

Monotropa uniflora

Ghost Pipes are herbaceous perennial plants that lack chlorophyll; they obtain their nutrients via mycotrophy, i.e., by parasitizing the fungi present in their roots. The plants are commonly white at flowering but, in rare instances, may be pink or red. The stems are hairless, smooth, waxy, and range from 5 to 30 cm in height, though most commonly found in the shorter portion of that range. Leaves are alternate and reduced to narrow scales pressed against the stems. Flowers are produced from June to October. Flowers are terminal, solitary, and nodding. The calyx consists of 2 to 5 scale-like bracts of unequal size, ranging 7 to 10 mm long and 4 to 6 mm wide. The five petals are separate, somewhat sac-like at their attachment to the receptacle gradually becoming wider toward their broadly rounded tips; petal dimensions range from 10 to 20 mm long and 5 to 15 mm wide. Stamens number 8 to 10 and are nearly equal to or shorter than petals; filaments are hairy; anthers are relatively short, irregularly globular, oriented



horizontally within the flower, and open via a single horizontal slit (not via pores); pollen grains are shed singly (not in groups of four). A ring-like, lobed, nectary is present between filaments and the base of the ovary. Ovaries are superior and consist of four or five fused carpels, each of which bears numerous small ovules on an axile placenta; styles are short and cylindrical, topped with disk-like stigmas. After pollination, as fruits develop, flowers gradually re-orient to a vertical position as the stems and leaves darken; eventually, fruit-bearing plants become nearly black. Fruits mature between August and November. Fruit capsules bear 4 or 5 vertical grooves and release numerous small seeds, 0.5 to 1 mm long, usually with a small, membranous, wing.

In the Garden

Because of its mycotrophic/mycoparasitic nature, *Monotropa uniflora* is difficult to impossible to cultivate in a garden setting. The plants require well-established networks that fungi form with forest trees, the human management of which is beyond the realm of contemporary horticulture. Nursery propagated plants are not available. If Ghost Pipes should happen to appear spontaneously in one's garden they should be revered and enjoyed in situ.

Name & Relationships

The genus name, *Monotropa*, is based on two Greek words, *monos*, one, and *tropos*, turn, in reference to the sharply curved stem apex that accounts for the downward orientation of the single flower. The species portion of the binomial, *uniflora*, is Latin for one-flowered. The combination *Monotropa uniflora* was published by Linnaeus in his monumental work, *Species Plantarum*, in 1753. Currently, Ghost Pipes are classified in the large family Ericaceae that includes familiar plants such as Rhododendrons, Azaleas, Mountain Laurels, and Blueberries, and a host of others. Within Ericaceae, *Monotropa* is closely related to two other mycoparasitic plants found in Virginia, *Hypopitys monotropa* (Pinesap), and *Monotropsis odorata* (Sweet Pinesap). Populations in northern Florida with reddish pigmentation and small differences in flower structure are accepted by some botanists as a separate species, *Monotropa brittonii*, the Scrub or Southern Ghost Pipe.



In the Wild

Ghost Pipes occur in mesic to dry upland forests, in a variety of soils and vegetation types. Presence of conifers and/or Fagaceae family (Chestnuts, Beech, Oaks) have been noted as common elements in their habitat, presumably because these trees harbor the fungal symbionts that Ghost Pipes require for nutrition. Long-tongued Bumblebees are important pollinators. Wind disperses Ghost Pipe's small, light-weight seeds; staying aloft in turbulent air is likely assisted by its thin, membrane-like, seed "wings."

Human Uses

Native Americans employed Ghost Pipes for a variety of sedative and pain-relieving effects. Presence of deleterious grayanotoxins and the circumstance that some plants accumulate toxic levels of heavy metals argue against herbal medicinal use of Ghost Pipes. VNPS makes no recommendations concerning self-medication with Ghost Pipes.

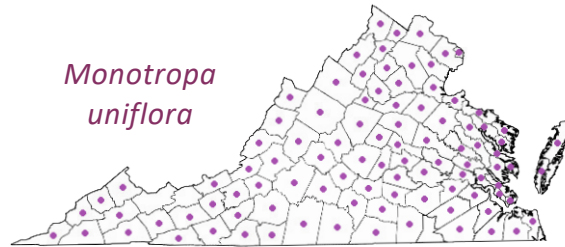
Conservation Status

Conservation status of *Monotropa uniflora* is secure.



Where to See It

Monotropa uniflora has a multicontinental distribution. In North America north of Mexico, Ghost Pipes occur from Nova Scotia to British Columbia, south to northernmost California in the west, and from Minnesota to eastern Texas and Florida in the east. A disjunct population occurs in cool mountainous regions of southern Mexico, and through Central America to Colombia. Ghost Pipes are also found widely in southern and eastern Asia. Ghost pipes can be found throughout forested regions of Virginia.



From the Digital Atlas of the Virginia Flora, vaplantatlas.org

Gardeners should not collect Ghost Pipes in the wild. We strongly encourage individuals to source their native plant material from a reputable nursery or seed vendor. To learn more about interesting species of plants native to Virginia, visit www.vnps.org for times and dates of programs and wildflower walks in your area, and for sources of nursery propagated plants.

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