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Salix × *jessenii* (*Salicaceae*) — a new hybrid from Switzerland

Salix × *jessenii* (*Salicaceae*) — новый гибрид из Швейцарии

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Abstract. A new interspecific hybrid, *Salix* × *jessenii* O. V. Epanch. et I. V. Belyaeva from Switzerland is described and its characteristics are given. This hybrid is cultivated in botanical gardens and private collections in Europe and Russia. The potential uses of this unusual ornamental willow are given.

Keywords: *Salix purpurea*, *Salix serpillifolia*, arctic-alpine willows, cultivation, new interspecific hybrid, ornamental willows, spontaneous hybridisation.

Аннотация. Приводится описание нового межвидового гибрида *Salix* × *jessenii* O. V. Epanch. et I. V. Belyaeva. Этот гибрид культивируется в ботанических садах и частных коллекциях в Европе и России. Предложено возможное использование этой необычной декоративной ивы.

Ключевые слова: *Salix purpurea*, *Salix serpillifolia*, естественная гибридизация, аркто-альпийские ивы, декоративные ивы, культивирование, новый межвидовой гибрид.

Willows (*Salix* L., *Salicaceae* Mirb.) are famous for their ease of interspecific hybridisation, which has played a significant role in the evolution of the genus (Skvortsov, 1968, 1999; Meikle, 1975; Chmelař, Meusel, 1986; Martini, Paiero, 1988; Ohashi, 2001; Hörandl et al., 2002; Koropachinskiy, Milyutin, 2006; Belyaeva, 2020; Wagner et al., 2023). There are numerous spontaneous and artificial hybrids listed in the nomenclatural database, International Plant Names Index (IPNI, 2024) and in the taxonomic database, Plants of the World Online (POWO, 2024), in which the nomenclatural and taxonomic status of plants are updated on a regular basis and according to current worldwide publications.

The study of the biology of cultivated willows and their infraspecific variability in natural populations, clarifying their nomenclature and taxonomy as well as describing new taxa that include natural and artificial hybrids, was started in the Botanical Garden of the Ural Branch of the Russian Academy of Sciences (BG UB RAS, Yekaterinburg (previously Sverdlovsk) Russia) by V. I. Shaburov in the early 1960s (Belyaeva et al., 2022). This work was continued by I. V. Belyaeva until the early 2000s and then by O. V. Epanchintseva until now. Three generations of professional and enthusiastic scientists have carried out research on *Salicaceae* for nearly 60 years, which is itself a unique achievement that hopefully will be continued by future generations.

Through collaboration with botanists and plant collectors around the world, we came across an unusual hybrid between *Salix purpurea* L. subsp. *angustior* Lautenschl. and *S. serpillifolia* Scop. We believe that information on this hybrid appeared between 2000 and 2009 in the yearly catalogue of the Walter-Meusel-Stiftung Arctic Alpine Garden in Chemnitz, Germany (Arktisch Alpiner Garten in Chemnitz, Deutschland), although there is no exact date when this hybrid was first included in the catalogue or when it was collected. In the past, the catalogue was sent by post as a printed copy or given to people who were interested in arctic-alpine plants. In the BG UB RAS there are only two copies of this catalogue available, one for 1999, where the hybrid between *S. purpurea* subsp. *angustior* and *S. serpillifolia* was not yet mentioned, and the other for 2009 where the hybrid was mentioned. Unfortunately, on the website of

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the Arktisch Alpiner Garten the old catalogues are not available, only the catalogue for the current year (Jessen, 2024) which mentions that the hybrid is still offered for sale. The hybrid, *S. purpurea* subsp. *angustior* × *S. serpillifolia*, was not mentioned in the paper by S. Jessen and L. Lehmann (2000), although three other hybrids were mentioned. They include either *S. purpurea* subsp. *angustior* or *S. serpillifolia* as one of their parents, i. e. *S. purpurea* subsp. *angustior* × *S. helvetica* Vill., *S. foetida* Schleich. ex DC. × *S. serpillifolia* and *S. herbacea* L. × *S. serpillifolia*.

Since 2011, *S. purpurea* subsp. *angustior* × *S. serpillifolia* has been cultivated in the BG UB RAS by O. V. Epanchintseva and since 2012 in a private willow collection, first in Hertfordshire and then at Willow Mount, Gloucestershire (UK) by I. V. Belyaeva. This hybrid willow is very ornamental, highly resistant to different weather conditions, diseases and pests, easy to propagate and deserves to have a scientific name and be described for further distribution and use in horticulture.

This work is a part of long running projects, "The World Checklist of *Salicaceae sensu stricto*" (Belyaeva, Govaerts, 2023) in the Royal Botanic Gardens, Kew and "Introduction and Acclimatisation of Arctic-Alpine Willows in the Middle Urals, Russia" (O. V. Epanchintseva and I. V. Belyaeva) in the BG UB RAS.



Fig. 1. *Salix purpurea* f. *gracilis* habit, private garden, Willow Mount, Lydbrook (United Kingdom), 18 X 2024. Photo by K. Chamberlain.

Material and methods

The morphological characters of living plants of the hybrid, *S. purpurea* subsp. *angustior* × *S. serpillifolia* and its parents were compared. All relevant literature was searched for information on the hybrid and parent taxa and the available herbarium material of parent taxa was studied at the following Herbaria: B, BAS, BASBG, BM, BOCH, BR, CGE, DR, E, FR, G, H, HBA, K, LE, LIV, MHA, MW, PERM, S, SVER, UPS, W, WU, Z, ZT (Herbarium codes follow Thiers, 2024). Morphological analysis included characters that were considered in major taxonomic research (Wimmer, 1866; Buser, 1940; Skvortsov, 1968, 1999; Meikle, 1984; Chmelař, Meusel, 1986; Martini, Paiero, 1988; Lautenschlager, 1989; Hörandl, 1992; Hörandl et al., 2002; Ohashi, 2001; Belyaeva et al., 2006; Argus et al., 2010, Valyagina-Malyutina, 2018).

Taxonomy and nomenclature

According to the taxonomic view of Belyaeva and R. H. A. Govaerts (2023) reflected in POWO (2024), *S. purpurea* subsp. *angustior* (Lautenschlager-Fleury, Lautenschlager-Fleury, 1987; Lautenschlager, 1989) is a synonym of *S. purpurea* f. *gracilis* Wimm. (Wimmer, 1866). Female and male plants of this willow grow in the subalpine zone of the Alps in Switzerland and Austria where *S. serpillifolia* also occurs. The flowering times of these two taxa in the Austrian Alps are quite different: *S. purpurea* f. *gracilis* flowers in March — April and *S. serpillifolia* in June — August (Hörandl et al., 2002). In the Swiss Alps, *S. purpurea* f. *gracilis* flowers in June and *S. serpillifolia* in July (Lautenschlager, 1989). However, in the Swiss Alps (Oberwallis) where *S. purpurea* f. *gracilis* and *S. serpillifolia* grow together as pioneer plants (Jessen, 2024), their flowering, at least once, coincided, sufficiently for them to cross and produce viable offspring that was collected and cultivated for more than fifteen years in different gardens in Europe and Russia.

Salix purpurea f. *gracilis* belongs to section *Helix* Dumort. of subgenus *Vetrix* Dumort., which is represented by shrubs and trees; *S. serpillifolia* belongs to section *Herbella* Ser. of subgenus *Chamaetia* (Dumort.) Nasarow, which is represented by low and creeping dwarf shrubs (Skvortsov, 1968, 1999; Hörandl et al., 2002). Recently we described a new anthropogenic hybrid, *S.* × *polychroma* I. V. Belyaeva et O. V. Epanch. (Epanchintseva, Belyaeva, 2022), the parents of which also belong to subgenera *Vetrix* and *Chamaetia*, and represent different life forms, i. e. phanerophytes and chamaephytes

(Belyaeva, Govaerts, 2023). According to our observations in nature and in cultivation, spontaneous hybridisation between taxa of different life forms is less common in *Salix* than hybridisation between taxa of the same life form.

The specific characteristics of the parent taxon, *S. purpurea* f. *gracilis*, according to our research and available literature (Buser, 1940; Meikle, 1984; Lautenschlager-Fleury, Lautenschlager-Fleury, 1987; Lautenschlager, 1989; Hörandl, 1992; Hörandl et al., 2002), are as follows. Shrub 1.2–2(3) m high (Fig. 1). Branches olive grey to light brownish grey, branchlets yellowish brown or brownish purple to dark purple, thin, flexible, glabrous. Buds dimorphic, glabrous. Generative buds narrowly triangular with blunt rounded apex, yellowish purple or dark brownish purple, 2.3–4.9 mm long, 0.92–1.36 mm wide and 0.61–0.92 mm thick, carinate, appressed to the shoot in their lower part and slightly declined from the shoot at an angle in upper part with a rounded apex. Vegetative buds narrowly triangular, nearly acute, brownish purple, 2.14–2.6 mm long, 0.77–1.07 mm wide and 0.46–0.77 mm thick, carinate, appressed to the shoot, with an acute apex (Fig. 2: A). Leaves opposite or subopposite, narrowly linear-lanceolate, 2.5–4.9 cm long, 0.3–0.8 cm wide, with short acute flat apex and cuneate base, thin, glabrous, with flat glandular dotted margin, dull green adaxially, whitish green abaxially, amphistomatous, sometimes blackening on drying (Fig. 3: A). Stipules minute, rudimentary, caducous. Petiole 3.5–7 mm long, reddish, glabrous. Male catkins densely flowered, 1.2–2.5 cm long on stalks to 4 mm long, with 2–4 leaflets at base. Floral bracts 1.3–1.4 mm long, rounded, bicoloured, with darker apex and straight or twisted long white hairs at apex of outer and inner sides of the bract. Stamens 2, with fully connate filaments 2.2 mm long, anthers reddish at beginning of flowering, becoming yellowish later. Nectary 1, adaxial, 0.5 mm long, 0.4 mm wide.



Fig. 2. Branchlets with buds.
A — *Salix purpurea* f. *gracilis*; B — *S.* × *jessenii*; C — *S. serpillifolia*. Botanical Garden UB RAS, Yekaterinburg (Russia), 3 X 2024. Photo by O. V. Epanchintseva. Scale bar: 10 cm.

Hörandl (1992: 129–130) commented that the narrow-leaved form of *S. purpurea* in the subalpine zone in the Swiss Alps is only a reaction to extreme locations in general, which is important for the species in both, the subalpine levels as well as in dry locations on the hills. To check whether forms of *S. purpurea* with narrow leaves from the Swiss Alps retain their features (i. e. thin, short one year-old branchlets, narrow leaves and colour of the branches and branchlets), Hörandl (1992) suggested to transfer them into cultivation in better soil conditions to determine the genetic stability of these morphological features. *Salix purpurea* f. *gracilis* retained its morphological characters in cultivation in various conditions (Meikle, 1984; Chmelař, Meusel, 1986; Newsholme, 2002; Lagerström, Uronen, 2005; Brochet, 2017; Sanford et al., 2023) since the time when it was described by Wimmer (1866). What could be better evidence?

The specific characteristics of the parent taxon, *S. serpillifolia*, according to our research and available literature (Skvortsov, 1968; Lautenschlager, 1989; Hörandl, 1992; Skvortsov, 1999; Hörandl et al., 2002) are as follows. Low, prostrate dwarf shrub with thick, knotty, creeping and sometimes rooting greyish brown branches and yellowish green, glabrous short branchlets (Fig. 4: A, B). Buds monomorphic, glabrous, not carinate or slightly carinate, ovoid or round, 1.5–2.2 mm long, 0.8–1.1 mm wide, 0.7–1.1 mm thick with pointed apex, appressed to the shoot or slightly declined from the shoot at an angle in upper part (Fig. 2: C). Leaves alternate, spathulate or obovate 0.7–1.1 cm long, 0.2–0.5 cm wide, slightly



Fig. 3. Branchlets with leaves.
A — *Salix purpurea* f. *gracilis*; B — *S.* ×*jessenii*; C — *S. serpillifolia*. Botanical Garden UB RAS, Yekaterinburg (Russia), 1 X 2024. Photo by O. V. Epanchintseva.

folded, with short, pointed or rounded apex and cuneate base, thick, glabrous with a few glands on the flat margin, green adaxially, pale green abaxially, amphistomatous, not blackening on drying (Figs. 3: C; 4: B). Stipules minute, rudimentary, caducous. Petiole 0.7–2.3 mm long, glabrous. Male catkins loosely flowered, with 3–7 flowers on stalks 0.61–0.77 mm long and rosette of leaves at base. Floral bracts 1.53–1.68 mm long, 0.69–0.77 mm wide, retuse, green, glabrous. Stamens 2, with free, glabrous filaments 0.77–2.5 mm long and ovoid yellowish anthers 0.31–0.5 mm long, 0.15–0.31 mm wide. Nectaries 2, adaxial, 0.48 mm long, 0.35 mm wide and abaxial, 0.5 mm long and 0.12 mm wide.

The hybrid, *S. purpurea* f. *gracilis* × *S. serpillifolia*, demonstrates characteristics that are intermediate between the two parental taxa, such as size and form of growth, buds, leaves and flowers (Figs. 2: B; 3: B). Also, this hybrid willow has unique characteristics that are described below.

Salix × jessenii O. V. Epanch. et I. V. Belyaeva, nothosp. nova (*S. purpurea* × *S. serpillifolia*).

A low prostrate dwarf shrub with long, thin, flexible, creeping and sometimes rooting branches and short and long, thin, flexible branchlets (Fig. 4: C–E). Branchlets and branches brownish purple or purple, glabrous. Buds dimorphic, ovoid, glabrous. Generative buds ovoid, 2.38–2.52 mm long, 1.40–1.54 mm wide, 0.93–1.26 mm thick, not carinate, appressed to shoot in their lower part and slightly declined from the shoot at an angle in upper part, apex acute. Vegetative buds 1.54–1.96 mm long, 0.98–1.12 mm wide, 0.56–0.78 mm thick, narrowly ovoid, carinate, appressed to shoot, apex acute (Fig. 2: B). Leaves alternate, narrowly obovate, 1.53–2.20 cm long,

Fig. 4. *Salix serpillifolia* (A, B), Botanical Garden UB RAS, Yekaterinburg (Russia):
A — habit with buds, 15 IV 2024; B — habit with leaves, 16 IX 2024. Photos by O. V. Epanchintseva.
Salix ×*jessenii* (C–G):
C — habit with buds, 9 IV 2023; D — habit with leaves, 3 VII 2017; E — branchlets with male catkins, 9 IV 2023; F — branchlet with male catkin, 9 IV 2023; G — male catkin, 9 IV 2023. C, E–G: private garden, Willow Mount, Lydbrook (United Kingdom), photos by I. V. Belyaeva; D: Botanical Garden UB RAS, Yekaterinburg (Russia), photo by O. V. Epanchintseva.


A
B
C
D
E
F
G

0.55–0.69 cm wide, apex short, acute, flat, base cuneate, glabrous, with flat glandular dotted margin, green and lustrous adaxially, dull green abaxially, amphistomatous, not blackening on drying (Fig. 3: B; 4: D). Stipules minute, rudimentary, persistent. Petiole 3.1–4.1 mm long, reddish, glabrous. Male catkins loosely flowered when fully developed, 1.2–1.5 cm long on flowering branchlets, 0.47–0.49 cm long with 7 or 8 leaflets (Fig. 4: E–G). Floral bracts 0.56–0.69 mm long, rounded, purplish with blunt apex and sparse long white twisted hairs on outer and inner surfaces of bracts. Stamens 2, glabrous, 4.48 mm long, connate from base to ⅓–½ of the length of the filaments, anthers roundish, 0.56 mm in diameter, reddish at beginning of flowering, becoming yellowish later. Nectaries 2, adaxial, 0.7 mm long 0.3 mm wide, abaxial 0.8 mm long 0.2 mm wide. Female plant not found.

Holotype (Fig. 5): Russia, Yekaterinburg, Botanical Garden of the Ural Branch of the Russian Academy of Sciences, Salicetum, 4 IX 2024, O. V. Epanchintseva, 1-2024. Cultivated under accession number 3311 (SVER: SVER 948298; isotype — LE 01313305).

Paratypes: Russia, Yekaterinburg, Botanical Garden of the Ural Branch of the Russian Academy of Sciences, Salicetum, 23 IX 2024, O. V. Epanchintseva, 2-2024. Cultivated under accession number 3311 (MHA0035077, NSK0226710); United Kingdom, Gloucestershire, Lydbrook, Willow Mount Garden, 9 IV 2023, I. V. Belyaeva 17-2023, ♂ (WSY).

Diagnosis. *Salix* × *jessenii* differs from *S. purpurea* f. *gracilis* (see descriptions by Wimmer, 1966; Lautenschlager-Fleury, Lautenschlager-Fleury, 1987; Lautenschlager, 1989) in having a prostrate creeping form of growth vs a shrub; narrowly triangular buds vs ovoid or round; narrowly obovate, glossy adaxially, thick leaves not blackening on drying vs narrowly linear-lanceolate, dull adaxially, thin leaves sometimes blackening on drying; catkins tiny, loosely flowered vs longer and thicker densely flowered; stamens 2, not fully connate vs fully connate; nectaries 2 instead of 1 in *S. purpurea* f. *gracilis*. *Salix* × *jessenii* differs from *S. serpillifolia* (see descriptions by Scopoli, 1771: 255; Martini, Paiero, 1988; Lautenschlager, 1989; Hörandl, 1992; Hörandl et al., 2002) in branches, long and thin, with long internodes vs shorter and thicker with short internodes; dimorphic buds vs monomorphic; flat, narrowly obovate leaves with pointed apex vs slightly folded, spathulate or obovate leaves with rounded or pointed apex; reddish petioles vs greenish yellow; partly connate stamens vs free stamens in *S. serpillifolia*.

Note. Although the parent taxa of this new hybrid are *S. purpurea* f. *gracilis* and *S. serpillifolia*, the name, *Salix* × *jessenii*, applies to all hybrids between *S. purpurea* and *S. serpillifolia*.

Etymology. The epithet "*jessenii*" is derived from the surname of Stefan von Jessen, the curator of the Arctic Alpine Garden, Chemnitz (Germany), where this hybrid willow has been cultivated for more than 15 years.

Distribution. *Salix* × *jessenii* was introduced from Oberwallis, Switzerland, to the Arctic Alpine Garden, Chemnitz, where it is currently cultivated, propagated and made available for sale (Jessen, 2024). Described from cultivated plants. Currently, it is known in cultivation in the Botanical Garden of the UB RAS, Yekaterinburg (Russia) and in the private garden of Irina Belyaeva and Keith Chamberlain at Willow Mount, Lydbrook (United Kingdom).

Use. The potential uses of this beautiful hybrid willow could be as an ornamental plant because of its multiple little male catkins during flowering in early spring (Figs. 9–10) and for stabilising slopes by its long-spreading and rooting branches. *Salix* × *jessenii* is fast-growing, tolerates pruning well, is easily propagated by cuttings and is resistant to pests and diseases.

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Fig. 5. Holotype of *Salix* × *jessenii* (SVER948298).

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