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‘Donglin Fendai’: A New *Iris sanguinea* Cultivar

Zhaoqian Niu, Gongfa Shi, Linlin Fang, and Ling Wang
College of Landscape Architecture, Northeast Forestry University, Harbin, 150040, China

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Iris sanguinea is a perennial herbaceous plant in the Iridaceae family that exhibits an exquisite plant morphology, compact flower structure, robust disease resistance, and exceptional ornamental values. It can be used as a groundcover or cut flowers. In recent years, multiple new *I. sanguinea* cultivars with diverse floral patterns have been reported, including ‘Donglin Zi’ with purplish red outer perianth (Yang et al. 2022), ‘Qihuan Zi’ with tricoloration at full bloom (Fan et al. 2022), ‘Dream of the Butterfly’ with pale purple flowers and wide outer perianth (Zhao et al. 2018), ‘Xiao Feidie’ with white flowers and flat spoon-like outer perianth (Liu et al. 2023), and ‘Mini Fen’ with dark pink flowers and short plant stature (Fu et al. 2022).

In 2017, a new cultivar of *I. sanguinea*, Donglin Fendai, was created by crossbreeding *I. sanguinea* (Fig. 1B) and *I. sanguinea* f. *albiflora* (Fig. 1C), which are two species with distinct flower colors. The outer petals of ‘Donglin Fendai’ are transverse oval and pink–purple (RHS N87C). The spots are triangular and white and point downward at a 45-degree angle to the ground when fully bloomed. The claws have wedge-shaped black–brown reticulation with yellow–green markings. The inner perianth lobes are oval and pink–purple (RHS N87D) with a concave apex shape. When blooming, they are nearly upright, and the claw strips have black–brown reticulation and yellow markings.

Origin

Seeds of *I. sanguinea* and *I. sanguinea* f. *albiflora* were obtained from Shenyang Botanical Garden and planted in the nursery of Maoershan Experimental Forest Farm of the Northeast Forestry University in Spring 2003. The seeds from open-pollinated plants of both species were collected in 2011, and they were sown in the same nursery during Spring 2012.

In 2014, F1 plants were screened and one exceptional plant with pink–purple outer perianth lobes and white triangular spots was identified. The plant was propagated from 2017 to 2020 using the ramet method, and the resulting clonal population exhibited vigorous growth with stable flower color characteristics. The new cultivar was named Donglin Fendai because of its distinctive color pattern and shape (dancing ballet girl) and given the registration number DBLYDX-DLFD-2019-02 by the American Iris Association in 2023.

Description

The experiment was conducted at the Majiagou Nursery of Northeast Forestry University in Harbin, China (lat. 45.72°N, long. 126.63°E). During the growing season (May–September), the daily average temperature ranged between 15 and 25 °C, relative humidity was 60% to 80%, and plants were cultivated under natural sunlight. The soil type was black soil (pH, 6.2–6.8) with an organic matter content ≥3.5% managed with sprinkler irrigation (two to three times per week) and organic fertilizers. In 2020, ‘Donglin Fendai’ and its parent lines (30 for each) were planted using a completely randomized block design with three replications. The flower color was recorded according to the Royal Horticultural Society (RHS 2007) Color Chart. Fifteen plants were randomly selected from each block, and fully open flowers were used for phenotypical measurements (Table 1). A one-way analysis of variance was performed using IBM SPSS Statistics 26.0 during the statistical analysis.

‘Donglin Fendai’ was selected from open-pollinated progeny of *I. sanguinea* and *I. sanguinea* f. *albiflora*. The flower is flat, and the plant height of ‘Donglin Fendai’ is 54.36 ± 0.14 cm, which is lower than that of the parents (57.35 ± 0.42 cm for *I. sanguinea* and 56.75 ± 0.41 cm for *I. sanguinea* f. *albiflora*). The leaf length and width of ‘Donglin Fendai’ are 51.72 ± 0.25 cm and 1.12 ± 0.08 cm, respectively, which are lower than those of *I. sanguinea* (58.44 ± 0.64 cm and 1.24 ± 0.11 cm, respectively) and *I. sanguinea* f. *albiflora* (56.34 ± 0.62 cm and 1.22 ± 0.09 cm, respectively). The leaf length-to-width ratio is 46.17 ± 0.38 for ‘Donglin Fendai’, which is lower than that of its parents. The bract of ‘Donglin Fendai’ (length, 5.68 ± 0.12 cm; width, 1.46 ± 0.13 cm) is shorter and wider than that of *I. sanguinea* (length, 6.27 ± 0.36 cm; width, 1.02 ± 0.09 cm) and *I. sanguinea* f. *albiflora* (length, 6.07 ± 0.18; width, 1.01 ± 0.04 cm). With longer and wider bracts in general, the bract length-to-width ratio of ‘Donglin Fendai’ (3.89 ± 0.07) is lower than that of the parents (*I. sanguinea*: 6.14 ± 0.33; *I. sanguinea* f. *albiflora*: 6.01 ± 0.28). The flower diameter of ‘Donglin Fendai’ is 6.05 ± 0.33 cm; however, it is 6.22 ± 0.18 cm for *I. sanguinea* and 6.74 ± 0.17 cm for *I. sanguinea* f. *albiflora*. The length of the inner perianth segment of ‘Donglin Fendai’ (4.23 ± 0.11 cm) is shorter than that of the parents (4.86 ± 0.13 cm for *I. sanguinea* and 4.83 ± 0.15 cm for *I. sanguinea* f. *albiflora*). In contrast, the inner perianth segment of ‘Donglin Fendai’ is wider (1.82 ± 0.09 cm) than that of its parents (1.69 ± 0.23 cm for *I. sanguinea* and 1.77 ± 0.23 cm for *I. sanguinea* f. *albiflora*), resulting in a smaller length-to-width ratio compared with that of its parents. Similarly, the outer perianth of ‘Donglin Fendai’ is also smaller than that of its parent. The most prominent feature of ‘Donglin Fendai’ is the light pink–purple of the inner and outer petals (Fig. 1A and 1D) compared to the blue–purple color of *I. sanguinea* (RHS N88A) when in full bloom (Fig. 1B and 1E) and white color of *I. sanguinea* f. *albiflora* (RHS N155C) (Fig. 1C and 1F).

The style branch of ‘Donglin Fendai’ is light purple (RHS 85D, vein color blue–purple RHS 96C) (Fig. 1A), that of *I. sanguinea* is blue–violet (RHS N88A) (Fig. 1B), and that of *I. sanguinea* f. *albiflora* is white (RHS N155C) (Fig. 1C). The anther of ‘Donglin Fendai’ is violet (RHS N83B) (Fig. 1D), that of *I. sanguinea* is blue–violet (RHS N92C) (Fig. 1E), and that of *I. sanguinea* f. *albiflora* is yellow (RHS 15A) (Fig. 1F). The flowering and fruiting periods of ‘Donglin Fendai’ are similar to those of its parents; the flowering time is from 5 Jun to 25 Jun and the fruiting time is from 10 Aug to 20 Sep. Pest damage and disease damage were not observed during the trial, and all plants have fragrance-free flowers. Its seedlings exhibited cold sensitivity (<10 °C growth restriction) that requires greenhouse propagation for optimal development. The cultivar demonstrated stable performance in similar climates. Disease resistance in high-temperature/high-humidity regions requires further evaluation.

In summary, ‘Donglin Fendai’ has a distinctive color pattern compared with that of the parents, and the new cultivar can be used as a novel indigo–violet cut flower.

Cultivation Techniques

‘Donglin Fendai’ can be propagated by ramet in spring, summer, or early autumn. When dividing plants, two to three buds should be reserved and planted with 40-cm × 40-cm spacing. Generally, no fertilization is required, and diseases and pests rarely occur.

Habit and Application

‘Donglin Fendai’ has strong cold tolerance and disease resistance. It can overwinter in the open field in Heilongjiang, China.

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L.W. is the corresponding author. E-mail: wanglinghlj@126.com.

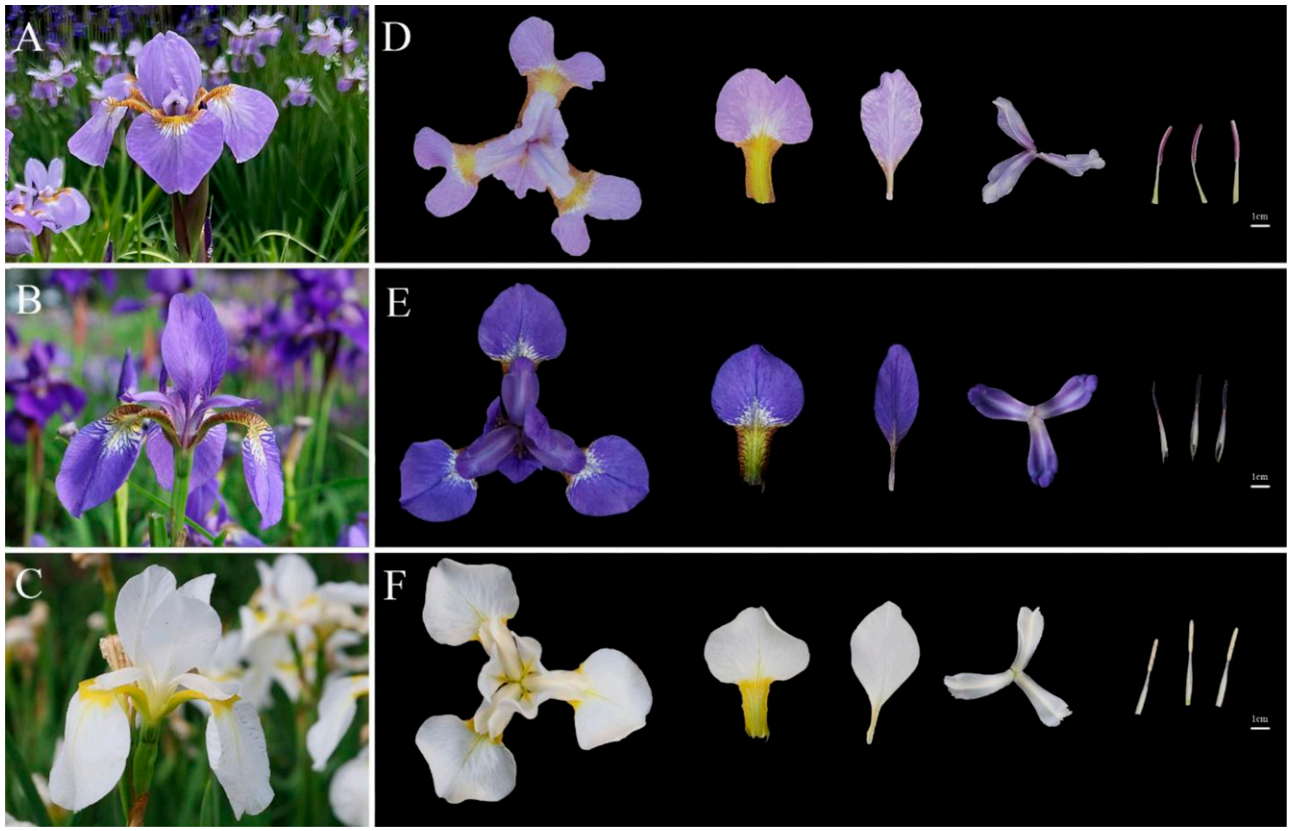

Fig. 1. Anatomical structures of 'Donglin Fendai', *I. sanguinea* f. *albiflora*, and *I. sanguinea*. (**A**) Flowers of 'Donglin Fendai'. (**B**) Flowers of *I. sanguinea*. (**C**) Flowers of *I. sanguinea* f. *albiflora.* (**D**) Flower anatomical structures of 'Donglin Fendai'. (**E**) Flower anatomical structures of *I. sanguinea*. (**F**) Flower anatomical structures of *I. sanguinea* f. *albiflora.* Flower anatomical structures (from left to right) include flower top view, outer perianth segment, inner perianth segment, style branches, and stamens.

Table 1. Morphological characteristics of 'Donglin Fendai' and its parents.

Traits[i]	'Donglin Fendai'	*I. sanguinea*	*I. sanguinea* f. *albiflora*
Plant height (cm)	54.36 ± 0.14 b	57.35 ± 0.42 a	56.75 ± 0.41 a
Leaf length (cm)	51.72 ± 0.25 c	58.44 ± 0.64 a	56.34 ± 0.62 b
Leaf width (cm)	1.12 ± 0.08 b	1.24 ± 0.11 a	1.22 ± 0.09 a
Leaf length/width	46.17 ± 0.38 b	47.12 ± 0.98 a	46.56 ± 0.78 b
Bract length (cm)	5.68 ± 0.12 b	6.27 ± 0.36 a	6.07 ± 0.18 a
Bract width (cm)	1.46 ± 0.13 a	1.02 ± 0.09 b	1.01 ± 0.04 b
Bract length/width	3.89 ± 0.07 b	6.14 ± 0.33 a	6.01 ± 0.28 a
Flower diameter (cm)	6.05 ± 0.33 b	6.22 ± 0.18 b	6.74 ± 0.17 a
Inner perianth length (cm)	4.23 ± 0.11 b	4.86 ± 0.13 a	4.83 ± 0.15 a
Inner perianth width (cm)	1.82 ± 0.09 a	1.69 ± 0.23 b	1.77 ± 0.23 b
Inner perianth length/width	2.32 ± 0.29 b	2.87 ± 0.12 a	2.71 ± 0.12 a
Outer perianth length (cm)	5.51 ± 0.07 a	4.79 ± 0.22 b	4.81 ± 0.06 b
Outer perianth width (cm)	3.72 ± 0.06 a	2.05 ± 0.21 b	2.16 ± 0.23 b
Outer perianth length/width	1.48 ± 0.23 b	2.33 ± 0.11 a	2.23 ± 0.07 a
Flower period	5 Jun–25 Jun	5 Jun–25 Jun	5 Jun–25 Jun
Fruit period	10 Aug–20 Sep	10 Aug–20 Sep	10 Aug–20 Sep

[i]Data were collected from 2020 to 2022 and analyzed using IBM SPSS Statistics 26.0 (one-way analysis of variance). Different letters in the same row denote significant differences ($P < 0.05$).

Suitable habitats include wet grassland and waterside wetland. 'Donglin Fendai' has high ornamental value and can be used as cut flowers and for urban landscaping in cold areas.

Availability

Inquiries about research and requests for 'Donglin Fendai' can be directed to Dr. Ling Wang (E-mail: wanglinghlj@126.com) at the College of Landscape Architecture, Northeast Forestry University, Harbin, China.

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