

Cultivar Classification of *Weigela*

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Abstract

The cultivars in the genus *Weigela* have up till now been classified within a few species or directly under the genus. The two main species are: *W. florida* and *W. praecox*. Less important are *W. coraeensis*, *W. hortensis*, *W. floribunda* and *W. japonica*. These species freely hybridize with each other. Because many cultivars show influence of two or more species, there is a lot of confusion about the correct classification, and this system is no longer satisfactory. Instead a new, more stable classification in eight cultivar-groups (Groups) is proposed here. The classification is mainly based on size of the plant, leaf colour and colour of the flower. The new classification is based on growers' practice, while the old classification was based on genetic relationships. The definitions of the cultivar-groups are simple and clear; cultivars can be classified better and this system is easy to work with, even for non-specialists.

INTRODUCTION

Weigela Thunb. (*Caprifoliaceae*) is a genus of popular ornamental shrubs, especially in temperate regions. It is mainly appreciated for its colourful flowers and/or leaves. The genus is closely related to *Diervilla* Miller. Nakai (1921) recognised only *Diervilla*, while Bailey (1929) concluded that *Weigela* morphologically and geographically was truly distinct from *Diervilla*, and also recognised a third genus: *Calyptrostigma* Koehne. Nakai (1936) also recognised two other genera: *Weigelastrum* Nakai and *Macrodiervilla* Nakai. Hara (1983) recognised only *Diervilla* and *Weigela*. Recent phylogenetic research by Kim and Kim (1999) indicates that *W. maximowiczii* (S. Moore) Rehder and *W. middendorffiana* Hort. ex Carrière are closer to *Diervilla* than to *Weigela* and at least the former might be recognised as a separate genus: *Weigelastrum*. The classification of Hara (1983), recognizing *Weigela* and *Diervilla*, is now commonly used, and is followed here.

Nowadays ten species of *Weigela* are recognized (Cullen, 2000), which all have their natural distribution in northeast Asia with the highest species diversity in Japan and Korea. Most of them are cultivated in botanical, and other gardens. A few species have been used for breeding and/or selection: *W. florida* (Bunge) A. DC. and *W. praecox* (Lemoine) L.H. Bail. are most important. Less important are *W. coraeensis* Thunb., *W. hortensis* (Siebold & Zucc.) K. Koch, *W. floribunda* (Siebold & Zucc.) K. Koch and *W. japonica* Thunb. Furthermore, interspecific hybridisation, a common phenomenon, has resulted in the recognition of over 200 cultivars, which often possess a genome derived from two or maybe more species. Between 1860 and 1940 especially, many cultivars were introduced from France. Currently some 100 cultivars are still in the trade. In the last decade many new cultivars were introduced and their classification is getting more and more confusing. Some breeders or authors try to classify new cultivars under species as much as possible, while others save their efforts and classify them directly under the genus. Classification has thus become rather uninformative and has resulted in much instability of names.

Applied Plant Research, Unit Nursery Stock in Lisse, The Netherlands carried out taxonomic and performance trials of *Weigela* during 2003-2007 at the request of the Dutch nursery industry and in cooperation with the Royal Boskoop Horticultural Society. One result was an improved classification of *Weigela* cultivars.

MATERIAL AND METHODS

A total of 50 accessions was collected by Applied Plant Research and planted at the trial field in Boskoop. The plants were observed for five years, starting in 2003. The accessions mainly came from growers. Next to the trial in Boskoop more than 100 accessions from the Dutch Plant Collection of *Weigela* at the Botanical Garden, Wageningen University, were also observed. In addition the national collection of more than 200 accessions of *Weigela* at the Botanical Garden in Sheffield, UK was studied.

All accessions were identified, described and photographed. For cultivar grouping, the most useful characters were selected from literature, field observations and discussions with growers and specialists. Standard cultivars have been designated for each cultivar-group which are distinguished by:

- size of the plant (dwarf or not)
- colour of the leaves
- colour of the flowers

RESULTS

Historical Survey of the Cultivar-Classification of *Weigela*

The first cultivars were developed and introduced by L. van Houtte from Ghent (Belgium), in about 1860 (e.g. 'Groenewegenii', 'Looymansii Aurea' and 'Stelzneri'). Shortly after that the French breeder Billiard from Fontenay-aux-Roses (Northern France) started introducing some 20 new cultivars (e.g. 'Gustave Malet' and 'Caméléon'). In 1867 another French breeder, Victor Lemoine from Nancy, started his breeding program. His first cultivars were given Latin names (e.g. 'Purpurata', 'Kermesina' and 'Lavallei'), but from 1875 onwards he gave them French names. Up to 1930 Lemoine introduced more than 60 cultivars. Nowadays many of them are still important in the nursery industry (e.g. 'Abel Carrière', 'Avalanche', 'Bouquet Rose', 'Féerie' and 'Floréal'). Around 1900 new cultivars were also being introduced in Germany: e.g. 'Eva Rathke' and 'Styriaca'. During and after the 2nd world war the first cultivars came from North America, e.g. 'Bristol Ruby' and 'Newport Red' ('Vanicek') and later from Canada such as 'Dropmore Pink'.

Around 1960 some new cultivars were introduced from Boskoop (The Netherlands): e.g. 'Eva Supreme', 'Rosabella' and 'Boskoop Glory'. In the last two decades many new cultivars have been introduced, mostly from France and The Netherlands. Important modern selection criteria are leaf colour and dwarf size.

From the start of the introduction of cultivars in the 19th century it was clear that classification under species was difficult and that many cultivars were of hybrid origin. Carrière (1875) used the term "Hybrid Group" to classify cultivars of hybrid origin. In the catalogues of Lemoine most cultivars were presented as hybrid cultivars ("Hybrida") and some of the cultivars were given binomials like *W. hortensis* and *W. praecox*. During the 20th century many works such as Rehder (1927), Späth (1930), Grootendorst (1968), Krüssman (1978) and Bean (1980) classified most *Weigela* cultivars as hybrids and only a few were associated with binomials such as *W. florida*, *W. praecox*, *W. japonica* and *W. floribunda*. In the checklist of Howard (1965) no attempt was made to associate cultivars with binomials beyond the reference given by the original author. On the other hand in some other publications like Huxley et al. (1992) and Dirr (1990), most cultivars are classified under species (*W. florida* and *W. praecox*). In modern works like Hoffman (2005) and Lord (2005) about 60% of cultivars are treated as hybrid cultivar and about 40% associated with binomials (see Appendix). Some modern *Weigela* breeders introduce their cultivars associated with a species, mostly *W. florida* (e.g. 'Verweig' (Monet), 'Verweig 2' (Cappuccino), 'Verweig 3' (Minor Black), 'Alexandra', 'Brigela' (French Lace), 'Elvera' (Midnight Wine) and 'Plangen' (Pink Poppet)).

There is confusion and disagreement on the correct binomial for a number of cultivars with the genomes of *W. coraeensis*, *W. floribunda*, *W. florida*, *W. hortensis*, *W. japonica* and/or *W. praecox*. Prominent examples are: 'Abel Carrière' (*floribunda* / *florida* / hybrid), 'Bristol Snowflake' (*florida* / *japonica* / hybrid), 'Minuet' (*florida* / hybrid) and

'Bouquet Rose' (*florida* / *praecox* / hybrid), see Bean (1980), Hoffman (2005), Huxley et al. (1992), Krüssmann (1978) and Rehder (1927).

A good basis for cultivar-group classification was worked out by Van Proosdij (1997). In this student report the following nine groups were defined on the basis of leaf and flower colour: Variegata Group, Aurea Group, Purpurea Group, Candida Group, Eva Rathke Group, Biformis Group, Héroïne Group, Féerie Group and Groenewegenii Group. With some minor changes in the definition, the first three of these nine groups are adopted into the new classification system as presented in this paper.

Boom (2000) presented a classification of cultivars in three groups: Red-flowered, Pink-flowered and White-flowered.

The Cultivar-Groups

Eight cultivar-groups are proposed and officially established following the International Code of Nomenclature for Cultivated Plants (ICNCP), Brickell et al. (2004).

1. Purpurea Group. Description: Leaves (brown)-red or purple-red. Usually dwarf to semi-dwarf habit; adult plants usually 0.5-1.5 m. Flowers with various colours, but usually purple or red.

Standard cultivar: 'Foliis Purpureis' (standard specimen: Marco Hoffman MH 447, conserved at WAG).

Cultivars: 'Alexandra' (Wine & Roses), 'Anika', 'Bokrashine' (Naomi Campbell), 'Coffee Black', 'Elvera' (Midnight Wine), 'Foliis Purpureis', 'Ruby King', 'Samba', 'Tango', 'Verweig 3' (Minor Black) and 'Victoria'.

2. Dwarf Group. Description: Leaves green, variegated or yellow. Dwarf habit; adult plants usually < 1 m high and broad. Growth is influenced by climate and soil; under very good circumstances adult plants may sometimes reach 1.5 m high and/or broad. Flowers with various colours.

Standard cultivar: *W.* 'Minuet' (standard specimen: Marco Hoffman MH 448, conserved at WAG).

Cultivars: 'Courtanin' (Nain Rouge), 'Full Colour', 'Minuet', 'Plangen' (Pink Poppet), 'Verweig' (Monet) and 'Verweig 2' (Cappuccino).

3. Variegata Group. Description: Leaves variegated. Adult plants usually > 1 m high or broad. Flowers with various colours.

Standard cultivar: *W.* 'Florida Variegata' (standard specimen: Marco Hoffman MH 449, conserved at WAG).

Cultivars: 'Brigela' (French Lace), 'Caricature', 'Courtamon' (Couleur d'Automne) 'Emerald Edge', 'Florida Variegata', 'Kolmagira' (Magical Rainbow), 'Kosteriana Variegata', 'Praecox Variegata', 'Siebold Variegata', 'Sunny Princess', 'Suzanne' and 'White Pillow'.

4. Aurea Group. Description: Leaves (green)-yellow. Adult plants usually > 1 m high or broad. Flowers with various colours.

Standard cultivar: 'Looymansii Aurea' (standard specimen: Marco Hoffman MH 450, conserved at WAG).

Cultivars: 'Darts Yellow Lady', 'Looymansii Aurea', 'Newzako' (Jean's Gold) and 'Olympiade' (Briant Rubidor).

5. White-Flowered Group. Description: Leaves green. Adult plants usually > 1 m high or broad. Flowers white or almost white.

Standard cultivar: 'Candida' (standard specimen: Marco Hoffman MH 451, conserved at WAG).

Cultivars: 'Avalanche', 'Bristol Snowflake', 'Candida', 'Héroïne', 'Mont Blanc', 'Nivea' and 'White Knight'.

6. Red-Flowered Group. Description: Leaves green. Adult plants usually > 1 m high or broad. Flowers red or purple red.

Standard cultivar: 'Bristol Ruby' (standard specimen: Marco Hoffman MH 452, conserved at WAG).

Cultivars: 'Bokrarob' (Little Red Robin), 'Bristol Ruby', 'Courtared' (Lucifer), 'Courtavif'

(Rubivif), 'Eva Rathke', 'Eva Supreme', 'Evita', 'Newport Red', 'Purple Rain', 'Red Prince' and 'Saturn'.

7. Pink-Flowered Group. Description: Leaves green. Adult plants usually > 1 m high or broad. Flowers pink or purple.

Standard cultivar: *W.* 'Rosabella' (standard specimen: Marco Hoffman MH 453, conserved at WAG).

Cultivars: 'Abel Carrière', 'Aldenham Glow', 'Boskoop Glory', 'Bouquet Rose', 'Conquête', 'Dart's Overflow', 'Darts Pink Lady', 'Dropmore Pink', 'Féerie', 'Fleur de Mai', 'Floréal', 'Gracieux', 'Groenewegenii', 'Gustave Malet', 'Lavellei', 'Madame Couturier', 'Othello', 'Pink Princess', 'Polka', 'President Duchartre', 'Rosabella', 'Rosea', 'Rumba' and 'Styriaca'.

8. Bicolor Group. Description: Leaves green. Adult plants usually > 1 m high or broad. Flowers on one plant at the same time clearly with two or more colours (e.g. white and red, white and purple or yellow and red).

Standard cultivar: 'Courtalor' (Carnaval) (standard specimen: Marco Hoffman MH 454, conserved at WAG).

Cultivars: 'Bicolor', 'Caméléon', 'Courtalor' (Carnaval), 'Intercol' (Dart's Colouredream) and 'Versicolor'.

DISCUSSION

Hetterscheid and Brandenburg (1995) already have argued that cultivated plants and their special purpose taxonomy are part of a context (human society) different from the context of taxonomy of plants in nature (evolution). Therefore they propose to separate the systematics of cultivated plants from the taxon concept, which is used for the systematics of plants found in nature. For strongly domesticated genera it is clear that classification based on the traditional taxon concept, is unsuitable to classify the cultigenic diversity. *Weigela* is a good example of a genus that has undergone moderate domestication.

By using the traditional classification for *Weigela* as a basis, more and more confusion and disagreement can be expected, because the genomes of more and more new cultivars will show the influence of more than one species. There seems to be no barrier for hybridising *W. florida*, *W. praecox*, *W. hortensis*, *W. japonica*, *W. floribunda* and *W. coraeensis* and probably also *W. middendorffiana*, *W. maximowiczii*, *W. decora* (Nakai) Nakai and *W. subsessilis* (Nakai) L.H. Bail.

Attempts at earlier classifications, like that of Carrière (1875) and the more advanced ones of Van Proosdij (1997) and Boom (2000) have been partly adopted. In the new classification presented here, in cooperation with growers and specialists, some new cultivar-groups are defined and established.

By using the cultivar-group as defined in ICNCP, rather than the species, a number of problems can be solved. In addition this new classification meets the wishes of users.

Using cultivar-groups for cultivars of *Weigela* will have the following advantages:

- the destabilizing effect of an uncertain assignment of cultivars to a species or directly under the genus is circumvented;
- the new classification uses only a few simple characters to define the cultivar-groups, which makes cultivar assignment easier, even for those not versed in taxonomy.

CONCLUSION

In conclusion I feel that the presented classification of *Weigela* cultivars in cultivar-groups serves stability much better than the traditional taxonomic classification system using binomials.

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Figures

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|---|-----------------------------|---|
| 1a. Leaves (brown) red or purple red. Usually dwarf to semi-dwarf habit | Purpurea Group | 2 |
| 1b. Leaves green, variegated or yellow | | |
| 2a. Dwarf habit; adult plants < 1 m high and broad | Dwarf Group | 3 |
| 2b. No dwarf habit | | |
| 3a. Leaves variegated or (green) yellow | | 4 |
| 3b. Leaves green | | 5 |
| 4a. Leaves variegated | Variegata Group | |
| 4b. Leaves (green) yellow | Aurea Group | |
| 5a. Flowers red, pink or purple, all one colour | | 6 |
| 5b. Flowers white or almost so, or of more than one colour | | 7 |
| 6a. Flowers red or purple red | Red-flowered Group | |
| 6b. Flowers pink or purple | Pink-flowered Group | |
| 7a. Flowers white or almost white | White-flowered Group | |
| 7b. Flowers on the same plant at the same time clearly 2 or more coloured | Bicolor Group | |

Fig. 1. Key to the cultivar-groups.

APPENDIX

Binomials Applied to Cultivars

W. coraeensis Thunb.

Distribution: Japan

Upright to spreading shrub, up to 3-5 m. Branches thick, glabrous, grey. Leaves 7-15 cm, elliptic-obovate, acuminate, serrate, shining green above, underneath lighter and almost glabrous; leaf stalk ca. 1 cm. Flowers 2-8 together in short cymes in the leaf-axils. Calyx equally 5-lobed, hairless or almost so, lobes broadly linear, tube very short or absent. Corolla 2-4 cm, abruptly widening, glabrous, white to light pink, becoming red with age. Anthers free, hairless. Style not projecting beyond corolla.

Only a few cultivars have been classified in this species.

W. florida (Bunge) A. DC.

Distribution: N.China, Korea

Upright to spreading shrub, up to 3 m. Young branches hairless or with short hairs. Leaves 4-10 cm, (oblong-)obovate to elliptic, acuminate, finely serrate, above hairless to sparsely hairy on the midrib, underneath hairy mainly on the veins, light green; leaf stalk 0.1-0.5 cm. Flowers 1-3 together in the leaf-axils. Calyx equally 5-lobed; tube hairless or with scattered hairs; lobes 8-12 mm, lanceolate, acuminate, long-hairy. Corolla 3-4 cm long, gradually widening, pink to reddish, lighter inside, soft hairy outside. Anthers free, hairless. Style as long as corolla.

The most well known ornamental species, with numerous cultivars.

W. floribunda (Siebold & Zucc.) K. Koch

Distribution: Japan

Densely hairy shrub to 3 m. Branches becoming hairless with age. Leaves 6-12 cm long, (oblong-)ovate to elliptic, acuminate, serrate, sparsely hairy above, underneath densely hairy, mainly on the veins; leaf stalk 0.1-0.5 cm. Flowers 1-3 together in the leaf-axils. Calyx equally 5-lobed; tube short or absent. Corolla 3-3.5 cm long, gradually widening, red, shortly hairy outside. Anthers free, hairless. Style projecting from corolla.

Only a few cultivars have been classified in this species.

W. hortensis (Siebold & Zucc.) K. Koch

Distribution: Japan

Broad shrub to 3 m. Young branches hairy becoming hairless with age. Leaves 5-10 cm, ovate(-oblong) to elliptic, acuminate, finely serrate, above sparsely hairy, underneath dense grey hairy; leaf stalk 0.5-0.8 cm. Flowers usually 3 together. Calyx equally 5-lobed; tube short or absent.; lobes 3-5 mm, hairy. Corolla abruptly widening, 2-3 cm long, pink to white.

Only a few cultivars have been classified in this species.

W. japonica Thunb.

Distribution: Japan

Broad shrub, to 3 m. Young branches hairy, becoming hairless with age. Leaves 5-10 cm, ovate(-oblong) to elliptic, acuminate, finely serrate, above sparsely hairy, underneath hairy on the veins; leaf stalk 0.5-0.8 cm. Flowers 1-3 together, almost sessile. Calyx equally 5-lobed; tube short or absent.; lobes 7-10 mm, hairy. Corolla 3-3.5 cm, gradually widening, white to light pink, becoming red with age. Anthers free, hairless. Style projecting from corolla

Only a few cultivars have been classified in this species.

W. praecox (Lemoine) L.H. Bail.

Distribution: Korea

Upright to spreading shrub, up to 2-3 m. Young branches hairless or with short hairs. Leaves 4-7 cm, (oblong-)obovate to elliptic, acuminate, finely serrate, above sparsely hairy on the midrib, underneath hairy mainly on the veins, light green; leaf stalk 0.1-0.5 cm. Flowers 1-2 together in the leaf-axils. Calyx equally 5-lobed; tube hairless or with scattered hairs; lobes 8-12 mm, lanceolate, acuminate, long-hairy. Corolla 3-4 cm long, abruptly widening, pink to reddish, inside lighter and often yellowish, soft hairy outside. Anthers free, hairless. Style as long as corolla. Early flowering. Numerous cultivars have been classified in this species.

Species without Known Cultivars:

- *W. decora*
- *W. maximowiczii*
- *W. middendorffiana*
- *W. subsessilis*