

# WHITE PINE

*(Pinus strobus)*



Frank Oliver photo

The cones of white pines are long and slender. The tree is one of the many stars of Indiana's winter scenery after a snow.

By Roger L. Hedge

One are the extensive forests of north-central and northeastern North America that once supported massive white pines. Some exceptional specimens reached 150 to 200 feet, with 5- to 7-foot diameters.

It's hard to imagine 250- to 300-year-old white pines today, but they were not uncommon in Colonial virgin forests. That's part of the reason the species is steeped in our country's history.

The tall, straight specimens of this largest of the native Eastern pines in New England were prized by Great Britain's Royal Navy for making ship masts dating back to the 17th century. The soft, straight-grained, lightweight wood was also used for houses, window sashes and furniture. Today, white pine is still used for making cabinets and other home interior work.

From the late 1800s to the early 1900s, Michigan was the center of the nation's largest lumber industry. Vast stands of stately white pine were

cleared to satisfy the nearly insatiable appetite for lumber of the first European settlers in the Great Lakes region.

Although not nearly so prominent on the Hoosier landscape farther north and east, white pine grew in northwest Indiana's dunes, savannas, swamps and even bogs. White pines still grow there today, scattered locally in remnant natural areas in the Indiana Dunes region.

A few other Hoosier northern counties also have them. Outliers may be seen farther south, along some of the larger stream corridors in west-central Indiana. There, overlooking high bluffs or above steep sandstone cliffs and canyons that provide a cool microclimate, white pine occurs alongside a smattering of other Northern plants, including Eastern hemlock trees.

White pine and those other species are relicts of the last Ice Age. After the glacier's melting retreat, a cooler, moister climate prevailed, accommodating Northern plant species that still survive today in a much warmer climate. White

**State Range:** Widely planted as ornamental. Rare wild populations concentrated in northwest and west-central Indiana.

**National Distribution:** The bulk, east of Indiana, runs the length of the Appalachian Mountains to northern Georgia. Also occurs in most of Michigan, Wisconsin and northeastern Minnesota.

**Identification:** Indiana's only native pine with needles clustered in groups of five. Long, slender cones 5-8 inches long. Whorled branches—each whorl signifies a year's growth.

**Longevity:** Average of 200 years.

pine's tolerance of most soils, and its relatively fast, tall straight growth and soft blue-green needles make it a popular ornamental but using it as a lawn tree can provide challenges. Drought, air pollution, salt, insects and disease are some of the inherent problems white pine plantings face. But planting it at a proper site makes caring for it worth the effort.

Indiana's native white pines are in some of our state's most pristine and scenic areas, from the Lake Michigan dunes to west-central Indiana's Shades State Park, and Pine Hills and Portland Arch nature preserves.

White pine is a favorite Christmas tree because of its soft needles, straight trunk, and thick, full appearance. But a forewarning from the author's experience: The soft needles and pliable branches aren't well suited to heavy ornaments—but white pine is still his favorite. □

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# SWEET WHITE VIOLET

(*Viola blanda*)



Frank Oliver photo

Sweet white violet grows in Hoosier National Forest. The species is known for its tiny, attractive white flower that packs a fragrant, appealing smell.

By Andrew Reuter

Few flowers invoke the emergence of spring like violets.

A variety of similar violet species can be found throughout Indiana. Violets can be easily recognized and are often one of the most common wildflowers encountered in nature. But one miniscule violet species reaches out beyond mere attractive appearance into the pleasant-smelling category.

Also commonly known as redstem white violet (the preference of Charles C. Deam, our first State Forester), this plant is notable for its tiny and intensely fragrant flower.

Its irregular flower graces a single stalk. The three lower lips are adorned boldly with purple-brown veins—strongest on the lowest petal and less so on the two side petals. The top two petals are narrower than the bottom three, reflexed and curling backward like long beagle ears that have been flipped backward over a pup's head.

The shiny heart-shaped leaves are sparsely haired and cordate, helping to identify it from other similar species,

specifically small white violet (*V. macloskeyi*). Technically, sweet white violet leaves are basal clusters formed at rhizomatous nodes, and are often more pointed than those of small white violet but can be rounded and blunt, with a deeper sinus between the two rear lobes, which can overlap in younger leaves. For further identification, sweet white violet's leaf petioles and its leafless peduncle of the solitary flower are often tinged red, hence Deam's preferred common name.

The irregular flower is formed in prime pollination style. Like other violets, these minute, scented flowers house an extended nectar spur. The attractive colors strike a noticeable contrast between the white petal backdrop and the purple-brown lower-lipped veins, which serve as guiding lines on a landing strip, pointing pollinators toward the recessed corolla spur.

Violets are an important perennial food source for early emerging or arriving pollinators. These insects, such as bees, bee-flies and butterflies, require a long proboscis to

**Bloom Time:** April–May.

**State Range:** Scattered counties in the northern quarter and southern third.

**Flower Size:** ½ inch across.

**Habitat:** Rich woods and wet areas, in slightly acidic, high-humus, moisture-retentive soils.

reach the hidden nectar of violets, pushing by obstructing stamens, which brush the visiting pollinators with pollen to be transported to other violets far or near.

Blooming during potentially still-harsh weather conditions and at a critical low-energy reserve station in pollinators' life cycle, violets are vital as a nectar offering in the urban and suburban landscape.

Animals such as deer and box turtle also use violets as a direct food source. And violets are a host plant for most fritillary butterfly caterpillars. Resident and reproducing fritillary species, including the state-endangered regal fritillary, use violets as larval hosts.

This wee-little violet fills a specific natural role, serving up an aesthetic display and delightful aroma. And it's just what's needed on the herbivore and nectarivore menu for specific insects and animals in the greater Hoosier ecosystems. □

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# MOSQUITO FERN

(*Azolla caroliniana*)



Michael Homoya photo

At center, mosquito fern, the world's smallest fern, floats with duckweed at Twin Swamps Nature Preserve, a natural bald cypress swamp in Posey County.

By Michael Homoya

Most ferns in Indiana look like ferns—plants with lance-shaped leaf blades intricately divided into various lacy patterns.

But some true ferns don't give the impression of being ferns at all. Mosquito fern is a prime example. This nickel-sized, mossy-looking plant with extremely tiny leaves is generally considered the smallest fern in the world. If that's not unusual enough, it's also aquatic, living most of its life floating on the water's surface.

Despite its name, the plant doesn't look like a mosquito. Its name may come from the unverified claim that, in places where dense colonies cover the water surface, mosquito reproduction seems not to happen.

One of mosquito fern's distinctive features is the presence of cyanobacteria (i.e., blue-green "algae") in its leaves. These bacteria (*Anabaena azollae*) convert atmospheric nitrogen into a form (nitrate) that the fern can use as fertilizer. In this symbiotic relationship, the fern

also benefits the bacteria, providing them a protected environment within its leaves.

Mosquito ferns have high economic value around the world, particularly in Asia, where mosquito ferns float in paddies of rice and taro crops. When the ferns die and rot, or are plowed under, nutrients from their tissues are released and become available to the crop.

Like all ferns, mosquito ferns never possess flowers or seeds. Instead, they produce spores. These tiny dust-like packages disperse into the landscape and can develop into a special phase of a fern's life cycle called a gametophyte. A gametophyte is usually tiny and rarely seen. On it, sexual reproduction can occur to produce the fern growth with which even casual plant observers are more familiar, such as roots, stems and leaves.

But most mosquito fern reproduction takes place by fragmentation. In this process, pieces of the fern break from the parent plant and grow into a new one.

**State Range:** Found principally in southwestern counties.

**Habitat:** Calm water in forested and shrub swamps, ponds.

**Appearance:** About ½ inch across.

**State Status:** Rare.

This can happen innumerable times, leading to large, mat-forming colonies.

Such large colonies don't often form in Indiana. Mostly, scattered plants are found, usually among other floating aquatic plants such as duckweed and water meal. Fairly rare in Indiana, mosquito fern occurs primarily in its southwestern region. Nonetheless, the fern can show up in almost any Indiana body of water, perhaps having been transported by waterfowl. Outside of the southwestern counties, the ferns normally don't persist for long periods.

A reliable place to see mosquito fern is from the boardwalk at Twin Swamps Nature Preserve in Posey County. There, surrounded by magnificent native bald cypress trees, you can scan the water's surface in comfort.

And most of the time there'll be surprisingly few flying mosquitoes to bother you. □

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# SUNDEWS

(*Drosera*)



Frank Oliver photo

The sticky substance of this Lake County sundew plant traps an insect. Consuming insects provides the plant with nitrogen.

By Teresa Clark

Evolution has provided species with specific adaptations to survive in different ecosystems. These enable living organisms to occupy all areas of the earth and oceans that can support life.

The food chain you learned about in school is really a web of twists and turns. For example, the mosquito that lunched on your arm may become that evening's dinner for a bat, or it may provide nutrition for a plant.

But wait, you say. That is backward. Plants don't eat animals; animals eat plants (and other animals, too). Right?

In fact, there are carnivorous (meat-eating) plants outside of the Mario Brothers video game and the "Little Shop of Horrors" movie, right here in Indiana. Some ecosystems are so poor in available nutrition from the bottom up in the soil that some plant species have adapted to fill the available ecological niche by getting nitrogen from the top down—by consuming animals.

The plant genus *Drosera*, the

sundews, includes two species of carnivorous plants that live in northern Indiana's nutrient-poor bogs and fens. Spoon leaf sundew (*D. intermedia*), the less common of the two, is listed as state rare, but neither species is prolific due to many factors, including continued habitat loss. Distinguishing one species from the other is generally done by the shape of the leaf blade. The second species, round-leaved sundew (*D. rotundifolia*), has round leaf blades that can be green or red, while *D. intermedia*'s resemble the business end of a wooden spoon and are bright green in color. The leaf blades of both have gland-tipped hairs that have a sticky substance to attract and capture prey.

The hairs on all sundews exude a sticky polysaccharide (i.e., long-sugar molecules) to trap insects. The capture and subsequent consumption of prey can provide up to 50 percent of a sundew's nutrients, a proportion necessary due to the poor conditions

**State Range:** Approximately 13 counties in northern Indiana.

**Size:** 2 to 8 inches tall.

**Name Origin:** Greek *drosos*, meaning dew or dewdrop.

**Time to consume prey:** 15–45 minutes, but may take days for enzymes to break prey down.

in the sphagnum mats of the acid bogs and fens they inhabit.

The hairs' behavior and their response to prey has been long studied by scientists. Even Charles Darwin, in his 1897 book *Insectivorous Plants*, wrote about his experiments with different chemicals and tactile stimulation to induce contractions of the hairs. Recent research has also shown that the plant secretes different digestive enzymes in response to the structure and makeup of the prey.

While sundews are sometimes sold commercially, the best way to see them is in their natural habitat. You can do so best by participating in a guided hike, because their habitats can be destroyed without careful attention. Check out [calendar.dnr.IN.gov](http://calendar.dnr.IN.gov) during the summer for opportunities to attend such a hike to a northern Indiana bog. □

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# SWAMP MALLOW

*(Hibiscus moscheutos)*



John Maxwell photo

Swamp mallow blooms along a wetland edge at LaSalle Fish & Wildlife Area in Newton County during late August. The plant often blooms into fall.

By Thomas Swinford

**T**he swamp mallow is a showstopper. Its large and colorful flowers are tough to miss. And you'll find them atop a plant that can be taller than a human.

Identifying this statuesque showy perennial plant is nearly foolproof.

The blooms are 4–6 inches across with five petals. The flowers are strikingly colored. Most are pure white with an eye of crimson red, but bright pink and paler, rose-colored flowers are not uncommon across a colony.

Individual flowers last for only one day and are open primarily in the morning. But each plant produces many buds and may bloom continuously for a month.

Swamp mallow has found widespread acceptance in the nursery trade as a native plant for pollinator plantings and habitat restoration. While classified as a wetland plant, swamp mallow can tolerate seasonal changes in water levels. During the spring it may withstand extended periods of

flooding, yet later in summer be happy on a site that has gone mostly dry.

Its expansive range extends from Maine through the Great Lakes and along the southern coastal states west, to Texas. In our state, it may be most common in the northern counties. The plant is also abundant along the valleys of the Wabash and Ohio rivers, becoming common in the sloughs and swamps of southwest Indiana.

The plant's preferred habitats are open wetlands along the margins of ponds and marshes, or muddy areas along streams. Soils where it grows include poor clays, mucks and peats but it prefers rich wet or moist soils.

Overall, mallows are a successful and important family of plants found around the globe. Their distinct seed pods earn them the name "cheese-wheel" plants due to the wedges of seeds arranged in their round pod.

Mallow plants contain natural gums and mucilage that were once, but are no longer, used for making marshmallows. Many mallows are used as food and in

**State Range:** Scattered across Indiana.

**Habitat:** Open wetlands.

**Use:** Important for insect conservation.

beverages. Cotton is the only known poisonous member of the family. Hollyhocks, hibiscus, okra, and cocoa are other well-known family members.

Many species of wildlife use swamp mallow. Hummingbirds frequently visit its flowers. Native bumblebees and other long-tongued bees, including the rose mallow bee, pollinate it. The latter is a specialist that only visits swamp mallow, helping ensure its pollination.

Rose mallow is also the host plant for many caterpillars, including gray hairstreak, painted lady butterflies, skippers and several moths, including the io moth and bird-dropping moth.

While swamp mallow is tall and robust, it is herbaceous. Its show may stop when it dies in the fall, but it still serves a purpose—the stems provide overwintering shelter for beneficial insects, including solitary bees. □

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