

Jin Ling Tian Cheng: A New Ornamental *Lycoris chinensis* Cultivar

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Lycoris is a perennial bulbous flower belonging to the Amaryllidaceae family, which is commonly known as surprise lily, hurricane lily, or spider lily due to its distinctive flowering characteristics. They bloom from summer to early fall when the flower stalks emerge from the ground without foliage, giving rise to name like “surprise lilies” (Knox 2006). Among the species, *Lycoris radiata* stands as a representative with its spider-like appearance, featuring six tepals arranged radially around a central reproductive structure. The petals display a diverse array of colors, including red, yellow, white, pink, and multi-color variations across different species and cultivars (Ji and Meerow 2000). In addition, the strap-like or linear-shaped leaves of *Lycoris* also add ornamental value, emerging before or after flowering and providing visual interest during winter and spring when the plants are not in bloom. Therefore, its surprising blooms, abundant colors, and unique growth habits make it valuable for gardens and cut flowers. According to the latest published data, there are more than 30 species in the genus, predominantly native to East Asia (Zhang et al. 2022b), with ~80% of them naturally distributed in China. So, *Lycoris* boasts a rich cultivation history in Chinese gardens. Furthermore, ongoing research focuses on breeding new *Lycoris* cultivars, with unique traits. For instance, *L. longituba* cultivar Yi Xian Chun Tao exhibits pink-purple flowers, distinguishing from white *L. longituba* (Zhang et al. 2022a), and *L. straminea* cultivar E Huang Xiao Ran stands out with a larger plant and flower size with vivid red stripes on the petals, surpassing the color intensity of *L. straminea* (Wang et al. 2023). These new cultivars contribute to horticultural diversity and hold higher

economic value for landscape and cut flower application.

Origin and Development

The breeding of *Lycoris* aims to enhance desirable traits such as flower color, size, and shape through artificial hybridization, natural hybridization and selection methods, along with advancements in biotechnology. The various breeding methods employed contributed to the development of new cultivars with improved characteristics. Natural hybridization plays a significant role in *Lycoris* breeding, particularly in diploid species like *L. longituba*, *L. chinensis*, *L. sprengeri*, and *L. aurea*, leading to the generation of natural hybrids or variants with distinct ornamental traits (Kurita and Hsu 1996). These natural hybrids contribute valuable genetic diversity to breeding programs. For example, *L. chinensis*, naturally distributed in East China, has golden-yellow flowers and easily serves as a female parent in crosses resulting in the production of mature seeds and individuals with new genetic diversity in naturally distributed populations. The new cultivar Jin Ling Tian Cheng was an individual selected from the *L. chinensis* population, exhibiting five to seven orange-yellow flowers, distinguishing it from the typical yellow *L. chinensis*. Following asexual reproduction, the bulbs maintain consistent flowering characteristics similar to the female parent. Jin Ling Tian Cheng was registered on the Royal General Bulb Growers' Association (KAVB) website (Edibulbcode: 89748) in 2021.

The new cultivar Jin Ling Tian Cheng of *Lycoris* is characterized by its nearly spherical bulbs with black skin and striking flowering attributes. When it flowers, the stem ranges from 50 to 70 cm in height, bearing deep orange-red flower buds that give rise to five to seven orange-yellow flowers arranged in an umbel formation. The flower shape is intermediate between tube-shaped and spider-shaped with slightly curved and ruffled edges on each petal, reaching up to 8 cm in diameter. The stamens exhibit a deeper orange color and are shorter than the perianth, and the stigma is deep red and nearly as long as the petals (Fig. 1A). It blooms in the middle of August and the strap-shaped leaves with 2- to 3-cm width emerge in spring and wither back in early summer. Jin Ling Tian Cheng was selected from the *L. chinensis* wild population, distinguished by its distinct orange-yellow petal color, wider petals, and smoother edges compared with the typical yellow buds and yellow to golden-yellow flowers of *L. chinensis* (Fig. 1B).

Propagation, Cultivation, and Application

There are several methods for *Lycoris* propagation, including seed propagation, bulb division, and plant tissue culture (Huang and Liu 1989; Ramawat and Merillon 2014; Ren et al. 2017). Seed propagation is a vital approach for breeding, but it always takes 3 to 4 years from seed to bulb that can flower, which is a time-consuming process. In contrast, asexual reproduction ensures the maintenance of stable traits for new cultivars. Bulb division, ideally conducted during dormant seasons, involves carefully excavating mature bulbs and separating offsets to initiate new plant growth. In addition, the bulbs can be cut longitudinally to stimulate the formation of small bulbs at the wound sites. The bulbs after cutting were planted in a well-draining matrix containing perlite and vermiculite, maintaining a humidity of ~50%. Commonly, some small bulbs will be produced at the base of each bulb in 3 to 4 months, with subsequent transplantation after reaching 1 to 2 cm in diameter. Plant tissue culture emerges as a highly efficient method for mass propagation, using meristematic tissue

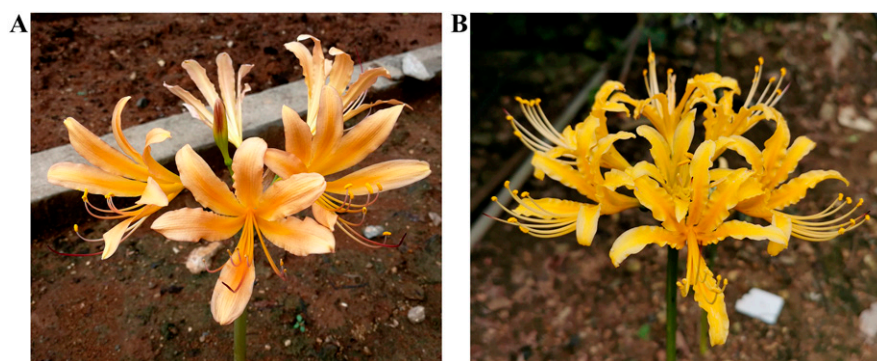


Fig. 1. Distinctive flower characteristics of new *Lycoris* cultivar Jin Ling Tian Cheng (A) and *Lycoris chinensis* (B).

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from bulb bases as explants. Varied concentrations of auxins and cytokinins are used for cell division and differentiation according to the different species or cultivars. The method of asexual reproduction is suitable for the new cultivar Jin Ling Tian Cheng.

Lycoris plants are widely distributed in naturally humid habitats, displaying notable adaptability to varied environmental conditions, rendering them suitable for diverse garden settings, but they exhibit a preference for slightly acidic substrates. Optimal planting locations should prioritize well-drained soil and moderate sunlight exposure. During bulb planting, it is imperative to ensure that bulbs are positioned within the soil, with the soil surface covering the apex of the bulb. Following planting, provide regular watering during the growing season, while avoiding waterlogged conditions. Application of a balanced fertilizer pre- or post-flowering is recommended to promote robust growth and flowering. Maintenance practices include the timely removal of yellowing leaves and weed management to uphold plant vitality. In garden applications, *Lycoris* species and cultivars offer versatility, lending themselves to clustered plantings or integration with other perennial species, thereby enhancing landscape

diversity. Consequently, they have favored selections for garden borders, rock gardens, and woodland environments. Moreover, *Lycoris* flowers hold promise as cut flowers, with harvesting before full bloom and immediate placement of cut stems in water serving to prolong their vase life.

Availability

‘Jin Ling Tian Cheng’ is available through the Institute of Botany, Jiangsu Province and Chinese Academy of Sciences (Nanjing Botanical Garden Mem. Sun Yat-Sen). Contact Fengjiao Zhang (e-mail: zfjiao@yeah.net) for inquiries.

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