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'Emerald Pagoda' Japanese Snowbell

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Japanese snowbell, *Styrax japonicum* Siebold & Zucc. (Styracaceae Dumort.) of China and Japan (Griffiths 1994), is a wide-spreading, dense shrub or tree with small, graceful, waxy white, pendulous flowers. It is one of the best ornamental plants for zone 5 and warmer. Cultivation is not difficult; it is a very stress tolerant plant, and it performs well in different sites (Raulston and Tripp, 1995). This small tree is reported as good for any situation (Dirr, 1998), acid soils (Lancaster, 1995), and is most effective on terrace plantings when viewed from below (Huxley, 1992). Flowers occur in mid-May to early June, and grayish fruits from August to early November. Dirr (1998) reported Japanese snowbell as "somewhat attractive" in fruit, but primarily as "a most beautiful and delicate flowering tree, yet is not well-known outside of arboreta and botanical gardens." Known cultivars of Japanese snowbell are few in number, selected typically for growth form (weeping, dwarf, or fast-growing) and floral color (pink or white).

'Emerald Pagoda' has large, slightly fragrant, snow-white flowers borne in early May (Fig. 1). Its leaves and fruits are larger compared to the species, and leaves are a darker green hue. Earlier flowering and foliage, flowers, and fruits with the increased ornamental value were the objectives leading to the selection of 'Emerald Pagoda'. Our objective is to document the data on 'Emerald Pagoda' as a release of new germplasm from the JC Raulston Arboretum.

Origin

Dudley (1985) reported on the 1985 plant exploration in the Republic of Korea sponsored by the National Arboretum. Raulston, professor and director of the North Carolina State Univ. (NCSU) Arboretum, was sponsored by NCSU, the North Carolina Association of Landscape Architects (NCALA), the North Carolina Landscape Contractors Association (NCLCA), the North Carolina Association of Nurserymen (NCAN), and the Friends of the NCSU Arboretum.

The expedition visited Sohuksan (lat. 34°05′N, long. 125°10′E), the outermost Korean Island in the Yellow Sea. Sohuksan is dominated by Mt. Sohuksan (620 m tall), the highest peak of the southwest coast and offshore islands (Raulston, 1985). Half of the island was undisturbed due to very steep and hazardous terrain, but the remaining mature vegetation was in great danger as the slopes were being clear-cut to harvest the medicinal bark of *Persea thunbergii* (Sieb. & Zucc.) Kosterm., reported under the synonym *Machilus thunbergii* Siebold & Zucc. (Raulston, 1985).

Raulston took 50 cuttings from a tree located near the summit of Mt. Sohuksan and shipped them to Raleigh, N.C., where they arrived 2 d later. Newell Hancock, Raulston's technician and colleague, placed the surviving cuttings (three only) in a mist bed, but they failed to root. Later, he grafted them onto *Styrax japonicum* seedlings; only one survived.

The germplasm was grown in the JC Raulston Arboretum nursery and was noted as having superior flowers, fruits, and leaves. It was designated temporary as 'Sohuksan', reflecting its origin. Raulston subsequently distributed some germplasm to associates for evaluation, but died without officially releasing the germplasm. Some of the germplasm was introduced into the nursery/landscape industry under the name 'Sohuksan'.

Raulston chose the name 'Emerald Pagoda' for official release of this new cultivar selection. A pagoda is a tower erected as a temple, memorial, or monument that is conspicuous and distinctive in Far Eastern landscapes. This clone is conspicuous and distinct in the landscape during its floral display, and supplies a rich green foliage during the growing season.

Description

'Emerald Pagoda', side veneer-grafted on seedling rootstock of *Styrax japonicum,* bears an upright form with a rounded-conical shape. The bark has longitudinal dark streaks.

Fig. 1. Branches of 'Emerald Pagoda' in flower at the JC Raulston Arboretum, Raleigh, N.C., photographed by J.C. Raulston (slide #105-330D). See also front cover of this issue of *HortScience*.

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Branches are strongly ascending with new growth occurring on lateral pins. Young twigs are terete, 2–4 mm thick, stellate-pubescent, and flattened near the nodes with a fused (≈1 cm) stipular base. Leaves are petiolate, glandular-serrate, elliptic-ovate to broadly ovate, acuminate, broadly cuneate to rotund, yet the extreme base is abruptly cuneate with the marginal vein continuing along the petiole's edge. The blade is 4.5–12 cm long, 2.5–9 cm wide, stellate-pubescent along the major veins on the upper surface, and moderately stellate-pubescent below. There are 7–9 lateral pairs of veins, with the major tertiary vein extending beyond the margin to terminate in a stubby gland ≈0.5 mm long. The acumen is 0.5–1 cm long × ≈0.5 mm wide. The petiole is 4–11 mm long, canaliculate above, and stellate-pubescent. The inflorescence is subsessile, 1–3 mm long, and bears 1–2 flowers axillary and 2–4 flowers terminally. The pedicels are 2–2.5 cm long, glabrate with remote stellate trichomes. Bracts are lacking. The flowers are borne on elongated pedicels, white, spreading to 3–4 cm wide, and aromatic. The calyx is short-campanulate, adpressed, 5-lobed, with the tube 4 mm long, 4–6 mm wide, and sparsely stellate. The calyx lobes are 1–2 mm long, 3–3.5 mm wide, truncate and erose, stellate and stellate-ciliate, and persist after the petals and stamens have aborted. The corolla has a 3–4 mm long tube with (3-) 4–5- (6-) lobes 15–20 mm long, 7–14 mm broad, elliptic, broadly acute, and bear a 1–2 mm long × 2–3 mm broad claw. The 6–10 (12) stamens are seemingly in one series, with one arising from the middle of each corolla lobe and one from between each adjacent pair of lobes. The white filaments are 5–6 mm long, incurved basally ≈1–2 mm, then ascending to spreading outward and pilose near the throat. The anthers are greenish-brown with yellow sacs, narrow lanceolate, sagittate, introrse, 7 mm long, and 1 mm wide. The pollen is yellow. The solitary pistil is inferior with a white glabrate style 14–17 mm long bearing a truncate stigma weakly bilobed and slightly darkened. The fruits are ellipsoid drupes, 12–14 mm long, 9–11 mm wide, and borne on fruiting pedicels 21–25 mm long. (Fig. 1).

The type material for 'Emerald Pagoda' are: HOLOTYPE: Tree in flower, 26 Apr. 1989, *Fantz 4395* (NCSC). PARATYPE: Tree in fruit, 10 July 1991, *Fantz 5194* (NCSC). Currently, the living standard (type) is located in the Reading Garden at the JC Raulston Arboretum.

Observations. Standard color designations (e.g., RHS 148A) are used (Royal Horticultural Society, 1995) for comparison between the species and 'Emerald Pagoda'. The species *Styrax japonicum* growing at the JC Raulston Arboretum has a broader habit with more numerous branches that are lax and less stiff. Leaves are glossy green (RHS 138A-B) above, 2.5–8 cm long and 1–4 cm wide. Flowers opened 2 weeks later than 'Emerald Pagoda' and always bore five corolla lobes. The corolla tube was 2–2.5 cm long with corolla lobes 1.3–1.5 cm long. Fruits are 7–10 mm long, 7–9 mm wide, and are borne on 14–18 mm fruiting pedicels.

'Emerald Pagoda' has larger leaves (4.5–12 cm × 2.5–9 cm) that are darker green (RHS 147A–148A). Flowers are snow white (whiter that RHS 155, the only group of white chips). This cultivar bears larger flowers (corolla tube 3–4 mm long) with 3–6 corolla lobes (lobes 1.5–2 cm long), of which 4–5 lobes are more common. Fruits are larger (12–14 mm × 9–11 mm) and are borne on longer fruiting pedicels (21–25 mm). However, fewer fruits set.

The larger flowers and foliage along with demonstrated reduced fruit set suggests an increased ploidy level in 'Emerald Pagoda' as compared to the diploid species. A study by C. Lambert (unpublished, 2000) demonstrated that stomata size, pollen size, and pollen viability are similar to the species. Thus, variation in this cultivar appears to be controlled by genetic factors not related to ploidy level.

Culture

This cultivar is propagated by budding or side veneer grafting. Cuttings can be rooted, but are difficult to overwinter. It grows best in light shade in well-drained, slightly acidic soil, and is heat tolerant.

Availability

Limited scion wood of 'Emerald Pagoda' can be obtained from the JC Raulston Arboretum, Dept. of Horticultural Science, Box 7609, North Carolina State Univ., Raleigh, NC 27695-7609.

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