

Characteristics and Breeding of a New Thornless Castor aralia Cultivar, “Cheongsong II”

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ABSTRACT

New thornless cultivar of castor aralia(*Kalopanax septemlobus* Koidz.) was developed and selected in Cheongsong, Prov. of GyeongSangbuk-do during the period from 1994 to 1999 by Korea Forest Research Institute(KFRI). The new thornless cultivar, “Cheongsong II” is characterized by a thinner outer-bark and soft, wider leaves, and is particularly characterized by thornless stems. This cultivar has a thinner outer-bark(8.82mm) when compared with thorned type trees(13.95mm). It also has a larger leaves than does thorned type trees. Consequently, the new thornless cultivar, “Cheongsong II” is defined to have thinner bark and longer and wider leaves than do other thorned type trees.

Key Words : *Castor aralia*, *Kalopanax septemlobus*, *Cheongsong II*, *Thornless cultivar*

INTRODUCTION

The genus *Kalopanax* comprises one species of deciduous, small to medium-sized tree that is native to China, Japan, Eastern Russia, and Korea. Especially, the Castor aralia(*K. septemlobus*) is a deciduous tree which when fully grown is up to 30m high with a DBH 1.8m. And, bark color is gray and covered, when young, with prominent short and sharp prickles with a broad base. Leaves are palmate, long stalked, 10~30cm long as they are wide with 5 to 9 lobes. Lobes are acuminate and finely toothed. Lamina are shiny green and glabrous above while slightly pubescent when young beneath(Lee, 1993). In Korea, this species is widespread from mountains and fields throughout the country from 100m to 1,800m of sea level. But, this species is the most widespread at 700m on the north

side of a slanting surface or rich woodland valley area (Lee, 2001). It is a valuable tree in China, Japan, and Korea. The wood may be suitable for furniture, instrument, construction, musical instrument wood, carving, and some interior uses. The dried bark and root have been used as a medicine in those countries for various ailments. Analysis of the nutrient content of leaves for castor-aralia showed plentiful levels of iron, zinc, magnesium, calcium, and beta-carotene, making it a potential food source of high nutritive value. Phytochemical investigations have allowed the isolation and characterization of saponin and phenolic compounds that are reported to show preventive activity against stress-induced changes(Lee *et al.* 1995; Porzel *et al.* 1992; Shao *et al.* 1989, 1990). Young leaves and shoots contain a unique odor. People eat this edible wild plant in the spring. It is valuable for development of

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both edible and medicinal uses, and in fact, there is a great demand for this. The breeding importance of the *K. septemlobus* must be maintained by not broadening the genetic base in Korea.

In general, there is the need for improvement of forest form and for selection of excellent individuals for management of genetic variation through analysis of genetic variation within a forest which contains a variety of genetic variations. It is necessary to carry out research successively and continuously for a dominant populations or mass selection, plus tree selection, and progeny testing from a natural populations. To promote this research, systematic and basic researches are needed for understanding the level of breeding within a selected populations.

Breeding

Castor aralia is one of the important medicinal and edible species growing in North Eastern Asia - Korea, Japan, China etc.. The bark of stems and roots have been used as folk medicine, while its terminal buds and

young leaves are in a great demand as edible vegetables. But for the characteristics of thorned stems and grows as an isolated individual rather than in a population, this species was not cultivated intensively.

For the resolve an this problems, a new thornless cultivar of castor aralia, "Cheongsong II" was developed and selected at Korea Forest Research Institute (KFRI) in Suwon during the period from 1994 to 1999 through the collecting gene resources and searching new special purpose trees.

Characteristics

New thornless cultivar, "Cheongsong II" is characterized as a thinner outer-bark width, soft and wider leaves, especially thornless compared to those of the thorned type trees. Outer- bark width of "Cheongsong II" and thorned type trees were 8.82mm and 13.95mm, respectively. And leaf characters(leaf length, leaf width and leaf petiole length) were 16.12cm, 14.24cm, 16.88cm and 14.38cm, 11.43cm, 16.58cm, 14.38cm, 11.43cm,

Table 1. Comparison of morphological characters between new thornless cultivar and thorned type trees in *K. septemlobus*

Species	Division	Bark				Leaf			Winter-bud	
		Inner bark	Outer bark	Bark	Thorn	Leaf	Leaf	Leaf petiole	No. of lobe	Diameter (cm)
		width (mm)	width(mm)	weight (g)		length (cm)	width (cm)	length (cm)		
Cheongsong II		4.66	8.82	0.31	thornless	16.12	14.24	16.88	6	1.13
Thorned type trees		4.42	13.95	0.30	thorned	14.38	11.43	16.58	7	0.92

Table 2. Results of survival rate(%) for root-cutting treatment by soil type and layer

Treatment	Soil layer			
	Upper layer		Middle layer	
Sand	80		58	
PKS2+Sand+Perlite	84		60	
Vermiculite+Perlite	78		54	
PKS2+Perlite	98		67	
PKS2	92		64	

Table 3. Results of analysis for content a useful materials between the two species

Species	Division	Water (%)	Ash (%)	Protein (%)	Lipid (%)	Mineral				Ascorbic acid(mg)
						Ca	P	Fe	K	
Cheongsong II		82.0	1.1	6.0	0.3	10	30	0.2	210	49.0
Thorned type trees		82.4~84.5	1.0~1.2	4.5~6.3	0.1~0.3	8~10	24~33	0.1~0.2	194~239	12.8~49.2

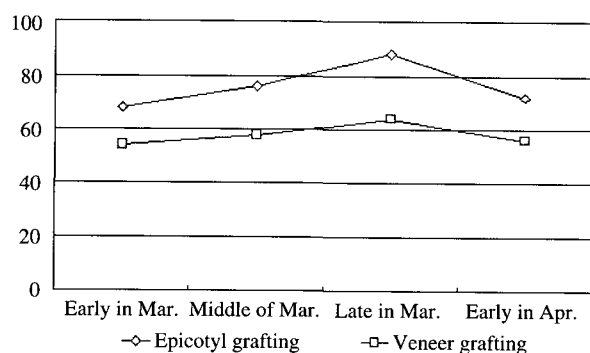


Fig. 1. Changes of survival rate(%) by grafting method and period for new thornless cultivar in *K. septemlobus*.

16.58cm in "Cheongsong II" and thorned types trees, respectively. Consequently, "Cheongsong II", new cultivar is determining thinner and wider in morphological characters than the other thorned type trees (Table 1, Fig 3).

The survival rate showed excellent values in the propagation of grafting and root-cutting. In grafting propagation method, the survival rate generally revealed

the higher in epicotyl than veneer grafting. Also, in the grafting treatment period, lately of March treatment showed excellent values in the survival rate than the other treatment periods. And the results of root-cutting treatment by soil type and layer, upper soil layer and PKS2+Perlite (1:1) treatment revealed the higher survival rate (98%) than other treatments (Table 2, Fig. 1, 2).

The results of analysis for content a useful materials between new thornless cultivar and thorned type trees, no significant difference was founded (Table 3).

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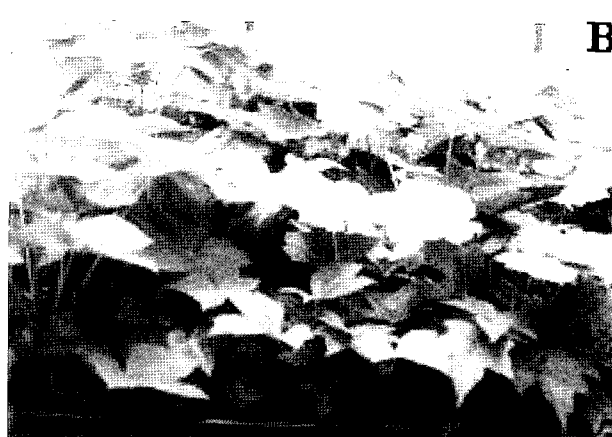


Fig. 2. Photograph of new thornless cultivar in *K. septemlobus* by propagation method (A : Grafting, B : Root-cutting).



Fig. 3. Photograph of the comparison for morphological characteristics between new thornless cultivar and thorned type trees(A : "Cheongsong II", B : Thorned type tree).

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