

# Novel tea cultivar, cold and disease tolerant tea plant [*Camellia sinensis* L.] "Chamnok"

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## ABSTRACT

Most of Korean tea trees (*Camellia sinensis* L.) are originated from China, which have small and thick leaves. Yabugida, the representative species of Japan, has picked up a natural cross from indigenous breeding sites, and is cultivated by about 80 percent (40,000ha) of the total area of the population. The study was carried out to select superior tea species, adaptable to the Korean climate by collecting various genetic sources and investigating their genetic and physiological characteristics. For cold and disease tolerant tea species with high yield, botanical seeds were collected, sowed, and evaluated their growth conditions for 6 years. Tested Chamnok species for physiological characters was applied for protection of new varieties of plants on 2001. The tree's form of "Chamnok" was regarded as an upright shape, strong resistant to cold and diseases and appropriate one for organic cultivation. Compared to Yabugida, Chamnok showed earlier germinal stage (6 days early), plenty of shoot number (53/0.04 m<sup>2</sup>). Chamnok showed 10.1% higher production yield (337kg/10a) and higher amounts of tannin and total amino acid but lower caffeine content than Yabugida. In this study, we developed Korea representative tea species "Chamnok" with cold and disease tolerant, and high yield.

## MATERIALS & METHOD

- Total 51 plants, 105 seeds were cultivated at (6\*41\*15cm) flatus for seedling and planting.
- Germinated 76 plants were screened first on large leaf size, strong disease resistant and 97 HD1-22 (bonsung #5) was selected on 1995 and 40 more related plant were planted.
- 14 plants were studied on its character on growth rate, yield and quality for 4 years from 1998-2001

**Table 1.** Pedigree diagram of *Camellia sinensis* L. variety

Year	1994	1995~1997	1997~2001
Generation	F <sub>1</sub> V <sub>0</sub>	V <sub>1</sub>	V <sub>2</sub>
Seed Collection and sowing	HD1-01 - HD1-76	HD1-22V <sub>1</sub>	HD1-22V <sub>2</sub> (Chamnok)
No. of selection	76	1	1
procedure		1 <sup>st</sup> selection	characteristic

**Table 2.** Floral characters of *Camellia sinensis* L. variety

Cultivar	Flower size <sup>w</sup>	Style length <sup>x</sup>	Position of style ramification <sup>y</sup>	Hairs of ovary <sup>z</sup>
Chamnok	3	2	3	3
Yabugida	3	2	1	2

<sup>w</sup>Flower size 1 : > 4.5cm, 2 : 3.0~4.5cm and 3 : <3.0cm in diameter.

<sup>x</sup>Style length 1 : <stamen, 2 : =stamen and 3 : > stamen.

<sup>y</sup>Position of style ramification 1 : <35%, 2 : 35~65% and 3 : > 65%.

<sup>z</sup>Hairs of ovary 1 : few, 2 : intermediate and 3 : many.



**Figure 1.** Chamnok field (left Chamnok, right Yabugida)

## RESULTS & CONCLUSIONS

**Table 3.** Characteristics of Sprouting, cold tolerance and cutting in the *Camellia sinensis* L. variety

Cultivar	Sprouting date (Month. date)	Harvesting time (Month. date)	Cold tolerance	Disease resistance	Insect resistance	Cutting ratio (%)
Chamnok	4. 13	5. 9	strong	Strong	Strong	86
Yabugida	4. 19	5. 16	weak	weak	medium	87

**Table 4.** Leaf characters of *Camellia sinensis* L. variety

Cultivar	Leaf length (cm)	Leaf width (cm)	Index (length/width)	Leaf thickness (mm)
Chamnok	7.6	3.3	2.4	2.6
Yabugida	5.8	2.0	2.9	1.7

**Table 5.** Yield component characters of *Camellia sinensis* L. variety

Cultivar	No. of new buds* (개/0.04m <sup>2</sup> )	Weight of 100 buds(g)	Yield of 1st harvesting (kg/10a)	Index
Chamnok	53	30	323	109
Yabugida	49	28	296	100

**Table 6** Yield component characters of *Camellia sinensis* L. variety

Cultivar	Total Nitrogen (%)	Total Amino acid (mg/100g)	Caffeine (%)	Tannin (%)	Catechin (%)	VitaminC (mg/100g)
Chamnok	5.2	3,346	2.1	17.9	9.6	121
Yabugida	4.7	2,630	3.7	14.8	10.5	95

**Table 7** Farm Supply of *Camellia sinensis* L. variety

Year	2011~2012	2013~2014	2015~2016	2017	Total
Plants	20,000	50,000	63,300	43,000	176,300

- † The tea seedlings germinated from open-pollinated tea seeds had been evaluated for growth habits including sprouting time and leaf characteristics since 1994 and the cultivar numbered S2-26 was selected in 1997
- After an evaluation of regional performance for yield and adaptability, this HD1-22 26 was finally selected and was named 'Chamnok' in 2001
  - 'Chamnok' is a vigorous cultivar with elected growth habit and tolerance to cold and anthracnose and Gray Bright disease (Table 3)
  - The chemical quality of tea leaves from the 1st flush is very good with a higher amino acid content and a lower caffeine content than those of 'Yabukita' cultivar
  - This achievement indicates that not only breeding by segregation is a very efficient method in tea cultivar improvement in Korea within a short breeding period, but also Korean wild tea populations may be harbouring a greater genetic diversity with high potential

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