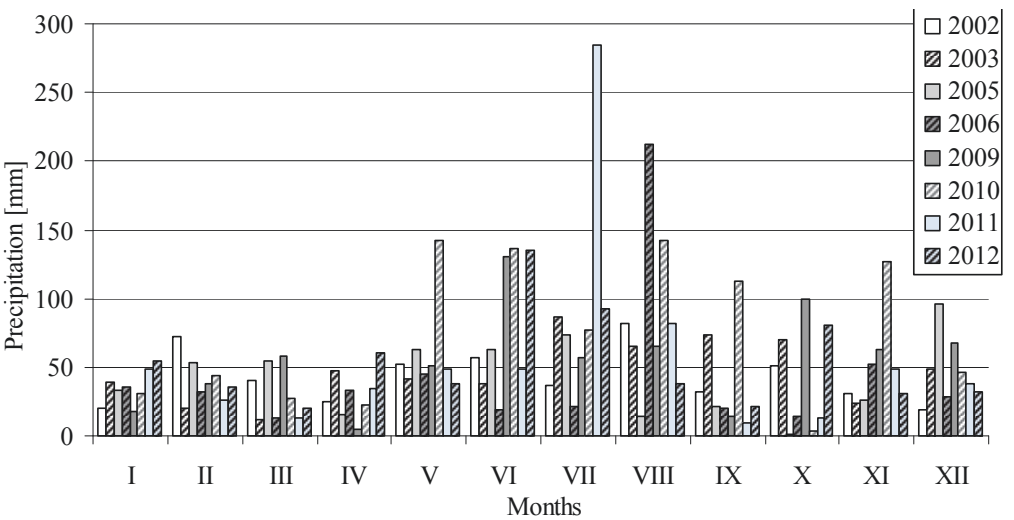

Fig. 8. Total monthly precipitation [mm] in the following years: 2002–2003, 2005–2006, 2009–2012, in the PAS Botanical Garden CBDC in Powsin.

RESULTS

Among the studied cultivars originating from the Gallica (*Rosa gallica*), small differences were observed in winter hardiness (Table 2), development during the growing season (Table 3), and blooming period (Fig. 9).

Overwintering

The most important criterion determining the success of rose growing in our climate is the ability of shrubs to survive the winter without affecting their further growth and blooming in season. Most of the studied historical rose cultivars originating from the Gallica overwinter well in the conditions of the Botanical Garden, even through severe winters. The final consecutive autumn-winter-spring seasons of observation (2009/2010, 2010/2011, 2011/2012) were extremely unfavorable. Among the studied cultivars, however, only in the shrubs of 'Cardinal de Richelieu', 'Complicata', 'Charles de Mills', 'Duchesse de Angoulęme' and 'Duchesse de Montebello' (2002/2003, 2005/2006, 2009/2010, 2010/2011, 2011/2012) low frost damage, such as darkened vascular bundles or less often one-year-old shots frozen and very rarely older ones, was observed in the years of unfavorable winter conditions. The greatest frost damage was noted in the season of 2009/2010 when the shrubs of all the above-mentioned cultivars were damaged. The shoots of 'Charles de Mills' and 'Cardinal de Richelieu' shrubs froze during the final three successive seasons of observation (Table 2). They needed slight pruning, about 1/3 to 2/3 of the height or length of shoots. The frost injury regenerated quickly and the pruning did not interfere with further growth and blooming.

Growth and flowering

In spring varying dates of bud bursting were observed in the shrubs, starting from mid-March to the second decade of April. Leaves appeared in mid-April at the earliest, but in a few shrubs ('Belle Herminie', 'Tuscany Superb', 'Versicolor', 'Violacea') leaf sprouting started only in the first days of May (Table 3). During the ten years of observation, leaves and young shoots were never damaged by spring ground frost. Foliage, partially changing color into yellow ('Ambroise Paré', 'Charles de Mills', 'Officinalis', 'Splendens', 'Versicolor', 'Violacea'), stays on until winter.

The first abundant blooming appeared after 3–4 years after planting on shoots that were at least one year old. Then, the shrubs flowered every year, with shoots from at least the previous year in bloom. Flower buds and flowers were damaged by spring ground frost. During the growing season, the beginning of flowering is earliest in 'Splendens', 'Ambroise Paré', 'Camaïeux', and 'Cardinal de Richelieu'. In the next ten days, shrubs of the other cultivars start blooming; 'Belle Herminie' flowered latest – 12 days after 'Splendens'. The period of full bloom starts in the first half of June and lasts for 3–4 weeks (Fig. 9). After blooming, for aesthetic reasons it is recommendable to cut off withered inflorescences in the following double-flowered cultivars which do not set ornamental hips: 'Ambroise Paré', 'Camaďeux', 'Cardinal de Richelieu', 'Duchesse d'Angoulême', and 'Duchesse de Montebello'. Ornamental hips are set in 'Charles de Mills', 'Complicata', 'Officinalis', 'Splendens', 'Versicolor', and 'Violacea'. Other cultivars set hips sporadically.

The shrubs of the examined cultivars reached their specific height 2–4 years after they had been planted and maintained it for the whole study period (Fig. 10). Root suckers are produced by 'Officinalis', 'Splendens', and 'Tuscany Superb'.

In the collection, no symptoms of rose rust (*Phragmidium mucronatum* (Pers.) Schltdl.) or downy mildew (*Pseudoperonospora sparsa* Berk.) were noted on the observed shrubs. Powdery mildew (*Sphaerotheca pannosa* var. *rosae*) appeared sporadically and in small amount on all the cultivars. Symptoms of black spot (*Diplocarpon rosae* F.A. Wolf) of little intensity were only observed in 'Charles de Mills' in damp summers. Small colonies of aphids were observed at the tips of shoots during blooming and individual specimens of spider mite. The observed pathogens did not affect the decorativeness of the shrubs in a significant way.

Table 2

Frost damage of the historical cultivars derived from the French rose (*Rosa gallica* L.) in the PAS Botanical Garden CBDC in Powsin according to the scale for deciduous plants developed by Łukasiewicz [20]: 0 – undamaged plants; 1 – darkened vascular bundles on shoots, but buds develop; 2 – frost-damaged flower buds; 3 – frost-damaged leaf buds; 4 – frost-damaged tips of one-year-old shoots; 5 – frost-damaged one-year-old shoots or only their living bases; 6 – also frost-damaged 2-year-old and older shoots; 7 – shoots frost-damaged to the ground (snow) surface, but new shoots grow from undamaged parts (shoot bases or roots); 8 – cracked shoots; 9 – damping off of the stem or boughs; 10 – complete plant frost damage (no signs of regeneration).

Cultivar	Year												
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
'Ambroise Paré'	-	-	-	-	-	-	-	-	-	-	0	0	0
'Belle Herminie'	-	-	0	0	0	0	0	0	0	0	0	0	0
'Camaïeux'	-	-	0	0	0	0	1	0	0	0	1	1	1
'Cardinal de Richelieu'	0	0	0	0	4	0	0	0	0	0	4	4	4
'Charles de Mills'	-	-	-	-	-	0	0	0	0	0	5	5	4
'Complicata'	-	-	0	0	0	0	1	0	0	0	5	5	0
'Duchesse d'Angoulême'	-	-	0	0	0	0	1	0	0	0	4	0	0
'Duchesse de Montebello'	-	-	0	0	0	0	1	0	0	0	5	5	0
'Officinalis'	-	-	-	-	-	-	0	0	0	0	0	0	0
'Splendens'	-	-	-	-	-	0	0	0	0	0	0	0	0
'Tuscany Superb'	-	-	0	0	0	0	0	0	0	0	0	0	0
'Versicolor'	-	-	-	0	0	0	0	0	0	0	0	0	0
'Violacea'	-	-	-	-	-	-	-	-	-	-	0	0	0

Table 3
The average time and dates of leaf bud breaking (a) and first leaf blade opening (b) in the consecutive years for the historical cultivars derived from the French rose (*Rosa gallica* L.) in the PAS Botanical Garden CBDC in Powsin. Average time of leaf bud breaking: eb – 26–31.03; ec – 1–5.04; sa – 6–10.04; sb – 11–15.04; sc – 16–20.04; la – 21–25.04. Average of beginning of first leaf blades opening: ed – 6–10.04; sd – 11–15.04; sf – 16–20.04; sg – 21–25.04; lb – 26–30.04.

Cultivar	Phase	Average	Year												
			2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
‘Ambroise Paré’	a	la	-	-	-	-	-	-	-	-	-	-	-	21.04	22.04
	b	lb	-	-	-	-	-	-	-	-	-	-	-	28.04	28.04
‘Belle Herminie’	a	sb	-	-	-	17.04	15.04	13.04	18.04	9.04	10.04	24.04	5.04	15.04	19.04
	b	lb	-	-	-	30.04	25.04	27.04	1.05	14.04	15.04	28.04	17.04	1.05	3.05
‘Camaïeux’	a	sa	-	-	-	7.04	5.04	31.03	7.04	25.03	10.04	10.04	5.04	7.04	18.04
	b	sf	-	-	-	20.04	15.04	17.04	19.04	10.04	20.04	17.04	30.04	15.04	2.05
‘Cardinal de Richel.’	a	sb	7.04	12.04	10.04	12.04	10.04	11.04	15.04	26.03	15.04	10.04	10.04	12.04	17.04
	b	sf	15.04	19.04	15.04	20.04	17.04	18.04	22.04	18.04	22.04	17.04	25.04	22.04	25.04
‘Charles de Mills’	a	sa	-	-	-	-	-	-	7.04	24.03	10.04	5.04	1.04	2.04	10.04
	b	sg	-	-	-	-	-	-	17.04	10.04	15.04	15.04	25.04	15.04	20.04
‘Complicata’	a	sb	-	-	-	10.04	5.04	2.04	10.04	25.03	2.04	26.03	15.04	8.04	10.04
	b	sf	-	-	-	17.04	10.04	11.04	17.04	10.04	15.04	9.04	25.04	16.04	20.04
‘Duchesse d’Angoulême’	a	ec	-	-	-	5.04	7.04	10.04	12.04	20.03	10.04	29.03	30.03	2.04	11.04
	b	sd	-	-	-	16.04	15.04	10.04	18.04	31.03	17.04	10.04	20.04	17.04	18.04
‘Duchesse de Mont.’	a	eb	-	-	-	25.03	20.03	20.03	23.03	20.03	10.04	29.03	5.04	18.03	5.04
	b	sf	-	-	-	12.04	12.04	5.04	7.04	31.03	17.04	10.04	20.04	10.04	17.04
‘Officinalis’	a	sb	-	-	-	-	-	-	7.04	26.03	1.04	7.04	15.04	10.04	10.04
	b	sf	-	-	-	-	-	-	18.04	17.04	20.04	12.04	25.04	18.04	19.04
‘Splendens’	a	eb	-	-	-	-	-	-	2.04	2.04	7.04	23.03	5.04	27.03	1.04
	b	ed	-	-	-	-	-	-	12.04	12.04	10.04	5.04	10.04	10.04	12.04
‘Tuscany Superb’	a	sa	-	-	-	15.04	10.04	5.04	17.04	3.04	17.04	5.04	10.04	7.04	13.04
	b	sg	-	-	-	30.04	20.04	17.04	27.04	21.04	22.04	17.04	17.04	25.04	25.04
‘Versi-color’	a	ec	-	-	-	15.04	12.04	9.04	15.04	25.03	17.04	10.04	2.04	15.04	17.04
	b	sg	-	-	-	30.04	27.04	25.04	25.04	13.04	25.04	14.04	15.04	27.04	29.04
‘Violacea’	a	la	-	-	-	-	-	-	-	-	-	-	25.04	27.04	25.04
	b	lb	-	-	-	-	-	-	-	-	-	-	1.05	30.04	2.05

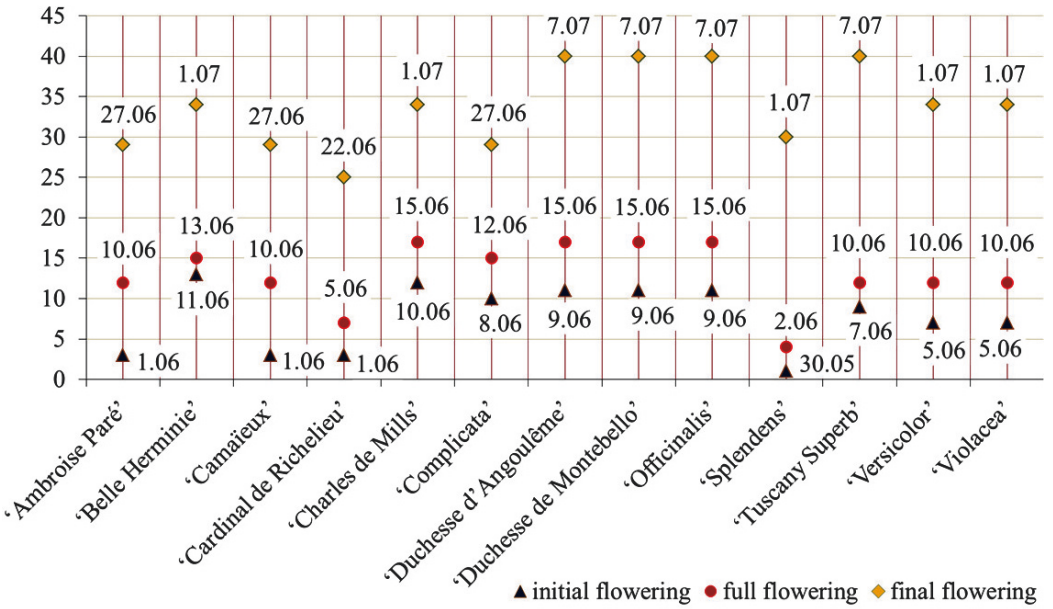

Fig. 9. The average date of initial, full and final flowering of the historical cultivars derived from *Rosa gallica* in the PAS Botanical Garden CBDC in Powsin. Y-axis – the consecutive days of the flowering period.

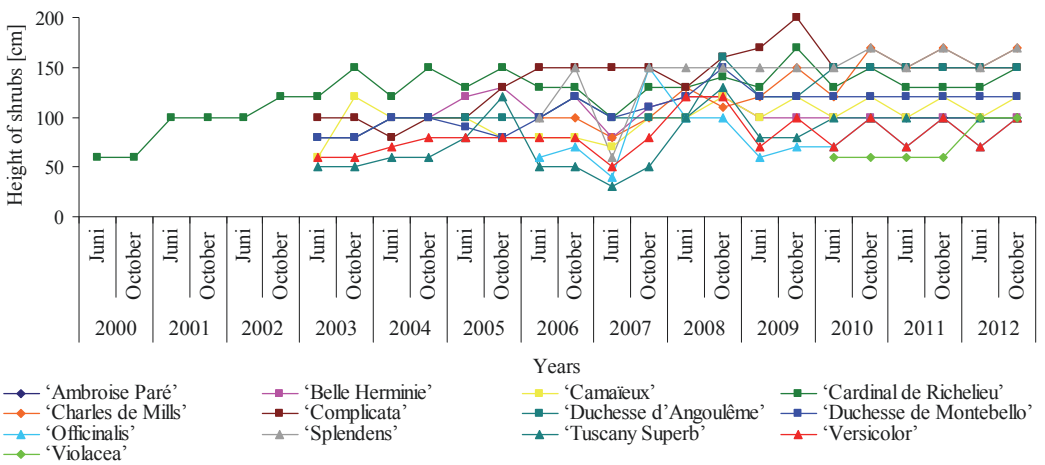

Fig. 10. The height [cm] of shrubs at the time of flowering and at the end of October for the cultivars derived from the French rose (*Rosa gallica* L.) in the PAS Botanical Garden CBDC in Powsin. Symbols: ▲ – own roots and rootstocks: ■ – *R. canina* 'Laxa'; ◆ – *R. multiflora*.

DISCUSSION

Low winter temperatures are the most decisive climate factor limiting the number of non-native plant species able to grow in Poland [23]. Resistance to winter conditions is also the basic criterion of choosing rose varieties and one of the most important factors of growing success in our climate.

The studied cultivars belong to a native species, but this is the northern border of its range. Most of them come from south-west Europe, notably France.

Shrubs of the French rose (*R. gallica*) cultivars studied overwintered well even during particularly unfavorable autumn-winter-spring weather patterns. During the seasons of 2009/2010, 2010/2011 and 2011/2012, the snow cover persisted especially long and it was particularly high. Sporadic freezing noted in a few cultivars ('Cardinal de Richelieu', 'Charles de Mills', 'Complicata', 'Duchesse de Montebello') was low and did not influence the general decorativeness of the shrubs during the growing season. They overwinter similarly to numerous Pimpinellifolias (*R. pimpinellifolia*), e.g. 'Aďcha', 'Elegans', 'Frühlingsduft', 'Frühlingsgold', 'Poppius', 'Stanwell Perpetual' [24], and Rugosas (*R. rugosa*), e.g. 'Agnes', 'Belle Poitevine', 'F.J. Grootendorst', 'Frau Dagmar Hastrup', 'Rugeaux du Japon' [25]. They show, however, much higher

frost resistance than ground covers [26], English roses [27], hybrid teas, floribundas, shrub roses, ramblers or climbers growing in the same Collection of PAS BG CBDC, in which shoots often freeze to the ground level during severe winters [28]. Even small freezing classified as level 1 damage according to Łukaszewicz's scale (1992) results in the need to prune down to the healthy tissues in most rose shrubs of modern rose cultivars, while freezing at a level of 6 according to this scale often in the need to cut right down to the ground level. If even slightly damaged shoots are left on the shrub, especially in more sensitive cultivars, they dry up during the growing season, often after new shoots have developed. This results in the need of pruning again [28]. Moreover, frost-damaged shoots are susceptible to fungal diseases [29].

The shrubs began growing late, usually until the second half of April, but they grew fast and intensively. Such bud and leaf sprouting time is at least a dozen days later than that noted in many Pimpinellifolias (*R. pimpinellifolia*) [24] and Rugosas (*R. rugosa*) [25,30] as well as in numerous ground covers [26]. At the time when in most Pimpinellifolias (*R. pimpinellifolia*) [24] and Rugosas (*R. rugosa*) [25,30] as well as in numerous ground covers [26] leaves had already developed and young shoots had started their growth, in the Gallicas buds just opened and the leaf development process only started.

The time of blooming of the studied cultivars is comparable (June) and blooming lasts three weeks on average. A few cultivars ('Charles de Mills', 'Complicata', 'Officinalis', 'Splendens', 'Versicolor', 'Violacea') produce decorative hips. The Gallicas start flowering a few days later than Rugosas [25,30] and Pimpinellifolias [24], but earlier than classic ground covers [26].

The presence of blossoming and fruiting prickly rose shrubs is of positive ecological significance, especially in cities [5]. Observations conducted at the National Collection of Rose Cultivars PAS Botanical Garden CBDC in Powsin indicate that Gallicas are characterized by high tolerance to the climate conditions which prevail in Central Poland. High resistance to frost, tolerance to diseases, small maintenance requirements and high decorativeness in early summer (fragrant flowers) and autumn (hips, leaf color change) suggest that these roses should be used more. The history of cultivation [5,9,12] and ten years of observation in Powsin indicate that in Central Poland most Gallica roses can be perfect as shrubs or hedges for parks or green areas in cities and historical places. In amateur gardens, they can be recommendable for their small size.

Nowadays, the French rose and its cultivars are not widely cultivated, but because of its ornamental merits, which were appreciated in the past, as well as its ecological value, it is worth considering the possibility of bringing back the importance of its cultivation.

CONCLUSIONS

The investigated Gallicas are characterized by very high tolerance to unfavorable winter conditions in Central Poland. No frost damage was observed in 'Ambroise Paré', 'Belle Herminie', 'Officinalis', 'Splendens', 'Tuscany Superb', 'Versicolor', and 'Violacea'.

The blooming time of Gallicas is early for cultivated roses and it falls in June. Flowering is not repeated. In late summer and in autumn the fruit and foliage, which stay on until frost sets, are decorative. Decorative hips set on 'Charles de Mills', 'Complicata', 'Officinalis', 'Splendens', 'Versicolor', and 'Violacea'. In 'Ambroise Paré', 'Charles de Mills', 'Officinalis', 'Splendens', 'Versicolor', and 'Violacea', leaves change color to intense yellow in autumn.

Gallicas are a valuable complement for the available assortment of shrubs. High resistance to winter conditions and diseases as well as small maintenance needs make the studied Gallicas useful for a wide range of applications as shrub roses in parks and in urbanized areas. In such case, the best can be the following: 'Ambroise Paré', 'Complicata', 'Officinalis', 'Splendens', 'Versicolor', and 'Violacea'. All the studied Gallicas are preferable for historical garden layouts and amateur cultivation. 'Belle Herminie', 'Duchesse d'Angoulęme', 'Duchesse de Montebello' and 'Tuscany Superb', in turn, as cultivars with numerous petals, growing to a small size and usually requiring pruning after flowering, are especially recommendable for growing in small gardens.

REFERENCES

1. Popek R. Biosystematyczne studia nad rodzajem *Rosa* L. w Polsce i krajach ościennych. Cracow: Wydawnictwo Naukowe WSP; 1996.
2. Baesler B, Cairns T, Duncan W, Fagan G, Grant W, Grapes K, et al. Rosen: Enzyklopädie; die wichtigsten Wildrosen und über 4000 Gartenrosen. Köln: Könemann; 2005.
3. Gierczyk B, Soboń J. Nowe stanowiska chronionych, zagrożonych i rzadko spotykanych gatunków roślin naczyniowych w Polsce. Przegląd Przyr. 2008; 19(3–4): 19–31.
4. Popek R. Dziko rosnące róże Europy: klucz-atlas. Cracow: Officina Botanica; 2007.
5. Popek R. Róże dziko rosnące Polski. Cracow: Plantpress; 2002.
6. Mirek Z, Zarzycki K, Wojewoda W, Szeląg Z, editors. Red list of plants and fungi in Poland. Cracow: W. Szafer Institute of Botany, Polish Academy of Sciences; 2006.

7. Zieliński J. *Rosa gallica* L. – róża francuska. In: Kaźmierczakowa R, Zarzycki K, editors. Polska czerwona księga roślin. Paprotniki i rośliny kwiatowe. Cracow: W. Szafer Institute of Botany, Polish Academy of Sciences; 2002. p. 195–196.
8. Piękoś-Mirkowa H, Mirek Z. Flora Polski. Rośliny chronione. Warsaw: Multico; 2006.
9. Krüssmann G. Rosen, Rosen, Rosen; unser Wissen über die Rose. Berlin: Paul Parey; 1974.
10. Scariot V, Akkak A, Botta R. Characterization and genetic relationship of wild species and old garden roses based on microsatellite analysis. J Am Soc Hortic Sci. 2006; 131(1): 66–73.
11. Austin D, Perry C, Urban H. David Austin's Englische Rosen. Munich: Blv; 2005.
12. Quest-Ritson C, Quest-Ritson B. The RHS encyclopedia of roses. London: Dorling Kindersley; 2003.
13. Czarna A, Woźnicka A, Maj M, Morozowska M. Flora of vascular plants of selected Poznań cemeteries. Acta Agrobot. 2011; 64(4): 123–140. http://dx.doi.org/10.5586/aa.2011.054
14. Tokarska-Guzik B. The establishment and spread of alien plant species (Kenophytes) in the flora of Poland. Katowice: Wydawnictwo Uniwersytetu Śląskiego; 2005.
15. NOBANIS – European Network on Invasive Alien Species [Internet]. 2006 [cited 2014 Aug 6]; Available from: http://www.nobanis.org/
16. Monder MJ. Observations of overwintering of historical roses in roses collection of Botanical Garden of Polish Academy of Sciences in Warsaw after frosty winter 2002/2003. Bull Bot Gar Mus Coll. 2004; 13: 197–207.
17. Monder MJ. Zasoby genowe i ocena wybranych odmian róż historycznych w kolekcji Ogrodu Botanicznego CZRB PAN. Zesz Probl Post Nauk Roln. 2007; 517: 487–494.
18. Kubus M. Stan zachowania wybranych założeń rezydencjonalno-ogrodowych w województwie zachodniopomorskim. In: Mitkowska AM, Mirek Z, Hodor K, editors. Założenia rezydencjonalno-ogrodowe: dziedzictwo narodu polskiego (na tle europejskich wpływów kulturowych): praca zbiorowa. Cracow: W. Szafer Institute of Botany, Polish Academy of Sciences; 2008. p. 121–127.
19. Monder M. Katalog róż polecanych przez Związek Szkółkarzy Polskich. Warsaw: Agencja Promocji Zieleni; 2008.
20. Łukasiewicz A. Zahamowanie rozwoju pąków u niektórych drzew iglastych po surowej zimie 1986/1987 i wynikająca stąd potrzeba uzupełnienia skali przemrożeń u drzew i krzewów. Bull Bot Gar Mus Coll. 1992; 1: 53–57.
21. Łukasiewicz A. Potrzeba ujednolicenia metodyki fenologicznej w polskich ogrodach botanicznych i arboretach. Wiad Bot. 1984; 28(2): 153–158.
22. Sudnik-Wójcikowska B. Flora miasta Warszawy i jej przemiany w ciągu XIX i XX wieku. Część I. Warsaw: Wydawnictwo Uniwersytetu Warszawskiego; 1987.
23. Banaszczak P, Tumiłowicz J. Uszkodzenia mrozowe drzew i krzewów w Arboretum SGGW w Rogowie podczas zimy 2005/06 roku. Rocz Dendrol. 2007; 55: 57–85.
24. Monder MJ. Evaluation of growth and flowering of cultivars derived from the pimpinellifolia (*Rosa pimpinellifolia* L.) growing in the collection of rose cultivars in the Botanical Garden of the Polish Academy of Science in Powsin. J Fruit Ornam Plant Res. 2011; 19(1): 195–207.
25. Monder MJ. Evaluation of growth and flowering of cultivars derived from the rugosa (*Rosa rugosa* Thunb.) growing in the national collection of rose cultivars in the Polish Academy of Sciences Botanical Garden in Powsin. Part I. The historical cultivars. Acta Agrobot. 2012; 65(2): 109–116. http://dx.doi.org/10.5586/aa.2012.064
26. Monder MJ. Evaluation of growth and flowering of 15 modern ground cover cultivars of roses growing in the collection of rose cultivars in the Polish Academy of Science's Botanical Garden in Powsin. Acta Hortic. 2012; 953: 85–90.
27. Monder MJ. Odmiany róż angielskich w kolekcji odmian uprawnych róż Ogrodu Botanicznego CZRB PAN w Warszawie. Bull Bot Gar Mus Coll. 2008;17:81–89.
28. Monder MJ. Ocena stanu krzewów 368 odmian róż po sezonie zimowym 2009/2010 w Ogrodzie Botanicznym PAN w Warszawie. Rocz PTD. 2010; 58: 39–52.
29. Wojdyła A, Wiśniewska-Grzeszkiewicz H. Występowanie zamierania pędów na gatunkach i odmianach róż. In: Róże w szkółce i pod osłonami – ogólnopolska konferencja różana. Skierniewice: 2000. p. 47–51.
30. Monder MJ. Evaluation of growth and flowering of cultivars derived from the rugosa (*Rosa rugosa* Thunb.) growing in the national collection of rose cultivars in the Polish Academy of Sciences Botanical Garden in Powsin. Part II. The modern cultivars. Acta Agrobot. 2012; 65(2): 117–124. http://dx.doi.org/10.5586/aa.2012.065
31. Vonholdt H. Rosenverzeichnis – Rosarium Sangerhausen. Sangerhausen: 3 Auflage.
32. Roses, clematis and peonies and everything gardening related [Internet]. HelpMeFind. 2014 [cited 2014 Aug 6]; Available from: http://www.helpmefind.com/rose/plants.php/

Ocena wzrostu i kwitnienia historycznych odmian pochodzących od róży francuskiej (*Rosa gallica* L.) w Narodowej Kolekcji Odmian Uprawnych Róż w Ogrodzie Botanicznym Polskiej Akademii Nauk w Powsinie

Streszczenie

Róża francuska (*Rosa gallica* L.) to gatunek rodzimy we florze Polski, objęty ścisłą ochroną gatunkową. Istnieją liczne odmiany uprawne pochodzące od tego gatunku, jednak w Polsce są one praktycznie nieznane i nieuprawiane. W latach 2000–2012 przeprowadzono obserwacje dotyczące wzrostu i kwitnienia u krzewów 13 odmian tej grupy róż zgromadzonych w Kolekcji Odmian Uprawnych Róż Ogrodu

Botanicznego CZRB w Powsinie. Były to: 'Ambroise Paré', 'Belle Herminie', 'Camaďeux', 'Cardinal de Richelieu', 'Charles de Mills', 'Complicata', 'Duchesse d'Angoulęme', 'Duchesse de Montebello', 'Officinalis', 'Splendens', 'Tuscany Superb', 'Versicolor', 'Violacea'. Corocznie notowano powstałe uszkodzenia po okresie zimowym; datę początku otwierania się pąków liściowych i rozchylania blaszek liści; początku, pełni i końca kwitnienia oraz uszkodzenia spowodowane przez choroby. Warunki pogodowe w latach obserwacji często były trudne i niekorzystne dla róż, zarówno w okresie jesienno-zimowo-wiosennym (surowe zimy: 2002/2003, 2005/2006, 2009/2010, 2010/2011, 2011/2012), jak i letnim. Wśród badanych odmian obserwowano tylko niewielkie różnice w ich mrozoodporności, rozwoju w okresie wegetacyjnym i terminie kwitnienia. U większości badanych odmian nie notowano żadnych uszkodzeń mrozowych nawet po surowych zimach. Krzewy rozpoczynały wzrost późno, zwykle w drugiej połowie kwietnia. Kwitnienie natomiast rozpoczynało się wcześnie – w pierwszej dekadzie czerwca. Odmiany pochodzące od róży francuskiej powinny znaleźć szerokie zastosowanie w parkach, na terenach zieleni w miastach, w założeniach historycznych, a także w ogrodach przydomowych. Odmiany te są godne polecenia ze względu na wysoką mrozoodporność, brak podatności na choroby oraz niewielkie rozmiary.

Handling Editor: Elżbieta Weryszko-Chmielewska