

# ‘Flower Angel’: A New *Iris sanguinea* Cultivar

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The Iridaceae is a family of perennial, herbaceous, and bulbous plants that belong to the order Asparagales, taking their name from the genus *Iris*. There are more than 2000 species in this family (Peter and Manning, 2008). The genus *Iris* is the largest one of the family Iridaceae. There are about 300 species around the world and 60 species in China (Roguz et al., 2020). Irises are commonly used in landscaping because of their large, colorful, and showy flowers (Lian et al., 2016). Among *Iris* species, *Iris sanguinea* (also known as Oriental Iris) has particularly large, brightly colored, butterfly-shaped flowers and it is resistant to cold and drought, and therefore it has a high ornamental value. In addition, this species is resistant to water logging and pollution (Bi et al., 2011; Shang and Wang, 2014). It is often found in wet habitats such as swamps and wetlands, and it can tolerate freezing conditions. Wild populations of *I. sanguinea* are abundant, but the petals have a fairly uniform blue-violet color (Wang and Wang, 2017). In the past few years, some new cultivars have been developed, such as ‘Forest Fairy’ (Kuwantai et al., 2018), ‘Dream of the Butterfly’ (Zhao et al., 2018), and ‘NEFU’ (Qi et al., 2020), and improving the color of flowers has become a focus of breeding of *I. sanguinea*. In 2011, the

new cultivar Flower Angel was selected from its progeny. Compared with maternal strain, the outer perianth of ‘Flower Angel’ is violet [Royal Horticultural Society (RHS) N87A], the inner perianth is violet (RHS N87B), and the middle veins of the petals are white.

## Origin

In 2003, the seeds of *I. sanguinea* were obtained from the Shenyang Botanical Garden of China and were sown in the Mao-Er-Shan experimental forestry farm of Northeast Forestry University (NEFU), Harbin, China. Seeds from plants were collected in the fall and planted next spring in the same nursery of NEFU with their parents. In 2011, a unique plant (inventory no. NEFU 2011-13) was detected in that population. Its outer perianth and inner perianth were violet (RHS N87A and RHS N87B), and the middle veins of the petals were white. Over the next few years, the plant was divided into several individuals and the clones were propagated at the Mao-Er-Shan experimental farm of NEFU. After several years of outdoor cultivation, a large number of plants developed in 2015. After 3 years of cultivation (2015–18), all plants showed stable and consistent morphological traits. In 2018, the new cultivar was officially authorized to be released as ‘Flower Angel’ by the American *Iris* Society with accession no. 18-1112.

## Description

From 2015 to 2018, the ‘Flower Angel’ and its parent *I. sanguinea* were planted in a 50-m<sup>2</sup> flower nursery of NEFU for data collection. Ninety plants each of ‘Flower Angel’ and parent *I. sanguinea* were planted in common gardens with a randomized design, with three replicates for each cultivar. Thirty plants (10 plants in each replication) of

‘Flower Angel’ and 30 plants of *I. sanguinea* were selected randomly to record the following morphological traits: flower diameter, flower color, plant height, leaf length, leaf width, leaf length-to-width ratio, bract length and width, bract length-to-width ratio, inner perianth length, inner perianth width, inner perianth length-to-width ratio, outer perianth length, outer perianth width, outer perianth length-to-width ratio, flowering season, and fruiting period. The references of all color numbers were from the Royal Horticultural Society Color Chart (Royal Horticultural Society, 2007), which are designated as RHS numbers. The data were analyzed using SPSS 22.0 (Lenovo, Beijing, China) with Duncan’s one-way analysis of variance.

The plant height of ‘Flower Angel’ was  $\approx 72$  cm, which is taller than *I. sanguinea* (55 cm). On average, the leaves are 63.6 cm long and 1.1 cm wide, which results in a larger leaf area than *I. sanguinea* ( $58.11 \times 0.97$  cm), but the ratio of leaf length to width of ‘Flower Angel’ was less than *I. sanguinea* (Table 1). The bract length was shorter, but the bract width was wider than *I. sanguinea*. The average ratio of bract length to width of ‘Flower Angel’ was 4.79, which was less than *I. sanguinea* (5.98). Flowers of ‘Flower Angel’ had three falls and three standards, similar to *I. sanguinea*. However, the flower size of ‘Flower Angel’ was 8.9 cm in diameter, which is considerably wider than *I. sanguinea* (6.5 cm). The inner and outer perianths are wider than *I. sanguinea*, but the ratios of length to width of the inner and outer perianths were less (Table 1). The perianth color of ‘Flower Angel’ is violet (RHS N87A and RHS N87B), whereas the perianth color of *I. sanguinea* is violet (RHS N88A). The perianths of ‘Flower Angel’ have brown reticulate patterns on a yellow background at the base, similar to *I. sanguinea*. The anther of ‘Flower Angel’ is violet (RHS N86C), compared with the violet-blue (RHS N92C) anthers of *I. sanguinea*. The style color is light-violet (RHS N86C), but the middle vein is white, whereas the styles of *I. sanguinea* are violet (RHS N88A) (Figs. 1–3). The flowering time of ‘Flower Angel’ extends from 5 June to 25 June at NEFU, and the fruiting period lasts until 20 Sept., similar to *I. sanguinea*.

In summary, the major differences between ‘Flower Angel’ and *I. sanguinea* concern flower size and diameter, color, and plant height. Compared with *I. sanguinea* ‘Flower Angel’ has more colorful, violet flowers, with contrasting white middle veins. These unique characteristics make ‘Flower Angel’ an excellent supplement to the diversity of *I. sanguinea* species for ornamental purposes, and thus a valuable resource for further *Iris* breeding.

## Cultivation Techniques

‘Flower Angel’ is suitable for cultivation in northern China and similar climate zones. It is well adapted to growing in sandy loam or light clay with well-drained and rich

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Table 1. Morphological traits of new cultivar ‘Flower Angel’ and *Iris sanguinea* were collected from 30 plants (10 plants/replication in three replications) planted in a randomly designed nursery in Northeast Forestry University, Harbin, China, from 2015 to 2018.

Traits <sup>z</sup>	Flower Angel	<i>Iris sanguinea</i>
Plant height (cm)	71.99 ± 0.16 a <sup>y</sup>	55.59 ± 0.12 b
Leaf length (cm)	63.6 ± 0.18 a	58.11 ± 0.04 b
Leaf width (cm)	1.10 ± 0.01 a	0.97 ± 0.003 b
Leaf length/width	58.34 ± 0.54 b	59.83 ± 0.2 a
Bract length (cm)	5.24 ± 0.11 b	6.12 ± 0.008 a
Bract width (cm)	1.1 ± 0.009 a	1.02 ± 0.001 b
Bract length/width	4.79 ± 0.05 b	5.98 ± 0.01 a
Flower diameter (cm)	8.85 ± 0.01 a	6.47 ± 0.003 b
Inner perianth length (cm)	4.18 ± 0.02 b	4.86 ± 0.03 a
Inner perianth width (cm)	2.11 ± 0.08 a	1.64 ± 0.08 b
Inner perianth length/width	1.97 ± 0.02 b	2.97 ± 0.03 a
Outer perianth length (cm)	4.90 ± 0.03 a	4.62 ± 0.02 b
Outer perianth width (cm)	3.69 ± 0.01 a	2.12 ± 0.04 b
Outer perianth length/width	1.33 ± 0.08 b	2.20 ± 0.04 a
Flower period	5 June–25 June	5 June–25 June
Fruit period	10 Aug.–20 Sept.	10 Aug.–20 Sept.

<sup>z</sup>Data were collected in 2015–18 and analyzed using SPSS 22.0 (Lenovo, Beijing, China).

<sup>y</sup>Means followed by the different letters in the same row are significantly different ( $P < 0.05$ ).



Fig. 1. Single flower of (left) *Iris sanguinea* and (right) ‘Flower Angel’ illustrate flower size and color. The flower of ‘Flower Angel’ is larger and its perianth is violet [Royal Horticultural Society (RHS) N87A or RHS N87B), the styles is violet-blue (RHS N86C), compared with violet-blue (RHS N88A) of *I. sanguinea*.



Fig. 2. Single flower of *Iris sanguinea* and ‘Flower Angel’ (top view).

humus in full sun. Division is the most important propagation method for ‘Flower

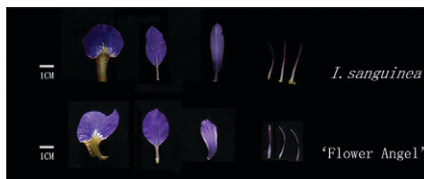


Fig. 3. Anatomic structure of *Iris sanguinea* and ‘Flower Angel’, indicating outer and inner perianths, style, and anthers.

Angel’, and can be accomplished in the spring, summer, and early fall. A 30- × 30-cm plant spacing is adequate for individual plants under regular watering. ‘Flower Angel’ can be maintained through manual weeding and is susceptible to few pests and diseases.

### Use

*I. sanguinea* ‘Flower Angel’ has tremendous potential for landscaping worldwide. It can be used in urban landscaping as an ornamental plant. Its flowers and leaves are especially suitable for cut flowers.

### Availability

Information about plant material and research of ‘Flower Angel’ can be obtained from Dr. Ling Wang (wanglinghlj@126.com) at the College of Landscape Architecture, Northeast Forestry University, Harbin, China.

### Literature Cited

- Bi, X.Y., Q. Lou, and Y. Zheng. 2011. Studies on compatibility of interspecific hybridization between *Iris lactea* Pall. var. *chinensis* Koidz. and *I. sanguinea* Hornem. Hort. Plant J. 38(5):977–984, doi: 10.16420/j.issn.0513-353x.2011.05.022.
- Kuwantai, A., Y.J. Liu, Z.Z. Wan, H.Y. Liu, and L. Wang. 2018. ‘Forest Fairy’: A new *Iris sanguinea* cultivar. HortScience 53:1222–1223, doi: 10.21273/HORTSCI113114-18.
- Lian, X.Y., G.J. Luo, H. Li, W.J. Xu, Y.E. Xiao, and X.Y. Bi. 2016. Reciprocal difference of interspecific hybridization between three different colors of *Iris dichotoma* and *I. domestica*. J. Hort. Sci. Biotechnol. 91(5):483–490, doi: 10.1080/14620316.2016.1173525.
- Peter, G. and J. Manning. 2008. The *Iris* family: Natural history & classification. Timber Press, Portland, OR.
- Qi, X.Y., L.J. Fan, Y. Gao, Y.H. Shang, H.Y. Liu, and L. Wang. 2020. ‘NEFU-1’: A new *Iris sanguinea* cultivar. HortScience 55:109–111, doi: 10.21273/HORTSCI114578-19.
- Roguz, K., M.K. Gallagher, E. Senden, Y. Bar-Lev, M. Lebel, R. Heliczner, and Y. Sapir. 2020. All the colors of the rainbow: Diversification of flower color and intraspecific color variation in the genus *Iris*. Front. Plant Sci. 11:569811, doi: 10.3389/FPLS.2020.569811.
- Royal Horticultural Society. 2007. Royal Horticultural Society Color Chart. Royal Hort. Soc., London, UK.
- Shang, F.J. and L. Wang. 2014. Biological characteristics of flowering and pollination of *Iris sanguinea*. Pratacultural Sci. 31(5):892–897, doi: 10.11829/j.issn.1001-0629.2013-0552.
- Wang, K. and L. Wang. 2017. A new *Iris sanguinea* cultivar ‘Bandie’. Hort. Plant J. 44(S2):1–2, doi: 10.19433/j.cnki.1006-9119.2019.16.010.
- Zhao, J.J., X. Chen, L.J. Fan, and L. Wang. 2018. ‘Dream of the Butterfly’: A new *Iris sanguinea* cultivar. HortScience 53:1706–1707, doi: 10.21273/HORTSCI113378-18.