

A FA Interspecific Hybrid Lily 'Green Star' with Unspotted Greenish Yellow Petals

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Abstract. An interspecific hybrid lily cultivar 'Green Star' was bred in 2005 at the National Institute of Horticultural and Herbal Science (NIHHS), Rural Development Administration (RDA), Korea. The crossing and *in vitro* embryo rescue was conducted between *Lilium* FA97-2 (*L. × formolongi* 'Silky White' × *L. Asiatic* 'Sunray') and *L. Asiatic* 'Bomi (Byeongga × Connecticut King)' by cut style pollination method (CSM) at Suwon in 2000. The first selection was done and was tentatively named as 'FA03-5' in 2003. After *in vitro* multiplication and bulbing production of 'FA03-5' line, growth and flowering characteristic tests were conducted from 2003 to 2005. The evaluation of characteristics and consumer preferences were surveyed at a lily flower show of NIHHS in 2005. 'Green Star' flowered in the middle of June and grew more than 120 cm stem in length. Flowers bloomed facing upward, unspotted in petals and greenish yellow (RHS, Y6D). 'Green Star' was male sterile. Year-round flowering can be done by storing the bulb under -1.5°C conditions. It was needed to control the *Botrytis* disease in wet season.

Additional key words: bulb, flower, interspecific hybridization, *Lilium* spp., new variety

Introduction

Lily belongs to the genus *Lilium* of the family Liliaceae. It is a perennial bulb and monocotyledonous plant. There are seven sections of the genus *Lilium* based on their botanical classifications (Comber, 1949). It includes approximately 100 species distributed in the Northern Hemisphere (10° to 60°), mainly in Asia, North America and Europe (MaRae, 1998). Interspecific hybridization has been widely used to develop new commercial lily cultivars. Although successful hybridization with botanical sections of the genus could be readily obtained, the results in fertile hybrids showed that intersectional hybridization was more difficult and progeny were often sterile (Ronald and Ascher, 1976; Ronald and Collicutt, 1995, 1996).

The aims of the interspecific hybridization in genus *Lilium* are to introduce desirable characters, such as disease resistance, and tolerance for suboptimal culture conditions (e.g. high temperature and low light etc.), and to create new flower forms colors and so on. Twenty-three FA interspecific hybrid lily cultivars were bred in Korea from 2000 to 2009. These were 'Sinavro', 'Doran', 'Supia', 'Pink Pearl' (Rhee, 2008), 'Glory Pink' (Rhee et al., 2009).

'FA97-2' resulted in interspecific hybridization between

Leucolirion sections *L.xformolongi* 'Silky White' and Sinomartagon sections *L. Asiatic* hybrid 'Sunray' by cut style pollination and embryo rescue culture. 'FA97-2' is the first generation between distance relationships and it has no stable flower shape. To breed stable flower shape of interspecific hybrid 'FA97-2' cross pollination with a stable Asiatic hybrid male plant is needed. 'Green Star' is a second generation between the Leucolirion sections (female parent 'FA97-2') and the Sinomartagon sections (male parent 'Bomi'). The important characteristics of 'Green Star' are its stable flower shape, weak fragrance, light green color, spotless petals, large flowers, size, and resistance to botrytis in field condition and so on. Therefore, 'Green Star' was developed and released as a year-round flower to satisfy consumers and florists' needs.

Materials and Methods

Interspecific crossing was conducted between the female parent 'FA97-2' ('Silky White' × 'Sunray') and male parent 'Bomi' by cut style pollination and embryo rescue culture at Suwon in 2000. Controlled crossing was done in the greenhouse. It was preliminarily selected as 'FA03-5' in 2003. Multiplication, bulbing, growth and flowering characteristic tests were conducted from 2003 to 2005. In 2005 'Wongyo C1-83' was used to evaluate the characteristics of the hybrid at Suwon. The evaluation of characteristics was made according

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to the Manual for Agricultural Investigation (RDA, 1995) and the Guidelines for the Conduct of Tests for Distinctness, Homogeneity, and Stability of Lily (*Lilium* L.) (UPOV, 1991). Vase life was measured indoors at a minimum of 20°C temperature using cut flowers with 60 cm stem length. Preferences of consumers were surveyed at a lily exhibition at NIHHS in 2005.

Results and Discussion

Origin

'Green Star' originated from a cross made in 2000 between *Lilium* FA interspecific hybrid 'FA97-2 (a progeny between *L. × formolongi* 'Silky White' and *L. Asiatic* hybrid 'Sunray')' and *L. Asiatic* hybrid 'Bomi' (a progeny between 'Byeongga' and 'Connecticut King'). Controlled crossing was done in the greenhouse. It was preliminarily selected as 'FA03-5' in 2003. Multiplication, bulbing, growth and flowering cha-

racteristic tests were conducted from 2003 to 2005. 'Green Star' was released after the evaluation of its characteristics and the survey of preferences of consumers at a lily exhibition at NIHHS, RDA, in Suwon in 2005 (Fig. 1).

Description

As shown in Tables 1, 2, and 3, 'Green Star' flowered in the middle of June. Plants averaged 128 cm in height when grown in unheated plastic house at the NIHHS in Suwon. The flowers were facing upward, unspotted and with greenish yellow (RHS, Y6D) petals (Fig. 2). The throat of the flower was light green. The stigma was light yellow and pollen was light brown (Table 1). The pollen was sterile (data was not shown). The size of flower was 18.6 cm. Mean outer petal length and width were 13 cm and 4.9 cm, respectively. The leaves were 9.9 cm long and, 2.7 cm wide (Table 2). The weight and size of bulb were 86.5 g and 19.7 cm, respectively. The number of nose was 1.1. The number of



Fig. 1. 'Green Star' lily; (A) flower, (B) plant.

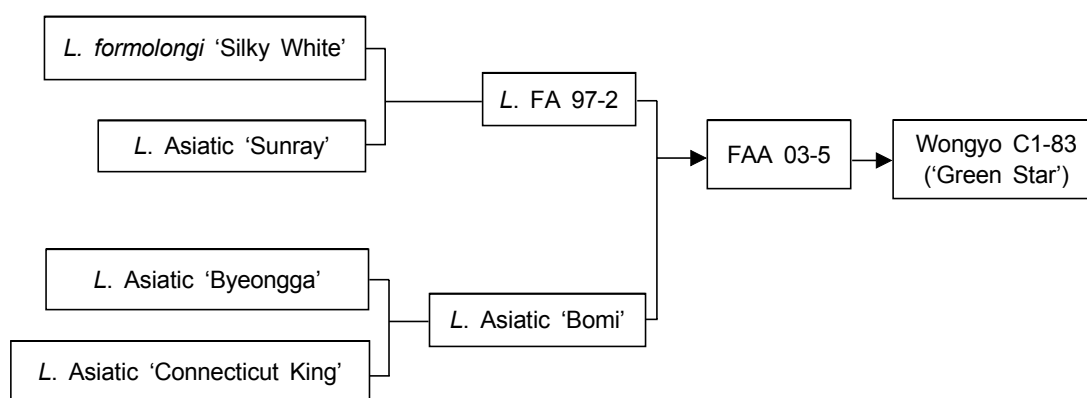


Fig. 2. Pedigree diagram of FA interspecific hybrid lily 'Green Star'.

Table 1. Morphological characteristics of FA interspecific hybrid lily 'Green Star'.

Cultivar	Flower color (RHS ²)	Stigma color	Pollen color	Spot	Blooming direction	Use
Green Star	Yellow (Y6D)	Yellow	Scarlet	None	Upright-facing	Cut flower
Royal Fantasy (Control)	Yellow (Y4C)	Green	Yellow	None	Upright-facing	Cut flower

²RHS denotes Royal Horticultural Society Color Chart.

Table 2. Flowering and growth characteristics of FA interspecific hybrid lily 'Green Star'.

Cultivar	Flowering time ^z	Plant height (cm)	Flower size (cm)	Outer petal length (cm)	Outer petal width (cm)	Leaf length (cm)	Leaf width (cm)
Green Star	June 6	128.9 ± 7.7 ^y	18.6 ± 0.4	13.0 ± 0.5	4.9 ± 0.2	9.9 ± 2.1	2.7 ± 0.4
Royal Fantasy (Control)	June 7	81.5 ± 7.6	17.1 ± 0.9	10.8 ± 0.5	3.3 ± 0.3	13.4 ± 0.9	1.8 ± 0.3

^zPlanted on Nov. 18, 2004.^yMean ± standard error of 10 plants.**Table 3.** Bulb characteristics of FA interspecific hybrid lily 'Green Star'.

Cultivar	No. of noses ^z	Bulb circumference (cm)	Bulb weight (g)	No. of bulblet	Bulblet weight (g)
Green Star	1.1 ± 0.3	19.7 ± 3.9 ^y	86.5 ± 4.9	4.2 ± 2.5	10.6 ± 8.3
Royal Fantasy (Control)	1.0 ± 0.0	15.9 ± 3.6	47.4 ± 2.4	3.8 ± 3.3	3.7 ± 3.6

^zHarvested on Sep. 20, 2005.^yMean ± standard error of 10 bulbs.**Table 4.** Vase life and consumer preference of FA interspecific hybrid lily 'Green Star'.

Cultivar	Vase life of cut flower (days) ^z	Preference ^y
Green Star	14.3 ± 2.8 ^x	4.3 ± 0.7
Royal Fantasy (Control)	13.3 ± 2.1	4.0 ± 0.0

^zVase life was measured under indoor conditions with minimum temperature of 20°C at night. The stem length of cut flowers was adjusted to 60 cm.^yPreference was surveyed at a lily flower show of NHRI in 2005 (index 1-5; Poor:1, intermediate:3, excellent:5).^xMean ± standard error of 10 plants.

bulblets was 4.2 (Table 3). Vase life of cut flower was 14.3 days and the slightly preferred 'Green Star' than the control cultivar (Table 4).

Precautions of Cultivation and Prospects

'Green Star' can be propagated by standard methods of division and bulb scaling. Also, the plants have been generated by tissue culture propagation using lily multiplication medium. Year-round flowering can be achieved by storing the bulb under -1.5°C conditions. For forced cultivation, it is necessary to add calcium to the fertilizer or remove side scales to prevent leaf scorch. 'Green Star' has vigorous growth and takes one year to become a commercial bulb. Thus, it will help to increase the consumption of lily.

Availability

'Green Star' was applied as No. 2005-405 on November 23, 2005 and registered as No. 1836 on April 18, 2007. Consequently, it is being protected by Korean Seed Industry Law.

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