Taxus cuspidata ‘Keumbitnoeul’

Jeong-Ho Lee¹

Korea Forest Seed and Variety Center, Variety Examination Division, 670-4 Suhoeri, Suanbo, Chungju, Chungbuk-Do 380-941, Republic of South Korea

Additional index words. ornamental plant breeding, plant introduction, Taxaceae

Yews (*Taxus* L., Taxaceae L.) are prized as ornamental and garden plants. Throughout temperate regions, and especially in Asia, their excellent shape and hardy nature make yews a favored plant choice. *Taxus* includes approximately seven species of small evergreen conifers that grow in cool, temperate regions of the Northern Hemisphere as well as more tropical mountainous areas of the Philippines and Mexico (Vogan et al., 2004). Species of *Taxus* can have extreme longevity, and there have been documented numerous cases of individual trees living a thousand years or more (Marinelli, 2004). The National Agricultural Statistics Service estimated that commercially grown yews in the United States had a wholesale value of ≈\$4 million in 1998 (National Agricultural Statistics Service, 2008). In South Korea, ≈11 million yews are produced each year (Korea Forest Service, 2008).

Various morphological characteristics exist within the genus *Taxus*. The Korean species *T. cuspidata* (Siebold & Zucc.) has a lanceolate leaf that grows to lengths of 1.5 to 2 cm and a width of 3 mm. *Taxus cuspidata* var. *latifolia* Nakai, found in north-central Korea and Ulleungdo, has a leaf width of just 3 mm to 4.5 mm, whereas *T. caespitosa* Nakai, also found in Korea, has a main trunk that extends sideways and roots that develop down from the branches, resembling the Japanese stone pine *Pinus pumila* (Pall.) Regel (Lee, 1999).

As a result of the market preference for ornamental and landscape yews, a breeding program was initiated at the Korea National Arboretum in 1988 to select and develop a cultivar with attractive foliage and small stature so it is suitable for growing inside a house. This article reports on the first cultivar that resulted from this project, ‘Keumbitnoeul’ (from Tax. 1), which has outstanding yellow-green foliage and a relatively slow growing habit.

Origin

Yew seeds were collected in the fall of 1988 from Mt. Gyeong and Mt. Gariwang in Gangwon Province and from the Korean National Arboretum. From this collection,

36 L of seeds (≈468,000 seeds) were selected and stratified before sowing in the fall of 1989. From the germinated seedlings, 100 individuals were selected (from Tax. 1 to Tax. 100) in Spring 1990. Potential mother trees were obtained by selecting the golden-leaved Tax. 1 in Spring 1991. A distinctive trait of ‘Keumbitnoeul’ is its short height of 71 cm in 19 years. Also, its leaf color is gold (Fig. 1).

Description

Main characteristics. After 19 years of growth in Gwang-neung, central Korea,

‘Keumbitnoeul’ has attained a height of 71 cm and width of 65 cm. Mature leaves are lanceolate, 18.5 mm long and 2.4 mm wide with a yellow-green color [Royal Horticultural Society (RHS) yellow group 13-A; RHS’ Colour Chart, 2007] (Table 1).

Uniformity and stability. After 5 years of growth, in 1995, we took 30 cuttings from ‘Keumbitnoeul’ and propagated them. In 1997, 120 cuttings were taken from the 30 propagated individuals and another 80 cuttings from the original tree. The results of the first examination indicated stability without variability. By 2007, 30,000 cuttings had been established through consistent propagation in the same way. In 2008, a further 30,000 cuttings were taken from these 30,000 cuttings. We examined 60,000 cuttings in total, including ‘Keumbitnoeul’ itself and the 30 original progeny propagated from the cuttings from the “first” ‘Keumbitnoeul’. The results showed stable annual expression of characteristics without variability.

Notes for culture. For optimum results, ‘Keumbitnoeul’ should be propagated in April from 9-cm cuttings and kept in a

Fig 1. Mother tree and cuttings of the new *Taxus cuspidata* cv. Keumbitnoeul.

Table 1. Growth characteristics of *Taxus cuspidata* cv. Keumbitnoeul.

Division	Ht (m)	Crown width (m)	Leaflet length (mm)	Leaflet width (mm)	Leaflet collar
Keumbitnoeul	0.71	0.65	18.5 ± 0.93	2.4 ± 0.09	Yellow group 13 A (RHS color chart)
<i>Taxus cuspidata</i>	2.5 ± 0.5	2.5 ± 0.4	23.5 ± 1.51	2.9 ± 0.14	Green group 147A (RHS color chart)

RHS = Royal Horticultural Society.

Table 2. Selection of *Taxus cuspidata* cv. Keumbitnoeul.

Year	1988	1989	1990	1991–1994	1995–2008
	Seed collection 3 locations	Seedling	Clone selection (Tax. 1, Tax. 2, ..., Tax. 100)	Selection by trials (growth)	Final selection Keumbitnoeul from Tax. 1
Remark	First selection		Second selection		Third selection

Received for publication 5 May 2009. Accepted for publication 16 Apr. 2009.

¹To whom reprint requests should be addressed; e-mail mtmac@forest.go.kr.

controlled greenhouse environment (humidity $75\% \pm 3\%$; temperature $23 \pm 2^\circ\text{C}$) in a soil mixture of 30% sand and 70% loamy sand. Once a callus has formed, the humidity should be reduced to 40% to prevent rotting. At the same time, screens should be used to decrease the light by 40%. In this way, a rooting rate of $97\% \pm 3\%$ and a subsequent survival rate of $98\% \pm 2\%$ can be achieved.

Breeding process. In 1988, we collected 36 L of seeds (468,000 individual seeds) from three groups of natural populations. We sowed these seeds in an area of 300 m² in a nursery in the fall of 1989 and produced $\approx 400,000$ seedlings. Then, we selected 100 individuals with dwarf and steady characteristics in 1990. The selected seedlings were

used in field trials from 1991 to 1994. We finally selected one 'Keumbitnoeul' from Tax. 1 in 1995 (Table 2).

Availability

Taxus cuspidata, 'Keumbitnoeul' (keumbit means gold color, noeul means evening sun), is now available, and an application for the protection of new plant varieties has been filed. Registration is expected in 2009. In accordance with the Seed and Industrial Act, *Taxus cuspidata* will be registered for Protection of New Varieties of Plants by an Ordinance of the Ministry for Food, Agriculture, Forestry and Fisheries in 2009.

Literature Cited

- Korea Forest Service (KFS). 2008. Statistical yearbook of forestry (2007). KFS, Korea.
- Lee, T.B. 1999. Illustrated flora of Korea, p. 57. Hyangmunsa, Seoul, Korea.
- Marinelli, J. 2004. Plant. Dorling Kindersley Limited, London, UK.
- National Agricultural Statistics Service (NASS). 2008. 1998 Census of horticultural specialties. 7 Feb. 2009. <<http://www.nass.usda.gov/census/census97/horticulture/horticulture.htm>>.
- Royal Horticultural Society's Colour Chart. 2007. RHS colour chart. RHS, London, UK.
- Vogan, R., P. Brown, C. Frith-Macdonald, L. Hawthorne, L. Luff, C. Novis, F. Ritter, M. Walters, and F. Wild. 2004. Flora—The gardener's bible. Dorling Kindersley Limited, London, UK.