

NewCROP Factsheet

Perilla

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Common Names

English: perilla, beefsteak plant, Chinese basil, purple mint

Bengali: ban tulsi

Chinese: tzu ssu, yeh-ssu, chi-ssu, hung-sha-yao, ts'ao-t'ou, tsu-shih ts'ao,

Hindi: bhanjira

Japanese: shiso, egoma, shisonoha (red leaved form), umeboshi (plum pickled with perilla)

Korean: kkaennip namul

Scientific Names

Species: *Perilla frutescens* (L.) Britton

Three other *Perilla* species are recognized by some authorities, but the distinctions are ambiguous, and a taxonomic revision is needed.

Family: Lamiaceae (Labiatae)

Uses

The seed oil is used for cooking, as a drying oil, and as a fuel. The seeds are eaten by people and used as bird seed. The foliage is used as a potherb, for medicine, and for food coloring. The foliage is also distilled to produce an essential oil for flavoring. The plants are grown as ornamentals.

Origin

Asia: It is a traditional crop of China, India, Japan, Korea, Thailand, and other Asian countries.

Crop Status

In South Korea 40,800 ha were in production in 1991. Korean plantings are often partly harvested first as a potherb, and later the seeds are harvested (Lee et al. 1993). The average seed yield in Korea is 770 kg/ha in commercial production (Lee et al. 1989) although research plots can yield twice as much (summarized by Brenner 1993).

Ethnic food stores in the United States that cater to people from Korea and Japan generally carry some perilla products including: fresh greens in season, seed oil, pickled plums, plum sauce and other condiments. Perilla is infrequently used in the United States as an ornamental bedding plant with green or brightly colored red foliage.

Seed Oil

There is new commercial use of the seed oil as a source of dietary omega-3 fatty acid for health conscious consumers. A www browser search for “omega-3 + Perilla” generated a list of nine commercial suppliers for this product in December 2008.

The seeds of perilla contain 31 to 51% of a drying oil similar to tung or linseed oil (all drying oils leave a hard protective surface when dry). Perilla seed oil has been used in paints, varnishes, linoleum, printing ink, lacquers, and for protective waterproof coatings on cloth. Perilla competes with linseed as a drying oil. The oil has also been used for cooking and fuel. The spent seed meal can be fed to ruminants.

The oil is highly unsaturated, with an iodine number of 185 to 208, and includes linolenic, linoleic, and oleic acids. The high linolenic content of the oil (64%) makes it unstable due to oxidation; plant breeders are developing new varieties with low linolenic content for edible oil and high linolenic oil for industrial uses (Lee et al. 1993).

Culinary

Perilla foliage and seed oil are used in Korean cooking. The foliage is used as a potherb and a garnish in Japan. The seeds are eaten in Japan, Korea, and India.

In Japan the foliage also provides a red (anthocyanin) food coloring and specialized red-leaved perilla varieties are used in the production of pickled plums. The perilla pigment is most stable under cold, acidic conditions, but light can bleach the pigment (Suyama et al. 1983). In addition to food coloring, perilla adds an antimicrobial agent to pickled foods.

Volatile Oil

The volatile oil of perilla is used as a flavoring agent, in which perilla aldehyde is the desirable flavoring compound. One of the aldehyde isomers is 2,000 times as sweet as sugar and four to eight times as sweet as saccharin (Guenther 1949). Perilla alcohol, prepared from perilla aldehyde, is used in fragrances, and has legal food status in the United States. A perilla line from Bangladesh is a potential commercial source of rosefuran, a compound of interest in flavoring and perfumery (Misra and Husain 1977).

Perilla genotypes with different volatile oil chemistries have been crossed to allow study of the genetic control of biosynthetic pathways. Through these crosses, chemotypes have been developed that demonstrate classical genetic segregation patterns (summarized by Brenner 1993). One genotype lacks perilla aldehyde but has perilla ketone. One recent example of this type of investigation involves a geranial-producing perilla (Honda et al. 1994).

Traditional Medicinal Uses

Asian herbalists prescribe perilla for cough and lung afflictions, influenza prevention, restless fetus, seafood poisoning, incorrect energy balance, etc (summarized by Brenner 1995). Studies

of perilla volatile oil have revealed that distinct chemotypes of perilla have dramatically different biological effects (summarized by Brenner 1995). The perilla aldehyde chemotype is the source of Japanese “ao-shiso” a medicine with an agreeable fragrance.

Toxicity

Perilla is ordinarily avoided by cattle but has been implicated in cattle poisoning. Plants are most toxic if cut and dried for hay late in the summer, during seed production. Perilla ketone causes pulmonary edema (fluid in the lung cavity) in many animal species, although not in pigs or dogs. In Japan 20 to 50% of long-term workers in the perilla industry develop dermatitis on their hands due to contact with perillaldehyde. Perilla toxicity is reviewed by Brenner (1993).

Botany

Identification

The best diagnostic characteristics of perilla are the net-patterned testa of the nutlets. Perilla superficially resembles basil and coleus. Dry skeletons of the plants persist into the spring; their racemes retain dry papery calyces when the purple to white flowers have fallen away.

Weed Ecology

Perilla is a common weed of pastures and roadsides in the southeastern United States (Brenner 1993). One reason for perilla’s survival in pastures, is that cattle avoid it. It stands 15 cm tall for most of the summer. In August, it blooms and its stem elongates rapidly. The plant reaches a height of approximately 1 m before being killed by frost.

Photoperiod

Perilla has been used by plant physiologists to investigate floral induction. Long nights induce flowering, but different accessions have different critical night lengths. Plants become photosensitive at the fourth leaf pair stage. Flowering starts 18 to 20 days after the start of long nights. After 30 long nights, plants will bloom until they die, regardless of subsequent daylength. The response of perilla to photoperiod is reviewed by Brenner (1993).

Crop Culture (Agronomy/Horticulture)

Perilla is a summer annual, adapted to warm humid climates. The seeds can be planted one cm deep as early as possible in the spring. The flowers self-pollinate without insect visits (Brenner 1993).

One of the greatest difficulties in perilla cultivation is the limited seed viability in storage. At room temperature, the seeds can die in less than a year. Lowered temperature and lowered humidity improve storage life (summarized by Brenner 1993).

Germplasm

Government Germplasm Collections

United States:

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Nineteen accessions, including the following representative examples:

PI 248668 early maturity oilseed

PI 553087 red foliage, for food coloring, or ornamental

PI 546460 white seeded from Nepal

PI 572264 late-maturity oilseed, modern Korean cultivar

Japan:

Mr. Shirata, National Institute of Agrobiological Resources, Kannondai, Tsukuba, Ibaraki, 305 JAPAN. Tel.: 81-298-38-7461; Fax: 81-298-38-7408 E-mail:kazukun@abr.affrc.go.jp

Access to Commercial Sources

Searching the www finds sources

Key References

[This perilla FactSHEET is extracted from Brenner (1993) which has an expanded bibliography.]

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Selected Experts

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