

Leaf and Stem Production of *Perilla frutescens* by Fertilizing of Sta-Green

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ABSTRACT

This study was conducted to determine feasibility of production system of *Perilla frutescens* leaf-stem by fertilizing of Sta-Green in pots. Germination rate of *Perilla frutescens* seeds collected in 2002 was 7%, also germination rate of seeds collected in 2003 was 62%, while germination rate of seeds collected in 2004 was above 93%. Seed germination rate of *Perilla frutescens* collected in 2004 were higher than seed gathering in 2002.

Especially, plant growth and yield of *Perilla frutescens* grown in pot(The pots was filled with soil mixtures of Sta-Green and Peat Moss mixed with 40:60 ratio.) was the highest. These results indicate that leaf and stem production of *Perilla frutescens* can be improved by fertilizing of Sta-Green in pots.

Key words : *Perilla frutescens*, leaf and stem, production, Sta-Green, green house, seed collecting year

INTRODUCTION

Perilla is annual growing to 60cm by 30cm. It is in flower from July to August in America. The scented flowers are hermaphrodite (have both male and female organs). We rate it 3 out of 5 for usefulness. The plant prefers light (sandy) and medium (loamy) soils and requires well-drained soil. The plant prefers acid, neutral and basic (alkaline) soils. It cannot grow in the shade. It requires moist soil. Prefers a light soil. Requires a rich well-drained moisture-retentive soil in full sun. Plants require a well-drained soil but do not

need particularly fertile soil. Prefers an acid soil with a pH between 5.5 and 6. The plant is not frost hardy and requires temperatures above 18°C if it is to grow well. The plant requires short days in order to flower. *Perilla* is often cultivated in the Orient as a food flavoring. There are some named varieties, those with purple leaves being preferred for seed production. *Perilla* is also cultivated for the oil obtained from its seed. It is sometimes used in sub-tropical bedding schemes in Britain. Surface-sow or only lightly cover the seed in mid spring in a greenhouse. The seed germinates best at 20°C, though it also succeeds at slightly lower

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temperatures. Germination is usually quick, prick out the seedlings into trays or individual pots when they are large enough to handle and plant them out into their permanent positions in early summer. Give the plants some protection such as a cloche until they are growing away well. The seed has a short viability and should be used when less than a year old. The seeds ripen from October to November and produce seeds with 2.6 g in 1000-seed weight(Michael, 2002).

Edible young leaves and seedlings are raw or cooked. The flavor is strange to western palates at first, some people detecting cinnamon, others coriander or citrus. Older leaves are also salted and used as a garnish for tempura. The leaves can also be dried for later use. The leaves contain about 3.1% protein, 0.8% fat, 4.1% carbohydrate, 1.1% ash. Sta-Green can be utilized as a soil conditioner in agricultural crop areas. Choi and Park(2005) reported that treatment of Sta-Green around 45% improved the growth of medicinal plants. The leaves, stems and seeds of *Perilla* are often used in Oriental medicine. The leaves are used in the treatment

Table 1. Composition of soil Sta-Green

Guaranteed Analysis	Content(%)	Others
Total Nitrogen(N)	0.05	Ammoniacal Nitrogen 0.01% Nitrate Nitrogen 0.01% Urea Nitrogen 0.03%
Available Phosphate(P ₂ O ₄)	0.03	Ammonium Phosphate
Soluble Potash(K ₂ O)	0.03	Potassium Nitrate

of colds, chest stuffiness, vomiting, abdominal pain etc. The seed is antiasthmatic, antitussive, emollient and expectorant. It is used internally in the treatment of asthma, colds and chills, nausea, abdominal pain, food poisoning and allergic reactions(especially from seafood), bronchitis and constipation. A drying oil obtained from the seed is used in making paints, varnishes, water proofing etc. The stems are a traditional Chinese remedy for morning sickness. This herb should be avoided by pregnant women.

Sta-Green can be utilized as a soil conditioner in agricultural crop areas. Choi and Park(2005) reported that treatment of Sta-Green around 45% improved the growth of medicinal plants.

This study was conducted to investigate the effect of fertilizing of Sta-Green on leaves and stems production of *Perilla frutescens* in greenhouse.

MATERIALS AND METHODS

Seeds of *Perilla frutescens* as a native variety were seed gathering at the medicinal plant garden of Sunchon National University in August, 2002, 2003 and 2004, respectively, the seeds were used for experiment. The seeds were stored in a refrigerator at 4°C for 30 days after collection. The seeds were planted in pot(Ø25cm) in greenhouse of Missouri University Agronomy on 25th of August, 2004. The pots was filled with Sta-Green of 0, 10, 20, 30, 40 and 50%. Stand soil mixtures of Peat Moss. The soil Sta-Green includes N-P₂O₅-K₂O=0.05-0.03-0.03(Table 1).

Five seeds per pot, collected in 2003 and 2004, were planted onto pots, and three seedlings per pot were finally selected for the experiment. Harvest was made when the plant height reached 10~15 cm high. The shoot and root fresh weight of whole plants were measured.

General cultural procedure and management such as weed control followed conventional culture methods for medicinal plants (RDA: Rural Development Administration, 1995).

All measurements for plant growth and yield were referred to standard measurement of RDA, Korea (RDA, 1989).

RESULTS AND DISCUSSION

Germination of *Perilla frutescens* seeds by collecting year

Germination time and rate of *Perilla frutescens* seeds by collecting year are shown in Table 2.

Germination of *Perilla frutescens* seeds collected in 2004 was initiated from the second of September while those in 2002 from the 9th of September. The results show that *Perilla frutescens* seeds collected in 2004 were more early germinated than those in 2002. Germination rate of *Perilla frutescens* seeds collected in 2002, 2003 and 2004 were 7%, 62% and 93%, respectively, showing higher germination capacity in seeds collected in 2004. The result show that germination rate was lower as the seed collecting year increased. Germination was complete within 3 days

after germination initiation, from 5th to 8th of September.

These results indicate that leaf and stem production of *Perilla frutescens* can be improved by optimizing seed collecting time in greenhouse.

Effect of Sta-Green treatment on the growth of *Perilla frutescens*

The result on growth of *Perilla frutescens* as affected by Sta-Green is shown Table 3. In control, plant height, number of leaves per plant, and fresh weight of *Perilla frutescens* grown were 10.7cm, 4.3 and 13.9 g, respectively. Plant height, number of leaves per plant, and fresh weight of *Perilla frutescens* in Sta-Green treatment were 12.9~14.4cm, 4.0~5.0 and 14.1~15.2g, respectively. However, when the plants were grown in Sta-Green treatment 40% and the bigger one.

The results show that leaf and stem production of *Perilla frutescens* can be improved by using Sta-Green. Choi(2005) reported that treatment of Sta-Green around 45% improved the growth of *Angelica acutiloba*.

Table 2. Germination time and rate of *Perilla frutescens* seeds by collecting year

Seed gathering year	Germination		
	first day	date	rate(%)
'02 seed	Sep. 9	-	7
'03 seed	Sep. 5	Sep. 8	62
'04 seed	Sep. 2	Sep. 5	93

Table 3. Growth of *Perilla frutescens* by fertilizing of Sta-Green

Treatment	Plant height (cm)	Number of leaf	Weight (g)
Control	10.7b*	4.3a	13.9b
Sta-Green 10%	12.9a	4.9a	14.1ab
Sta-Green 20%	13.5a	4.8a	14.9a
Sta-Green 30%	13.7a	4.9a	15.1a
Sta-Green 40%	14.4a	4.9a	15.2a
Sta-Green 50%	13.8a	4.8a	14.3ab

*Mean separation within column by Duncan's multiple range test, 5% level of significance.

These results require further more detail studies on effects of treatment methods on growth responses of *Perilla frutescens* as affected by different growing stages.

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