‘King’: A New *Iris sanguinea* Cultivar

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The *Iris* family, Iridaceae, is distributed throughout much of the world and is one of the most important horticultural families (Manning and Goldblatt, 2008). *Iris sanguinea* is a native perennial herb of northeastern China and Inner Mongolia, where it often grows in swamps, wet grasslands, and sunny slopes (Zhao, 1985). *I. sanguinea* has bright flowers and distinctive flower patterns; is tolerant to cold, drought, salt, and alkaline soils; and is resistant to pollution. It also exhibits rapid propagation; strong resistance to diseases, pests, and cold; and has a high ornamental value. It has wide ornamental applications in northern China (Shang and Wang, 2014). Wild *I. sanguinea* in China are rich in germplasm, but only produce a single flower color (Wang et al., 2013). In recent years, hybridization of wild *I. sanguinea* has resulted in successful breeding of numerous, colorful flowering cultivars. These new hybridized cultivars include Zidie, a rose-purple cultivar (Dong et al., 2014); Beautiful Lotus, a light-purple cultivar [Royal Swedish NCS color no. S3030-R60B] by crossing *I. sanguinea* and *I. sanguinea* f. *albiflora* (Wang et al., 2016); Tingdie, a blue-violet cultivar [Royal Horticultural Society (RHS) N89B] (Wu et al., 2017); and Bandie, a blue-violet cultivar (RHS 96B) (Wang and Wang, 2017). However, currently, there are no new cultivars with large and brightly colored flowers. In 2011, King, a new violet (RHS N88B) cultivar, was selected from the progeny of *I. sanguinea* and seed-harvested under natural growing conditions. King, as a new cultivar, has larger flowers with a violet perianth, blooms in June (Harbin, northeast China), and exhibits an extended period of green foliage.

Origin

In 2007, seeds produced through natural crossing were collected from native *I. sanguinea* plants growing in the Northeast Forestry University (NEFU), Mao-Er-Shan Experimental Forest Farm experimental

nursery in Harbin, China. In Spring 2008, the seeds were sown in the same nursery. In 2011, among the progenies, plants were identified with larger flowers, a violet outer perianth with downward rolled edge, and light-colored inner perianth (code: NEFU 2011-01). The clonal system was established through ramet reproduction, and the progenies were planted in the NEFU experimental nursery for the next 5 years. All propagated

plants exhibited stable and consistent phenotypically in regard to large flowering size, brilliant flower color, stable and consistent flower stem length, vigorous growth, strong environmental adaptability, uniform plant height and structure, long green leaves, flowering period, and extensive management. The flower was officially authorized to be released as ‘King’ by The American Iris Society in 2017 (accession no. 17-0988).

Description

The new cultivar King and *I. sanguinea* were planted separately in the NEFU experimental nursery in Harbin, China, for data collection from 2015 to 2017. Morphological characteristics included plant height, leaf length and width, leaf length/width ratio, bract length and width, bract length/width ratio, flower diameter, inner perianth length

Table 1. Morphological characteristics of *I. sanguinea* and cultivar King.

Characteristics	<i>I. sanguinea</i>	King
Plant height (cm)	55.98 ± 0.61 b ²	78.65 ± 0.95 a
Leaf length (cm)	59.36 ± 0.54 b	68.71 ± 0.88 a
Leaf width (cm)	1.07 ± 0.02 b	1.55 ± 0.03 a
Leaf length/width	55.28 ± 1.31 a	44.46 ± 0.96 b
Bract length (cm)	6.14 ± 0.11 b	7.47 ± 0.34 a
Bract width (cm)	1.04 ± 0.04 b	1.41 ± 0.06 a
Bract length/width	6.00 ± 0.27 a	5.39 ± 0.34 b
Flower diameter (cm)	6.45 ± 0.07 b	12.87 ± 0.25 a
Inner perianth length (cm)	4.48 ± 0.06 b	6.93 ± 0.08 a
Inner perianth width (cm)	1.49 ± 0.02 b	3.90 ± 0.10 a
Inner perianth length/width	3.04 ± 0.06 a	1.75 ± 0.04 b
Outer perianth length (cm)	4.69 ± 0.07 b	7.52 ± 0.09 a
Outer perianth width (cm)	1.79 ± 0.05 b	7.13 ± 0.06 a
Outer perianth length/width	2.61 ± 0.09 a	1.05 ± 0.04 b
Fruit Length (cm)	4.59 ± 0.06 b	4.70 ± 0.06 a
Fruit diameter (cm)	1.30 ± 0.06 a	1.26 ± 0.04 a
Flower period	5 June–25 June	5 June–25 June
Fruit period	August–September	September–October

²Means followed by a different letter in the same row are significantly different ($P < 0.05$).

Fig. 1. The flowers of (A) *I. sanguinea* and (B) ‘King’. ‘King’s’ inner perianth color was violet [Royal Horticultural Society (RHS) N88B] compared with a different violet (RHS N88A) for *I. sanguinea*. In contrast, the outer perianth color for ‘King’ and *I. sanguinea* were the same violet (RHS N88A).

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Fig. 2. Single flower of 'King' structure, including outer perianth, inner perianth, bract, anther, ovary, and style. Inner perianth length-to-width ratio is 1.75; the outer perianth length-to-width ratio is 1.05. The color of the outer perianths are violet [Royal Horticultural Society (RHS) N88A]; the colors of inner perianths and styles are violet (RHS N88B).

and width, inner perianth length/width ratio, outer perianth length and width, outer perianth length/width ratio, fruit length and diameter, flower period, and fruit period, which were evaluated on a randomized sample of 30 plants (3 replications $\times$ 10 plants). The data were analyzed using IBM's SPSS Statistics 21.

'King' plant height (78.65 cm) was greater than *I. sanguinea* (55.98 cm), therefore enhancing the *Iris* plant height (Table 1). Leaf length (68.71 cm) and width (1.55 cm) of 'King' were longer and wider than *I. sanguinea* (59.36 cm and 1.07 cm, respectively), which increases potential ground coverage. However, the ratio of leaf length/width of 'King' was less than *I. sanguinea* (Table 1). Bract length and width of 'King' were 7.47 cm and 1.41 cm, respectively, which was greater than *I. sanguinea*; but, the 'King' bract length/width ratio was less than *I. sanguinea*.

The flower diameter of 'King' was 12.87 cm, which was larger than *I. sanguinea* (6.45 cm) and other cultivars of *I. sanguinea* (Dong et al., 2014; Kuwantai et al., 2018; Wang and Wang, 2017), therefore making 'King' an outstanding potential new *Iris* for landscape applications (Fig. 1). Although there have been many new *Iris* cultivars with various colors, 'King' represents a significant breakthrough with respect to flower size. 'King' has flowers twice as large as *I. sanguinea* and is a tremendous potential source for the selection of future *Iris* cultivars. In addition,

the inner perianth color of 'King' was different from *I. sanguinea*, and both the inner and outer perianths were larger than *I. sanguinea*. The elliptic inner perianth color of 'King' was violet (RHS N88B) compared with a different violet (RHS N88A) for *I. sanguinea*. The inner perianth length (6.93 cm) and width (3.90 cm) for 'King' was significantly greater than *I. sanguinea* (4.48 and 1.49 cm, respectively). In contrast, the outer perianth color for 'King' and *I. sanguinea* were the same violet (RHS N88A) (Fig. 2). The outer perianth length (7.52 cm) and width (7.13 cm) were greater than the length (4.69 cm) and width (1.79 cm) of *I. sanguinea*. Moreover, the outer perianth length/width ratio of 'King' was 1.05, which is almost circular and very different from the 2.61 length/width ratio of *I. sanguinea* (Table 1). The flowering period for 'King' and *I. sanguinea* were the same (5–25 June), whereas the 'King' fruiting period (September–October) was later than *I. sanguinea* (August–September) (Table 1).

In summary, the primary differences between 'King' and *I. sanguinea* includes the flower and bract dimensions, inner perianth color, plant height, leaf size, and fruiting period. 'King' has an exceptional appearance for landscaping, and tremendous potential for the development of new cultivars. When planting in Harbin, China, 'King' usually emerges at the end of April and senesces in late October. It goes on to survive the winter and emerge the following spring.

Availability

Information about research or use of 'King' plants can be addressed to Dr. Ling Wang (e-mail: wanglinghlj@126.com) from the College of Landscape Architecture, Northeast Forestry University, Harbin, China.

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