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THE GENUS SPIRAEA IN CULTIVATION IN BOHEMIA, MORAVIA AND SLOVAKIA

Rod *Spiraea* v kultuře v Čechách, na Moravě a na Slovensku

Roman B u s i n s k ý , Ludmila B u s i n s k á

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Cover photograph: *Spiraea* ×*blanda* Zab. in the Dendrological garden at Průhonice, May 22, 2001.

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C O N T E N T S

The genus *Spiraea* in cultivation in Bohemia, Moravia and Slovakia

ROMAN BUSINSKÝ [1], LUDMILA BUSINSKÁ [2]

[1] Silva Tarouca Research Institute for Landscape and Ornamental Gardening, CZ-252 43 Průhonice; businsky@vukoz.cz — [1, 2] Kodaňská 51, CZ-101 00 Praha 10

ABSTRACT

History of the classification of the genus *Spiraea* (spirea, *Rosaceae*) with a view to the infrageneric division is given. Spireas have been used as ornamental flowering shrubs in Europe for more than 250 years. Significant quantity of spirea taxa cultivated in Bohemia, Moravia and Slovakia was found on the basis of old herbarium evidence, historical documents and living plants. A taxonomic revision of spireas cultivated in, or documented from Bohemia, Moravia and Slovakia was made in accordance with original literature and study of natural herbarium material of most species, and with field study of many taxa mostly in SE Asia, undertaken during eleven authors' expeditions to China and Japan (where majority of species is native). Many of old determinations of spirea species in the cultivation, or in its herbarium evidence were found to be incorrect. About 70 taxa of living plants of spireas from the territory of former Czechoslovakia were collected (mostly propagated vegetatively) in the Dendrological garden of the Research Institute of Ornamental Gardening at Průhonice near Praha in the 1980's. This spirea assortment was being evaluated for six or eight years from horticultural points of view concerning phenological data, growth and habitus, aesthetic characterization, tolerance to winter frosts and extent of damage by aphids. Three categories of gardening prosperousness of evaluated clones were established. Systematic treatment of all taxa of the genus *Spiraea* found to be cultivated, documented or mentioned from Bohemia, Moravia and Slovakia is given together with drawings of 78 attested taxa. All taxa given are divided into two groups: the group of natural species with their subspecies, varieties and directly derived cultivars, and the group of cultural taxa in the rank of species (interspecific hybrids or hybrid cultivars). Altogether 42 natural species (more than 100 taxa in total) were attested to be cultivated in the territory of Bohemia, Moravia and Slovakia since about the mid-19th century. Three taxonomic changes are proposed: *Spiraea mongolica* Maxim. (known from China) is treated as a synonym of *Spiraea lasiocarpa* Kar. & Kir. (known from Central Asia from the territory of former Soviet Union); *Spiraea fritschiana* Schneid. var. *microgyna* (Nakai) Businský and *Spiraea* ×*pseudosalicifolia* Silverside 'Triumphans' are newly combined. Four new hybrid cultivars, *Spiraea* 'Green Moundlet', *Spiraea* 'Leafy Carmine', *Spiraea* 'Ludmila', and *Spiraea japonica* 'New Pruhonice', some cultivated under incorrect names for many years, are described.

Keywords:
Spiraea, Taxonomy, Horticulture, History, Czech Republic, Bohemia, Moravia, Slovakia

INTRODUCTION

The genus *Spiraea* L., spirea, represents deciduous shrubs of the family *Rosaceae* Juss., subfamily *Spiraeoideae* Focke, respectively the family *Spiraeaceae* Humb., Bonpl. & Kunth in the narrower concept. The genus is widespread in the temperate and the subtropical zone of the northern hemisphere having more than 100 species. The genus has the richest species diversity in the territory of China, where more than 60 autochthonous species are found (YÜ & LU 1974, YÜ et al. 1975, etc.), including Taiwan with four endemic species (LI et al. 1977). Further areas with rather rich occurrence of spirea species are the regions adjacent to China, which have also some endemic species. These are especially Central Asia, the Himalayas (more than ten species of uncertain taxonomic value were described from this area in the 1980's), Korea and Japan (with ten autochthonous species, see OHWI 1984). On the other hand only seven autochthonous species are known from Europe (cf. TUTIN et al. 1968). Two of them occur only in Europe in a small area, the others are present also in Asia having there the bigger part of the geographic range. According to the new interpretation, on the American continent only eight species occur in USA and Canada (KARTESZ 1994) and one endemic species grows in Mexico (SCHNEIDER 1905, 1912).

HISTORY OF THE CLASSIFICATION OF THE GENUS *SPIRAEA*

(R. Businský)

The first spirea species known some time around the middle of the 18th century were described in 1753 by the Swedish natural scientist C. Linné. He is the author of the generic name *Spiraea*. But his interpretation was generally very broad, so that he included into this genus such species, which were separated by subsequent authors to independent genera on the basis of broader knowledge of botanical science. Five of the Linné's species remained in the genus *Spiraea*, as it is contemporary defined. *Spiraea salicifolia* was designated as genus type. Since the first quarter of the 19th century several botanists investigated the classification of the genus *Spiraea* in more details. But the genus concept of the authors of the oldest classifications was still much broader in comparison with the modern one. The relevant genus included species ranked nowadays not only to more genera but even to different genus groups, i.e., it contained representatives that did not belong sometimes even to the subfamily *Spiraeoideae* Focke. The French botanist J. Cambessedes tried to make a more detailed classification of spireas in the oldest published monograph of the genus *Spiraea* (CAMBESSEDES 1824). He included into this genus, in the scope of the typical section, about 16 nowadays species of true spireas together with species ranked now into five separate genera: *Holodiscus* Maxim., *Stephanandra* Sieb. & Zucc., *Sibiraea* Maxim., *Sorbaria* A. Br. and *Aruncus* L. His further four sections of the broad genus *Spiraea* represent the genera *Filipendula* Mill., *Physocarpus* Maxim., *Porteranthus* Britton ex Small (= *Gillenia* Moench) and *Kerria* DC. in a modern concept.

The most comprehensive classification of the genus *Spiraea* in the 19th century was elaborated by the Russian botanist C. J. Maximowicz from Petersburg in the frame of the monograph of the family *Spiraeaceae* (MAXIMOWICZ 1879) in which he differentiated four tribes. Of these the type tribe contained beside the genus *Spiraea* other three genera. His genus *Spiraea* included three sections:

I. Sect. *Petrophytum* Nutt. – represents the separate American half-shrub genus *Petrophytum* (Torr. & Gr.) Rydb. in a modern concept

II. Sect. *Chamaedryon* Ser. – is divided into two unnamed series:

Ser. 1. – partly corresponds with the section *Glomerati* Nakai (see YÜ & KUAN 1963); it contains 6 species, one of them was newly described (one variety was promoted by the author to a species rank later)

Ser. 2. – partly corresponds with the section *Chamaedryon* Ser. in the narrow concept (see YÜ & KUAN 1963); it contains 10 species (12 in a modern concept), two of them were newly described

III. Sect. *Spiraria* Ser. – is divided into two unnamed series:

Ser. 1. [= Sect. *Calospira* K. Koch] – contains 13 species (10 in a modern concept), three of them were newly described

Ser. 2. [= Sect. *Spiraea*] – contains three species (4–5 in a modern concept)

The monograph contains 30 to 35 nowadays recognized species of true spireas, and within them 44 infraspecific taxa were differentiated (at the levels corresponding to the rank of subspecies and variety), from which some are accepted in the rank of species nowadays. The interpretation of species and infraspecific taxa published by MAXIMOWICZ (1879) is, in general, very close to the classification accepted in modern regional floristic encyclopedias, nevertheless about twice as many new species of spireas were described since the cited monograph had been published.

At the end of the 19th century the German forester and dendrologist H. Zabel published a monograph on spireas in German gardens (ZABEL 1893). He classified six related genera in two subfamilies and divided the proper genus *Spiraea* into four subgenera:

I. Subgen. *Botryospira* Zab. – contains two species, belonging to separate genera *Petrophytum* and *Sibiraea* nowadays

II. Subgen. *Chamaedryon* (Ser.) Zab. – contains 14 species (13 in a modern concept) and 13 hybrids, one of species and nine of hybrids were newly described

III. Subgen. *Nothospira* Zab. – contains only *Spiraea bracteata* Zab. (= *S. nipponica* Maxim.) and one hybrid (S. ×*nudiflora* Zab.) between species from the second and fourth subgenus

IV. Subgen. *Spiraria* (Ser.) Zab. – is divided into three groups corresponding with sections:

1. (Sect.) *Calospira* K. Koch – contains 12 species (seven in a modern concept) and nine hybrids, seven of hybrids was newly described

2. (Sect.) *Pachystachya* Zab. – contains 14 hybrids between species from the last and the following group, seven of them were newly described

3. (Sect.) *Euspiraria* – contains three species (4–5 in a modern concept) and two newly described hybrids {the third taxon mentioned as a hybrid is *S. douglasii* Hook. var. *menziesii* (Hook.) Presl nowadays}

Zabel gave in his publication besides descriptions of particular species and hybrids also descriptions of their forms known in cultivation. His publication deals altogether with 30 species of true spireas, what represents about 25 species in modern interpretation, and nearly 40, mostly interspecific, hybrids.

At the beginning of the 20th century the German dendrologist C. K. Schneider published his detailed two volumes' dendrological encyclopedia "Illustriertes Handbuch der Laubholzkunde", including broadleaved woody plants indigenous and planted in central Europe. The genus *Spiraea* was elaborated in the first volume (SCHNEIDER 1905) with minor supplements in the second volume (SCHNEIDER 1912). This book is not significant by the classification of infrageneric taxa of the genus *Spiraea*, but by the detailed descriptions of species and by illustrations of leaves, flowers and fruits, including their variation. The author elaborated also not cultivated little known species, originated from the whole geographic range of the genus, what he met during his extensive study of herbarium specimens.
The variation of species was elaborated to the level of form. The author divided the genus into two subgenera of which the typical one (subgen. *Euspiraea*) he divided into three sections:

1. Sect. *Chamaedryon* Ser. (in the Maximowicz's concept) – forming umbel-like or corymb-like racemose inflorescences, i.e., with one-flowered pedicels;

2. Sect. *Calospira* K. Koch – forming cymose-like ramified inflorescences in the form of more or less flat compound corymbs;

3. Sect. *Spiraria* Ser. – forming cymose-like ramified inflorescences in the form of pyramidal panicles.

The second subgenus he named *Homoiospiraea*, and included into it a single species, *Spiraea hartwegiana* Rydb. (= *S. parvifolia* Benth.), with flowers in elongated simple racemes with bracteate pedicels, occurring in Mexico, not being in cultivation till now.

The significant contribution to the knowledge of spireas represented the work of another famous German dendrologist, of A. Rehder. He described eight new species (other two were additionally synonymized with older names) and several varieties of spireas from China (REHDER 1913). His "Manual of Cultivated Trees and Shrubs Hardy in North America" represents an extensive dendrological encyclopedia where he mentioned only the species, hybrids and infraspecific taxa which emerged in cultivation in America or in Europe. Therefore only two from his new Chinese species were included in the Manual. The first edition of the Manual (REHDER 1927) contains 50 spirea species (of which at least five are not accepted as separate species nowadays) and nearly as many interspecific hybrids

and a number of varieties inclusive cultivars. The second revised edition, published in 1940 (see REHDER 1958), was nearly not changed concerning spireas. REHDER (1927, 1958) adopted the infrageneric division into three sections from SCHNEIDER (1905), except for the rank of subgenus, what he had not to differentiate for the species mentioned.

The authors of all cited publications dealing with the classification of the genus *Spiraea* arranged infrageneric taxa and species according to more or less the same system. It starts with species flowering on simple pedicels in sessile fascicles, further in umbel-like or corymb-like racemes on short leafy twigs, in all cases growing out from buds on last year's shoots, and proceeded to species with flat compound corymbs (corymb-like panicles) towards species with pyramidal panicles on the end of long this year's shoots. This system represents a more or less fluent range of species (or their related groups) with gradually more compound inflorescences on more elongated shoots. This schematic morphological range corresponds directly with the phenology of flowering. The range starts with species being in blossom early in spring soon after sprouting before the growth of long sterile leafy shoots and ends with species flowering in late summer on the ends of fully developed long shoots. Another interconnected phenomenon is the diversity of leaf shapes in dependence on the shoots vigorousness. The species of the first half of the morphological range often produce heteromorphic leaves, i.e., of more rugged shape on vigorous long shoots rather than on thin or blossoming twigs, whereas the species nearer to the end of the range have leaves isomorphic in general.

The Japanese botanist T. NAKAI proposed (1916) an alternative system of the genus *Spiraea*. His system, based on the same morphological principle, had a partly reverse arrangement of species, or their related groups respectively. Beside that he divided the genus (represented by a part of Asian members only) into two subgenera. The newly circumscribed subgenus, hypothetically evolutionarily more primitive, characterized by pyramidal panicles or by compound corymbs on the ends of long shoots of the present year he named *Protospiraea*, while the subgenus hypothetically derivated and characterized by simple inflorescences growing from buds on last year's shoots he named *Metaspiraea*. In the former subgenus Nakai respected the old division into sections *Spiraria* and *Calospira*, but in the latter he distinguished three sections: 1. – a new section *Glomerati* with flowers in sessile clusters, 2. – the section *Chamaedryon* Ser. in the usual concept, 3. – a new section *Metachamaedryon* represented by a single species, *Spiraea trichocarpa* Nakai, with compound corymbs on short leafy twigs. This classification, in fact, divided the classic section *Calospira* into two groups (even belonging to separate subgenera), and that only on the basis of the length of branchlets bearing inflorescences. It is interesting that NAKAI published one year before (1915) the original system of the genus with sections *Chamaedryon*, *Calospira* and *Spiraria*, and with subdivision of the first one into three new subsections *Glomerati*, *Euchamaedryon* and *Metachamaedryon*, in a preparatory paper for the fourth volume of Flora Sylvatica Koreana.

The Nakai's division of the genus from the year 1916 into two subgenera and the general arrangement, starting by the section *Spiraria* with *Spiraea salicifolia* L. as the type of the genus, was accepted in Flora of USSR (POJARKOVA 1939). However, the author did not use the division of the subgenus *Metaspiraea* into two sections (those relevant for the spireas of USSR), but accepted only the section *Chamaedryon* Ser. within it. Besides, she distinguished within the all three accepted classic sections a number of new subdivisions (in the rank called "rjad", corresponding with series, and in the second one, called "cikl") but their names are not valid (ICBN, Art. 36.1.).

Newly elaborated system of the infrageneric division of spireas was proposed by two Chinese authors from the Botanical Institute of the Chinese Academy in Beijing, YÜ & KUAN (1963). It deals with Chinese species which are, however, representatives of the majority of related species groups of the genus. The system originated by modified integration of the classical division of the genus partly reversed by Nakai and the newly proposed subdivision into ten series. Six of them were newly described by Yü and four were partly overtaken from Pojarkova and validated. The genus *Spiraea* was divided in the cited paper as follows:

I. Sect. *Spiraea*

II. Sect. *Calospira* K. Koch

1. Ser. *Japonicae* Yü
2. Ser. *Henryanae* Yü
3. Ser. *Longigemmatae* Yü
4. Ser. *Canescentes* Yü

III. Sect. *Chamaedryon* Ser.

5. Ser. *Trilobatae* Pojark. ex Yü
6. Ser. *Mediae* Pojark. ex Yü
7. Ser. *Chamaedryfoliae* Pojark. ex Yü
8. Ser. *Gemmatae* Yü

IV. Sect. *Glomerati* Nakai

9. Ser. *Prunifoliae* Yü
10. Ser. *Hypericifoliae* Pojark. ex Yü

This system was accepted without any change in Flora R. P. Sinicae (YÜ & LU 1974). The system seems to be the most natural one of all existing classifications, but it does not register several taxonomically significant species which are not autochthonous in China (e.g., *S. betulifolia* Pall., *S. crenata* L., *S. nipponica* Maxim.). Beside that, proposed classification of species in several new series according to the characters mentioned in their diagnoses is questionable. Nevertheless, it is possible to consider it as the most modern published classification of the genus *Spiraea*.

It is certain, that the schematic morphological range of spireas, as it was characterized above, is represented by particular species enough continuously, that a definition of any higher infrageneric units is, to a large extent, artificial and the ranging of several species questionable. This fact, with the phenomenon of easy spontaneous hybridization even between more distant related groups, indicates that the primary genus division into a small number of section is the highest intrageneric classification that can be accepted, whereas the division on the level of subgenus can hardly be accepted. (The classification of the little known Mexican species, *Spiraea hartwegiana* Rydb., is omitted here, because its subgeneric separation could be justified., see above). *Spiraea nipponica* Maxim., having been usually ranged to the section *Chamaedryon* because of having mostly simple umbel-like racemose inflorescences, is clear example of a species which is on the transition between two sections of the genus. Bigger inflorescences of this species with lower pedicels sometimes ramified and its evident relationship with the Korean *S. trichocarpa* Nakai or the similarity with the Himalayan *S. canescens* D. Don (both with compound corymbs) confirm that no clear border exist between sections *Chamaedryon* and *Calospira*. Similarly transitional character of the inflorescence shape has, for example, the little known Himalayan *S. arcuata* Hook. fil. or the Central Asian *S. lasiocarpa* Kar. & Kir. Another example of partly transitional, anomalous structure of the inflorescences can be found in *S. baldschuanica* B. Fedtsch., having irregularly corymbose inflorescences compound from simple racemes, erroneously described, as a whole, as panicles (POJARKOVA 1939). Another, qualitatively different example that the character of simple or ramified pedicels, used as the main one for differentiation of the sections mentioned, is not distinctly differentiated, can be found in *S.* ×*vanhouttei* (Briot) Zab. This hybrid of two species with the same pseudo-umbellate inflorescences with only simple pedicels produces sometimes compound inflorescences of double pseudo-umbels on vigorous flower-bearing branches.

Because of big *Spiraea* species diversity in southeast Asia, of insufficiently known variation and its overlapping among related or similar species, and of spontaneous interspecific hybridization, this genus belongs to taxonomically difficult and still little explored groups of woody plants of the northern temperate zone. Many of taxa described especially in the 20th century from the territory of China and India are known only from limited numbers of herbarium specimens. They often represent endemic, morphologically distinctive species, but some are probably only taxonomic synonyms of older names or only varieties of previously known species. Also interpretation of many old names on herbarium material in world herbaria is incorrect in big percentage of cases, the determinations of several species are traditionally confusing. This situation can be clarified only by modern taxonomic revision of the genus, preferably in form of complete monograph.

In this publication the classification of the genus into four sections in accordance with YÜ & KUAN (1963) is accepted, but these are arranged according to the species succession corresponding with the classical concept (mostly after REHDER 1949).

HISTORY OF THE GENUS *SPIRAEA* CULTIVATION IN THE WORLD

(R. Businský)

History of botanical discoveries and first descriptions of species of the genus *Spiraea* L. was from the beginning closely connected with the introduction of plants into the culture and with using spireas as ornamental flowering shrubs. Spireas were used since long ago in gardens in ancient China and Japan (above all *Spiraea prunifolia* Sieb. & Zucc., *S. thunbergii* Sieb. ex Blume, *S. cantoniensis* Lour., *S. japonica* L. fil., and probably also *S. blumei* G. Don and *S. nipponica* Maxim.). In Europe, beside two native species, *S. hypericifolia* L. and *S. salicifolia* L., cultivated evidently already in the 16th or 17th century, the first species being imported from overseas were East American *S. tomentosa* L. and *S. alba* Du Roi (REHDER 1958, BEAN 1981). Several Asian species were introduced into culture in Europe earlier than they were described (*Spiraea mollifolia* Rehd., *S. nipponica*, *S. veitchii* Hemsl., *S. wilsonii* Duthie), similarly also one Eurasian species *S. media* Schmidt. Already in the 19th century many spirea species were grown in nurseries and planted in castle gardens and parks, especially in England, France and Germany. In many arboreta, botanical gardens and nurseries at that time an ample assortment of species from different areas of origin was gathered. Closely and more distantly related species got into contact, what the process of spontaneous interspecific hybridization in culture and frequent emergence of hybrid progeny made possible. From these hybrids the plants interesting especially from ornamental point of view were selected and grown further under new binominal names with indication of supposed parent species or their varieties. In the monograph mentioned above ZABEL (1893) resumed all species and hybrids of the genus *Spiraea* known in the cultivation in Germany, what represented nearly 70 taxa beside many forms. Most of hybrids given in his publication was newly described by him (26 altogether) on the basis of individuals originated from open pollination in the garden of the Forest Academy in Hannover-Münden near Göttingen (where he worked as estate manager in the years 1869 to 1895), or in other gardens or nurseries. Most of spireas of the Zabel's collection of living plants was further propagated by the Hesse nursery in Weener near Oldenburg (BEAN 1981).

Beside many interspecific hybrids, attractive mutations and forms were selected in some species during their cultivation and then vegetatively propagated as clones since the end of the 19th century. Among species selected in this way *Spiraea japonica* was always prominent. This variable species from Japan and China has very attractive flowers with various tinges of pink to dark carmine, what is rare in spireas. The oldest cultivated varieties of this species grown already in the ancient Japan were described at the end of the 1970's by European botanists as separate species under the names *S. albiflora* (Miq.) Zab. and *S. bullata* Maxim. In Europe the oldest selected cultivated varieties of *S. japonica* were mentioned as varieties or forms (cf. REHDER 1927, 1949, 1958), and later, after the cultivated plants nomenclature branching off at the beginning of the 1950's, these vegetatively propagated clones and new varieties were evaluated as cultivars. In the same way, according to time of the origin, the nomenclature of cultivated varieties of other spirea species (or interspecific hybrids) was stated. But they were few until recently. Only in the last decades in gardening enterprises in West Europe and USA modern, especially dwarf, spirea cultivars were selected (see LOMBARTS 1999). But the biggest part of them is still represented by cultivars of *S. japonica* (of which many have yellow foliage). Their number significantly exceeds the total of all cultivars of remaining species nowadays, if not including old cultivated hybrids. (Several nurseries in the Czech Republic and also abroad, under the influence of an old literature, often include a part of *S. japonica* cultivars under the name *S.* ×*bumalda* Burvénich. But the hybrid species status of this taxon is not justified and the name itself represents a cultivar of *S. japonica* of unknown parent and geographic origin, see BEAN, 1981). From other species at least three cultivars of Japanese *S. nipponica* and three ones of *S. betulifolia* are in cultivation in the world nowadays. As far as other species are concerned, at most one cultivar from each species has been in cultivation till now.

Under the influence of long-term tradition of the successful introduction and cultivation of an ample assortment of spirea species paradoxically the cultivated *Spiraea* species belong to the most confused and erroneously determined woody plants of the temperate zone. Even in botanical gardens and in arboreta, and all the more in the gardening enterprises, we meet commonly errors in registration of living plants or numerous plants without species determination anywhere in the world. Beside direct findings in cultivated plants evidence of various spirea collections this situation was detected on the basis of seed sowings at Průhonice. The seeds were obtained via the international seed exchange among botanical gardens within seed offers "Index seminum" especially when the seed items originated already secondary from the cultivation. One of the main reasons of traditionally confused practice in spirea determination is the mentioned very easy interspecific hybridization which occurs spontaneously when

natural geographic barrier was eliminated. This phenomenon, occurring in spireas in high extent among commonly cultivated woody plants, is caused by relative genetic homogeneity of the genus, so that almost any species combinations intercross spontaneously when they are in contact in the culture. The only exception exists in the section *Glomerati* whose representatives cross only with species from the neighbouring section *Chamaedryon*.

SPIREAS IN CULTIVATION IN BOHEMIA, MORAVIA AND SLOVAKIA

(R. Businský)

Especially in Bohemia the long tradition of many spirea species cultivation has existed. The oldest herbarium evidence of the cultivation of introduced species in our countries, found in herbaria revised by the author (see below), originate from the end of the first half of the 19th century. They refer to species *Spiraea cantoniensis* Lour., *S. canescens* D. Don and *S. alba* Du Roi. The first findings of naturalized foreign spirea species originate from the end of 19th century, for example *S. alba* near Vsetín in East Moravia from 1883. From the turn of the 19th and 20th century information on naturalization, especially of American spireas, got into the Czech flora monographs (for example POLÍVKA 1900, POLÍVKA, DOMIN & PODPĚRA 1928).

Essential influence on the introduction and cultivation of foreign spirea species and other woody plants in Bohemia and further in Moravia and Slovakia from the beginning of the 20th century had the foundation of the park at Průhonice near Praha and particularly later activities connected with it. Count A. E. Silva Tarouca started to build up the park at Průhonice in 1885. His aim was to built up a natural landscape park systematically having been enriched with exotic woody plants. The founder of the park at Průhonice became later the main promoter of the Dendrological Society in Austro-Hungary, founded in 1908 in Vienna. Silva Tarouca became its president and one of the two vice-presidents became Istvan Ambrozy-Migazzi, the founder of the most important arboretum in Slovakia, Mlyňany Arboretum. It was founded in 1892, near the village Vieska on Žitava eastwards of Nitra. General secretary of the society was C. K. Schneider, the author of the encyclopedia Illustriertes Handbuch der Laubholzkunde and of many taxon names of the genus *Spiraea* L. The Dendrological Society had its experimental garden for plant introduction since 1909 at Průhonice. This enterprise, consisted later of several plots called "Society gardens at Průhonice", continued in its activity after the establishment of the Czechoslovak Republic under the name Czechoslovak Dendrological Society, founded in 1922 and persisting till 1954. In the Society gardens nursery material was grown at the beginning for society members only, after the year 1920 young plants were sold and the assortment was spread to inland nursery enterprises. The proper castle park was bought in 1927 by the Czechoslovak state from Silva Tarouca and then the Ministry of Agriculture founded at Průhonice the State Experimental Agriculture Enterprises with the Research Station for Ornamental Gardening. The main part of the Society gardens was relocated to a new land called "Štípenka" which was transferred in 1954 to the independent Research Institute of Ornamental Gardening. But in 1962 the lands of the State Experimental Agriculture Enterprises were divided and a part, inclusive the castle park, came under the management of the Czechoslovak Academy of Sciences as the Botanical Garden, later as a department of the Institute of Botany. Both institutes have exist till now but the former under the name Silva Tarouca Research Institute for Landscape and Ornamental Gardening (see below as RILOG). The lands with woody plants of both the institutes are employed in recreation, exhibitions and experiments.

Several foreign species of the genus *Spiraea* came newly in the cultivation at Průhonice already before World War I, e.g., from E. H. Wilson field collection in China. Within the activities of the Dendrological Society another expedition to China by C. K. Schneider and by the Austrian botanist H. Handel-Mazzetti was undertaken in 1913. However, the expedition was untimely finished because of World War I outbreak. Therefore Schneider left with the field collections to USA, where he worked for five years with A. Rehder in Arnold Arboretum, Massachusetts. After returning to Vienna in 1920 he collaborated further with the Dendrological Society in Czechoslovakia and so plants that he had collected in China came to Průhonice including several spireas (SVOBODA et al. 1967). The extent of spirea cultivation at Průhonice in the first half of the 20th century can be concluded from the assortment cited in the register of plants and catalogues of the Dendrological Society at Průhonice from the years 1910 to 1941, and from the plant statement at the occasion of handing over the park in 1927. On the basis of the information summarized by P. SVOBODA et al. (1967) forty-seven relatively identifiable taxa of the genus *Spiraea* were grown in the Průhonice castle park in 1927; twenty six of them were natural species.

In the Society gardens at Průhonice supposedly twenty five other spirea taxa were grown in the years (1923–)1930–1941; ten of them were natural species. The complete spirea assortment grown only in 30th years in the Průhonice area represented 36 natural species, 15 interspecific hybrids and 21 varieties or cultivars (total 72 taxa). In spite of data credibility at that time it is presumable that some of the names could have been used erroneously for plants of different taxonomic content because till now some taxonomic problems of spireas, especially of those from southeast Asia, have not been solved. From species and interspecific hybrids mentioned at that time have not been safely proved living plants in the Czech countries (nor in Slovakia) in the last twenty years (1980–2000) the following ones:

Spiraea aquilegifolia Pall. – native of Mongolia and NE China

bella Sims. – native of the Himalayas

cana Waldst. & Kit. – native of S Europa (from NE Italy to Serbia)

expansa Wall. ex K. Koch (given as *S. amoena* Spae) – native of the Himalayas

longigemmis Maxim. – native of W China

myrtilloides Rehd. – native of W China

pubescens Turcz. – native of E China and adjacent regions

zabeliana Schneid. – a taxon of uncertain value described from the Himalayas

×*multiflora* Zab. (= *S. crenata* L. × *S. hypericifolia* L.)

×*nivea* Zab. (= *S. expansa* K. Koch × *S. canescens* D. Don)

×*rubra* Zab. (= *S. expansa* K. Koch × *S. douglasii* Hook.)

×*schinabeckii* Zab. (= *S. chamaedryfolia* L. × *S. trilobata* L.)

During the revision of woody plants occurrence in the Průhonice castle park in the years 1963–1965 only nine natural spirea species, three interspecific hybrids, and four cultivars of *Spiraea japonica* L. fil. were detected (SVOBODA et al. 1967). The extent of spirea and also other woody plants assortment cultivated in other places of the Průhonice area after 1941, i.e., in the Society gardens and later on the lands of the Research Institute of Ornamental Gardening and of the Botanical Institute has not been preciously documented. But certainly also there the assortment was impoverished in comparison with the Průhonice castle park proper. This was indicated by the situation at the turn of 70th and 80th years, i.e., in the time when the authors of this publication started to investigate the spirea assortment in details. At that time another wave of woody plants introduction to Průhonice proceeded intensively to the Dendrological garden of the Research Institute of Ornamental Gardening, which originated by enlarging of the former garden "Štípenka". Spireas were introduced above all from the Hillier nursery in England (more than 20 taxa, partly imported for verifying the material already cultivated in our country, partly introduced newly), but also from Germany (firms Kordes and Schmidt); some were obtained by international seed exchange within offers "Index Seminum".

The enlargement of the assortment of spireas cultivated in Bohemia and Moravia was supported also by inland gardening enterprises and nurseries which grew ornamental shrubs. Some gardening firms in our country prospered already at the end of the 19th century, the biggest expansion of gardening firms has taken place during the existence of the first Czechoslovak Republic from 1919 up to World War II. During the war and after the commencement of communist regime in 1948 ornamental gardening was in considerable decline. Only several firms continued their production on high professional level. In Bohemia those were above all the nurseries at Žehušice east from Kutná Hora founded in 1925 (e.g., they offered twenty spirea species or interspecific hybrids and seven cultivars in 1936); later became important also the nurseries in Litomyšl (Svitavy district) founded in 1946, and at Ďáblice near Praha. In Moravia most important ornamental nurseries were at Bystřice pod Hostýnem (Kroměříž district) founded in 1926. Thanks to gardening firms several spirea taxa, not grown in the Průhonice area or at least not mentioned in the plant registration here (or at all or till 80th years), got to culture in the Czech countries. It concerns these interspecific hybrids found in herbaria or cultivated in gardens:

Spiraea ×*conferta* Zab. (*S. cana* Waldst. & Kit. × *S. crenata* L.), as *S.* ×*inflexa* K. Koch

×*semperflorens* Zab. (*S. japonica* L. fil. × *S. salicifolia* L.)

×*watsoniana* Zab. (*S. douglasii* Hook. × *S. splendens* K. Koch)

×*microthyrsa* Zab. (*S. alba* Du Roi × *S. media* Schmidt)

Preserved herbarium specimens from parks or sporadic rests of old plantings including in private gardens give evidence of their former cultivation in our countries. The first two of these taxa were not found as

living in last twenty years. Among mentioned taxa belongs probably also *Spiraea* ×*cinerea* Zab. (*S. cana* Waldst. & Kit. × *S. hypericifolia* L.), recorded from the Žehušice nurseries, but neither its herbarium evidence nor old plantings were found.

In last decades the assortment of spireas cultivated in Bohemia and Moravia was enlarged also by important inland arboreta and botanical gardens which have got new taxa or provenances within the mentioned international seed exchange "Index Seminum". Among these establishments the most important in Bohemia is the arboretum at Kostelec n. Č. L. (Kolín district) which belongs to the Faculty of Forestry, Czech Agriculture University in Praha, and in Moravia the Botanical Garden and Arboretum in Brno which belongs to the Mendel University of Agriculture and Forestry. The Kostelec Arboretum was founded in 1954 and already after nine years a list of woody plants grown there was published (SVOBODA 1963). This list contains 38 spirea taxa of which valuable species mentioned were obtained from Průhonice, but some also from other places (e.g., *Spiraea flexuosa* Fisch. ex Cambess. from nurseries at Ďáblice near Praha, or *S. sargentiana* Rehd. from Bratislava).

The situation of foreign or cultural spireas cultivation in Slovakia was simpler. At the end of the 19th century Botanical garden existed in the miner's town Schemnitz (the district town Banská Štiavnica in central Slovakia nowadays), where about ten spirea taxa were grown. They are confirmed from herbarium specimens collected by S. Kupčok in 1894–1895. Similar importance for dendrology and introduction of woody plants as in Bohemia had Průhonice, in Slovakia it was the mentioned Mlyňany Arboretum near Nitra working in the last decade as Institute of Dendrobiology of the Slovak Academy of Sciences. This arboretum is well known especially by the introduction of evergreen woody plants, but it was very important also for cultivation of the spirea assortment, particularly after World War II (from the previous period neither reliable register of spireas nor living plants came down). Since 1956 plants were obtained here via the international seed exchange "Index Seminum". Big importance for the enlargement of the spirea assortment had especially the expedition to China in 1960 (to the Tianmu Shan mountains at the border of Zhejiang and Anhui provinces), and also the expeditions to Korea in 1982–1985. Plant material from these expeditions was used for the foundation of new areas of geographically specialized dendrological expositions (especially the area of East Asian woody plants). The first complete list of woody plants grown in the Mlyňany Arboretum was prepared by BENČAŤ (1967) in which 24 spirea taxa are mentioned, 13 of them being natural species. In the list of woody plants gene pool of the Mlyňany Arboretum, prepared at the occasion of its hundred-years existence (TÁBOR & TOMAŠKO 1992), 46 spirea taxa are mentioned, of these 29 are natural species. In this new list seven taxa are missing in comparison with the previous one; from natural species they are *Spiraea chamaedryfolia* L. (autochthonous in Slovakia) and *S. canescens* D. Don (documented by the herbarium specimen from 1953 but not found in the 1980's). In the years 1983 till 1992 we made revision of the genus *Spiraea* in the Mlyňany Arboretum. At this occasion the presence of 20 natural species, three interspecific hybrids and seven varieties or cultivars was proved. From species mentioned in the above cited newer list *Spiraea flexuosa* Fisch. ex Cambess., *S. gemmata* Zab. and *S. splendens* Baumann ex K. Koch were not confirmed in the old part of the arboretum, and *S. crenata* L., *S. expansa* Wall. ex K. Koch, *S. miyabei* Koidz. and *S. alba* Du Roi in new areas; moreover the Korean taxon *S. microgyna* Nakai (reduced below to a variety of *S. fritschiana* Schneid.) was newly found in 1992. From interspecific hybrids mentioned in the newer list *Spiraea* ×*foxii* Zab. 'Margaritae' (given as *S.* ×*margaritae* Zab. in both lists), *S.* ×*semperflorens* Zab. (quoted in both lists) and its cultivar 'Syringiflora' have not been confirmed. In the last decades also botanical gardens were more important for spirea cultivation and introduction in Slovakia. These are the Botanical Garden of the Komenský University in Bratislava in west Slovakia and P. J. Šafárik Botanical Garden in Košice in east Slovakia. The latter has the second richest cultivated spirea assortment in Slovakia in the last twenty years (following the Mlyňany Arboretum). In the course of the 1980's cuttings were taken by the authors from most of the found rare taxa and interesting individuals of spireas cultivated in the Mlyňany Arboretum and in the Botanical Garden in Košice. From these cuttings plants were propagated and planted in the Dendrological garden at Průhonice for further comparison and assortment enlargement.

Climatic conditions in Bohemia and in major part also in Moravia represent the transitional zone between oceanic and continental climate which is not convenient for the cultivation of several to frost sensitive spirea species. They can partly freeze during some winter seasons; most frequently their one-year's shoots, exceptionally also older branches. This applies only to a few cultivated species and to the majority of their hybrids. It concerns especially species coming from the region of south or southeast China, such as *Spiraea thunbergii* Sieb. ex Blume, *S. cantoniensis* Lour. {but not its hardy hybrid *S.* ×*vanhouttei* (Briot) Zab.} and *S. chinensis* Maxim., and species from the Himalayan region, such as

S. canescens D. Don, *S. bella* Sims. and *S. expansa* Wall. ex K. Koch. The warmest regions of central Bohemia and south Moravia are according to its average climatic conditions admittedly suitable even for sensitive spirea species but occasional fluctuation of temperature makes these species unstable for cultivation. At the southern edge of the warm Central Bohemian basin Průhonice and Kostelec n. Č. L. are located with their above mentioned arboreta and also Žehušice with historically important ornamental nurseries. At the northern edge of the South Moravian lowland basin (belonging to Pannonia region phytogeographically) Brno is located with its important arboretum. Slovakia has the climate more continental in general, with more severe winters but with smaller temperature fluctuations. The regions of south and SE Slovakia, neighbouring with the Pannonian basin, are warmer but with poor precipitation. They are suitable for cultivation of some sensitive spirea species, e.g., *S. cantoniensis*, but they are not favourable for species that need high humidity, i.e., especially species from the Himalaya region. At the north periphery of the Pannonian basin the Mlyňany Arboretum, and at the northeast corner Košice with its botanical garden are situated. From the whole territory under observation the vaster Carpathian part of Slovakia is climatically the most intemperate region with relatively rich precipitation. Therefore, the region is potentially suitable for the cultivation of the majority of spirea hard species provided that the basic site requirements would be respected. However, no dendrologically important establishments are situated in this region, but it would be possible to enrich here plantings in urban parks or in highways surroundings.

Note:
In this publication Bohemia and Moravia are delimited in accordance with today's territory of the Czech Republic; Moravia is accepted including the part of Silesia pertaining to the Czech Republic; Bohemia and Moravia are sometimes mentioned together as the Czech countries from the period of Czechoslovakia; Slovakia is identic to today's territory of the Slovak Republic.

EVALUATION OF SPIREAS IN THE DENDROLOGICAL GARDEN AT PRŮHONICE

(R. Businský, L. Businská)

As it was mentioned above, spireas belong to important woody plants in ornamental gardening. The majority of species is very unassuming for soil and humidity and even many of them grow well in drying, poor and stony soils, or need at least well drained substrates; only several species of the section *Spiraea* need, on the contrary, higher soil humidity. Both types of requirements can be well used in horticulture, all the more that many species tolerate the first or the second site type even in extremes. But most species require sunny sites, especially when they have to be rich in blossoms and to produce fully functional greenery. Quite a number of the species grows on natural sites as undergrowth in shady bushy forests especially in southeast Asia, but these species are usually cultivated rarely as a botanical object of interest, they are poor in blossoms (especially under shading) and are not very important for horticulture. Nevertheless, these species tolerating deep shade grow well mostly also on sunny sites. Many species form underground suckers or running roots and by means of them they gradually spread into tufts and after more years into thickets. Some other species branch very dense from one place without spreading so that adult shrubs are compact at the base. Most species and hybrids used in cultivation are attractive in the time of blossom, nevertheless all spireas have relatively small or even very small flowers. This drawback is fully compensated by formation of either large dense inflorescences or by numerous small inflorescences on long flower-bearing branches. Most species have white flowers, sometimes with yellowing or pinkish tinge. Only several species have deep-pink to dark carmine red flowers. These species and their cultivars or hybrids are much popular. Several species are attractive by autumn colour change to red tinges. The mentioned characters predestine spireas for wide use in horticulture. They are suitable for plantings of solitary shrubs, groups or growths attractive by flowers, and even for technical plantings against soil slide or for stabilization of stream banks. It is popular to use spireas in mass plantings in towns and along roads, where their cover and aesthetic functions are utilized. In spite of big importance of spireas in horticulture, in the second half of the 20th century the assortment commonly cultivated till that time was impoverished. This is probably coherent with the long-lasting stagnation of landscape architecture and park plantings under the communist regime, when from former dendrologically varied and architectonically valuable urban and castle parks or gardens the short-lived shrub layer started to disappear. This situation in our countries has not been satisfactorily renewed till now. Also spireas are all the time underestimated woody plants used nowadays in very restricted assortment with the popularity of mostly dwarf cultivars growing only around 0.5 m.

For the above mentioned reason the aim of our work in the Dendrological garden of the Research Institute of Ornamental Gardening at Průhonice (see below as Průhonice DG) was the taxonomic revision and recollection of the assortment of the genus *Spiraea* L. that was cultivated in former Czechoslovakia, and the evaluation of this assortment from grower's points of view under our climatic conditions. The other type of activities was focused to selection of perspective taxa or clones for enlarged use in horticulture. The foundation of clone mother stock, that would be used for production of taxonomically verified and effective propagation material for nurseries, was the final aim.

Material and methods used

The basic method of study of genus *Spiraea* representatives occurring in cultivation or naturalized in the territory of former Czechoslovakia was to concentrate living plants to one place (Průhonice DG), and parallelly to collect herbarium specimens from all detected taxa, provenances and clones. This method proved to be an essential starting point for taxonomic revision of spireas in the given region. It was possible to determine and classify most of taxa concerned by mutual comparison of living plants, herbarium material and literary data. To the knowledge of many species variation have contributed also studies of the genus during many years in nature. The authors have undertook a series of expeditions to the area of southeast Asia, where about 80 percent of the whole spirea species diversity are native. Within this field research, extensive herbarium material of the genus *Spiraea* was concentrated from eight expeditions to the People's Republic of China (1990–2001), two expeditions to Japan (1991 and 1997) and one to Taiwan (1991). Herbarium samples of majority of *Spiraea* species native in China was also examined in 1992 and 1995 in two largest Chinese herbarium collections, which both belong to the Institute of Botany, Academia Sinica, i.e.: in Xiang Shan, Beijing (PE) and in Kunming, Yunnan (KUN).

The research of cultivated spireas was aimed mainly at institutes engaged professionally in dendrology, introduction and cultivation of woody plants in Bohemia, Moravia and Slovakia. The authors examined the spirea assortments grown in these institutes in the years 1982 till 1992. From most found taxa herbarium specimens were collected; these are stored in the RILOG at Průhonice nowadays. It concerns the following institutes, given after its current state (short boldfaced titles are used below):

- **Průhonice DG** – Dendrological garden of the Silva Tarouca Research Institute for Landscape and Ornamental Gardening, Průhonice, Praha západ (Prague West) district, central Bohemia
- **Průhonice CP** – Průhonice Castle Park & Arboretum, Institute of Botany, Academy of Sciences of the Czech Republic, Průhonice, Praha západ district, central Bohemia
- **Praha BG** – Botanical Garden of the Charles University, Na Slupi Street, Praha 2, central Bohemia
- **Kostelec Arboretum** – Arboretum Peklov, Truba, Kostelec n. Č. L., Kolín district (Faculty of Forestry, Czech Agriculture University in Praha), central Bohemia
- **Brno Arboretum** – Botanical Garden & Arboretum, Mendel University of Agriculture & Forestry, Brno, south Moravia
- **Křtiny Arboretum** – Arboretum Křtiny, Blansko district (Faculty of Forestry, Mendel University of Agriculture & Forestry, Brno), south Moravia
- **Nový Dvůr Arboretum** – Arboretum Nový Dvůr, Stěbořice, Opava district (Silesian Museum, Opava), north Moravia (Silesia)
- **Bratislava BG** – Botanical Garden of the Komenský University, Bratislava, Slovak Republic
- **Mlyňany Aboretum** – Aboretum Mlyňany, Institute of Dendrobiology of the Slovak Academy of Sciences, Slepčany, Zlaté Moravce district, Slovak Republic
- **Košice BG** – Botanical Garden of P. J. Šafárik University, Mánes Street, Košice, Slovak Republic

Simultaneously in the above said period and also later spirea assortments were studied with the same aim in our countries in nurseries and in greenery plantings of castle or urban parks and also in the landscape along roads. Besides living plants, older spirea herbarium evidence of wild, naturalized or cultivated plants from the regions under observation, and also from abroad, was studied in the following institutions:

- Herbarium, Botany Department, National Museum in Praha, Průhonice, Praha západ district (PR)
- Herbarium, Botany Department, Faculty of Natural Sciences, Charles University, Benátská Street, Praha 2 (PRC)
- Herbarium, Department of Plant Biology, Faculty of Natural Sciences, Masaryk University, Kotlářská Street, Brno (BRNU)
- Herbarium, Institute of Forest Botany, Dendrology and Typology, Faculty of Forestry, Mendel University of Agriculture & Forestry, Brno (BRNL)

In the 1980's, parallelly to pursuing taxonomic revision, we succeeded to collect in the Průhonice DG living plants of almost all detected taxa of the genus *Spiraea* grown in the territory of former Czechoslovakia in the mentioned period. They represented, except for three indigenous species, the assortment cultivated in botanical gardens, arboreta, nurseries, public parks, and also in private gardens or in other types of plantings. This collection contains approximately 70 taxa, most of them were propagated vegetatively by soft-wood cuttings in two periods in 1980 and 1983. Mostly 4–6 individuals were planted out on experimental plots in the DG in early spring 1983 and 1985. Smaller quantity of additionally obtained taxa were planted out later. The taxa on experimental plots were observed and regularly evaluated from grower's point of view since the first vegetation period. The period of intensive regular evaluation (IRE) lasted till the end of 1990, i.e., six to eight years for most taxa. At the beginning of 1991 the results were partly summarized within the wide project of evaluation of broadleaved blossoming ornamental shrubs, as a part of a research programme of the Research Institute of Ornamental Gardening. In following years the cultivated spirea assortment was further evaluated, but not so intensively, and was also supplemented by some new foreign cultivars and botanical taxa obtained later.

Evaluation of taxa from horticultural points of view

Particular evaluated taxa were in most cases represented by one selected clone with most typical morphological characters, and the best of gardening interest. Only in few cases plants propagated vegetatively from several individuals from nature (*Spiraea media* Schmidt, *S. salicifolia* L.), or grown from seeds, were evaluated. The origin of the selected clones or plants was often not exact because of original information lacking. Brief evaluation results and interconnected data are mentioned below the general characterization of taxon in question in the table of evaluation data (ED). During the evaluation of selected clones or plants data on phenology, growth, aesthetic and ecological characterizations were obtained according to following criteria.

Phenological data:

A. Followed in every vegetation period during the IRE of the taxon.

1) Beginning of winter buds **flushing** = date of ca 1/3 winter buds flushing off.
2) **Blossoming**:
   – beginning of blossoming = date of ca 1/3 flower buds blossoming off;
   – end of blossoming = date of ca 2/3 last flowers becoming overblown;
   – whole time of blossoming = number of days from the beginning till the end of blossoming;
   – main time of blossoming = period in which the rate of blossoming does not decrease under ca 1/3 of maximal intensity.

B. Summarized from the above data.

1) Winter buds flushing – range of dates of flushing beginnings.
2) Blossoming:
   – earliest blossoming = earliest date of the blossoming beginning;
   – latest blossoming = latest date of the blossoming end;
   – longest period of blossoming = longest whole blossoming time within one vegetation period;
   – main period of blossoming determined by comparison of annual data.

Growth and habitus:

1) **Height** and **width of shrubs** of the evaluated clone or plants, evaluated annually (average value of individuals).
2) **Habitus of shrubs** of the evaluated clone or plants: brief habitus description with characterization and density or texture of branching, character of offshooting, etc. (evaluated for the first time after four years from planting out).

Aesthetic characterization:

Blossoming richness, evaluated annually in the main blossoming time on the basis of relative classification by points (0–3) with two variants:
0 point = plants not blossom or very scarcely;
1 point = sparse blossoming;
2 points = mediumly rich blossoming;
3 points = abundant blossoming;
variant A = regular occurrence of flowers; variant B = irregular occurrence of flowers.

Ecological characterizations:

1) **Tolerance** of the clone or plants **to winter frosts**, evaluated annually at the beginning of vegetation period on the basis of relative classification by points (0–5):

0 point = completely intolerant, i.e., whole shrubs frozen;
1 point = intolerant, i.e., last year's shoots considerably damaged by frost down to the ground;
2 points = faintly tolerant, i.e., last year's shoots damaged by frost to ca 3/4 of length;
3 points = mediumly tolerant, i.e., last year's shoots damaged by frost to ca 1/2 of length;
4 points = tolerant, i.e., last year's shoots damaged by frost to ca 1/4 of length;
5 points = very tolerant, i.e., last year's shoots not damaged by frost or damaged only their immature tips.

2) Extent of **pest damage** (only aphids observed), evaluated annually in three suitable terms from the beginning of summer till autumn on the basis of relative classification by points (1–5):

1 point = aphids occur abundantly on more than 50 % of plant surface;
2 points = aphids occur regularly on 25–50 % of plant surface;
3 points = aphids occur irregularly on 5–25 % of plant surface;
4 points = aphids occur rarely on up to ca 5 % of plant surface;
5 points = no aphid occurrence.

Universal evaluation:

Three categories of estimated **gardening prosperousness** of a taxon for common planting in conditions of the Czech Republic were established: *first-rate*, *valuable*, *insignificant*. The first two categories indicate perspective taxa, the third one unperspective taxa, in general. The categories are generalized for taxon in question on the basis of a representative clone or plants evaluated.

SYSTEMATIC TREATMENT

(reading: R. Businský, drawings: L. Businská)

Taxa elaborated in this publication are given below in two groups, of which the first one includes natural species with their subspecies, varieties and directly derived cultivars, the second one includes cultural taxa in the rank of species, i.e., interspecific hybrids and hybrid cultivars. In both groups, taxa are arranged in accepted sections of the genus (see above) and within them according to their relative relationship.
In the second group hybrids between species from different sections are given separately, and four new cultivars are described in the last chapter, three of them without species classification because of their unclear genetic origin.

For single species following data are given, as far as they are relevant:

- accepted correct name of the taxon
- general characterization of the taxon:
  a) natural geographic range
  b) taxonomic notes and knowledge from authors' observations in nature
  c) history of introduction into culture, general importance for gardening, mode of use, and information on cultivation in the Czech countries and Slovakia
  d) important infraspecific taxa and cultivars with brief characterization (in case of *Spiraea japonica* L. fil., the only species with higher number of cultivars, data on cultivars are given separately and cultivars arranged alphabetically)
- table of evaluation data (ED) summarizing the intensive regular evaluation (IRE) of the selected clone or plants from horticultural points of view according to the criteria stated in the previous chapter:
  – origin of the evaluated clone or plants
  – category of universal evaluation (in capitals right)
  – phenological diagram showing:
    range of dates of buds flushing beginnings (**.....**),
    period of blossoming between the earliest and latest detected date (**-------**),
    main period of blossoming (**====**)
  – number of years of the IRE (under the diagram in the middle)
  – longest period of blossoming

- average height and width of shrubs in two ages from planting out (in fourth and last year of IRE)
  * the growth was evaluated on unsuitable dry site with relatively shallow soil
- blossoming richness (middle value of annual data)
- tolerance to winter frosts (middle value of annual data)
- extent of damage by aphids (middle value of annual data)
- notes about habitus or other characteristics of evaluated shrubs (e.g., susceptibility to browsing by game during winter season)

Drawings of the majority of given taxa were drawn after herbarium evidence of plants mostly cultivated in the territory of Bohemia, Moravia and Slovakia; a small part of the drawings was drawn after herbarium specimens from nature (in that case the locality where the sample has been collected by the authors is given). Most of the drawings is reproduced in natural size, unless reduction or enlargement of the drawing (or its part) is stated. All drawings have been delineated by Ludmila Businská.

Abbreviations and the symbol used in the legend of drawings:

ab. – above
br. – branch, branchlet
bt. – bottom
fl. – flower, flowering
fr. – fruit, fruits
inf. – inflorescence
l. – left
lv. – leaves
magn. – magnified
nat. – natural
pl. – plants
prob. – probably
r. – right
w. – with
~ – about

Considering common erroneous determinations and taxa confusions of spireas, there were mainly data concerning plants or their representative herbarium samples revised by the former author taken in this chapter (other important data are mentioned marginally in historic context).

Note:
The geographic names are given in accordance with current spelling of the appurtenant country. In the case of non-Latin writing languages the names were transliterated in standard practice (e.g., from Russian or Japanese) or, from Chinese, after the "Atlas of the People's Republic of China, Foreign Languages Press, China Cartogr. Publ. House, Beijing, 1989".

Natural species

inclusive of infraspecific taxa and derived cultivars

Spiraea L.

Sect. *Glomerati* Nakai

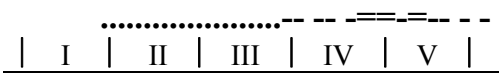
Spiraea prunifolia Sieb. & Zucc. (1835)

A species native of central and eastern China to Taiwan and Korea, since long ago cultivated in Japan, from where it was introduced into Europe by P. F. Siebold around 1845. It was described on the basis of a double-flowered form (species type) that occurs also in nature, found by E. H. Wilson in W Hubei (BEAN 1981). Plants with simple flowers, identified as the **var. *simpliciflora*** Nakai (1916), were introduced into Europe in 1864 (REHDER 1958). This variety has probably been never cultivated in our countries. The typical double-flowered variety is known from ten provinces in China from the extensive range from Shaanxi, E Sichuan and Guizhou as far as Shandong to Zhejiang, while the var. *simpliciflora* occurs in six provinces only (YÜ & LU 1974). As an ornamental shrub the species is notable by early blossoming, by double flowers and red autumn foliage. The oldest found herbarium evidence from the regions under observation comes from Netolice, south Bohemia, collected in 1890. Recently, in the Czech countries and Slovakia, apart from arboreta and botanical gardens, it is sometimes cultivated in parks and also rarely propagated in nurseries.

01 Spiraea prunifolia

ED of *Spiraea prunifolia*:

Clone: Průhonice CP, part. 96 VALUABLE



8 years

Longest period of blossoming: 60 days Blossoming richness: 1–2B

Height in 4 & 8 years: 150 & 210 cm Frost tolerance: 4–5

Width in 4 & 8 years: 180 & 270 cm

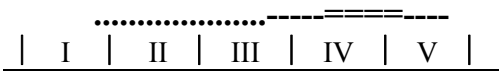
Thin shrub of somewhat disarranged habitus, with long whip-like shoots; flowers sometimes freeze before blossoming.

Spiraea faurieana Schneid. (1905)

An almost unknown taxon, originally described as a new species based on a herbarium specimen collected near Hakodate in SW Hokkaido, Japan, in 1890 (SCHNEIDER 1905). According to its characters, the taxon belongs between the *Spiraea prunifolia* and *S. thunbergii* and it could be their spontaneous hybrid, both of them have been cultivated in Japan for a long time, however, they are not autochthonous (in opinion of OHWI, 1984, the latter has been naturalized extensively). Recently, *S. faurieana* is quoted as a separate species (OHWI 1984) that occurs wildly in northern Honshu and in Hokkaido. A more detailed comparative study of Japanese material with related taxa specimens from China, including Taiwan, could maybe allow to reevaluate this taxon as a subspecies (or a variety) of *S. prunifolia*. Anyway, *S. faurieana* is never quoted in an available literature among those species that was introduced into culture. However, an old planted shrub of unclear origin that corresponds fully to this taxon was discovered by the authors in July 1984 near a castle in the Mlyňany Aboretum in Slovakia. Consequently, a group of shrubs grown from seeds of this old shrub has been found in new areas in the same arboretum, showing a certain variation of the leaves shape. The original old shrub from Mlyňany was propagated vegetatively in 1984 and this clone has been planted in the Průhonice DG. The taxon has not been found anywhere else in the Czech countries or Slovakia. As an ornamental shrub this species is notable by very early blossoming, sometimes as early as in the first half of April or even earlier (end of March), with utilization similar to that of *S. prunifolia*.

ED of *Spiraea faurieana*:

Clone: Mlyňany Arboretum (1984) VALUABLE



6 years

Longest period of blossoming: 32 days Blossoming richness: 2A

Height in 4 & 6 years: 120 & 180 cm Frost tolerance: 5

Width in 4 & 6 years: 180 & 240 cm

At the beginning a sparse shrub with long whip-like shoots and with fine foliage texture.

Spiraea thunbergii Sieb. ex Blume (1826)
= *S. crenata* Thunb. (1784), nom. illeg.

A species native of central and eastern China (in provinces Shaanxi, Shandong and Liaoning), since long ago cultivated in Japan where it is not autochthonous but extensively naturalized (OHWI 1984). It was introduced into Europe from Japan around 1863 (REHDER 1958). From growers' viewpoint it is interesting by early blossoming and long persisting foliage. The oldest found herbarium evidence from the regions under observation comes from Praha, collected in 1910. Recently, in the Czech countries and Slovakia, apart from arboreta and botanical gardens, it is sometimes cultivated in parks and also occasionally propagated in nurseries. The species is sometimes damaged by frost during hard winter seasons in our climatic conditions.

02 Spiraea faurieana

03 Spiraea thunbergii

ED of *Spiraea thunbergii*:

Clone: England, Hillier Nursery (1970's) INSIGHIFICANT

| I | II | III | IV | V | VI | VII | VIII | IX | X | XI | XII |

8 years

Longest period of blossoming: 33 days Blossoming richness: 1–2B

Height in 4 & 8 years: 110 & 170 cm Frost tolerance: 4

Width in 4 & 8 years: 160 & 220 cm

Dense shrub with thin semi-erect branches and very fine foliage texture; regarding sparse flowers it is not very conspicuous during flowering time and its flowers sometimes freeze before flowering.

Spiraea hypericifolia L. (1753)

A species with an extensive natural geographic range in Eurasia. The typical subspecies is distributed from E Europe to Central Asia, W Mongolia, N China and SE Siberia (Transbaikalia), while the **subsp. *obovata*** (Willd.) Dostál (≡ *S. obovata* Waldst. & Kit. ex Willd., 1809) occurs in SW Europe. It has been cultivated allegedly already since 1640 (!, REHDER 1958), or 1800 (subsp. *obovata*). It participated on the origination of cultural hybrids, *Spiraea* ×*multiflora* Zab., *S.* ×*arguta* Zab., *S.* ×*cinerea* Zab. and *S.* ×*micropetala* Zab., two of them are very valuable and commonly cultivated. *Spiraea hypericifolia* proper is not horticulturally valuable too much, though early coming into bloom, but of rather disarranged habitus and not so much abundantly blossoming (clones cultivated in our countries). With respect to relatively large extent of variation, more attractive forms would be introduced into culture. *Spiraea hypericifolia* subsp. *obovata* was formerly often treated as a separate species, allegedly commonly cultivated in parks of our countries (POLÍVKA, DOMIN & PODPĚRA 1928), but without herbarium evidence; the statement was newly taken over by DOSTÁL (1989). In Bohemia, *S. hypericifolia* (inclusive of the subsp. *obovata*) was cultivated already before half of the 19th century. In Průhonice it was recorded from 1910, of Caucasian origin. In Slovakia it is documented from Botanical Garden in Banská Štiavnica from 1895. Recently, in the Czech countries, the species is only rarely cultivated in dendrological collections (Průhonice DG, Brno Arboretum; various provenances).

ED of *Spiraea hypericifolia*:

Clone: Průhonice DG INSIGHIFICANT

| I | II | III | IV | V | VI | VII | VIII | IX | X | XI | XII |

8 years

Longest period of blossoming: 22 days Blossoming richness: 2B

Height in 4 & 8 years: 170 & 210 cm Frost tolerance: 5

Width in 4 & 8 years: 200 & 360 cm

Thin shrub with crooked branches covered by light greyish cortex, not attractive enough by somewhat yellowish flowers becoming soon overblown.

Note:
Closely related ***Spiraea aquilegifolia*** Pall. (1776), native of Transbaikalia, Mongolia and N China, was recorded from Bohemia cultivated in the Průhonice CP in the 1920's, and again was introduced here in the 1960's, from N Mongolia by the expedition of the Botanical Institute, planted out on rock garden where it did not survive to the 1980's.

04 Spiraea hypericifolia

Sect. *Chamaedryon* Ser.

Spiraea crenata L. (1753)

A species with an extensive natural geographic range from SE Europe continuing NE and E-wards in the zone between 46° and 58° N to the Altaj and Zapadnyj Sajan Mountains (SVJAZEVA 1980), and with disjunct southern area from central Caucasus to N Iran. The indigenous occurrence of the species reaches the SE corner of Slovakia by the only locality near Plešany village between Bodrog and Tisa rivers (critically threatened species included into the Red Data Book of the Czech and Slovak Republic, see HOLUB 1999). The species has been cultivated since 1800 (REHDER 1958), but not very often. *Spiraea crenata* is shortly blossoming, sparse and rather low shrub, not important enough as an ornamental species; it is used as a shrub for planting of sands and is also melliferous (HOLUB 1999). It participated on the origination of cultural hybrids, above all *S.* ×*multiflora* Zab., *S.* ×*arguta* Zab. and *S.* ×*conferta* Zab. The oldest found herbarium evidence of *S. crenata* from Bohemia was collected in a nursery at the Červený Hrádek (Rothenhaus) castle near Jirkov near Chomutov in 1844. The reference to naturalized occurrence of *S. crenata* in the České Středohoří Mts. (vicinity of Vlastislav) from the end of the 19th century (POLÍVKA, DOMIN & PODPĚRA 1928, cf. KOBLÍŽEK 1992) is based on herbarium specimens of not flowering (rather planted than naturalized) plants of *S. hypericifolia* subsp. *obovata*. In Průhonice, *S. crenata* was mentioned from 1927–1932 (SVOBODA, P. et al. 1967), and later, e.g., in four urban parks in Praha from the 1960's (SVOBODA, A. M. 1981). In recent years, the species is, in the Czech countries and Slovakia, only exceptionally cultivated in dendrological collections (Průhonice DG; alleged in the Mlyňany Arboretum and in the Košice BG).

ED of *Spiraea crenata*:

Plant: USSR, Minsk (seeds, 1970's) INSIGNIFICANT

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                    .....     --==--
|  I  |  II  |  III  |  IV  |  V  |  VI  |  VII  |  VIII  |  IX  |  X  |  XI  |  XII  |
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8 years

Longest period of blossoming: 16 days Blossoming richness: 2B

Height in 4 & 8 years: 120 & 160 cm Frost tolerance: 5

Width in 4 & 8 years: 60 & 100 cm

Slender, sparse, erectly branched shrub with fine foliage texture.

Spiraea lasiocarpa Kar. & Kir. (1842)

A species with allegedly limited range of distribution in Central Asia, largely in the Tien Shan mountain system in the territory of Kirgizia and Kazakhstan between 70° and 80° E as far as China border (SVJAZEVA 1980). It was described from the Dzhungarskij Alatau mountain range from a locality close to the China present border. Although it has been discovered more than 150 years ago, outside the territory of former Soviet Union it has remained unknown. It is not quoted in any of the *Spiraea* monographs that are mentioned in this publication above (only MAXIMOWICZ, 1879, mentioned the name with a questionmark and a short note) neither is it accepted for the Chinese (YÜ & LU 1974) or Mongolian (GRUBOV 1982) territory. *Spiraea lasiocarpa* has been proved by the present author to be conspecific with the original material *S. mongolica* Maxim. (1881) from herbaria in St. Petersburg (LE) and Beijing (PE)*. According to the original description, *S. gemmata* Zab. (1893) also seems to represent clearly the same species (see the note at *S. mollifolia* below). *Spiraea mongolica* Maxim. has been described on the basis of plants collected by Przewalsky in 1871 and 1873 in the today's Chinese province Nei Mongol in the mountains near the Huang He river (between 105° and 112° E) and it is accepted in Flora R.P. Sinicae (YÜ & LU 1974) from Xinjiang (where it borders with the area in Kazakhstan and Kirgizia) as far as Xizang (Tibet proper), Hubei and Henan on SE.

* *Spiraea lasiocarpa* Kar. & Kir. in Bull. Soc. Nat. Moscou 15: 536 (1842).
= *S. mongolica* Maxim. (1881), **syn nov.** Type: Mongolia occid., Terra Ordos, montibus Alaschan, pars media declivit. occid.; 18. Juni 1873 – *Przewalski 295*; holo: LE !, iso: PE !.

05 Spiraea crenata

06 Spiraea lasiocarpa

Spiraea lasiocarpa is close to *S. crenata*, from which it differs significantly, in particular by large pointed buds (this character is not mentioned in Russian literature, cf. POJARKOVA 1939), pinnated venation of leaves and by occasionally branching flowers peduncles. SVJAZEVA (1980) included a large-flowered morphotype, described as *S. ferganensis* Pojark. (1939), in *S. lasiocarpa* as a synonym. This morphotype was planted in Leningrad already in 1951 (ŠUL'GINA 1954) and could be especially attractive in a culture. Typical *S. lasiocarpa* has been studied by the authors in nature during its flowering time in the Kirgizskij Chrebet mountain range in 1988 and along the Tekes river upper flow in E part of the Terskej Alatau mountain range in 1989. It seems to be a species very suitable for introduction into culture (it is attractive during flowering time and fully frost-resistant), however, in spite of that it is still missing in horticulture but is cultivated in some botanical gardens, originally perhaps only in the former Soviet Union, from where it could have been sent abroad via seeds exchange. Even the Košice BG obtained the typical *S. lasiocarpa* from seeds sent from the Soviet Union, from where it was propagated vegetatively for the Průhonice DG in 1985, where one shrub has been planted. The species was not confirmed anywhere in our countries. However, some plants that were cultivated at Průhonice under the name of *S. gemmata* Zab. in the 1920's (and perhaps also later in other places of our countries) might have belonged to *S. lasiocarpa*.

Note:
A taxon described as ***Spiraea uratensis*** Franch. (1883), native of N part of central China, was considered closely related to *S. canescens* D. Don and introduced into Europe in 1926 (REHDER 1958). The present author has not seen any original material of the taxon but its description given by REHDER (1958), and plants grown in the Průhonice DG from seeds obtained from the Arboretum in Vácrátót, Hungary (sown 1986), are both very close to *S. lasiocarpa*. Additional study could prove these taxa to be conspecific.

Spiraea nipponica Maxim. (1886)
= *S. bracteata* Zab. (1884), nom. illeg.

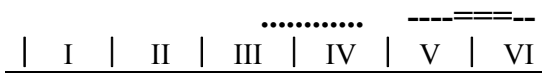
A species native of Japan, from where it was introduced into Europe already before 1882 by Siebold (BEAN 1981) and described for the first time under an illegitimate name *Spiraea bracteata* Zab. (1884), then as *S. media* var. *rotundifolia* Nicholson (1885) and consequently under the correct name *S. nipponica*. The Nicholson's variety is often cited as *S. nipponica* var. *rotundifolia* (Nichols.) Makino, however, the cultivar name **'Rotundifolia'**, representing the oldest cultivated clone, is more relevant. In 1923 a narrow-leaved variety, **var. *tosaensis*** (Yatabe) Makino (≡ *S. tosaensis* Yatabe, 1892), from the Shikoku island was introduced into culture in Britain (BEAN 1981), while the typical variety grows wildly in central Honshu. The var. *tosaensis* is not too attractive in flower and it is often confused with a similar American cultivar **'Snowmound'**, that is from horticultural viewpoint the most significant clone, remarkable for its low, dense growth and abundant flowering.

In the Czech countries, *Spiraea nipponica* was cited, in particular, from Průhonice in 1914–1941 and it has been maintained here in several clones up till now. Besides, recently it has been found in our countries in almost all arboreta and botanical gardens, frequently as several morphologically different shrubs, often under various names; older shrubs were sometimes found even in some castle or urban parks. Only a part of those shrubs could be classified as the true *S. nipponica* (e.g., in the Kostelec Arboretum, in the Praha BG, in the Průhonice CP and DG), while the remaining part represents plants that are either not typical or that bear clear characters of interspecific hybridization. The hybrids probably originated spontaneously when growing the previous generations of plants together with other species of the genus in some dendrological collections. In some cases it seems *S. trichocarpa* Nakai was the hypothetical second parent of the mentioned hybrid individuals. For instance, one such hybrid clone is cultivated in the Průhonice DG (it comes from a plant called *S. bracteata* in old plantings from the local "Štípenka" garden); it is very attractive, abundant in flowers and its habitus corresponds to *S. trichocarpa* (see observation data below). In Slovakia, *S. nipponica* was mentioned in the Mlyňany Arboretum and confirmed there by the authors in the 1980's, and at the same time it was also quoted in the Košice BG. Recently, the valuable cultivar 'Snowmound' and newly also the cultivar **'Halward's Silver'** (originated in the Royal Botanic Garden in Hamilton, Ontario, Canada, in 1960, see KRÜSSMANN 1978), are often being used in the Czech countries, in particular in public parks, while the var. *tosaensis* was, besides the Průhonice DG (import from England), identified in the Kostelec Arboretum only and nowhere in Slovakia.

07 Spiraea nipponica

08 Spiraea nipponica ‘Snowmound’

ED of *Spiraea nipponica* ‘Rotundifolia’:
Clone: Průhonice DG FIRST-RATE



8 years

Longest period of blossoming: 34 days Blossoming richness: 3B

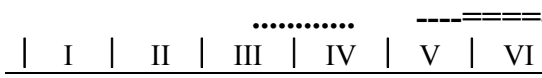
Height in 4 & 8 years: 130 & 160 cm Frost tolerance: 5

Width in 4 & 8 years: 140 & 260 cm

Relatively dense, elegantly arch-like branched shrub.

ED of *Spiraea nipponica* ‘Snowmound’:

Clone: Germany, Kordes Nursery (1982) FIRST-RATE



7 years

Longest period of blossoming: 30 days Blossoming richness: 3B

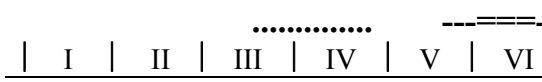
Height in 4 & 7 years: 110 & 120 cm Frost tolerance: 5

Width in 4 & 7 years: 110 & 150 cm

Low, compact shrub with erect stout branches.

ED of *Spiraea nipponica* var. *tosaensis*:

Clone: England, Hillier Nursery (1970’s) INSIGNIFICANT



6 years

Longest period of blossoming: 30 days Blossoming richness: 2B

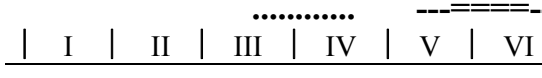
Height in 4 & 6 years: 130 & 150 cm Frost tolerance: 5

Width in 4 & 6 years: 120 & 180 cm

Middle dense, erectly branched shrub with fine foliage texture.

ED of *Spiraea nipponica* × *S. trichocarpa* Nakai:

Clone: Průhonice DG, Štípenka, 4/5 (as *S. bracteata*) FIRST-RATE



8 years

Longest period of blossoming: 30 days Blossoming richness: 3B

Height in 4 & 8 years: 150 & 200 cm Frost tolerance: 5

Width in 4 & 8 years: 230 & 300 cm

Large, widely arch-like branched shrub of an elegant habitus, seldom offshooting.

Note:
Spiraea myrtilloides Rehd. (1913), a species native of central and SW China, was described for the first time as *S. virgata* Franch. (1890), nom. illeg. It was introduced into Europe in 1908 (REHDER 1927). It was cultivated by Denrological Society at Průhonice in years 1914 to 1941; later it has not been neither mentioned nor found anywhere in the regions under observation. The species was studied by the former author in provinces of Sichuan and Yunnan; it is resembling *S. nipponica*, but its leaves are minor and buds short. It could be attractive as ornamental shrub if more abundantly blossoming individual for vegetative propagation would be selected.

Spiraea mollifolia Rehd. (1913)

An alpine species growing in SW China (Gansu, Sichuan, Yunnan, Xizang, and probably also in Shaanxi and Hubei) in altitudes of 2500–4200 m. The species was discovered by E. H. Wilson in 1904 in W Sichuan, from where, before its description, it was introduced into Europe in 1909 (BEAN 1981). Morphologically significant species conspicuous for its large buds on strong angular shoots and, in its typical form, also by dense indumentum. Sparsely pubescent to almost glabrous morphotypes, corresponding to this species by their other characters, were described as the **var. *glabrata*** Yü & Lu (1980) from Xizang (Tibet proper). Such plants were studied and sampled by the authors in many localities in the extensive territory of SW China: except for Xizang (from Lhasa as far as the Yunnan border), also in NW Yunnan, S Shaanxi and in W Hubei; it seems that they are much more widely spread than the typical hairy morphotype (studied by the authors in Gongga Shan mountains region in W Sichuan). Very similar plants, sometimes with partly compound inflorescences, are identified as *S. arcuata* Hook. fil. (1878), an insufficiently known taxon described from Sikkim. Interpretation of the above mentioned glabrate plants was also confused with the name *S. gemmata* Zab. (REHDER 1913, 1927, 1949), a taxon described by ZABEL (1893) on the basis of plants grown from seeds from the then Mongolia, today's northern China. Nevertheless, according to the detailed description, Zabel's *S. gemmata* corresponds fully to type material of *S. mongolica* Maxim. (1881) and that is conspecific with an older acceptable name *S. lasiocarpa* Kar. & Kir. Anyway, under the name *S. gemmata* Zab. plants from several provenances from expeditions to China (SVOBODA et al. 1967) were cultivated at Průhonice in 1922–1932. Their samples was not preserved and they might have belonged either to *S. mollifolia* or to *S. lasiocarpa*. Plants in the Mlyňany Arboretum were also cultivated under the name *S. gemmata* Zab. in the 1970's and their herbarium specimen from 1973 seems to be closest to the already mentioned *S. arcuata*.

Introduced plants of typical *Spiraea mollifolia* are less significant from horticultural viewpoint, they flower sparsely and for a short time only, nevertheless they are interesting for botanical collections. However, a deep rose-flowered morphotype, growing in homogeneous populations in altitudes around 4000 m in hardly accessible source area of the Dulong Jiang river (upper flow of the Irrawaddy river) in the corner of SE Xizang (Tibet proper), would be very valuable for introduction into culture. The authors studied these populations in 1999; they represent so far undescribed taxon, that should be evaluated as a variety. Such plants when introduced into garden culture would be the only rose-flowered spirea blossoming in the spring. In Bohemia *S. mollifolia* was cultivated at Průhonice in 1910–1932, i.e. very soon after its introduction into Europe. During World War II the species was lost in culture. Probably the only clone cultivated in Bohemia at the present time, corresponding with the typical morphotype, was imported to the Průhonice DG from the Hillier Nursery in England in the 1970's. In Moravia it was listed in the plant catalogue of a horticultural firm in Borotín near Velké Opatovice (Blansko district) in 1985, perhaps obtained newly from Průhonice. *Spiraea mollifolia* was neither mentioned nor found in Slovakia.

ED of *Spiraea mollifolia*:

Clone: England, Hillier Nursery (1970's) INSIGNIFICANT

6 years

Longest period of blossoming: 16 days Blossoming richness: 1B

Height in 4 & 6 years: 80 & 110 cm Frost tolerance: 5

Width in 4 & 6 years: 100 & 180 cm

Low shrub with short arching branches, rather scarcely flowering, remarkable for its dense hairiness.

09 Spiraea mollifolia

Spiraea cana Waldst. & Kit. (1807)

A south-European species with limited natural distribution in countries of the former Yugoslavia, reaching NE Italy by the only locality (Monte Cavallo, east of Belluno), not verified newly (cf. ADOLPHI 1995). It was introduced into culture in 1825 (REHDER 1958). The species forms dense erect shrubs usually to 1 m high, conspicuous by dense indumentum. It is the parent of hybrids *Spiraea* ×*conferta* Zab. and *S.* ×*cinerea* Zab., both also cultivated in our countries (the second commonly in recent years). It seems that *S. cana* is generally more rare in culture than before one hundred years, partly probably for the reason of its replacing by somewhat resemble and abundantly blossoming hybrid *S.* ×*cinerea*. The species was rather infrequently cultivated in the first Czechoslovak Republic (cf. POLÍVKA, DOMIN & PODPĚRA 1928). The oldest herbarium evidence was found from a garden in Horažďovice, south Bohemia, collected about 1865, and from Slovakia, from the Botanical Garden in Banská Štiavnica, collected in 1894. The species was allegedly cultivated at Průhonice in the 1920's and at the beginning of the 1930's but its evidence from there has not been handed down. In recent years it has not been found anywhere in the regions under observation.

Spiraea media Schmidt (1792)

A polymorphic species with an extensive natural geographic range from SE and central Europe (westwards to Steiermark and W Slovakia) to E Siberia, Kamchatka, Sakhalin, Korea and N Japan, SE-wards to central China (Sichuan, Henan). In SE part of the range it occurs in the **var. *sericea*** (Turcz.) Regel (≡ *S. sericea* Turcz., 1843), that is by some authors treated as a separate species (see YÜ & LU 1974, SVJAZEVA 1980). In the Czech countries it is not autochthonous but in Slovakia it is only extensive naturally distributed spirea, occurring sparsely almost in whole territory to the east and south of the Váh river, on sunny rocky shrubby sites on limestones and eruptive rocks up to 1500 m. The species was introduced into culture allegedly in 1789 (REHDER 1958), before its description. It is horticulturally attractive as rather low ornamental shrub, but it is only rarely cultivated in the Czech countries and Slovakia. It was recorded at Průhonice from the 1930's and is cultivated in some arboreta and botanical gardens (Průhonice DG, Kostelec Arboretum, Brno Arboretum; Mlyňany Arboretum, Košice BG) nowadays.

Some European authors distinguish *Spiraea media* **subsp. *polonica*** (Blocki) Pawlowski (≡ *S. polonica* Blocki, 1892), distributed in SE Poland, Ukraine, and probably also in some localities in Slovakia, where is mentioned near Kozárovce, at Kriváň village near Detva and from Zemplínské vrchy hills (DOSTÁL 1989, ZAHRADNÍKOVÁ 1992). The taxon seems to be better to classify in the rank of variety, though it was treated also only as a form (SCHNEIDER 1905). In culture, in our countries or somewhere else it is probably missing because it is not attractive enough; it was offered in Žehušice Nursery in the 1930's. Plants with dense indumentum from SE Europe are indicated as the **var. *mollis*** (K. Koch & Bouché) Schneid., described originally (1854) as a separate species, treated often as a taxon originated by hybridization with *Spiraea cana* (cf. ZABEL 1893). A morphotype corresponding with this variety was collected on Kováčovské kopce hills in S Slovakia near Hungarian frontier in 1959. In my opinion, the population from the locality near Kozárovce (from Levice district, see above) belongs also to the var. *mollis*, but with partial occurrence of morphotypes transitional to the typical variety. *Spiraea media* var. *mollis* was also cultivated in Kostelec Arboretum in the 1980's. A taxon described as *S. oblongifolia* Waldst. & Kit. (1812), accepted usually as *S. media* **var. *oblongifolia*** (Waldst. & Kit.) Dipp., represents mostly glabrous morphotype without taxonomic significance, commonly occurring above all in the European part of the geographic range of the species in the scope of their variation.

ED of *Spiraea media* var. *media*:

Plants: S Slovakia, Slovakian karst, Zádiel gorge; alt. 600 m (wild);
coll. R. Businský, 6.7.1985 VALUABLE

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                .....------====-
| I | II | III | IV | V | VI | VII | VIII | IX | X | XI | XII |
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6 years

Longest period of blossoming: 30 days Blossoming richness: 3B

Height in 4 & 6 years: 120 & 150 cm Frost tolerance: 5

Width in 4 & 6 years: 100 & 140 cm Irregularly, erectly branched, very offshooting shrub.

10 Spiraea cana

11 Spiraea media

Spiraea chamaedryfolia L. (1753)

A species with an extensive geographic range divide into two areas separated by a gap in the extent of about 4000 km. The typical subspecies occurs in central Siberia, where is mostly distributed in the Altai region and continuing NE-wards, reaching eastwards about 115° E by the sparse occurrence, with northern limit overlapping 60° N (SVJAZEVA 1980), and southwards reaching NW margin of China (N Xinjiang) and N Mongolia. In European part of the range, the species is represented by the **subsp. *ulmifolia*** (Scop.) J. Duvigneaud, described originally as a separate species from Carinthia in 1772, and later accepted usually in the rank of variety. It is distributed from E Alps across countries of the former Yugoslavia to E Carpathians and Bulgaria. It differs, in clear-cut morphotypes, from the typical subspecies above all by vigorous erect growth, raceme-like elongating inflorescence, rounded base of leaves, and it probably corresponds to the tetraploid cytotype (2n = 36; cf. ADOLPHI 1995). Morphological distinction between both subspecies is not unambiguous in some forms, and, above all in culture, can be problematic in some cases. *Spiraea chamaedryfolia* subsp. *ulmifolia* occurs rarely in E and central Slovakia, where a few localities are considered sometimes as autochthonous, e.g. near Tisovec in Slovenské Rudohorie Mts. (cf. ZAHRADNÍKOVÁ 1992). In my opinion, these and other occurrences rather represent a naturalization from former plantings. Uncertain are also records from the half of the 19th century, e.g. from E part of the Nízké Tatry Mts., the Slovenský Ráj Mts. or the Šariš region (around Prešov). The closest distinctly autochthonous occurrences are situated in Sub-Carpathian Ukraine (today's district of Zakarpat'e), the eastmost region of the first Czechoslovak Republic belonging to East-Carpathian phytogeographic area.

Typical *Spiraea chamaedryfolia* was introduced into culture in 1789, the subsp. *ulmifolia* one year later (REHDER 1958). The species is valuable ornamental shrub of dense habitus, very offshooting and abundantly blossoming. It seems, that in the Czech countries and perhaps also in Slovakia the species (at least in the subsp. *ulmifolia*) was cultivated already in the first half of the 19th century. Recently it is cultivated in most of arboreta and botanical gardens and sometimes found in urban parks and gardens, usually in the subsp. *ulmifolia*, and sporadically naturalized. Possibly first published mention about naturalization of *S. chamaedryfolia* in the Czech countries comes from Znojmo vicinity from the end of the 19th century (POLÍVKA 1900) but the oldest naturalization was probably earlier. In last years it is not grown by horticultural firms, neither planted out.

ED of *Spiraea chamaedryfolia* subsp. *chamaedryfolia*:

Clone: Průhonice DG FIRST-RATE

8 years

Longest period of blossoming: 54 days Blossoming richness: 2–3B

Height in 4 & 8 years: 130 & 200 cm Frost tolerance: 5

Width in 4 & 8 years: 120 & 240 cm

Dense, erectly branched, offshooting shrub; sometimes remontant (e.g., in the end of August 1988).

ED of *Spiraea chamaedryfolia* subsp. *ulmifolia*:

Clone: England, Hillier Nursery (1970's) FIRST-RATE

8 years

Longest period of blossoming: 40 days Blossoming richness: 3B

Height in 4 & 8 years: 160 & 180 cm Frost tolerance: 5

Width in 4 & 8 years: 140 & 240 cm

The same habitus and growth characteristics as in the typical subspecies.

12 Spiraea chamaedryfolia subsp. chamaedryfolia

13 Spiraea chamaedryfolia subsp. ulmifolia

Spiraea ussuriensis Pojark. (1939)

A species very closely related to *Spiraea chamaedryfolia*, with rather small geographic range in the Far East in the basin of Amur river and around Vladivostok, reaches E China, N Korea, and also Japan (central and N Honshu, Hokkaido). In Japan it is treated as *S. chamaedryfolia* var. *pilosa* (Nakai) Hara (OHWI 1984); in the Chinese territory it is not distinguished from the typical *S. chamaedryfolia* (YÜ & LU 1974) which however reaches only marginally the distant NW part of the country. One of the reasons, for accepting *S. ussuriensis* as a separate species in this publication, is the fact that, between the ranges of both taxa, the geographic range of *S. flexuosa* Fisch. ex Cambess. is wedged, whose morphological characters are not intermediate between these species. The diagnostic characters of mentioned three species are given by POJARKOVA (1939). Seeds of *S. ussuriensis* have been offered by a few botanical gardens of the former USSR in last decades. In this way the species has been obtained in the Průhonice DG in the 1980's, and in the Košice BG, Slovakia. It is horticulturally not valuable enough as an ornamental shrub, shortly and scarcely blossoming, interesting mostly as a botanical collection material, but with attractive foliage and tolerant to shadow.

ED of *Spiraea ussuriensis*:

Plants: USSR, Moscow (seeds, 1970's) INSIGNIFICANT

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| I | II | III | IV | V | VI | VII | VIII | IX | X | XI | XII |
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8 years

Longest period of blossoming: 20 days Blossoming richness: 1B

Height in 4 & 8 years: 100 & 140 cm Frost tolerance: 5

Width in 4 & 8 years: 120 & 160 cm

Dense shrub with horizontal branchlets and fine branching texture and foliage, turning yellow in autumn.

Spiraea flexuosa Fisch. ex Cambess. (1824)

A species from the group of *Spiraea chamaedryfolia* distributed mostly in central to E Siberia, from Altai eastwards to the Japan Sea, with northern limit overlapping 60° N (SVJAZEVA 1980). Through Mongolia it reaches N China, where is distributed from N Xinjiang in the west to the Heilong Jiang (Amur) basin, and possibly reaches N Korea. It was united to *S. chamaedryfolia* by authors in the past, either classified as its variety (MAXIMOWICZ 1879, ZABEL 1893), or considered only its synonym (REHDER 1927, 1949, 1958). However, it is accepted in last decades as a separate species in countries where it is indigenous. *Spiraea flexuosa* is generally missing in culture except for botanical gardens of the former USSR and some arboreta in Europe. It was cultivated in the 1920's in the Průhonice CP, where one old vital shrub grows up to this time. In Slovakia, it is recorded in the Mlyňany Arboretum in the old park (TÁBOR & TOMAŠKO 1992), but it was not listed by BENČAŤ (1967), neither found there by the present authors. The species forms shrubs of the same growth as *S. chamaedryfolia*, and it could be used similarly from grower's points of view.

Spiraea cantoniensis Lour. (1790)

A species native of S China, where it is considered indigenous from Guangxi to Hunan and Zhejiang, and cultivated elsewhere (YÜ & LU 1974), perhaps for few centuries. It is also used for a long time in horticulture in Japan, where is not autochthonous (OHWI 1984). It was introduced into Europe in 1824 (REHDER 1958), where is popular mostly in warmer regions of southern and western part, above all in double-flowered cultivar **'Lanceata'** with narrower leaves, originated in 1855 (REHDER 1958). The species is not fitted for an extensive cultivation in the Czech countries with respect to the lower frost tolerance, but it is better usable in southern regions of Slovakia. After mild winters, it is decorative even in our countries by blossoms and long persistent foliage. The species is the parent of *Spiraea ×vanhouttei* (Briot) Zab., the most cultivated spirea hybrid in our countries. In Bohemia, *S. cantoniensis* was cultivated already around the half of the 19th century under the synonym *S. reevesiana* Lindl., later it was cultivated only sporadically, apparently with respect to its insufficient hardiness; it was missing, e.g., in the spirea assortment of the Dendrological Society at Průhonice between 1910 and 1941. In recent years it is only rarely cultivated in dendrological collections in the regions under observation (Průhonice DG, Mlyňany Arboretum), sometimes in the cultivar 'Lanceata' (Kostelec Arboretum).

14 Spiraea ussuriensis

15 Spiraea flexuosa

ED of *Spiraea cantoniensis*:

Clone: England, Hillier Nursery (1970's) INSIGNIFICANT

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| I | II | III | IV | V | VI | VII | VIII | IX | X | XI | XII |
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8 years

Longest period of blossoming: 28 days Blossoming richness: 1–2B

Height in 4 & 8 years: 140 & 170 cm Frost tolerance: 3

Width in 4 & 8 years: 170 & 220 cm

Rather sparse, erectly branched, later wide-branching shrub; the shoots not becoming ripe in autumn and bear leaves even after first frosts; suffers from browsing by game during winter season.

Spiraea trilobata L. (1771)

A species native of southern part of central Siberia (above all in Altai region) continuing through Mongolia to central and E China (with distribution from Gansu to Heilongjiang), and to Korea. It was introduced into Europe in 1801 (BEAN 1981). It is horticulturally not valuable enough, of rather low growth (up to 1–1.5 m high) and little blossoming, but the species is the parent of valuable hybrid, *Spiraea* ×*vanhouttei*. In Bohemia, the species was cultivated already around the middle of the 19th century. In recent years it is cultivated in the Czech countries only infrequently in dendrological collections (e.g., in Kostelec Arboretum, or in a collection of the Technical Horticultural School in Mělník or the Brno Arboretum, from where it was propagated vegetatively for the Průhonice DG). In Slovakia it is documented from Botanical Garden in Banská Štiavnica from 1894, and in the 1980's it was found in the Košice BG.

ED of *Spiraea trilobata*:

Clone: Brno Arboretum (1983), seeds from Tomsk, USSR INSIGNIFICANT

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| I | II | III | IV | V | VI | VII | VIII | IX | X | XI | XII |
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6 years

Longest period of blossoming: 18 days Blossoming richness: 2B

Height in 4 & 6 years: 120 & 120 cm Frost tolerance: 5

Width in 4 & 6 years: 110 & 160 cm

Low, dense, initially erectly branched, later roundish shrub; suffers from browsing by game during winter season.

Spiraea blumei G. Don (1832)
= *S. chamaedrifolia* Blume (1826), nom. illeg.

A species native of China, Korea and Japan, with the largest distribution in the Chinese territory from Gansu to almost southern coast and eastwards to Liaoning (YÜ & LU 1974), though was not usually given from there (viz REHDER 1958, KRÜSSMANN 1978, CULLEN 1995). It was introduced into Europe about 1858 (REHDER 1958). In culture, it is often confused with somewhat similar *Spiraea* ×*vanhouttei*. The species is mentioned in catalogues of the Dendrological Society at Průhonice in 1935 to 1941, but it was not known here in the 1960's. During last twenty years, the true *S. blumei* has been found in Bohemia only in Nový Dvůr Arboretum (plants of unknown origin), and in Slovakia in Mlyňany Aboretum, where was introduced by the expedition China 1960 from Tianmu Shan Mountains, Zhejiang province (many plants from there were planted out in the new tract of the arboretum), and for second time by the expedition Korea 1985 (plants planted out in 1987). From the Chinese provenance, a few plants were propagated vegetatively for the Průhonice DG in 1985, where they grow up to now. The species is

16 Spiraea cantoniensis

17 Spiraea cantoniensis ‘Lanceata’

18 Spiraea trilobata

19 Spiraea blumei

20 Spiraea chinensis

horticulturally valuable by abundant blossoming, but the terminal parts of shoots can be damaged by frosts in our conditions, therefore the species is fitted for warmer regions (e.g., in the Mlyňany Arboretum it thrives very well).

Note:
Closely related ***Spiraea pubescens*** Turcz. (1832), native of central to E China, in Mongolia, Transbaikalia and Korea, introduced into Europe not until 1883 (REHDER 1958), was mentioned to be cultivated in the Průhonice CP in the 1920's. Seeds of this species from Beijing were sown in the Průhonice DG in the middle of the 1980's and three plants were grown on them. The plants flower only very sporadically and they seem to be not fitted as an ornamental shrub enough.

Spiraea chinensis Maxim. (1879)
= *S. pubescens* Lindl. (1847), nom. illeg.

A species with large range of distribution in central and southern China, eastwards to the East China Sea. A very closely related taxon occurring in western Japan was described as ***Spiraea nervosa*** Franch. & Savatier (1878). OHWI (1984) includes *S. chinensis* Maxim. as a synonym of *S. nervosa* var. *angustifolia* (Yatabe) Ohwi. In case *S. nervosa* and *S. chinensis* are considered to be conspecific, then the correct name for those Chinese plants is the former one. However, YÜ & LU (1974), in compliance with an older classification (e.g. REHDER 1949), consider *S. nervosa* to be a synonym to ***S. dasyantha*** Bunge (1835), a species from central to eastern China, closely related to *S. chinensis*. The present author has checked herbarium material of all three taxa from nature and has also studied the *S. dasyantha* population in the Hebei province and populations of *S. chinensis* in two localities in the Anhui province and plants grown in the Mlyňany Arboretum in Slovakia, that come from the Tianmu Shan mountains in the Zhejiang province. *Spiraea dasyantha* was found to be the most different from the two remaining taxa which were found to be mutually very closely related, however, both with extensive variation among their populations. It is impossible to merge these two species without a more detailed study, therefore *S. chinensis* remains here as a separate species.

The species was introduced into Europe in 1843 (REHDER 1958), but it seems to be generally rare in a culture, because it is somewhat less attractive as an ornamental shrub for sparse flowering and it shows less frost resistance, even in Britain, where during hard winters it freezes to the ground (BEAN 1981). In Bohemia it was neither mentioned from Průhonice before World War II nor later. In Slovakia it was introduced into the Mlyňany Arboretum, where it was imported without any determination by an expedition to China from the Tianmu Shan mountains in the Zhejiang province in 1960. A substantial number of vital shrubs was cultivated from seeds from this provenance which were planted in the Arboretum new area, where they were found by the authors and propagated vegetatively for the Průhonice DG in 1985. The shrubs were damaged by winter frost in the Mlyňany Arboretum only in the upper part of their shoots, however at Průhonice they sometimes froze to the ground and they are not cultivated there any more. In the 1980's this species was reported from the Košice BG.

Sect. *Calospira* K. Koch

Spiraea baldschuanica B. Fedtsch. (1909)

A taxonomically isolated species with very limited geographic range in the Central Asia in Pamir-Alai region approximately between 38–39° N & 68–70° E in the territory of Tadjikistan, where it grows on limestone ground between the altitude of 1100 and 2300 m (SVJAZEVA 1980). It is unique by its inflorescences which form sparse corymbs compound from simple racemes with conspicuously thin pedicels. For classification of this species a new series, "Rjad *Decumbentes* Pojark.", nom. inval., in Flora of the USSR (POJARKOVA 1939) was created. The series was constituted for two species only, *Spiraea baldschuanica* and *S. decumbens* W. Koch (with its var. *tomentosa* accepted as the separate *S. hacquetii* Fenzl & K. Koch), however, a relationship of these species is uncertain. *Spiraea baldschuanica* was not introduced into gardeners' culture, though it is rather attractive and suitable for considerable dry sites. It has been rarely offered by botanicals gardens of the former USSR in the framework of an international seeds exchange, so that it can be cultivated in the world rather as a botanical rarity. Like this it was obtained in Košice BG, from where a few plants were propagated vegetatively for the Průhonice DG in 1985. From this material only two vital plants in the authors' private garden at Doubravčice near Kostelec n. Č. L. thrive nowadays.

21 Spiraea baldschuanica

Spiraea trichocarpa Nakai (1909)

A species native of northern Korea, where was discovered in 1902 and introduced into England by E. H. Wilson in 1917 from the Diamant Mountains (BEAN 1981). Later it was found also in two provinces of E China. The species is considered to be closely related to Japanese *Spiraea nipponica* (cf. REHDER 1958) but its compound inflorescence it shares with members of the sect. *Calospira* (cf. YÜ & LU 1974). From this viewpoint, the couple seems to represent a transition between (rather artificially circumscribed) sections *Calospira* and *Chamaedryon* of the genus. *Spiraea trichocarpa* is horticulturally a very valuable, abundantly blossoming large shrub, suitable to plant out singly or on margins of higher growths. It is mentioned from Průhonice since 1932. Recently it is cultivated in the regions under observation in most of arboreta and botanical gardens represented by more morphotypes or provenances, rarely is found in castle parks, too. It could be used more frequently for park and garden plantings.

ED of *Spiraea trichocarpa*:

Clone: Průhonice DG FIRST-RATE

I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII
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8 years

Longest period of blossoming: 28 days Blossoming richness: 3B

Height in 4 & 8 years: 150 & 220 cm Frost tolerance: 5

Width in 4 & 8 years: 200 & 300 cm

Rather large and dense shrub of an elegant habitus with arching branches.

Spiraea canescens D. Don (1825)

A species native of the Himalayan region, including the SE bordering mountain ranges from north Pakistan and Kashmir as far as the Chinese province of Sichuan. It was introduced into W Europe in 1837 (REHDER 1958, BEAN 1981) and probably it was widely used in garden culture, where it has participated on interspecific hybrids origination, in particular with two representatives of the section *Spiraea*. The species forms tall shrubs that are attractive by their long arching shoots with densely arranged floriferous twigs. *Spiraea canescens* **var. *myrtifolia*** Zab. (1893), with its more narrow leaves, is often differentiated in culture. It was described on the basis of plants from a culture of an unknown origin. This variety has a lower taxonomic value and represents probably an individual variation of the species only. YÜ & LU (1974) include this taxon under the **var. *glaucophylla*** Franch. (1889), occurring in Yunnan and Sichuan. In general, during the past decades *S. canescens* has receded in the culture and was replaced by several Chinese species, comparable as to the abundance of their flowering, e.g., by *S. veitchii* (cf. BEAN 1981). *Spiraea canescens* was documented from Bohemia by herbarium specimens, collected by A. Roth under the name of *S. nepalensis* hort. or *S. argentea* hort. in 1844–1857 in a nursery at the Červený Hrádek (Rothenhaus) castle near Jirkov near Chomutov. On the basis of the list of the castle park woods and plant catalogues of the Dendrological Society (SVOBODA et al. 1967) was found that it was cultivated also at Průhonice during the years 1927–1941. Later evidence from Bohemia or Moravia was not found nor was the species with surety found recently anywhere in culture. In the climatic conditions of the Czech countries it can be expected that shrubs of this species will freeze partially during some winter seasons and probably due to this cause this species became extinct here. A clone obtained in 1980 from an English firm Hillier under the name of "*Spiraea calcicola*", that is close morphologically to *S. canescens*, is cultivated successfully in the Průhonice DG for more than 20 years, however, it could have been influenced by a spontaneous interspecific hybridization (occurrence of lobed leaves on vigorous shoots). It is possible to exclude its appurtenance to a very different species, *S. calcicola* W. W. Smith (the authors have studied this species in nature in two areas of the Chinese province of Yunnan). On the basis of a herbarium specimen from 1953 was revealed that the true *S. canescens* was cultivated in Slovakia in the Mlyňany Arboretum, however, lately it was found neither there nor anywhere else.

22 Spiraea trichocarpa

23 Spiraea canescens

Spiraea sargentiana Rehd. (1913)
= *S. canescens* D. Don. var. *sulfurea* Diels (1900)

A species native of SW China in Sichuan and Yunnan provinces, from where was introduced into Europe by E. H. Wilson in 1909 (REHDER 1958, BEAN 1981) and already in 1910 cultivated at Průhonice, yet was not found there in the 1960's. It is also documented by herbarium specimens from the castle park at Lednice in southern Moravia from the 1920's, and later from Křtiny Arboretum in the 1950's. In Slovakia, it is documented from the Mlyňany Arboretum from 1949, and was found by the authors there in 1983 when was propagated vegetatively for the Průhonice DG. It was also found in the Košice BG in 1985. However, *Spiraea sargentiana* is generally in recent times very rarely cultivated species in our countries and abroad probably too. The species is horticulturally valuable as an ornamental shrub of a middle growth with mostly abundant blossoming.

ED of *Spiraea sargentiana*:

Clone: Mlyňany Arboretum (1983) VALUABLE

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| I | II | III | IV | V | VI | VII | VIII | IX | X | XI | XII |
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6 years

Longest period of blossoming: 30 days Blossoming richness: 2B

Height in 4 & 6 years: 170 & 180 cm Frost tolerance: 5

Width in 4 & 6 years: 200 & 240 cm

Rather dense, arch-like branched shrub with fine foliage and branching texture; sometimes suffers from browsing by game during winter season.

Spiraea henryi Hemsl. (1887)

A species native of SW to central China, where was discovered by A. Henry near Ichang, Hubei province, in 1885. It was introduced into Europe by E. H. Wilson in 1900 (BEAN 1981). It has been mentioned from Průhonice since 1923. Recently it is cultivated in the regions under observation in most of arboreta and botanical gardens represented by more morphotypes or provenances, rarely is found in castle or urban parks and gardens, too. *Spiraea henryi* is horticulturally a very valuable, abundantly blossoming large shrub, suitable to plant out singly or on margins of higher growths.

ED of *Spiraea henryi*:

Clone: Průhonice DG FIRST-RATE

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| I | II | III | IV | V | VI | VII | VIII | IX | X | XI | XII |
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8 years

Longest period of blossoming: 35 days Blossoming richness: 3B

Height in 4 & 8 years: 180 & 240 cm Frost tolerance: 5

Width in 4 & 8 years: 220 & 320 cm

Large, dense, arch-like branched shrub, slightly offshooting; sometimes suffers from browsing by game during winter season.

Spiraea wilsonii Duthie (1906)

A species native of SW to central China, which was introduced into Europe by E. H. Wilson from Hubei province in 1900 (BEAN 1981). The species is related and its geographic range is close to *Spiraea henryi*, and is utilizable also similarly, as a large shrub decorative during flowering. In Bohemia, it was mentioned from Průhonice for the first time in 1923. Recently it is cultivated in our countries only rarely in arboreta (Průhonice DG, Mlyňany Arboretum). It would be proper to extend its cultivation to urban or castle parks.

24 Spiraea sargentiana

25 Spiraea henryi

26 Spiraea wilsonii

ED of *Spiraea wilsonii*:

Clone: England, Hillier Nursery (1970's) FIRST-RATE

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                 .............  ---=====----
| I | II | III | IV | V | VI | VII | VIII | IX | X | XI | XII |
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8 years

Longest period of blossoming: 37 days Blossoming richness: 3B

Height in 4 & 8 years: 210 & 230 cm Frost tolerance: 5

Width in 4 & 8 years: 240 & 400 cm

Spreading, dense, somewhat arch-like branched shrub, slightly offshooting; sometimes suffers from browsing by game during winter season.

Spiraea veitchii Hemsl. (1903)

A species native of SW to central China, where was discovered by E. H. Wilson in 1900 in Hubei province and introduced into Europe for the Veitch firm (BEAN 1981). The species is valuable as a conspicuously tall shrub, abundantly blossoming, suitable to plant out singly or on margins of higher growths. It reaches the maximum height among all species of the genus, up to more than 5 m. For instance, the authors observed shrubs up to about 6 m high in rather dense forest near the Yanzi Pass in Shennongjia Co., W Hubei, or a large population of shrubs about 4–5 m height in Jiulong Co., W Sichuan. In Bohemia, the species has been mentioned from Průhonice since 1923. Recently it is cultivated in the regions under observation in arboreta and botanical gardens represented by more morphotypes or provenances, rarely is found in castle parks, too.

ED of *Spiraea veitchii*:

Clone: Bratislava BG (1983) VALUABLE

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| I | II | III | IV | V | VI | VII | VIII | IX | X | XI | XII |
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8 years

Longest period of blossoming: 38 days Blossoming richness: 3A

Height in 4 & 8 years: 240 & 300 cm Frost tolerance: 5

Width in 4 & 8 years: 200 & 260 cm

Tall, middle dense, elegantly erectly branched shrub with arch-like upper parts of branches; sometimes suffers from browsing by game during winter season.

Spiraea miyabei Koidz. (1909)

A species described from Japan, where it grows rarely in N Honshu and S Hokkaido (OHWI 1984). Similar plants that occur in Korea were described as *Spiraea sylvestris* Nakai (1915), that is considered to be conspecific (cf. REHDER 1949, 1958, YÜ & LU 1974). Variable plants grow in SW to central China that are also classified as belonging to this species, however, not to its typical variety, since they were described by REHDER simultaneously in 1913 as three taxa in the varietal rank, under the names of the **var. *glabrata*** Rehd., **var. *pilosula*** Rehd. and **var. *tenuifolia*** Rehd. The first two were described from W Hubei, the third one from Sichuan; besides that the first one is also mentioned from the Shaanxi province and the second one from Sichuan and Yunnan as well (YÜ & LU 1974). In our opinion, this taxa group (that is without any doubt also close to the partially sympatric couple *S. longigemmis* Maxim. and *S. rosthornii* Pritz.) represents one of the most relevant taxonomic problems among species of the genus *Spiraea* in SE Asia. REHDER (1913) states, at the description of his varieties, that he was "unable to separate the material from China specifically from *S. miyabei*", that was available to him in two samples from Hokkaido. The authors studied this species population both in Japan, in the Hidaka mountain range in Hokkaido in August 1997, and in China, in the Shennongjia mountain range in W Hubei in 1995.

27 Spiraea veitchii

The Hidaka population, that, on the basis of Flora of Japan (OHWI 1984), cannot be determined otherwise than as *S. miyabei*, is different from all spireas that were ever seen by the authors – the leaves are up to 11 cm long, lanceolate, long acuminate, doubly, deeply (to 1–1.5 cm from the margin) sharply serrate and with buds to about 5 mm long, narrowly pointed and covered by two soft scales. By comparison, the plants studied from W Hubei have shallowly doubly serrate leaves and, in general, they are similar to *S. rosthornii* (that was not mentioned from Hubei), from that they differ in particular by short buds. It will be possible to solve the taxonomic problem of this group only by studying the extensive material and probably using the up-to-date analytic methods. So far, it seems that differences in buds character of this group can be of lower taxonomic importance than in case of some other species (e.g., *S. mollifolia*, *S. nipponica*, *S. canescens*, *S. trichocarpa*, etc.), and lower than assumed up till now. Then it would be necessary to reevaluate the species definition. However, it is probable that the Japanese and Chinese plants that have been classified as *S. miyabei* up till now are not conspecific. This would also be suggested by an extensive gap in their distribution area, representing about 2500 km.

Typical Japanese plants have not been probably introduced into culture so far, while the Chinese var. *glabrata* and var. *pilosula* were allegedly introduced into culture already before their description in 1907 (REHDER 1958). However, even these are represented in the culture exceptionally only and they are not mentioned in culture in Britain (cf. BEAN 1981). *Spiraea miyabei* was reported from Průhonice in the years 1923–1941 as the var. *glabrata*, that was obtained originally from the German firm of Hesse-Weener, however, later it was neither mentioned nor found here nor anywhere else in the Czech countries. Seeds under the name of *S. miyabei* were sown as late as in 1986 (obtained by international seeds exchange) and several plants were grown from them in the Průhonice DG. Taxonomic appurtenance of these plants is controversial, since the shrubs have not developed well. This species is mentioned in Slovakia (without varieties differentiation) in a new list of the Mlyňany Arboretum plants (TÁBOR & TOMAŠKO 1992) in new areas, however, it was not found there, the determination was probably wrong. *Spiraea miyabei* was obtained by international seeds exchange around 1980 in the Košice BG, where the authors found (1985) one plant with narrowly cuneate leaves, closest to the var. *pilosula*.

Spiraea longigemmis Maxim. (1879)

A species native of Central and SW China, where it was recorded from the Shaanxi, Gansu, Sichuan and Yunnan provinces (YÜ & LU 1974), however, the authors found it also in S Xizang (near Nyingchi) in 1992. The species is related to *Spiraea rosthornii* Pritz. and certainly to the Chinese representatives of *S. miyabei*, though the latter species was classified by YÜ & KUAN (1963) to another series of the genus. *Spiraea longigemmis* was introduced into Europe probably in 1887 (REHDER 1958), but, in general, it is missing in culture at the present time, though it is attractive and flowers abundantly (cf. BEAN 1981). In the Czech countries it was cultivated in the Průhonice CP already before 1927 and by the Dendrological Society in 1927–1940, from where it was distributed to some nurseries (e.g., to Žehušice, on the basis of a plant catalogue from 1936). Recently, only one morphotype very close to this species was found here in the Kostelec Arboretum in 1984. A record about its cultivation in Slovakia was found in the Košice BG in 1984 only, however, it was not confirmed there and probably it has not identified correctly, either.

Spiraea rosthornii Pritz. (1900)

A species native of SW and central China eastwards to the Anhui province (YÜ & LU 1974), though European authors have mentioned it for W or SW China only (e.g., REHDER 1958). It is very closely related to and partly sympatric with *Spiraea longigemmis*. Both the species was sometimes confused in herbaria or in culture, because differentiation of some plants is problematic, and, regarding the leaves shape variation of both taxa, it is limited actually to the presence or incomplete absence of indumentum. To treat this two taxa as separate species is probably overvalued. *Spiraea rosthornii* was introduced into Europe by E. H. Wilson from W Sichuan in 1909 (BEAN 1981). It is not really attractive as an ornamental shrub and usually it is cultivated in dendrological collections only. In Průhonice it was cultivated already in 1910. Recently, the species is cultivated in the Czech countries in the Průhonice DG in several provenances and also in the Kostelec Arboretum (originally from the Tallinn Botanical Garden, Estonia) and in the Brno Arboretum; in Slovakia in the Mlyňany Arboretum and the Košice BG.

28 Spiraea miyabei varieties

29 Spiraea longigemmis

30 Spiraea rosthornii

ED of *Spiraea rosthornii*:

Clone: Brno Arboretum (1983) INSIGNIFICANT

6 years

Longest period of blossoming: 48 days Blossoming richness: 1–2B

Height in 4 & 6 years: 170 & 180 cm Frost tolerance: 5

Width in 4 & 6 years: 220 & 280 cm

Middle dense, broad shrub, with somewhat disarranged branches; suffers from browsing by game during winter season.

Spiraea bella Sims (1823)

A dioecious species native of the Himalayan region from Kashmir eastwards to the Chinese province of Yunnan. It was introduced into Europe from Nepal already about 1820 and allegedly distributed in garden culture of the 19th century (BEAN 1981) in spite of its rather low attractiveness and insufficient frost tolerance in more cool regions of Europe. On the basis of old herbarium evidences both from the Czech countries and from abroad we can assume that various species and clones were cultivated in garden culture in the past (mostly from the end of the 19th century to World War II) under the name *Spiraea bella*, though they were quite often very different and unrelated. Therefore, at the present time it is difficult to determine the scope of cultivation of the true *S. bella*. From Bohemia, the species is surely documented by herbarium specimens collected before half of the 19th century in Praha and in a nursery at the Červený Hrádek (Rothenhaus) castle near Jirkov near Chomutov (1845). However, neither herbarium evidence has been found from later times, nor from the 20th century, when the species was mentioned, e.g., in the Průhonice CP from the 1920's. Also recently, any typical living plants have not been found in the Czech countries and Slovakia as well. A dwarf, compact and entirely unflowering clone has been cultivated under the name *S. bella* in the past decades, that has probably originated as a bud mutation of some spontaneous *S. bella* hybrid somewhere in culture. It is described below as a new cultivar put under the generic name.

Note:
Another Himalayan dioecious, closely related species, ***Spiraea expansa*** Wall. ex K. Koch (1853), often given as *S. amoena* Spae, was introduced into Europe in 1843 (REHDER 1958). It was mentioned to be cultivated at Průhonice in years 1923 to 1941, and, probably mistakenly, in the Mlyňany Arboretum in 1992. Also this species is not sufficiently frost-hardy in our climatic conditions. Any living plant and even neither herbarium evidence of the species have not been found from the regions under observation.

Spiraea decumbens W. Koch (1831)

A species native of Europe in a limited area of SE limestone Alps from south Dolomites to Carnian and Julian Alps in the Italian territory with a small overlap to Slovenia. The species forms two varieties, one typical, represented by glabrous plants in a smaller eastern part of the area and by the more extensively distributed **var. *tomentosa*** Poech (1844), represented by tomentose plants with less serrate and often more narrow leaves. *Spiraea decumbens* var. *tomentosa* was often mentioned as a separate species in the past, either under the name of *S. hacquetii* Fenzl & K. Koch or as *S. lancifolia* Hoffmannsegg (the latter name was used for this taxon, e.g., by REHDER, 1927, 1949, 1958, though its identity is dubious – cf. SCHNEIDER 1905, ADOLPHI 1995), and in the last decades also as *S. decumbens* subsp. *tomentosa* (Poech) Dostál (cf. ADOLPHI 1995). Taking into consideration the insufficiently differentiated range of distribution and occurrence of deficiently clear-cut or transitive morphotypes, it seems that is better to accept this taxon in the varietal than subspecific rank. *Spiraea decumbens* forms dwarf procumbent shrublets up to 25 cm high with underground suckers, growing on limestone rocks and scree. It is an imperfectly dioecious species, the only one known outside the Himalayan region and one of the dwarfest natural species in the world. In Europe it is the only autochthonous species from the section *Calospira*.

31 Spiraea bella

32 Spiraea decumbens var. decumbens

33 Spiraea decumbens var. tomentosa

Spiraea decumbens has been cultivated since 1830, the var. *tomentosa* since 1885 (REHDER 1958). In culture it is necessary to protect it before plants with stronger growth capacity and cultivate it on sunny sites, while limestone substratum does not seem to be necessary; plants with pistillate flowers are more attractive. It is suitable for rock gardens and for low ornamental walls as well as for the lowest flower beds, together with perennials. The species was reported from the Czech countries to be cultivated rarely in rock gardens and in gardens at the beginning of the 20th century (POLÍVKA, DOMIN & PODPĚRA 1928), however, it has not appeared in the later Czechoslovak flora monographs. The oldest found herbarium evidence (of the typical variety) comes from a garden at Krč in Praha from 1911. In the years 1924 to 1932 the species was cultivated in the Průhonice CP (probably in the rock garden) and it was propagated in gardens of the Dendrological Society but it has not been mentioned here after World War II. At the beginning of the 1990's the species was newly imported in its typical variety from the Netherlands and from Germany to the Průhonice DG and it is also cultivated in the authors' private garden for several years. The former author brought offshoots of the plants of the var. *tomentosa* from a locality on the upper flow of the Piave river between Pieve di Cadore and Longarone in Belluno Prov. in October 1993. Plants that have grown from them were planted out to a rock garden in the Průhonice CP where they have remained until now. In Slovakia the species was neither recorded nor found.

Spiraea hayatana H. L. Li (1952)

A species endemic in the central mountain range of the Taiwan Island, where it occurs in altitudes between 3000 and 3500 m. It is closely related to *Spiraea formosana* Hayata (1911), that is also endemic in the Taiwanese mountains and allied to *S. japonica* L. fil. Both the Taiwanese taxa were accepted as a single species (YÜ & LU 1974), but it seems not to be rightfully. *Spiraea hayatana* is a low erect shrub, in nature hardly 0.5 m high, with rose flowers in dense inflorescences. Seeds of this species were collected by the authors in November 27, 1991, on eastern side of the Hsuehshan massif (3884 m, the second highest peak of the island) at the altitude of 3100 m. Seeds were sown in spring 1992, grown plants planted out in the Průhonice DG, where have prosper more than 30 plants now. They still keep low growth (up to 50–80 cm high), which is one of the differences from *S. formosana* (in nature about 1.5 m high) that was studied by the authors in the same region in altitudes below 2500 m and found morphologically distinctly different. *Spiraea hayatana* was not probably introduced into garden culture before, however, it might be cultivated as a botanical collection material in some botanical gardens around the world. Its ornamental value is not important really, nevertheless it could be used for rock gardens especially.

Spiraea japonica L. fil. (1781)

A species with considerable variation and extensive range of natural distribution in SE Asia. Its typical variety occurs in Japan only, from Hokkaido to Kyushu. However, the species shows a more extensive distribution in the Chinese territory, where it occurs in its central and south part (including the tropical area margin) represented by six native varieties (YÜ & LU 1974), from them the most extensively distributed in nature and known in culture are: **var. *acuminata*** Franch. (1886), **var. *fortunei*** (Planchon) Rehd. (≡ *S. fortunei* Planchon, 1853) and **var. *ovalifolia*** Franch. (1886). Together with a very close species, *Spiraea purpurea* Hand.-Mazz. (native of SW China and N Burma, missing in culture), *S. japonica* is exceptional for its usually deeply pink to dark red flower colour, that in case of this genus occurs only in two American species of the section *Spiraea*, too. For this reason *S. japonica*, as the only cultivated species with red flowers in corymbose inflorescences and the only one tolerant of dry habitats, has an exceptional position and, above all, an unreplaceable ornamental value among spireas in culture. The largest number of cultivars and cultural hybrids was grown and has been cultivated from this species. The oldest cultural varieties have originated from the old garden culture in Japan – that are, above all, 'Albiflora' and 'Bullata', both of them have been cited in the late literature as separate species (e.g., REHDER 1958), however, in the new concept they are cultivars, since they are not known from nature (cf. BEAN 1981, OHWI 1984). The first plants that were sent to Europe by R. Fortune in 1849 or 1850 from China belonged to the tall var. *fortunei*, while the Japanese plants were imported for the first time before 1864 in the low, white-flowered cultural variety 'Albiflora' (BEAN 1981). Both the other mentioned Chinese varieties were introduced into Europe in 1908 (REHDER 1958). In the old literature, in particular in the 19th century and in horticulture still at the beginning of the 20th century, this species was cited under the synonym of *S. callosa* Thunb., later by three years, and in culture represented either by the var. *fortunei* or perhaps by the typical variety. Besides this a part of low growing cultivars of *S. japonica* was classified beforehand under *S. bumalda* Burvénich (resp. *S.* ×*bumalda*), a hypothetical hybrid between

34 Spiraea hayatana

35 Spiraea japonica var. fortunei

Spiraea japonica and *S. albiflora* (Miq.) Zab. (= *S. japonica* 'Albiflora') of an unknown origin. *Spiraea* ×*bumalda* together with a group of ten cultivars was still accepted by KRÜSSMANN (1978), whose authority in the horticultural circles was the very reason why this concept is still used routinely.

Spiraea japonica in natural forms has been cultivated sporadically in the Czech countries and in Slovakia already since the end of the 19th century, recently rather rarely only in some arboreta or botanical gardens (e.g., Průhonice CP, Arboretum Mlyňany) and in castle or old urban parks (e.g., in Plzeň); in majority of cases these forms correspond to the var. *fortunei*, var. *acuminata*, or to the white-flowered var. *ovalifolia*. The interesting form of the var. *fortunei* has been cultivated in the Průhonice CP for a long time (see the drawing on the previous page) – it attains to a height of 1.6 to 2.2 m, has loosely spreading inflorescences which constitute the terminal branching system of flowering shoots up to 60 cm in diameter, minute pink flowers, and leaves up to 16 cm long, glaucous, conspicuously papillose and subglabrous beneath. *Spiraea japonica* is often cultivated in the form of many cultivars in various plantings, including strips along roads and highways. The most often cultivated cultivars are: 'Anthony Waterer', 'Atrosanguinea', 'Pruhoniciana' and 'Ruberrima', from the new ones 'Goldflame' and 'Little Princess' and from the newest ones, cultivated by horticultural firms in the Czech Republic during the last five to ten years **'Dart's Red'** (originated in Holland before 1970), **'Golden Princess'** (originated in England before 1985), **'Goldmound'** and **'Zigeunerblut'** (originated in Germany in the 1980's). In general, the group of forms and cultivars of *S. japonica* together with *S.* ×*vanhouttei* represents the most often cultivated spireas in the regions under observation.

ED of *Spiraea japonica* var. *fortunei*:

Clone: Mlyňany Arboretum (1983) INSIGNIFICANT

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                ..........          ----======----------
|  I  |  II  |  III  |  IV  |  V  |  VI  |  VII  |  VIII  |  IX  |  X  |  XI  |  XII  |
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6 years

Longest period of blossoming: 55 days Blossoming richness: 2–3B

Height in 4 & 6 years: 130 & 170 cm Frost tolerance: 5

Width in 4 & 6 years: 200 & 220 cm

Rather sparse shrub, erectly branched initially, later turning broadly wide-branching.

Brief characteristics and a survey of evaluation data of the individual cultivars of ***Spiraea japonica*** found or mentioned in the Czech countries or Slovakia, listed in an alphabetical order, are specified below.

- **'Albiflora'**

A cultivar comes from the old Japan garden culture but of unknown origin, introduced into France before 1864 (BEAN 1981). It was accepted by European and American authors until recently as a separate species, *Spiraea albiflora* (Miq.) Zab. (1878). But in Japan it is treated as a synonym, or part of the species variation respectively, of *S. japonica* (see OHWI 1984). Presumably, the taxon represents a dense white-flowered mutation of this species, found once in nature or culture in Japan and then propagated as a garden clone, thus a cultivar in conformity with today's nomenclature. In the regions under observation it has been cultivated probably since the end of the 19th century, recently mostly in dendrological collections, rather rarely in urban parks or gardens.

ED of *Spiraea japonica* 'Albiflora':

Clone: England, Hillier Nursery (1970's) VALUABLE

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                ...........         ---=======---------- --- --
|  I  |  II  |  III  |  IV  |  V  |  VI  |  VII  |  VIII  |  IX  |  X  |  XI  |  XII  |
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6 years

Longest period of blossoming: 112 days Blossoming richness: 2–3A

Height in 4 & 6 years: 70 & 90 cm Frost tolerance: 5

Width in 4 & 6 years: 100 & 130 cm Low, middle dense shrub with erect stout branches.

36 Spiraea japonica var. ovalifolia

37 Spiraea japonica ‘Albiflora’

- **'Anthony Waterer'**

A cultivar originated as a bud mutation on the clone corresponding to 'Bumalda' in Knap Hill Nursery in England not long before 1890 (BEAN 1981). It is characterized by bright crimson flowers and here and there by yellow or pale green variegated leaves. The cultivar was for long time the most extensive distributed clone of *Spiraea japonica*, and, together with cultivars 'Albiflora' and 'Coccinea', it represents one of the clones with the longest period of flowering. In the regions under observation it has been cultivated probably since the end of the 19th century, in recent years still frequently occurring mostly in older plantings in parks and gardens but with recession in propagation and planting now.

ED of *Spiraea japonica* 'Anthony Waterer':

Clone: Mlyňany Arboretum (1983) FIRST-RATE

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          .....          --=======---------- -- -- --
| I | II | III | IV | V | VI | VII | VIII | IX | X | XI | XII |
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6 years

Longest period of blossoming: 110 days Blossoming richness: 3A

Height in 4 & 6 years: 90 & 110 cm Frost tolerance: 5

Width in 4 & 6 years: 110 & 140 cm

Low, dense shrub, erectly branched initially, later turning wide-branching.

- **'Atrorosea'**

A cultivar described by Zabel in 1893 as one of hybrid forms between *Spiraea japonica* and "*S. albiflora*" found as a seedling of the latter parent. It should be of rather lower, dense growth with deep rose flowers. It seems that the cultivar has not been cultivated ever more frequently (cf. BEAN 1981), or it was confused with other cultivars. In our countries it was mentioned neither from Průhonice, but it was offered by some gardening firms (e.g., the Horák Nursery in Bystřice pod Host., 1939). Recently the identity of the clone is uncertain.

- **'Atrosanguinea'**

A cultivar described by Zabel in 1893, with dark rose flowers and redish young foliage. It was replaced long ago by more valuable clones. In the Czech countries it was formerly perhaps commonly cultivated but in recent years it has not been followed in detail in the regions under observation because it is identifiable problematically.

ED of *Spiraea japonica* 'Atrosanguinea':

Clone: Průhonice DG, Štípenka, 27/? INSIGNIFICANT

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          .....          -----====---------
| I | II | III | IV | V | VI | VII | VIII | IX | X | XI | XII |
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6 years

Longest period of blossoming: 55 days Blossoming richness: 2A

Height in 4 & 6 years: 110 & 140 cm Frost tolerance: 5

Width in 4 & 6 years: 160 & 240 cm

Dense shrub, erectly branched initially, later turning broadly wide-branching but still somewhat compact.

38 Spiraea japonica ‘Anthony Waterer’

- **'Bullata'**

A garden clone of unknown origin, cultivated long ago in Japan, from where it was introduced into England close before 1881 (BEAN 1981), and accepted for a long time as a separate species, *Spiraea bullata* Maxim. (1879). It represents probably a dwarf mutation, morfologically very different from all other forms of the species, conserved by vegetative propagation. Except for dwarf growth it is conspicuous by atypically shortened, minute and corrugate leaves and small dense inflorescences of bright crimson flowers. It is an interesting cultivar fitted for rock gardens and special garden designs. In the Czech countries it has been cultivated probably since the beginning of the 20th century, in recent years here and in Slovakia is found sometimes in botanical collections and private gardens.

ED of *Spiraea japonica* 'Bullata':

Clone: England, Hillier Nursery (1970's) INSIGNIFICANT

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                ..........          --===-=----- -- --- --
| I | II | III | IV | V | VI | VII | VIII | IX | X | XI | XII |
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6 years

Longest period of blossoming: 62 days Blossoming richness: 1–2B

Height in 4 & 6 years: 30 & 55 cm Frost tolerance: 5

Width in 4 & 6 years: 30 & 50 cm

Dwarf, dense, initially erectly branched, later roundish shrublet; sometimes suffers from browsing by game during winter season.

- **'Bumalda'**

A cultivar of unknown origin described by Belgian horticulturist F. Burvénich in 1891 as a separate species, *Spiraea bumalda*. The history of the cultivar was followed from its growing in Zürich, from where it was sent for the first time to England in 1885 (BEAN 1981). The original clone has a habitus similar to the cultivar 'Albiflora' but with carmine-pink flowers. For its morphology it was considered as a hybrid between the latter and *S. japonica* proper, in the time when 'Albiflora' was accepted as a separate species. ZABEL (1893) and BEAN (1981) mention that the original clone had some leaves "edged or marked with yellow". In the older horticultural literature, under the name *S. bumalda*, a group of lower cultivars of *S. japonica* was included, but sometimes another collective name, *S. pumila* Zab., was used. The only herbarium evidence from our countries, fully corresponding with the original clone description, was found from the castle park at Lednice in S Moravia from 1900. Recently the identity and distribution of the clone is uncertain considering a big number of similar cultivated clones and forms originated sometimes also by generative way. In the recent twenty years, however, no living plants corresponding with the original description or identical with mentioned herbarium specimen have been found.

- **'Coccinea'**

A cultivar originated as a mutation from 'Anthony Waterer' probably in Holland before the year 1950, different by lighter flowers, and less valuable. In the Czech countries it was sometimes propagated by horticultural firms in the 1970's. Recently it has not been followed in the regions under observation because of its similarity with other cultivated forms.

ED of *Spiraea japonica* 'Coccinea':

Clone: England, Hillier Nursery (1970's) INSIGNIFICANT

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                ..........          --========-------- --- -- ---
| I | II | III | IV | V | VI | VII | VIII | IX | X | XI | XII |
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6 years

Longest period of blossoming: 110 days Blossoming richness: 2A

Height in 4 & 6 years: 90 & 110 cm Frost tolerance: 5

Width in 4 & 6 years: 110 & 140 cm

Low, dense shrub, erectly branched initially, later turning wide-branching.

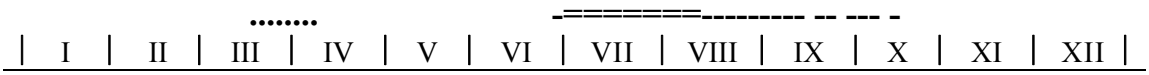
39 Spiraea japonica ‘Bullata’

- **'Crispa'**

A cultivar originated in the German firm Hesse (Oldenburg) in 1923 (KRÜSSMANN 1978) probably from 'Anthony Waterer' as a deviation with conspicuous, deeply incisely and curly serrate leaves (in the same way yellowish variegated). It blossoms less abundantly and grows rather slightly, so it is not so much valuable. In our countries it has been cultivated since the 1930's, recently more sparsely, in some urban parks or gardens.

ED of *Spiraea japonica* 'Crispa':

Clone: Průhonice DG INSIGNIFICANT



6 years

Longest period of blossoming: 105 days Blossoming richness: 2B

Height in 4 & 6 years: 70 & 100 cm Frost tolerance: 5

Width in 4 & 6 years: 80 & 120 cm

Low, middle dense, somewhat erectly branched shrub; its dry leaves partly persistent after winter to spring.

- **'Froebelii'**

A cultivar distributed by K. O. Froebel from Zürich before 1894 (BEAN 1981). It is characterized by stout growth and abundant (but relatively short) blossoming of bright crimson colour. It represents one from the most frequently cultivated and valuable clones of the species. In the Czech countries it has been cultivated since the beginning of the 20th century, recently rather underestimated, and, as some other older valuable cultivars, replaced by modern clones, mostly by 'Goldflame' which is of similar habitus but slightly less blossoming however with attractively coloured foliage.

ED of *Spiraea japonica* 'Froebelii':

Clone: Průhonice DG FIRST-RATE

6 years

Longest period of blossoming: 75 days Blossoming richness: 3A

Height in 4 & 6 years: 110 & 130 cm Frost tolerance: 5

Width in 4 & 6 years: 180 & 260 cm

Dense shrub, erectly branched initially, later turning compactly broadly wide-branching.

- **'Genpei'**

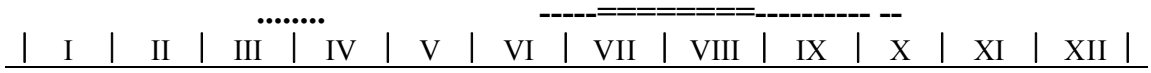
A modern cultivar originated from Japan, introduced into Europe (Holland) probably in the end of the 1970's. Initially it was called 'Shirubana' (or 'Shirobana'), but its original Japanese name is allegedly 'Genpei' (LOMBARTS 1999). The cultivar has not been given by KRÜSSMANN (1978), neither by BEAN (1981). It was introduced into the Průhonice DG from England in 1985 under the name 'Shirubana'. It is conspicuous by inflorescences of various colours from white to bright rose. In the Czech countries it is more and more popular with horticultural firms and used mostly in private gardens; in Slovakia is has not been found.

40 Spiraea japonica ‘Crispa’

41 Spiraea japonica ‘Froebelii’

ED of *Spiraea japonica* ‘Genpei’:

Clone: England, Hillier Nursery (1985) INSIGNIFICANT



6 years

Longest period of blossoming: 105 days Blossoming richness: 2B

Height in 4 & 6 years: 70 & 90 cm Frost tolerance: 5

Width in 4 & 6 years: 100 & 130 cm

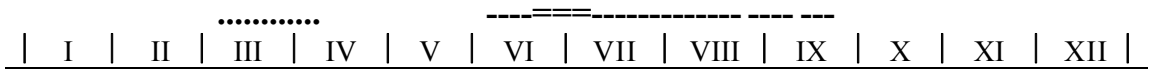
Low, dense shrub, erectly branched initially, later turning roundish wide-branching; young foliage of some shoots reddish.

- **‘Goldflame’**

A cultivar originated allegedly in Royal Botanic Garden in Hamilton, Ontario, Canada, in 1960 (VERSTL 1998), introduced into Europe in 1972 by F. J. Grootendorst in Dutch Boskoop (KRÜSSMANN 1978). It represents a sport from ‘Anthony Waterer’ (LOMBARTS 1999), but the cultivar is more similar to the clone ‘Froebelii’. The cultivar is very conspicuous by bronze coloured foliage with changing hue of red from the flush to late autumn. Recently it is fairly frequently used in the Czech countries in urban strip plantings or gardens.

ED of *Spiraea japonica* ‘Goldflame’:

Clone: Germany, Kordes Nursery (1982) FIRST-RATE



6 years

Longest period of blossoming: 57 days Blossoming richness: 2–3A

Height in 4 & 6 years: 80 & 120 cm Frost tolerance: 5

Width in 4 & 6 years: 140 & 200 cm

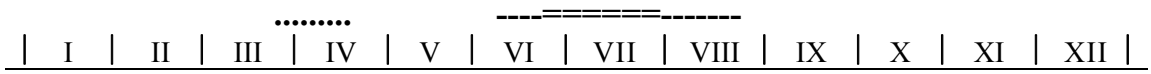
Rather low, dense shrub, erectly branched initially, later turning compactly wide-branching; foliage red initially, orange to gold during summer and more dark since the beginning of October.

- **‘Little Princess’**

A modern cultivar originated probably in the English firm L. R. Russell in Windlesham (KRÜSSMANN 1978), but distributed by Dutch firms in Boskoop around 1953 or possibly risen in Holland from plants identified as “*Spiraea japonica alpina*” (BEAN 1981). It is fitted for carpet plantings on sunny sites or for rock gardens. In our countries it is recently in favour for low urban plantings.

ED of *Spiraea japonica* ‘Little Princess’:

Clone: Germany, Schmidt Nursery (1970’s) FIRST-RATE



6 years

Longest period of blossoming: 56 days Blossoming richness: 2–3A

Height in 4 & 6 years: 60 & 90 cm Frost tolerance: 5

Width in 4 & 6 years: 100 & 160 cm

Low, dense shrub, erectly branched initially, later turning compactly broadly wide-branching.

42 Spiraea japonica ‘Little Princess’

- **'Macrophylla'**

A cultivar described by Zabel in 1893 as *Spiraea japonica* var. *macrophylla*, grown from seeds and introduced into culture by the firm Simon-Louis in France before 1866 under the name "*S. Fortunei macrophylla*" (REHDER 1949). It is conspicuous by broad inflated leaves, but is only poorly blossoming, interesting rather as a botanical rarity than a decorative shrub and then cultivated sparsely. In the Czech countries it has been cultivated since 1923 at Průhonice, recently only very rarely in dendrological collections; in Slovakia it has not be found.

ED of *Spiraea japonica* 'Macrophylla':

Clone: Brno Arboretum (1983) INSIGNIFICANT

I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII
		.....			--- -- ---==- -- --						

6 years

Longest period of blossoming: 38 days Blossoming richness: 1B

Height in 4 & 6 years: 100 & 120 cm Frost tolerance: 5

Width in 4 & 6 years: 100 & 140 cm

Shrub of rather disarranged habitus, sparsely, erectly branched initially, later turning wide-branching; suffers from browsing by game during winter season.

- **'Nana'**

A dwarf cultivar of unknown origin often confused with *Spiraea japonica* var. *alpina* Maxim. (1879) which was described from nature in Japan representing probably only individual dwarf form not given in modern literature (cf. OHWI 1984). However, similar forms or clones were cultivated already in ancient Japan (MAXIMOWICZ 1879), and one of them could be introduced into Europe and called 'Nana'. The cultivar is fitted only on fully sunny sites without competition of other plants, best for rock gardens or carpet plantings. It is similar to 'Little Princess' but it reaches approximately half size in the same age. In our countries it seems to be somewhat less distributed, mostly used in private gardens.

ED of *Spiraea japonica* 'Nana':

Clone: England, Hillier Nursery (1970's) VALUABLE

I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII
		.....			---======	-------					

6 years

Longest period of blossoming: 68 days Blossoming richness: 2B

Height in 4 & 6 years: 35 & 40 cm Frost tolerance: 5

Width in 4 & 6 years: 70 & 80 cm

Dwarf, very dense shrub of compact roundish habitus.

- **'Pruhoniciana'**

A cultivar grown by F. Zeman in a garden of the Dendrological Society at Průhonice in 1913 as a alleged hybrid between *Spiraea japonica* var. *ovalifolia* Franch. and *S. bumalda* 'Anthony Waterer'. The cultivar was described in the rank of species as *S. pruhoniciana* Kriechbaum (1925), however, by Rehder accepted with Zeman's authorship in 1940 (see REHDER 1958), and subsequently reduced to *S. bumalda* f. *pruhoniciana* (Zeman) Rehd. (1945). In plant catalogues of the Dendrological Society from 1928 and later the cultivar is given as *S. pruhoniciana* and described as a compact shrub about 60 cm high, with bright rose flowers in large inflorescences and with foliage geting tinged beautifully red in autumn. The original cultivar is hardly cultivated in west Europe in recent times, though perhaps it had been distributed by some nurseries abroad before World War II. KRÜSSMANN (1978) mentions, that this clone is similar to 'Anthony Waterer' but is only 50 cm high.

The mentioned descriptions of the original clone considerable differentiate from plants cultivated under the name *Spiraea bumalda* 'Pruhoniciana' at Průhonice and elsewhere in the Czech countries in

last decades. The oldest plants whose are at disposal under the name in question at Průhonice grow in the castle park near the castle (part 5), where were planted out in 1960. These plants were 0.8 m high after about five years (SVOBODA et al. 1967), now they are too old, partly in shadow, and reach up to 1.7 m. Nowadays, it is supposed that the original clone reproduced spontaneously by seeds, probably in years of World War II or a few years after. Plant originated in this way was propagated vegetatively later by mistake under the original name, though it markedly shifted morfologically from the original clone and is more close to *S. japonica* var. *ovalifolia*. That is the reason why the clone cultivated after World War II is described as a new cultivar below.

- **'Ruberrima'**

A cultivar described by Zabel in 1893, characterized by deep rose flowers and compact growth. It is one of successful clones of the 19th century. Its present distribution in our countries is not known with regard to its similarity to other clones or forms originated by generative way. It is certainly represented in many older plantings.

ED of *Spiraea japonica* 'Ruberrima':

Clone: England, Hillier Nursery (1970's) VALUABLE

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          .....      ----====----------
| I | II | III | IV | V | VI | VII | VIII | IX | X | XI | XII |
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6 years

Longest period of blossoming: 57 days Blossoming richness: 2–3A

Height in 4 & 6 years: 110 & 140 cm Frost tolerance: 5

Width in 4 & 6 years: 160 & 220 cm

Dense shrub, erectly branched initially, later turning compactly wide-branching.

- **'Walluf'**

A cultivar originated in the German firm Goos & Koenemann at Niederwalluf am Rhein (near Wiesbaden) before 1930 as a more lightly flowering mutation from 'Anthony Waterer'. It was apparently horticulturally less valuable cultivar whose cultivation stopped after World War II (it is not mentioned to be cultivated in Britain, cf. BEAN, 1981). In our countries it was cultivated at Průhonice between 1924–1941. It is possible that it was propagated later, perhaps under an incorrect name. Recently the identity of the clone is uncertain.

Spiraea fritschiana Schneid. (1905)
= *S. japonica* L. fil. var. *typica* Gilg (1904)

A species native of central China to Korea, related to *Spiraea japonica*. It was introduced into Europe in 1919 (REHDER 1958). It is generally rare in culture, horticulturally less valuable as a decorative shrub unless some more abundantly blossoming individual would be selected for vegetative propagation. A few plants of the species were found by the authors in the Košice BG in the 1980's, cultivated under a mistaken name (*S. japonica* 'Albiflora'), originated from seeds obtained from Charkov, Ukraine, USSR. The plants were propagated vegetatively for the Průhonice DG, where two clones from that material have been cultivated up to now. The species was also found in collection of woody plants of Technical Horticultural School in Mělník in central Bohemia, probably reproduced from Průhonice.

43 Spiraea fritschiana var. fritschiana

44 Spiraea fritschiana var. microgyna

ED of *Spiraea fritschiana* var. *fritschiana*:

Clone: Košice BG (1985),
seeds from Charkov, Ukraine, USSR (sown 1976) INSIGNIFICANT

I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII
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6 years

Longest period of blossoming: 18 days Blossoming richness: 1B

Height in 4 & 6 years: 80 & 100 cm Frost tolerance: 5

Width in 4 & 6 years: 100 & 140 cm

Rather low and sparse shrub, erectly branched initially; very suffers from browsing by game during winter season.

Spiraea fritschiana var. *fritschiana* can be easily distinguished by sharply angled shoots, while the very similar morphotype with terete shoots was described as *Spiraea microgyna* Nakai (1915). On the basis of the former author's study of variation of the var. *fritschiana* in nature in Danfeng Co., Shaanxi and in Xinglong Co., Hebei, and also of knowledge of angled-shoot and terete-shoot morphotypes from cultivation, the latter is accepted here only in the rank of variety, as follows:

Spiraea fritschiana Schneid. **var. *microgyna*** (Nakai) Businský, **comb. et stat. nov.**
≡ *Spiraea microgyna* Nakai in Bot. Mag., Tokyo, 29: 79. 1915. – Type not designated.

This taxon was considered by REHDER (1949) as a synonym of *Spiraea fritschiana*, and it still remains very little known and seems to be endemic for Korea. It was illustrated in ANONYMUS (1974: Pl. 101). The taxon was revealed by the former author in October 1992 cultivated in the Mlyňany Arboretum (see the drawing in the previous page) from seeds collected by the expedition Korea 1985 (the plants had been planted out in May 1987). It has not been found anywhere in Slovakia or in the Czech countries but was also detected by the former author abroad, i.e., in the Botanical Garden at Salaspils near Riga in Latvia in 1989, originated from the Botanical Garden in Pyongyang (1976).

Spiraea betulifolia Pall. (1784)

A polymorphous species, or a group of closely related taxa in an alternative concept, differently classified by authors of flora monographs of particular regions where it is native. To this group the following taxa belong when accepted in the rank of species in a narrow sense (consistently with the concept of authors of the below cited publications), with a corresponding geographic distribution:

Spiraea betulifolia Pall., s. str. – Russian Far East from 125° E to N Kamchatka (SVJAZEVA 1980) southwards to central Honshu (OHWI 1984)

Spiraea beauverdiana Schneid. – Hokkaido, S Kuril Islands: Kunashir and Shikotan (SVJAZEVA 1980)

Spiraea aemiliana Schneid. – Hokkaido, S Kuril Islands northwards to Urup Island (SVJAZEVA 1980)

Spiraea stevenii (Schneid.) Rydb. – Russian Far East from Amur River basin (about 130° E) to Bering Strait and northwards to 70° N (SVJAZEVA 1980), Alaska and NW Canada (KARTESZ 1994)

Spiraea corymbosa Raf. (1814) – E part of North America from New York to Georgia and Kentucky (REHDER 1958)

Spiraea lucida Douglas ex Greene (1892) – W part of North America from British Columbia and Oregon, eastwards to South Dakota (REHDER 1958)

The three taxa, *Spiraea aemiliana*, *S. beauverdiana* and *S. beauverdiana* var. *stevenii*, was described by Schneider simultaneously in 1905 on the basis of single herbarium specimens and characterized by, in fact insignificant, diagnostic characters which we can found in variation range of a single population. Probably the only later work where these taxa are accepted parallelly as separate species was published by SVJAZEVA (1980). Any consistent taxonomic concept concerning whole group of pertinent taxa has not been published since the time of original description of the three taxa (cf. SCHNEIDER 1905). On the basis of a study of herbarium material of all six mentioned taxa of the group from nature, and also of

a field variation study of *S. betulifolia* s. str. and the taxon described as *S. aemiliana*, or *S. beauverdiana*, in the Hidaka and Taisetsuzan Mountains, in Hokkaido Island, and an additional knowledge of most taxa from culture, the former present author leans towards the following classification of the group:

Spiraea betulifolia (subsp. *betulifolia*) var. *betulifolia*

Spiraea betulifolia (subsp. *betulifolia*) var. *aemiliana* (Schneid.) Koidz.

= *Spiraea beauverdiana* Schneid., *S. stevenii* (Schneid.) Rydb.

Spiraea betulifolia subsp. *corymbosa* (Raf.) Taylor & MacBryde

Spiraea lucida Dougl. ex Greene (in detail see below)

Two other species belongs to the close relations: ***Spiraea virginiana*** Britt. (1890), native of SE U.S.A., never introduced to our countries, and *S. splendens* Baumann ex K. Koch (= *S. densiflora* Nutt. ex Rydb.) from western part of North America, mentioned below.

From *Spiraea betulifolia*, in the broader concept accepted here, the most distributed taxon in European garden culture was the East-American **subsp. *corymbosa***, introduced into Europe in 1819 (BEAN 1981, REHDER 1958), which participated on the origination of five cultural hybrids with *S. japonica* or species of the section *Spiraea*. The taxon was accepted as a subspecies of *S. betulifolia* already by ZABEL (1893) but his combination is invalid. Although *S. corymbosa* is given by DOSTÁL (1989) as a species rarely cultivated in Czechoslovak parks, its existence in our countries including Slovakia has been never confirmed. The quoted mention, taken over by ZAHRADNÍKOVÁ (1992) to the Flora of Slovakia, was probably based on wrongly determined material. The taxon was not mentioned neither from Průhonice. Likewise recently it has not been recorded nor found in the regions under observation.

The typical *Spiraea betulifolia* **var. *betulifolia*** was formerly generally rare in culture, though the time of its introduction into Europe is given 1812 (cf. BEAN 1981, REHDER 1958; whether these data concern the typical variety is uncertain). From the Czech countries *S. betulifolia* (believed that the typical one) was mentioned by the Dendrological Society at Průhonice from 1922 to 1941, and here also from the castle park in the 1920's, where it (the true var. *betulifolia*) has been handed down up to now. Recently the species is cultivated scatteredly in our countries, mostly in arboreta and botanical gardens, in more clones or provenances (e.g., Průhonice CP, Průhonice DG, Kostelec Arboretum, Brno Arboretum), in Slovakia it is mentioned in the Mlyňany Arboretum.

ED of *Spiraea betulifolia* var. *betulifolia*:

Clone: Průhonice CP, part 126 FIRST-RATE

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6 years

Longest period of blossoming: 47 days Blossoming richness: 3B

Height in 4 & 6 years: 70 & 90 cm Frost tolerance: 5

Width in 4 & 6 years: 90 & 140 cm

Low, middle dense, offshooting shrub with crooked branches; sometimes remontant (e.g., in the end of September 1988); sometimes suffers from browsing by game during winter season.

Spiraea betulifolia **var. *aemiliana*** is a dwarf shrublet, growing naturally in tundra communities, high altitudes and on extreme sites in higher latitudes. It keeps its dwarf growth also when is cultivated in warmer places of low altitudes. It is experimentally cultivated in the Průhonice DG (see the observation data below) but the plants do not blossom very much. In spite of that, it seems to be fitted for rock gardens and the lowest plantings. The variety is newly offered in the Horák Nursery in Bystřice pod Hostýnem in eastern Moravia (in the plant catalogue 1999). To Slovakia it was brought by the staff of the Mlyňany Arboretum from Kamchatka in 1990 under the name *S. stevenii*, and secondarily from Mlyňany to Průhonice.

45 Spiraea betulifolia var. betulifolia

46 Spiraea betulifolia var. aemiliana

ED of *Spiraea betulifolia* var. *aemiliana*:

Plant: USSR, Leningrad (seeds, 1985) INSIGNIFICANT

Longest period of blossoming: 25 days Blossoming richness: 2B

Height in 4 & 6 years: 45 & 50 cm Frost tolerance: 5

Width in 4 & 6 years: 70 & 90 cm

Dwarf, middle dense, offshooting shrublet; sometimes suffers from browsing by game during winter season.

In general, *Spiraea betulifolia* is now popular in Europe or Canada concerning its low growth, offshooting (other related taxa have both the characters too) and foliage get tinged beautifully red in autumn. At least three cultivars were introduced into cultivation (KRÜSSMANN 1978, LOMBARTS 1999), but two of them of Canadian origin are mentioned as hybrids. However, no cultivar of *S. betulifolia* has been found in the Czech countries or Slovakia.

Spiraea lucida Douglas ex Greene (1892)
= *S. betulifolia* Hook. (1834), nom. illeg.

A species native of western part of North America from British Columbia and Oregon to South Dakota eastwards. It is very close to *Spiraea betulifolia* in which it was included by some authors as a variety (e.g., BEAN 1981). It was introduced into culture in 1885 (REHDER 1958) being cultivated later rarely, mostly in dendrological collections, though it is a horticulturally valuable ornamental shrub. In the Czech countries it was very rare at all times; the oldest herbarium evidence was found from Praha (a garden at Krč) from 1911 and it was mentioned neither from Průhonice before World War II. Recently it was cultivated in the Brno Arboretum in the 1980's, from where was propagated vegetatively for the Průhonice DG in 1985. Some plants also grow here from seeds obtained from Frankfurt am Main in Germany. Except for this, a few vital shrubs of the species (originated from the Brno Arboretum) have been observed by the authors for ten years in their private garden at Doubravčice, near Kostelec n. Č. L., where spontaneous dissemination by seeds in the close vicinity frequently happens. In Slovakia the species has not been recorded nor found.

ED of *Spiraea lucida*:

Plants: Brno Arboretum (1985) VALUABLE

Longest period of blossoming: 37 days Blossoming richness: 2–3B

Height in 4 & 6 years: 80 & 90 cm Frost tolerance: 5

Width in 4 & 6 years: 120 & 160 cm

Low shrub with erect shoots, shaping dense tufts spreading by short suckers; sometimes remontant (e.g., in the end of September 1988); suffers from browsing by game during some winter seasons.

Spiraea splendens Baumann ex K. Koch (1875)
= S. *densiflora* Nutt. ex Torrey & Gray (1840), nom. inval.

A species native of western part of North America from British Columbia to California. In literature it is usually given under the name *Spiraea densiflora* Nutt. ex Rydb. var. *splendens* (K. Koch) C. L. Hitchc. (e.g., see BEAN 1981), or *S. densiflora* subsp. *splendens* (K. Koch) Abrams (see KRÜSSMANN 1978), but before *S. densiflora* and *S. splendens* were considered to be separate species (see REHDER 1927, 1949, 1958). In a modern concept these names represent taxonomic synonyms of the only species with the

47 Spiraea lucida

48 Spiraea splendens

correct name *S. splendens* (KARTESZ 1994). The species is very close to *S. betulifolia*, from which it conspicuously differs above all by rose flowers, as the only species of this group, so that it was also called *S. betulifolia* var. *rosea* Gray, e.g., by ZABEL (1893). It is a low shrub reaching the height of 0.5 to 1.2 m. It was introduced into culture before 1861 (BEAN 1981) but was always rare. Sometimes was confused with low cultivars of *Spiraea japonica*. The species is interesting above all dendrologically, also as a decorative shrub mostly for rock gardens; the bigger horticultural interest could represent taller forms which are not at disposal in culture. In the Czech countries the species has not been mentioned nor documented before recent times. In the 1980's it was found in the Brno Arboretum, from where was propagated vegetatively for the Průhonice DG, and in Kostelec Arboretum; in Slovakia it has not been found but was mentioned in the Mlyňany Arboretum (TÁBOR & TOMAŠKO 1992).

ED of *Spiraea splendens*:

Clone: Brno Arboretum (1983),
seeds from Trondheim, Norway — INSIGNIFICANT

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6 years

Longest period of blossoming: 60 days — Blossoming richness: 2–3B

Height in 4 & 6 years: 60 & 75 cm — Frost tolerance: 5

Width in 4 & 6 years: 80 & 130 cm

Low, dense shrub of roundish habitus, blossoming long but most of the time scarcely; sometimes remontant (e.g., in the middle of September 1988); suffers from browsing by game during some winter seasons.

Sect. *Spiraea*

Spiraea humilis Pojark. (1939)

A species native of the Far East, closely related to *Spiraea salicifolia* L., from which it differs by lower growth, broadly pyramidal inflorescences, shorter leaves and rusty tomentose indumentum. Its natural distribution takes a limited area, mostly lower basin of Amur river and besides the Sikhote Alin Mountains, Sakhalin Island and northwards forward occurrence around 58° N between the Aldan river and the Sea of Okhotsk (SVJAZEVA 1980). *Spiraea humilis* was not probably introduced into gardeners' culture, though it is possibly the only low species of spireas suitable for wet sites. It was cultivated in some botanical gardens of the former USSR, from where could be distributed abroad in the framework of an international seeds exchange. In this way it was obtained in the Průhonice DG from the Botanical garden in Riga.

ED of *Spiraea humilis*:

Clone: USSR, Latvian SSR, Riga (seeds sown in the 1970's) — VALUABLE

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6 years

Longest period of blossoming: 66 days — Blossoming richness: 2A

Height in 4 & 6 years: 80 & 90 cm* — Frost tolerance: 5

Width in 4 & 6 years: 110 & 130 cm* — Injury due to aphids: 2–3

Low, dense shrub, erectly branched initially, roundish later, slightly offshooting; suffers from aphids in dry sites.

49 Spiraea humilis

Spiraea salicifolia L. (1753)

A species with an extensive natural geographic range divided into two areas, the small one in central to eastern Europe (eastwards to SE Poland, central Rumania and S Bulgaria; cf. ADOLPHI 1995) and the large one in Siberia from 70° E eastwards as far as to the Bering Sea, Kamchatka and Japan. The species occurrence extends in Asia southwards to E Mongolia, NE China, Korea and central Honshu. To the north, the species reaches farthest from all Eurasian spireas, over the 70th parallel at the lower Lena river (SVJAZEVA 1980). The occurrence of the species, in the narrow taxonomic concept, in NW part of North America is sometimes erroneously given on the basis of confusion with similar morphotypes of *Spiraea alba* Du Roi or *S. latifolia* (Ait.) Borkh. The species has been cultivated in Europe since the 16th century and naturalized in many regions west and north of its natural range inclusive of Great Britain (BEAN 1981). It is the parent of interspecific hybrids with closely related American species, and also with some species of the section *Calospira*, both originated mostly spontaneously in culture in consequence of introduction of those alien species into Europe. Hybrids with American species of the section *Spiraea* often naturalize in favourable moist sites, where they can represent a rather invasive spreading. *Spiraea salicifolia* thrives, likely with related American species, in sites with elevated underground water level, forming thickets spreading by suckers. It is able to penetrate into permanently wet margins of ponds and even these ones gradually grow over. For this character the species is fitted for stabilization of watersides. The species proper is not horticulturally valuable enough because it is not blossoming very much and often suffers from aphids, but some of its hybrids are in favour for a long time. *Spiraea salicifolia* is considered autochthonous in the Czech countries in southern part of Bohemia and perhaps in SW Moravia, while is naturalized here and there in other regions or rarely found in older plantings (cf. KOBLÍŽEK 1992). In Slovakia its autochthonous occurrence is uncertain, but it is mentioned from Záhorie lowlands (SW Slovakia, since 1857) and from the Slovenské Rudohorie Mountains in central part of the country (ZAHRADNÍKOVÁ 1992). Likewise in Slovakia it is found occasionally naturalized or cultivated (e.g., large growths of more individuals occur in the Mlyňany Arboretum).

ED of *Spiraea salicifolia*:

Plants: S Bohemia, Šumava Mts., bank of the Teplá Vltava river
3.5 km SSW of Volary; alt. 740 m (wild); coll. R. Businský, 5.8.1985 INSIGNIFICANT

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6 years

Longest period of blossoming: 78 days — Blossoming richness: 2B

Height in 4 & 6 years: 160 & 180 cm* — Frost tolerance: 5

Width in 4 & 6 years: 140 & 200 cm* — Injury due to aphids: 1–2

Dense, erectly branched, very offshooting shrub; suffers from aphids above all in dry sites where they sometimes cause deformations of shoots, sometimes it is also prone to browsing by game during some winter seasons.

Spiraea alba Du Roi (1772)

A species with an extensive natural geographic range in North America from Alberta to Quebec in the north as far as Missouri to Georgia in the south. It was introduced into Europe probably in 1759 (REHDER 1958). It is very close to *Spiraea salicifolia*, therefore it was usually considered to be its variety in the 19th century, sometimes under the name *S. salicifolia* var. *paniculata* Aiton (1789). The species occurs in similar moist to very wet sites and also forms thickets spreading by suckers. It participated on the origination of several cultural interspecific hybrids. The horticultural importance and utilization scope of *S. alba* are similar as in its sister Eurasian species. On the basis of herbarium specimens preserved from the Czech countries was found that it has been cultivated here since the 1840's and found naturalized from the end of the 19th century. From the oldest known and documented naturalized occurrences some localities can be mentioned here, e.g., at Vsetín in E Moravia (1883),

50 Spiraea salicifolia

51 Spiraea alba

near Chocerady in Sázava river basin in central Bohemia (1913), near Dačice in SE Bohemia (1915), or near Týniště nad Orlicí (1922) and Česká Skalice (1938) in NE Bohemia. In the past years it was cultivated more frequently (cf. DOSTÁL 1950, 1989), which is attested by remnants of old plantings somewhere in parks (e.g., Jiřice near Humpolec, Telč). Recently it is not cultivated in our nurseries neither planted out. From Slovakia the species is documented by herbarium specimens of cultivated plants from some parks in districts Poprad, Lučenec and Trebišov from the 1960's but certainly it was cultivated in this country much earlier. More recently it was found, e.g., in the Liptov region in the 1980's.

ED of *Spiraea alba*:

Clone: Slovakia, Liptovský Mikuláš distr., Lipt. Hrádok,
plantation along road to Poprad (1985) INSIGNIFICANT

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6 years

Longest period of blossoming: 78 days Blossoming richness: 2B

Height in 4 & 6 years: 140 & 160 cm* Frost tolerance: 5

Width in 4 & 6 years: 140 & 180 cm* Injury due to aphids: 2

Middle dense, erectly branched, very offshooting shrub.

Spiraea latifolia (Ait.) Borkh. (1803)
≡ *S. salicifolia* L. γ. *latifolia* Aiton (1789)

North-American species very close to *Spiraea alba*, in which was also recently included as *S. alba* var. *latifolia* (Ait.) Dippel (cf. KARTESZ 1994). The natural distribution of both taxa overlaps in a large area but the range of *S. latifolia* is situated more to the NE, with the southern limit in North Carolina. The time of its supposed introduction into Europe coincides with the year of its first description in 1789 (REHDER 1958). Ecological requirements, the horticultural importance and utilization scope of both taxa are the same. In Bohemia, *S. latifolia* is documented already before half of the 19th century (from Praha). In Průhonice it was recorded from the turn of the 1920's and 30's. In the Czech countries the species was not given in literature as naturalized but, e.g., on the basis of a herbarium specimen from 1963 was found that it grew wild near Konstantinovy Lázně (Tachov district in W Bohemia). In recent years it was found in the regions under observation only rarely, mostly in arboreta and botanical gardens, in Bohemia, e.g., in Praha BG or Kostelec Arboretum. It is not cultivated in our nurseries neither planted out.

ED of *Spiraea latifolia*:

Clone: Brno Arboretum (1983),
seeds from Montreal, Canada INSIGNIFICANT

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| I | II | III | IV | V | VI | VII | VIII | IX | X | XI | XII |
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6 years

Longest period of blossoming: 86 days Blossoming richness: 3B

Height in 4 & 6 years: 140 & 160 cm* Frost tolerance: 5

Width in 4 & 6 years: 150 & 170 cm* Injury due to aphids: 4

Middle dense, erectly branched, very offshooting shrub.

52 Spiraea latifolia

Spiraea douglasii Hook. (1834)

A species naturally distributed in the west of North America from Alaska to California, in a modern concept (cf. KARTESZ 1994) divided into two varieties, the typical one with leaves grey feltlike beneath, and the **var. *menziesii*** (Hook.) Presl with leaves glabrous or faintly puberulous beneath. The latter was given as a separate species, *Spiraea menziesii* Hook. (1834), in older literature (see REHDER 1949, 1958), originally described parallelly to *S. douglasii*. The natural range of both varieties considerably overlaps: while the typical variety is distributed from British Columbia southwards, the var. *menziesii* occurs northwards of north Oregon and Idaho and reaches more to the inland. The typical variety was revealed by D. Douglas in British Columbia around 1827 and for the first time grown in the Glasgow Botanical Garden from seeds (BEAN 1981); the var. *menziesii* was introduced into Europe in 1838. Both varieties are very valuable from growers' viewpoint as ornamental shrubs fitted for moist to very wet sites, where they are able to form thickets spreading by suckers, similarly as the species of the *S. salicifolia* group. They are suitable for use in common mass or strip plantings in urban setting or along highways, and also for special use, e.g., for stabilization of watersides. The species is applicable in horticulture as the Eurasian *S. salicifolia* but its decorative value is higher with regard to its brighter flower colour and usually more abundant blossoming. Particularly some clones of the typical variety are attractive by bicolour foliage and bright flowers. In the Czech countries and partly also in Slovakia the species, in the typical variety, is fairly frequently cultivated for a long time (cf. POLÍVKA, DOMIN & PODPĚRA 1928, DOSTÁL 1950). An oldest found herbarium evidence comes from Praha from the 1840's. In Průhonice it is mentioned since 1924. Recently the typical variety of the species is not rare representing in the regions under observation in larger plantings of shrubs of various application and naturally in arboreta or botanical gardens. Here and there it has be found naturalized, recently, e.g., near Nové Město na Moravě (W Moravia) or at Skalsko (near Jílové nad Sázavou, in central Bohemia). On the other hand, the var. *menziesii* was in our countries from the past often confused with various hybrids between species of the section *Spiraea*. The true var. *menziesii* was recently found only rarely in a few arboreta or botanical gardens (e.g., in the Brno Arboretum, or the Košice BG).

ED of *Spiraea douglasii* var. *douglasii*:

Clone: Brno Arboretum (1983) FIRST-RATE

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| I | II | III | IV | V | VI | VII | VIII | IX | X | XI | XII |
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6 years

Longest period of blossoming: 72 days Blossoming richness: 3B

Height in 4 & 6 years: 170 & 180 cm* Frost tolerance: 5

Width in 4 & 6 years: 160 & 220 cm* Injury due to aphids: 5

Dense, erectly branched, very offshooting shrub; foliage conspicuous by the contrast of dark green upper side and greyish white lower side in combination with bright carmine rose flowers.

ED of *Spiraea douglasii* var. *menziesii*:

Clone: Brno Arboretum (1985) VALUABLE

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| I | II | III | IV | V | VI | VII | VIII | IX | X | XI | XII |
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6 years

Longest period of blossoming: 68 days Blossoming richness: 2B

Height in 4 & 6 years: 120 & 150 cm* Frost tolerance: 5

Width in 4 & 6 years: 120 & 160 cm* Injury due to aphids: 4–5

Middle dense, erectly branched, very offshooting shrub.

53 Spiraea douglasii var. douglasii

54 Spiraea douglasii var. menziesii

55 Spiraea tomentosa

Spiraea tomentosa L. (1753)

A species naturally distributed in eastern to inland part of North America from Manitoba to Nova Scotia peninsula in the north as far as Kansas to Georgia in the south. It was introduced into Europe allegedly already in 1736 (BEAN 1981), as the first species imported from another continent. In culture it has a similar use as other species of the section *Spiraea*, but is interesting in addition by its morphological distinctness from them. As a decorative shrub it is decidedly more valuable than *Spiraea salicifolia*, and recently underestimated. It is also fitted for moist to very wet sites and also forms thickets spreading by suckers. In Bohemia, *Spiraea tomentosa* is documented already before half of the 19th century (from Praha). In the Czechoslovak region it was mentioned in flora monographs of the first third of the 20th century (cf. POLÍVKA, DOMIN & PODPĚRA 1928) and later (DOSTÁL 1950, 1989) as a commonly cultivated and here and there naturalized species. However, on the basis of herbarium evidence it would seem that in the past it was cultivated or found only sporadically (e.g., in the park at Chudenice near Klatovy in W Bohemia in the end of the 19th century). In Průhonice it was mentioned in the 1920's. Recently in Bohemia and Moravia it has not been found naturalized anywhere and almost nowhere was found either in arboreta or botanical gardens. In Slovakia it is mentioned as cultivated by ZAHRADNÍKOVÁ (1992, probably by taking over the unspecified allegation of DOSTÁL, 1989, which refers rather to the Czech countries), in the Mlyňany Arboretum (TÁBOR & TOMAŠKO 1992) and the Košice BG (in the 1980's), in both latter places perhaps wrongly determined.

ED of *Spiraea tomentosa*:

Clone: Germany, Marburg (seeds sown 1985) VALUABLE

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6 years

Longest period of blossoming: 48 days Blossoming richness: 2B

Height in 4 & 6 years: 100 & 120 cm* Frost tolerance: 5

Width in 4 & 6 years: 100 & 150 cm* Injury due to aphids: 5

Middle dense, erectly branched, offshooting shrub; sometimes suffers from browsing by game during some winter seasons.

Interspecific hybrids and hybrid cultivars

Hybrids within the sect. *Chamaedryon* Ser.

Spiraea* ×*conferta Zab. (1884)

A supposed hybrid between *Spiraea cana* and *S. crenata*, described on the basis of plants grown by Zabel in Hannover-Münden near Göttingen from seeds sent from the St. Petersburg Botanical Garden under the designation "*S. cana* β. *sawranica* 1872" (ZABEL 1893). A very close hybrid of unknown origin with supposed parents *S. crenata* and *S. media* var. *mollis* (cf. SCHNEIDER 1905) was described as *S.* ×*inflexa* K. Koch (1854). REHDER (1927, 1949, 1958) united both the hybrid taxa and the older Koch's name interpreted as *S. cana* × *S. crenata*. In this publication both the hybrids are accepted separately. Neither one of the mentioned hybrid names was found given for plants cultivated in Bohemia, Moravia or Slovakia. However, two herbarium specimens of distinctly intermediary hybrid of *S. cana* × *S. crenata*, formally belonging to *S.* ×*conferta*, were found. Older of them comes from the Botanical garden in Banská Štiavnica from 1894 (determined as *S. hypericifolia* L.), later was collected in the urban park Riegrovy sady in Praha in 1936 (under the name *S. arguta* Zab.). These evidences confirm that this hybrid was cultivated in our countries for a long time and, at least in Bohemia, in some nursery as well. (Corresponding hybrid plants were found by the former author, e.g., in the Botanical Garden at Salaspils near Riga in Latvia in 1989, allegedly propagated from old plantings in the country.) Possibly any of the mentioned hybrid plants were not originated from original plants grown by Zabel, but rose spontaneously during a contact of the parents on various places and its hybrid origin was disregarded. For instance, both the parents were mentioned from the Průhonice CP in 1927 and in this time also in the catalogue of Průhonice Society gardens of the Dendrological Society. Recently the hybrid has not been found anywhere growing in the regions under observation.

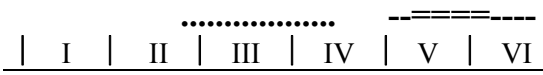
56 Spiraea ×conferta

Spiraea ×vanhouttei (Briot) Zab. (1884)
≡ *S. aquilegifolia* Pall. (var.) *vanhouttei* Briot (1866)

A hybrid between *Spiraea trilobata* and *S. cantoniensis*, grown by Billiard at Fontenay aux Roses near Paris about 1862 (BEAN 1981). This fully hardy taxon is one of the most valuable cultural spireas, as a decorative shrub characterized by very abundant blossoming of clear white flowers and by compact habitus fitted for hedges up to 2 m of height. In our countries it is recently perhaps the most cultivated spirea used in plantings of various application.

ED of *Spiraea ×vanhouttei*:

Clone: Průhonice DG FIRST-RATE



8 years

Longest period of blossoming: 35 days Blossoming richness: 3A

Height in 4 & 8 years: 170 & 210 cm Frost tolerance: 5

Width in 4 & 8 years: 200 & 300 cm

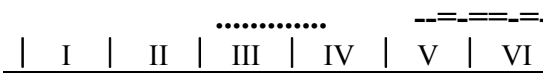
Very dense shrub with fine foliage texture, erectly branched initially, later turning arch-like, forming broadly roundish habitus with relatively narrow centre at the basis; suffers from browsing by game during winter season.

Spiraea ×blanda Zab. (1884)

A hybrid between *Spiraea cantoniensis* and *S. chinensis*, risen in culture probably in France before 1876 (KRÜSSMANN 1978). By its characters, growers' value and by a scope of representation in culture it is intermediate between the parents. It is suitable only for the warmest regions of our countries in respect to its low frost tolerance. The oldest found herbarium specimens from the Czech countries come from the castle park at Lednice in southern Moravia, collected in 1900, and from Praha, collected in 1901. Later it was allegedly cultivated by the Dendrological Society at Průhonice in years 1914 a 1915 as originated from the Mlyňany Arboretum (SVOBODA et al. 1967), from where it is documented by herbarium specimens from 1950. Recently it was found also in the Mlyňany Arboretum from where was propagated vegetatively (a few clones in 1983) and planted out in the Průhonice DG (where a clone of intermediary phenotype was regularly evaluated). In Bohemia the hybrid was found also in Kostelec Arboretum in 1985 in the form of several older individuals grown from seeds of *S. cantoniensis* (sown 1979), coming from the Padova Botanical Garden in Italy. It was found in Slovakia also in the Košice BG in the same year.

ED of *Spiraea ×blanda*:

Clone: Mlyňany Arboretum (1983) INSIGNIFICANT



6 years

Longest period of blossoming: 32 days Blossoming richness: 1B

Height in 4 & 6 years: 150 & 170 cm Frost tolerance: 3

Width in 4 & 6 years: 160 & 220 cm

Rather sparse shrub, erectly branched initially, later turning wide-branching; very suffers from browsing by game during some winter seasons.

57 Spiraea ×vanhouttei

58 Spiraea ×blanda

Hybrids within the sect. *Calospira* K. Koch

Spiraea ×revirescens Zab. (1893)

A hybrid between *Spiraea expansa* and *S. japonica*, described by ZABEL (1893) in six forms which he grew at Hannover-Münden near Göttingen. Five of these forms rose from seeds of the former parent. The hybrid seems to be generally rare in culture, probably for its low frost tolerance under the influence of the Himalayan parent; e.g. it is not mentioned by BEAN (1981) to be cultivated in Britain. In the Czech countries it was cultivated allegedly at Průhonice in years 1923 to 1932, obtained from the German firm Hesse-Weener, thus it survived the notorious hard winter 1928/29 (perhaps sheltered by covering ?). Later it was not mentioned from Průhonice until it was obtained from Hillier Nursery in England for the Průhonice DG in the end of the 1970's and planted out here on an experimental plot in 1985, where it froze thoroughly after five years. It could be attractive by repeating blossoming up to the beginning of autumn but in the climatic conditions of the Czech countries it is not stable. In Slovakia it has not be found but in the warmest regions there is possible to expect its prosperity.

Spiraea ×foxii K. Koch ex Zab. (1893)
= *S. callosa* Thunb. var. *superba* Froebel (1870), nom. inval.

A hypothetic hybrid between *Spiraea japonica* and *S. betulifolia* subsp. *corymbosa*, risen in culture before 1870 (BEAN 1981). *Spiraea ×foxii* in narrow sense has rather lower decorative value, somewhat similar to some cultivars of *S. japonica*, a few of them are more valuable. In our countries it is almost not cultivated; the oldest herbarium evidence was found from the Botanical Section garden of the Praha National Museum, in Praha, Troja, from 1939. Recently it was found only in Kostelec Arboretum in 1985, from where was propagated vegetatively for the Průhonice DG.

ED of *Spiraea ×foxii*:

Clone: Kostelec Arboretum (1985) INSIGNIFICANT

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6 years

Longest period of blossoming: 30 days Blossoming richness: 2B

Height in 4 & 6 years: 60 & 70 cm Frost tolerance: 5

Width in 4 & 6 years: 100 & 150 cm

Low, rather sparse shrub of rather disarranged habitus with infirm branches, soon irregularly wide-branching to nodding; suffers from browsing by game during some winter seasons.

Parallelly to *Spiraea ×foxii*, a similar hybrid was introduced into culture in Zürich in 1870 under the name *S. callosa* Thunb. var. *superba* Froebel. On its origin the cultural variety, *S. japonica* 'Albiflora', probably participated. Today's correct cultivar name for this hybrid is *S. ×foxii* **'Superba'**. This cultivar was mentioned from Průhonice in 1923 to 1932, and, on the basis of the herbarium specimen from 1956, also in the urban nurseries in Praha, Ďáblice, and surely it was planted in some other horticultural firms. However, recently it has not been found anywhere in the regions under observation and is not cultivated enough either abroad.

From seeds of the cultivar 'Superba', probably pollinated by *Spiraea japonica*, another cultural hybrid was grown by Zabel before 1890, and named after its daughter as *S. margaritae*. This hybrid, accepted as cultivar **'Margaritae'** nowadays, is from the *S. ×foxii* group the most valuable clone from growers' viewpoint, recently most distributed in culture but still of rather lower decorative value than some cultivars of *S. japonica*. The cultivar 'Margaritae' has been cultivated in the Czech countries in the Průhonice DG (since the end of the 1970's, obtained from England) from where it has been distributed to some nurseries and newly also to urban plantings in our countries. In Slovakia it has not been found by the authors, though it is given in both the above mentioned list of woody plants in the old part of the Mlyňany Arboretum (BENČAŤ 1967, TÁBOR & TOMAŠKO 1992), and in the Košice BG, too.

59 Spiraea ×revirescens

60 Spiraea ×foxii

61 Spiraea ×foxii ‘Margaritae’

ED of *Spiraea ×foxii* 'Margaritae':

Clone: England, Hillier Nursery (1970's) INSIGNIFICANT

6 years

Longest period of blossoming: 68 days Blossoming richness: 2B

Height in 4 & 6 years: 120 & 140 cm Frost tolerance: 5

Width in 4 & 6 years: 160 & 230 cm

Rather sparse, soon broadly wide-branching shrub of rather disarranged habitus; its dry leaves after winter partly persistent to spring.

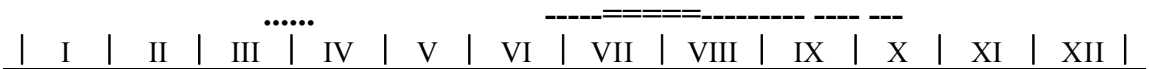
Hybrids within the sect. *Spiraea*

Spiraea ×rosalba Dipp. (1893)

A hybrid between very close species, the Eurasian *Spiraea salicifolia* and the American *S. alba*, risen somewhere in culture probably spontaneously before 1892. The hybrid is not usually given in literature (cf. KRÜSSMANN 1978, BEAN 1981), though it does not seem very much rare in culture. In most cases it has not been distinguished, another way said it was confused with *S. salicifolia* (in which *S. alba* was included later) or with other similar hybrids (cf. SILVERSIDE 1990). Presumably, the hybrid originated in recent history of European horticulture spontaneously more times under the contact of parent species without correct determination. Clones morphologically corresponding with the pertinent parent combination occur scatteredly cultivated for a long time in the Czech countries in gardens or parks, probably by reason of activities of some nursery firms, which grew this taxon perhaps under another name. A group of shrubs of the hybrid was found, e.g., in one private garden at Mukařov, Praha východ (Prague East) district, in 1985, from where it was propagated vegetatively for the Průhonice DG. This clone appears as valuable from growers' viewpoint, fitted for use in decorative or special plantings of preferably larger dimensions, above all on moist or wet sites, but it is not grown recently in nurseries nor newly planted out. In some places it could erode the indigenous gene-pool of *S. salicifolia* in an uncontrollable way. In Slovakia this hybrid has not be found but its omitted occurrence is possible.

ED of *Spiraea ×rosalba*:

Clone: CZ, Praha východ distr., Mukařov, a private garden (1985) VALUABLE



6 years

Longest period of blossoming: 88 days Blossoming richness: 3B

Height in 4 & 6 years: 150 & 170 cm* Frost tolerance: 5

Width in 4 & 6 years: 120 & 180 cm* Injury due to aphids: 3–4

Dense, erectly branched, very offshooting shrub; sometimes suffers from aphids above all in dry sites.

Spiraea ×billardii Hérincq (1855)

A group of hybrid forms risen spontaneously in garden culture on more places in Europe, considered to be a hybrid between *Spiraea douglasii* (including its var. *menziesii*) and *S. salicifolia* s. lat. (cf. ZABEL 1893). The hybrid plants belonging to this parent combination were found for the first time around 1850 (REHDER 1958, BEAN 1981). Already in the 19th century there were distinguished and described a few forms of the group, taken to be cultivars later. The hybrid of *S. douglasii* × *S. salicifolia* s. lat. was also considered to be identical with, in fact natural American taxon *S. menziesii* Hook. (see ZABEL 1893).

62 Spiraea ×rosalba

Only in 1975, J. Duvigneaud published his opinion that the original description and illustration of Hérincq's *S.* ×*billardii* distinctly show the parentage of *S. alba* which had been included in *S. salicifolia* s. lat. in the past. Of the same opinion is also SILVERSIDE (1990), who proposed to distinguish a new taxon, *S.* ×*pseudosalicifolia*, for the hybrid of *S. douglasii* and *S. salicifolia* s. str. Also after the separation of the latter (see also below), the hybrid *S.* ×*billardii* s. str. remains represented by more forms or clones in the European garden culture, whose identity with old horticultural names (*S. menziesii* f. *eximia* Hort. ex Zab., f. *lenneana* Hort. ex Zab., *S. speciosa* Dipp.), sometimes considered to be cultivars, is now doubtful. The hybrid forms belonging to *S.* ×*billardii* s. str. represent in the Czech countries, and in Slovakia probably as well, some of the most distributed spireas of the section *Spiraea*, in older parks or plantings more frequent than the natural species of the section. But members of this hybrid group or most of related taxa are not popular for nurserymen and garden architects nowadays, and they are used sometimes for mass plantings only. Tracing the cultivation of the hybrid back into the history in our countries is problematical considering common confusions and difficulties with herbarium determination, but some of the pertinent forms were certainly cultivated here already in the last third of the 19th century. An use of forms of this hybrid group in horticulture is the same as in the related taxa, but *S.* ×*billardii* belongs to those which suffer from aphids above all in more dry sites.

ED of *Spiraea* ×*billardii*:

Clone: Průhonice DG INSIGNIFICANT

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| I | II | III | IV | V | VI | VII | VIII | IX | X | XI | XII |
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6 years

Longest period of blossoming: 84 days Blossoming richness: 3B

Height in 4 & 6 years: 170 & 180 cm* Frost tolerance: 5

Width in 4 & 6 years: 140 & 200 cm* Injury due to aphids: 3

Dense, erectly branched, very offshooting shrub; suffers from aphids in dry sites.

Spiraea* ×*pseudosalicifolia Silverside (1990)

A hybrid between *Spiraea douglasii* and *S. salicifolia* s. str., distinguished only recently in Britain among naturalized populations of the *S. salicifolia* hybrid group on the basis of separation from *S.* ×*billardii* s. str. Following up, ADOLPHI (1995) gives that *S.* ×*pseudosalicifolia* is widely naturalized also in some regions of central Europe where it spreads as a residue of old plantings on more moist sites (a sketch of a leaf in the quoted paper does not correspond to the one in the protologue, however).

Gathering of most clones of the *Spiraea salicifolia* hybrid group cultivated or naturalized during the recent times in our countries to the Průhonice DG and comparison of their new herbarium evidences made its re-classification possible. It has been ascertained that the clone obtained in Pruhonice from Hillier Nursery, England, in the 1970's under the name *S.* ×*billardii* 'Triumphans', surely identical with the original plants of this cultivar risen in European culture in the end of the 19th century, morphologically corresponds to the stated parent combination of *S.* ×*pseudosalicifolia* and its protologue (see below*). The mentioned clone was cultivated allegedly at Průhonice in 1914–1941, and from these times it is documented, e.g., from Mladá Boleslav in central Bohemia (1920). Recently it has been propagated by Czech nurseries and, as a fairly valuable clone, is frequently used for mass plantings, but in Slovakia it has not been mentioned neither found. Except for plants distinctly belonging to this cultivar, there were found a few herbarium specimens from the Czech countries corresponding to *S.* ×*pseudosalicifolia*, e.g., from an urban park in Soběslav (1943) and in Strakonice (1956), both in southern Bohemia, from the urban nurseries in Praha, Ďáblice (1956), and from the eastern vicinity of Olomouc in central Moravia where a sample of plants naturalized along the Bystřice river was collected (1965).

****Spiraea* ×*pseudosalicifolia*** Silverside **'Triumphans'**
≡ *Spiraea menziesii* Hook fil. *triumphans* Hort. ex Zab., Strauch. Spiräen der deutsch. Gärten: 101. 1893.
– Type not designated.

63 Spiraea ×billardii

64 Spiraea ×pseudosalicifolia ‘Triumphans’

ED of *Spiraea ×pseudosalicifolia* 'Triumphans':

Clone: England, Hillier Nursery (1970's) VALUABLE

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          .....      ----======----------- --- ---- ---
| I | II | III | IV | V | VI | VII | VIII | IX | X | XI | XII |
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6 years

Longest period of blossoming: 84 days Blossoming richness: 3B

Height in 4 & 6 years: 160 & 190 cm* Frost tolerance: 5

Width in 4 & 6 years: 130 & 180 cm* Injury due to aphids: 2

Dense, erectly branched, very offshooting shrub; suffers from aphids above all in dry sites where they sometimes cause deformations of shoots.

Spiraea ×macrothyrsa Dipp. (1893)

A group of hybrid morphotypes with supposed parents *Spiraea douglasii* and *S. latifolia*. Their confusion with similar hybrids is easy, above all with the parallel *S. ×billardii* (= *S. douglasii* × *S. alba*), some also with hybrids of *S. salicifolia* s. str. As *S. latifolia* was included in *S. salicifolia* s. lat. in the past, or usually in *S. alba* more recently, both the *S. ×macrothyrsa* and *S. ×billardii* were united under the latter name (KRÜSSMANN 1978, SILVERSIDE 1990). When *S. latifolia* is accepted as a variety of *S. alba*, then the correct name for the hybrid group in question is *S. ×billardii* nothovar. *macrothyrsa* (Dipp.) Duvigneaud, whose use is more suitable (the existence of more morphotypes considering) than to accept the taxon as the cultivar *S. ×billardii* 'Macrothyrsa' (see KRÜSSMANN 1978). This cultural hybrid has been allegedly cultivated since 1870 (REHDER 1958). An intermediary morphotype is documented from our countries by herbarium specimens, e.g., from the Průhonice CP from the 1930's (it has been cultivated here since 1923), or later from Praha. But the oldest herbarium evidence was found from Pezinok in western Slovakia, already from 1914. All known data show that the hybrid has been cultivated in our countries frequently, but disregarded and determined as *S. salicifolia* or *S. douglasii* (e.g., a few herbarium specimens from central Bohemia from the beginning of the 1940's were found). Recently the hybrid is represented in our countries by more morphotypes or clones of spontaneous origin but the intermediary one is less frequent. Rather extensive growths of glabrescent morphotypes of this hybrid occur in the Průhonice CP and they also have been planted out in the vicinity. These forms were confused not long ago with *S. ×rubella* Dipp. (e.g., KOBLÍŽEK 1992), the close hybrid between *S. salicifolia* and *S. latifolia* (which has not been detected in our countries according to latest knowledge). From glabrescent forms the most attractive clone originated from an old plant in the Průhonice DG called "*Spiraea armata*". Growers' use of *S. ×macrothyrsa* is similar as of *S. ×billardii* but some clones have higher ornamental value and also resistance to aphids. Now it is found above all in older plantings and it is only rarely planted out newly. A distinctly anomalous morphotype, still corresponding with the parent combination *S. douglasii* × *S. latifolia*, was found and collected by the authors in the Košice BG in 1985.

ED of *Spiraea ×macrothyrsa*:

Clone: CZ, Praha 10, Strašnice, urban plantings (1984) FIRST-RATE

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          ..........      -----=======--------- --- ----
| I | II | III | IV | V | VI | VII | VIII | IX | X | XI | XII |
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6 years

Longest period of blossoming: 80 days Blossoming richness: 3B

Height in 4 & 6 years: 160 & 180 cm* Frost tolerance: 5

Width in 4 & 6 years: 140 & 200 cm* Injury due to aphids: 5

Dense, erectly branched, very offshooting shrub.

65 Spiraea ×macrothyrsa

Hybrids between species from different sections of the genus

a) Sect. *Glomerati* Nakai **× sect. *Chamaedryon*** Ser.

***Spiraea* 'Arguta'**
= *Spiraea* ×*arguta* Zab. (1884)

Supposed double hybrid without an accurate known origin, found as a seedling grown from *Spiraea* ×*multiflora* Zab. (see below) pollinated probably by *S. thunbergii* around the turn of the 1870's and the 1880's (BEAN 1981). The only cultivated clone of this hybrid cultivar represents one of the earliest blossoming spireas characterized by numerous snowy white flowers. The oldest herbarium evidence of the cultivar from our countries comes from the castle park at Lednice in southern Moravia, collected in 1900. It was frequently used solitarily or in groups in parks or garden plantings in our countries until recently. In the Czech countries it is replaced in last years by similar hybrid clone, *S.* ×*cinerea* 'Grefsheim', which has one of the parents the same.

ED of *Spiraea* 'Arguta':

Clone: England, Hillier Nursery (1970's) FIRST-RATE

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          .....---=====--
| I | II | III | IV | V | VI | VII | VIII | IX | X | XI | XII |
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8 years

Longest period of blossoming: 40 days Blossoming richness: 3A

Height in 4 & 8 years: 150 & 210 cm Frost tolerance: 5

Width in 4 & 8 years: 170 & 300 cm

Dense, erectly branched shrub without suckers, with fine branch and foliage texture.

Note: A similar hybrid ***Spiraea* ×*multiflora*** Zab. of Eurasian *S. hypericifolia* and *S. crenata*, described parallelly to *S.* ×*arguta*, in 1884, was cultivated already around half of the 19th century. The oldest herbarium evidence from the Czech countries comes from a nursery at the Červený Hrádek (Rothenhaus) castle near Jirkov near Chomutov, collected in 1858. From the 20th century it is mentioned from the Průhonice CP in 1927 (SVOBODA et al. 1967) and documented from the park at Chudenice near Klatovy from 1942. In the second half of the century it was, e.g., offered in the plant catalogue of Nurseries in Litomyšl from 1979. However, any living plant of the hybrid has not be found during last twenty years.

Spiraea* ×*cinerea Zab. (1884)

A hybrid between two European species, *Spiraea cana* and *S. hypericifolia*, originated in culture in two forms without known detailed data (ZABEL 1893, REHDER 1958). Its cultivar **'Grefsheim'** comes from Grefsheim Nursery at Nes in Norway where it was grown in 1949 (KRÜSSMANN 1978). The original Zabel's hybrid is hardly in cultivation now but the cultivar 'Grefsheim' is very valuable taxon characterized by early and abundant blossoming (the earliest from abundantly blossoming spireas), frequently grown in our nurseries and used in modern urban plantings (strip settings) or along highways in recent years. In Slovakia it was cultivated, e.g., in the Mlyňany Arboretum in the 1980's and recently is used in urban or garden plantings as well.

ED of *Spiraea* ×*cinerea* 'Grefsheim':

Clone: Germany, Schmidt Nursery (1970's) FIRST-RATE

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          ......-----====--
| I | II | III | IV | V | VI | VII | VIII | IX | X | XI | XII |
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8 years

Longest period of blossoming: 33 days Blossoming richness: 3A

Height in 4 & 8 years: 140 & 190 cm Frost tolerance: 5

Width in 4 & 8 years: 200 & 260 cm

Compact and dense, erectly branched shrub, with fine branch and foliage texture, slowly offshooting by short suckers; suffers from browsing by game during some winter seasons.

66 Spiraea ‘Arguta’

67 Spiraea ×cinerea ‘Grefsheim’

b) Sect. *Calospira* K. Koch **× sect. *Spiraea***

Spiraea ×brachybotrys Lange (1882)

A supposed hybrid between morphologically distant species, the Himalayan *Spiraea canescens* and W-American *S. douglasii*, originated in culture without known detailed data. Its was described on the basis of a plant cultivated at Kew, London, which was sent from the nurseryman Booth of Hamburg under the name *S. pruinosa* around 1880. Perhaps the same clone came to Kew around the same time from Lavallée as *S. luxurians* (BEAN 1981). It is a tall, sparse graceful shrub utilizable solitarily for park or garden settings but it is not fully frost-hardy in climatic conditions of central Europe. In the Czech countries it has been cultivated about since the beginning of the 20th century. The oldest found herbarium specimen comes from Litomyšl (E Bohemia), collected in 1909; at Průhonice it has been cultivated since 1937, and before World War II it was also grown by some nursery firms. Recently the hybrid is found in arboreta and in older plantings of castle or urban parks, in Slovakia, e.g., in the Bratislava BG or the Mlyňany Arboretum. In some hard winters it tends to be partly injured by frosts.

ED of *Spiraea ×brachybotrys*:

Clone: England, Hillier Nursery (1970's) INSIGNIFICANT

6 years

Longest period of blossoming: 40 days Blossoming richness: 2B

Height in 4 & 6 years: 220 & 230 cm Frost tolerance: 3–4

Width in 4 & 6 years: 200 & 300 cm Injury due to aphids: 3–4

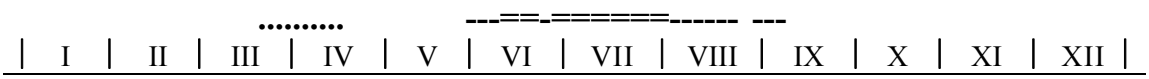
Tall, sparse, elegantly erectly branched, sparsely offshooting shrub, with long, whip-like arching branches.

Spiraea ×fontenaysii Lebas (1866)

A hybrid between *Spiraea canescens* and *S. salicifolia*, close to *S. ×brachybotrys*, raised probably from intentional pollination of *S. canescens* by Billiard of Fontenay aux Roses near Paris before 1866 (BEAN 1981). The hybrid is known in two clones, the typical white-flowered, and pink-flowered called **'Rosea'**. It is a shrub of rather lower decorative value, whose shoots are often injured by winter frosts in our countries. The oldest found herbarium specimen was collected in a park on the Praha hill Petřín, already in 1892. The hybrid has been cultivated at Průhonice since 1923, in recent years also in some other arboreta (e.g., the Brno Arboretum) or is rarely found in old garden plantings (e.g., Mukařov, Praha východ district). All living plants found during the last twenty years belong to the typical form. In Slovakia the hybrid has not been mentioned neither found.

ED of *Spiraea ×fontenaysii*:

Clone: Průhonice DG, Štípenka, 27/13 INSIGNIFICANT



6 years

Longest period of blossoming: 80 days Blossoming richness: 2B

Height in 4 & 6 years: 150 & 160 cm Frost tolerance: 4

Width in 4 & 6 years: 140 & 220 cm Injury due to aphids: 2–3

Rather sparse, erectly branched shrub of somewhat disarranged habitus, shortly offshooting; suffers from aphids.

68 Spiraea ×brachybotrys

69 Spiraea ×fontenaysii

Spiraea* ×*sanssouciana K. Koch (1857)

A hybrid between SE-Asian *Spiraea japonica* and W-American *S. douglasii*, described originally from a plant raised in the nursery at Sans Souci near Potsdam in Germany, shortly before 1857 (BEAN 1981). Another hybrid of the same parent combination rose from seeds of *S. douglasii* pollinated spontaneously by a plant of the second parent planted nearby, in Sunningdale in England, from where it was sent by C. Noble in 1859 to Kew, where it was named *S. nobleana* by W. Hooker. This plant was confused with another natural hybrid from California, therefore considered for many years native of U.S.A. (BEAN 1981). ZABEL (1893) accepted *S. sanssouciana* as a hybrid of the above mentioned parents on the one hand, and on the other *S. nobleana* for a cultural hybrid between *S. betulifolia* var. *rosea* (= *S. splendens* K. Koch) and *S. douglasii*, grown by him; however, its correct name is *S.* ×*watsoniana*, described also by Zabel, but later (see below). Additionally, a clone raised from the Noble's plant was taken to be a cultivar, **'Nobleana'**, and correctly referred to the hybrid name *S.* ×*sanssouciana* (cf. BEAN 1981). It was obtained in the Průhonice DG from the Hillier Nursery in England in the end of the 1970's. *Spiraea* ×*sanssouciana* was not mentioned from the Czech countries before, but its herbarium evidence from a parish garden at Sloupnice near Litomyšl (E Bohemia) collected in 1904 and 1908 was found. Recently the hybrid is offered by some our nurseries, but in Slovakia it has not been mentioned neither found. It is utilizable as a broad shrub decorative by summer blossoming but is less valuable than some cultivars of *S. japonica* or first-rate clones of *S. douglasii*.

ED of *Spiraea* ×*sanssouciana* 'Nobleana':

Clone: England, Hillier Nursery (1970's) INSIGNIFICANT

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|  I  |  II  |  III  |  IV  |  V  |  VI  |  VII  |  VIII  |  IX  |  X  |  XI  |  XII  |
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6 years

Longest period of blossoming: 70 days Blossoming richness: 2B

Height in 4 & 6 years: 180 & 200 cm Frost tolerance: 5

Width in 4 & 6 years: 220 & 240 cm Injury due to aphids: 4

Relatively large and dense, erectly branched shrub with stout shoots, during later phase of flowering rather unseemly considering faded centres of large compound inflorescences.

To *Spiraea* ×*sanssouciana* belongs also another hybrid supposedly originated from *S. japonica* 'Albiflora', raised in French nurseries before 1888 (either of Simon-Louis in opinion of ZABEL, 1893, or more likely of Lemoine in opinion of BEAN, 1981), named *S. intermedia* Lemoine ex Zab. (1893), and later taken to be a cultivar correctly given as *S.* ×*sanssouciana* **'Intermedia'** (cf. BEAN 1981). Its oldest found herbarium specimens from our countries were collected in a private garden in Praha, Vršovice quarter, in 1899. However, no published mention of this taxon was found from the regions under observation.

Spiraea* ×*semperflorens Zab. (1893)
= *S. semperflorens* Dieck (1885), nom. inval.

A group of hybrid forms between *Spiraea japonica* and *S. salicifolia*, the oldest of them rose in culture somewhere in Europe, probably in 1870 (REHDER 1927, 1958). Other forms were grown in French or German nurseries or gardens (cf. ZABEL 1893). The most distributed form in western Europe, in the end of the 19th and at the beginning of the 20th century, became the hybrid with *S. japonica* 'Albiflora', named *S. syringiflora* Lemoine ex Zab. (1893). It rose in French nurseries before 1885 (either of Simon-Louis in opinion of ZABEL, 1893, or more likely of Lemoine in opinion of BEAN, 1981) and later it was taken to be a cultivar correctly given as *S.* ×*semperflorens* **'Syringiflora'** (cf. BEAN 1981). In the Czech countries the hybrid was cultivated already shortly after its introduction into culture, documented by an evidence of the typical form from a parish garden at Sloupnice near Litomyšl (E Bohemia) from 1894 and 1908 under the name *S. japonica*, with which it was perhaps mistaken in other places. Neither later the hybrid was given under pertinent name, even nor at Průhonice, nor anywhere else in the Czech countries, and also has not be found living recently. In Slovakia it was mentioned in lists of woody plants of the Mlyňany Arboretum (BENČAŤ 1967, TÁBOR & TOMAŠKO 1992), and in the spirea assortment of the Košice BG, but it has not been found by the authors anywhere.

70 Spiraea ×sanssouciana ‘Nobleana’

71 Spiraea ×sanssouciana ‘Intermedia’

72 Spiraea ×semperflorens

Note:
Spiraea ×notha Zab. (1893) was raised by Zabel in three forms a few years before its description as a supposed hybrid between *S. betulifolia* subsp. *corymbosa* and *S. latifolia*. The hybrid was mentioned from the Průhonice CP in the 1920's. A morphologically similar plant grown newly from seeds of unknown origin was found in the Průhonice DG in 1983. It became the mother plant of an attractive clone described below as a new cultivar put under the generic name.

Spiraea ×watsoniana Zab. (1908)
= *S. nobleana* Zab. (1893), nom. illeg.

A hybrid between *Spiraea splendens* and *S. douglasii*, raised by Zabel before 1890 from seeds of the former parent (REHDER 1958, BEAN 1981). However, ZABEL (1893), for the first time, erroneously classified this hybrid under the name *S. nobleana* Hook., before his supplementary description of the correct name. A statement about occurrence of this hybrid in nature in W-American state Oregon (REHDER 1927, 1958), on the basis of a herbarium specimen from 1886, described before as *S. subvillosa* Rydb. (1908), refer to an intermediary form between typical *S. douglasii* and its var. *menziesii* (HITCHCOCK & CRONQUIST 1961, BEAN 1981). *Spiraea ×watsoniana* is a medium size shrub decorative by dense rose inflorescences, generally rare in culture. On the basis of the herbarium specimen from 1943 was found that it was cultivated in the Hacker Nursery in Hradec Králové (E Bohemia) and from the same time comes also an unconfirmed mention in a plant catalogue of the Thomayer Nursery at Říčany near Praha under the name *S. nobleana* f. *superbetulifolia* Zab. The hybrid was neither recorded in catalogues of the Dendrological Society at Průhonice. Likewise, it has not been found any mentions of the hybrid cultivation in the Czech countries or Slovakia later, except for an offer in the plant catalogue of Nurseries in Litomyšl (E Bohemia) from 1979.

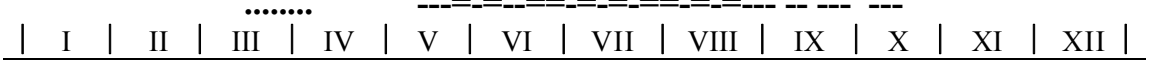
c) Sect. *Chamaedryon* Ser. **× sect. *Spiraea***

Spiraea ×microthyrsa Zab. (1893)

A cultural hybrid that Zabel obtained under the name *Spiraea alba* without data about its origin, before 1890, and considered as a hybrid of *S. alba* and *S. media*. This parent couple seems to be authentic and represents, from the viewpoint of the morphology and relationship, the most distant known parent combination in the genus. As the latter species flowers in the first half of May and the former one above all in August, their hybrid is characterized by very long blossom period from spring to autumn, usually during more than four months, probably the longest from all spireas. Unfortunately, flowers come into blossom irregularly in sparse, not large inflorescences, therefore the ornamental value of the hybrid is relatively low. It was probably generally rare in culture in all times, though it could be easy unnoticed or incorrectly determined. Any spirea was not mentioned under the name *S. ×microthyrsa* from our countries, but the hybrid had to be cultivated under another name somewhere in Czech nurseries because its older shrubs were found by the authors in the 1980's in private gardens on two places in central Bohemia,
in Praha, Vinohrady quarter, and at Mukařov, Praha východ district.

ED of *Spiraea ×microthyrsa*:

Clone: CZ, Praha 10, Vinohrady, Říčanská Street, a garden (1985) INSIGNIFICANT



6 years

Longest period of blossoming: 135 days Blossoming richness: 1B

Height in 4 & 6 years: 120 & 140 cm Frost tolerance: 5

Width in 4 & 6 years: 140 & 180 cm Injury due to aphids: 3

Dense, erectly branched shrub of somewhat disarranged habitus, offshooting by short suckers.

73 Spiraea ×watsoniana

74 Spiraea ×microthyrsa

New cultivars

In the assortment of spireas cultivated at Průhonice in last two decades several clones or hybrid plants (or a possible mutation) without certain taxonomic affiliation were found. Four items of them are attractive for ornamental gardening and for many years they have been propagated vegetatively in the Průhonice DG under provisional denomination. Two of them are cultivated also by nurseries in the Czech countries under misnomers for a number of decades. The four clones in question are described below as new cultivars in agreement with ICNCP (TREHANE 1995). Three of them are given under the generic name because of their uncertain species affiliation or interspecific hybrid origin without authentic parents.

***Spiraea* 'Green Moundlet'**

History: It was cultivated under the name "*Spiraea bella*" in Žehušice Nursery, Kutná Hora district, Czechoslovakia, in the 1970's, from where it was distributed to the Dendrological garden of the RILOG, Průhonice before 1978 and to some nurseries and garden culture in Bohemia (an older history is unknown).

Originator: Unknown.

Taxonomy: An unflowering bud mutation probably of a hybrid between *Spiraea bella* Sims and an unknown species.

Note: In some old individuals (in the Průhonice DG, or in the Brno Arboretum) single stout shoots up to about 1 m high with larger leaves were found. On these shoots inflorescences of bisexual flowers sporadically develop in following years. These branches obviously represent the vitalized residue of a somatic phase of the original mother plant in the form of chimaeric tissues. This flowering phase cannot be determined as a true *Spiraea bella* but it probably rose by its spontaneous hybridization with an unknown species somewhere in culture. A flowering lateral shoot of such a two-year branch and one leaf are illustrated in the left part of the accompanying figure. The described mutation originated probably secondarily on the mother plant of ordinary growth of point as a "witch-broom".

Description: Dwarf, very dense, unflowering shrublet, about 25–30 cm high in the age of about five years, up to 40 cm when older, compactly roundish habitus with very slender crooked, initially erect branchlets. Shoots only 0.3–1.2 mm wide, sparsely puberulous, terete, glossy; winter buds minute, globose. Leaves ovate, acute at the apex and usually roundish or sometimes cuneate and entire at the base, above relatively densely, shallowly lobed and irregularly dentate, blades 1.5–3 cm long and 0.9–1.9 mm wide, light green above, greyish and papillose beneath, glabrous in both sides, petioles 3–5 mm long, sparsely puberulous usually together with margins of the blade base.

Differential characters: Dwarf, dense, unflowering shrublet, up to 40 cm high; shoots very thin; leaves ovate, shallowly lobed and irregularly dentate, 1,5–3 cm long, greyish beneath.

Etymology: The epithet represents a compactly roundish shape of dwarf shrublets characterized by only light green colour of the foliage without flowers formation.

Epithet's author (nominant): Roman Businský, the RILOG, Průhonice.

Illustration: On the opposite side (together with the mother plant).

Herbarium specimen: Herbarium of the RILOG, Průhonice – *Spiraea* No. 83/016: Dendrological garden of the RILOG, Průhonice, coll. Roman Businský, 7.7.1983.

Mother plant: Dendrological garden of the RILOG, Průhonice, B–IV–200.

Propagation: Autovegetatively by summer cuttings as a clone.

Introducer & distribution guarantee: the RILOG, Průhonice.

Note:
The cultivar is cultivated recently under the name "*Spiraea bella*" in some nursery firms or arboreta in the Czech Republic, e.g., in: Ďáblice Nursery, Praha; Litomyšl Nursery; Forestry School Enterprise, Bohumile near Kostelec n. Č. L.; Montano Nursery, Přerov n. Labem; Brno Arboretum; and also abroad, e.g., in the Pozna✶ Botanical Garden, Poland (Prof. Koblížek, Mendel University, Brno, pers. comm.).

75 Spiraea ‘Green Moundlet’

***Spiraea* 'Leafy Carmine'**

History: It was propagated vegetatively (July 1985) from a plant found by Roman Businský in the Botanical Garden of P. J. Šafárik in Košice, E Slovakia, grown from seeds of *Spiraea betulifolia* Pall. (sown in February 1976) obtained from the Botanical Garden in Dněpropetrovsk, Ukrainian SSR.

Originator: Roman Businský, the RILOG, Průhonice.

Taxonomy: A hypothetic hybrid *Spiraea betulifolia* Pall. × *S. chamaedryfolia* L.

Description: Shrub of lower size, about 1 m high and 1 m wide in the age of six years, up to 1.2 m high and 1.5 m wide when older, densely and initially erectly branched, broadly roundish in full developed habitus; spreading by short suckers. Shoots glabrous, angled, straw-coloured and glossy; winter buds conical, about 2 mm long, covered by two outer distant, acuminate and carinate scales and with a few loose inner scales, both the types with ciliated tops. Leaves ovate to elliptic, pointed or roundish at the apex and cuneate to broadly cuneate or roundish at the base with a shortly attenuate transition to the petiole, 2.5–5 cm long and 1.5–3 cm wide, with petioles 3–8 mm long, unequally to doubly, densely and sharply serrate except for the entire base or lower third, glabrous except for sparse hairlets on main veins beneath, margins and the petiole, bright green above, more light and papillose beneath; the foliage turning conspicuously carmine red from July and during September in particular. Inflorescences sparse racemose corymbs with lower pedicels usually branched or forming lateral corymbs, 2–6 cm wide as a whole, glabrous. Flowers about 8–9 mm in diameter, white; sepals becoming reflexed, hairy on inner side, stamens distinctly longer than orbicular petals, staminal disk conspicuous, with high lobes, receptacle inside and pistils on ventral suture longly hairy, styles about 3 mm long, terminal, mature follicles with distinctly convex dorsal sides and styles deflected sidewards.

Differential characters: Shrub 1–1.2 m high; leaves densely, sharply serrate, turning conspicuously carmine red from July; inflorescences sparse racemose corymbs with lower pedicels usually branched or forming lateral corymbs, 2–6 cm wide.

Etymology: The epithet represents conspicuously carmine red colouring foliage.

Epithet's author (nominant): Roman Businský, the RILOG, Průhonice.

Illustration: On the opposite side.

Herbarium specimen: Herbarium of the RILOG, Průhonice – *Spiraea* No. 85/060: Slovakia, Košice, the Botanical Garden of P. J. Šafárik, coll. Roman Businský, 4.7.1985.

Mother plant: Dendrological garden of the RILOG, Průhonice, B–III–121.

Propagation: Autovegetatively by summer or hard-wood cuttings as a clone.

Introducer & distribution guarantee: the RILOG, Průhonice.

ED of *Spiraea* 'Leafy Carmine':

Clone: Košice BG (1985), seeds from Dněpropetrovsk, Ukraine, USSR (sown 1976) VALUABLE

I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII
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6 years

Longest period of blossoming: 64 days Blossoming richness: 2B

Height in 4 & 6 years: 100 & 110 cm Frost tolerance: 5

Width in 4 & 6 years: 100 & 120 cm

76 Spiraea ‘Leafy Carmine’

***Spiraea* 'Ludmila'**

History: The original plant found Ludmila Cetlová, later Businská, the co-author of this publication, in June 23, 1983, in an abandoned planting of shrubs of unknown origin, grown from seeds obtained in the framework of an international seeds exchange "Index Seminum", in the Dendrological garden of the RILOG, Průhonice.

Originator: Roman Businský, the RILOG, Průhonice.

Taxonomy: Morphologically most similar to *Spiraea* ×*notha* Zab. (= *S. betulifolia* subsp. *corymbosa* × *S. latifolia*)

Description: Shrub of middle size, about 1.1 m high and 1.6 m wide in the age of six years, up to 1.7 m high and 2.5 m wide when older, with dense and slightly crooked branches, broadly roundish in full developed habitus; spreading by short suckers. Shoots glabrous when young, mature relatively thick, terete, dull; winter buds about 2 mm long, ovoidal to almost conical, with ciliate margins of scales. Leaves broadly elliptic, cuneate to broadly cuneate at the base, 4–6 cm long and 2.5–4 cm wide, with petioles 4–7 mm long, sharply doubly serrate (more deeply in upper leaves) except for the base, glabrous above, sparsely puberulous on the main vein beneath including petiole and on margin of young leaves; the foliage turning carmine red usually from the middle of September. Inflorescences compound corymbose panicles, entirely glabrous, in full flowering broadly pyramidal, 10–20 cm wide, with dense rounded top; its lower lateral axes distant, with a leaflet at ramification, unbranched in basal half or two third and with a leaf at the base. Flowers large, about 10 mm in diameter, white with slightly pinkish tinge; sepals glabrous, becoming reflexed, stamens distinctly longer than orbicular petals, staminal disk conspicuous, receptacle inside and pistils on ventral suture longly hairy, styles terminal.

Differential characters: Shrub up to 1.5 m high or more and 2.5 m wide; leaves broadly elliptic, 4–6 cm long and 2.5–4 cm wide; inflorescences large compound, leafy corymbose panicles, in full flowering broadly pyramidal, 10–20 cm wide, with dense rounded top and distant lower lateral axes, flowers about 10 mm in diameter, white with slightly pinkish tinge.

Etymology: The epithet honour Ludmila Cetlová, later Businská, who found the original plant.

Epithet's author (nominant): Roman Businský, the RILOG, Průhonice.

Illustration: On the opposite side.

Herbarium specimen: Herbarium of the RILOG, Průhonice – *Spiraea* No. 83/026 (coll. 23.6.1983), 85/066a (coll. 6.6.1985) & 85/066b (coll. 24.6.1985), all collected in the Dendrological garden of the RILOG, Průhonice, by Roman Businský.

Mother plant: Dendrological garden of the RILOG, Průhonice, B–III–168 (propagated vegetatively for the first time under No. 194/83).

Propagation: Autovegetatively by summer or hard-wood cuttings as a clone

Introducer & distribution guarantee: the RILOG, Průhonice.

ED of *Spiraea* 'Ludmila':

Clone: Průhonice DG VALUABLE

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| I | II | III | IV | V | VI | VII | VIII | IX | X | XI | XII |
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6 years

Longest period of blossoming: 72 days Blossoming richness: 3B

Height in 4 & 6 years: 110 & 150 cm Frost tolerance: 5

Width in 4 & 6 years: 160 & 200 cm

77 Spiraea ‘Ludmila’

***Spiraea japonica* L. fil. 'New Pruhonice'**

History: It has been cultivated under the name *Spiraea pruhoniciana* Zeman or *S. bumalda* 'Pruhoniciana' for about 50 years at Průhonice (on the lands of the RILOG and the Institute of Botany, Acad. of Sci. of the Czech Rep. nowadays), from where it has been distributed to nurseries in Bohemia and Moravia, and rarely to neighbouring countries (Slovakia). It is a vegetatively propagated plant supposedly originated by spontaneous generative reproduction of *S. japonica* 'Pruhoniciana' (arisen allegedly as a hybrid between *S. japonica* var. *ovalifolia* Franch. and *S. bumalda* Burvénich 'Anthony Waterer' at Průhonice, 1913; in detail see above) around World War II.

Originator: Roman Businský, the RILOG, Průhonice.

Taxonomy: A hypothetic offspring of *Spiraea japonica* 'Pruhoniciana' morphologically most similar to *S. japonica* var. *ovalifolia*.

Description: Shrub of middle size, about 1.4 m high and 2.8 m wide in the age of six years, up to 1.7 m high and 3.5 m wide when older, with middle dense habitus, semi-erectly branched initially, later turning broadly roundish wide-branching. Shoots glabrous when young. Leaves ovate to elliptic, sharply pointed at the apex and roundish at the base, 5–11 cm long and 2–5.5 cm wide, unequally to doubly serrate with cuspidate teeth, pale green to slightly glaucescent and glabrous beneath. Inflorescences arranged in complex corymbs, up to 25 cm in diameter, with pubescent axes; flowers pale rose, 8–10 mm in diameter, blossom from the end of the first decade of June to the end of July.

Differential characters: Shrub up to 1.7 m high; leaves ovate to elliptic, 5–11 × 2–5.5 cm, sharply pointed; inflorescences up to 25 cm in diameter; flowers pale rose. From the original description of *S. japonica* 'Pruhoniciana' (see above) it differs in bigger growth (about twice as higher), looser habitus, and in pale rose flowers.

Etymology: The epithet represents a new cultivar grown at Průhonice, derived from *Spiraea japonica* 'Pruhoniciana'.

Epithet's author (nominant): Roman Businský, the RILOG, Průhonice.

Illustration: On the opposite side.

Herbarium specimen: Herbarium of the RILOG, Průhonice – *Spiraea* No. 01/002: Dendrological garden of the RILOG, Průhonice, B–III–191, coll. Roman Businský, 16.8.2001. – *Spiraea* No. 97/001: Průhonice, the castle park, part 5, coll. Jiří Burda, 27.6.1997.

Mother plant: Průhonice, Bot. Inst. of Acad. Sci. of the Czech Rep., the castle park, part 5, plant No. B–033/1 (well developed shrub in a group of about 13 identical individuals planted out in 1960, which represent the oldest known plants of this clone).

Propagation: Autovegetatively by summer or hard-wood cuttings as a clone.

Introducer & distribution guarantee: the RILOG, Průhonice.

ED of *Spiraea japonica* 'New Pruhonice':

Clone: Průhonice DG FIRST-RATE

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|  I  |  II  |  III  |  IV  |  V  |  VI  |  VII  |  VIII  |  IX  |  X  |  XI  |  XII  |
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6 years

Longest period of blossoming: 45 days Blossoming richness: 3B

Height in 4 & 6 years: 120 & 140 cm Frost tolerance: 5

Width in 4 & 6 years: 200 & 280 cm

Note: *Spiraea japonica* 'New Pruhonice' is horticulturally very valuable cultivar with wide use including for strip plantings in urban setting or along highways. In the Czech countries it is frequently planted for a long time, in Slovakia is cultivated only rarely (e.g., in the Mlyňany Arboretum).

78 Spiraea japonica ‘New Pruhonice’

CONCLUSIONS

On the basis of a long-term study of the genus *Spiraea* in nature, herbaria, and in the culture, the former author considers the highest acceptable infrageneric division of the genus into four sections: *Glomerati* Nakai, *Chamaedryon* Ser., *Calospira* K. Koch, *Spiraea*, that is adopted here. The main criterion of the spireas classification is structure of inflorescences and their position on branchlets or shoots, with which the phenology of flowering directly corresponds. However, particular species of the genus form an almost continuous range across all four mentioned groups. Very easy and frequent spontaneous interspecific hybridization of spireas, usual even between members of different sections, confirms a relative genetic homogeneity of the genus. The process of spontaneous hybridization is made possible especially by contact of related species separated geographically in nature, when they are cultivated together. Therefore the progeny risen in cultivated plants collections is more frequently hybrid (and mostly fertile) than genetically pure. Number of known cultural hybrids is comparable with number of natural species. History of spireas discoveries was from the beginning closely connected with the introduction of plants into the culture for ornamental purposes. Mentioned facts, together with big species diversity in regions of SE Asia (largely in China and the Himalayas), still not explored sufficiently, put spireas among woody plants with significant proportion of incorrectly determined items in cultivation and in herbaria as well.

According to recent information there are three species of spireas autochthonous in the territory of Bohemia, Moravia and Slovakia: *Spiraea crenata* L., on the only locality in SE corner of Slovakia; *S. media* Schmidt, in most territory of Slovakia except for the W and NW part; *S. salicifolia* L., in S Bohemia and probably in SW Moravia (the occurrence of the species in SW and central Slovakia is uncertain). Records about the occurrence of *Spiraea chamaedryfolia* L. subsp. *ulmifolia* (Scop.) J. Duvigneaud from Slovakia probably concern naturalized plants only. On the basis of the taxonomic revision of herbarium samples and living plants of spireas, cultivated in the history of horticulture and botanical collections in Bohemia, Moravia and Slovakia, altogether 105 taxa in the cultivation was confirmed, of them: 42 natural species, 2 subspecies and 10 distinctly delimited varieties, 21 interspecific cultural hybrids including hybrid cultivars in the rank of species, and 30 other cultivars (22 of *S. japonica* L. fil.). The biggest importance for the introduction of spireas into the Czech countries from the beginning of the 20th century had the horticultural establishments and institutes in the area at Průhonice near Praha. Similar importance for Slovakia had the Mlyňany Arboretum near Nitra. Tradition of the woody plants introduction at Průhonice was taken up by new collection of taxa from abroad in the last quarter of the century, together with the specialized investigation of spireas, summarized in this publication.

The intensive evaluation of living plants of about 70 spirea taxa (represented usually by single selected clone), collected from the territory of former Czechoslovakia, was carrying out in the Dendrological garden of the Research Institute of Ornamental Gardening at Průhonice in the years 1983 to 1990. Results of the evaluation are summarized here in tables of evaluation data for particular taxa. The tables include the synoptic phenological diagram of buds flushing and blossoming, and also a category of estimated gardening prosperousness of the taxon in our climatic conditions. In the framework of these categories there were universally evaluated 19 taxa first-rate, 16 valuable, and 30 insignificant. The first-rate taxa are represented by eight species (of these, *Spiraea japonica* by five cultivars), and by five cultural hybrids in the rank of species. The study of living spirea plants at Průhonice culminated by description of four new hybrid cultivars.

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C Z E C H S U M M A R Y

Rod *Spiraea* v kultuře v Čechách, na Moravě* a na Slovensku

Rod *Spiraea* L., tavolník, reprezentuje opadavé keře z čeledi *Rosaceae* Juss., podčeledi *Spiraeoideae* Focke (resp. čeledi *Spiraeaceae* Humb., Bonpl. & Kunth v užším pojetí). Rod je rozšířen v mírném až subtropickém pásmu severní polokoule s celkovým počtem přes 100 druhů a vykazuje nejbohatší druhovou diverzitu na území Číny, kde se vyskytuje přes 60 autochtonních druhů (včetně Tchajwanu). Další oblasti s bohatším zastoupením druhů sousedí s Čínou, takže mají některé druhy společné, ale také některé endemické. Jsou to především oblasti Střední Asie a Himálaje, dále Korea a Japonsko. Naproti tomu v Evropě je známo pouze sedm autochtonních druhů, z nichž jen dva mají malý areál pouze na území Evropy a ostatní sem zasahují z Asie, kde mají hlavní rozšíření. Na americkém kontinentu je podle nového pojetí udáváno jen osm druhů v USA a Kanadě a jeden endemický druh roste v Mexiku.

* včetně části Slezska příslušící České republice

Historie klasifikace rodu *Spiraea*

První druhy tavolníků známé okolo poloviny 18. století popsal v r. 1753 švédský přírodovědec C. Linné, autor latinského rodového jména. Linnéovo pojetí taxonů však bylo všeobecně velmi široké, zahrnující v případě tavolníků druhy později oddělované do samostatných rodů, často zastoupených bylinnými zástupci a v některých případech ani nepříslušících k dnes vymezované podčeledi *Spiraeoideae*. Z Linnéových druhů zůstalo pět v dnešním úzce vymezeném rodu *Spiraea*, z nichž *S. salicifolia* byla vybrána jako typ rodu. O první podrobnou klasifikaci tavolníků se pokusil francouzský botanik J. CAMBESSEDES (1824) v nejstarší publikované monografii rodu *Spiraea*. V uvedené monografii, sestavené v duchu trvající široce chápané rodové taxonomie, je zahrnuto asi 16 dnešních druhů pravých tavolníků a dále druhy patřící do dalších devíti dnešních rodů. Avšak i některé pravé tavolníky jsou tam vymezeny jinak, než pozdějšími autory nebo je jejich identita nejasná. Nejrozsáhlejší klasifikace rodu *Spiraea* v 19. století byla zpracována ruským botanikem C. J. MAXIMOWICZem (1879). Dílo obsahuje celkem 30 až 35 dnes uznávaných druhů pravých tavolníků a v rámci rodu *Spiraea* již jen jedinou skupinu řazenou později samostatně. Maximowiczovo pojetí druhů a variet je všeobecně velmi blízké pojetí uznávanému dnešními autory, přestože od doby publikování uvedené monografie byl popsán přibližně dvojnásobek nových druhů tavolníků. Koncem 19. století sepsal německý lesník a dendrolog H. ZABEL (1893) monografické dílo o tavolnících pěstovaných v německých zahradách, v němž uvádí kromě popisů jednotlivých druhů a hybridů také variabilitu v podobě popisů forem známých v kultuře. Celkem jeho dílo zahrnuje 30 druhů pravých tavolníků (asi 25 druhů v dnešním pojetí) a téměř 40 hybridů. V rámci dendrologických encyklopedií první třetiny 20. století byl rod *Spiraea* podrobně zpracován C. K. SCHNEIDERem (1905) a A. REHDERem v r. 1927 (viz též 1958).

Citovaní i další autoři prací o rodu *Spiraea* z druhé poloviny 19. a první poloviny 20. století členili skupinu pravých tavolníků do vnitrorodových taxonů, buď do podrodů, sekcí nebo sérií podle individuálního pojetí, ale obvykle podle principiálně stejného systému založeného na hodnocení stavby květenství a jejich umístění na větévkách. Tento systém začíná u druhů s květy na jednoduchých stopkách v přisedlých svazcích, dále v okolič natých nebo chocholič natých hroznech na krátkých olistěných větévkách – ve všech dosavadních případech vyrůstajících z pupenů na loňských výhonech – přes druhy s plochými složenými chocholíky po druhy s pyramidálními latami na konci dlouhých letorostů. Systém představuje víceméně plynulou morfologickou řadu druhů reprezentujících stále více složená květenství na postupně se prodlužujících letorostech, která přímo koresponduje s obdobím kvetení tavolníků od druhů časně z jara kvetoucích (brzo po rašení před růstem sterilních olistěných výhonů) po druhy kvetoucí až v pozdním létě na konci plně vyvinutých silných výhonů. Alternativní systém rodu *Spiraea*, vycházející ze stejného morfologického principu, ale s částečně opačným pořadím druhů navrhl japonský botanik T. NAKAI (1916), současně s rozdělením rodu na dva podrody. Tato klasifikace byla částečně použita ve Flóře SSSR (POJARKOVA 1939). Nově propracovaný systém vnitrorodového členění tavolníků s rozlišením deseti sérií ve čtyřech sekcích, představující syntézu předchozích prací různých autorů, publikovali čínští autoři YÜ & KUAN (1963). Tento systém byl beze změny přijat ve Flora RP Sinicae (YÜ & LU 1974), která se zabývá největším počtem přírodních druhů. Dotyčný systém členění rodu na primární úrovni čtyř sekcí, *Spiraea*, *Calospira* K. Koch, *Chamaedryon* Ser. a *Glomerati* Nakai, se dnes jeví být nejvíce přirozený, a proto je přijmut i v této práci. Přesto je jisté, že schematická morfologická řada tavolníků je jednotlivými druhy natolik plynule reprezentována, že vymezení jakýchkoli vyšších vnitrorodových jednotek (do jisté míry i sekcí) je poněkud umělé a zařazení některých druhů proble-matické. V každém případě patří rod *Spiraea* k taxonomicky obtížným a dosud málo prozkoumaným skupinám dřevin severního mírného pásma. Důvodem je zejména rozsáhlá druhová diverzita rodu v méně prozkoumaných oblastech jihovýchodní Asie, dále překrývání variability mezi příbuznými nebo podobnými druhy a také častá spontánní mezidruhová hybridizace.

Historie pěstování rodu *Spiraea* ve světě

Historie botanických objevů a prvních popisů druhů rodu *Spiraea* byla od začátku úzce spjata s introdukcí rostlin do kultury a s využíváním tavolníků jako okrasných kvetoucích keřů. Tavolníky byly již dávno používány v zahradách ve staré Číně a v Japonsku. Do Evropy byly poprvé ze zámoří introdukovány dva východoamerické druhy, *Spiraea alba* Du Roi (patrně v r. 1759) a *S. tomentosa* L. (patrně již v r. 1736), a to dříve než byly botanicky popsány. Rovněž několik asijských druhů bylo introdukováno do kultury v Evropě před jejich popisem. Proto již v 19. století bylo mnoho druhů tavolníků pěstováno kromě botanických zahrad a arboret také školkařskými firmami a vysazováno v zámeckých zahradách a parcích, především v Anglii, Francii a Německu. V kultuře se tak dostalo do kontaktu mnoho druhů z různých oblastí původu, což umožnilo jejich spontánní mezidruhovou hybridizaci. Z hybridního potomstva pak byly vybírány rostliny zajímavé z okrasného hlediska. Největší množství hybridních taxonů soustředil a popsal zmíněný H. ZABEL (viz 1893). Kromě četných hybridů byly u některých druhů vybírány a dále vegetativně v kultuře udržovány atraktivní mutace a formy. Mezi takto šlechtěnými druhy vždy vynikala *S. japonica* L. fil., která je atraktivní svými květy s různými odstíny růžové až po temně karmínovou, což je u tavolníků vzácné. Dnešní počet kultivarů tohoto druhu převyšuje součet všech kultivarů zbývajících druhů, nepočítáme-li staré kulturní kříženec.

Vlivem dlouhodobé tradice úspěšné introdukce a pěstování rozsáhlého sortimentu druhů tavolníků patří druhy tohoto rodu v kultuře paradoxně k nejvíce zaměňovaným a chybně determinovaným dřevinám. Hlavním důvodem je nesporně velmi snadná mezidruhová hybridizace, ke které spontánně dochází při eliminaci přirozených prostorových bariér. Tento fenomén je zapříčiněn relativní genetickou homogenitou rodu, takže se mezi sebou spontánně (a obvykle fertilně) kříží téměř jakékoli kombinace druhů (kromě zástupců sekce *Glomerati*, křížících se jen s druhy sousední sekce *Chamaedryon*), dostanou-li se v kultuře do kontaktu.

Tavolníky v kultuře v Čechách, na Moravě a na Slovensku

Nejstarší herbářové doklady dokumentující pěstování introdukovaných druhů u nás pocházejí z konce první poloviny 19. století – týkají se druhů *Spiraea cantoniensis* Lour., *S. canescens* D. Don a *S. alba* Du Roi. Z konce 19. století pocházejí první nálezy zplanělých cizích druhů tavolníků (např. *S. alba* z r. 1883).

Zásadní vliv na introdukci a pěstování cizích druhů dřevin včetně tavolníků v Čechách a v návaznosti na Moravě a Slovensku od začátku 20. století mělo založení parku u zámku v Průhonicích nedaleko Prahy (v roce 1885) a především pozdější aktivity s tím spojené. Zakladatel Průhonického parku, hrabě A. E. Silva Tarouca, se stal prezidentem Dendrologické společnosti v Rakousku-Uhersku, založené v r. 1908 ve Vídni. Generálním tajemníkem společnosti se stal zmíněný přední dendrolog C. K. Schneider, autor řady jmen taxonů tavolníků. Dendrologická společnost měla svoji pokusnou introdukční zahradu od r. 1909 v Průhonicích, později na několika pozemcích. Objekt nazývaný Spolkové zahrady v Průhonicích pak fungoval v letech 1922 až 1954 pod Československou dendrologickou společností. Průhonický zámecký park byl v roce 1927 odkoupen Československým státem a ministerstvo zemědělství zřídilo v Průhonicích Státní pokusné objekty zemědělské s Výzkumnou stanicí pro okrasné zahradnictví, v r. 1954 ustanovenou jako Výzkumný ústav okrasného zahradnictví. V roce 1962 byly pozemky s dendrologickými sbírkami rozděleny a část včetně zámeckého parku přiřazena do správy Československé akademie věd jako Botanická zahrada, později oddělení Botanického ústavu Akademie věd České republiky. Tento stav trvá dodnes s tím, že starší z obou ústavů dnes nese jméno původního zakladatele zámeckého parku: Výzkumný ústav Silva Taroucy pro krajinu a okrasné zahradnictví (VÚKOZ). Hlavní objekt Spolkových zahrad, přemístěný počátkem 30. let na nový pozemek "Štípenka", se stal později základem Dendrologické zahrady VÚKOZ.

Do kultury v Průhonicích se již před I. světovou válkou dostalo více druhů tavolníků pocházejících z terénních sběrů E. H. Wilsona v Číně. V rámci činnosti Dendrologické společnosti uskutečnil v roce 1913 C. K. Schneider spolu s rakouským botanikem H. Handel-Mazzetti*m* sběrnou Expedici do Číny, která byla předčasně ukončena pro vypuknutí I. světové války, kvůli které odjel Schneider se sběry do USA, kde pět let pracoval s A. Rehderem v Arnold Arboretu. Od návratu do Vídně v r. 1920 nadále spolupracoval s Dendrologickou společností v novém Československu a tak se do Spolkové zahrady v Průhonicích dostaly rostliny pocházející z jeho sběrů v Číně, včetně některých tavolníků. Podle historických záznamů shrnutých P. SVOBODOU a kol. (1967) bylo v roce 1927 v Průhonickém parku pěstováno 47 relativně identifikovatelných taxonů rodu *Spiraea* (z toho 26 přírodních druhů). Kompletní výčet sortimentu tavolníků pěstovaných jen ve 30. letech v celém areálu Průhonic reprezentuje 36 přírodních druhů, 15 mezidruhových hybridů a 21 variet nebo dnešních kultivarů. Přes věrohodnost zdrojů tehdejších údajů je však pravděpodobné, že některá z jmen mohla být chybně použita

pro rostliny odlišného taxonomického obsahu, neboť dodnes jsou některé taxonomické problémy tavolníků, zejména JV Asie, nedořešeny. Za II. světové války a v poválečných letech došlo k významnému ochuzení dendrologických sbírek v Průhonicích. Tak při revizi výskytu dřevin v Průhonickém parku z let 1963–1965 bylo zjištěno jen devět přírodních druhů tavolníků, tři mezidruhové hybridy a čtyři kultivary od *Spiraea japonica* L. fil. (SVOBODA a kol. 1967). V 70. a 80. letech probíhala nová vlna introdukce dřevin do Průhonic, a to na Dendrologickou zahradu Výzkumného ústavu okrasného zahradnictví. Tavolníky sem byly dováženy především z Anglie od firmy Hillier (přes 20 taxonů, částečně již u nás pěstovaných pro verifikaci materiálu, částečně nových), ale i z Německa (firma Kordes a Schmidt); některé byly získány mezinárodní výměnou semen v rámci nabídek "Index Seminum".

K rozšiřování pěstovaného sortimentu tavolníků v Čechách a na Moravě rovněž přispěly tuzemské zahradnické a školkařské firmy zabývající se pěstováním okrasných keřů. Některá zahradnictví u nás prosperovala již koncem 19. století, k největšímu rozvoji zahradnických firem však došlo za existence Československé republiky po roce 1919 do II. světové války. Během ní a po nástupu komunistického režimu v r. 1948 došlo u nás k výraznému útlumu okrasného zahradnictví. Jen několik firem fungovalo dál téměř kontinuálně na vysoké odborné úrovni. V Čechách to byly především školky v Žehušicích u Kutné Hory, založené v r. 1925 (např. v r. 1936 nabízely 20 druhů a kříženců tavolníků a dalších 7 kultivarů); později se staly významné i školky v Litomyšli, založené 1946. Na Moravě byly nejvýznamnější okrasné Horákovy školky v Bystřici pod Hostýnem, založené v r. 1926. Zásluhou zahradnických firem se dostalo do kultury v Českých zemí několik taxonů tavolníků, které nebyly v areálu Průhonic pěstovány, nebo alespoň vedeny ve zdejší evidenci rostlin nejméně do 80. let. Z nich byly herbářovými vzorky nebo ojedinělými zbytky starších výsadeb v Čechách doloženy čtyři mezidruhové hybridy a jeden další byl uváděn v katalozích. V posledních desetiletích obohatily sortiment pěstovaných tavolníků v Čechách a na Moravě také významnější tuzemská arboreta a botanické zahrady, které mají přínos zejména v získávání nových taxonů nebo proveniencí prostřednictvím zmíněné mezinárodní výměny semen v rámci nabídek "Index Seminum". Z těchto pracovišť jsou u nás nejvýznamnější v Čechách především Arboretum v Kostelci n. Č. L. (Lesnické fakulta České zemědělské university v Praze) a na Moravě pak Botanická zahrada a arboretum v Brně (Mendelova zemědělská a lesnická universita).

Situace s pěstováním cizokrajných nebo kulturních tavolníků na Slovensku byla jednodušší. Koncem 19. století byla v hornickém městě Schemnitz (dnešní Banská Štiavnica) Botanická zahrada, kde bylo v 90. letech pěstováno asi deset taxonů tavolníků, které jsou doloženy herbářovými položkami z let 1894–1895. Podobný význam jaký pro dendrologii a introdukci dřevin v Českých zemích představovaly Průhonice, mělo pro Slovensko Arboretum Mlyňany u Nitry, působící v poslední době jako Ústav dendrobiologie Slovenské akademie věd. Toto arboretum se proslavilo především introdukcí stálezelených dřevin, ale i pro pěstování sortimentu tavolníků bylo velmi významné, zejména po II. světové válce (z dřívějšího období se nedochovala věrohodná evidence taxonů rodu *Spiraea* ani živé rostliny). Od roku 1956 se zde získávaly rostliny prostřednictvím mezinárodní výměny semen v rámci nabídek "Index Seminum". Velký význam pro obohacení sortimentu tavolníků měla zejména sběrná expedice do Číny v r. 1960 (do pohoří Tianmu Shan v pohraničí provincií Zhejiang a Anhui) a rovněž výpravy do Koreje v letech 1982–1985. Rostlinný materiál z těchto expedic byl použit pro založení nových ploch geograficky specializovaných dendrologických expozic. První kompletní soupis dřevin Arboreta Mlyňany sestavil BENČAŤ (1967), ve kterém je uvedeno 24 taxonů tavolníků, z toho 13 přírodních druhů. V soupisu genofondu dřevin Arboreta Mlyňany, sepsaného k výročí jeho stoleté existence (TÁBOR & TOMAŠKO 1992), je uvedeno již 46 taxonů tavolníků, z toho 29 přírodních druhů. V letech 1983 až 1992 zde byla autory prováděna revize rodu *Spiraea*, při které byla potvrzena přítomnost 20 přírodních druhů, tří mezidruhových hybridů a sedmi variet nebo kultivarů. Pro pěstování a introdukci tavolníků na Slovensku mají v posledních desetiletích větší význam také botanické zahrady. Na západním Slovensku je to Botanická zahrada University Komenského v Bratislavě a na východě Botanická zahrada P. J. Šafárika v Košicích, která má v posledních dvaceti letech, po Arboretu Mlyňany, druhý nejbohatší pěstovaný sortiment tavolníků na Slovensku. V průběhu 80. let byly z většiny nalezených vzácných taxonů a zajímavých jedinců tavolníků pěstovaných v Arboretu Mlyňany a v Botanické zahradě v Košicích autory odebrány řízky a z nich namnoženy a vysazeny rostliny v Dendrologické zahradě v Průhonicích pro účely porovnání a obohacení sortimentu.

Klimatické podmínky v Čechách a z větší části i na Moravě představují přechodnou zónu mezi oceanickým a kontinentálním klimatem, která není vhodná pro pěstování některých choulostivějších druhů tavolníků, které mohou během některých zimních sezon částečně zmrzat (nejčastěji jednoleté výhony,

výjimečně i starší větve). Týká se to jen malého množství pěstovaných druhů a většiny jejich kříženců. Jde především o druhy pocházející z regionu jižní až JV Číny, jako *Spiraea thunbergii* Sieb. ex Blume, *S. chinensis* Maxim., *S. cantoniensis* Lour. {ale nikoli její otužilý kříženec *S.* ×*vanhouttei* (Briot) Zab.} a druhy z oblasti Himálají, jako *S. canescens* D. Don, *S. bella* Sims. a *S. expansa* Wall. ex K. Koch. Nejteplejší oblasti středních Čech a jižní Moravy jsou sice svým klimatickým průměrem vhodné i pro choulostivější druhy, ale občasné teplotní výkyvy činí takovéto druhy u nás pěstitelsky nestabilní. Teplejší, ale srážkově chudé oblasti jižního a jihovýchodního Slovenska navazující na Panonskou nížinu jsou vhodné pro pěstování choulostivějších druhů, např. pro *S. cantoniensis*, nejsou však příznivé pro druhy vyžadující větší vlhkost, tj. zejména druhy z oblasti Himálají (to se týká jak Arboreta Mlyňany, tak Botanické zahrady v Košicích).

Hodnocení tavolníků v Dendrologické zahradě v Průhonicích

Tavolníky patří mezi důležité dřeviny v okrasném zahradnictví. Většina druhů je velmi nenáročných na půdu a vlhkost, a tak mnohé dobře prosperují ve vysychavých, chudých a kamenitých nebo alespoň dobře drenážovaných substrátech; jen několik druhů ze sekce *Spiraea* vyžaduje vyšší půdní vlhkost. Oba typy požadavků jsou dobře využitelné v zahradnické praxi, tím spíše, že řada druhů snáší jeden nebo druhý typ prostředí i v extrémech. Většina druhů však vyžaduje výslunná stanoviště, zejména pokud chceme aby bohatě kvetly a vytvářely plně funkční zeleň. Je sice řada druhů rostoucích na přirozených lokalitách jako podrost ve stinných křovinatých lesích, zejména v jihovýchodní Asii, ale tyto druhy jsou obvykle pěstovány vzácně jako botanická zajímavost, často kvetou jen řídce (zejména při zastínění) a nejsou pro zahradnickou praxi příliš důležité. Přesto i tyto druhy snášející hlubší zastínění obvykle dobře prosperují na slunci. Mnoho druhů se vyznačuje tvorbou podzemních výběžků, pomocí kterých se keře postupně rozrůstají do kolonií. Řada druhů se rozvětvuje velmi hustě, takže dospělé keře jsou na osluněných stanovištích kompaktní, ať jde o druhy rozrůstavé do šířky nebo jen hustě trsnaté. Většina druhů a kříženců využívaných v kultuře je atraktivních v době květu, přestože všechny tavolníky mají relativně drobné až velmi drobné květy. Tento nedostatek je plně kompenzován tvorbou buď velkých hustých květenství nebo obvyklou početností malých květenství na květonosných větvích. U většiny druhů je barva květů bílá, někdy s nažloutlým, jindy narůžovělým odstínem, jen několik druhů vytváří sytě růžové až tmavě karmínově červené květy – tyto druhy jsou zvlášť oblíbeny, včetně jejich kříženců. Některé druhy jsou atraktivní podzimním vybarvováním listů do červených odstínů. Uvedené vlastnosti předurčují tavolníky pro široké uplatnění v zahradnické praxi pro zeleň nejrůznějšího zaměření od výsadeb květem atraktivních solitérních keřů po technické výsadby proti sesuvu půdy nebo ke zpevnění břehů vodních toků. Oblíbené je používání tavolníků ve skupinových výsadbách do měst a podél silničních komunikacích, kde je využívána jejich krycí i estetická funkce současně. Přes velký význam tavolníků v zahradnické praxi došlo u nás ve druhé polovině století ke zřetelnému ochuzení jejich běžně pěstovaného sortimentu. Patrně to souvisí s dlouhodobou stagnací zahradní tvorby a parkových výsadeb za komunistického režimu, kdy se zejména z dříve dendrologicky pestrých a architektonicky hodnotných městských a zámeckých parků a zahrad začalo vytrácet krátkověké keřové patro, které dosud není uspokojivě obnovováno. Proto i tavolníky jsou u nás stále pěstitelsky nedoceněnými dřevinami používanými dnes jen ve velmi omezeném sortimentu s oblibou převážně zakrslých kultivarů dorůstajících jen okolo 0.5 m. Proto se stalo cílem naší práce v Dendrologické zahradě Výzkumného ústavu okrasného zahradnictví v Průhonicích (níže viz DZ Průhonice) jednak taxonomicky zrevidovat a znovu soustředit sortiment rodu *Spiraea* pěstovaný v bývalém Československu a jednak ze zahradnických hledisek vyhodnotit tento sortiment v našich klimatických podmínkách. Druhý typ aktivit se pak zaměřil na výběr perpektivních taxonů nebo klonů pro rozšířené používaní v zahradnické praxi a na založení klonové matečnice využitelné k produkci taxonomicky i funkčně ověřeného množitelského materiálu pro školkařské firmy.

P o u ž i t á m e t o d a a m a t e r i á l

Základní metodou studia zástupců rodu *Spiraea* vyskytujících se v kultuře na území bývalého Československa bylo soustředit na jedno místo (DZ Průhonice) živý materiál a paralelně sebrat herbářové doklady ze všech zjištěných taxonů, proveniencí a klonů. Tato metoda se ukázala jako nezbytný počáteční krok ke zpracování taxonomické revize tavolníků pěstovaných v uvedeném regionu. Vzájemným srovnáním položek živého a herbářového materiálu a porovnáním s literaturou pak bylo možné utřídit a determinovat většinu taxonů. K poznání variability mnoha druhů rovněž přispělo mnohaleté terénní studium rodu v přírodě. Autoři provedli sérii expedic do oblasti JV Asie, kde je domácích okolo 80 procent celkového druhového bohatství. V rámci tohoto terénního studia byl shromážděn rozsáhlý herbářový materiál tavolníků z osmi výprav do Čínské lidové republiky (1990–2001), dvou výprav do Japonska (1991 a 1997) a jedné výpravy na Tchajwan (1991). Dále byly v roce

1992 a 1995 prozkoumány vzorky většiny druhů rodu *Spiraea* domácích v Číně ve dvou největších čínských herbářových sbírkách, v Xiang Shan v Pekingu (PE) a v Kunmingu v provincii Yunnan (KUN), patřících Botanickému ústavu Čínské Akademie.

Studium pěstovaných tavolníků bylo v prvé řadě zaměřeno na jednotlivá pracoviště v Čechách, na Moravě a na Slovensku, která se profesionálně zabývala dendrologií, introdukcí a pěstováním dřevin. Autoři revidovali tavolníky na těchto pracovištích v letech 1982 až 1992. Od většiny taxonů byly sebrány herbářové doklady, které jsou dnes uloženy ve VÚKOZ v Průhonicích. Jde o následujicí pracoviště, uvedená podle současnosti:

- Dendrologická zahrada Výzkumného ústavu Silva Taroucy pro krajinu a okrasné zahradnictví (VÚKOZ), Průhonice
- Průhonický park a arboretum, Botanický ústav Akademie věd České republiky, Průhonice
- Botanická zahrada University Karlovy v Praze, Praha 2, Na Slupi
- Arboretum Peklov, Truba, Kostelec n. Č. L., okr. Kolín (Lesnická fakulta, Česká zemědělská univerzita v Praze)
- Botanická zahrada a arboretum, Mendelova zemědělská a lesnická univerzita, Brno
- Arboretum Křtiny, Křtiny, okres Blansko (Lesnická a dřevařská fakulta, Mendelova zemědělská a lesnická univerzita, Brno)
- Arboretum Nový Dvůr, Stěbořice, okres Opava (Slezské muzeum, Opava)
- Botanická zahrada Univerzity Komenského, Bratislava, Slovenská republika
- Aboretum Mlyňany SAV, okres Zlaté Moravce, Slovenská republika
- Botanická zahrada Univerzity P. J. Šafárika, Košice, Slovenská republika

Současně byly v uvedeném období i později se stejným cílem prozkoumávány sortimenty tavolníků pěstované v našich školkařských firmách a výsadby zeleně v zámeckých a městských parcích a zahradách i v krajině (kolem silničních komunikací). Kromě živých rostlin byly studovány starší herbářové doklady divoce rostoucích, zplanělých nebo pěstovaných tavolníků z Čech, Moravy a Slovenska i ze zahraničí, a to v následujících institucích:

- Národní Muzeum Praha, Botanické oddělení Průhonice (PR)
- Přírodovědecká fakulta Univerzity Karlovy v Praze, Katedra botaniky (PRC)
- Přírodovědecká fakulta Masarykovy Univerzity v Brně, Katedra biologie rostlin (BRNU)
- Mendelova zeměd. a les. univerzita Brno, Ústav lesnické botaniky, dendrologie a typologie (BRNL)

Během osmdesátých let se nám podařilo paralelně s prováděním taxonomické revize shromáždit v DZ v Průhonicích téměř kompletní soubor taxonů rodu *Spiraea* zjištěných na území tehdejšího Československa, tj., kromě třech domácích druhů, sortiment pěstovaný v uvedené době v botanických zahradách, arboretech, v okrasných školkách, ve veřejných parcích i soukromých zahradách a jiných typech výsadeb. Tento soubor byl tvořen přibližně 70 taxony, z nichž většina byla metodicky jednotně vegetativně namnožena (obvykle bylinnými řízky) ve dvou obdobích v r. 1980 a 1983 a vysazena po obvykle 4–6 jedincích na srovnávací plochy na DZ v předjaří v r. 1983 a 1985. Menší množství dodatečně získaných taxonů bylo dosazeno později. Na srovnávacích plochách pak byly taxony od prvního vegetačního období po výsadbě dlouhodobě sledovány a pravidelně hodnoceny ze zahradnických hledisek. Období intenzivního pravidelného hodnocení (IPH) trvalo do konce roku 1990, t.j. u většiny taxonů po dobu šesti až osmi let. Začátkem roku 1991 byly výsledky částečně zpracovány v rámci širšího hodnocení listnatých keřů okrasných květem, dílčího projektu výzkumného programu Výzkumného ústavu okrasného zahradnictví. V následujících letech byl pěstovaný sortiment tavolníků sledován dál, ale méně intenzivně a rovněž doplňován o některé nové zahraniční kultivary nebo botanické taxony, které se podařilo získat až dodatečně.

Hodnocení taxonů ze zahradnických hledisek

Jednotlivé hodnocené taxony jsou ve většině případů reprezentovány jedním vybraným klonem, který se jevil morfologicky nejvíce typický a nejvhodnější ze sadovnického hlediska; v malém počtu případů byly hodnoceny rostliny vypěstované vegetativním rozmnožením více jedinců z přírody (*Spiraea media*, *S. salicifolia*) nebo vyrostlé ze semen. Původ vybraných klonů nebo rostlin často není přesný pro nedostatek původních informací. Stručné výsledky hodnocení vybraných klonů nebo rostlin a související údaje jsou uvedeny za celkovou charakteristikou příslušného taxonu v přehledu observačních dat. Během hodnocení vybraných klonů nebo rostlin byly získávány fenologické, vzrůstové a sadovnicko-pěstitelské informace podle následujících kriterií.

Fenologické údaje:

A. *Hodnocené každou vegetační sezonu během IPH taxonu*
1) začátek **rašení** zimních pupenů (datum prorašení asi 1/3 zimních pupenů)
2) začátek, konec, celková a hlavní doba **kvetení** podle následujících kriterií
   a) začátek kvetení = kalendářní datum rozkvetení asi 1/3 poupat
   b) konec kvetení = kalendářní datum odkvětu asi 2/3 posledních květů
   c) celková doba kvetení = celkový počet dní od začátku po konec kvetení
   d) hlavní doba kvetení = období kdy intenzita kvetení neklesá pod přibližně 1/3 maximální intenzity

B. *Shrnuté z předchozích údajů*
1) rašení zimních pupenů – rozsah zjištěných dat začátků rašení
2) kvetení:
   – nejčasnější kvetení = nejčasnější zjištěné datum začátku kvetení
   – nejpozdnější kvetení = nejpozdnější zjištěné datum konce kvetení
   – nejdelší období kvetení = nejdelší zjištěná celková doba kvetení za jedno vegetační období
   – hlavní období kvetení zjištěné celkovým porovnáním ročních údajů

Vzrůst a habitus:

1) **Výška** a **šířka keřů** hodnoceného klonu nebo rostlin hodnocené každoročně (průměr hodnot jedinců).
2) **Habitus keřů** hodnoceného klonu nebo rostlin: stručný popis habitu s charakterem a hustotou nebo texturou větvení, způsobu rozrůstání a pod. (hodnoceno poprvé po čtyřech letech od výsadby).

Estetická charakteristika:

Bohatost kvetení hodnocená každoročně v období hlavního kvetení podle relativního bodovacího klasifikátoru v rozsahu 0–3 body se dvěma variantami:
0 bodů = rostliny nekvetou nebo jen velmi ojediněle
1 bod = rostliny kvetou řídce
2 body = rostliny kvetou středně bohatě
3 body = rostliny kvetou bohatě
varianta A = rovnoměrné rozmístění květů
varianta B = nerovnoměrné rozmístění květů

Ekologické charakteristiky:

1) **Odolnost** klonu (rostlin) **vůči zimním mrazům** hodnocená každoročně začátkem vegetačního období podle relativního bodovacího klasifikátoru v rozsahu 0–5 bodů:
0 bodů = zcela neodolný – celé keře zmrzlé
1 bod = neodolný – loňské výhony velmi značně poškozené mrazem až k zemi
2 body = slabě odolný – loňské výhony značně poškozené mrazem do asi 3/4 délky
3 body = středně odolný – loňské výhony středně poškozené mrazem do asi 1/2 délky
4 body = odolný – loňské výhony mírně poškozené mrazem do asi 1/4 délky
5 bodů = velmi odolný – loňské výhony nejsou poškoz. mrazem nebo poškoz. jen v nevyzrálých vrcholech

2) Rozsah **poškození** obligátně se vyskytujícím **škůdcem** (sledováno pouze u mšic) hodnocený každoročně ve třech vhodných termínech od začátku léta do podzimu podle relativního bodovacího klasifikátoru v rozsahu 1–5 bodů:
1 bod = výskyt škůdce velmi hojný – na ploše přes 50% povrchu rostliny;
2 body = výskyt škůdce plošně rovnoměrný – na 25–50% povrchu rostliny;
3 body = výskyt škůdce plošně nerovnoměrný – na 5–25% povrchu rostliny;
4 body = výskyt škůdce ojedinělý – na ploše do asi 5% povrchu rostliny;
5 bodů = rostliny bez výskytu škůdce

Všeobecné vyhodnocení:

Tři kategorie odhadnuté **sadovnické perspektivity** taxonu pro běžné výsadby v našich podmínkách: *prvotřídní*, *hodnotný* nebo *postradatelný*, přičemž první dvě kategorie jsou chápany jako varianty pro sadovnicky perspektivní taxony, třetí představuje taxony všeobecně neperspektivní. Kategorie jsou zobecněny pro příslušný taxon na základě hodnoceného reprezentativního klonu, respektive rostlin.

Systematické zpracování

Taxony podrobně zpracované v této práci jsou uvedeny ve dvou skupinách, z nichž první zahrnuje **přírodní druhy s jejich varietami (poddruhy) a přímo odvozenými kultivary**, druhá pak kulturní taxony v druhové kategorii, tedy **mezidruhové kříženec a hybridní kultivary**. V obou skupinách jsou taxony řazeny do akceptovaných sekcí rodu (viz výše) a v rámci nich pak podle relativní příbuznosti. Ve druhé skupině jsou pak samostatně uvedeni kříženci mezi druhy různých sekcí a na závěr jsou popsány čtyři nové kultivary, z toho tři bez druhového zařazení vzhledem k jejich nejasnému genetickému původu.

U jednotlivých druhů jsou uvedeny tyto údaje (pokud jsou relevantní):

- akceptované korektní jméno taxonu
- celková charakteristika taxonu v podobě následujících údajů:
  a) přirozené rozšíření;
  b) taxonomické poznámky a poznatky z vlastního pozorování v přírodě;
  c) historie introdukce do kultury, obecný pěstitelský význam, použití a poznatky o pěstování v Českých zemích a na Slovensku;
  d) významné infraspecifické taxony a kultivary se stručnou charakteristikou (v případě *Spiraea japonica* L. fil., jediného druhu s větším počtem kultivarů, jsou údaje o kultivarech uvedeny samostatně a kultivary řazeny abecedně)
- přehled observačních dat [ED] obsahující shrnutí intenzivního pravidelného hodnocení vybraného klonu nebo rostlin ze zahradnických hledisek podle výše uvedených kriterií:
  – původ hodnoceného klonu nebo rostlin
  – kategorie všeobecného vyhodnocení (vpravo velkými písmeny): *prvotřídní* [first-rate], *hodnotný* [valuable], *postradatelný* [insignificant]
  – fenologický diagram znázorňující: rozsah zjištěných dat začátků rašení (**.....**), období kvetení mezi prvním a posledním zjištěným kvetením (**------**), hlavní období kvetení (====)
  – počet let pravidelného hodnocení (uprostřed pod diagramem)
  – nejdelší období kvetení [longest period of blossoming]
  – průměrná výška [height] a šířka [width] keřů ve dvou obdobích věku od výsadby (ve čtvrtém a posl. roce IPH)
    * = vzrůst byl hodnocen na nevhodném suchém stanovišti s relativně mělkou půdou
  – bohatost kvetení [blossoming richness] (střední hodnota z jednotlivých ročních údajů)
  – odolnost vůči zimním mrazům [frost tolerance] (střední hodnota z jednotlivých ročních údajů)
  – rozsah poškození mšicemi [injury due to aphids] – uvedeno pouze u taxonů, které tímto škůdcem obligátně trpí, tj. u zástupců typické sekce rodu a jejich kříženců (uvedena střední hodnota z jednotlivých ročních údajů)
  – poznámky o habitu, případně dalších vlastnostech hodnocených keřů (např. náchylnost k zimnímu okusu zvěří)

Kresby většiny uvedených taxonů, doprovázející tuto práci, byly nakresleny podle herbářových dokladů rostlin pěstovaných na území Čech, Moravy a Slovenska; malá část kreseb byla nakreslena podle herbářových dokladů z přírody (pak je uvedena lokalita, na které byl vzorek autory práce sebrán). Většina kreseb je zobrazena v přirozené velikosti, pokud není uvedeno zmenšení nebo zvětšení kresby (nebo její části). Všechny kresby zhotovila Ludmila Businská. Anglické zkratky, slova a symbol použité v legendě kreseb jsou zde uvedeny v českém ekvivalentu:

ab. – nahoře	inf. – květenství	prob. – pravděpodobně
after pl. from – podle rostlin z	l. – levá, vlevo	r. – pravá, vpravo
br. – větev, větévka	leaf – list	shoot – výhon
bt. – dole	lv. – listy	two – dva
bud(s) – pupen(y)	magn. – zvětšeno	w. – s
fl. – květ, kvetoucí	mother plant – mateční rostlina	~ – přibližně
fr. – plod, plody	part of – část	% of nat. size – % přiroz. velikosti

Vzhledem k výše zmíněným chybným determinacím a záměnám taxonů běžných u rodu *Spiraea*, byly do této kapitoly zahrnuty hlavně údaje týkající se rostlin nebo jejich reprezentativních vzorků revidovaných dříve uvedeným autorem (ostatní údaje byly převzaty jen pro orientaci v rámci historického kontextu).

Systematické zpracování tavolníků je v této práci uvedeno z úsporných důvodů jen v anglickém jazyce. Pouze kapitola s popisy nových kultivarů je uvedena v české verzi v plném rozsahu níže.

N o v é k u l t i v a r y

V sortimentu tavolníků pěstovaných v posledních dvaceti letech v Průhonicích bylo nalezeno několik klonů nebo rostlin hybridního (případně mutačního) původu jejichž taxonomická příslušnost není jednoznačná. Z nich čtyři taxony jsou atraktivní pro okrasné zahradnictví a jsou v Dendrologické zahradě v Průhonicích již řadu let vegetativně množeny (nebo v případě dvou z nich pěstovány i jinými školkařskými firmami v Českých zemích) pod pracovním označením nebo nevhodným jménem. Tyto klony jsou níže popsány jako nové kultivary v souladu s Mezinárodním kódem nomenklatury pěstovaných rostlin (TREHANE 1995). Tři jsou uvedeny přímo pod rodovým jménem, vzhledem k jejich nejisté druhové příslušnosti nebo hybridnímu původu bez spolehlivé znalosti rodičovské kombinace.

***Spiraea* 'Green Moundlet'**

Historie: byla pěstována pod jménem "*Spiraea bella*" ve firmě Okrasné školky Žehušice, v okrese Kutná Hora, odkud byla rozšířena před rokem 1978 na DZ v Průhonicích a do kultury v Čechách (starší historie je neznámá).

Původce: neznámý.

Taxonomie: pupenová nekvetoucí mutace pravděpodobně od kříženec *Spiraea bella* Sims s neznámým druhem.

Poznámka: U několika starých jedinců byly nalezeny (DZ Průhonice, Arboretum Brno) jednotlivé silné výhony až okolo 1 m vysoké, s většími listy, na kterých se v dalších letech místy vytvořila květenství oboupohlavných květů. Tyto větve zjevně reprezentují oživený pozůstatek somatické fáze původní matečné rostliny ve formě chimérových pletiv. Kvetoucí postranní výhon takové dvouleté větve a jeden list jsou nakresleny v levé časti tabule na str. 131. Tato kvetoucí fáze nemůže být determinována jako *Spiraea bella*, ale mohla vzniknout její spontánní hybridizací s neznámým druhem při kontaktu kdesi v kultuře. Popisovaná mutace vznikla zřejmě druhotně na mateční rostlině normálního vzrůstu bodově jako čarověník.

Popis: Zakrslý, velmi hustý, zcela nekvetoucí keřík, asi 25–30 cm vysoký ve stáří okolo pěti let, později do 40 cm, kompaktně zakulaceného habitu s velmi tenkými pokroucenými větévkami zpočátku vzpřímenými. Letorosty jen 0,3–1,2 mm silné, roztroušeně pýřité, zaoblené, lesklé; zimní pupeny drobné, zakulacené. Listy vejčité, s obvykle zaokrouhlenou nebo klínovitou, celokrajnou bází, výše relativně hustě, mělce laločnaté a nepravidelně zubaté, čepel 1,5–3 cm dlouhá a 0,9–1,9 mm široká, oboustranně lysá, svrchu světle zelená, na rubu šedá a papilózní; řapík 3–5 mm dlouhý, řídce pýřitý, včetně okrajů báze čepele.

Rozlišovací znaky: zakrslý, hustý, nekvetoucí keřík do 40 cm vysoký; letorosty velmi tenké; listy vejčité, mělce laločnaté a nepravidelně zubaté, 1,5–3 cm dlouhé, na rubu šedé.

Etymologie: anglické jméno 'Green Moundlet', v překladu znamenající "zelená kupka, kopeček", vyjadřuje kompaktní zoblený tvar zakrslých keříků význačných pouze zelenou barvou olistění bez tvorby květů.

Autor jména: Roman Businský, VÚKOZ, Průhonice.

Vyobrazení: na protější straně anglického textu výše (spolu s mateční rostlinou).

Herbářový vzorek: herbářová sbírka VÚKOZ, Průhonice – *Spiraea* č. 83/016: Dendrologická zahrada VÚKOZ, sebral Roman Businský, 7.7.1983.

Mateční rostlina: Dendrologická zahrada VÚKOZ, Průhonice, B–IV–200.

Množení: autovegetativně bylinnými řízky jako klon.

Zavádějící pěstitel a garant distribuce: VÚKOZ, Průhonice.

Poznámka: Tento kultivar je pod jménem "*Spiraea bella*" pěstován v současné době v některých školkařských firmách nebo arboretech v ČR, např.: Školky Ďáblice, Praha; Školky Litomyšl; Školní lesní podnik Kostelec n. Č. L. – Bohumile; Školky Montano, Přerov n. Labem; Arboretum Brno; a také v zahraničí, např. v Botanické zahradě v Poznani v Polsku (Prof. Koblížek, Mendelova Universita Brno, ústní sdělení).

***Spiraea* 'Leafy Carmine'**

Historie: byla vegetativně namnožena (červenec 1985) z rostliny nalezené Romanem Businským v Botanické zahradě P. J. Šafárika v Košicích na vých. Slovensku, vypěstované ze semen *Spiraea betulifolia* Pall. (výsev únor 1976) získaných z Botanické zahrady v Dněpropetrovsku v Ukrajinské SSR.

Původce: Roman Businský, VÚKOZ, Průhonice.

Taxonomie: hypotetický kříženec *Spiraea betulifolia* Pall. × *S. chamaedryfolia* L.

Popis: Keř nižší velikosti, asi 1 m vysoký a 1 m široký ve stáří šesti let, starší až 1,2 m vysoký a 1,5 m široký, hustě, zpočátku vzpřímeně větvený, při plně vyvinutém habitu široce zakulacený; rozrůstající se pomocí krátkých výběžků. Letorosty lysé, hranaté, slámově nažloutlé, lesklé; zimní pupeny kuželovité, okolo 2 mm dlouhé, kryté dvěma vnějšími oddálenými zašpičatělými, kýlnatými šupinami a volnými vnitřními šupinami, v obou případech s brvitou špičkou. Listy vejčité až eliptické, 2,5–5 cm dlouhé a 1,5–3 cm široké, s řapíky 3–8 mm dlouhými, nestejnoměrně až dvakrát hustě, ostře pilovité kromě celokrajné báze nebo spodní třetiny, lysé kromě ojedinělých chloupků na hlavních žilkách, okrajích a řapíku, svrchu sytě zelené, na rubu světlejší a papilózní; olistění se v letních měsících (počínaje červencem a zejména během září) nápadně zbarvuje do karmínově červené barvy. Květenství řídké hroznovité chocholíky se spodními stopkami obvykle rozvětvenými nebo tvořícími vedlejší chocholíky, celkově 2–6 cm široké, lysé. Květy asi 8–9 mm v průměru, bílé, kališní cípy později zpět ohnuté, na vnitřní straně chlupaté, tyčinky výrazně delší než okrouhlé korunní lístky, staminální disk výrazný s vysokými laloky, češule uvnitř a semeníky podél břišního švu dlouze chlupaté, čnělky asi 3 mm dlouhé, terminální, zralé měchýřky s výrazně vypouklou hřbetní stranou, s čnělkami do stran odkloněnými.

Rozlišovací znaky: keř 1–1,2 m vysoký; listy hustě, ostře pilovité, od července se nápadně zbarvující do karmínově červené barvy; květenství řídké hroznovité chocholíky se spodními stopkami obvykle rozvětvenými nebo tvořícími vedlejší chocholíky, celkově 2–6 cm široké.

Etymologie: anglické jméno 'Leafy Carmine', v překladu znamenající "listy tvořený karmín", vyjadřuje nápadně karmínově se zbarvující olistění.

Autor jména: Roman Businský, VÚKOZ, Průhonice.

Vyobrazení: na protější straně anglického textu výše.

Herbářový vzorek: herbářová sbírka VÚKOZ, Průhonice – *Spiraea* č. 85/060: Slovensko, Košice, Botanická Zahrada P. J. Šafárika, sebral Roman Businský, 4.7.1985.

Mateční rostlina: Dendrologická zahrada VÚKOZ, Průhonice, B–III–121.

Množení: autovegetativně bylinnými nebo dřevitými řízky jako klon.

Zavádějící pěstitel a garant distribuce: VÚKOZ, Průhonice.

***Spiraea* 'Ludmila'**

Historie: původní rostlinu nalezla Ludmila Cetlová, později Businská, spoluautorka této práce, dne 23. června 1983 v zapomenutých výsadbách keřů vypěstovaných ze semen neznámého původu, získaných na základě mezinarodní výměny semen v rámci nabídek "Index Seminum", v Dendrologické zahradě VÚKOZ, Průhonice.

Původce: Roman Businský, VÚKOZ, Průhonice.

Taxonomie: morfologicky nejbližší *Spiraea* ×*notha* Zab. (= *S. betulifolia* subsp. *corymbosa* × *S. latifolia*).

Popis: Keř střední velikosti, asi 1,1 m vysoký a 1,6 m široký ve stáří šesti let, starší až 1,7 m vysoký a 2,5 m široký, hustě a trochu křivolace větvený, při plně vyvinutém habitu široce zakulacený; rozrůstající se pomocí krátkých výběžků. Letorosty již v mládí lysé, vyzrálé relativně silné, zaoblené, matné; zimní pupeny asi 2 mm dlouhé, zaobleně kuželovité, s brvitými okraji šupin. Listy široce eliptické, 4–6 cm dlouhé a 2,5–4 cm široké, s řapíky 4–7 mm dlouhými, ostře dvakrát pilovité (hlouběji u horních listů) kromě báze, svrchu lysé, na rubu na hlavní žilce velmi řídce pýřité, včetně řapíku a okrajů mladých listů; olistění se obvykle od poloviny září zbarvuje do karmínově červené barvy. Květenství složené chocholičnaté laty, zcela lysé, za plného rozkvětu široce kuželovité, 10–20 cm široké, s hustým zaobleným vrcholem; jejich dolní postranní osy oddálené, s malými listy u rozvětvení, nevětvené v bazální polovině nebo dvou třetinách a s listem u báze. Květy velké, asi 10 mm v průměru, bílé se slabě narůžovělým nádechem; kališní cípy lysé, C, tyčinky zřetelně delší než okrouhlé korunní lístky, staminální disk výrazný, češule uvnitř a semeníky na břišní straně dlouze chlupaté, čnělky terminální.

Spiraea ‘Ludmila’ – pokračování

Rozlišovací znaky: keř dorůstající přes 1,5 m výšky a asi 2,5 m šířky; listy široce eliptické, 4–6 cm dlouhé a 2,5–4 cm široké; květenství velké složené, olistěné chocholičnaté laty, za plného rozkvětu široce kuželovité, 10–20 cm široké, s hustým zaobleným vrcholem a oddálenými dolními postranními osami, květy asi 10 mm v průměru, bílé se slabě narůžovělým nádechem.

Etymologie: jméno bylo vytvořeno na počest Ludmily Cetlové, později Businské, která nalezla původní rostlinu.

Autor jména: Roman Businský, VÚKOZ, Průhonice.

Vyobrazení: na protější straně anglického textu výše.

Herbářový vzorek: herbářová sbírka VÚKOZ, Průhonice – *Spiraea* č. 83/026 (sběr 23.6.1983), 85/066a (sběr 6.6.1985), 85/066b (sběr 24.6.1985), všechny: Dendrologická zahrada VÚKOZ, sebral Roman Businský.

Mateční rostlina: Dendrologická zahrada VÚKOZ, Průhonice, B–III–168 (první množení vegetativně pod č. 194/83).

Množení: autovegetativně bylinnými nebo dřevitými řízky jako klon.

Zavádějící pěstitel a garant distribuce: VÚKOZ, Průhonice.

***Spiraea japonica* L. fil. ‘New Pruhonice’**

Historie: Je pěstován asi 50 let v Průhonicích (na pozemcích dnešního VÚKOZ a Botanického ústavu Akademie věd ČR) pod jménem *Spiraea pruhoniciana* Zeman nebo *S. bumalda* ‘Pruhoniciana’, odkud byl rozšířen do školek v Čechách a na Moravě, ojediněle též do sousedních zemí (Slovensko). Je vegetativně rozmnožovanou rostlinou s předpokládaným vznikem okolo II. světové války spontánním generativním rozmnožením kultivaru *S. japonica* ‘Pruhoniciana’ (vzniklým údajně jako hybrid mezi *S. japonica* var. *ovalifolia* Franch. a *S. bumalda* Burvénich ‘Anthony Waterer’ v Průhonicích roku 1913; viz výše).

Původce: Roman Businský, VÚKOZ, Průhonice.

Taxonomie: hypotetický potomek *Spiraea japonica* ‘Pruhoniciana’ morfologicky nejbližší *S. japonica* var. *ovalifolia*.

Popis: Keř střední velikosti, asi 1,4 m vysoký a 2,8 m široký ve stáří šesti let, starší až 1,7 m vysoký a 3,5 m široký, středně hustého habitu, zpočátku polovzpřímeně větvený, později široce polokulovitě rozkladitý. Letorosty již v mládí lysé. Listy vejčité až eliptické, na konci ostře špičaté a zaokrouhlené na bázi, 5–11 cm dlouhé a 2–5,5 cm široké, nestejně až dvakrát pilovité se zašpičatělými zuby, vespod bledé až slabě nasivělé, lysé. Květenství uspořádané ve složených chocholících, až 25 cm v průměru, s pýřitými osami; květy světle růžové, 8–10 mm v průměru, kvetoucí od konce první dekády června do konce července.

Rozlišovací znaky: keř dorůstající 1,7 m výšky; listy vejčité až eliptické, 5–11 × 2–5,5 cm velké; květenství až 25 cm v průměru, květy světle růžové. Od původního popisu *S. japonica* ‘Pruhoniciana’ se liší větším vzrůstem (asi dvakrát vyšším), řidším habitem a světle růžovými květy.

Etymologie: jméno reprezentuje nový kultivar vypěstovaný v Průhonicích, odvozený od *Spiraea japonica* ‘Pruhoniciana’.

Autor jména: Roman Businský, VÚKOZ, Průhonice.

Vyobrazení: na protější straně anglického textu výše.

Herbářový vzorek: herbářová sbírka VÚKOZ, Průhonice – *Spiraea* č. 01/002: Dendrologická zahrada VÚKOZ, B–III–191, sebral Roman Businský, 16.8.2001. – *Spiraea* č. 97/001: Průhonice, zámecký park, odd. 5, sebral Jiří Burda, 27.6.1997.

Mateční rostlina: Průhonice, Botanický ústav Akademie věd ČR, zámecký park, odd. 5, rostlina č. B–033/1 (dobře vyvinutý keř ve skupině asi 13 identických jedinců vysazených v r. 1960, které reprezentují nejstarší známé rostliny tohoto klonu).

Množení: autovegetativně bylinnými nebo dřevitými řízky jako klon.

Zavádějící pěstitel a garant distribuce: VÚKOZ, Průhonice.

Poznámka:

Kultivar ‘New Pruhonice’ je pěstitelsky významný, s širokým použitím včetně pásových a plošných výsadeb do městského prostředí a k silničním komunikacím; v Českých zemích je dosti často vysazován, na Slovensku je pěstován jen vzácně (např. v Arboretu Mlyňany).

Závěr

Na základě dlouhodobého studia rodu *Spiraea* v terénu, herbářích a v kultuře považuje dříve uvedený autor za nejvyšší přijatelné členění rodu do čtyř sekcí: *Glomerati* Nakai, *Chamaedryon* Ser., *Calospira* K. Koch a *Spiraea*, které je použito v této práci. Hlavním kriteriem pro klasifikaci tavolníků je stavba květenství a jejich umístění na větévkách nebo výhonech, s čímž přímo souvisí fenologie kvetení. Jednotlivé druhy rodu však vytvářejí téměř plynulou morfologickou řadu napříč přes všechny čtyři uvedené skupiny. Velmi snadná a častá spontánní mezidruhová hybridizace tavolníků, nezřídka i mezi zástupci různých sekcí, potvrzuje relativní genetickou homogenitu rodu. Ke spontánní hybridizaci dochází zejména kontaktem příbuzných, ale v přírodě geograficky oddělených druhů při společném pěstování. Proto potomstvo vzniklé ve sbírkách pěstovaných rostlin je častěji hybridní (a obvykle fertilní), než gene-ticky čisté. Počet známých kulturních hybridů je srovnatelný s počtem přírodních druhů. Historie objevů tavolníků v přírodě je od počátku úzce spjata s introdukcí rostlin do kultury pro okrasné účely. Uvedená fakta, spolu s rozsáhlou druhovou diverzitou v nedostatečně prozkoumaných oblastech JV Asie (převážně v Číně a Himálajích), řadí tavolníky mezi dřeviny s velmi vysokým podílem chybně determinovaných položek v kultuře i v herbářích.

Na území Čech, Moravy a Slovenska jsou podle současných informací autochtonní tři druhy tavolníků: *Spiraea crenata* L. – na jediné lokalitě na JV cípu Slovenska; *S. media* Schmidt – na většině území Slovenska kromě západní a SZ části; *S. salicifolia* L. – v jižních Čechách a snad na JZ Moravě (výskyt na JZ a středním Slovensku je nejistý). Údaje o výskytu *Spiraea chamaedryfolia* L. subsp. *ulmifolia* (Scop.) J. Duvigneaud na Slovensku se pravděpodobně týkají jen zplanělých rostlin. Na základě taxonomické revize herbářových vzorků a živých rostlin tavolníků, pěstovaných v historii zahradnictví a botanických sbírek v Čechách, na Moravě a Slovensku, bylo doloženo pěstování celkem 105 taxonů, z toho 42 přírodních druhů, 2 poddruhů a 10 výrazně vymezených variet; z kulturních taxonů pak 21 mezidruhových kříženců včetně hybridních kultivarů v druhové kategorii a 30 dalších kultivarů (z toho 22 od *S. japonica* L. fil.). Největší význam pro introdukci tavolníků do Českých zemí měly od začátku 20. století zahradnické objekty a pracoviště v areálu Průhonic u Prahy. Podobný význam mělo pro Slovensko Arboretum Mlyňany u Nitry. Na tradici introdukce dřevin v Průhonicích navázalo v poslední čtvrtině století nové soustřeďování taxonů a specializovaný výzkum tavolníků shrnutý v této práci.

V Dendrologické zahradě Výzkumného ústavu okrasného zahradnictví v Průhonicích bylo v letech 1983 až 1990 prováděno intenzivní hodnocení živých rostlin asi 70 taxonů tavolníků (obvykle reprezentovaných jedním vybraným klonem) soustředěných z území bývalého Československa. Výsledky tohoto hodnocení jsou zde zpracovány v přehledech observačních dat uvedených u jednotlivých taxonů. Jejich součástí je názorný fenologický diagram rašení a kvetení a rovněž odhadnutá kategorie obecné sadovnické perspektivity dotyčného taxonu v našich klimatických podmínkách. V rámci těchto kategorií bylo všeobecně vyhodnoceno 19 taxonů prvotřídních, 16 hodnotných a 30 postradatelných. Prvotřídní taxony jsou reprezentovány osmi druhy (z nich *Spiraea japonica* pěti kultivary), a pěti kulturními kříženci v druhové kategorii. Studium živých rostlin tavolníků v Průhonicích vyvrcholilo popsáním čtyř nových hybridních kultivarů.

Na základě studia originální literatury, herbářových dokladů a živých rostlin byly navrženy tři taxonomické změny v rodu *Spiraea*: *Spiraea mongolica* Maxim. (uváděná z území Číny) je považo-vána za synonymum *Spiraea lasiocarpa* Kar. & Kir. (uváděné z území bývalého Sovětského svazu); *Spiraea fritschiana* Schneid. var. *microgyna* (Nakai) Businský a *Spiraea* ×*pseudosalicifolia* Silverside ‘Triumphans’ jsou uvedeny jako nové kombinace.

Přehled akceptovaných taxonů

pěstovaných v Čechách, na Moravě a na Slovensku v historickém kontextu

Doprovodný text k tabulce na str. 154 – 159.

Kulturní taxony v kategorii druhu (tj. mezidruhoví kříženci a hybridní kultivary) jsou v tabulce uvedeny samostatně za přírodními druhy (s jejich subspeciemi, varietami a přímo odvozenými kultivary); obě skupiny jsou řazeny abecedně.

Legenda ke sloupcům:

1. Správné jméno akceptovaného taxonu a rok jeho publikace
2. Nejstarší jméno taxonu (pokud není správným jménem) a rok jeho publikace // Pozn.: rok prvního sběru v přírodě; země mimoevropského původu kultivaru; kultivar nově zde popsaný
3. Rok introdukce přírodního taxonu do kultury v Evropě (kromě Čech, Moravy a Slovenska) nebo rok vzniku kultivaru
4. Rok a místo sběru nejstaršího zjištěného herbářového vzorku, nálezu živé rostliny nebo záznamu o pěstování v Čechách a na Moravě; alternativně rok známé introdukce (↓) živé nebo zaznamenané rostliny {tučné písmo = autorem revidovaný herbářový vzorek (her.) nebo živá rostlina; normální písmo = literární údaj bez potvrzení}
5. Stejné údaje jako ve sloupci 4 pro Slovensko (terénní studium zde bylo prováděno do konce r. 1992)
6. Současný stav pěstování taxonu nebo výskytu živých rostlin v České republice

Symboly a obecné zkratky:

– = nenalezen žádný herbářový vzorek, živá rostlina ani literární záznam
= pravděpodobně pěstován několik desítek let
* = introdukce předcházející publikaci originálního popisu nejstaršího (platného) jména přírodního taxonu
± = přibližný rok
↓ = rok známé nebo předpokládané introdukce do země
→ = pěstován mnoho let před rokem nálezu rostlin nebo herbářových vzorků
\+ = vzácně pěstován nebo se vyskytující
++ = běžně pěstován nebo se vyskytující
-- = nenalezen rok introdukce do kultury nebo rok vzniku kultivaru
--- = v současnosti není známa živá rostlina
b. = před
autocht. = autochtonní
her. = autorem revidovaný herbářový vzorek
lit. = literární údaj a rok publikace
moth.pl. = mateční rostlina
natural. = velmi dlouho zplanělý
orig. = originated
t.? = taxonomicky pochybný
vic. = okolí

Zkratky geografických údajů:

B.Š. = Banská Štiavnica (Schemnitz), botanická zahrada
Byst. = Horákovy školky, Bystřice pod Hostýnem, okres Kroměříž
Chud. = "Americká zahrada" u Chudenic, okres Klatovy
Cerv. Hr. = Cervený Hrádek (Rothenhaus) u Jirkova poblíž Chomutova, zámecká školka
Doubr. = soukromá zahrada autorů u Doubravčic poblíž Kostelce n. Č. L., okres Kolín
Hr. Král. = Hradec Králové (školky)
Kost. = Arboretum Peklov, Truba, Kostelec n. Č. L., okres Kolín
Koš. = Botanická zahrada Univerzity P. J. Šafárika, Košice
Křtiny = Arboretum Křtiny
Ml. = Arboretum Mlynany
Ml. Bol. = Mladá Boleslav
Pr. = Průhonice
Tepl. = Teplice nad Bečvou u Hranic, okres Přerov
Žeh. = Okrasné školky Žehušice, okres Kutná Hora

APPENDIX

SURVEY OF ACCEPTED TAXA

CULTIVATED IN BOHEMIA, MORAVIA AND SLOVAKIA IN HISTORIC CONTEXT

Cultural taxa in the rank of species (i.e., interspecific hybrids and hybrid cultivars) are given separately after natural species (with their subspecies, varieties and directly derived cultivars); both groups are ordered alphabetically.

Legend to columns:

1. Correct name of an accepted taxon and year of its publication
2. Oldest taxon name (provided that it is not correct) and year of its publication // Note: year of first collection in nature; country of extra-European cultivar origin; the cultivar newly described here
3. Year of introduction of a natural taxon into cultivation in Europe (except for Bohemia, Moravia and Slovakia), or year of cultivar origin
4. Year and place of collection of the oldest found herbarium sample, finding of living plant, or record of cultivation in Bohemia & Moravia; alternatively year of known introduction (↓) of living or recorded plant {bold type = by the former author examined herbarium sample (her.) or living plant; normal type = literary entry without confirmation}
5. The same data as in the column 4 for Slovakia (field study was carried out here till the end of 1992)
6. Present state of taxon cultivation or occurrence of living plants in the Czech Republic (Bohemia & Moravia)

Symbols and abbreviations:

– = no found any herbarium sample, living plants nor literary record
= probably cultivated for a few dozens years
* = introduction preceding the publication of the protologue of the oldest (valid) name of a natural taxon
± = approximate year
↓ = year of known or supposed introduction into the country
→ = cultivated many years before the year of finding of plants or herbarium samples
+ = rarely cultivated or occurring
++ = commonly cultivated or occurring
-- = no found year of introduction into cultivation or year of cultivar origin
--- = no known living plant in present
b. = before
autocht. = autochthonous
her. = by the former author examined herbarium sample
lit. = literary entry and year of publication
moth.pl. = mother plant
natural. = naturalized for very long time
orig. = originated
t.? = taxonomically questionable
vic. = vicinity

Abridgements of geographic data:

Bra. = Bratislava BG
B.Š. = Banská Štiavnica (Schemnitz) Botanical Garden
Byst. = Horák Nursery, Bystřice pod Hostýnem, Kroměříž distr.
Chud. = "American Garden" at Chudenice, Klatovy distr.
Cerv. Hr. = Cervený Hrádek (Rothenhaus) castle nursery near Jirkov near Chomutov
Doubr. = authors' private garden at Doubravčice near Kostelec n. Č. L., Kolín distr.
Kost. = Kostelec Arboretum
Koš. = Košice BG
Křtiny = Křtiny Arboretum
Ml. = Mlynany Arboretum
Ml. Bol. = Mladá Boleslav
Pr. = Průhonice
Tepl. = Teplice nad Bečvou near Hranice, Přerov distr.
Žeh. = Žehušice Nursery, Kutná Hora distr.

1	2
Correct name **Spiraea**	Oldest name *Spiraea* Note
alba Du Roi (1772)	
aquilegifolia Pall. (1776)	
baldschuanica B. Fedtsch. (1909)	
bella Sims (1823)	
betulifolia Pall. (1784) var. *betulifolia*	
—> **subsp. corymbosa** (Raf.) Taylor & MacBryde (1978)	*corymbosa* Raf. (1814)
—> **var. aemiliana** (Schneid.) Koidz. (?)	*aemiliana* Schneid. (1905)
blumei G. Don (1832)	*chamaedrifolia* Blume (1826), nom. illeg.
cana Waldst. & Kit. (1807)	
canescens D. Don (1825)	
cantoniensis Lour. (1790)	
—> **'Lanceata'**	
chamaedryfolia L. (1753) subsp. *chamaedryfolia*	
—> **subsp. ulmifolia** (Scop.) J. Duvigneaud (1975)	*ulmifolia* Scop. (1772)
chinensis Maxim. (1879)	*pubescens* Lindl. (1847), nom. illeg.
crenata L. (1753)	
decumbens W. Koch (1831) var. *decumbens*	
—> **var. tomentosa** Poech (1844)	
douglasii Hook. (1834) var. *douglasii*	
—> **var. menziesii** (Hook.) Presl (1849)	*menziesii* Hook. (1834)
expansa Wall. ex K. Koch (1853)	*expansa* Wall. (1829), nom. inval.
faurieana Schneid. (1905)	collected 1890
flexuosa Fisch. ex Cambess. (1824)	
fritschiana Schneid. (1905)	*japonica* L. fil. var. *typica* Gilg (1904)
—> **var. microgyna** (Nakai) Businský (2001)	*microgyna* Nakai (1916)
hayatana Li (1952)	
henryi Hemsl. (1887)	
humilis Pojark. (1939)	collected 1909
hypericifolia L. (1753) subsp. *hypericifolia*	
—> **subsp. obovata** (Willd.) Dostál (1968)	*obovata* Waldst. & Kit. ex Willd. (1809)
japonica L. fil. (1781) var. japonica	
—> **var. acuminata** Franch. (1886)	
—> **var. fortunei** (Planchon, 1853) Rehd. (1902)	*callosa* Lindl. & Paxton (1851)
—> **var. ovalifolia** Franch. (1886)	
—> 'Albiflora'	Japan
—> 'Anthony Waterer'	
—> 'Atrorosea'	
—> 'Atrosanguinea'	
—> 'Bullata'	Japan
—> 'Bumalda'	

3	4	5	6	
World	Bohemia & Moravia	Slovakia	Present cult. (Czech R.)	*Spiraea*
± 1759	her. **b. 1850** Praha	→ her.**1960** Poprad	+	*alba*
--	1927 Pr.	–	---	*aquilegifolia*
--	↓ **1985** Doubr.	↓ ± **1982** Koš.	+	*baldschuanica*
*± 1820	her. **1845** Cerv. Hr.	–	---	*bella*
t.? 1812	1922 Pr.	↓ 1983 Ml.	+	*betulifolia* var. *betulifolia*
1819	t.? lit. 1989 without locality	–	?	—> subsp. *corymbosa*
--	↓ **1985** Pr.	↓ **1990** Ml.	+	—> var. *aemiliana*
± 1858	t.? 1935 Pr.	↓ **1960** Ml.	+	*blumei*
1825	her. ± **1865** Horažďovice	–	---	*cana*
1837	her. **1844** Cerv. Hr.	her. **1953** Ml.	t.?	*canescens*
1824	her. **b. 1850** Praha	lit. 1967 Ml.	+	*cantoniensis*
1855	1936 Žeh.	lit. 1967 Ml.	+	—> 'Lanceata'
1789	1924 Pr.	lit. 1967 Ml.	+	*chamaedryfolia* subsp. *chamaedr.*
1790	her. **1845** Cerv. Hr.	natural.	++	—> subsp. *ulmifolia*
1843	↓ **1985** Pr.	↓ **1960** Ml.	---	*chinensis*
± 1800	her. **1844** Cerv. Hr.	autocht.	+	*crenata*
*1830	her. **1911** Praha	–	+	*decumbens* var. *decumbens*
1885	↓ **1993** Pr.	–	+	—> var. *tomentosa*
*± 1827	natural.; her. **1846** Praha	→ **1971** Bra.	++	*douglasii* var. *douglasii*
1838	1927 Pr.; her. **1943** Křtiny	lit. 1967, **1987** Ml.	+	—> var. *menziesii*
*1843	1923 Pr.	t.? ↓ 1983 Ml.	---	*expansa*
t.?	↓ **1984** Pr.	→ **1984** Ml.	+	*faurieana*
--	her. **b. 1887** Praha	lit. 1992 Ml.	+	*flexuosa*
1919	↓ **1985** Pr.	↓ **1976** Koš.	+	*fritschiana*
--	–	↓ **1985** Ml.	---	—> var. *microgyna*
--	↓ **1992** Pr.	–	+	*hayatana*
1900	1923 Pr.	→ **1983** Ml.	+	*henryi*
--	↓ ± **1980** Pr.	↓ **1987** Ml.	+	*humilis*
1640	her. **b. 1850** Praha	her. **1895** B.Š.	+	*hypericifolia* subsp. *hypericifolia*
± 1800	her. **1845** Cerv. Hr.	–	---	—> subsp. *obovata*
t.?	t.? 1927 Pr.	t.?	t.?	*japonica* var. *japonica*
1908	her. **1882** Chud.	her. **1919** Modra	t.?	—> var. *acuminata*
*± 1850	1927 Pr.	→ **1983** Ml.	+	—> var. *fortunei*
1908	1910 Pr.	–	+	—> var. *ovalifolia*
b. 1864	her. **1923** Karlovy Vary	**1985** Koš.	+	—> 'Albiflora'
b. 1890	her. **1910** Litomyšl	lit. 1967 Ml.	++	—> 'Anthony Waterer'
b. 1893	1939 Byst.	?	?	—> 'Atrorosea'
b. 1893	→ **1979** Pr.	# –	+?	—> 'Atrosanguinea'
1880	1924 Pr.; her. **1935** Praha	lit. 1967 Ml.	+	—> 'Bullata'
b. 1885	her. **1900** Lednice	t.? lit. 1992 Ml.	?	—> 'Bumalda'

1	2
Correct name **Spiraea** [*japonica*, continued]	Oldest name *Spiraea* Note
—> 'Coccinea'	
—> 'Crispa'	
—> 'Dart's Red'	
—> 'Froebelii'	
—> 'Genpei'	Japan
—> 'Golden Princess'	
—> 'Goldflame'	Canada
—> 'Goldmound'	
—> 'Little Princess'	
—> 'Macrophylla'	
—> 'Nana'	
—> 'New Pruhonice'	newly described here
—> 'Pruhoniciana'	
—> 'Ruberrima'	
—> 'Walluf'	
—> 'Zigeunerblut'	
lasiocarpa Kar. & Kir. (1842)	
latifolia (Ait.) Borkh. (1803)	*salicifolia* L. γ. *latifolia* Aiton (1789)
longigemmis Maxim. (1879)	
lucida Douglas ex Greene (1892)	*betulifolia* Hook. (1834), nom. illeg.
media Schmidt (1792) var. media	
—> **subsp. polonica** (Blocki) Pawlowski (1968)	*polonica* Blocki (1892)
—> **var. mollis** (K. Koch & Bouché) Schneid. (1905)	*mollis* K. Koch & Bouché (1854)
miyabei Koidz. (1909) var. *miyabei*	
—> **var. glabrata** Rehd. (1913)	collected 1901
—> **var. pilosula** Rehd. (1913)	collected 1901
mollifolia Rehd. (1913)	collected 1903
myrtilloides Rehd. (1913)	*virgata* Franch. (1890), nom. illeg.
nipponica Maxim. (1886) var. *nipponica*	*bracteata* Zab. (1884), nom. illeg.
—> **var. tosaensis** (Yatabe) Makino (1906)	*tosaensis* Yatabe (1892) discovered 1891
—> 'Halward's Silver'	Canada
—> 'Rotundifolia'	Japan
—> 'Snowmound'	U.S.A. or Canada
prunifolia Sieb. & Zucc. (1835)	
pubescens Turcz. (1832)	
rosthornii Pritz. (1900)	
salicifolia L. (1753)	
sargentiana Rehd. (1913)	*canescens* D. Don var. *sulfurea* Diels (1900)
splendens Baumann ex K. Koch (1875)	*densiflora* Nutt. ex Torrey & Gray (1840), nom. inval.

3	4	5	6	
World	Bohemia & Moravia	Slovakia	Present cult. (Czech R.)	*Spiraea* [*japonica*, continued]
b. 1950	↓ ± **1977** Pr.	–	+?	—> 'Coccinea'
1923	her. **1936** Šumperk	# –	++	—> 'Crispa'
b. 1970	b. 1999	–	+	—> 'Dart's Red'
b. 1894	her. **1909** Hradec Králové	# –	++	—> 'Froebelii'
b. 1980	↓ **1985** Pr.	–	+	—> 'Genpei'
b. 1985	↓ **1990** Pr.	–	+	—> 'Golden Princess'
1960	↓ **1982** Pr.	–	++	—> 'Goldflame'
--	↓ **1991** Pr.	–	+	—> 'Goldmound'
b. 1953	↓ ± **1977** Pr.	↓ 1983 Ml.	++	—> 'Little Princess'
b. 1866	1923 Pr.	lit. 1992 Ml.	+	—> 'Macrophylla'
--	↓ ± **1977** Pr.	b. 1984 Ml.	+	—> 'Nana'
b. ± 1950	**1960** Pr.	b. 1985 Ml.	++	—> 'New Pruhonice'
1913	orig. 1913 Pr.	–	---	—> 'Pruhoniciana'
b. 1893	1914 Pr.	# –	+?	—> 'Ruberrima'
b. 1930	1924 Pr.	–	---	—> 'Walluf'
--	b. 1999	–	+	—> 'Zigeunerblut'
--	t.? 1922 Pr.; ↓ **1985** Pr.	↓ ± **1980** Koš.	+	*lasiocarpa*
1789	her. **b. 1850** Praha	↓ **1987** Ml.	+	*latifolia*
± 1887	1927 Pr.	–	---	*longigemmis*
1885	her. **1911** Praha	–	+	*lucida*
*1789	her. **b. 1850** Praha	autocht.	+	*media* var. *media*
--	1936 Žeh.	t.? autocht.	---	—> subsp. *polonica*
--	1930 Pr.; **1984** Kost.	autocht.	---	—> var. *mollis*
--	–	–	---	*miyabei* var. *miyabei*
*1907	1923 Pr.	t.? ↓ 1974 Ml.	t.?	—> var. *glabrata*
*1907	–	↓ ± **1980** Koš.	---	—> var. *pilosula*
*1909	1910 Pr.	–	+	*mollifolia*
*1908	1914 Pr.	–	---	*myrtilloides*
*b. 1882	1914 Pr.; her. **1935** Lednice	↓ 1974 Ml.	++	*nipponica* var. *nipponica*
1923	↓ ± **1977** Pr.	t.? ↓ 1974 Ml.	+	—> var. *tosaensis*
1960	↓ **1990** Pr.	–	+	—> 'Halward's Silver'
b. 1882	t.? 1914 Pr.	t.?	+	—> 'Rotundifolia'
--	↓ **1982** Pr.	↓ **1987** Ml.	++	—> 'Snowmound'
± 1845	her. **1890** Netolice	her. **1894** B.Š.	++	*prunifolia*
1883	1927 Pr.	–	+	*pubescens*
1909	1910 Pr.	↓ ± **1970** Ml.	+	*rosthornii*
16th cent.	autocht.	autocht. or natural.	+	*salicifolia*
*1909	1910 Pr.	her. **1949** Ml.	+	*sargentiana*
b. 1861	↓ ± **1982** Brno	lit. 1992 Ml.	+	*splendens*

1	2
Correct name **Spiraea**	Oldest name *Spiraea* Note
thunbergii Sieb. ex Blume (1826)	*crenata* Thunb. (1784) nom. illeg.
tomentosa L. (1753)	
trichocarpa Nakai (1909)	collected 1902
trilobata L. (1771)	
uratensis Franch. (1883)	
ussuriensis A. Pojark. (1939)	collected 1905
veitchii Hemsl. (1903)	
wilsonii Duthie (1906)	
'Arguta'	*arguta* Zab. (1884)
×**billardii** Hérincq (1855)	
×**blanda** Zab. (1884)	
×**brachybotrys** Lange (1882)	
×**cinerea** Zab. (1884)	
—> **'Grefsheim'**	
×**conferta** Zab. (1884)	
×**fontenaysii** Lebas (1866)	
×**foxii** K. Koch ex Zab. (1893)	*callosa* Thunb. var. *superba* Froebel (1870), nom.inval.
—> **'Margaritae'**	
—> **'Superba'**	
'Green Moundlet'	newly described here
'Leafy Carmine'	newly described here
'Ludmila'	newly described here
×**macrothyrsa** Dipp. (1893)	
×**microthyrsa** Zab. (1893)	
×*multiflora* Zab. (1884)	
×*notha* Zab. (1893)	
×**pseudosalicifolia** Silverside (1990)	collected 1973
—> **'Triumphans'**	
×**revirescens** Zab. (1893)	
×**rosalba** Dipp. (1893)	
×**rubella** Dipp. (1893)	
×**sanssouciana** K. Koch (1857)	
—> **'Intermedia'**	
—> **'Nobleana'**	
×**semperflorens** Zab. (1893)	*semperflorens* Dieck (1885), nom. inval.
—> **'Syringiflora'**	
×**vanhouttei** (Briot) Zab. (1884)	*aquilegifolia* Pall. (var.) *vanhouttei* Briot (1866)
×**watsoniana** Zab. (1908)	*nobleana* Zab. (1893), nom. illeg.

3	4	5	6	
World	Bohemia & Moravia	Slovakia	Present cult. (Czech R.)	*Spiraea*
± 1863	her. **1910** Praha	lit. 1967 Ml.	++	*thunbergii*
*1736	her. **b. 1850** Praha	↓ **1987** Ml.	+	*tomentosa*
1917	1932 Pr.	**1985** Koš.	+	*trichocarpa*
1801	her. **b. 1850** Praha	her. **1894** B.Š.	+	*trilobata*
1926	t.? 1986 Pr.	–	t.?	*uratensis*
--	↓ ± **1982** Pr.	↓ ± **1982** Koš.	+	*ussuriensis*
*1900	1923 Pr.; her. **1934** Olomouc	→ **1984** Ml.	+	*veitchii*
*1900	1923 Pr.	→ **1984** Ml.	+	*wilsonii*
± 1880	her. **1900** Lednice	lit. 1967 Ml.	++	'Arguta'
± 1850	natural.; her. **1910** Litomyšl	#; lit. 1992 Ml.	++	×*billardii*
b. 1876	her. **1900** Lednice	1914 Ml.	+	×*blanda*
± 1880	her. **1909** Litomyšl	–	+	×*brachybotrys*
± 1880	1936 Žeh.	lit. 1967 Ml.	---	×*cinerea*
1949	↓ ± **1977** Pr.	↓ **1987** Ml.	++	—> 'Grefsheim'
b. 1884	her. **1936** Praha	her. **1894** B.Š.	---	×*conferta*
b. 1866	her. **1892** Praha	–	+	×*fontenaysii*
b. 1870	1922 Pr.; her. **1939** Praha	–	+	×*foxii*
b. 1890	1914 Pr.; ↓ ± **1975** Pr.	lit. 1967 Ml.	+	—> 'Margaritae'
1870	1923 Pr.; her. **1956** Praha	–	---	—> 'Superba'
--	b. ± 1970 Žeh.	–	+	'Green Moundlet'
1985	**1985** Pr.	moth.pl. 1976 Koš.	+	'Leafy Carmine'
1983	**1983** Pr.	↓ **1987** Ml.	+	'Ludmila'
1870	1923 Pr.	her. **1914** Pezinok	++	×*macrothyrsa*
b. 1890	1936 Žeh.; **1985**	↓ **1987** Ml.	+	×*microthyrsa*
± 1850	her. **1858** Cerv. Hr.	–	---	×*multiflora*
b. 1890	1927 Pr.	–	---	×*notha*
?	t.? her. **1943** Soběslav	?	?	×*pseudosalicifolia*
b. 1890	1914 Pr.; her. **1920** Ml. Bol.	–	+	—> 'Triumphans'
b. 1890	1923 Pr.	↓ **1987** Ml.	---	×*revirescens*
b. 1892	→ **1985**	–	+	×*rosalba*
b. 1892	her. **1941** Benešov vic.	–	++	×*rubella*
b. 1857	her. **1904** Litomyšl vic.	–	---	×*sanssouciana*
b. 1888	her. **1899** Praha	–	---	—> 'Intermedia'
b. 1859	↓ ± **1977** Pr.	–	+	—> 'Nobleana'
± 1870	her. **1894** Litomyšl vic.	t.? lit. 1967 Ml.	---	×*semperflorens*
b. 1885	t.?	t.? lit. 1992 Ml.	---	—> 'Syringiflora'
± 1862	her. **1899** Praha	lit. 1967 Ml.	++	×*vanhouttei*
b. 1890	her. **1943** Hradec Králové	–	---	×*watsoniana*

INDEX OF SCIENTIFIC NAMES AND CULTIVARS

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