‘Purple Jade’: The First Tulip Cultivar Released in China

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Tulip (*Tulipa gesneriana* L.), belonging to the tribe Tulipeae in the family Liliaceae, is a fascinating bulbous flower all over the world. It is widely used for potting, bed, and border plants due to its large and attractive flowers with a wide range of colors (Fahad et al., 2014). Nowadays, more than 150 million tulip bulbs have been imported to China every year (Xue et al., 2005). Among them, ‘Purple Lady’ and ‘Miss Holland’ are the most popular cultivars in China for their lovely purple and red flowers, respectively. Pink purple and red colors are the symbols of luck and happiness in Chinese culture. The newly released pink purple-flowered (RHS 72B) tulip cultivar Purple Jade is the first Chinese tulip cultivar registered in 2015. The main objective of this paper was to provide information about ‘Purple Jade’ and its main characteristics compared with its female parent ‘Purple Lady’ that also has purple flower.

Origin

Purple Jade is a high-quality cultivar derived from the cross of ‘Purple Lady’ and ‘Miss Holland’ by Institute of Floriculture, Liaoning Academy of Agricultural Sciences. In 2001, the cross was made and 1214 hybrid seeds were obtained. In 2007, there were 23 breeding lines that gave the first flowering. The best performing breeding line LY-0156–20 was evaluated in the open experimental field at Liaoning Academy of Agricultural Sciences located in Shenyang City, northeast China, and was officially authorized to release as ‘Purple Jade’ by Liaoning Provincial Seed Administration Bureau in 2015.

Description

The experiment plot located in Shenyang City at long. 123°34′4″ E, lat. 41°49′12″N

with elevation 45 m, where monthly mean temperature ranges from –11.0 to 24.7 °C, the extreme minimum temperature is –33.1 °C in January, whereas the maximum temperature is 39.3 °C in July, the frost-free period is 183 d, and the annual rainfall is around 690 mm concentrated in June, July, and August, accounting for ≈60% of total amount. The soil in test plot was mixed with loam, peat, and sand before planting with low electrical conductivity (EC) value (0.75 dS·m^{–1}), slightly acid value (pH 6.80), and low organic matter (0.86%) (EC and pH value measured by COMBI 5000; STEP Systems GmbH, Nurnberg, Germany; Organic matter measured by infrared spectroscopy, Tang et al., 2007). The bulbs (11 cm < perimeter < 12 cm) were planted at a distance of 15 × 20 cm apart and 15 cm deep in the experimental field on 1 Oct. 2014. The plants were drip irrigated. All the bulbs survived in winter without any protection. A combination fertilizer 5N–4.4P–4.2K was applied while the leaves began to emerge in spring.

Flower characteristics were based on a random sample of 15 flowers (three replications × five flowers). The significance of the differences between means of the two cultivars was evaluated using Fisher’s *t* test analysis of variance (*P* < 0.05, IBM SPSS Statistics; SPSS Inc., Chicago, IL).

Table 1. Phenological periods of ‘Purple Jade’ and ‘Purple Lady’ (day/month).

Stages	Purple Jade	Purple Lady
Planting	1/10	1/10
Sprouting	17/3	24/3
Flower bud emergence	4/4	9/4
Initial flowering	15/4	16/4
Flower withering	1/5	28/4
Leaf withering	17/6	3/6

Table 2. Stem and leaf characteristics of ‘Purple Jade’ and ‘Purple Lady’.

Characteristics	Purple Jade	Purple Lady
Stem length (cm)	55.95 ± 2.00 a ²	41.60 ± 1.31 b
Stem diameter (mm)	8.11 ± 0.11 a	4.78 ± 0.21 b
Leaf length (cm)	23.86 ± 2.56 a	25.08 ± 0.38 a
Leaf width (cm)	8.61 ± 1.27 a	9.31 ± 0.21 a
Leaf length/width	2.84 ± 0.64 a	2.69 ± 0.07 a
Leaf number	3.80 ± 0.45 a	3.00 ± 0.00 b

²Means followed by the different letters in the same row are significantly different (Fisher’s *F*; *P* < 0.05).

‘Purple Jade’ is more vigorous than ‘Purple Lady’ with a longer growing period, sprouting on 17 and 24 Mar., whereas leaves withering on 17 and 3 June, respectively (based on the data in 2015; Table 1). The most important trait of ‘Purple Jade’ is long flowering duration, reaching about 16.8 d, 4.4 d longer than ‘Purple Lady’. Most tulip cultivars have short flowering period, so long flowering duration is an important target for tulip breeding in our program as well as all over the world (Van Creijl, 1997).

The stem of ‘Purple Jade’ is higher and thicker than ‘Purple Lady’ (means based on 3 years’ data from 2014 to 2016; Table 2). The leaf length, leaf width, and the ratio of leaf length:width of ‘Purple Jade’ are similar to those of ‘Purple Lady’. Both cultivars have small leaves, no more than 26 cm in length and 10 cm in width. ‘Purple Jade’ has three or four leaves. However, ‘Purple Lady’ has only three leaves.

The flower color of ‘Purple Jade’ is lovely pink purple (RHS 72B) as shown in Fig. 1. The corolla of ‘Purple Jade’ is significantly bigger than ‘Purple Lady’ (means based on 3 years’ data from 2014 to 2016; Table 3), with 7.30 and 4.49 cm in height, respectively. Length of outer petal and inner petal of ‘Purple Jade’ is significantly longer than ‘Purple Lady’, 7.30 and 7.04 cm vs. 4.54 and 4.40 cm. Width of outer petal is not significantly different between the two cultivars (4.32 vs. 4.30 cm), but width of inner petal of ‘Purple Jade’ is significantly wider than ‘Purple Lady’ (4.62 vs. 4.38). Macroscopical observations revealed that ‘Purple Jade’ had the similar susceptibility with ‘Purple Lady’ to the main tulip diseases. Furthermore, in the soil–climatic conditions of the experimental field, both cultivars showed good resistance to fungus diseases induced by *Fusarium oxysporum* and *Botrytis tulipae*, which is of major importance for selecting a tulip cultivar (Miller et al., 2004; Tang et al., 2015; Van Eijk et al., 1979).

In conclusion, ‘Purple Jade’ is a promising pink purple-flowered tulip cultivar. All the traits mentioned make itself a very desirable cultivar for cut flower and landscaping as well as a parent for breeding.

Availability

‘Purple Jade’ tulip was registered in the official list of cultivars of China Ministry of Agriculture in 2015, and virus-free bulbs are presently available from the Liaoning Academy of Agricultural Sciences at Dongling Road 84, Shenyang 110161, Liaoning,

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Table 3. Flower characteristics of 'Purple Jade' and 'Purple Lady'.

Characteristics	Purple Jade	Purple Lady
Height of corolla (cm)	7.30 ± 0.16 a ²	4.49 ± 0.25 b
Length of outer petal (cm)	7.30 ± 0.16 a	4.54 ± 0.09 b
Width of outer petal (cm)	4.32 ± 0.15 a	4.30 ± 0.12 a
Outer petal length/width	1.69 ± 0.05 a	1.06 ± 0.04 b
Length of inner petal (cm)	7.04 ± 0.11 a	4.40 ± 0.12 b
Width of inner petal (cm)	4.62 ± 0.08 a	4.38 ± 0.08 b
Inner petal length/width	1.52 ± 0.02 a	1.00 ± 0.02 b

²Means followed by the different letters in the same row are significantly different (Fisher's F; $P < 0.05$).

Fig. 1. Flowers of 'Purple Jade' (left) and 'Purple Lady' (right).

China. This cultivar has not yet been applied for protection according to International Union for the Protection of New Varieties of Plants guidelines. It is requested to recognize

appropriately the source given when this cultivar contributes to scientific research or development of a new breeding line or cultivar.

Literature Cited

- Fahad, R., Y. Adnan, R. Atif, A. Sajid, I.S. Muhammad, and B.L. Ki. 2014. Pre-planting exogenous application of gibberellic acid influences sprouting, vegetative growth, flowering, and subsequent bulb characteristics of 'Ad-Rem' tulip. *Hort. Environ. Biotechnol.* 55:479–488.
- Miller, W.B., M. Verlouw, S.S. Liou, H.O. Cirri, K. Snoverclift, and C. Watkins. 2004. Variation in fusarium-induced ethylene synthesis among tulip cultivars. *HortScience* 39:893.
- Tang, N., T.V.D. Lee, A. Shahin, M. Holdinga, P. Bijman, M. Caser, G.F.V. Richard, J.M. Van Tuyl, and P. Arens. 2015. Genetic mapping of resistance to *Fusarium oxysporum*, f. sp. *tulipae*, in tulip. *Mol. Breed.* 35(5):122.
- Tang, N., M.Z. Li, J.Y. Sun, L.H. Zheng, and L. Pan. 2007. Development of soil organic matter fast determination instrument based on spectroscopy. *Guangpuxue Yu Guangpu Fenxi* 27 (10):2139–2142.
- Van Creijl, M.G.M. 1997. Interspecific hybridization in the genus *Tulipa* L. Wageningen Univ., Wageningen, PhD Diss. Abstr. 1–163.
- Van Eijk, J.P., F. Garretsen, and W. Eikelboom. 1979. Breeding for resistance to *Fusarium oxysporum* f. sp. *tulipae*, in tulip (*Tulipa* L.). 2. Phenotypic and genotypic evaluation of cultivars. *Euphytica* 28(1):67–71.
- Xue, D.M., K.Y. Li, X.Y. Zhao, L.X. Xing, and W.Y. Zhao. 2005. Analysis on flower bulb market in China. The National Bulb Flowers Strategic Development Seminar 12–19.