

Propagation of Three *Rubus* Species Native to Korea by Stem Cutting

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Abstract

Stem cuttings of three *Rubus* species native to Korea were treated by two commercial root stimulation formula for propagation. Differences among the species was obvious, root was induced relatively easily on *R. hongnoensis*. Fifty percent of stem rooted without any treatment on this species and two stimulators was effective to increase the root induction. On the other hand, two other species, *R. schizostylus* and *R. ribisoideus*, had very low percent of rooting. Treatment using root stimulators was effective but still lower than that of *R. hongnoensis*. Root induction was not influence by the medium that resulted no differences between two media.

Key Words: *Rubus* species, native to korea, propagation, *ex-situ* conservation, stem cutting

Introduction

Small berries in the genus *Rubus* are important crops. Many of commercial cultivars had been bred to improve the quality of the fruit and resistance to certain diseases for long time (Finn and Knight 2002). In order to breed superior cultivars, the wild species that have many potential characteristics are essential (Knight 2004). Breeding program of *Rubus* species in Korea was far behind of other countries because of low consumptions. In addition, the breeding program was performed only with *R. coreanus* and *R. occidentalis*. The other research on *Rubus* species was also focused on these two species (Korea Forest Research Institute 2010). *R. hongnoensis*, *R. schizostylus* and *R. ribisoideus* bear small berries but rarely consumed by human as crop. These three species are wild and are endogenous species of Korea. All three are found in a small area of Island (Jeju or Geomundo or Wando) and the numbers are gradually decreasing due to the deforestation of the

habitats (Kim et al. 2012). The study was performed to investigate the propagation method, stem cutting, for restoration of the species and *ex-situ* conservation of wild germplasm for the use of breeding materials in the future.

Materials and Methods

Three species of *Rubus* were collected from various place in Jeju Island in late April, 2017. The locations of three species was summarized Table 1. Stems were cut

Table 1. Location of three species used in this study

Common name	Scientific name	Location
Hongno orange raspberry	<i>Rubus hongnoensis</i> Nakai	Sequipo si, Jeju
Creeping bokbunja	<i>Rubus schizostylus</i> H.Lev.	Hanlip, Jeju
Thornless southern raspberry	<i>Rubus ribisoideus</i> Matsum.	Sequipo si, Jeju

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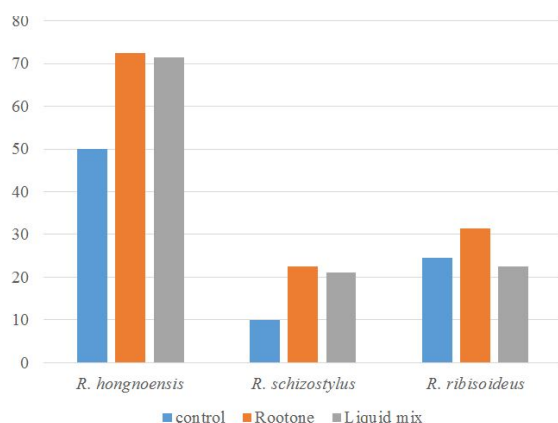


Fig. 1. Percent of root induction from stem cuttings of three *Rubus* species by different root induction treatments.

about 10 cm containing 2-3 axillary buds. Excised end was treated before strike cutting in the medium. Dipped in water was considered control and two commercial root stimulators, rootone (0.02% of 1-Naphtanleneacetic acid, NAA) and liquid formulation (plant extracts for root induction, 0.2% B, 0.01% Mo), were treated as given direction. The cut end of stem was dipped quickly in the powder of rootone before inserting in the medium. Water was added to 1/500 dilutions of liquid formation. Stem was dipped for 30 minutes and remove the access water then stem was inserted in the medium. Two different media, course sand and artificial soil mix, was used for the experiment. Cuttings were placed in greenhouse with two times of mist spray a day to keep the moisture and temperature was $23 \pm 2^\circ\text{C}$. Photoperiod and light condition was natural in the time of May. Cuttings per each treatment were 20 and experiment was repeated three times. Survival was observed 70 days later when the cuttings were transferred to new medium.

Results and Discussion

Root induction from stem cuttings of three *Rubus* species was investigated using different root stimulators, powdered or liquid formula, which are very commonly used. Stem cuttings adjusted the greenhouse environment for a while and shoot developed within 2-3 weeks after the strike. Most cuttings had new shoot elongated had roots and survived after the transplanting. There was significant differ-

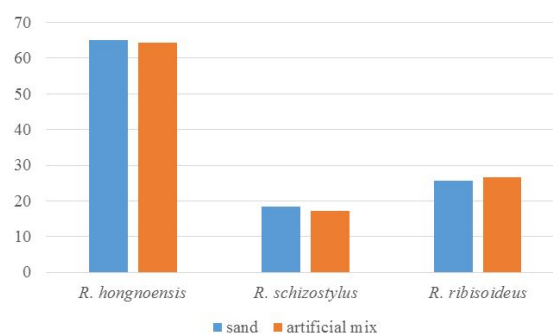


Fig. 2. Percent of root induction from stem cuttings of three *Rubus* species by different rooting media.

ence among the species in rooting percent. *R. hongnoensis* had high ability of rooting but the other two had very low rooting although the stems were collected in very similar time which is April (Fig. 1). The differences were thought to be due to the genetic. Physiological characteristics are very different from species and even cultivars within the species (Bobrowski et al. 1996). Some researchers found that the season of collection influenced the root induction from the stem (Kang et al. 2005) because of some factors such as plant hormones and nutrients in stem (Yoo and Kim 1996; Ling and Zhong 2012). It is worth try to softwood cutting for two species that had low percent of rooting.

The medium is also important factor for the success of cutting (Fig. 2). Bahm and Gray (2015) had a result that cutting rooted better in the artificial soil (perlite and perlite vermiculite mix) because of good drainage and retain moisture. The result of this study showed that there was no superior result in the artificial soil mix than sand. The factors influenced rooting ability of these three *Rubus* species depend on species ie. genotype and rooting hormone rather than medium.

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