

A New Grafted Cactus with Bright Yellow Color, ‘Hwangseon’

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Abstract. A new grafted cactus cultivar, called ‘Hwangseon’, *Gymnocalycium mihanovichii*, is a hybrid crossed between two orange color cultivars ‘Geoseong’ and ‘Huhwang’. Mating was performed in the greenhouse of National Institute of Horticultural & Herbal Science (NIHHS) in 2005. The harvested seeds were sown at 100 mL volumetric flasks filled with ‘Kyoto’ medium. Seedling had been grafted into a young rootstock, *Hylocereus trigonus*, and cultured in vitro in 100 mL test tube for more than six months. After re-grafting and planting in the green house in 2006, their characteristics were evaluated three times until 2009. The new cultivar has a flat round shape and bright yellow skin color. In addition, it has 7 to 9 ribs with gray and straight spines on the body and produces an average of 12.3 offsets.

Additional key words: *Gymnocalycium mihanovichii*, hybrid, offset

Introduction

Grafted cactus is a plant which is artificially connected to one another after cutting the two cacti. In Korea, cacti species such as *Gymnocalycium mihanovichii*, *Echinopsis silvestrii*, and *Notocactus scopia*, have been used as the scion, and *Hylocereus trigonus* and *Cereus peruvianus* species like a pillar have been used as rootstock. In general, grafting has an advantage to overcome the slow growth of cactus due to lack of chlorophyll in its body. However, the possibility of infection by virus and bacteria increases during the course of cutting. Likewise, the problem of growth retardation and pigment formation also arise after grafting (Chung et al., 2003). To overcome these problems, breeding a new variety and distributing this to the farmers are eventually important in the current cactus culture. For the last twenty years, breeders of Korea had introduced new varieties of *Gymnocalycium mihanovichii* over one hundred years (Jeong et al., 2004a, 2004b, 2006, 2007; Park et al., 2008).

Many cultivars were supplied to the Goyang, Anseong, and Eumseong regions in Korea. The produced grafted cactus was valued at 5.3 billion Korean Won and the planted area had reached to about 25.7 ha, and exports of the grafted cactus amounted to 2.6 million dollars in 2009 (MIFAFF,

2010). For continuous export, Korea should breed new varieties with good quality that the customers of importing country are usually demanding.

Origin

‘Hwangseon’ cultivar originates from ‘Geoseong’, the female parent and ‘Huhwang’, the male parent, both of which have orange color. After the artificial crossing was done at the greenhouse of NIHHS, the ovary matures for 3 months and 144 seeds were collected in 2005. These seeds were sown at 100 mL volumetric flasks filled with ‘Kyoto’ medium. The rate of germination was 69.4%. Seedling was grafted into young rootstock, *Hylocereus trigonus*, using in vitro technique of propagation and cultured in a test tube for 6 months. After grafting again using in vivo technique, planting was done in early summer. The ‘0521079’ among many hybrids was first selected in 2006. From 2007 to 2009, tests for distinctiveness, uniformity and stability of *Gymnocalycium mihanovichii* (KSVS, 2005) including its characteristics, color, shape, the number of offsets, were conducted. This cultivar passed the test of National committee on variety on November 2009 and was finally named into ‘Hwangseon’ (Fig. 1).

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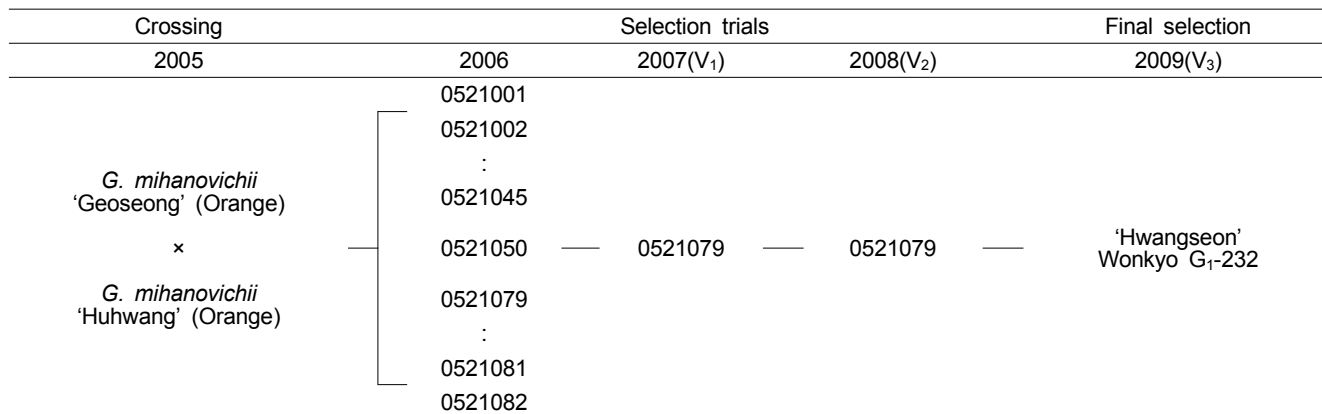


Fig. 1. Pedigree diagram of *Gymnocalycium mihanovichii* cv. Hwangseon.

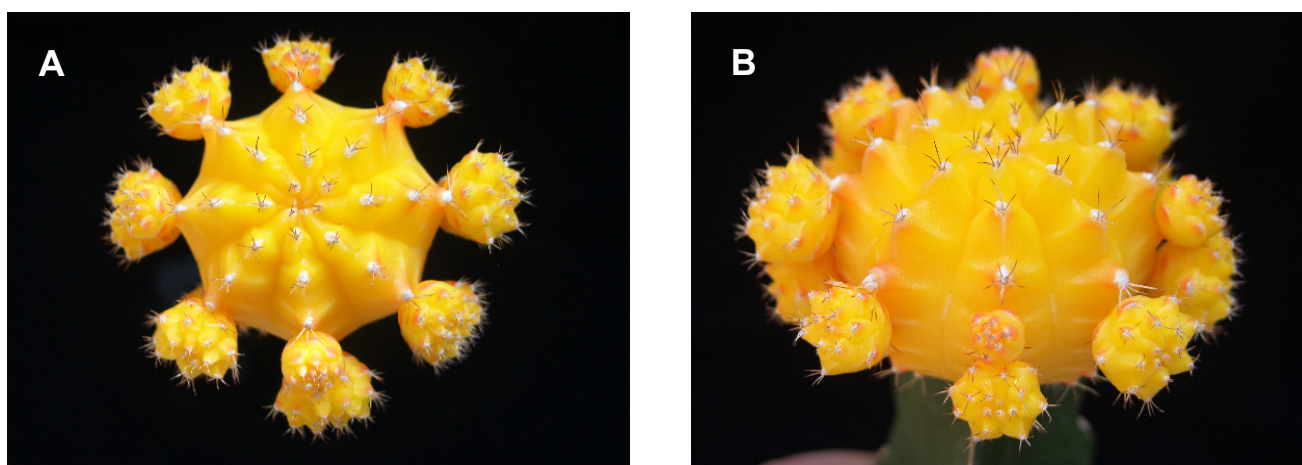


Fig. 2. The shape of *Gymnocalycium mihanovichii* cv. 'Hwangseon'. (A, the top view; B, the side view).

Table 1. The comparison of phenotypic characteristics between 'Hwangseon' and 'Hwangjo' at 10 months after planting.

Cultivar	Color	Rib			Spine		
		No.	Tubercle	Depth	Color	Direction	Length (mm)
Hwangseon	Yellow (YO 21A ^z)	7.9 ± 0.1 ^y	Projecting	Medium	Gray	Straight	5.1 ± 0.3
Hwangjo (Control)	Yellow (YO 16A)	9.0 ± 0.3	Projecting	Medium	Gray	Slant	3.1 ± 0.2

^zThe Royal Horticultural Society Color Chart.

^yValues represent mean ± S.E. (n = 60).

Description and Performance

The characteristics of 'Hwangseon' were compared with 'Hwangjo' 10 months after plantation. Color of 'Hwangseon' (YO 21A) and 'Hwangjo' skin body were both yellow (YO 16A). 'Hwangseon' has an average of 7.9 ribs with middle depth and projecting tubercle. The spine is gray and straight and the length of it amounts to an average of 5.1 mm.

Likewise, the shape, globe diameter, and number of offsets of the two cultivars were compared at 10 months

after planting. Both the cultivars had flat round shape. In size, 'Hwangseon' had an average globe diameter of 46.8 mm and 'Hwangjo' had that of 38.9 mm. In the number of offsets, 'Hwangseon' had an average of 12.3, but far fewer than 'Hwangjo' of 22.1. The ability of propagation of 'Hwangseon' is similar to other cultivars. However, yellow color of this cultivar is very bright comparing to the others and maintained for long time. This feature had received a high score of 4.0 in the degree of preference (Table 2).

Disinfection is necessarily needed in cutting of this cultivar

Table 2. The shape, globe diameter, number of offsets, and degree of preference of the new cultivar of 'Hwangseon' compared to the control of 'Hwangjo' at the 10 months after planting.

Cultivar	Shape	Diam. of globe (mm)	No. of offset	Preference ^z
Hwangseon	Flat round	46.8 ± 3.0	12.3 ± 4.0	4.0 ± 0.3
Hwangjo (Control)	Flat round	38.9 ± 2.7	22.1 ± 3.1	3.4 ± 0.4

^zPreference: Bad 1, medium 3, very good 5

^yValues represent mean ± S.D. (n = 60).

to protect it against virus and to have the normal growth of the scion. After grafting, keeping it in 25-30°C temperature and 80% humidity for one week is recommended. From April to October, the greenhouse needs 30-50% black curtain to prevent the sunlight damage to the scion and the stock. In winter season, temperature needs to be kept over 13°C to prevent the cracking of the scion body. In rainy season, the flower must be removed to inhibit the mold infection.

Availability

'Hwangseon' was applied as No. 2010-101 on January 26, 2010 and was registered as No. 3474 on April 12, 2011, in KSVS. This cultivar is currently being protected by Korean Seed Industry Law.

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