

# The distribution, characteristics and utilization of Korean native *Actinidia* Genus

Cho, Y.<sup>1</sup>, Cho, H.<sup>2</sup> & Park, M.<sup>3</sup>

Key words: *A. arguta*, *A. polygama*, *A. Kolomikta*, *A. rufa*

## Abstract

*A. arguta* is found nationwide whether the altitude is low or high if good drainage is achieved with plenty of water. The distribution of *A. polygama* seems to be more limited to higher altitude than *A. arguta* so it can be found in deep valley of highland even in Mt. Halla. *A. kolomikta* seems rather limited to colder area than *A. arguta* to Mt. Jiri to the south. Meanwhile, *A. rufa* is very confined to southern islands including Jeollanamdo and Jeju islands. Some institutes still continue to utilize Korean native *Actinidia* plants commercially since early 1980's. More collaborative efforts are needed for further development of these plants nationwide.

## Introduction

There are more than 60 different *Actinidia* species in the world, but, only 2 species were commercialized among them since mid 1950's, which are *A. deliciosa* and *A. chinensis* (Cui 2002). These two species are not found in Korea, all originating from central china. Recently, plenty of studies have been conducted in various fields due to the successful story from these two species. These studies also increased the interests in other related species of *Actinidia* Genus, so it is natural that the thoughts to develop own materials follow as the previous studies are showing better potentials in some ways than commercial ones in Korea.

## Materials and methods

For last decades, countless explorations were organized to find out good native *Actinidia* clones from the habitats nationwide. As a result, the collections were evaluated further in experimental field, sometimes, using for many intra or inter-species crosses. This paper introduces some information on native *Actinidia* plants which has been achieved till now in Korea.

## Results and Discussion

There are 4 different species of genus *Actinidia* in Korea such as *A. arguta*, *A. polygama*, *A. kolomikta* and *A. rufa*, although some variants of *A. arguta* are found. Most of them grow in the deep valley with good drainage and moisture at high sea

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<sup>1</sup> Fruit Research Institute of Jeollanamdo Agricultural Research and Extension Services, 15-2 Daeyari 2gu, Wando-up, Jeonnam 537-807, Republic of Korea, E-Mail aktis@korea.kr

<sup>2</sup> As above, E-Mail cometcho@korea.kr

<sup>3</sup> As above, E-Mail mypark@korea.kr

level except *A. rufa*, to the contrary, *A. kolomikta* plants tends to be found in higher mountainous place than 3 other species (Tab. 1). *A. rufa* is strictly confined to the southern coastal area and islands including Jeju where the temperature is warmer and humid.

**Tab. 1: Geographical distribution of native *Actinidia* Genus in South Korea**

Species	Major natural habitats (Counties, mountains and valleys)	Geographical range
<i>A. arguta</i>	Most Gangwon counties (Hongchen, Jeongson, Pyeongchang, Taeback), Muju, Gongju, Namwon, Gurye, Youngam, Jeju	33.2N to 37.5N, 126.2E to 129.2E
<i>A. kolomikta</i>	Most Gangwon counties, Jiri Mt.	35.1N to 38.4N, 127.1E to 129.1E
<i>A. polygama</i>	Most Gangwon counties, Chilgab Mt., Jiri Mt., Jeju	35.1N to 38.1N, 127.1E to 129.1E
<i>A. rufa</i>	Jeonnam counties (Sinan, Wando, Yeosu), Jeju	33.1N to 34.6N, 125.2E to 127.5E

**Tab. 2: Leaf and flowering characteristics of Korean native *Actinidia* Genus at blooming period**

Species	Leaf blade shape	Shape of leaf apex	Blistering on upper side leaf	Presence of variegation on leaf upper part (color)	Flowering period
<i>A. arguta</i>	Ovate	Acute	Very weak	No	Mid May
<i>A. kolomikta</i>	Lanceolate	Caudate	Strong	Yes (whitish pink or pink)	Late April to early May
<i>A. polygama</i>	Ovate	Acuminate	Medium	Yes (white)	Late May to early June
<i>A. rufa</i>	Broad ovate	Acute	Weak	No	Early May

The flowering order of 4 *Actinidia* species is *A. kolomikta*, *A. rufa*, *A. arguta* and *A. polygama* (Tab. 2). So there are rare chances to be cross-pollinated among species in nature, even between *A. arguta* and *A. rufa* which flower at similar period in southern latitude because their habitats are far away by the sea level difference.

**Tab. 3: Fruit characteristics of Korean native *Actinidia* Genus at maturity**

Species	Fruit size (g)	Soluble solid content (°Bx)	Fruit surface color	Horticultural maturity
<i>A. arguta</i>	5 to 8	14 to 19	Green	Late Sep. to mid Oct.
<i>A. kolomikta</i>	4 to 7	16 to 23	Orange	Mid to late Sep.
<i>A. polygama</i>	4 to 6	12 to 16	Light green	Late Sep. to late Oct.
<i>A. rufa</i>	7 to 19	6 to 17	Brown	Late Sep. to early Oct.

Most species bear very small fruits compared to commercial *Actinidia* fruits but the soluble solid content are similar or higher with no fruit skin hairs, reaching earlier maturity with good flavour (Tab. 3). These features expose convenience such as no peeling and cutting with these fruits, despite of smaller size.

**Tab. 4: Potential use of Korean native *Actinidia* plants**

Species	Past and present	Future
<i>A. arguta</i>	Fruit; fresh fruit Leaf; anthelmintic Root; anti-inflammatory Tree sap; anti-cancer, edema, diabetes, nephropathy Young shoots; vegetable side dish	Dermatitis Wine Dry fruit Ornamentals
<i>A. kolomikta</i>	Fruit; medicinal uses (gout, lumbago, abdominal pain, rheumatism) Leaf and shoot; anti-inflammatory, blood circulation	Dermatitis
<i>A. polygama</i>	Fruit; fresh fruit, medicinal uses (labor pain, cough, scurvy, pulmonary tuberculosis) Young shoots; vegetable side dish	Wine
<i>A. rufa</i>	Fruit; fresh fruit Shoots; diuretic, jaundice, anti-tumor Fresh leaf; medicinal use for cat	Anti-cancer Resistant rootstock

Traditionally, Koreans have been using *Actinidia* plant and fruits in various ways (Tab. 4). Some recent studies are revealing surprising functionality of these species such as dermatitis, anti-cancer and gout therapy (Ahn *et al.* 2010, Chat *et al.* 2004, Kim *et al.* 2009a, b, Lin *et al.* 2008, Nishiyama *et al.* 2008, Nitta and Ogasawara 1999, Wang *et al.* 1994, White *et al.* 1986). Meanwhile, the efforts to exploit these species are not working properly although some institute are producing new selection independently (Tab. 5) (NSS 2011). More collaboration nationwide should be achieved to utilize the whole available materials and human resources as well.

**Tab. 5: Selections of *Actinidia arguta* for fresh fruit by research institutes in Korea**

Research institutes	Selections	Breeding method
Fruit research institute of Jeonnam RDA	Chiak	Open pollination
Namhae station of RDA	Bangwoori, skinny green	Interspecific cross
Gangwon RDA	Chengsan, Gwangsan	Clonal collection
National Forest Service	Daemyeong, Saehan	Interspecific cross

## Conclusions

Although the fruit size and marketability are considered critically important factors for successful commercialization, there are many interesting aspects of utilizing native *Actinidia* plants and fruits, for example, like functionalities to human health as well as fresh fruits. There are still a lot of native vines with good heritages to be evaluated for further potentials.

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