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Historical Record of Mushroom Research and Industry in Korea

Young Bok Yoo*, Youn Lee Oh, Pyung Gyun Shin, Kab Yeul Jang, Gi-Ho Sung and Won-Sik Kong

Mushroom Research Division, National Institute of Horticultural & Herbal Science, Rural Development Administration, Korea

Two kinds of mushrooms, Gumji (金芝; *Ganoderma*) and Soji, were described in old book of Samguksagi (History of the three kingdoms; B.C 57~A.D 668; written by Bu Sik Kim in 1145) in Korea-dynasty. Many kinds of mushrooms were also described in more than 17 kinds of old books during Chosun-dynasty (1392~1910) in Korea. Nowadays, mushroom cultivation has been increased through out the world last decade years. Production of mushrooms has also been increased 10-20% and many varieties have been cultivated. Similar trends were also observed in Korea.

Approximately two hundred commercial strains of 37 species in mushrooms were developed and distributed to cultivators. Somatic hybrid variety of oyster mushroom ‘Wonhyeong-neutari’ were developed by protoplast fusion, and distributed to grower in 1989. The fruiting body yield index of somatic hybrids of *Pleurotus* ranged between 27 and 155 compared to parental values of 100 and 138. In addition, more diverse mushroom varieties such as *Phellinus baumi*, *Auricularia* spp., *Pleurotus ferulae*, *Hericium erinaceus*, *Hypsizigus marmoreus*, *Grifola frondosa*, *Agrocybe aegerita* and *Pleurotus cornucopiae* have been attempted to cultivate in small scale cultivation. Production of mushrooms as food was 190,111 metric tons valued at 800 billion Korean Won (one trillion won if include mushroom factory products; 1dollar = 1,040 Won) in 2011. Major cultivated species are *Pleurotus ostreatus*, *Pleurotus eryngii*, *Flammulina velutipes*, *Lentinula edodes*, *Agaricus bisporus*, and *Ganoderma lucidum*, which cover 90% of total production.

Since mushroom export was initiated from 1960 to 1980, the export and import of mushrooms have been increased in Korea. Technology developed for liquid spawn production and automatic cultivation systems lead to the reduction of the production cost resulting in the increasement of mushroom export. However some species were imported because of high production cost for these mushrooms requiring the effective cultivation methods. Developing of effective post-harvest system will be also directly related to mushroom export.

In academic area, RDA scientists have been conducting mushroom genome projects. One of the main results is the whole genome sequencing of *Flammulina velutipes* for molecular breeding. An electrophoretic karyotype of of *F. velutipes* was obtained using CHEF with 7 chromosomes, with a total genome size of approximately 26.7 Mb. The mususcript of the genome of *F. velutipes* was published in *PLOS ONE* this year. For medicinal mushrooms, we have been conducting the genome research on *Cordyceps* and its related species for developing functional foods using this mushroom. In 2013, Korea Food and Drug Administraion (KFDA) approved *Cordyceps* mushroom for its value as an immune booster.

Keywords : Gumji and Soji, Commercial strains, Production of mushrooms, Automatic cultivation systems, Mushroom industry, Genome project.