



Flatrock Glades

Cedar Glade Plant Guide for Elementary Students



Cover and above image © Darel Hess

This flower guide was developed to assist elementary students as well as members of the general public to identify endemic and common plant species found in Flat Rock State Natural Area located in Rutherford County, Tennessee. Flowers are grouped by color for quick reference in the field.

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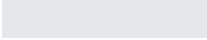


Bertha Chrietzberg, Tennessee Native Plant Society

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The limestone rocks are rich in fossils.

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Tennessee Milk Vetch and Pyne's Ground Plum © K Cleary Sadler



Introduction

by

Dr. Thomas Hemmerly

Cedar glades (also known as limestone glades) are open, grassy, rocky natural areas surrounded by eastern red cedar and other trees and shrubs. Such ecosystems occur primarily in middle Tennessee. Plants of cedar glades must be adapted to the thin soil covering the limestone rock. In the winter, the soil tends to be wet. But, in summer the hot temperatures cause the soil to dry rapidly. Thus, glade plants must have some of the same ways of surviving as do desert plants. Over thousands of years, glade plants have become arranged within glades according to soil depth. The zones generally recognized include:

- **Zone 1: bare rock, no soil**
- **Zone 2: gravelly glades, 0–2 in. soil depth**
- **Zone 3: grassy glades, 2–8 in. soil depth**
- **Zone 4: shrub zone, 8–12 in. soil depth**
- **Zone 5: cedar woods, oak-hickory forest, more than 12 in. soil depth**

Plants found in the more shallow soils get plenty of sun but may suffer from drying. Those living in the deeper soils have more moisture available but are usually located along the edge of the open glade and are shaded for part of the day. This means that there is no ideal zone for glade plants.

Glades change throughout the seasons. Various glade plants flower at different times, with the peak of flowering in April and early May.

Many glade plants are endemics—rare plants that are found only in cedar glades. Others are typical of glades but are also found in other places. All deserve our care and protection as they are national and global treasures.



© Darel Hess

Prickly-Pear Cactus

Opuntia humifusa

This perennial plant is in the **Cactus family**. It is the only native cactus in Tennessee. The flattened green stems (pads) are specialized for water storage and photosynthesis. The spines are really greatly reduced leaves. The plants can grow and spread out to be 2 to 3 feet wide in a cluster but the plant is only 8 inches tall. The fruits can be eaten or made into jelly or a cold drink. The flattened stems can be cooked and eaten as a vegetable. The plant produces large, yellow flowers with red centers from May to June. It is found in **Zones 2 and 3**.



© Darel Hess

Sunnybell Lily

Schoenolirion croceum

This perennial plant is in the **Lily family**. The flower has beautiful yellow petals and blueish green leaves that come from the base of the plant. It blooms from April to May. The leaves are 15–24 inches long. It is found in **Zones 2 and 3**, always near standing water. It is an endangered plant and protected by state law. Interstate construction in Tennessee was once rerouted around a population of rare sunnybells.

Hoary Puccoon

Lithospermum canescens

This plant is in the **Borage family**. It is a perennial with alternate leaves. It has up to five unbranched stems 4–16 inches long. The flowers are showy, orange to golden yellow, 0.5 inches wide or less, and five-lobed. Native Americans used the flowers as a source of yellow dye (“puccoon” is their word for dye). It flowers in April and May and is found in rocky open areas in **Zones 2 and 3**.



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Nashville Mustard

Leavenworthia stylosa

The Nashville Mustard is in the **Mustard family**. Also known as a glade cress, the fragrant flowers are on solitary stalks separate from the small, rounded, basal leaves; the white and yellow petals are notched. The plant grows to be 2–3 inches tall. It is found in **Zone 2** and is endemic to the glades in the Central Basin of Tennessee. It is an annual that flowers from February to May. Another form (variety) of this plant has all yellow flowers and is shown here; however, the yellow variety does not grow in the Flat Rock State Natural Area.



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Price's Wood Sorrel

Oxalis priceae

A member of the **Wood Sorrel family**, this perennial has leaves typical of the genus (they resemble showy clover leaves). The flowers are yellow with red spots at the base of the petals, and they are 1/2 inch wide. This plant is endemic to cedar glades and is found in **Zone 2**. The genus name indicates the presence of oxalic acid, which makes the shamrock-shaped leaves taste sour. This is one of five plants named after Sadie Price of Bowling Green, Kentucky. It flowers from April to May.



© Darel Hess

Shrubby St. John's Wort

Hypericum frondosum

This perennial plant is in the **St. John's Wort family**. It is a shrub with opposite leaves. It grows 3–4 feet in height. The flowers have five distinctive yellow petals and numerous stamens in the center. The leaves have characteristic tiny, translucent spots. This plant is in a group of plants with current medicinal applications as antidepressants. It flowers from July to August and is found in **Zone 4**.

Prairie Coneflower

Ratibida pinnata

This perennial plant is in the **Sunflower family**. It is 3 to 4 feet tall and very distinctive. The name “cone” refers to the center disk flowers, which change from green to dark brown. The 2-inch-long ray petals are very reflexed; the tips often bend back and touch the stem. The leaves are deeply dissected. It grows in **Zone 3** and flowers from May to August.



© Darel Hess

Missouri Evening Primrose

Oenothera macrocarpa

This showy, low-sprawling perennial plant is from the **Evening Primrose family**. It has flowers that may measure up to 5 inches across. Leaves are narrow and may grow up to 6 inches long; they often have a silvery look because of numerous tiny hairs. Blooms may be seen in late spring (May to June). Seed pods are up to 3 inches long with four wing-like parts. It is found in **Zone 2** of cedar glades. East of the Mississippi River, it is found only in Rutherford County, Tennessee.



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Tennessee Milk Vetch

Astragalus tennesseensis

This perennial plant is in the **Bean** or **Pea family**. It is a low-growing, plant that grows 4 to 16 inches tall. The compound leaves and flowers are covered with small, soft hairs. The yellowish-white flowers are pea-like and clustered at the end of the stalk; it blooms from April to May. The fruits are yellow, hairy pods the size of peanuts that lay on the ground. Young Tennessee Milk Vetch plants that lack fine hairs and flowers resemble Pyne's Ground Plum. It is found in **Zone 3**.



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Yellow Stargrass

Hypoxis hirsuta

Yellow Stargrass is a perennial plant that looks like grass when it is not in flower. It is in the **Amaryllis family**, and the plant grows from an onion-like structure called a corm. It is 3 to 6 inches tall, with hairy, grass-like leaves. The pretty star-shaped yellow flowers occur in clusters of three or more; there are three petals and three sepals, giving the flowers their star-like appearance. It occurs in **Zone 3** of the glades and flowers from April to May.

Blue-Eyed Grass

Sisyrinchium albidum

Blue-eyed grass is not a grass at all but is in the **Iris family**. This perennial plant grows 6 to 8 inches in height, and the leaves are flat, narrow, long blades. The small blue flowers have three petals and three sepals that are almost identical. The flowers are born near the top of the plant on slender stalks. It flowers from March to May and is found in **Zones 2 and 3**.



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Glade Savory

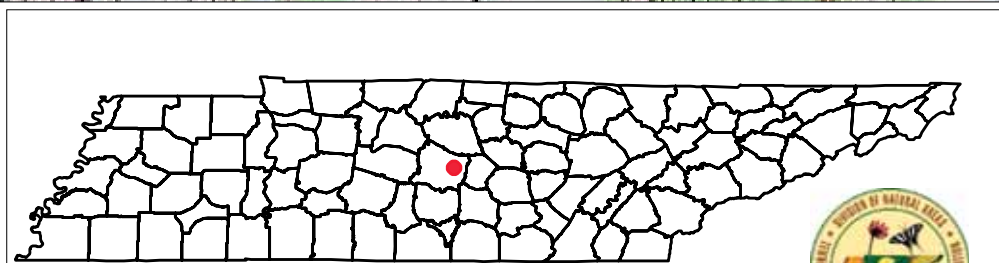
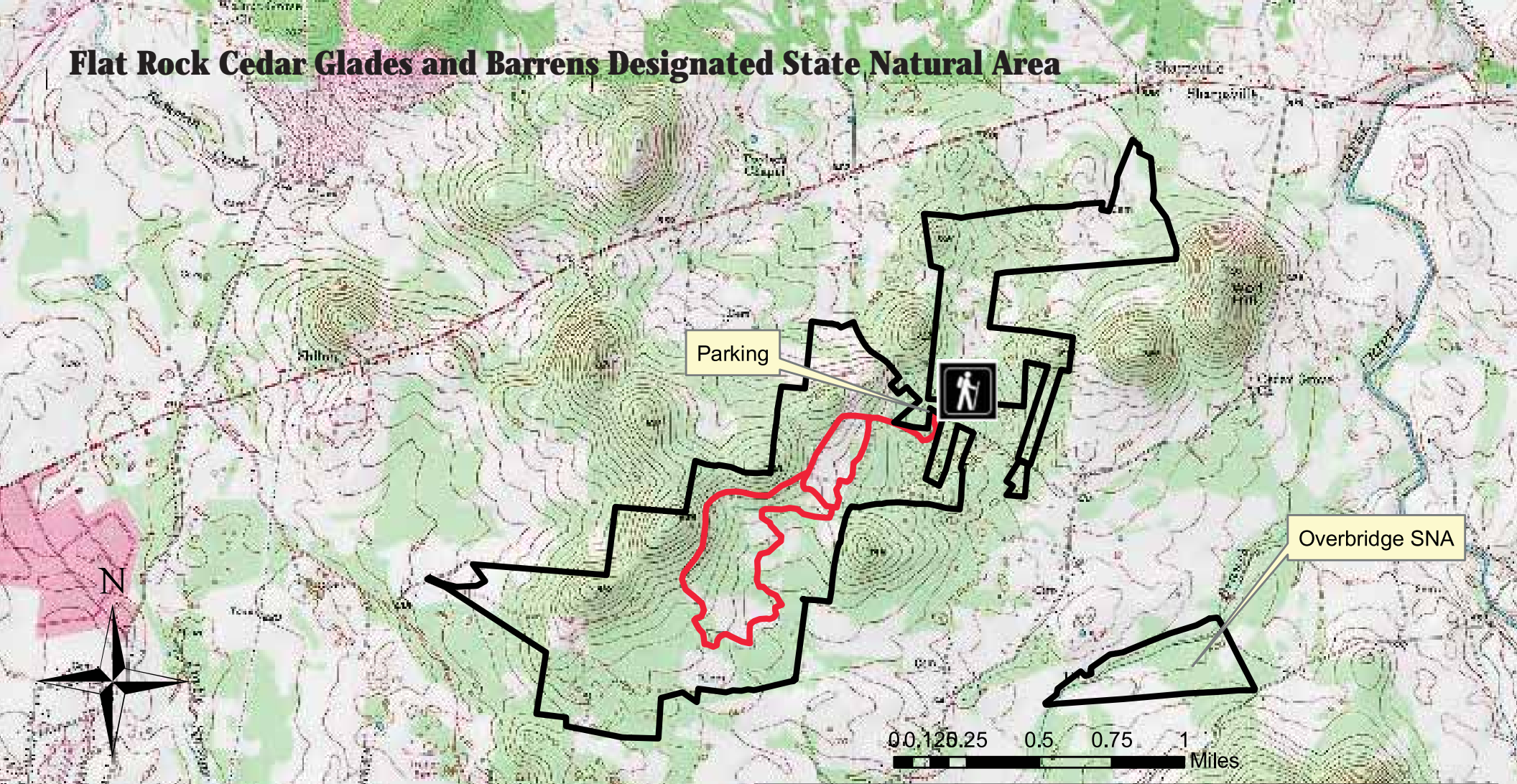
Satureja glabella

This perennial is a member of the **Mint family**. It is only 3 to 4 inches tall. The flower is small and delicate with a prominent calyx (tube) and dark purple spots on the corolla (petals). The leaves are smooth (*glabella* means smooth). It is found in limestone soils and is endemic to the Interior Low Plateau. It is found in **Zone 3** (grassy glades) and flowers from June to August. The well-known herb basil is in this same genus. A useful way to identify members of the Mint family is to check the shape of the stem, as most mint plants have a square stem.

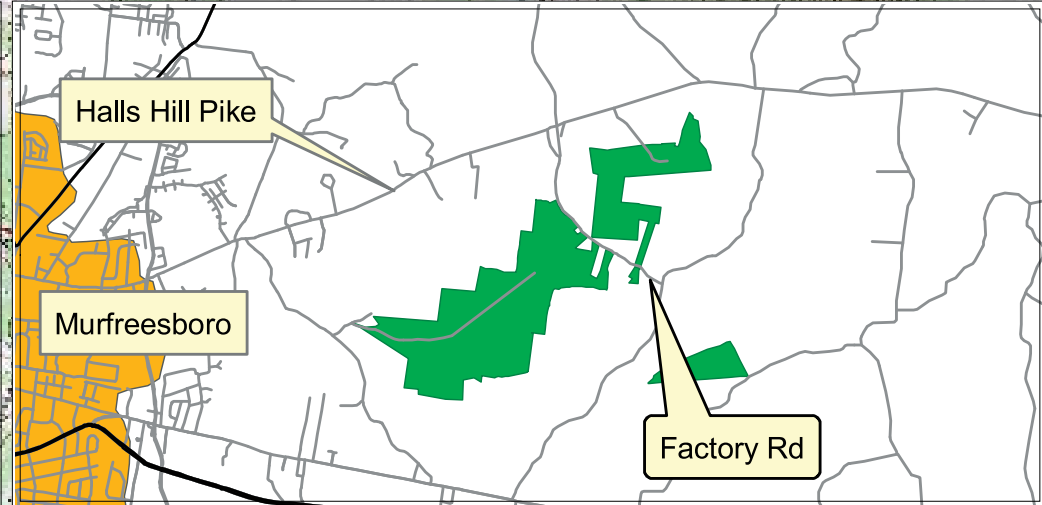


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Flat Rock Cedar Glades and Barrens Designated State Natural Area



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Gattinger's Lobelia

Lobelia gattingeri

This annual or biennial plant is in the **Bell flower family**. It is named in honor of pioneer Tennessee botanist Dr. Augustin Gattinger. This is a small plant (6 to 12 inches tall) with unbranched stems. The leaves clasp the base of the stem. The flowers are on the top portion of the stem and are attached to the stem. The flowers are blue-purple, about 1/2 inch long or less. This plant is endemic to the glades and is found in **Zone 2**. It blooms from May to June. Some species of *Lobelia* contain alkaloid substances and have been used medicinally, but some may be poisonous!



© David Duhl

Wild Petunia

Ruellia humilis

Wild Petunia is in the **Acanthus family**. It grows to be 6 to 12 inches tall. This perennial plant has opposite leaves and blue violet trumpet-like flowers on 1- to 2-foot trailing stalks. The flower has a long tube and five lobe-like petals. The flowers are fragrant, and the plant is common to glades. It is found in **Zones 2 and 3** and flowers from May to October.

Prairie Purple Coneflower

Echinacea simulata

This rare plant of the **Sunflower Family** is a cousin to the federally endangered Tennessee Coneflower and although it occurs in other states, in Tennessee it is found only in Rutherford County. This tall perennial plant (24 to 36 inches) has reflexed (drooping) pink to purple petals; it blooms from late May to July. Another name for this plant is the wavy-leaf purple coneflower. The tall stems and narrow leaves are rough and hairy. This plant is found in **Zone 3**.



© K Cleary Sadler

Tennessee Coneflower

Echinacea tennesseensis

This perennial plant is in the **Sunflower family**. Thought to be extinct in the 1960s, it was found in a small glade in Rutherford County, Tennessee in 1968. It is listed as a federally endangered species and is endemic to the glades. This plant is about 18 inches tall. The disk flowers in the center of each head are dark brown and spiky to the touch. The ray petals are purple-pink and narrow. The flower heads look like umbrellas that have been turned inside out; the ray petals are bent forward, just the opposite of other coneflowers. It flowers from May to October and is found in **Zone 3**. It does not grow in Flat Rock State Natural Area.



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Gattinger's Prairie Clover

Dalea gattingeri

This perennial plant, not a true clover, is in the **Bean or Pea family**. It is a low-growing plant with 5 to 7 leaflets which are fine, dense, and very pleasantly aromatic when crushed. The elongated rose-purple flowers are on wiry, reddish stems. The plant is found in **Zones 2 and 3**. This is often a dominant ground cover and is endemic to the glades. It flowers from May to June. True clovers have a symbiotic relationship with certain soil bacteria; they have small bumps on their roots that contain these soil bacteria that take nitrogen gas from the air and convert it to a form plants can use to grow.



© Dennis Horn

Lyreleaf Sage

Salvia lyrata

This perennial is a member of the **Mint family**. It grows to be 12 to 18 inches tall and has leaves that grow from the base of the plant. The lobed leaves are shaped like a lyre, an ancient stringed instrument. The tubular flowers range in color from pale blue to lavender and radiate from the top of a central stalk. It flowers from April to June. It is a common plant in fields and clearings; even though it is a native species, it is invasive in open habitats. It is found in **Zones 3 and 4**. Another common name for this plant is Cancerweed because it was made into an ointment that was believed to cure warts and cancer.

Nashville Breadroot

Pediomelum subacaule

This perennial plant is in the **Bean** or **Pea family**. This showy wild-flower is about 6 inches tall and is easily identified by its palmately compound leaves (think of the palm of your hand) and dense spectacular cluster of purplish-blue flowers. Endemic to the glades, it is found in **Zone 3**. It is called Breadroot because it has a large tuber at the end of a thin root which is very starchy and may have been used by Native Americans for food. It flowers from April to May.



© Darel Hess

Pyne's Ground Plum

Astragalus bibullatus

Pyne's Ground Plum is in the **Bean** or **Pea family**. It grows very close to the ground and is only about 3 inches tall. The stems (3 to 6 inches) have smooth, compound leaves. The flowers look like tiny pea flowers and are purple-blue in color. The fruit is a red, fleshy pod. Protected by law, the plant is endemic to Rutherford County, Tennessee. First collected in 1881 near LaVergne, the species was rediscovered and named as a new species in the early 1980s by a local botanist, Milo Pyne. It blooms from April to May and is found in **Zones 3 or 4**.



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Shooting Star

Dodecatheon meadia

The shooting star is a perennial plant in the **Primrose family**. The unusual flowers look like rockets. Five petals are swept back and are usually white but are sometimes pink. The flowers are on a stalk 15–25 inches tall. Smooth, oval-shaped leaves form a rosette at the base of the flower stalk. This plant flowers from April to June. Some botanists recognize two ecotypes (ecological variants adapted to local conditions); one type occurs in full sun (**Zone 3**) and others in the shade of shrubs or trees (**Zones 4 and 5**).



© Steve Baskauf

Glade Larkspur

Delphinium carolinianum

This perennial plant is in the **Buttercup family**. The name Larkspur refers to the single spur formed by one of the five sepals (they resemble petals). The 3/4-inch flowers are usually offwhite or white with pink or mauve spurs and are clustered along the upper portion of the stem (stem length is 3 to 4 feet). The deeply dissected leaves are at the base of the stem. The plant is found in **Zones 2 and 3** and flowers from May to July.

Large Houstonia

Houstonia purpurea

This perennial plant is in the **Madder family**. Most members of this genus are tiny delicate wildflowers called Bluets. In contrast, this plant grows 6 to 12 inches in height. The tiny pinkish or pale violet flowers, 1/4 inch wide, are found in clusters above the thin, oblong-shaped leaves. It flowers from April to July. This plant is found in **Zones 2 or 3**.



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Glade Sandwort

Arenaria patula

Glade sandwort is in the **Pink family**. This annual plant is also known as Wild Baby's Breath. A small annual 3 to 6 inches tall, it has thin, linear leaves. The white/purple petals are notched and about 1/2 inch long. The photo is a ground-level view of the plant. It is common in limestone soils and flowers from April to June in **Zone 2**.



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Fame Flower

Talinum calcaricum

Limestone Fame Flower is in the **Purslane family**. This miniature perennial (4 to 6 in. tall) is easily overlooked even though it may occur in large numbers. The curved, cylindrical leaves are only 3/4 inch long. The flowers, with bright purplish petals, are borne in small clusters at the top of slender stems and are only 1/2 inch wide. The flowers only open a few hours each afternoon. It was described as a new endemic species in 1967 and is found in **Zone 2**. It blooms from May to August.



© Steve Baskauf

Glade Stonecrop

Sedum pulchellum

Also known as Limestone Stonecrop, this annual plant is a member of the **Sedum family**. This is a low-growing plant (3 inches tall) with succulent leaves. The tiny white-to-pink flowers are arranged on 3 to 7 curved branches. The leaves are narrow (1/4 inch wide) and cylindrical. The plants form a mat on thin soil over limestone rock. It is found in **Zone 2** and flowers from May to June.

Eastern Redcedar

Juniperus virginiana

Actually a juniper, this tree is called “cedar” due to its similarity to the cedars of the Old World. This coniferous evergreen tree (up to 50 feet tall) belongs to the family *Cupressaceae* (or, commonly, **cypress**). It grows in the deep cracks in the limestone rock and commonly forms a ring around open cedar glades (**Zone 5**). Female trees bear small, bluish, berry-like cones. Because of their abundance, size, and aromatic properties, redcedar trees of middle Tennessee have been used for making pencils and other useful items.



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Adderstongue Fern

Ophioglossum engelmannii

Another name for this perennial plant is Limestone adderstongue. This plant is classified in the **Adder's-tongue family** of ferns. The name for this plant is derived from the spore-bearing stalk that resembles a snake's tongue. The plant produces a single leaf-like frond and spore-bearing stalk from April to May. Although it produces spores, it primarily reproduces by underground rhizomes. Researchers have determined that this group of ferns contains the largest chromosome count of any living organism (some species have more than 1,400). This plant can be found growing among mosses in **Zone 3** of the glades.



© Darel Hess



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Reindeer Moss

Cladonia sp.

Despite the name moss, this is actually a lichen. Lichens are nonflowering organisms composed of thread-like cells of a fungus with cells of photosynthetic algae scattered throughout. This species occurs as grayish-green mounds often 6–12 inches across. It is found in the shaded shrub **Zone 4** of cedar glades, often along with true mosses. Much farther north, in the tundra regions, this lichen is grazed by reindeer.



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Nostoc

Nostoc commune

This distinctive organism, previously considered to be a type of algae, is now recognized as a **cyanobacterium**. Cyanobacteria are bacteria with chlorophyll that are able to manufacture their own food by photosynthesis. This species also “fixes” nitrogen; it converts free nitrogen from the air into nitrates needed for plant growth. These organisms enrich glade soils when the pH is balanced. When wet, Nostoc is gelatin-like, but it becomes hard, dark, and crusty when dry. Witches butter is another name locally used for this organism. It is found in **Zones 1 and 2**.

Glossary of Terms

Alternate

leaves are attached at a single place on the stem

Annual

the plant's life cycle is completed in one year or one season.

Aromatic

plant parts (flowers, leaves, wood, etc.) have a pleasant smell

Basal

at the base of a plant structure

Biennial

plant that lives two growing seasons

Calyx

the green petals that cover the outside of the flower

Coniferous

trees that bear cones and never flowers

Corolla

the colored petals of the flower

Corm

a short, thick underground stem that stores food in some plants

Endangered or threatened

plants that are in danger of becoming extinct

Endemic

plants limited to a certain region

Extinct

no longer in existence

Palmately compound

leaves that emerge from a center point (like your fingers from the palm of your hand)

Perennial

the plant lives for 3 or more years

Photosynthesis

the process by which plants and some other organisms use the energy of sunlight to produce glucose

Ray petals

arranged like the spokes of a wheel

Reflexed

petals are curved backward

Rosette

a circular arrangement of leaves that branch out from a center stem

Translucent

light can shine through but objects cannot be seen

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