

WEED MANAGEMENT IN PASTURES

# Beefsteak Plant (Perilla Mint)

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## The Short Story

*Perilla frutescens* (L.) Britton is known by many names, including beefsteak plant, perilla mint, Chinese basil, purple mint, and rattlesnake weed (Figure 1). The plant is an annual mint that can sometimes be found in southern Indiana pastures.

Beefsteak plant is considered toxic to cattle, causing respiratory distress syndrome (panting disease). Due to its toxicity, it is important to control the plant by pulling or digging it up, mowing it, or using herbicides. 2,4-D, Milestone®, Forefront®, Weedmaster®, and glyphosate have been reported to provide good control.



Figure 1. Beefsteak plant.

Source: William S. Justice, USDA-NRCS PLANTS Database, [plants.usda.gov](http://plants.usda.gov).



Figure 2. Documented cases of beefsteak plant in Indiana.

Source: USDA-NRCS PLANTS Database, [plants.usda.gov](http://plants.usda.gov).

## The Rest of the Story

Beefsteak plant has recently appeared in a pasture at the Feldun-Purdue Agricultural Center (FPAC) in Lawrence County; however, this is not the first time the plant has been found in Indiana. Beefsteak plant has been documented in 15 Indiana counties, mostly in the Southeast and South-Central quadrants of the state (Figure 2).

## Identification

One of the most noticeable things about beefsteak plant is the variable color of the leaves and stems. Leaves are opposite with long petioles and can be purple to green or have combinations of green tinged with purple. The leaves are somewhat wide at the base, narrow to a tip, and are approximately 3 to 7 inches long and nearly as wide. The leaf margins are saw-like, having a sharp, serrated

appearance; however, this can be somewhat variable.

The stems can grow to 3 feet tall, are hairy, and can be green to dark purple. The beefsteak plant has a square stem, as do most plants in the mint family. Flowers bloom from July to October and are white to purple.

## Toxicity

There are some toxicity issues associated with the beefsteak plant. In a 1990 *Journal of Animal Science* article, the authors reported that a herd of 70 cows in Illinois were poisoned by the beefsteak plant. According to the report none of the animals died. In *Perilla Mint*, the University of Tennessee

Extension authors state that beefsteak plant causes more cattle deaths in Tennessee than any other toxic plant.

Beefsteak plants contain ketones that have been associated with acute respiratory distress syndrome (or panting disease) in cattle. Animals suffer an inflammation of the lungs, which impairs gas exchange. Although all of the plant can contain these ketones, the flowering structures are considered the most dangerous. Other ruminants and horses are also at-risk and beefsteak plant is reported to still be toxic in hay.

In “Perilla Ketone: A Potent Lung Toxin from the Mint Plant, *Perilla frutescens* Britton,” the authors reported that ketones extracted from the beefsteak plant produced pulmonary disease in mice. Samples of beefsteak plant taken from Tennessee stream banks all contained the perilla ketone. However, the ketone was not found in seed from plants collected in Oklahoma or samples commercially available in Japan.

The authors were able to induce pathology in cattle with a synthesized perilla ketone; however, the amount of ketone and animal size had an effect. Synthetic ketone injected at a total of 0.1 oz into two 706-pound (0.0001 oz/lb) Angus heifers did not produce pathology. But in a separate experiment, approximately 0.3 oz in the blood of a 600-pound heifer did induce illness 10 hours after exposure. Similar amounts caused illness in a 123-pound male sheep. It appears that these compounds are not always present or the pathology is not always induced.

## History

Certain varieties of the beefsteak plant are grown as a crop in Asia and most likely arrived in the United States as a garden plant. The plant’s attractive colors and leaf serration may also have contributed to its use as an

ornamental. The variety *frutescens* has been used as an oil crop and the variety *crispa* has been used as a spicy vegetable in China and Japan. Varieties have also been used for medicinal purposes. However, weedy relatives of these varieties can be found on roadsides and wastelands in these countries.

Although there have been toxicity issues identified in this species, mention of its uses are widespread. Present and historical accounts mention varieties of this plant being used for many years. In “Perilla Ketone,” the authors end with concerns about its use. They conclude that the contradictions regarding the plant’s toxicity and its documented uses need to be investigated further. The authors speculate whether toxicity is a varietal issue (where some varieties express the toxins and others do not), or if toxicity is triggered by some kind of environmental cue that induces toxicity in some plants.

In any case, if beefsteak plant is found in a pasture, control measures should be implemented.

## Control

Because of the potential poisoning risks, it is essential to control beefsteak plant in a pasture. Typically, livestock will selectively graze forages, but in cases when forages are limited, livestock may graze this plant. Even if not grazed, livestock may be exposed to beefsteak plant through hay.

Implement control measures early in the season to prevent flower formation, because of the increased toxicity of the flowers.

At present, there is no Purdue Extension research on beefsteak plant control. However, there is some information available from other sources. These sources indicate that mowing before flowering may reduce beefsteak plant’s spread.

### See Other Images

More photos of beefsteak plant are available from:

Virginia Tech Weed Identification Guide

[www.ppws.vt.edu/scott/weed\\_id/prjfr.htm](http://www.ppws.vt.edu/scott/weed_id/prjfr.htm)

MissouriPlants.com

[www.missouriplants.com/Pinkopp/Perilla\\_frutescens\\_page.html](http://www.missouriplants.com/Pinkopp/Perilla_frutescens_page.html)

Sources also indicate that there are several herbicides with activity on beefsteak plant. The 2010 *Weed Control Manual for Tennessee* (University of Tennessee Extension publication PB 1580) rates 2,4-D, Forefront®, Milestone®, and Weedmaster® with eight out of ten, indicating approximately 80 to 90 percent control for beefsteak plant.

One of the USDA's "Weed of the Week" articles indicates that glyphosate is also a possible control measure. However, glyphosate would also injure forages, while 2,4-D, Forefront®, Milestone®, and Weedmaster® would not injure grass forages.

In conclusion, even with the uncertainty about the beefsteak plant's toxicity, this plant should be controlled in forages. Why take a chance on reducing livestock fitness or unnecessarily losing animals. Spot treating plants may be all that is needed to limit the potential of having problems.

## References

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