

# *Quail-Friendly Plants* of the Midwest



*an aid to identifying plants and managing habitats*

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## Foreword

Northern bobwhites (*Colinus virginianus*), like all species of wildlife, require four basic habitat components: food, water, cover and space. Anyone interested in increasing bobwhite populations must be able to identify and improve the habitat components that are limiting their population growth. Bobwhites usually obtain their daily water requirement from the foods they consume, so water is rarely a limiting factor. Space can be addressed by ensuring that the other two components are interspersed throughout the area being managed.

The purpose of this guide is to aid in the identification of plants important to bobwhites in the Midwest so that critical evaluations of the food and cover components of habitat can be made. While this guide contains many plants that are important for food and cover, it certainly is not intended to be a comprehensive list of all plant species used by bobwhites. Most of the plants listed are native to the Midwest. The exotic species included here have been in the Midwest a long time and do not exhibit aggressive spreading behavior that might displace native species or reduce biodiversity. All plants listed are likely to be naturalized or found “growing wild.”

Habitat with a diversity of plant species composition and structure will increase the space available to bobwhites. Plants that seem to have no direct benefits to bobwhites may have indirect benefits, such as increasing the number of insects and other invertebrates available to feed broods.

Most of the plants listed in this guide respond well to periodic disturbance. In the Midwest, bobwhites thrive in early to mid-successional plant communities maintained by fire, disking, grazing or a combination of all three. Using these management tools will promote the growth of many of the plants listed.

We hope this guide will serve you as one of many tools needed to critically evaluate bobwhite habitat on your land and to make informed management decisions that will benefit bobwhite populations.

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## How to use this guide

Plants in this guide have been grouped into three general classes: **Grass**, **Forb** (broadleaf plants), and **Woody** (trees, shrubs and vines). Within each of these classes, species are listed alphabetically by common name. See the index on page 118 to locate plants by common and scientific name.

Beneath the class designation is a symbol or symbols denoting how quail use the plant. Plants may have the following uses:



**Nesting cover:** Quail typically nest in clump grasses with fine leaves and stems, often in association with abundant forbs or legumes. Most nests occur within 50 feet of a road, trail, field edge or shrub thicket.



**Roosting cover:** Bobwhites tend to roost at night in sparse vegetation 1 to 3 feet tall with abundant bare ground and little or no overhead obstruction. Roosting cover is similar in composition to nesting cover.



**Winter cover:** During periods of snow or cold, bobwhites need to conserve body heat and reduce exposure. Winter thermal cover consists of dense stems or branches that block the wind and reduce snow accumulation. Evergreens and plants with dark-colored stems absorb and release heat, resulting in a warmer microclimate. Winter cover on south-facing slopes is especially desirable.



**Summer cover:** Dense shrub thickets and tall grasses provide shade from intense summer heat, often resulting in temperatures 15 degrees cooler than areas with full solar exposure. Bobwhites may also perch on limbs several feet above ground to take advantage of cooling breezes.



**Escape cover:** When threatened by predators, quail seek the shelter of quality escape cover 3 to 12 feet tall. Escape cover is also known as covey headquarters, and consists of dense branches or stems overhead, with an open or bare understory. Patches or thickets at least 1,500 square feet in area are most likely to be used. This cover type is especially important in fall and winter, when bobwhites are seldom found more than 50 yards away.



**Brood cover:** For coveys to be present in the fall, they must have high-quality brood cover in the summer. Brood cover is characterized by diverse plant communities with an abundance of broadleaf plants and bare ground to facilitate movement and foraging for seeds and insects. Good brood cover usually results from recent disturbance, such as burning, light to moderate grazing, or disking.



**Food:** The list of foods consumed by bobwhites includes several hundred species of plants, insects, slugs and arachnids. Some are dietary staples every year, while others may be consumed only rarely. Food needs change throughout the year. Laying hens and chicks require insects to meet protein and mineral demands, while leaves provide essential vitamins. Seeds are rich in carbohydrates and oils and form the bulk of the diet in fall and winter. Regardless of the type of food being consumed, it is important that the cover provide plenty of bare ground to allow bobwhites access and ease of foraging.

Naturally, many of the plants listed will benefit quail in multiple ways. The 56 plants in this guide are by no means all those that have been documented as used by quail in the Midwest — that list contains 200 or more species. Rather, many of these plants are common in quail habitats or are likely to be used by bobwhites at some point during the year. If you commonly encounter 15 or more of these plants on your land, representing grasses, forbs and woody plants, there is a good chance that your property provides the basic necessities for quail populations to grow and survive. For more information on quail habitat management, see the references listed below or consult a wildlife professional.

In general, plant names in this guide follow the naming conventions of the Flora of Missouri Project (online: [mobot.org/mobot/missouri](http://mobot.org/mobot/missouri)), a collaboration between the Missouri Botanical Garden and the Missouri Department of Conservation. When in doubt about a common name, rely on the scientific (Latin) name.

## More information for the quail enthusiast

**Missouri Department of Conservation** [mdc.mo.gov](http://mdc.mo.gov)

On the Edge: A Guide to Managing Land for Bobwhite Quail.  
<http://mdc4.mdc.mo.gov/Documents/259.pdf>

**University of Missouri Extension** [extension.missouri.edu](http://extension.missouri.edu)

Missouri Bobwhite Quail Habitat Appraisal Guide:  
[extension.missouri.edu/explore/miscpubs/mp0902.htm](http://extension.missouri.edu/explore/miscpubs/mp0902.htm)

Ecology of Northern Bobwhite Quail in Missouri:  
[extension.missouri.edu/explore/agguides/wildlife/g09431.htm](http://extension.missouri.edu/explore/agguides/wildlife/g09431.htm)

Habitat Management Practices for Bobwhite Quail:  
[extension.missouri.edu/explore/agguides/wildlife/g09432.htm](http://extension.missouri.edu/explore/agguides/wildlife/g09432.htm)

The Covey Headquarters Newsletter: [coveyheadquarters.com](http://coveyheadquarters.com)

GrowNative: [grownative.org](http://grownative.org)

Native Warm Season Grass Newsletter. Call 660-885-8179 to be included on the mailing list.

Quail Forever: [quailforever.org](http://quailforever.org)

Quail Unlimited: [qu.org](http://qu.org)

Southeast Quail Study Group: [seqsg.org](http://seqsg.org)

Tall Timbers Research Station: [talltimbers.org](http://talltimbers.org)

USDA-NRCS Bobwhite Quail Habitat Management Information Sheet:  
[www.mo.nrcs.usda.gov/technical/forms/wildlife.html](http://www.mo.nrcs.usda.gov/technical/forms/wildlife.html)

USDA-NRCS Plants Database: [plants.usda.gov/index.html](http://plants.usda.gov/index.html)



## Barnyard grass

*Echinochloa crusgalli*,  
*E. muricata*



### Description

To all but the most astute botanists, these two species of barnyard grass are identical. They are annual grasses with long leaves, flattened or folded leaf sheaths, and green to purplish inflorescences. Long hairs are often found along the leaf midrib and at the nodes of the inflorescence. The bristly seed heads are quite conspicuous.



Scott Sudkamp, Missouri Department of Conservation

Barnyard grass is most often found growing in moist areas. The large seeds of this grass make it an important food source for bobwhites.

### Use by bobwhites

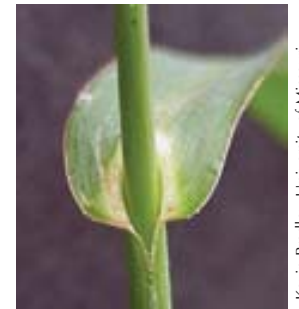
Because barnyard grasses are common in disturbed areas, they serve as good indicators of potential bobwhite brood habitat. While they occur in many habitats, barnyard grasses are most likely to be found in moist areas growing in association with other early successional plants. They provide good brood habitat, and quail may roost in sparse patches of this grass.



Robert H. Mohlenbrock, USDA-NRCS Plants Database

The long hairs, or bristles, on the seed head assist in identification of barnyard grass.

Mature barnyard grass plants have long bristles associated with the seeds. Note the purplish color of the seed heads.



Kevin Bradley, University of Missouri

Unlike many other grasses, barnyard grass has no ligule.



Fred Fishel, University of Missouri

Barnyard grass has larger seeds than most other grasses. (scale divisions = 1 mm)

## Big bluestem

*Andropogon gerardii*  
turkeyfoot grass



### Description

Big bluestem is one of the taller native grasses in the Midwest, with seed stalks up to 9 feet tall, more commonly 4-5 feet. The seed head typically has three “prongs,” giving it the appearance of a bird’s foot. Leaves are commonly 1-3 feet long and may be either smooth or hairy. Plants take on a bluish-coppery hue upon dormancy in the fall.

### Use by bobwhites

A dominant grass in prairies and native grass plantings, big bluestem grows in bunchy clumps that provide good habitat structure for nesting and brood rearing. Nests are made at the base of clumps from the previous year’s growth. Burned stands often provide brooding habitat. Coveys frequently roost in fields containing big bluestem. Dense stands may provide escape cover and summer and winter thermal cover.

Big bluestem leaves contain little lignin, which causes them to droop after the growing season. Leaves and seed heads tend to flatten under ice or snow. Thus, pure stands of big bluestem provide poorer quality roosting or spring nesting cover than other native warm-season grasses. This problem can be alleviated by high-clipping or summer grazing that leaves a 10- to 15-inch stubble that is more resistant to flattening. It is best planted in mixtures with other native grasses.



Mature seed stalks of big bluestem are copper colored and often grow more than 5 feet tall.

Scott Sudkamp, Missouri Department of Conservation

Robert N. Chapman, Missouri Department of Conservation



The clumpy growth of big bluestem allows room for other plants to exist and provides excellent habitat structure for nesting and roosting.

Quail hens tend to nest at bases of grass clumps.

Kallenbach and Bishop-Hurley, University of Missouri



ligule

Big bluestem has a small, membranous ligule. Hairs are common along the leaf sheath and blade.



The three-pronged “turkey foot” appearance of the big bluestem seed head is distinctive.

Jim Rathert, Missouri Department of Conservation



## Broomsedge

### *Andropogon virginicus*

broomgrass, broomsage, broomsedge bluestem, broomstraw, sage grass, yellow bluestem



### Description

This native warm-season grass is often confused with little bluestem. Compared with little bluestem, broomsedge stems are the more flattened and more densely leaved. Also, broomsedge in the fall/winter is typically yellowish tan, while little bluestem has a bronzy color. It is usually no more than 2 feet tall at maturity. Seeds are light and fluffy. Dense stands are often indicative of acid soils, phosphorus deficiency or overgrazing. Lime and fertilizer application may cause broomsedge to decline or disappear.



Several stems may arise from each clump of broomsedge. They will turn yellow-tan in the fall.

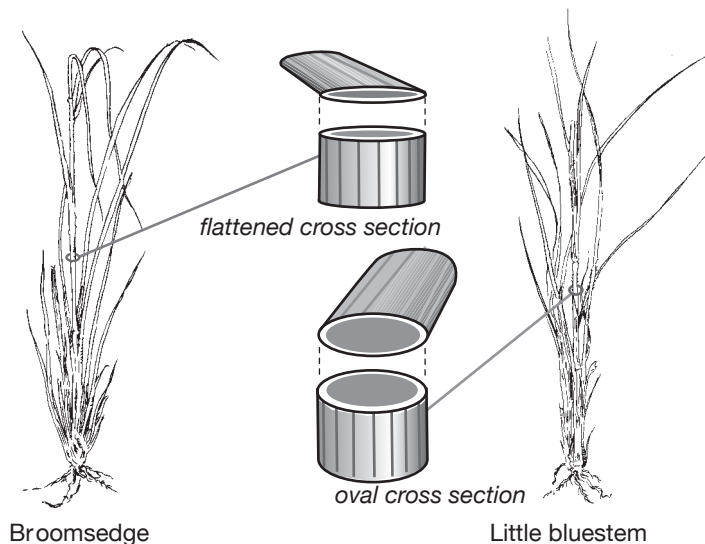
### Use by bobwhites

Broomsedge's clumpy growth and fine leaves and stems make it an excellent grass for nesting, and the height is preferred for roosting. Stands of broomsedge tend to be "weedy," supporting a diverse mix of annual plants that provide further benefits for bobwhites.



©James H. Miller, USDA-NRCS Plants Database

Broomsedge seeds are small and hairy.



Compare the cross section of a broomsedge stem with that of little bluestem. Broomsedge is more flattened.

©James H. Miller, USDA-NRCS Plants Database

## Crab grass *Digitaria* spp.



### Description

This group of annual grasses is common in disturbed areas throughout much of the Midwest. Native to Europe, they are most often perceived as weeds in fields and pastures. Crab grass generally grows no more than 2 feet tall. Seed stalks spread from a central point, much like the fingers on a hand.



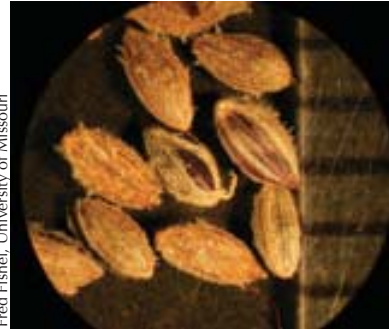
©Ted Bodner, USDA-NRCS Plants Database

Crab grass is generally less than 18 inches tall, allowing bobwhites to eat seeds right off the plant.

### Use by bobwhites

Often found in disturbed areas, crab grass tends to indicate early successional vegetation, and thus good quail habitat. Note, however, that late spring disturbance may result in a crab grass response heavy enough to displace other beneficial or desired plants. Bobwhites commonly consume crab grass seeds.

Fred Fishel, University of Missouri



Though tiny, crab grass seeds are frequently eaten by bobwhites. (scale divisions = 1mm)

Kevin Bradley, University of Missouri



In the collar region, note the small, membranous ligule and the hairy leaf blades.

Rob Kallenbach and Greg Bishop-Hurley, University of Missouri



Crab grass seed heads consist of several thin spikes.

Kevin Bradley, University of Missouri



Growth form may be upright (page 10) or prostrate (here).



## Foxtail

*Setaria* spp.

bristlegrass, knotroot



### Description

Most of the foxtails found in the Midwest are native to Europe and Asia. They are annual plants generally considered to be weeds. The common name comes from the appearance of the seed head, which suggests the bushy form of a fox's tail. Foxtails respond well to soil disturbance, especially in the spring. Height at maturity varies by species, but is generally 1-3 feet.



Scott Sudkamp, Missouri Department of Conservation

Foxtails (here, giant foxtail) are common following disturbance, especially in spring.

### Use by bobwhites

Foxtails are readily used as food by bobwhites. They often occur with other annual weeds in disturbed areas and respond best to spring disking. This response makes foxtail a nuisance in food plots or new grass/forb plantings. Foxtail grows quickly, making it attractive for brood rearing, but heavy stands choke out other plants and tend to lack diversity. It is best with other annual grasses and broadleaves as part of a diverse early successional plant community. Bobwhites roost in foxtail patches early in the fall, but the weak-stemmed structure of the plant makes it prone to flattening from winter rains and snows. Patches of foxtail are generally unusable as cover by late winter, and seeds are unavailable in deep snow.



Kevin Bradley, University of Missouri



Kevin Bradley, University of Missouri

Three common foxtail species. Clockwise, from above: green foxtail, giant foxtail, yellow foxtail.



Fred Fishel, University of Missouri

Compared with most grass seeds, foxtail seeds are large and energy rich. Bobwhites commonly eat them. (scale divisions = 1 mm)

## Indian grass

*Sorghastrum nutans*



### Use by bobwhites

Quail readily use Indian grass for a variety of needs. Its clumpy nature makes it good for feeding and brood rearing. It grows tall enough to offer summer and winter thermal cover. Coveys may roost in Indian grass when it occurs in mixed or open stands. Some Indian grass varieties have a tendency to outcompete other grasses and reduce plant diversity, particularly during the first few years after planting. Indian grass dominance normally decreases over time to a more subordinate role of codominance with species like big bluestem. Where Indian grass is too dense or tall, a late-summer prescribed fire can set it back the following year. Because it is a nutritious and palatable forage, prescribed grazing can be applied for the same result.

### Description

This tall, warm-season native averages 4-6 feet in height at maturity. Stems are stiff, and leaves are long and narrow. A characteristic of the plant is the “gunsight,” or notched ligule suggesting the rear sight of a rifle. Another easy characteristic to remember is that the leaf narrows so severely at the ligule that it almost appears to be pointed on each end. At maturity, the seed head looks like a plume, with seeds golden brown and hairy.



Indian grass is readily identified by its tall (more than 5 feet) stem and golden-plumed seed head.

Courtesy of The Samuel Roberts Noble Foundation, Ardmore, Oklahoma

Kallenbach and Bishop-Hurley, University of Missouri



Indian grass collar region.

Indian grass is characterized by a relatively hair-free leaf and stem and the classic “gunsight” formed by the notched ligule.

Fred Fishel, University of Missouri



Seeds are covered in dense hairs and long awns. (scale divisions = 1 mm)



Fluffy seeds form a dense plume.

Kallenbach and Bishop-Hurley, University of Missouri



## Little bluestem

*Schizachyrium  
scoparium*



### Description

Little bluestem is found throughout the Midwest on moderately dry (mesic) to dry soils. This native grass occurs in clumps with fine leaves less than ¼ inch wide. Seed stalks are commonly 2-3 feet tall, but may reach 4 feet on better soils. Stems are hairy and flattened near the base. Seeds are light and fluffy, giving the plant a feathery appearance. Little bluestem has a striking appearance after frost, when it attains a coppery hue. This grass is commonly confused with broomsedge (see pages 8 and 9).

### Use by bobwhites

Little bluestem is among the best grasses for nesting and roosting habitat. Many nests are made from fine leaves at the base of the clumps. In addition, the bunchy growth habit of the plant provides ample room for many other plants to grow in the same area, creating good brood habitat. This plant provides important habitat that bobwhites will use year-round.



Little bluestem grows in clumps. Stems in summer are bluish green.

Scott Suckamp, Missouri Department of Conservation

Missouri Department of Conservation



Little bluestem seeds are light and fluffy, covered in fine hairs.

Robert N. Chapman, Missouri Department of Conservation



A mixture of native warm-season grasses, forbs, shrubs and annual weeds makes this landscape highly attractive to bobwhites.



The clumpy nature of little bluestem is especially apparent after a burn.

Robert N. Chapman, Missouri Department of Conservation



## Orchard grass

### *Dactylis glomerata*



#### Description

Orchard grass is a cool-season bunch grass that is among the first to begin growth in spring. This exotic grass was introduced from Europe. Its leaves have a bluish cast, and close inspection of the leaf collar reveals a flattened shape and membranous ligule. Seed heads form by late May and are rather distinctive. Height at maturity averages 3 feet.

#### Use by bobwhites

This introduced grass is among the most wildlife-friendly of the cool-season grasses in the Midwest. Its bunchy growth form allows an open understory, which can result in a diverse plant community when managed with fire or periodic disturbance. Quail nest and brood in stands of orchard grass, especially when it is grown with legumes.

Orchard grass is often ready to cut for hay by the middle of May, when many nests are being constructed. Owners of orchard grass hay fields should plan to leave portions uncut on a rotating basis, or defer hay mowing until early or mid-July. Orchard grass is often planted with annual lespedeza, red clover or alfalfa, which makes it even more attractive to quail. If orchard grass is invaded by tall fescue or smooth brome, it is difficult to eradicate the undesirables without harming the orchard grass.



The Samuel Roberts Noble Foundation, Ardmore, Oklahoma

Good identifiers of orchard grass are its blue-green color and the distinctive shape of its seed head.

Kallenbach and Bishop-Hurley, University of Missouri



Orchard grass ligule is large and membranous.

Orchard grass leaf blades have a V-shaped cross section and are smooth, without any hairs.



The seed head is a compact panicle with a "lumpy" look.

Kallenbach and Bishop-Hurley, University of Missouri

## Panic grasses

*Panicum* spp.,  
*Dicanthelium* spp.  
fall panicum, proso  
millet, witch grass



### Description

More than three dozen species of panic grass are commonly found across the Midwest. Both annual and perennial species occur. Seeds are football-shaped and borne on a sprawling, panicle-shaped seed head. The leaves of panic grasses resemble flags along the stem.



©Ted Bodner, USDA-NRCS Plants Database

An open, sprawling panicle seed head is typical of the panic grasses.

### Use by bobwhites

Bobwhites readily consume panic grass seeds, which are larger than those of many other grasses. Seeds of the shorter species occur at the preferred peck-height for bobwhites, which may contribute to their frequent occurrence in bobwhite diets. Most species form a minor component of the plant community, but serve to increase diversity and habitat structure. Proso millet is often planted as a food plot crop for quail and doves and produces a great deal of seed and a structure conducive to brooding and feeding. Bobwhites may also roost in panic grass stands of sufficient height.

The Samuel Roberts Noble Foundation, Ardmore, Oklahoma



Many species of panic grasses provide cover and food to bobwhites and other wildlife.

Scribner's panic grass is a common species throughout the Midwest.



©Larry Allain, USDA-NRCS Plants Database

Many species of panic grass are prolific seed producers.



Steve Hurst, USDA-NRCS Plants Database

Seeds are smooth and football-shaped.



## Paspalums

*Paspalum* spp.  
dallis grass



### Description

The most obvious characteristic of the paspalums is the shape of the seeds and their manner of attachment. Seeds are round and flattened and are neatly lined up (but sometimes overlapping slightly) on the seed stalk in two or four rows.



Paspalums are prolific seed producers.

Scott Sudkamp, Missouri Department of Conservation

### Use by bobwhites

As with the panic grasses, paspalums rarely dominate a stand, but rather occur scattered about and tend to increase diversity and provide the kind of habitat structure that is beneficial for nesting, brood and roosting cover. Bobwhites consume the seeds, sometimes stripping them off the plant. The seeds of several species are at peck-height for easy feeding, which may contribute to their frequent use by quail.



©Patrick J. Alexander, USDA-NRCS Plants Database

Paspalum seeds line up neatly in rows.

Seed shape and arrangement on the stem are the most readily identifiable feature of the paspalums.



©Patrick J. Alexander, USDA-NRCS Plants Database

Some paspalum species have conspicuous silky hairs at the base of the spikelet.

On the seed stalk, seeds are attached in two or four rows.



Seeds are round and flattened, with a conspicuous midrib. (scale divisions = 1 mm)

Fred Fishel, University of Missouri



## Sideoats grama

*Bouteloua curtipendula*



### Description

Sideoats grama is another warm-season grass that grows as a clump. Characteristics of the species include fine leaves and widely spaced fine hairs along the leaf edge, especially near the collar. Most sideoats plants are 18-24 inches tall at maturity. After formation of the seed head, sideoats will not be mistaken for anything else. It has a unique, oatlike seed that droops slightly off one side of the stalk. Sideoats is relatively easy to plant and establishes quickly, often flowering and seeding the first year. Sideoats grama does best on dry sites such as glades, where it has less competition than on more productive soils. When planted with taller, more aggressive native grasses, it tends to fade away over time.

### Use by bobwhites

The fine leaves and clumpy growth form of this species make it excellent for nesting. Sideoats also provides good brood cover in mixed stands with forbs and legumes. Being one of the shorter native grasses in the Midwest, sideoats is desirable for roosting as well. Although seeds have been found in quail crops, sideoats probably is not an important food item.



Fine leaves and clumpy growth make sideoats well suited for nesting.

Jim Rathert, Missouri Department of Conservation



©Don Kurz

Long, dense hairs form at the collar and along the leaf blade.

Many native warm-season grasses are hairy, but sideoats is hairier than most. Its long hairs extend from the margins of the leaves well down the length of the blade.



Matt Seek, Missouri Department of Conservation

Sideoats grama seeds are large enough to be occasionally eaten by quail.



Missouri Department of Conservation

Seeds of sideoats grama are arranged along only one side of the stalk.

## Switch grass

### *Panicum virgatum*



#### Description

Switch grass is a native panic grass, but it tends to grow taller than most others and exhibits an upright, bunchy growth form. The leaves twist in a corkscrew-like pattern from the base to the tip of the blade. Native ecotypes on prairies rarely exceed 4 feet, but commonly used varieties, such as Cave-in-Rock and Kanlow, may grow more than 6 feet tall.

#### Use by bobwhites

As with other panic grasses, bobwhites may consume switch grass seeds, though they tend to be a minor part of the diet. Of greater benefit are the nesting and brooding opportunities switch grass provides with its bunchy growth and spreading canopy. Switch grass is among the stiffest-stemmed of Midwest grasses, allowing the plant to stand up to winter weather, thus providing thermal cover. Dense stands may also serve as escape cover.

Switch grass often dominates warm-season grass mixes in the first several years but eventually settles down to a codominant or subdominant role. Monocultures die out after 12-15 years, so it is important to plant switch grass with other native warm-season grasses where permanent cover is necessary. Native ecotypes should be used when available, as they tend to be shorter and less aggressive in mixed-grass communities.



Many switch grass varieties exceed 5 feet in height.

Scott Sudkamp, Missouri Department of Conservation



©Ted Bodner, USDA-NRCS Plants Database

Switch grass is a panic grass and exhibits the classic open panicle seed head with spreading stalks supporting abundant seeds.



Kallenbach and Bishop-Hurley, University of Missouri

The switch grass ligule consists of a dense fringe of hair that extends onto the leaf surface.



Like other panic grasses, switch grass seeds are football-shaped.

Steve Hurst, USDA-NRCS Plants Database



## Timothy

*Phleum pratense*



### Description

Timothy is a cool-season bunch grass, often planted in pasture mixtures with clover or other grasses. By late spring it can be readily identified by the blue-green, cylindrical seed head resembling a small cattail. It has an elongated ligule at the base of the leaf, with a notch on each side.

### Use by bobwhites

Timothy is used far less for pasture today than in the past. Where it is used, though, it offers good habitat structure. As with other bunch grasses, bobwhites readily nest in previous years' growth, and mixed stands offer good brood-rearing opportunities. Timothy matures for hay later than most cool-season grasses but may still be ready to bale during the peak hatching period; see orchard grass (*page 18*) for management suggestions. Timothy also provides good roosting cover.



Timothy is a cool-season bunch grass.

Dave Powell, USDA Forest Service (*Bugwood.org*)



James R. Johnson, USDA-NRCS Plants Database

Timothy is among the best nonnative grasses for wildlife because of its bunchy growth and nonaggressive habit.

Long, tight, cylindrical seed heads without long hairs are a sure clue to identifying timothy.



Kallenbach and Bishop-Hurley, University of Missouri

Timothy's ligule is large, white and membranous, with a notch at either side.



## Alfalfa

*Medicago sativa*



### Bloom period

May – September

### Description

Alfalfa is a legume native to the Old World, but has been in this country so long that it has naturalized in some areas. In the Midwest, it rarely persists longer than 5-10 years without replanting. Leaves are divided into three leaflets, with the middle leaflet on a distinct stalk. Leaflets are serrated along the outer third to half and are somewhat elongated. Flowers are usually purple, sometimes bluish, rarely white. Fruits are usually curved or twisted.

Upright growth form and purple flowers are good identifiers of alfalfa, even from a distance. The growth form makes this plant excellent for brood habitat.



The Samuel Roberts Noble Foundation, Ardmore, Oklahoma

### Use by bobwhites

Alfalfa is well known for its forage value to livestock, but is less known as an excellent component of brood habitat for many upland birds. The upright growth form of the plant, coupled with its open understory, provides great structure and cover for bobwhite broods. Uncut or late-cut alfalfa fields may also provide good nesting habitat, particularly when desirable grasses occur in the same stand.

Unfortunately, most varieties used today have been developed to allow early hay harvest. Consequently, many alfalfa fields grown for hay are cut right in the middle of the nesting season, negating its value as cover. Hay varieties are also prone to insect and fungal damage, so many fields are sprayed with pesticides that may have direct or indirect effects on quail broods. Managers interested in incorporating this plant into quail habitat should consider using varieties developed for pasture use, rather than hay. These pasture varieties are more likely to persist without frequent cutting or pesticide use.



Alfalfa flowers are usually purple, sometimes blue. Leaves occur in triplets and have serrated edges.



Middle leaflet is on a distinct stalk.

Kallenbach and Bishop-Hurley, University of Missouri



Steve Hurst, USDA-NRCS Plants Database

Like most legumes, alfalfa has kidney-shaped seeds. Seeds are 2-3 mm long.

## Beggar's lice

*Desmodium* spp.

sticktight, ticktrefoil



### Description

Anyone who has walked through a patch of weeds, open woods or prairie in the fall has encountered beggar's lice. The triangular seedpods are covered with dense hairs that cause them to stick to clothing. During the growing season, *Desmodium* can be recognized by the divided leaf and pink flower.

### Bloom period

May – August



Desmodium leaves consist of three leaflets.

Rob Chapman, Missouri Department of Conservation

### Use by bobwhites

These native legumes are an important food for bobwhites in the fall, found in nearly all quail crops. Legumes tend to attract many insects during the growing season, making them an excellent component of brooding habitat as well. Nineteen species of *Desmodium* are known to occur in the Midwest.



Scott Sudkamp, Missouri Department of Conservation

Desmodium flowers resemble those of most other legumes.



Scott Sudkamp, Missouri Department of Conservation

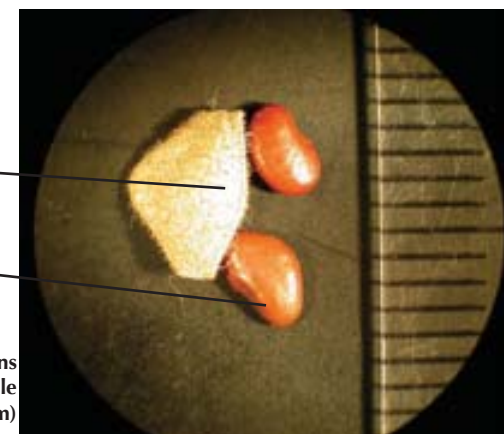


Jim Rathert, Missouri Department of Conservation

Triangular seedpods are fuzzy and linked end to end and readily stick to clothing and fur.

seedpod

seed



Each triangular pod contains a kidney-shaped seed. (scale divisions = 1 mm)

Fred Fishel, University of Missouri



## Bidens

### *Bidens* spp.

beggar ticks, sticktights, Spanish needle



### Bloom period

May – October

### Use by bobwhites

*Bidens* seeds are relished by ducks and are eaten by bobwhites as well. This plant also serves as brooding cover for chicks, which are attracted to the cool, insect-rich environment in which it grows.

### Description

Twelve species of *Bidens* are known to occur in the Midwest; *Bidens aristosa*, *B. bipinnata*, and *B. frondosa* are among the most common. Flowers are yellow, daisylike, and about 1-1½ inches in diameter. Some species have simple leaves, while the leaves of others are pinnately compound. Mature seeds are two- or three-pronged with small barbs and readily attach to clothes, hence the common names beggar ticks and sticktights. *Bidens* species tend to be found in wet or moist areas.



*Bidens* is most often found in moist areas.

The Samuel Roberts Noble Foundation, Ardmore, Oklahoma



Scott Suckamp, Missouri Department of Conservation

*Bidens* flowers are yellow, 1 to 1½ inches across.



The Samuel Roberts Noble Foundation, Ardmore, Oklahoma

Leaves of some species are pinnately compound.



Steve Hurst, USDA-NRCS Plants Database

Two or three prongs extend from the seed and readily cling to fabric and fur to facilitate distribution. Despite these sharp points, many birds relish *bidens* as food.



## Croton

*Croton* spp.

doveweed, goatweed,  
hogwort



### Description

Crotons are annual plants; most with dense white or rust-colored hairs on the leaves and stems. Tiny flowers occur in dense clusters, and each seed capsule contains three seeds (*C. capitatus*) or one seed (*C. monothogynus*). Plants are typically less than 18 inches tall. Several species are common in overgrazed pastures and disturbed areas.

### Bloom period

July – October



Scott Sudkamp, Missouri Department of Conservation

*Croton capitatus*  
(hogwort) is a common  
midwestern species.

### Use by bobwhites

Croton seeds are large and readily consumed when mature. Dense stands or plants mixed with other forbs and grasses provide an open understory and dense canopy, thus affording good brood cover. Crotons readily respond to overgrazing and may be found in abundance in late-summer pasture that has been heavily used.



Scott Sudkamp, Missouri Department of Conservation

A dense covering of white hairs gives  
croton flowers a fuzzy white appearance.



Scott Sudkamp, Missouri Department of Conservation

Crotons tend to bear many flowers and  
produce many seeds.



Fred Fishel, University of Missouri

Croton seeds are large (here, 4 mm across)  
and vary by species from nearly round to  
oblong.

## Flowering spurge *Euphorbia corollata*



### Bloom period

April – October

### Use by bobwhites

Bobwhites eat the seeds of this common forb and may use it for brood rearing as well.

### Description

This common forb may be found in idle areas, field borders and roadsides. It may reach 3 feet tall on richer soils. Leaves at the base and lower portion of the stem are alternate, but become opposite or whorled toward the flower. Inflorescences are multibranched, with multiple flower heads per branch. Flowers have five white petals with a yellow center and average about one-third of an inch across. Breaking the stem reveals a milky white sap. The fruit is a three-lobed ball borne on a stalk above the flower petals.



Jim Rathert, Missouri Department of Conservation

Numerous white flowers make flowering spurge conspicuous, even from a distance.



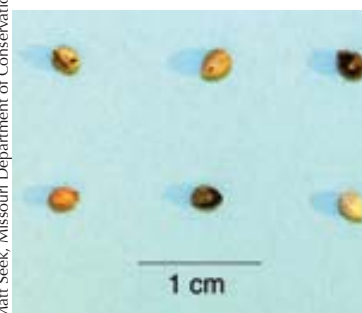
Scott Sudkamp, Missouri Department of Conservation

Spokelike arrangement (umbel) of flower stalks.

Milky sap is a good indicator of flowering spurge, but another is the arrangement of the flower heads. This view, looking down on the plant, depicts the attachment of flower stalks to the main stem like spokes on a wheel.

Delicate five-petaled flowers have yellow centers.

Matt Seck, Missouri Department of Conservation



Flowering spurge seeds are small, but they are common in quail diets.



©Tom Barnes, University of Kentucky



## Goat's rue

*Tephrosia virginiana*



### Bloom period

May – July

### Use by bobwhites

Bobwhites may eat the seeds of this legume and may use it as brooding habitat as well. Goat's rue is common on glades, savannas, woodlands and prairies, and its presence often indicates good quality habitat. Unfortunately, it is difficult to establish from seed.

### Description

This member of the bean family is readily identified by its striking flower, which consists of a cream-colored upper petal above two bright pink lower petals. Leaves are alternate, compound and usually hairy, with a pointed, hairlike tip. The plant may grow up to 30 inches tall. It is most common in savannas and sandy prairies. Upon maturity, the long, flattened seedpods shatter easily.



Goat's rue's structure makes it valuable for brood habitat.

Scott Sudkamp, Missouri Department of Conservation



Scott Sudkamp, Missouri Department of Conservation

Seedpods are covered in dense, silver hairs.

Upon maturity, goat's rue seedpods shatter readily and may throw seeds a considerable distance.



Scott Sudkamp, Missouri Department of Conservation

Leaves are pinnately compound, with lance-shaped leaflets.



Jim Rathert, Missouri Department of Conservation

Flowers consisting of pink and yellow petals are quite distinctive and beautiful.

## Illinois bundleflower

*Desmanthus illinoensis*



### Bloom period

June – August

### Use by bobwhites

Despite its relative abundance, bundleflower seeds are rarely eaten by bobwhites, which is disappointing, considering that it is one of the easiest and cheapest native forbs to grow. Its height (about 3 feet) and propensity to form a dense stand along roads and on disturbed areas make Illinois bundleflower more important for brood cover than for food. Mexican bean beetles commonly feed on bundleflower, but their use by bobwhite chicks is uncertain. Because it responds so well to disturbance, Illinois bundleflower serves as a good barometer for quail managers. It may be assumed that plant communities with an abundance of bundleflower are good for brood rearing.

### Description

Illinois bundleflower can be identified in summer by the doubly compound, fernlike leaves and white spherical flower heads. By fall, the stems become tough and woody, and the seedpods are distinctive, bearing a ball-shaped cluster of pods, each containing several flat, brown seeds.



Illinois bundleflower's structure makes it attractive for quail brood cover.

©Don Kurz



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Flower heads are white spheres with yellow stamens at the tips.



©Don Kurz

Leaflets are doubly compound and fernlike.



Scott Sudkamp, Missouri Department of Conservation

At maturity, Illinois bundleflower seed heads consist of several brown pods clustered in a ball.



Steve Hurst, USDA-NRCS Plants Database

Bundleflower seeds are round, flat and brown.



## Jewelweed

*Impatiens* spp.

pale touch-me-not  
(*Impatiens pallida*)

spotted touch-me-not  
(*I. capensis*)



**Bloom period**

May – October

### Description

Jewelweeds are annual plants commonly found in moist, shaded areas such as stream corridors. They commonly reach 18-24 inches. Leaves have scalloped edges and fleshy stems that exude a clear, watery gel-like liquid when crushed. Flowers are orange (*I. capensis*) or pale yellow (*I. pallida*). The name “touch-me-not” comes from the tendency of the ripe seedpods to snap open and throw seeds at a slight touch. Between the two species, jewelweeds can be found throughout most of the Midwest.



Scott Sudkamp, Missouri Department of Conservation

Jewelweed grows in moist, shady areas. Leaves have scalloped edges.

### Use by bobwhites

Jewelweed seeds were often found in the diets of bobwhites studied in southern Illinois during the 1950s, and in Missouri quail crops collected in the 1940s. Plants may serve as good brood habitat as well, and their structure and association with moist, cool soils offers bobwhites refuge from summer heat.



Scott Sudkamp, Missouri Department of Conservation

Jewelweed's distinctive, yellow-orange flower resembles a cornucopia.

The common name “touch-me-not” comes from the tendency of ripe seedpods to pop open and shatter at the slightest touch. Quail readily consume these seeds when available.



Scott Sudkamp, Missouri Department of Conservation

A ripe seedpod.



Scott Sudkamp, Missouri Department of Conservation

An exploded seedpod.

## Lambsquarters

*Chenopodium album*



### Bloom period

May – October

### Use by bobwhites

Lambsquarters' main value to quail is brood cover. It often occurs in dense stands on disturbed sites and has an open understory. Seeds are occasionally eaten as well, especially after snow has buried many other foods.

### Description

This species is commonly found in crop fields and other areas where the soil has been disturbed. It is rather nondescript. Leaves are triangular or kite-shaped, and their surfaces often have a powdery white appearance. Lambsquarters typically grows 2-6 feet tall.



Scott Suckamp, Missouri Department of Conservation

The main value of lambsquarters for quail is the brood cover provided by its upright growth and dense canopy.



Scott Suckamp, Missouri Department of Conservation

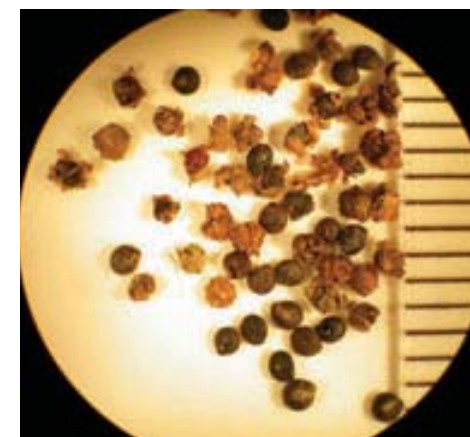
Due to its upright growth structure and leafy canopy, lambsquarters' main benefit to bobwhites is brood habitat. It readily responds to disturbance.

Leaves are triangular, with scalloped edges.



Kevin Bradley, University of Missouri

Numerous, rather nondescript flowers occur at the top of the plant.



Fred Fishel, University of Missouri

Lambsquarters seeds are tiny, about 1 mm across. They are an occasional food source for quail. (scale divisions = 1 mm)



## Lespedeza, annual/ Korean

*Lespedeza striata*,  
*L. stipulacea*  
common lespedeza



### Bloom period

July – October

### Use by bobwhites

Before the adoption of tall fescue as the Midwest's primary forage base, farmers grew thousands of acres of annual and Korean lespedeza for summer forage or hay. Today they are used much less frequently.

Neither species is native to this country. Annual lespedeza was introduced to the United States in 1846, and Korean lespedeza was imported in 1919. Both species have naturalized. In most habitats they rarely cause the problems associated with many other exotics, but on glades they may displace more desirable native forbs. Because they are annuals, both species produce abundant seed crops that are readily consumed by quail, other seed-eating birds and small mammals. Being legumes, both species provide good brood habitat.

### Description

These two species of lespedeza exhibit many similarities in growth form, occurring as semierect herbaceous plants with three-lobed leaves and reddish-purple to white flowers. Lower leaves are spreading while upper leaves stand erect.

Although annual lespedeza and Korean lespedeza are often lumped together, they do exhibit differences. Annual lespedeza has small stipules, somewhat narrow leaflets, and hairs on the stem that point downward. Korean lespedeza has large stipules, relatively wider leaflets, and upward-pointing stem hairs. Veins in the leaves of both species are conspicuous and pinnate. Both species bear large numbers of flattened, football-shaped seeds. Korean lespedeza appears to be more suited to cooler climates and should perform better than annual lespedeza in northern areas of the Midwest.



These lespedezas attract many insects. The height and structure of the plants make those insects available to bobwhite chicks.

The Samuel Roberts Noble Foundation, Ardmore, Oklahoma



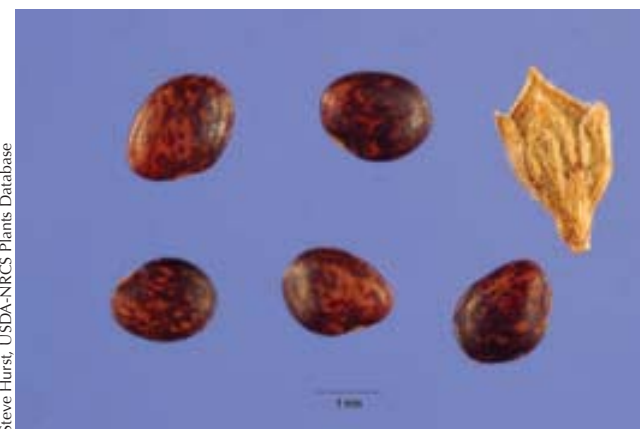
The Samuel Roberts Noble Foundation, Ardmore, Oklahoma

Flowers are reddish purple to white.



Kallenbach and Bishop-Hurley, University of Missouri

Leaves have three leaflets and conspicuous, pinnate veins. Note the stipule.



Steve Hurst, USDA-NRCS Plants Database

Seeds (about 1 mm across) are most often encountered still in the hull, seen in the upper right. Hulled seed is sometimes available commercially.

## Hairy lespedeza

*Lespedeza hirta*

hairy bush clover



### Bloom period

July – October

### Use by bobwhites

Bobwhites readily eat the seeds of this plant. Its structure and status as a legume make hairy lespedeza valuable for brood rearing cover as well.

### Description

Lespedezas are a diverse and ecologically important genus. These nitrogen-fixing plants improve soil fertility and provide a food source for many species of wildlife. Hairy lespedeza is found throughout the southern Midwest on rocky, acidic soils commonly associated with glades and savannas. As with most legumes, hairy lespedeza's leaflets occur in threes. Hairy lespedeza earns its name from its stem and oblong leaflets, both of which are covered with hairs. Hairy lespedeza is a perennial.



Leaves are composed of three leaflets, which are nearly round. Note that flowers are usually yellowish white, instead of pink as seen here.

©Ted Bodner, USDA-NRCS Plants Database

©Tom Barnes, University of Kentucky



The pea-like flowers are indicative of a legume.

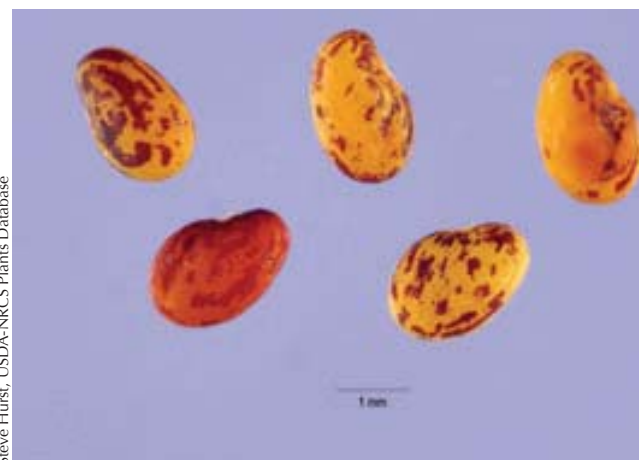


Leaflet veins are pinnate. Shape is oblong.

©Ted Bodner

The common name for this species comes from the hairy stems and leaves. Its upright growth structure makes it useful for brood habitat.

Steve Hurst, USDA-NRCS Plants Database



Seeds are mottled, about 2.25 mm long by 1.5 mm wide.



## Lespedeza, roundhead

*Lespedeza capitata*  
roundheaded bush  
clover



### Bloom period

July – October

### Use by bobwhites

As with most lespedezas, bobwhites relish the seeds of this plant. Roundhead lespedeza holds its seeds well into the winter, providing a food source over a longer period than many other legumes. However, this legume grows in dense grass, making its seeds relatively difficult for bobwhites to reach on the stalk or find in the dense thatch. Seeds may be more available after burning removes grass cover, but unburned overhead cover should not be too far away. This is a great plant for diversifying grasslands and makes good brood cover.

### Description

As the name would imply, this perennial species is easily identified in the fall and winter by the presence of reddish-brown, rounded seed heads. Leaflets are elongated and occur in sets of three; they are among the largest of the lespedezas, and may be 2 inches long by ½ inch wide. In summer, the underside of the leaf is silvery. Mature plants commonly attain a height of 3 feet and may grow as tall as 6 feet.



Roundhead lespedeza can grow more than 3 feet tall.

Robert N. Chapman, Missouri Department of Conservation



Tim Smith, Missouri Department of Conservation

Conspicuous reddish-brown seed heads and an upright growth structure are good identifiers of roundhead lespedeza.



Steve Hurst, USDA-NRCS Plants Database

Seeds have the typical legume shape: flattened and kidney-shaped.



Scott Sudkamp, Missouri Department of Conservation

Roundhead lespedeza's leaves are quite large, much longer than wide. Leaflets may be 2 inches long by ½ inch wide.

## Lespedeza, slender

*Lespedeza virginica*  
slender bush clover



### Bloom period

May – October

### Description

Slender lespedeza is among our most common native lespedezas in the Midwest and may be found throughout the region. Leaves are divided into three leaflets 1 to 1½ inches long and less than ¼ inch wide. Stems are upright, up to 3 feet tall. Flowers are pink to purple and occur in clusters toward the top of the plant.

**Caution:** This species closely resembles sericea lespedeza (*L. cuneata*), an aggressive introduced species that frequently displaces desirable plants and plant communities. Landowners should learn to differentiate the two and work to eradicate sericea. The easiest way to identify sericea is to hold the leaf up to the sky and observe the veins. Sericea has pinnate veins, while slender lespedeza's veins occur in a netlike pattern.



©Tom Barnes, University of Kentucky

Slender lespedeza's growth form is characterized by long spikes topped with pink flowers. Sericea lespedeza is similar, but is more branched toward the top, with white flowers.

### Use by bobwhites

Quail eat the seeds of this plant and may use it for brood rearing as well. It tends to grow on poorer soil than roundhead lespedeza and can be found on prairies, glades, savannas, woodlands and old fields. With less grass competition, seeds are often easier for quail to find.



©Tom Barnes, University of Kentucky

Slender lespedeza flowers are pink to purple and occur in clusters at the top of each stem.

Flowers are pink to purple and occur in clusters at the top of each stem. Leaflets occur in threes, each 1-1½ inches long and less than ¼ inch wide.



Rob Chapman, Missouri Department of Conservation

Sericea lespedeza leaflets (left) have pinnate veins and a pointed tip. Slender lespedeza leaflets (right) have netlike veins and a rounded tip.



Steve Hurst, USDA-NRCS Plants Database

Quail may eat the seeds of slender lespedeza.



## Lespedezas, trailing

*Lespedeza repens*,  
*L. procumbens*  
trailing bush clover



### Bloom period

June – October

### Description

There are only two species of trailing lespedezas in the Midwest and they are found in dry, open woods, savannas and prairies. Trailing lespedezas are small, native lespedezas with trailing stems that can readily form thick mats over bare areas if left undisturbed. The small flowers range from purple to white and can produce a large quantity of seeds.



©James H. Miller, USDA-NRCS Plants Database

Trailing lespedezas are so named for their propensity to trail prostrate along the ground.

### Use by bobwhites

Where abundant, trailing lespedezas are an important staple in the fall diet of quail. The small leaves may be eaten by quail in the spring and early summer.



©James H. Miller, USDA-NRCS Plants Database

The legume, or bean family (Fabaceae) is important not only to bobwhites, but to wildlife in general. Through a symbiotic relationship with bacteria in their roots, legumes collect and store atmospheric nitrogen. Some of this nitrogen is later used by other, nonleguminous plants. In addition, legumes tend to produce abundant seed crops, many of which are important foods for wildlife.

Flowers of the trailing lespedezas range from white or pink ...



©Tom Barnes, University of Kentucky

to purple.



Tracey Slotta, USDA-NRCS Plants Database

Seeds of trailing lespedezas are similar in size and appearance to those other lespedezas, including sericea lespedeza, an undesirable pest (see *Caution on page 54*). The growth form of the trailing lespedezas should not be mistaken for sericea lespedeza.

## Milkpea

*Galactia volubilis*



### Description

This herbaceous legume demonstrates a hairy surface on the top of the trilobed leaf; the stems are also hairy. Milkpea can be found throughout most of the southern Midwest on rocky glades and open woods. Seedpods are about 2½ inches long.

### Bloom period

July – September



Scott Sudkamp, Missouri Department of Conservation

Leaves and stems are hairy. Vining growth often causes milk pea to climb other plants.

### Use by bobwhites

Milkpea seeds are readily eaten by bobwhites. They may serve as a component of brood cover as well.



Milkpea seedpods are hairy, 2-2½ inches long.

©Ted Bodner, USDA-NRCS Plants Database



©Tom Barnes, University of Kentucky

Leaflets are three-lobed, and flowers are pink to lavender.



Where available, seeds are readily consumed by bobwhites and other birds and small mammals.

Tracey Slotta, USDA-NRCS Plants Database



## Partridge pea

*Cassia fasciculata*,  
*Chamaecrista fasciculata*



### Bloom period

June – October

### Description

This annual legume is a staple in seed mixes for small game. It thrives in sandy soils and responds well to soil disturbance and burning. Partridge pea grows up to 3 feet tall (more commonly 12-18 inches) and has compound, alternate leaves. Leaflets are relatively small, less than 1 inch long. Flowers are bright yellow with reddish-purple bases, about 1 inch across. Ripened seedpods are red-brown and often shatter explosively when touched or squeezed, throwing seeds a considerable distance.

Compound leaves and bright yellow flowers make this plant readily identifiable.



Jennifer Anderson, USDA-NRCS Plants Database

### Use by bobwhites

Partridge pea seeds show up in numerous food habit studies in the south, but rarely in the Midwest. This may be because south-eastern growth forms are shorter and bushier than Midwest plants or because the seed may be more apt to fall on exposed ground in southern woods than on grassy prairie soils. Nevertheless, it is a good plant to include for diversity in planting mixtures and is relatively cheap. Like Illinois bundleflower, its presence is a good indicator of brood habitat because it readily appears after burns, disking or grazing. When partridge pea begins to decrease in fields where it was prevalent, it is probably time to consider some kind of disturbance to reinvigorate the stand.



©Don Kurz

Flowers are about 1 inch across, with reddish-purple bases.



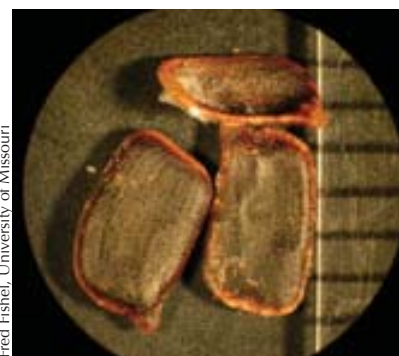
Scott Sudkamp, Missouri Department of Conservation

Seedpods are reddish brown and flattened, 1½ to 2 inches long.



©Don Kurz

Leaves are compound, rather than trilobed as in most legumes.



Fred Fishel, University of Missouri

Seeds are brown, flattened and rather square. (scale divisions = 1mm)

## Pigweed

*Amaranthus* spp.

carelessweed, redroot  
amaranth, water hemp,  
wild beet



### Bloom period

June – October

### Use by bobwhites

Pigweeds produce many seeds, which despite their small size, are regularly and abundantly consumed by bobwhites. Birds have been known to grasp the stem with their bill and strip seeds directly off the plant. Pigweed seed is available after snow has buried many other quail foods. Its occurrence on disturbed ground makes it attractive for brood rearing as well.

### Description

About a half dozen species of pigweed are common in the Midwest, often found in abundance in moist or disturbed areas. Leaves are alternate and simple. Small green or tan flowers produce small, round, shiny black seeds. The roots are red when pulled. Depending on the species, pigweed may grow 1-8 feet tall.



Most species of pigweed exhibit an upright growth habit, often growing more than 3 feet tall.

Scott Sudkamp, Missouri Department of Conservation

Scott Sudkamp, Missouri Department of Conservation



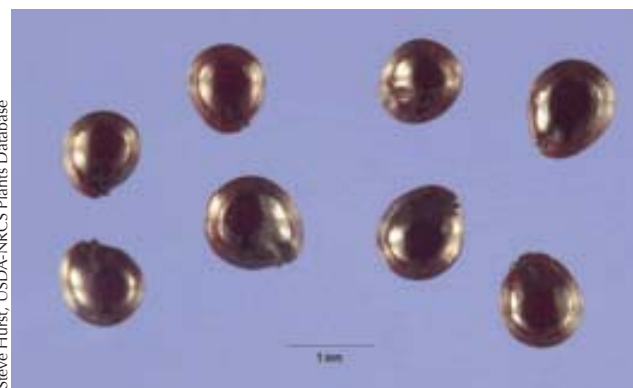
Sharp spines are present at the leaf axils of spiny pigweed, *Amaranthus spinosus*. Other species are spine-free. Also note flower formation at leaf axil.

Flowers emerge from leaf axils and the top of the plant.



Kevin Bradley, University of Missouri

Steve Hurst, USDA-NRCS Plants Database



Seeds are tiny, shiny, round and black. Quail and other birds readily consume them.



## Pokeweed

*Phytolacca americana*

poke, poke salad



### Bloom period

May – October

### Description

Pokeweed is common throughout the Midwest, and its size and fruit draw attention. This plant of disturbed areas, fallow fields and woodland edges may grow 6-8 feet tall. Leaves are smooth, oblong and usually 6-8 inches in length, though they may grow up to 12 inches. Stems turn bright purple as the plant matures. Clusters of succulent, shiny purple berries, about ¼ inch in diameter, occur at the tops of the plants.

**Caution:** The berries of this plant are poisonous to humans, as are the roots, stems and uncooked leaves.



Plants are tall (more than 5 feet) with a robust stem and spreading canopy.

Scott Sudkamp, Missouri Department of Conservation

### Use by bobwhites

Like many other birds, bobwhites are fond of pokeweed berries. Maturing in the summer, they may feed juvenile quail as well as adults. Where several plants grow in a cluster, the shade produces summer thermal cover for quail.



Scott Sudkamp, Missouri Department of Conservation

Each plant may produce hundreds of succulent, dark purple berries, relished by birds but poisonous to humans.



Scott Sudkamp, Missouri Department of Conservation

The dense shade and open understory produced by pokeweed provide ideal summer thermal cover for bobwhites.

Reddish-purple stems and rather large leaves are good identifiers of pokeweed before seed formation.



## Common ragweed

### *Ambrosia artemisiifolia*



#### Bloom period

July – October

#### Use by bobwhites

While the plants in this genus are persecuted as a field weed and the cause of hay fever, ragweed is undoubtedly among the most important foods of bobwhites. Ragweed seeds have a high energy content and are likely to be found in the crop of any bobwhite in fall and winter. It may be one of the few plants standing and holding seed above snow and ice during severe winters. In addition, patches of mature ragweed serve as roosting cover, while the structure of the plant and its tendency to thrive in early successional plant communities make it good brood cover as well. Ragweed responds best to disturbance in the fall; disking or burning in late spring may kill more seedlings than it stimulates.

#### Description

Common ragweed is an annual, commonly growing to 18 inches. Found throughout the Midwest, it quickly comes up in disturbed areas or following a fire. Leaves are simple, alternate, smooth and deeply lobed. Often the lobes are lobed again. Common ragweed is similar in appearance to western ragweed, a perennial species common throughout the Great Plains.



Common ragweed's upright structure and dense foliage makes it ideal as brood habitat.

Scott Sudkamp, Missouri Department of Conservation



Scott Sudkamp, Missouri Department of Conservation



Scott Sudkamp, Missouri Department of Conservation

Common ragweed leaves are deeply lobed and distinctive.

Male flowers are borne at the tips of the plant, while female flowers (where seeds are produced) occur at leaf axils.



Steve Hurst, USDA-NRCS Plants Database

Ragweed seeds are a frequent and preferred food of bobwhites. Seeds are easily recognized by the pointed tips and cusps.



©Ted Bodner, USDA-NRCS Plants Database

Disturbance (especially in fall) such as disking or burning should stimulate lots of ragweed seedlings the following year.



## Giant ragweed

*Ambrosia trifida*

horseweed



### Bloom period

July – October

### Use by bobwhites

Along with common ragweed, giant ragweed is responsible for innumerable cases of hay fever each summer. But also like common ragweed, giant ragweed is among the most favored foods of bobwhites. At least one researcher has found giant ragweed to contain more metabolizable energy by weight than corn. Giant ragweed often occurs in dense stands along field edges, providing great brood cover and summer thermal refuge.

### Description

As the name implies, this plant attains a considerable height, often in excess of 7 feet. The species name *trifida* refers to the leaves, which are three-lobed (sometimes five-lobed). Stems may be  $\frac{3}{4}$  inch or more in diameter at the plant base. Giant ragweed is common along field edges, roadsides, ditches and bottom-lands, and is a prolific seed producer.



Scott Sudkamp, Missouri Department of Conservation

The common name for this plant comes from its height. Under ideal growing conditions, plants may exceed 15 feet in height.



Scott Sudkamp, Missouri Department of Conservation

Leaves are commonly three-lobed, occasionally five-lobed.



Scott Sudkamp, Missouri Department of Conservation

Female flowers and seeds occur at the leaf axils.



Steve Hurst, USDA-NRCS Plants Database

Seeds are large and cusped, with an elongated central point. The high oil content makes them energy rich.

## Sensitive brier

*Mimosa quadrivalvis*  
*var. nuttallii*

devil's shoestrings,  
mimosa



### Bloom period

May – September



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Stems trail along the ground and are covered with short, hooked barbs.

### Use by bobwhites

A legume, sensitive brier is used by bobwhites as a food source and as a component of brood habitat. Quail nests have been found in and under sensitive brier, where it may afford better protection from predators than plants without the sharp thorns.

### Description

This trailing legume of dry prairies, glades and rocky savannas has a distinctive appearance. The prostrate stems are covered with hooked barbs. Doubly compound, featherlike leaves close rapidly when touched or disturbed. Flower clusters are just as distinctive, a fuchsia ball dotted with contrasting yellow stamens. Like the stems, seedpods are covered with barbs, but when opened reveal many seeds about 1/8 inch across.



©Don Kurz

Flower heads are bright fuchsia spheres, tipped with yellow stamens.

The common name of this plant comes from the tendency of the leaves to fold up when touched.



Matt Seek, Missouri Department of Conservation

Even the seedpods of this plant are covered with short bristles.



Seeds are about 3 mm long, brown and somewhat rounded.

Steve Hurst, USDA-NRCS Plants Database



## Smartweed

*Polygonum spp.*

buckwheat, knotweed,  
water pepper



### Bloom period

May – November

### Description

More than two dozen species of smartweeds are found in the Midwest, many of them quite commonly. Both annual and perennial species thrive in wet or moist soils and in early-successional plant communities. Annual smartweeds are prolific seed producers and are consumed by a wide variety of birds and other wildlife. The genus name *Polygonum* means “many knees,” a reference to the abundant, swollen nodes where the leaf meets the stem. Leaves are simple, alternate and parallel-veined; most are lanceolate. Flower clusters are white or pink, and at maturity the plant yields large numbers of seeds. In the fall, the stems are easily recognized by their angular joints and reddish color.



Missouri Department of Conservation

With adequate moisture, smartweed often forms extensive colonies. Flowers may be pink or white, depending on species.

### Use by bobwhites

Bobwhites, like many other birds, may consume large quantities of smartweed seeds. In addition, smartweed communities may be used as brood-rearing habitat.



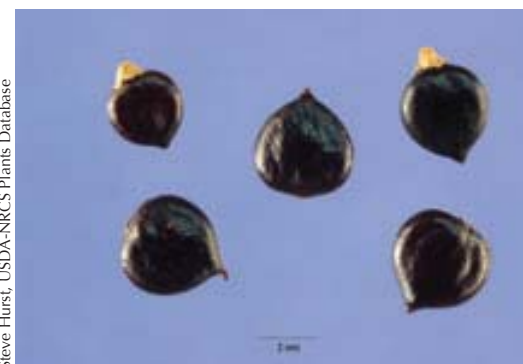
©Tom Barnes, University of Kentucky

Smartweed is a prolific seed producer, and seeds are readily consumed by many species of wildlife.

Nodes are conspicuously swollen, red and often angular.



Scott Sudkamp, Missouri Department of Conservation



Steve Hurst, USDA-NRCS Plants Database

Seeds are triangular in cross section, shiny, and black, with a pointed tip.

## Sunflower

*Helianthus* spp.



### Bloom period

July – October

### Use by bobwhites

Bobwhites readily consume sunflower seeds, though the seeds of several species quickly rot on the ground. Seeds have a high oil content, making them a valuable energy source. Dense stands are used as brood cover.

Unlike domestic varieties, wild sunflowers typically bear multiple flower heads per plant.

### Description

This large group of plants exhibits a variety of characteristics, but most of the commonly encountered species have triangular to lanceolate leaves, rough leaf surfaces and conspicuous yellow flowers. Seeds of wild sunflower species have the same shape but are smaller than sunflower seeds purchased for birdseed or human consumption. Unlike most garden-variety or commercially grown sunflowers, most of the wild sunflowers in the Midwest bear multiple flowers. Sunflowers thrive in disturbed areas such as crop fields, roadsides, overgrazed pastures and field edges, as well as woodlands, prairies, glades and old fields. They are commonly planted in food plot mixes. Native perennial species should be included in native grass plantings.



©Al Schneider, USDA-NRCS Plants Database



©Tom Barnes, University of Kentucky

Each “flower” on a stem is actually a collection of several hundred individual flowers. The inner, dark-colored center seen here is composed of disk flowers, while the bright yellow “petals” are ray flowers. Both disk and ray flowers produce seed if pollinated.



Steve Hurst, USDA-NRCS Plants Database

Stands of sunflowers provide good brood habitat in the summer, and plentiful food in the fall. The conspicuous yellow flower heads are easily recognizable. Leaf surfaces are noticeably rough on most species.



©Larry Allain, USDA-NRCS Plants Database

Sunflowers are so named because of the flower heads’ tendency to track the sun as it moves across the sky. Therefore, flower heads will typically face the same direction, as here.

Seed hulls of some species are striped, while others have all black hulls.



## Three-seeded mercury

*Acalypha gracilens*,  
*A. rhomboidea*

copperleaf, large-seeded mercury



### Bloom period

May – October

### Description

These annual plants are characterized by longitudinally folded, lobed, leaflike bracts that persist throughout the growing season. The seeds are small, egg-shaped and dark brown to light gray or tan. The leaves and leafy bracts change from green to copper in the fall as the mature seeds drop. Three-seeded mercury can be found throughout the Midwest from bottomland forests to upland prairies, pastures, old fields and disturbed places. Three-seeded mercury responds well to disking and fertilizer and often occurs along crop fields.



©Ted Bodner, USDA-NRCS Plants Database

Three-seeded mercury attains a coppery hue in the fall. By this time, seeds should have ripened and may be used by bobwhites.

### Use by bobwhites

Many insects are attracted to three-seeded mercury, making it a component of brood habitat for quail. Seeds are readily used by quail for food.



©Ted Bodner, USDA-NRCS Plants Database

During summer, the growth form of this plant may make it an important component of brooding habitat. Leaves are elliptical.

Many important and wildlife-friendly plants respond well to periodic disturbance, and may even require it. Habitat managers should employ techniques such as prescribed burning, disking and grazing to stimulate this and other important plants.



©James H. Miller, USDA-NRCS Plants Database

Bracts are leaflike appendages at the base of a flower.

The bracts of three-seeded mercury are conspicuous and aid in identification.



## Wild bean

*Strophostyles* spp.  
fuzzybean



### Bloom period

May – October

### Use by bobwhites

As with most legumes, bobwhites will eagerly consume wild bean seeds where available. Furthermore, it attracts many insects beneficial to broods.



©Ted Bodner, USDA-NRCS Plants Database

Unlike many plants, wild beans grow well even on acid soils, such as those found in many midwestern uplands as well as the pine range.

### Description

Three species of wild bean occur in the Midwest. Wild beans grow on many soil types and textures. Each of the three species is a somewhat small plant with twining vines and relatively small leaves composed of three leaflets. Seeds are present in hairy pods 1 to 1½ inches long (*Strophostyles leiosperma*) or 1½ to 3½ inches long (*S. helvola* and *S. umbellata*). It is often found climbing up other plants.



Kitty Kohout, R.W. Freckmann Herbarium (wisplants.uwsp.edu)

Wild bean pods are hairy, from 1 to 3½ inches long, depending on species.



©Tom Barnes, University of Kentucky

Flowers are pink to whitish pink.



Missouri Department of Conservation

Middle leaflets are borne on short stalks. Leaflet edges are smooth.



Tracey Slotta, USDA-NRCS Plants Database

Close inspection of the seeds can help separate the wild beans. *S. leiosperma* has smooth seeds, while *S. helvola* and *S. umbellata* seeds have a woolly coating. Of the latter two species, seed length can differentiate. *S. umbellata* seeds (shown here) are 3-5 mm long, while those of *S. helvola* measure 6-12 mm.



## Wild geranium

*Geranium carolinianum*,  
*G. maculatum*  
crane's bill



### Bloom period

April – June

### Description

Leaves of *Geranium* species are deeply cleft and palmately lobed. *Geranium maculatum* is most often found in woodlands, while *G. carolinianum* is more likely to be found in pastures, roadsides and other open areas. Seeds are located within the sharply pointed “crane’s bill” formed by the tubelike style of the flower. The presence of *G. carolinianum* is a sign of recent disturbance.



© Ted Bodner, USDA-NRCS Plants Database

Leaves are palmately lobed, spreading out like the fingers on a hand. This is *G. carolinianum*, which is deeply lobed.

### Use by bobwhites

Wild geranium adds to plant diversity within bobwhite habitat. Because it matures and flowers in the spring and early summer, wild geranium provides seeds and attracts insects earlier than many other plants.



Jennifer Anderson, USDA-NRCS Plants Database

Flowers of *G. maculatum* (here) are rather large and showy, with pink to purple petals, while those of *G. carolinianum* are considerably smaller ( $\frac{1}{3}$  to  $\frac{1}{2}$  as large) and whitish to pink. Note too the difference in leaf shape compared with *G. carolinianum* on page 80.



Erica Asai, USDA-NRCS Plants Database

The common name crane's bill comes from the appearance of the mature fruit.



Seeds of *G. carolinianum* (here) have a conspicuous honeycombed surface. Those of *G. maculatum* are also honeycombed, but less conspicuously so.

Steve Hurst, USDA-NRCS Plants Database

## Briars

*Rubus* spp.

blackberry, black raspberry, brambles, dewberry, jaggerbushes



### Bloom period

April - June

### Use by bobwhites

Briars provide food for many species of small mammals and birds, including bobwhites. Adults and chicks eat the fruit and insects that occur on the fruit. Large brambles provide summer loafing cover and year-round escape cover. Quail nests are often found in grass clumps under brambles. Habitat managers should avoid planting Himalaya blackberry, an exotic species that grows quickly in dense colonies and can quickly take over a pasture, reducing the amount of usable space for bobwhites.

### Description

Briars are erect shrubs growing to 2 feet tall in hard, dry pastures or occasionally branching to 8 feet in close colonies on better soils. The twigs and trunks are ribbed with numerous straight or recurved prickles. Flowers are white, blooming from April to June. The large, sweet fruits mature from June to August.



Scott Suckamp, Missouri Department of Conservation

Several briar species grow tall canes that form large thickets of dense, prickly cover. Quail easily move about in the understory, but the interwoven canes guard against predator attacks.



Robert H. Mohlenbrock, USDA-NRCS Plants Database

The briars exhibit numerous five-petaled white flowers from April through June.

The same thorny canes that vex hikers and berry pickers provide ideal cover for quail. Scattered briar thickets are a good choice for quail managers who want to provide year-round cover and a valuable summer food source.



©Ted Bodner, USDA-NRCS Plants Database

Primary canes of most blackberry species exhibit leaves with five leaflets, while flower canes (here) have three leaflets. Fruits ripen to a deep purple or black and provide quail a source of both food and water.



## Dogwoods, shrub

*Cornus* spp.

gray dogwood,  
redosier dogwood,  
roughleaf dogwood,  
silky dogwood,  
stiff dogwood,  
swamp dogwood



### Bloom period

May-July

### Description

These dogwoods are thicket-forming shrubs that can grow up to 12 feet tall. Stems consist of many irregular branched and interlaced twigs that form a dense canopy. Flowers are borne in terminal, long-stalked clusters, which develop into white to gray, globe-shaped fruits that mature in autumn. The leaves are simple, opposite and egg- to lance-shaped. Shrub dogwoods occur throughout the Midwest on many soil types and moisture regimes.

Shrub dogwoods are common in fence lines and along forest edges.

Individual plants are rather short (less than 12 feet tall) and somewhat rounded.



Scott Sudkamp, Missouri Department of Conservation

### Use by bobwhites

Shrub dogwoods — particularly roughleaf dogwood, gray dogwood and swamp dogwood — serve as excellent covey headquarters. The dense canopy afforded by the tightly interlaced twigs provides a nearly impenetrable barrier to avian predators. The closed, shaded canopy also reduces the amount of ground vegetation, providing essential bare ground and relief from summer heat. In fall, bobwhites readily consume the seeds. During winter, the tightly woven twigs reduce snow and ice accumulation. Shrub dogwoods and American plum should be familiar to any land manager with an interest in providing high-quality habitat for bobwhites.

Rob Chapman, Missouri Department of Conservation



Scattered dogwood thickets in association with native grass/forb communities are likely to attract bobwhite coveys.

*Covey headquarters* is the term used to describe a bobwhite covey's base of operation in the fall and winter. Missouri research has demonstrated that the average distance quail will venture from this cover in winter is about 70 feet.

Rob Chapman, Missouri Department of Conservation



Shrub dogwoods often form extensive thickets. The height and stem density provide outstanding summer and winter thermal cover as well as escape cover from predators.

An open understory is a requisite for covey *headquarters*, as is size. Research suggests that headquarters thickets should cover an area of about 1,500 sq. ft. to increase the likelihood of covey use. Heights of 3-12 feet are preferred.

Fruits of the shrub dogwoods are white or bluish drupes, normally occurring in clusters.



Scott Sudkamp, Missouri Department of Conservation



## Elderberry, common

*Sambucus canadensis*



### Bloom period

May - July

### Description

Common elderberry is a shrub that grows to 8 feet tall and forms dense colonies from root sprouts. The tops are multibranched, bearing opposite, pinnately compound leaves 4-12 inches long. Lance-shaped leaflets are 2-6 inches long, 1-2 inches wide and sharply toothed. The light yellow-brown to gray-brown twigs are covered with many lenticels. Large clusters of white flowers bloom from late May to July and are conspicuous even from a distance. Purple to black fruits occur in clusters on flat-topped heads from August to October. Common elderberry occurs throughout the Midwest in open woods, thickets, stream banks, fencerows, roadsides and railroad rights-of-way. Fire and diking should be used sparingly around this shrub.



©James H. Miller, USDA-NRCS Plants Database

The dense foliage of elderberry thickets makes excellent summer thermal and escape cover.



©Tred Bodner, USDA-NRCS Plants Database

Large clusters of white flowers atop this shrub make elderberry conspicuous and readily identifiable.



lenticels

Scott Sudkamp, Missouri Department of Conservation

Elderberry twigs are covered with many lenticels. Leaves are opposite in their attachment.



Scott Sudkamp, Missouri Department of Conservation

Mature fruits are purplish black and occur from August through October. More than 45 species of birds are known to consume these berries. Care must be taken to avoid confusing elderberry fruits with those of pokeweed, which are poisonous to humans.



## Grapes, wild

*Vitis* spp.,  
*Ampelopsis* spp.



### Description

Grapes are vines capable of climbing to 75 feet or more by means of tendrils. Leaves are alternate, simple and heart-shaped (*Vitis*) to triangular (*Ampelopsis*). Flowers bloom from mid to late spring, and globe-shaped fruits are borne in drooping clusters from late summer through fall.



Scott Sudkamp, Missouri Department of Conservation

Wild grape can quickly cover a brush pile, enhancing its value to quail.

### Use by bobwhites

The fruits are eaten by many species of birds, including bobwhites. Vines sometimes provide woody cover when they form a dense net and grow to cover brush piles and downed trees. Quail managers engaged in edge-feathering projects that drop mature trees can use this to their advantage by cutting trees with grapes attached. By cutting the tree but not the vine, the grapes will quickly spread to cover the downed tree, offering good summer and winter cover and putting the fruit in reach of bobwhites.

Don Kurz, Missouri Department of Conservation



Wild grape fruits resemble miniature versions of the cultivated varieties. Many wildlife species relish the fruits.

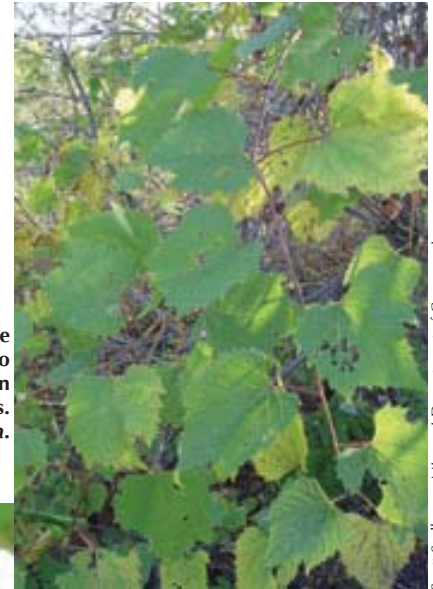
Grape leaves are simple and alternate on the stem. Leaves of the true grapes (*Vitis*) tend to be somewhat heart-shaped, while the raccoon grape (*Ampelopsis*) has triangular leaves. Shown here is riverbank grape, *Vitis riparia*.

Scott Sudkamp, Missouri Department of Conservation



Tendrils are the means by which grape vines climb trees and trellises.

Scott Sudkamp, Missouri Department of Conservation



## Greenbrier

*Smilax spp.*

bullbrier, catbrier,  
carrion flower,  
horsebrier, wild  
sarsaparilla



**Bloom period**

May - June

### Use by bobwhites

Bobwhites readily eat the seeds of greenbrier. In its sprawling habit, bristly greenbrier forms an impenetrable mass of branches that provide good escape cover.

### Description

Greenbriers are numerous and widely encountered throughout the Midwest, occurring in low woods in valleys and thickets, along stream banks, on rich wooded slopes, and along roadsides and fencerows. They grow as stout vines, climbing with the aid of tendrils that arise in pairs at the base of leaf stalks. The flowers are small and green and grow in clusters of 5 to 26 flowers on long stalks. Fruits ripen in early fall. Stems are often densely covered with black thorns that can be up to ½ inch long.



Scott Sudkamp, Missouri Department of Conservation

Dense tangles of greenbrier provide good escape cover for bobwhites and nesting habitat for many other species.



Scott Sudkamp, Missouri Department of Conservation

Tendrils are specialized structures that aid vines in climbing. Upon contact with branches, tendrils will curl around the twig, as seen here.



Scott Sudkamp, Missouri Department of Conservation

Greenbrier fruits are about the size of a pea and black or bluish black when mature. The fruits seen here are not yet ripe.



Scott Sudkamp, Missouri Department of Conservation

Greenbrier is aptly named. Stems are green and covered with prickles, many more than ¾ inch long.



## Hazelnut

*Corylus americana*

American hazelnut, filbert



**Bloom period**

March-April

### Description

Hazelnut is a thicket-forming, spreading shrub that can vary in height from 3 to 10 feet and occurs in dry or moist woodlands, prairies and savannas. Leaves are egg-shaped to oval, doubly serrated with five to eight veins on each side of the central vein. Fruits occur in clusters of two to six and are encased in large modified leaves called bracts. The sweet, light-brown fruits are prized by coffee drinkers and cooks throughout the world.



Chris Starbuck, University of Missouri

Hazelnut's thicket-forming growth habit makes it important to quail and other wildlife for cover.

### Use by bobwhites

Bobwhites readily consume hazelnuts where they are available. The dense canopy of leaves provides good summer thermal cover and escape cover from predators.



Chris Starbuck, University of Missouri



Chris Starbuck, University of Missouri

Catkins are single-sex inflorescences produced by several plant genera, such as oaks and birches. Hazelnut belongs to the birch family. In this species, the male catkins are typically solitary, 3-4 inches long, and occur from February through April.

Hazelnut leaves are simple, alternate, 3-6 inches long. They are egg-shaped to oval with doubly serrated margins.



Jim Rathert, Missouri Department of Conservation

Hazelnuts mature from July to August in clusters of 2 to 6. They are encased in large reddish-brown bracts.

While whole hazelnuts are too large for bobwhites to consume, they will readily eat pieces that larger animals drop.



Steve Hurst, USDA-NRCS Plants Database

## Huckleberry

*Vaccinium* spp.

blueberry, deerberry, farkleberry



### Bloom period

April - June

### Use by bobwhites

Huckleberry fruits are a staple in the diets of many wildlife species and are consumed frequently by bobwhites and other songbirds. The seeds will persist well into winter, when other preferred food sources become scarce. Dense colonies may provide summer thermal and escape cover.

### Description

*Vaccinium*s are stiffly branched leafy shrubs or small trees, often found in extensive colonies, from 6 inches to 10 feet tall. Although uncommon in some regions, they occur throughout the Midwest, often on acid soils overlying sandstone, chert or igneous bedrock of dry open woods, glades, ridges and upland slopes. The alternate, simple leaves are  $\frac{3}{4}$  to 3 inches long and  $\frac{1}{2}$  to 1 inch wide. The fruits are blue to black berries with a faint whitish coating and are sweet and palatable. The fruits contain as many as five seeds and mature from late June through August.



*Vaccinium*s are stiff-branched shrubs from 6 inches to 10 feet tall.

©James H. Miller, USDA-NRCS Plants Database

North Dakota State Soil Conservation Committee, USDA-NRCS Plants Database



Flowers of huckleberry and related species are white to pinkish, bell-shaped, and five-lobed. Flowering typically occurs from April to June.

©Ted Bodner, USDA-NRCS Plants Database



More than a dozen species of birds, including bluebirds, ruffed grouse, scarlet tanagers, wild turkeys and bobwhites use *Vaccinium*s for food. Gray fox, cottontail rabbits and white-tailed deer also eat the fruit or leaves and stems.

Fruits change from red to blue or purple as they ripen and contain as many as five seeds. They ripen from late June through August.



## Indigo, false *Amorpha fruticosa* indigobush



### Bloom period

May - July

### Description

The Latin name *fruticosa* refers to the shrubby character of this plant that occurs in moist ground in thickets along streams, rocky banks, pond borders and open wet woods. The leaves are pinnately compound. The dense flower clusters are deep purple to blue and produce numerous fruits that mature in late summer. The roots and stems of false indigo contain rotenone, which is used as an insecticide and fish poison and has shown some anticancer activity.



North Dakota State Soil Conservation Committee, USDA-NRCS Plants Database

The dense foliage and rapid growth of false indigo make for excellent summer thermal cover. This shrub occurs naturally around ponds and other moist areas in the western Midwest, and transplants well.

### Use by bobwhites

Bobwhites readily eat the seeds of this member of the bean family. The dense, interlacing foliage provides excellent summer thermal and loafing cover and should be included in any bobwhite habitat management plan, particularly around ponds or other water impoundments.



North Dakota State Soil Conservation Committee, USDA-NRCS Plants Database

False indigo leaves are pinnately compound, with leaflets  $\frac{3}{4}$  to  $1\frac{1}{2}$  inches long.



Jennifer Anderson, USDA-NRCS Plants Database

False indigo has beautiful spikes of flowers  $2\frac{1}{2}$  to 6 inches long, purplish blue, dotted with yellow stamens.



Scott Sudkamp, Missouri Department of Conservation

False indigo produces an abundance of seeds and is an important food source for quail.



Steve Hurst, USDA-NRCS Plants Database

Each pod contains a single seed. Seeds are shiny brown, curved at one end.



## Oaks

*Quercus* spp.



### Description

With more than 30 different species, oaks are arguably the most diverse group of trees in the Midwest. Oaks can be divided into two groups: red oaks and white oaks. Red oak leaves are bristle-tipped on each lobe, and the bark is typically dark-colored and furrowed. Red oak acorns take two years to mature and are bitter tasting. The inner surface of the acorn shell is coated with hairs and the acorn cap scales are usually thin. White oak leaves have rounded lobes and the bark is grayish and usually scaly. The acorns of white oaks mature at the end of their first growing season and are somewhat sweeter than red oak acorns. The acorn caps of white oaks are knobby outside and smooth underneath.



Jim Rathert, Missouri Department of Conservation

Oaks are long-lived trees that produce a seasonally important food for dozens of wildlife species. Their distinctive leaves and bark are identifying features.

### Use by bobwhites

Acorns are prized by bobwhites in the fall. They are a valuable source of carbohydrates that bobwhites convert to fat to meet the energy demands of winter. Of particular importance to bobwhites are oak species that dependably produce many small acorns, like chinkapin, post, pin, shingle and black jack oak. Bobwhites also readily consume pieces of larger acorns dropped by squirrels or deer. Oak sprouts that are kept short by mowing can provide adequate thermal cover in summer and brood habitat if not allowed to dominate an area. Dense stands of young oaks less than 10 feet tall can provide escape cover.

Jim Rathert, Missouri Department of Conservation



The red oaks include species with "bristle tipped" leaves, as well as shingle oak (far right).

Jim Rathert, Missouri Department of Conservation



The white oak group contains species with round-lobed leaves.

Differences between red oak and white oak species include leaf shape, bark color and texture, acorn maturity, and acorn physical characteristics.

Jim Rathert, Missouri Department of Conservation



Acorns from the white oak group (left and middle) mature in a single year, and their caps are knobby on the outside and smooth underneath. Red oak acorns (right) require two years to mature. The underside of the cap is hairy and the outer surface consists of thin, smooth scales.



## Osage orange

*Maclura pomifera*

bois-d'arc, bowwood, hedge, hedge apple



### Description

A member of the mulberry family, Osage orange grows as a medium-sized tree up to 50 feet tall, and occurs along streams, at the edges of woods and in fencerows and thickets. Fleshy fruits up to 5 inches in diameter have a yellow-green color and a knobby surface that resembles a brain. Fruits form in late summer and begin to fall in October. Alternate, simple leaves taper to a long, pointed tip. The twigs are slender with milky sap and have stout, straight spines about ½ inch long that emerge from above the leaf attachment.

Open grown Osage orange trees often have drooping branches that afford cover to bobwhites, but trees cut and laid over place more dense cover on the ground where quail need it. Consider cutting such trees to improve brushy cover.



Scott Sudkamp, Missouri Department of Conservation

### Use by bobwhites

Osage orange has been planted since the early 1800s primarily for windbreaks and hedgerows. Bobwhites readily find refuge from weather and predators beneath the boughs of Osage orange where thick stands can form an impenetrable canopy. The suitability of Osage orange diminishes with age. Periodic thinning of mature stands is required to maintain the dense shrubby qualities of this species. As with eastern red cedar, mature Osage orange trees offer better cover to bobwhites when cut and laid over than when left standing. Significant numbers of Osage orange seeds have been found in quail crops. They were probably eaten after squirrels or other animals opened the fruits.



Scott Sudkamp, Missouri Department of Conservation

Hedge wood is renowned for its hardness and resistance to decay. These same characteristics that make it so desirable for fenceposts make it attractive to habitat managers. Hedge trees cut for covey headquarters can be expected to persist for a decade or more without breaking down.

Osage orange leaves are alternate, simple, and shiny with a long pointed tip. Twigs typically bear numerous stout spines.



Scott Sudkamp, Missouri Department of Conservation

Osage orange fruit, or hedge apples, are up to 5 inches in diameter and resemble a green brain.

Inside the pithy fruit are dozens of elongated seeds. Quail and other birds sometimes consume these seeds, often after squirrels open the fruits.



Steve Hurst, USDA-NRCS Plants Database

## Plum, American

*Prunus americana*

wild plum



### Bloom period

April-May

### Description

American plum occurs in woodlands, pastures and thickets throughout the Midwest. This species can grow as a small tree up to 20 feet high but more commonly occurs in colonies or thickets by sending up root suckers and shoots. The leaves are egg-shaped, simple and alternate. The twigs are slender and smooth and may have spurlike branches or thorns. The bark breaks into long, thin, scaly plates and is covered with lenticels. It is one of the first shrubs to bloom in spring with showy clusters of fragrant white flowers. The globe-shaped fruit is variable in size and ripens from July through September. Ripe fruits are red, sweet and desirable to wildlife, as they are to makers of jellies, preserves and pies.

Another species, Chickasaw plum (*Prunus angustifolia*), is common in the southern Great Plains.

The dense foliage of wild plum offers good thermal refuge from intense summer heat.



Scott Sudkamp, Missouri Department of Conservation

### Use by bobwhites

This species' most valuable attribute in quail habitat is as covey headquarters. The dense canopy of leaves in summer shades out plants on the ground, providing ideal loafing cover and escape from the heat of summer days. Twigs of multiple plants intertwine to provide excellent winter cover and an almost impenetrable barrier to predators. The fruit of American plum is eaten by many species of wildlife, including bobwhites.



Missouri Department of Conservation

Wild plum is among the first flowers of spring. Fragrant white flowers occur in clusters of two to five and have five petals.



The Samuel Roberts Noble Foundation, Ardmore, Oklahoma

Fruits are fleshy red drupes ¾ inch to 1 inch long.



Scott Sudkamp, Missouri Department of Conservation

Wild plum leaves are simple and alternately arranged. They range from 2½ to 4 inches long and are dark green with a pointed tip and toothed margin.



# Poison ivy

*Toxicodendron radicans*



## Description

Poison ivy is a vine that can grow up to 60 feet high, trailing or climbing by aerial roots. It can also grow as a low, upright shrub. This species is often identified by alternate leaves with three oval to lance-shaped leaflets with a pointed tip. The leaves turn brilliant shades of red, orange and yellow in the fall. The flowers are greenish white and grow in clusters 1 to 4 inches long on new growth of stems. Creamy white fruits are globe-shaped, about ¼ inch across and grow in grapelike clusters. The entire plant contains a poisonous oil that produces an intense skin irritation for humans who come in contact with it.



This “quail’s eye view” of a poison ivy patch exemplifies good summer thermal and escape cover. Note that there is no mat of sod in the understory to inhibit movement or foraging.

Scott Sudkamp, Missouri Department of Conservation

## Use by bobwhites

Despite the hazard it presents to unwary hikers and gardeners, poison ivy is desirable as a favorite food of bobwhites. In areas where the plant is abundant, it is not uncommon to find quail crops full of poison ivy berries. Quail commonly locate nests in association with woody vines such as poison ivy. Dense stands can provide escape cover.



Missouri Department of Conservation

Poison ivy leaves consist of three leaflets with a shiny surface. The central leaflet stalk is ½ to 1¼ inches long. Leaflets have pointed tips.



Missouri Department of Conservation

Poison ivy fruits look like grape clusters. Individual fruits are creamy white, round, and about ¼ inch across.

While poison ivy produces an intense allergic reaction in most people, wildlife are not affected. Many species use this plant for food and cover. Examination by the authors of the crop from a single quail harvested in Oklahoma revealed more than 80 poison ivy berries that had been consumed.

# Possum haw *Ilex decidua* deciduous holly



## Description

Possum haw grows mostly as a shrub but sometimes as a tree up to 30 feet tall. The twigs are slender with short, spurlike lateral twigs. Possum haw can be dioecious, which means male and female flowers are borne on separate plants. The white flowers bloom in mid-spring either singularly or in clusters. Fruits are orange to red and globe-shaped, ripen in fall, and are persistent throughout winter. Female shrubs can be heavy fruit producers. Possum haw can occur in many habitats from glades and rocky, open woods to pond borders, swamps, and low wet woods along streams.



Rex Hamilton, USDA-NRCS Plants Database

The dense foliage of possum haw can provide summer thermal cover.

## Use by bobwhites

Many birds, including quail, consume large quantities of possum haw fruits, particularly in hard winter weather or when other food supplies become scarce. Possum haw may provide summer thermal cover and limited escape cover.



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Branches are light to dark gray with many spurlike twigs. Leaves are rounded at the tip with a tapered base and have round or blunt teeth.



Clarence A. Rechenthin, USDA-NRCS Plants Database

Female trees often bear abundant fruits. Intoxication can result when birds eat fermented fruits in late spring.



USDA-NRCS Plants Database

Round red berries are about 1/4 inch across and contain about four seeds each.



## Red cedar, eastern

*Juniperus virginiana*

cedar, juniper, red cedar



### Description

Eastern red cedar is a small to medium-sized tree up to 50 feet tall. It is an aromatic evergreen with a dense pyramid-shaped to cylindrical crown. Male and female cones usually appear on separate trees. Male cones produce clouds of pollen in late winter and early spring and are a common source of hay fever. Berries (female cones) are dark blue and mature in late summer. Eastern red cedar commonly occurs on glades and bluffs, open rocky woods, pastures, old fields, roadsides and fencerows.

### Use by bobwhites

Although eastern red cedar fruits are not a favorite food, bobwhites will consume them when other foods are scarce. Bobwhites seek shelter during winter under red cedar's low, dense canopy. Old fields that become invaded by cedar may soon be devoid of bobwhites as cedars crowd out other plants and form dense stands with no understory vegetation. Cedars taller than 15 feet probably offer better bobwhite cover when cut and laid over than they do standing. Quail regularly use these cut trees for shelter from snow and winter wind. If cedars are planted or left for cover, habitat managers should regularly burn adjacent cover to control the spread from seed. Eastern red cedars less than 5 feet tall are easily controlled with prescribed burning. Cutting the female, seed-bearing trees also helps control spread.



Eastern red cedar is a common, easily recognized species throughout the Midwest.

Scott Sudkamp, Missouri Department of Conservation



Missouri Department of Conservation

Although some eastern red cedar can improve wildlife habitat, rapid spread of the species will crowd out many plants and decrease habitat suitability.



Missouri Department of Conservation

Red cedars more than 15 feet tall may provide better quail cover when they are cut and laid over to form covey headquarters.



Missouri Department of Conservation

Female trees bear hundreds of blue berries (female cones). While not a preferred food by bobwhites, red cedar seeds persist well into winter and may be used in times of food scarcity.

## Sassafras

*Sassafras albidum*



### Description

Sassafras trees are short to medium-sized and sometimes form dense colonies from root sprouts. Sassafras is easily identified by the leaves that have margins of three shapes: entire, one-lobed and three-lobed. The leaves have a spicy aroma when crushed and turn orange as early as late August. The twigs have a yellow-green hue, turn upward at the tips and also have a spicy fragrance when crushed. The dark blackish-blue fruits attach to a long, red, swollen stalk and mature in early fall. Sassafras can be found growing in old fields, fencerows, railroads and roadsides as well as on the border of dry woods, glades, prairies and bottomlands.

### Use by bobwhites

Perhaps best known for the tea made from its root bark, sassafras is also an important dietary staple for many wildlife species. Deer, rabbits and woodchucks browse the leaves. Bobwhites and other songbirds frequently consume the fruits. Dense colonies may provide summer thermal and escape cover.



Sassafras grows as a short to medium-sized tree. Dense colonies of small sprouts may afford summer thermal and escape cover.



Sassafras flowers are yellow and appear on female trees in April and May.

Missouri Department of Conservation

Blackish-blue fruits are borne on bright red stalks, swollen at the point of fruit attachment.



©Steve Baskauf, Vanderbilt University (bioimages.vanderbilt.edu)



Sassafras leaves occur in three shapes: three-lobed, one-lobed, and unlobed (entire). Leaves and stems also produce a spicy aroma when crushed.

Missouri Department of Conservation



## Sumacs

*Rhus* spp.  
shumac



### Description

Four species of sumac occur commonly in the Midwest, often growing as thicket-forming shrubs, but occasionally up to 20 feet tall.

Sumacs can grow in a variety of Midwest soil types and occur in most habitat communities, including prairies, old fields, pastures and open woodlands. Winged, smooth and staghorn sumac have single stems and a broad reaching canopy of pinnately compound leaves. Fragrant sumac, which produces an aromatic odor when crushed, has three leaves resembling poison ivy but with more serrated margins. The leaves of all species often turn a brilliant red in autumn. Fruits are red and persist well through winter and into early spring. Smooth sumac tends to be invasive in pastures and hayfields. Fragrant sumac is the best of the four for quail habitat plantings.

### Use by bobwhites

The primary benefit of sumacs to bobwhites is the summer thermal cover they provide. The branches do not interlace extensively and therefore provide little if any winter cover. The lack of a dense canopy often allows fescue or brome to grow in the understory as well, negating its value as woody cover. While not especially energy rich, seeds are commonly consumed by quail. The fruits can become important to bobwhite survival during periods of deep snow or ice in the late winter when other food items have become depleted or are otherwise unavailable.



©Ted Bodner, USDA-NRCS Plants Database

In smooth sumac, pinnately compound leaves offer summer thermal cover, while dense clusters of red hairy fruits provide food.



USDA-NRCS Plants Database / Herman, D.E., et al. 1996. North Dakota tree handbook.

Aromatic sumac's leaves and its fruit arrangement are quite different from the other common midwestern sumacs, but this species' growth habit and denser branching make it better for quail habitat.



Scott Sudkamp, Missouri Department of Conservation

Smooth sumac (*R. glabra*) is so named for the smooth main stems and central leaf stems.



Scott Sudkamp, Missouri Department of Conservation

Winged stem of leaf

The central stems of winged sumac (*R. copallina*) leaves are winged.



## Viburnum

*Viburnum* spp.

arrowwood, blackhaw, nannyberry



### Bloom period

April-June

### Use by bobwhites

Viburnum fruits are eaten by many birds. Thickets near streams may provide quail relief from summer heat. The seeds persist through winter and may provide a valuable food source for quail when other foods become scarce. The combination of its food and cover values for quail and its aesthetic, visual qualities make viburnums an attractive plant in quail habitat projects.

### Description

In the Midwest, many species of viburnum grow as shrubs or small trees with branching crowns. Flowers are borne in dense, flat-topped panicles that produce many red to bluish black, berrylike fruits in fall. The leaves are opposite and turn brilliant shades of deep rose-purple to rose-red or bright red in fall. Viburnums occur throughout the Midwest, sometimes in thickets, in association with rocky or dry woods, glades and rich, moist valleys along streams.



USDA-NRCS North Dakota State Soil Conservation Committee

Dense branches and foliage make viburnums good for cover, especially where they occur in thickets.



©Ted Bodner, USDA-NRCS Plants Database

White flowers occur atop dense, flat-topped panicles. Leaves are opposite and toothed.



Scott Sudkamp, Missouri Department of Conservation

At least 10 species of viburnum are known to occur in the Midwest, on habitats ranging from dry, rocky woods to rich, moist valleys.



USDA-NRCS North Dakota State Soil Conservation Committee

Mature fruits are red to bluish black, depending on the species.



## Glossary

**Alternate** – occurring singly at each node; (compare *opposite*)



**Annual** – a plant that germinates, flowers, sets seeds, and dies within one year

**Axil** – the upper angle between a leaf or branch and the stem from which it arises

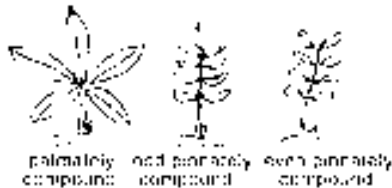
**Bract** – a leaflike structure at the base of a flower

**Bunch grass** – any of various grasses that grow in clumps

**Catkin** – a scaly, nodding spike consisting of flowers of a single sex

**Collar** – the area on the outside of a grass leaf where the blade joins the sheath

**Compound leaf** – a leaf blade that is separated into two or more distinct leaflets



**Dioecious** – Bearing male (staminate) and female (pistillate) flowers on separate plants

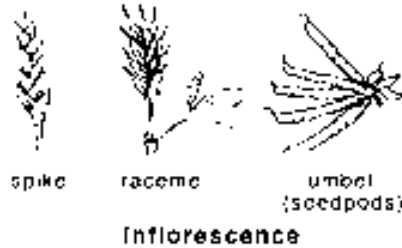
**Drupe** – a fleshy fruit containing a single, stony seed (pit)

**Ecotype** – individuals that are adapted to a specific environment

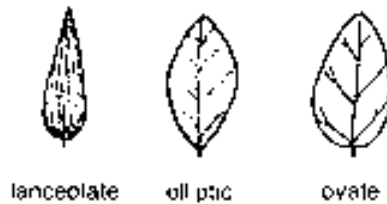
**Forb** – herbaceous plant other than a grass or sedge

**Glade** – rocky, open barrens within a woodland landscape characterized by the absence of trees, shallow soils and exposed bedrock; often dominated by drought-adapted forbs and warm-season grasses

**Inflorescence** – the flowering part of a plant



**Lanceolate** – lance-shaped; much longer than wide and narrower at the tip than at the base



**Legume** – a plant belonging to the bean family (Fabaceae). Typically produces seeds in pods. Legumes capture and store nitrogen in their roots through a mutually beneficial relationship with certain bacteria.

**Lenticel** – a slightly raised, somewhat corky, lens-shaped area on the surface of a stem

**Lignin** – a chemical polymer that functions as a natural binder and support for cellulose fibers. Lignin stiffens leaves, stalks and stems.

**Ligule** – a membranous appendage arising from the inner surface of the leaf junction with the leaf sheath

**Lodge** – to flatten under the pressure of snow cover or heavy rain

**Mesic** – in reference to habitats, moderately moist; in reference to plants, requiring moderate moisture

**Naturalized** – introduced plants that have become established and are naturally reproducing

**Node** – the position on the stem where leaves or branches originate

**Opposite** – occurring across from each other at the same node; (compare *alternate*)

**Palmate** – Lobes radiating out from the center like fingers from the palm of a hand

**Panicle** – branched flowers that mature from the bottom up

**Perennial** – a plant that lives for three or more years

**Petiole** – a leaf stalk (see *simple leaf*)

**Pinnately compound** – a compound leaf with leaflets arranged on opposite sides of an elongated axis; (see *compound leaf*)

**Procumbent** – trailing along the ground without becoming rooted

**Savanna** – grasslands interspersed with open-grown, widely spaced trees

**Scalloped edges** – curved projections forming an ornamental border

**Serrated** – sawlike, toothed along the margin with the teeth pointing forward

**Simple leaf** – a leaf blade that is not separated into leaflets

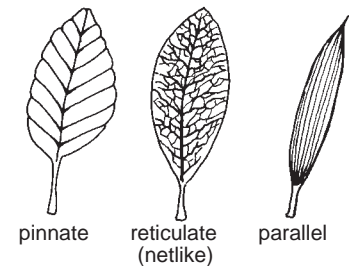
**Stamen** – the male flower part that produces pollen

**Stipule** – one of a pair of leaflike appendages found at the base of the petiole in some leaves

**Style** – the narrow portion of the female reproductive portion of a flower

**Tendrils** – a slender, twining stem used to grasp support for climbing

**Venation** – the arrangement of veins in a leaf



**Whorled** – a leaf arrangement with three or more leaves arising from a single node

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