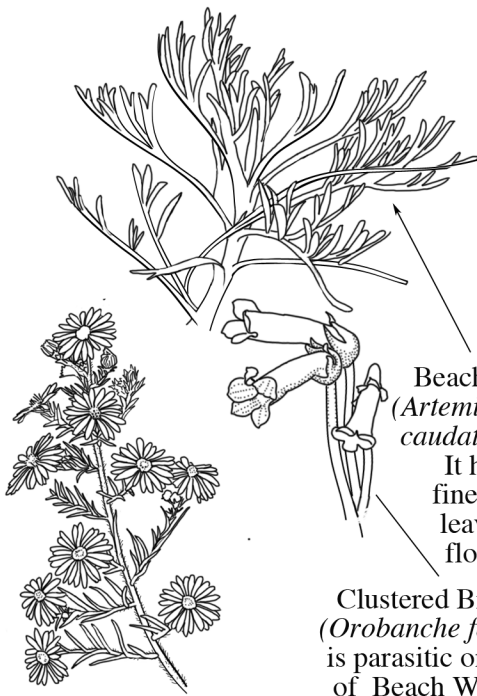
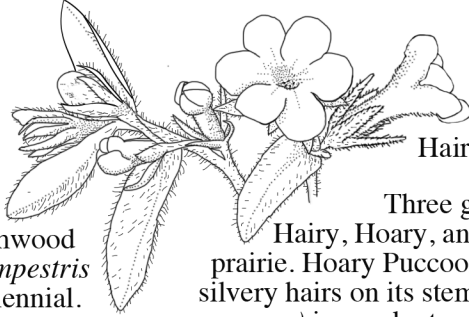


Dunesland Habitat Guide

Native Wildflowers of the Southern Lake Michigan Beaches and Dunes



Beach Wormwood (*Artemisia campestris caudata*) is biennial. It has silvery, finely dissected leaves and tall flower stems.

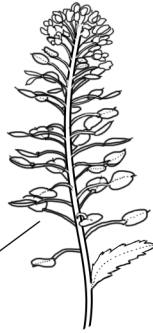


Hairy Hoary Fringed

Three golden puccoons – Hairy, Hoary, and Fringed – live in the sand prairie. Hoary Puccoon (*Lithospermum canescens*) has silvery hairs on its stems; Hairy Puccoon (*Lithospermum croceum*) is rough-stemmed and has hairy yellow flowers with calyx lobes almost as long as the corolla tube. Lemon-yellow Fringed Puccoon (*Lithospermum incisum*) has delicate fringes on its petals and a long corolla tube.

Hairy Aster (*Symphyotrichum pilosum*) has short hairs on its stems, and sometimes the leaves; its rarer cousin, Pringle's Aster (*Symphyotrichum pilosum pringlei*), has smooth leaves and stems.

Clustered Broomrape (*Orobanche fasciculata*) is parasitic on the roots of Beach Wormwood (*Artemisia campestris caudata*); Look for its white flowers in early May.



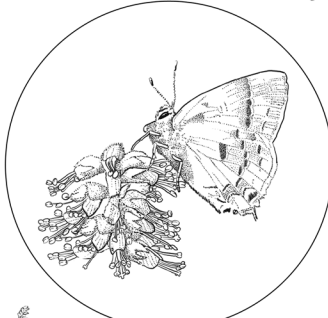
Common Pepper Cress (*Lepidium virginicum*) is a tiny, weedy native with a spicy taste. Notice the round, flat seed capsules and toothed leaves.



Did you know that the prickly Common Cocklebur (*Xanthium strumarium canadense*) inspired the invention of velcro?



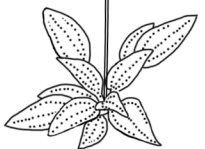
Starry False Solomon's Seal (*Smilacina stellata*) has a star-like perianth with six tepals and red, dark-lined fruits.



Lead Plant flower detail with Acadian Hairstreak butterfly (*Satyrrium acadium*)

Horse Mint (*Monarda punctata*) has tiered, silvery 'parasols.' Pollinators love it.

Notice the tiny paired leaves midway on the stem of Western Sunflower?

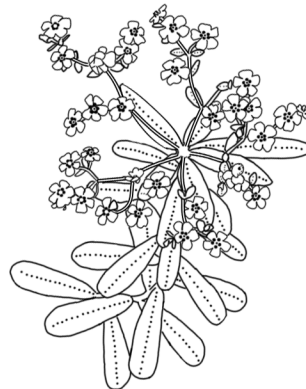


Western Sunflower (*Helianthus occidentalis*) has yellow flowers.

When walking through a prairie full of Common Mountain Mint (*Pycnanthemum virginianum*), look for its small, fragrant leaves and tall square stems, pubescent on the angle (which is one way to tell it from the smooth-stemmed Slender Mountain Mint (*Pycnanthemum tenuifolium*)).



Lead Plant (*Amorpha canescens*) has rich purple flowers beloved by butterflies and bees. Its leaves have a silvery appearance.



Flowering Spurge (*Euphorbia corollata*) is one of the longest-blooming plants in the dunesland. Look for the delicate clusters of tiny white flowers.

Grey Goldenrod (*Solidago decemflora*) has a gently drooping aspect to the panicle, as if nodding.

Dunesland Habitat Guide

Native Wildflowers of the Southern Lake Michigan Beaches and Dunes



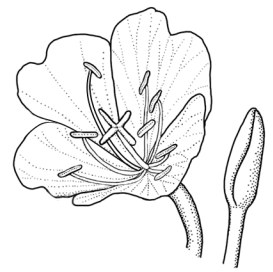
Tall Horseweed flowers (*Conyza canadensis*), which is in the daisy family, grows up to 5 feet tall and is common in disturbed areas.



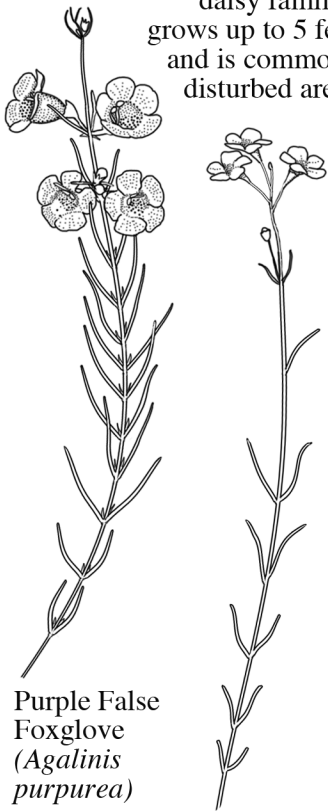
Smooth Grass-leaved Goldenrod (*Euthamia nuttallii*) is also called 'flat-topped goldenrod' to distinguish it from the more elongate panicles of other goldenrods here.



Common Blue Violet (*Viola sororia*) blooms spring into summer.



Look for the cross-shaped stigma in bright yellow Common Evening Primrose (*Oenothera biennis*).



Purple False Foxglove (*Agalinis purpurea*)

Pale False Foxglove (*Agalinis skinneriana*) has smaller flowers than *A. purpurea* and strongly angular stems.



Look for the soft woolly hairs and toothed edges on the leaves of Winged Pigweed (*Cycloloma atriplicifolium*). When fully grown it looks like a tumbleweed.



Winged Pigweed 'tumbleweed'

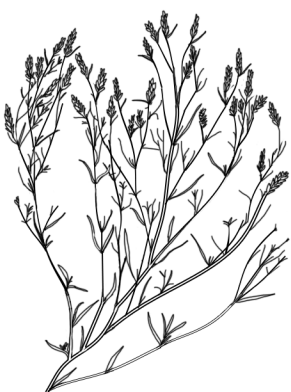


Lake Rocket (*Cakile lacustris*) is found on sandy lakeshores. The toothed leaves have a distinct succulent quality.



Common Milkweed seed pod

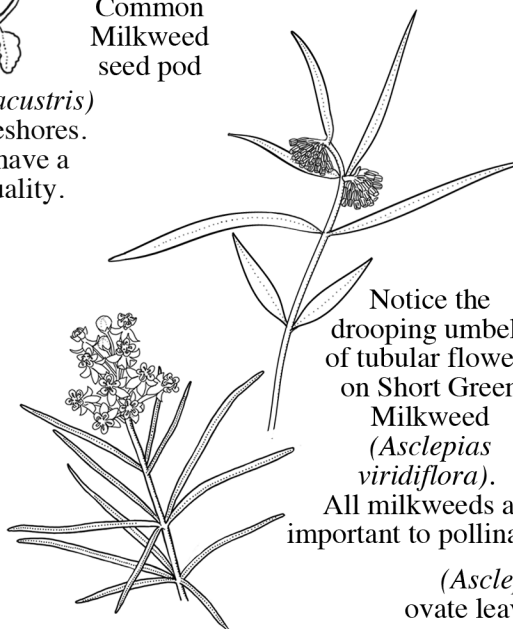
Milkweeds are host plants for the caterpillar of the magnificent Monarch butterfly (*Danaus plexippus*), whose annual migration spans over 2500 miles! Most species have milky juice in their stems and leaves.



American Bugseed (*Corispermum americanum*) is a sprawling species of the dunes. Look for the tiny winged seeds that give it its common name.



Seaside Spurge (*Chamaesyce polygonifolia*) is an open sand species that grows along the ground in a prostrate habit, forming irregularly-shaped mats. The leaf margins are smooth, not toothed.



Whorled Milkweed (*Asclepias verticillata*) may be seen in sandy, dry or dolomitic prairies. Its delicate white flowers are some of the smallest of the family in our area.

Notice the drooping umbels of tubular flowers on Short Green Milkweed (*Asclepias viridiflora*).

All milkweeds are important to pollinators!



Common Milkweed (*Asclepias syriaca*) has pink flowers, ovate leaves that can be wavy-margined or smooth, stiff or thin-textured, and opposite; the leaves are connected to the stems by short petioles. Its narrow-leaved relative, Butterfly Weed (*Asclepias tuberosa*), has orange or red-orange flowers with alternate leaves, but no milky sap.

Dunesland Habitat Guide

Native Wildflowers of the Southern Lake Michigan Beaches and Dunes



The stems of Marsh Blazing Star (*Liatris spicata*) do not have any hairs and the involucre bracts are appressed, so the base of the flower heads feels smooth.

Its look-alike cousin, Prairie Blazing Star (*Liatris pycnostachya*), has involucre bracts that flare out, making the heads look crowded and bristly.



Rough Blazing Star (*Liatris aspera* var. *intermedia*) has numerous purple flowers per head; the leaves are smooth but stems are rough to the touch.

Purple Prairie Clover (*Dalea purpurea*) is attractive to small and large native bees.



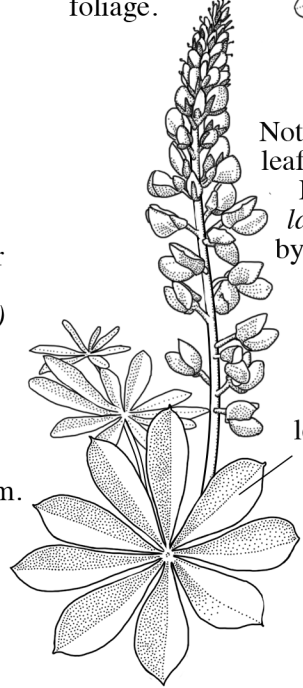
Small Fringed Gentian (*Gentianopsis virgata*) is occasional in calcareous fens and pannes. Its strikingly blue corolla sides are more fringed than the tips. The lower leaves are linear to lanceolate.



Silverweed (*Argentina anserina*), in the rose family, gets its common name from the silvery foliage.



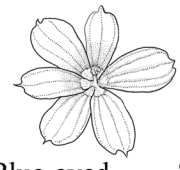
Cylindrical Blazing Star (*Liatris cylindracea*) has a few smooth, long heads with long pedicels atop each stem.



Wild Lupine (*Lupinus perennis*) is the host plant for the endangered Karner Blue Butterfly caterpillar.

Notice the sets of three leaflets on White Wild Indigo (*Baptisia lactea*), subtended by a pair of stipules.

Lupine's palmately compound leaves are very distinctive, in or out of bloom!



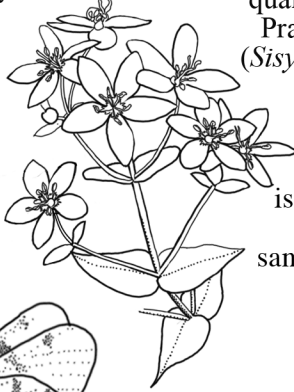
Blue-eyed Grass flower



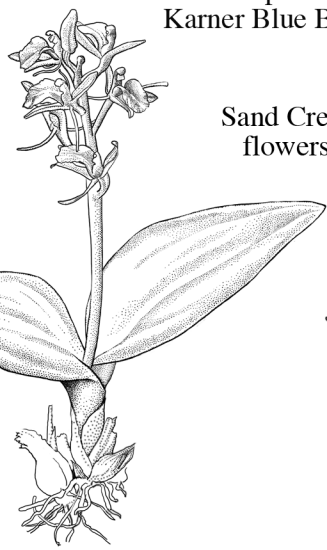
Stiff Aster is sometimes also known as Flat-topped Goldenrod (*Oligoneuron album*) even though it has white flowers.



Blue-eyed Grass (*Sisyrinchium albidum*) is an iris, not a grass, with two flowering spathes. It's an indicator species of high-quality habitats. Delicate Prairie Blue-eyed Grass (*Sisyrinchium campestre*) has just one spathe.

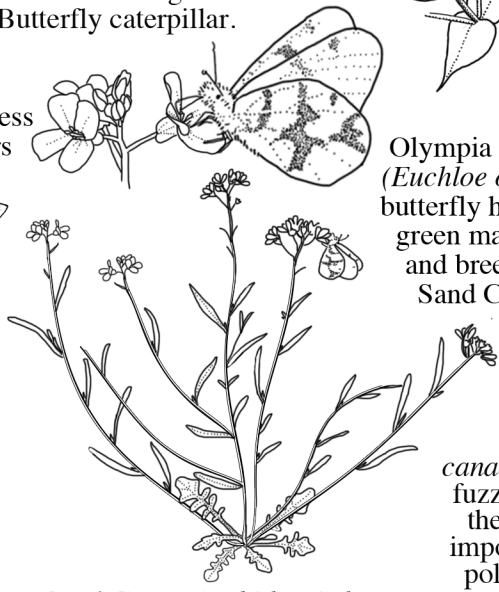


The rare Rose Pink (*Sabatia angularis*) is found on calcareous pond shores and in sandy or acidic prairies.



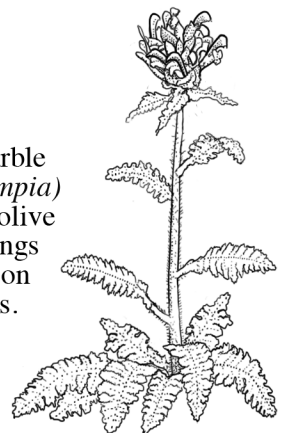
Green Twayblade (*Liparis loeselii*) is tiny and easy to miss in rich wetlands.

Sand Cress flowers



Sand Cress (*Arabidopsis lyrata*) is characteristic of sand dunes and beach ridges. Look for its four-petaled white flowers.

Olympia Marble (*Euchloe olympia*) butterfly has olive green markings and breeds on Sand Cress.



Wood Betony (*Pedicularis canadensis*) has alternate leaves, fuzzy stems, and blooms before the end of July. It is especially important as a vernal nectar and pollen source for overwintered queen bumblebees (*Bombus* spp.). As a hemiparasite, it takes some nourishment from the roots of other plants.

Dunesland Habitat Guide

Native Wildflowers of the Southern Lake Michigan Beaches and Dunes

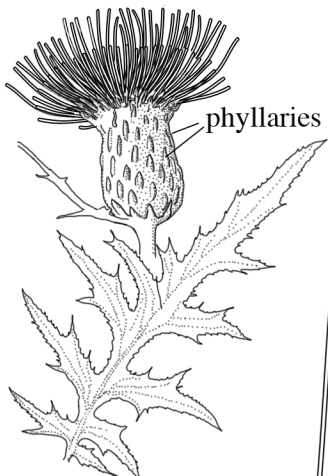


False Asphodel (*Triantha glutinosa*) has very sticky stems, delicate white flowers, and spectacular red fruit in the fall. It is a rare species of high-quality pannes and swales.



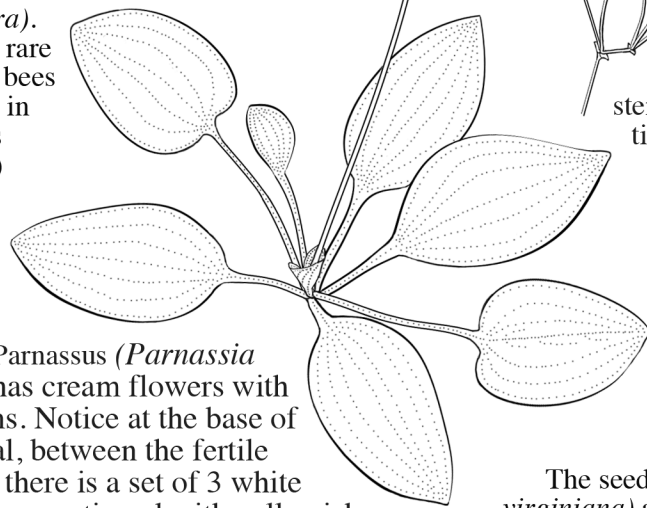
Triantha fruit

Look for yellow flowers in clusters of four in the delicate, narrow-leaved, Whorled Loosestrife (*Lysimachia quadriflora*). (The very rare *Macropis* bees specialize in this genus of plants.)



Swamp Thistle (*Cirsium muticum*) can be distinguished from non-native thistles by its soft, not spiny, phyllaries.

Grass of Parnassus (*Parnassia glauca*) has cream flowers with dark veins. Notice at the base of each petal, between the fertile stamens, there is a set of 3 white sterile stamens tipped with yellowish glands. The flowers produce abundant nectar.



Calamintha arkansana flower



Robin's Plantain (*Erigeron pulchellus*) has white, pink, pale blue or purple flowers, leaves that clasp the stem, and flowers that are over 2.5 cm in diameter.



Low Calamint (*Calamintha arkansana*) has a pleasant minty fragrance. Look for it in remnant wet areas.

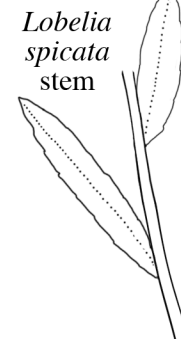
Stiff Sandwort (*Minuartia michauxii*) holds clouds of tiny white flowers on tall slender stems above a low tight cushion of tiny, wiry stems and branches. It's closely related to garden pinks.



The seeds of Wild Strawberry (*Fragaria virginiana*) are achenes; the entire fruit is called an 'accessory fruit' because not all of the flesh comes from the developed ovary.



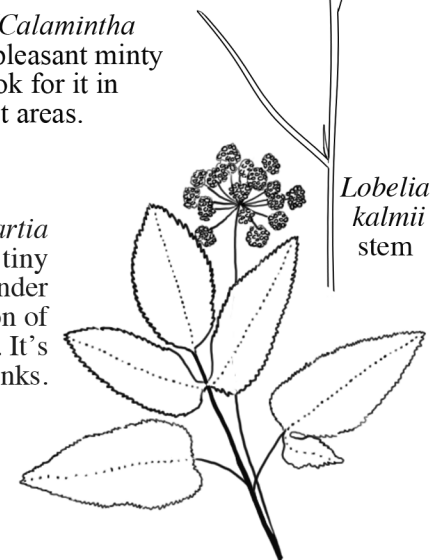
Lobelia spicata flowers



Lobelia spicata stem

Pale Spiked Lobelia (*Lobelia spicata*) has a raceme of light blue flowers atop stems of narrow alternate leaves.

The leaves of the more uncommon Kalm's Lobelia (*Lobelia kalmii*) are less than 3mm wide, narrower than all other local lobelias. It usually has fewer, larger, and more widely-spaced blue flowers on each spike.



Lobelia kalmii stem

Notice the finely-toothed leaflets and compact yellow umbels of moisture-loving Golden Alexanders (*Zizia aurea*). Many species of insects use this plant for food.

Dunesland Habitat Guide

Native Grasses of the Southern Lake Michigan Beaches and Dunes

Indian Grass (*Sorghastrum nutans*) is a common bunch grass with a long, stiff ligule where the leaf blade meets the sheath.

Blue Joint Grass (*Calamagrostis canadensis*) can be hard to tell from non-native invasive **Reed Canary Grass** vegetatively because both have papery ligules. Check the width of the leaves: *Calamagrostis* is under 1 cm. wide while **Reed Canary** is wider.

Switch Grass (*Panicum virgatum*) is another common grass of the dunes. "Turkey Foot" is another common name for

Big Bluestem (*Andropogon gerardii*), here shown with **Henslow's Sparrow** (*Ammodramus henslowii*).

Sand Dropseed fertile floret (1 mm scale bar)
hairy leaf base

Sand Dropseed (*Sporobolus cryptandrus*) has a wide, delicate panicle; notice how hairy it is at the base of the leaf blade?

Fluffy, twisty seed heads of **Little Bluestem** (*Schizachyrium scoparium*) look as if they are dancing along the culm! It's characteristic of the foredunes and sand prairie, forming a zone behind *Ammophila*, *Triplasis*, and *Calamovilfa*. It often grows with *Calamovilfa* in the dunes.

Common Sandbur spikelet

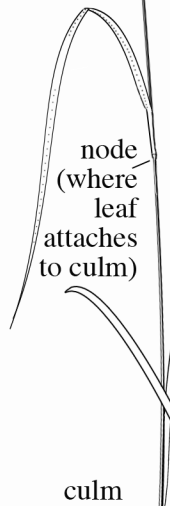
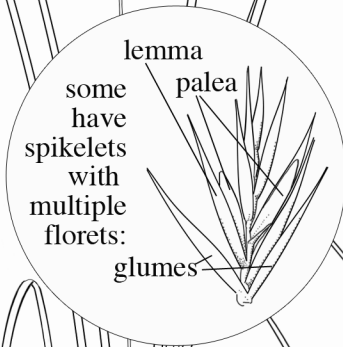
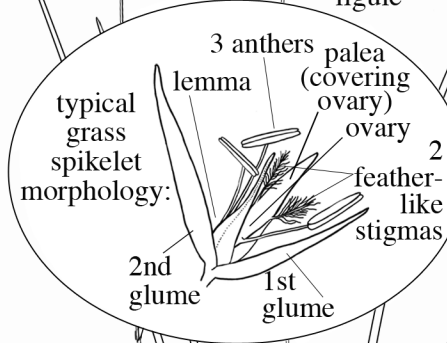
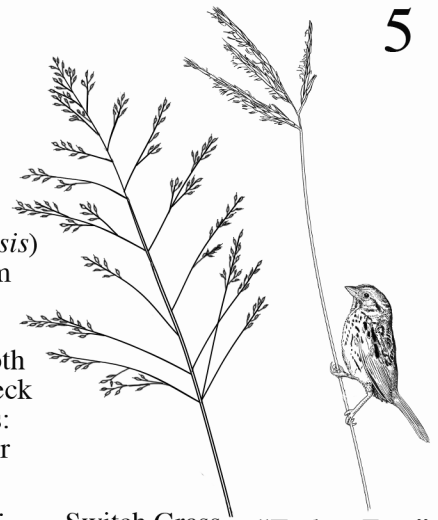
June Grass in seed

June Grass (*Koeleria macrantha*)

sometimes grows in small patches along the dunes. Notice the white plumes in flower? Its dense, golden seedheads are among the loveliest of our native grasses.

Watch out for the sharp tips on hardy native **Common Sandbur** (*Cenchrus longispinus*).

Few-flowered Panic Grass (*Dichanthelium oligosanthes*) is occasional in the dunes.



The deep roots of **Sand Reed** (*Calamovilfa longifolia* var. *magna*) help grab onto the sand so that dunes may form.

Marram Grass (*Ammophila breviligulata*) is one of the first plants to colonize and stabilize the dunes. Compare its long, narrow seed head and basal leaves with the wide-open seed head of Sand Reed, which has shorter leaves along the stem.

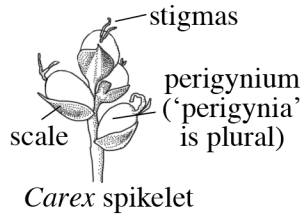
Purple Sand Grass spikelet

Purple Sand Grass (*Triplasis purpurea*) has purplish stems early in the season and purple flowers. A relatively short grass, its runners hug the sand.

June Grass in flower

Dunesland Habitat Guide

Native Sedges and Rushes of the Southern Lake Michigan Beaches and Dunes



Carex spikelet

Golden Sedge (*Carex aurea*) lives up to its name, with its tiny golden perigynia. Note the pointed scales.

staminate (male-flowered) spike with pistillate flower at tip

Mealy Golden Sedge (*Carex garberi*) retains its tightly-clustered white perigynia in maturity.

The perigynia in *C. aurea* turn orange and are more spaced apart.

male (staminate) spike

three female (pistillate) spikes

Small-seeded Fox Sedge (*Carex annectens* var. *xanthocarpa*) has basal leaves shorter than the flowering spike. Compare to *C. vulpinoidea* which has longer leaves. The Latin variety name means 'yellow-fruited.'

Plains Oval Sedge (*Carex brevior*) is widely distributed and can be found in dry sandy soils.

Early Fen Sedge (*Carex crawei*) has three pistillate spikes, with the lowermost emerging from a sheath near the base. Other similar ones have spikes emerging only from the upper sheaths.

This detail of Green Yellow Sedge (*Carex viridula*) shows how sometimes a pistillate (female) flower will show up atop the terminal male spike.

typical rush spikelets; note overlapping scales

Look for the strong contrast between the green perigynia and the maroon, almost black, scales in Dark-scaled Sedge (*Carex buxbaumii*).

Richardson's Sedge (*Carex richardsonii*) has distinct purple-brown perigynia and stem bases. Look for the purple sheaths just underneath each spike.

Twig Rush (*Cladium mariscoides*) The midnerve of their leaves are unique in that they appear impressed within a channel.

Chair-maker's Rush (*Schoenoplectus pungens*) has long triangular stems and is still used to weave chair seats. The inflorescence emerges from the leaf axil, with the leaf appearing as a continuation of the culm.

Hair Beak Rush (*Rhynchospora capillacea*), by contrast, has almost threadlike leaves.

Lakeshore Rush (*Juncus balticus*) is common in swales. Rush flowers often resemble tiny lilies!

Umbrella Sedge (*Carex umbellata*) grows on the leeward side of foredunes. Look for its odd habit of having flowering spikes both near the top and in numerous clusters at the base of the plant.

Dunesland Habitat Guide

Native Woody Plants of the
Southern Lake Michigan Beaches and Dunes



The rare Dwarf Birch (*Betula pumila*) has leathery, toothed leaves. Look for catkins at the tips of the branches in summer.



The delicate Sand Cherry (*Prunus pumila*) has white flowers and narrower leaves than most in its genus.



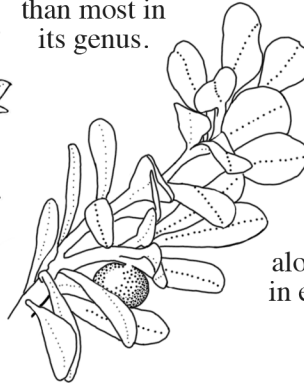
Black Oak (*Quercus velutina*) has velvety bud scales and tangled hairs on the back side of the leaf veins. It lives in sandy soils and supports many species.

Two different species of New Jersey Tea (*Ceanothus americanus* and *Ceanothus herbaceus*) live in our duneslands. The rarer *C. herbaceus* can be distinguished by leaves less than 2 cm. wide. (The other one's leaves are wider.) The fragrant white flowers are a magnet for many pollinators.

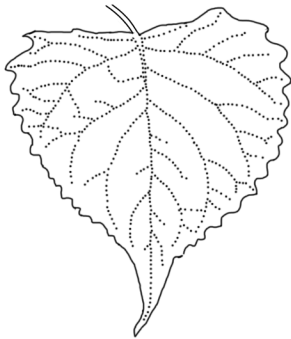
Bearberry flowers:



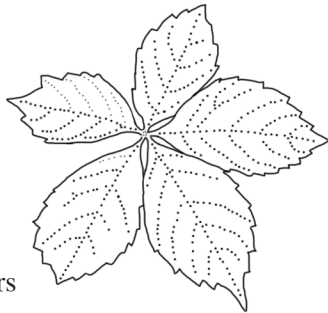
Bearberry (*Arctostaphylos uva-ursi* var. *coactilis*) is in the same family as blueberries; look for its drooping, bell-like white flowers, followed by dark red berries amid its evergreen leaves. It is the host plant for the Hoary Elfyn Butterfly.



Prickly Pasture Rose (*Rosa carolina* subsp. *subserrulata*) has prickles along the stems and pink flowers in early summer. The uncommon Pasture Rose (*Rosa carolina*) lacks prickles. Both their fruit nourish birds and mammals.



Eastern Cottonwood (*Populus deltoides*) trees are often some of the first woody colonizers of the dunes.

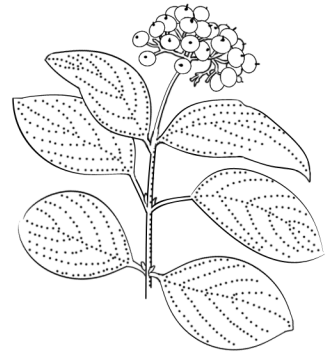


Virginia Creeper (*Parthenocissus quinquefolia*) has five leaflets, all joining in the center; the margins of the leaflets are toothed.

Shrubby Cinquefoil (*Dasiphora fruticosa*) has velvety pinnate leaflets, yellow flowers.



Shrubby Cinquefoil is host to many insect species!



Red Sticks (*Cornus sericea*) can be recognized by opposite leaves and deep red stems. Its white berries are beloved by birds.



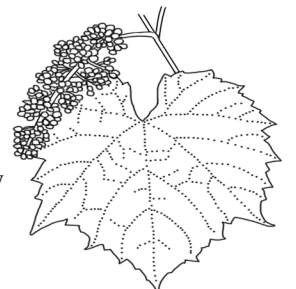
Common Juniper needle cluster:

Sprawling, evergreen Trailing Juniper (*Juniperus horizontalis*), with scale-like leaves and silvery-blue, berry-like cones, hugs the dunes, provides refuge for insects and small mammals, and prevents wind erosion. One plant can cover a very large area, so be careful when surveying. Its bushier cousin, Common Juniper (*Juniperus communis*), has widely-spreading, needle-like leaves.



Western Poison Ivy (*Toxicodendron rydbergii*) You've heard the rhyme, "Leaves of Three, Leave it Be?"

That's so you learn to respect the power of poison ivy to protect itself. Its oil, urushiol, is very irritating to the skin and should be washed off with soap and water quickly if you suspect you've touched it. (Some people are not allergic.) Look for the three leaflets, with teeth on the outside lobes, and a long stalk connecting the bottom two leaflets to the top one. Its woodland cousin, *Toxicodendron radicans*, has aerial roots that allows it to climb trees.



Wild Grape (*Vitis riparia*) provides nutritious food for migrating birds.

Dunesland Habitat Guide

Native Woody Plants of the Southern Lake Michigan Beaches and Dunes

Peach-leaved Willow (*Salix amygdaloides*) has dull leaves, with pale undersides. It is a tree with a central leader. Like *Salix lucida*, it has lanceolate leaves with finely-toothed margins, but *Salix lucida* has specialized glands on the petioles and the undersides of the leaves are green.

Shining Willow (*Salix lucida*) lives up to its name -- all parts are shiny!

Blue-leaved Willow (*Salix myricoides*) resembles *S. discolor*, but the leaf margins are more regular and finely serrate.

Black Willow (*Salix nigra*) is a tree, with a strong central leader, common on sandy pond shores. Its leaves are finely serrate like *S. amygdaloides* but the leaves are much narrower and shorter-petiolate. Look for leafy stipules and green undersides.

Jack Pine male cone

Once common, large stands of Jack Pine (*Pinus banksiana*), are needed for the rare Kirtland's Warbler's habitat.

Salix lucida mature leaf

Prairie Willow (*Salix humilis*): margins of leaves curl under, and are scalloped, not toothed.

female willow catkin

Pussy Willow (*Salix discolor*) leaves are broad, with irregularly-serrate to entire margins.

Ninebark (*Physocarpus opulifolius*) is a shrub that has white flowers with many stamens, characteristically exfoliating bark, and lobed leaves.

female willow flower with pappus

male willow flowers, (each with a scale below)

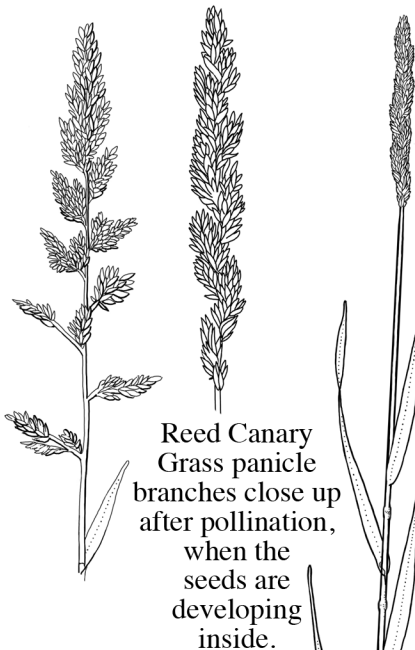
The leaf blades of rare, short Hoary Willow (*Salix candida*) have dark green upper surfaces and are white beneath with minute, tangled, matted hairs.

Sandbar Willow (*Salix interior*), a clonal shrub, has very narrow, irregularly-toothed leaves. It is native but spreads too quickly.

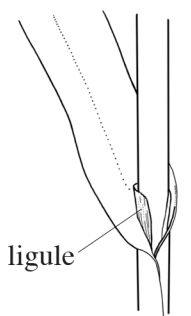
Dune Willow (*Salix syrticola*) is characteristic of dry sand dunes and the edges of marly pannes. It has fine silvery hairs on its leaves and branchlets.

Many people are surprised to learn that Illinois is home to the native Eastern Prickly Pear cactus (*Opuntia cespitosa*).

Invasive Plants of the Southern Lake Michigan Beaches and Dunes



Reed Canary Grass panicle branches close up after pollination, when the seeds are developing inside.



ligule

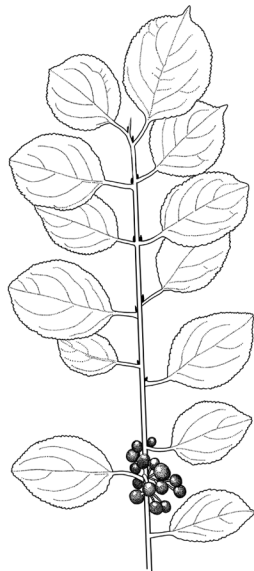
Reed Canary Grass (*Phalaris arundinacea*) spreads quickly by seeds and rhizomes. Look for a long, translucent ligule where the leaf blade joins the leaf sheath.



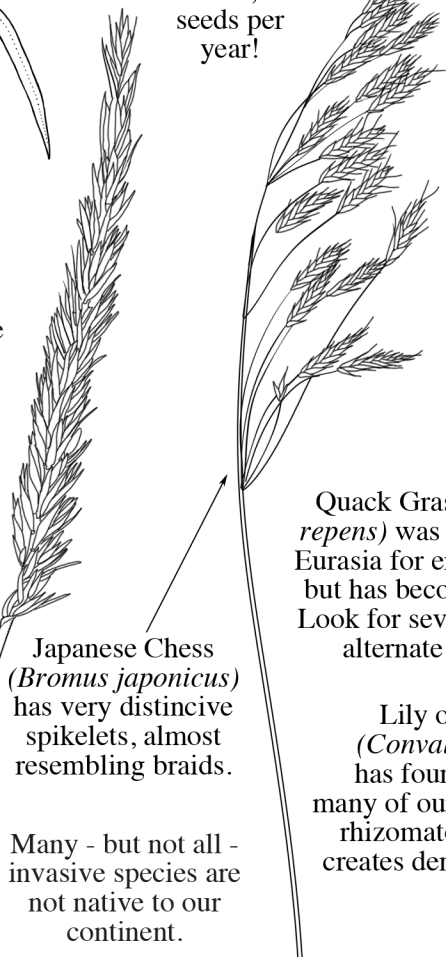
honeysuckle flower pair

Another woody invasive is Showy Fly Honeysuckle (*Lonicera X bella*) which is distinguished by red berries in late summer. Smooth leaf margins and light grey stems distinguish it from Common Buckthorn. Its opposite leaves distinguish it from Glossy Buckthorn.

Light blue-green Lyme Grass (*Leymus arenarius*) is nowhere near as able as *Ammophila* to retard erosion of the dunes, even though it was planted for that purpose.



Common Buckthorn (*Rhamnus cathartica*) is one of our more prolific woody invasives. See its sub-opposite leaves? (Some are alternate, some almost opposite.) With three or four seeds in each berry, one large fruiting shrub can produce over 15,000 seeds per year!



Japanese Chess (*Bromus japonicus*) has very distinctive spikelets, almost resembling braids.

Many - but not all - invasive species are not native to our continent.

Phragmites panicle

Don't confuse these invasives with the native American Reed (*Phragmites americanus*), which has a reddish tinge above the nodes on the culms (stems).

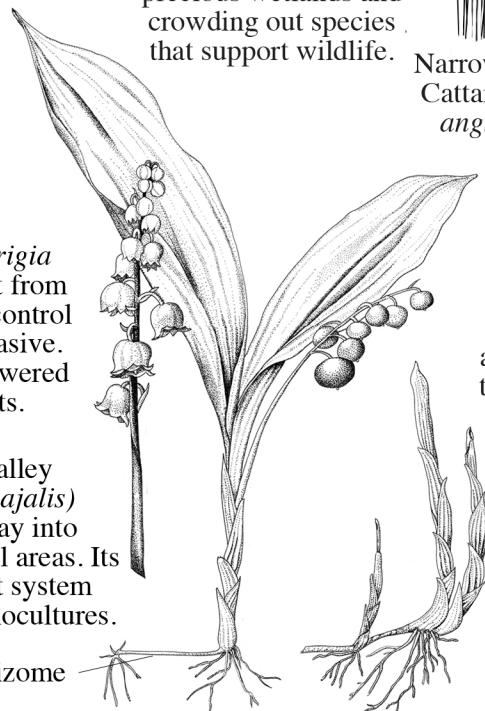


Common Reed (*Phragmites australis*) is taking over precious wetlands and crowding out species that support wildlife.

Quack Grass (*Elytrigia repens*) was brought from Eurasia for erosion control but has become invasive. Look for several-flowered alternate spikelets.

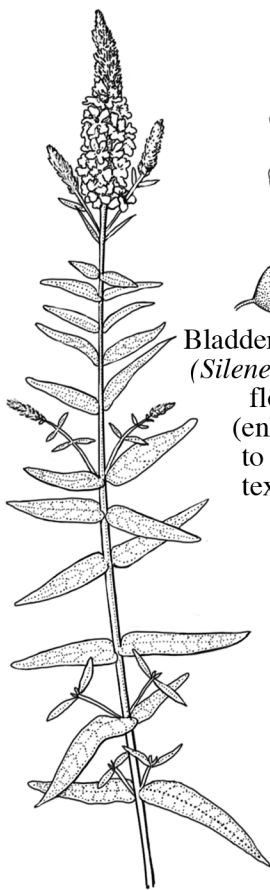
Lily of the Valley (*Convallaria majalis*) has found its way into many of our natural areas. Its rhizomatous root system creates dense monocultures.

rhizome

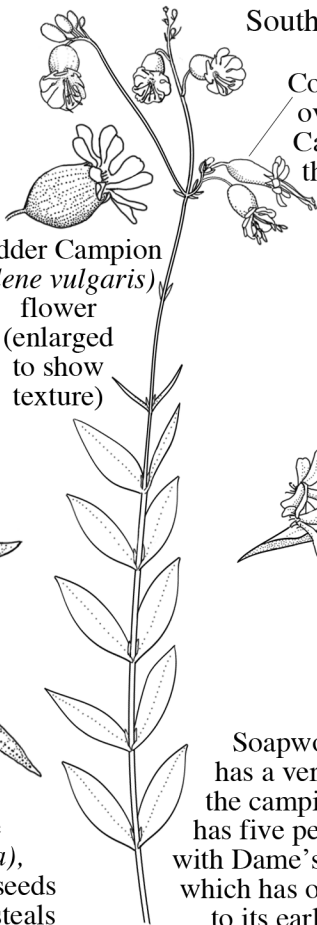


Narrow-leaved Cattail (*Typha angustifolia*) and its hybrid with *Typha latifolia*, *Typha X glauca*, are doing the same.

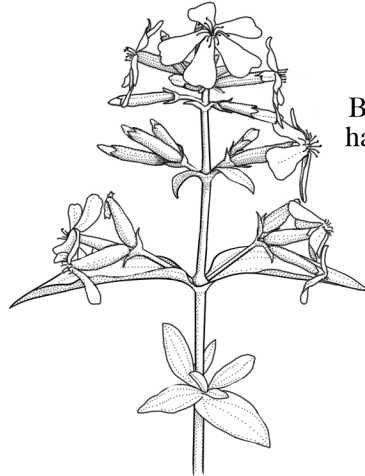
Invasive Plants of the Southern Lake Michigan Beaches and Dunes



Bladder Campion (*Silene vulgaris*) flower (enlarged to show texture)



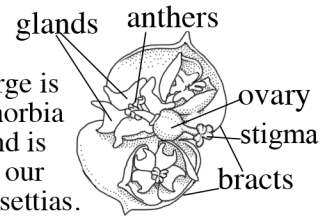
Compare the smooth, gently oval calyx tubes of Balkan Campion (*Silene csereii*) to the puffy, net-like ones of Bladder Campion (*Silene vulgaris*).



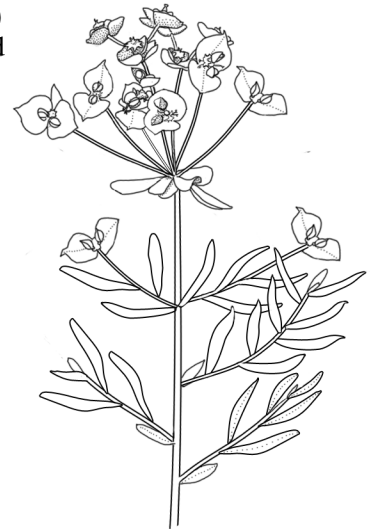
Bull Thistle (*Cirsium vulgare*) has spine-tipped phyllaries and green leaf undersides. The native *Cirsium discolor* can be distinguished by its white lower leaf surfaces.



Look closely at the complex Leafy Spurge flower structure:



Leafy Spurge is in the Euphorbia family, and is related to our holiday poinsettias.

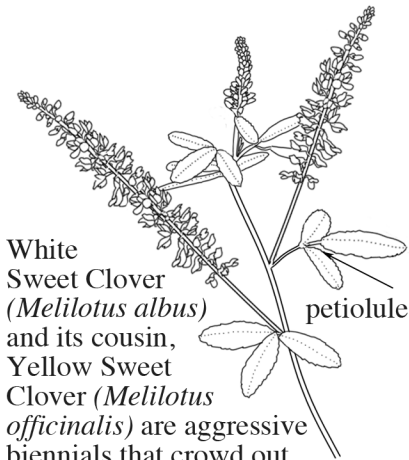


Leafy Spurge (*Euphorbia virgata*) is a very invasive hard-to-control species that spreads by seeds as well as by roots that can travel over 30' deep and wide. It is toxic to many animals and its sap can raise blisters.

Purple Loosestrife (*Lythrum salicaria*), while pretty, self-seeds prodigiously and steals valuable space from native wetland species.

Soapwort (*Saponaria officinalis*) has a very slender calyx tube, unlike the campions shown here. Although it has five petals, it is sometimes confused with Dame's Rocket (*Hesperis matronalis*), which has only four petals. Its name refers to its early use as a soap substitute. It produces underground runners which easily root when they're broken, making continued and careful followup necessary. Another of its common names is 'Bouncing Bet.'

The rhizomatous perennial, Field Thistle (*Cirsium arvense*) has weak spine-tipped phyllaries, clusters of purple flowers, smooth stems.



White Sweet Clover (*Melilotus albus*) and its cousin, Yellow Sweet Clover (*Melilotus officinalis*) are aggressive biennials that crowd out native species. Notice the long petiolule at the tip of the leaflet. (The clover, vetch, and birdsfoot trefoil here are all in the pea family. Look for trifoliate leaves and similarities in the flower shapes.)

The pink and white-flowered Crown Vetch (*Securigera varia*) was originally planted to control erosion but quickly became an invasive nightmare in natural areas while *not* doing the job it was planted to do!

The yellow-flowered Birdsfoot Trefoil (*Lotus corniculatus*) is frequent in disturbed ground. Look for the large pair of stipules at the base of the leaves.

Spotted Knapweed flower resembles Bachelors' Buttons but has purple flowers.

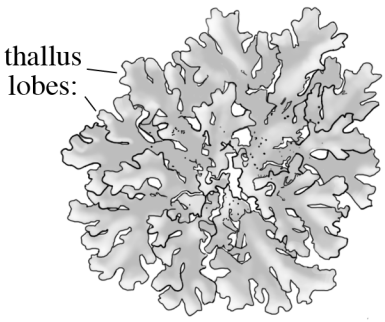


Spotted Knapweed rosette (*Centaurea stoebe* subsp. *micranthos*)



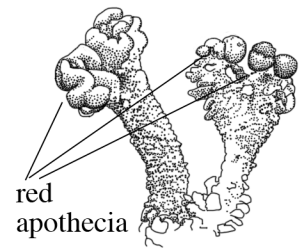
Garlic Mustard (*Alliaria petiolata*) has four-petaled white flowers and long pods that look like green 'candelabras' when in fruit.

Dunesland Habitat Guide



Lichens of the Southern Lake Michigan Beaches and Dunes

Lichens are not plants. They form unique dual organisms of a fungus growing symbiotically with an alga or a cyanobacterium as a crusty or branching structure on many different surfaces. The fungus "farms" the photosynthesizing alga for food while giving it a moist environment shielded from ultraviolet light. Hundreds of lichen species inhabit our region. Their beauty, and inspiring ability to live in places where little else can, make them a joy to study.

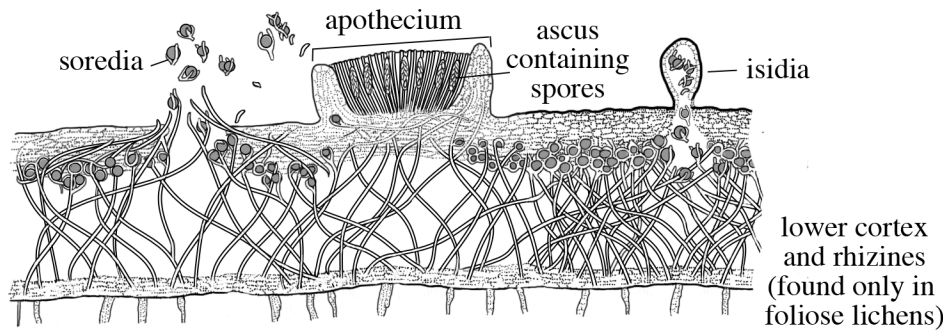


Fruticose lichens have complex, three-dimensional forms, such as these British Soldier Lichens and Sand Loving Iceland Lichen.

Foliose lichens form large, leafy patches, such as this silver-gray Hammered Shield Lichen.

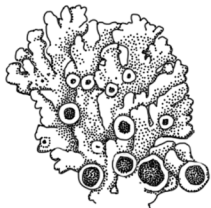
Hummingbirds and Blue-gray Gnatcatchers use the Hammered Shield Lichen (*Parmelia sulcata*) to camouflage and build their tiny nests. Hummingbirds interweave the lichen with spiderwebs. The entire nest stretches as the baby birds grow and need more room!

Lichen Anatomy (thallus cross-section):



The body of a lichen is called a **thallus**. Its upper cortex covers an **algal layer**, which is then supported by a layer of tangled fungal threads, called **medulla hyphae**. Foliose lichens also have a lower cortex of compressed fungal hyphae, called **rhizines** (fungal filaments) or a holdfast (a peg-like thallus extension), anchor the lichen to its substrate. Unlike roots, these structures are not channels for nourishment.

British Soldier Lichen (*Cladonia cristatella*) is so named from its round red "helmets," which are actually the apothecia. It's one of the easiest to notice! There are 14 species of *Cladonia* lichens recorded from Illinois Beach State Park. Some have brown, tan, or maroon apothecia.



Physcia stellaris



Physcia millegrana

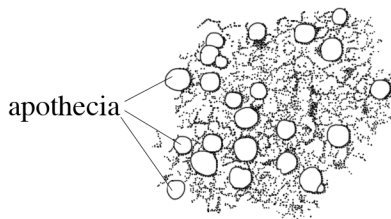
There are subtle differences between Star Rosette Lichen (*Physcia stellaris*), which has fairly smooth thallus lobes, and Mealy Rosette Lichen (*Physcia millegrana*), which has very pebbly ones. Notice their round black apothecia. *Physcia millegrana* is possibly our most common lichen as it's more tolerant of urban air pollution.

Another foliose lichen you may often see is the Candleflame Lichen (*Candelaria concolor*), which has a similar flat, leafy habit as *Parmelia*, but is bright yellow-orange and has a more ruffled appearance to the edges. Like *Physcia*, it is more pollution-tolerant than many other lichens,

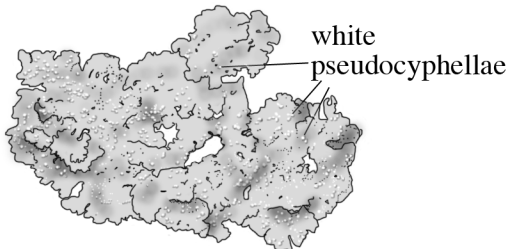


Sand Loving Iceland Lichen (*Cetraria arenaria*) is rare but distinctive. It is one of many Reindeer Lichens, so called because they use them for food.

Crustose lichens lack lobes and a lower cortex so they can adhere tightly on their substrate.



Frosted Comma Lichen (*Chrysothrix caesia*) may be found on smooth tree branches. The color of its violet-blue round apothecia is due to calcium oxalate crystals. Most crustose lichens cannot be accurately identified to species except through microscopic and/or chemical analysis.



Punctelia rudecta is a foliose lichen. Pseudocyphellae structures appear as tiny white pores on their upper cortex where the fungal hyphae underneath break through the surface. Their polka-dotted appearance distinguishes *Punctelia* from the *Parmelia* genus.

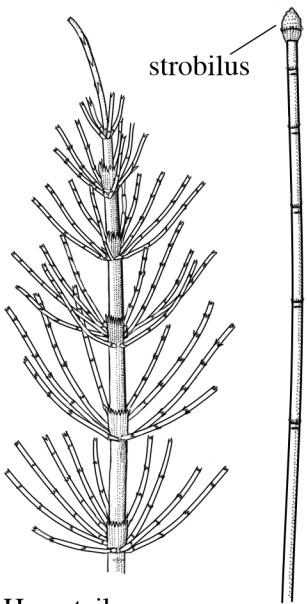
How Lichens Get Around:

Many lichens reproduce asexually by producing special fragmentation structures that package together algal cells and fungus strands. These are either powdery **soresia** (clusters of algal cells enclosed in fungal hyphae and dispersed by wind, insects, or other means) or tiny fingerlike **isidia**. Lichens also reproduce sexually by means of spores, produced in microscopic asci (singular: ascus) produced in **apothecia** (singular: **apothecium**).

Dunesland Habitat Guide

Cryptogams of the Southern Lake Michigan Beaches and Dunes

The non-seed plants that occur in Illinois are the ferns (including horsetails), lycopods (clubmosses, spikemosses, and quillworts), and bryophytes (mosses, liverworts and hornworts).



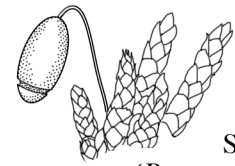
Tall Scouring Rush (*Equisetum hyemale*)
was used by early settlers to scour pots and pans. Ridges packed with silicon crystals give its stem strength and abrasive character. Horsetails (*Equisetum* species) like these were some of the earliest land plants. (AKA "Lego Fern" from its ability to come apart and be put back together!) They produce spores in pinecone-like "strobili" at the tips of some stems.

Horsetail (*Equisetum arvense*)
The pattern of spacing of their nodes, wherein those toward the apex of the shoot are increasingly close together, inspired mathematician John Napier to invent logarithms.

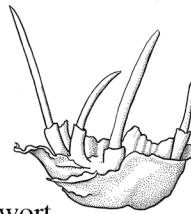


Lizard Crystalwort (*Riccia bifurca*)

Liverworts like this *Riccia* are one of the most ancient plant forms. Their lobes superficially resemble lichens', but they are green plants, not fungi. Unlike lichens, they need very moist areas to thrive. Scientists have found fossil liverwort spores that are believed to be around 470 million years old!

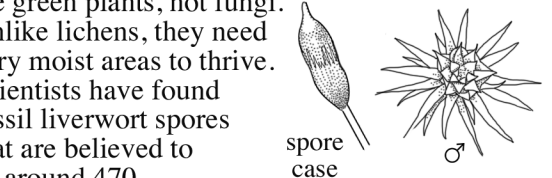


Silver Moss (*Bryum argenteum*)
has no chlorophyll at the leaf tips, hence its name. Notice how its overlapping leaves makes it look like a tiny pinecone?



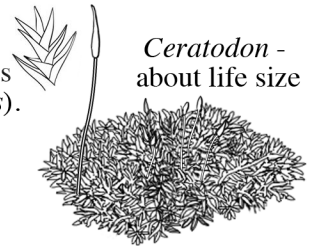
Hornwort

Hornworts form partnerships with blue-green algae to acquire necessary nitrogen from the air, which the hornwort can't do by itself. The horn-shaped structures produce the spores.



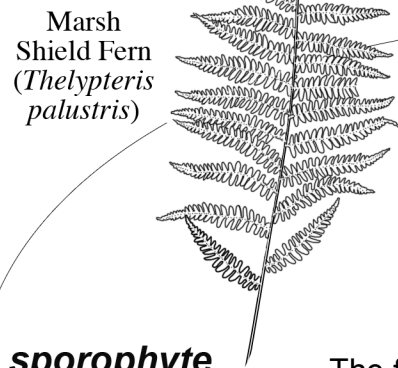
Raindrops splash from the male plants of Juniper Moss (*Polytrichum juniperinum*) to female plants below, carrying the gametes needed for reproduction.

The common reddish moss we see on the dunes is 70MPH moss (*Ceratodon purpureus*). It often colonizes disturbed and wind-swept areas.



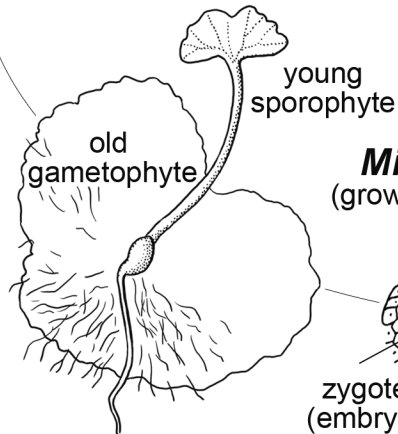
Ceratodon - about life size

Fern life cycle:

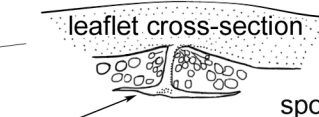


Marsh Shield Fern (*Thelypteris palustris*)

sporophyte generation



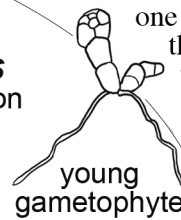
The fern life cycle is a good way to begin to learn about the life cycles of the other non-seedbearing plants.



sorus (cluster of sporangia, which contain the spores)
Spores are single-celled reproductive units that create new plants.

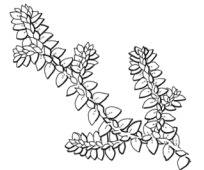
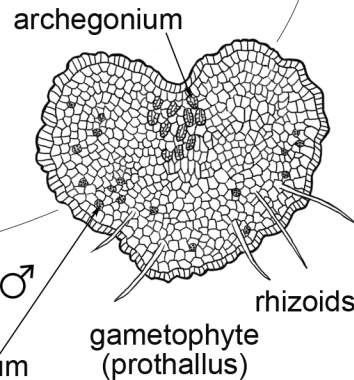
spores

Meiosis (reproduction stage)



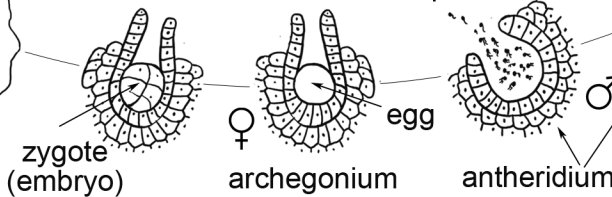
Mosses are tiny plants, most of which have leaves that are only one cell thick. Being non-vascular, they lack the xylem and phloem tubes that carry water and food in more advanced plants, and instead have developed the ability to tolerate variable ambient moisture levels.

gametophyte generation



Meadow Spikemoss (*Selaginella apoda*)
is a lycophte that has smaller leaves in two rows as well as larger leaves in two rows. It is often mistaken for a moss or leafy liverwort. Look for it in wet habitats.

Mitosis (growth stage)



Dunesland Glossary and Credits

Glossary:

- acidic*: having a pH below 7 (a soil type; the opposite of alkaline)
- alternate*: one after the other on each side of an axis or node; not opposite
- angular*: having angles
- annual*: a plant that completes its life cycle in one year or less
- anther*: the pollen-bearing portion of the stamen
- antheridium*: the male reproductive organ of nonflowering plants
- apex*: the tip or end (of a leaf or plant part)
- apothecia*: the fruiting part of a lichen
- appressed*: lying flat against a surface
- archegonium*: the female reproductive organ in mosses, liverworts, ferns, and most conifers
- axis*: the straight central part of a structure to which other parts are connected
- biennial*: a plant that completes its life cycle in two years
- branchlet*: a small branch
- calcareous*: water or soil made basic by a prevailing amount of calcium ions
- calyx*: the outer, usually green, portion of the flower; the sepals
- catkin*: a dry scaly spike bearing imperfect (having only male or female parts but not both) flowers
- chlorophyll*: the green photosynthetic pigment
- clonal*: forming a group of individual plants identical to the parent, usually connected at the base
- colonizer*: a species of plant that establishes colonies or populations of itself in a new area
- compound*: divided into distinct leaflets
- corolla*: the inner series of perianth parts – the petals
- cortex*: the outermost layer of the stem or root of a plant, or the surface layer of the thallus of some lichens
- culm*: the stem of grasses, sedges, and rushes
- dissected*: finely divided
- disturb*: temporarily change environmental conditions, causing a pronounced change in an ecosystem
- entire margin*: (of a leaf) the edge absent of teeth or crenations
- erosion*: the removal of soil, sand, or rock by the action of wind or water flow
- evergreen*: referring to plants (such as conifers) that retain their green leaves throughout the year
- exfoliating*: loosely shedding in thin or stringy layers
- foliose*: leafy-looking
- foredune*: the first sand dune ridge running parallel to the shore of a body of water such as lake or sea
- gamete*: a male or female germ cell which is able to unite with another of the opposite sex to form a *zygote*
- gametophyte*: the gamete-producing reproductive phase, producing the zygote from which the sporophyte arises
- glands*: small protuberances, often containing sugary secretions to attract insects
- glume*: the lowest empty scales subtending fertile scales in grass spikelets
- habitat*: the natural home of an organism
- hemiparasite*: a plant that is partially parasitic
- host plant*: a plant upon which another organism (usually an insect or fungus) depends for nourishment
- hybrid*: the offspring of two different species of plants or animals
- impressed*: sunken in
- inflorescence*: the flowering portion of a plant
- invasive*: tending to spread prolifically and undesirably or harmfully
- involucral bracts*: a whorl of bracts that subtend the flower
- lanceolate*: lance-shaped; broadest below the middle and tapering to a sharp point
- leaf axil*: the area where the leaf and the stem meet
- leaflet*: a discrete portion of a compound leaf
- leeward*: the side sheltered from the prevailing winds
- lemma*: the lowermost of two scales forming the floret in a grass spikelet
- ligule*: in the grasses, an extension of the leaf sheath
- linear*: very long and narrow, with parallel margins

lycophyte: a spore-bearing vascular plant that is one of the club mosses and their allies
margin: edge (as of a leaf)
marly: very limy, with calcium carbonate concentrations near the surface
midnerve: the central or principal vein of a leaf or other plant part
migration: movement from one place of residence to another
monoculture: a single species in one area
native: an indigenous plant or animal
node: the point along a stem where leaves, branches, or flower structures come forth
opposite: arranged in pairs along an axis, as in leaves or branches emerging from the same node
ovary: the portion of the flower that contains the ovules
ovate: shaped like an egg or oval
ovule: the plant part which, after fertilization, will become the seed
palea: the uppermost of the two scales forming the floret in a grass spikelet
palmate: (as in a leaf) with multiple primary veins arising from a single point at the leaf base
panicle: an inflorescence of two or more racemes or raceme-like corymbs
panne: a flat, calcareous, interdunal wetland with fen-like vegetation
pappus: (in the *Aster* family) a modification of the calyx that can be scaly, crown-like, or hair-like
parasitic: an organism that derives all or almost all of its nourishment from another unlike organism
perennial: a plant that lives for more than two years
perianth: the sepals, petals, or both, of a flower
perigynium: the (often) inflated sac containing the achene (fruit containing the seed) in the genus *Carex*
petiole: the stalk attaching the leaf blade to the stem
petiolule: the stalk of a leaflet
phloem: the vessels in plants that conduct sugars and other metabolic products downward from the leaves
photobiont: the photosynthesizing green or blue-green algae that are part of a lichen
phyllaries: the involucral bracts subtending the flower in the *Aster* family
pinnate: describing a leaf structure that has a central rib with several pairs of leaflet emerging from that axis
pistil: the female organ of a flower that consists of the ovary, style (when present), and stigma
pistillate: plants, inflorescences, or flowers that produce pistils and not stamens
pollinator: a vector (wind, insect or other animal, even humans) that transfer pollen from one plant to another
prickles: a sharp bristle or spine
prostrate: laying flat
prothallus: the gametophyte of ferns and other primitive plants.
pubescent: hairy
raceme: an inflorescence where the flowers have pedicels and are arranged along the axis of the flower stalk
remnant: a natural area that contains its full suite of pre-settlement native species
rhizomatous: having underground stems
rhizome: an underground stem, usually horizontal
scale: a thin, much reduced, leaf, bract, or perianth part
serrate: having a margin with saw-like edges
sessile: without a stalk
sheath: a tubular structure created by the margins of the leaf wrapping around the stem (as in grasses)
soredia: a reproductive structure of lichens consisting of fungal hyphae wrapped around a photobiont
spathes: a leaf-like structure enclosing or partly enclosing an inflorescence
spike: an unbranched inflorescence in which the flowers are sessile or subsessile along the long axis
spikelet: a secondary or small spike
stamen: the pollen-producing structure containing the anther and filament
staminate: plants or inflorescences that bear stamens but not pistils
stigma: the part of the pistil receptive to pollen
stipule: a bract situated at either side of a leaf axil
strobilus/strobili: the spore-producing part of the *Equisteum* genus
subtends: is at the base of

succulent: fleshy and/or juicy

swale: the low (usually wet) area between two dunes

symbiotic: refers to a mutualistic relationship which benefits both organisms

terminal: at the end of

thallus: a plant body that is not differentiated into stem and leaves. It lacks true roots and a vascular system.

translucent: nearly transparent, as in tissue paper

trifoliate: having three leaflets

umbel: an inflorescence in which the branches all radiate from a common point

vascular: consisting of conducting vessels or veins

vernal: pertaining to springtime

whorled: an arrangement of three or more organs (leaves, in this case) at a single node

xylem: the vascular tissue in plants that conducts water and dissolved nutrients upward from the root and also helps to form the woody element in the stem.

Credits:

Leslie Borns, steward, Montrose Dunes, for her tireless advocacy and tutelage of many about our dune flora

Henry Chandler Cowles, whose early monograph on the duneslands clarified their ecology for the author

Linda Curtis, botanist, for valued mentorship and encouragement

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Gerould Wilhelm, Ph.D., for ongoing detailed botanical review of these and many other pages

and the many photographers and naturalists who contributed reference images for this guide over its evolution.

This guide is in loving memory of botanist Margo Milde, who compiled the most comprehensive botanical survey of Waukegan Beach (among other sites), and whose duct-taped copy of Swink and Wilhelm's *Plants of the Chicago Region* is an inspiration to all of us students of the flora. Margo was a student of the renowned prairie ecologist, Dr. Bob Betz, who saved many of our natural remnant areas for future generations to study.

Reference credits:

Glossary definitions, with permission: Swink, Floyd and Gerould Wilhelm. 1994. *Plants of the Chicago Region*, 4th ed. Indianapolis: Indiana Academy of Science; ; <https://lichenportal.org/cnalh/>; <https://www.merriam-webster.com>.

Taxonomy: Wilhelm, Gerould and Laura Rericha. 2017. *Flora of the Chicago Region – a floristic and ecological synthesis*. Indianapolis: Indiana Academy of Science. An incomparable reference to the flora and their insect associates in this region, it is highly recommended as a basis for any in-depth study of our natural areas.