

A close-up, top-down view of a lush field of yellow pasture legumes. The plants are densely packed, with numerous bright yellow flowers and green leaves visible. The lighting is bright, highlighting the vibrant colors of the flora.

A3787

Identifying pasture legumes

**Dennis Cosgrove
Dan Undersander**



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Identifying pasture legumes

Dennis Cosgrove and Dan Undersander

Legumes are an important component of Midwestern pastures. They increase yield and quality of grass pastures and provide nitrogen to grasses through fixation of atmospheric nitrogen. This booklet identifies the nine most common legumes in Midwestern pastures.

This guide will help you identify legumes the first year, when you need to know if a seeding was successful. It will also help you identify legumes in established pastures so you can make informed decisions about pasture management, fencing and renovation.

This booklet is organized in three parts:

- Seed and seedling identification for new plantings,
- Identification of established plants (with flowers), and
- Information about growth habit and management for each legume.

What is a legume?

A legume is defined as a plant with seeds in a pod that splits into two distinct halves. Some common examples are peas, beans and peanuts. The plants discussed in this booklet have this characteristic and are therefore classified as legumes. We rarely see the seedpods on these plants as they are usually harvested well before they form. Many legumes have compound leaves (more than one leaflet per leaf) and fix nitrogen. This is not a good description of a legume however as many non-legumes also possess these traits.

Using this guide

Before you plant

Before purchasing legume seeds, you may want to consult the legume management section of this booklet. It describes the ideal uses for each species and outlines the best techniques for successful establishment, management and harvest. The species information chart on page 46 summarizes seeding rates and relative tolerance to drought, grazing and cold temperatures.

Identifying seeds and seedlings

The best time to identify seedlings is in the 3- to 4-leaf stage. At this time vegetative characteristics should be easily seen. Forage legumes exhibit significant variation among populations of the same species and often grow in mixed stands of several species. For this reason it is best to examine several plants to determine if the identifying characteristics you observe are consistent.

Identifying vegetative legumes and flowers

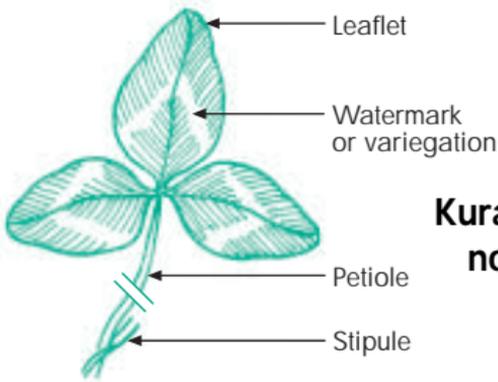
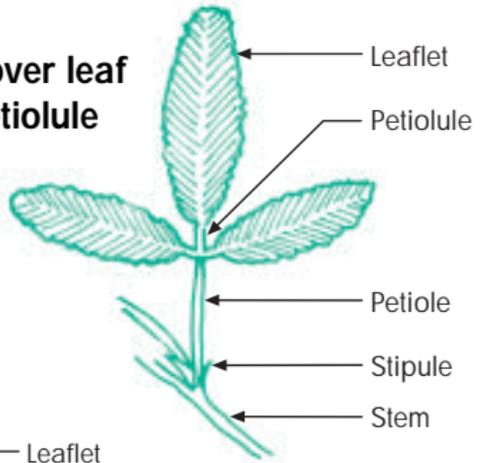
We have organized the legumes in this section according to leaf characteristics. Determine if the leaf has a petiolule. Then use the guide to compare other vegetative characteristics. If the plant is flowering, the flower type and color may also be helpful.

Variety selection

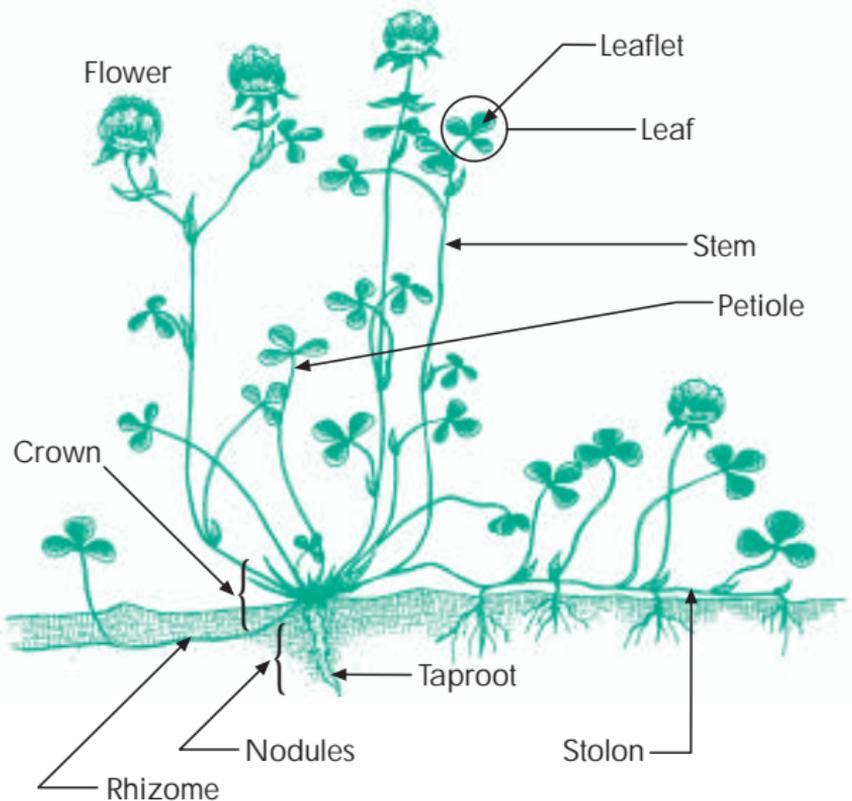
For more information on variety selection, consult Extension publication Forage Variety Update for Wisconsin (A1525) or visit www.uwex.edu/ces/crops/uwforage/uwforage.htm

Parts of a legume plant

Sweet clover leaf with petiolule



Kura clover leaf no petiolule

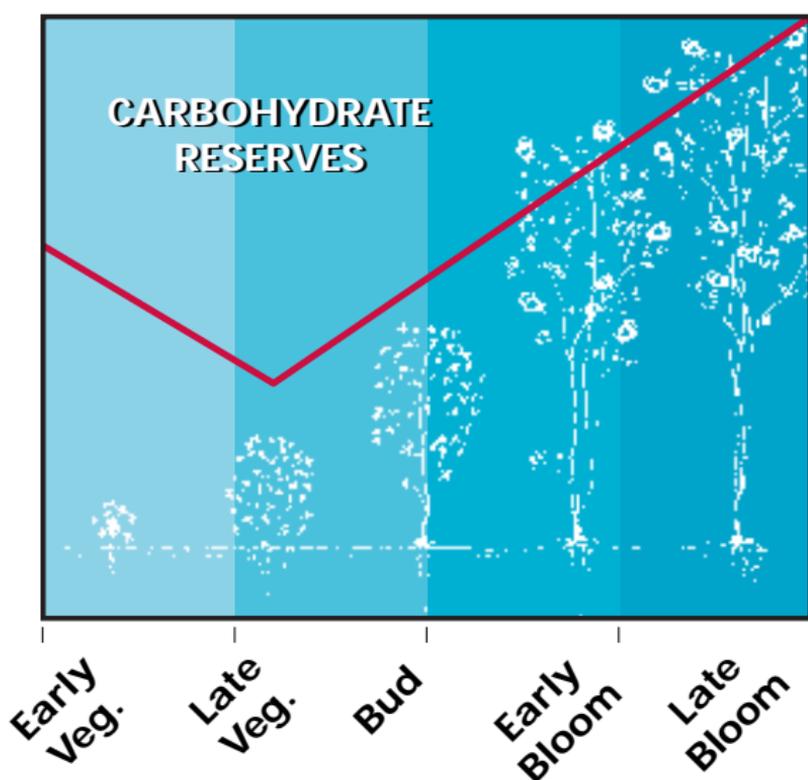


Glossary

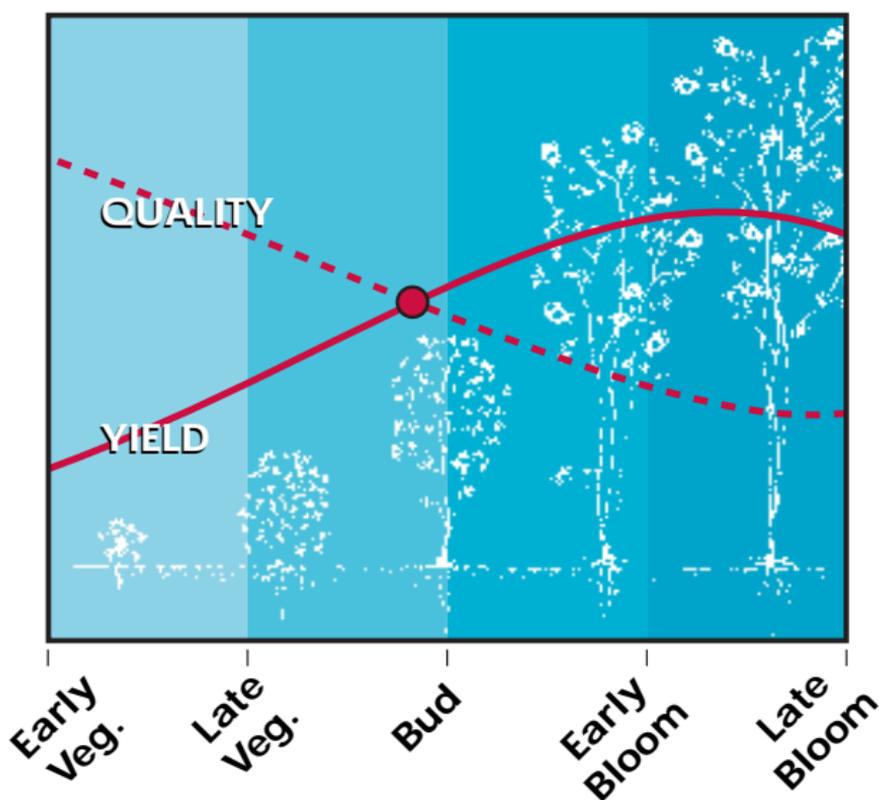
- Head** A dense inflorescence of flowers without stems.
- Inflorescence** The arrangement of flowers on the floral axis.
- Internode** Area of the stem between the nodes.
- Node** The point on the stem where leaves are attached.
- Petiole** The stalk of a leaf which connects the leaf to the stem.
- Petiolule** Extension of the petiole into the leaflets of a compound leaf.
- Pubescence** Small hairs on the surface of leaves and stems.
- Raceme** An inflorescence in which flowers are mounted on short stems along a central axis.
- Rhizome** An underground stem which is capable of producing new plants at the nodes.
- Stipule** Small, pointed, leaf-like structures at the base of the petiole.
- Stolon** A prostrate above-ground stem which is capable of producing new plants at nodes.
- Tendrill** A slender modified leaflet used for support.
- Umbel** An inflorescence in which flowers are mounted on short stems all arising from a common point.
- Variiegation** A pattern of lighter colored tissue on a leaf.

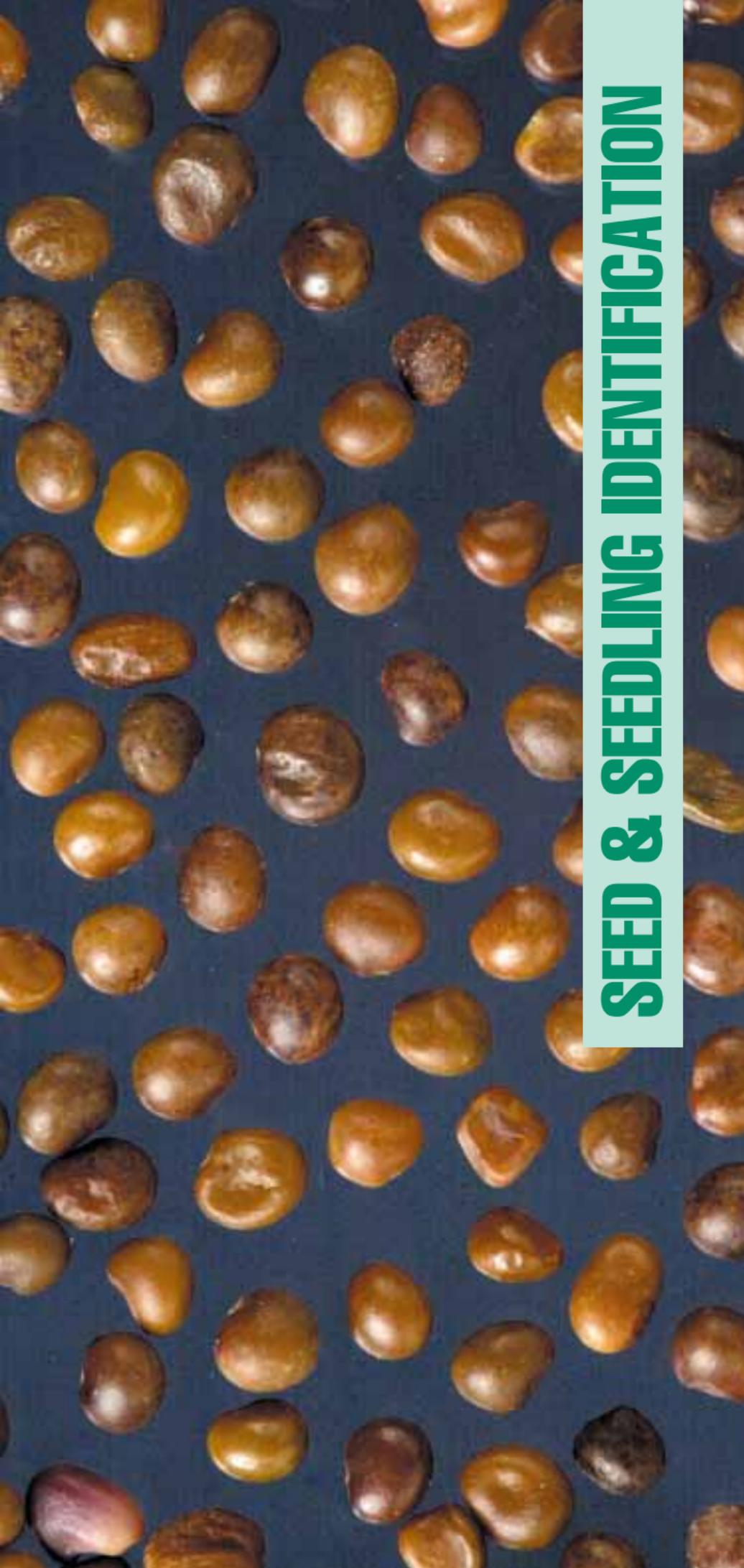
How a legume grows

Plants get energy from the sun. Through photosynthesis, plants convert energy to carbohydrates, which can either be used for growth or stored for future use. Forage growth is slow when plants are small (early spring growth or after grazing). When plants have few green leaves, they must rely heavily on stored carbohydrates for their energy. As leaves get bigger, photosynthesis increases dramatically, allowing for rapid growth. Before flowering, most pasture plants are growing as fast as possible if other factors are not limiting. Once the plant begins to flower, growth slows since most energy is diverted to flower and seed production. Forage quality decreases as plants age. This occurs because, as plants get larger and more stemmy, a greater percentage of nutrients and dry matter is tied up in non-digestible forms (such as lignin).



Good managers balance pasture quality against yield. The best time to graze is immediately following the most rapid growth but before flowering and seeding. A good rule of thumb is to wait until legumes are 10 inches tall before grazing. At this stage, sufficient carbohydrate reserves have been built up to allow for rapid regrowth; in addition, both yield and quality are high. If grazing occurs before the forage has had time to rebuild its carbohydrate reserves, yield will be low, the next regrowth may be slow, and winter survival may be decreased. One of the cornerstones of a successful grazing system is having rest periods long enough to allow for rapid forage regrowth.



A close-up photograph of numerous brown, oval-shaped seeds scattered across a dark blue background. The seeds vary slightly in color from light tan to dark brown and have a smooth, slightly glossy texture. A vertical light green banner is positioned on the right side of the image, containing the text 'SEED & SEEDLING IDENTIFICATION' in bold, dark green, uppercase letters.

SEED & SEEDLING IDENTIFICATION

LARGE SEEDS

2.5 mm or larger

Crown vetch

Seed & seedling characteristics

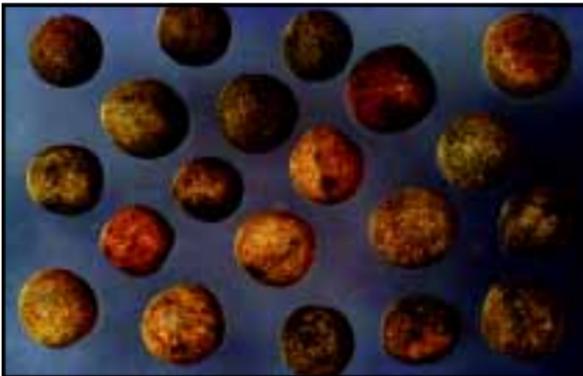
| | |
|------------------|------------|
| seed size | 2.2–4.0 mm |
| seed shape/color | rod shaped |
| leaflets/leaf | many |
| leaf margin | smooth |
| petiolule | absent |
| pubescence | none |
| variegation | none |



Hairy vetch

Seed & seedling characteristics

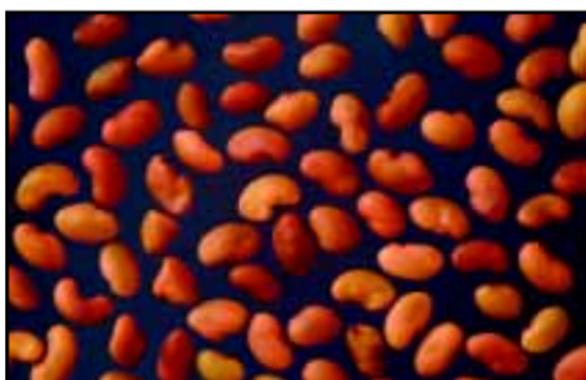
| | |
|------------------|-----------------------------|
| seed size | 2.7–4.9 mm |
| seed shape/color | large and round, dark color |
| leaflets/leaf | many |
| leaf margin | smooth |
| petiolule | absent |
| pubescence | present |
| variegation | none |
| other | tendrils at end of leaf |



Alfalfa

Seed & seedling characteristics

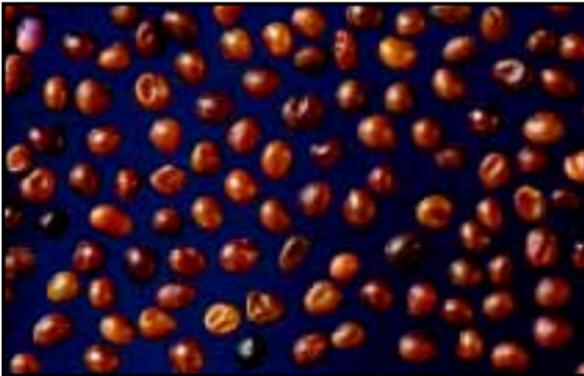
| | |
|------------------|-------------------------------|
| seed size | 2.3–2.6 mm |
| seed shape/color | kidney shaped with small beak |
| leaflets/leaf | 3 (some varieties have 5–7) |
| leaf margin | serrations on upper third |
| petiolule | present |
| pubescence | none |
| variegation | none |



Birdsfoot trefoil

Seed & seedling characteristics

| | |
|------------------|--------------|
| seed size | 1.2–1.7 mm |
| seed shape/color | round, brown |
| leaflets/leaf | 5 |
| leaf margin | smooth |
| petiolule | absent |
| pubescence | none |
| variegation | none |



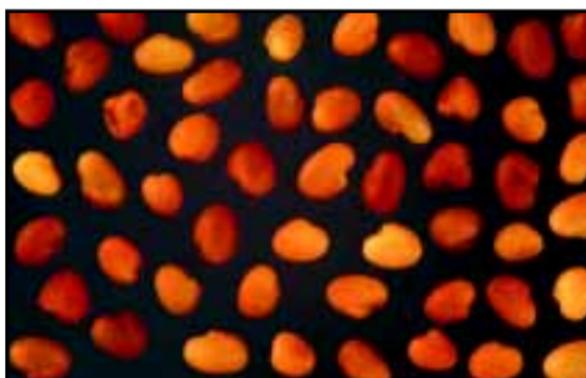
MEDIUM SEEDS

1.6 mm to 2.4 mm

Kura clover

Seed & seedling characteristics

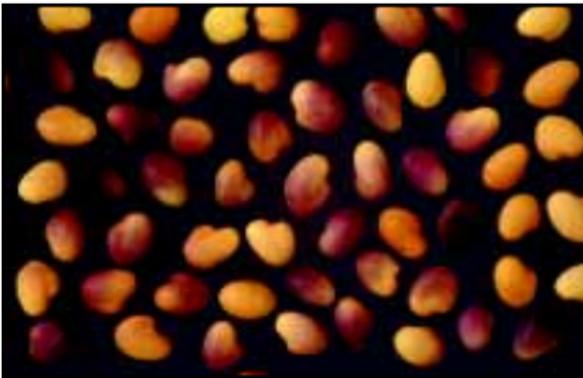
| | |
|------------------|-------------------------|
| seed size | 1.5–2.1 mm |
| seed shape/color | mitten shaped, brownish |
| leaflets/leaf | 3 |
| leaf margin | smooth |
| petiolule | absent |
| pubescence | none |
| variegation | white "V" on leaf |
| other | rhizomes present |



Red clover

Seed & seedling characteristics

| | |
|------------------|------------------------------|
| seed size | 1.5–2.1 mm |
| seed shape/color | mitten shaped, yellowish red |
| leaflets/leaf | 3 |
| leaf margin | smooth |
| petiolule | absent |
| pubescence | present |
| variegation | white "V" on leaf |



Sweet clover

Seed & seedling characteristics

| | |
|------------------|---------------------------------|
| seed size | 1.7–2.5 mm |
| seed shape/color | mitten shaped, dull green color |
| leaflets/leaf | 3 |
| leaf margin | serrations on entire margin |
| petiolule | present |
| pubescence | none |
| variegation | none |



Alsike clover

Seed & seedling characteristics

| | |
|------------------|--|
| seed size | 1.0–1.3 mm |
| seed shape/color | mitten shaped with shallow notch, dark color |
| leaflets/leaf | 3 |
| leaf margin | smooth |
| petiolule | absent |
| pubescence | none |
| variegation | none |
| other | leaflets shiny underneath |

SMALL SEEDS

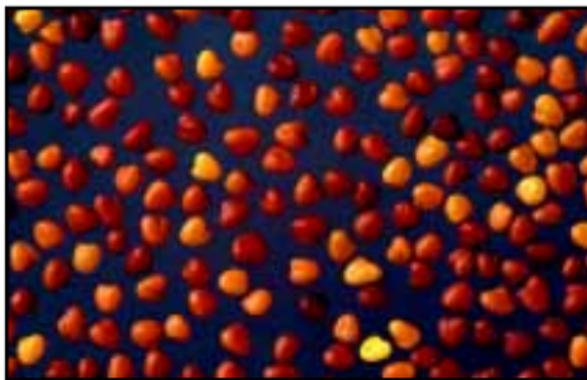
1.5 mm or smaller



White clover

Seed & seedling characteristics

| | |
|------------------|-------------------|
| seed size | 0.9–1.2 mm |
| seed shape/color | heart shaped |
| leaflets/leaf | 3 |
| leaf margin | smooth |
| petiolule | absent |
| pubescence | none |
| variegation | white "V" on leaf |





VEGETATIVE PLANT & FLOWER CHARACTERISTICS

Alfalfa

Vegetative characteristics

| | |
|---------------|-----------------------------|
| growth habit | erect |
| leaflets/leaf | 3 (some varieties have 5–7) |
| leaf margin | serrations on upper third |
| petiolule | present |
| pubescence | none |
| variegation | none |
| flower color | purple |
| flower type | raceme |



Sweet clover

Vegetative characteristics

| | |
|---------------|-----------------------------|
| growth habit | erect |
| leaflets/leaf | 3 |
| leaf margin | serrations on entire margin |
| petiolule | present |
| pubescence | none |
| variegation | none |
| flower color | yellow or white |
| flower type | raceme |



Kura clover

Vegetative characteristics

| | |
|---------------|-------------------|
| growth habit | erect |
| leaflets/leaf | 3 |
| leaf margin | smooth |
| petiolule | absent |
| pubescence | none |
| variegation | white "V" on leaf |
| flower color | whitish pink |
| flower type | head |
| other | rhizomes present |



Red clover

Vegetative characteristics

| | |
|---------------|-------------------|
| growth habit | erect |
| leaflets/leaf | 3 |
| leaf margin | smooth |
| petiolule | absent |
| pubescence | present |
| variegation | white "V" on leaf |
| flower color | reddish purple |
| flower type | head |



White clover

Vegetative characteristics

| | |
|---------------|-------------------|
| growth habit | prostrate |
| leaflets/leaf | 3 |
| leaf margin | smooth |
| petiolule | absent |
| pubescence | none |
| variegation | white "V" on leaf |
| flower color | white |
| flower type | head |
| other | stolons present |



Alsike clover

Vegetative characteristics

| | |
|---------------|---------------------------|
| growth habit | erect |
| leaflets/leaf | 3 |
| leaf margin | smooth |
| petiolule | absent |
| pubescence | none |
| variegation | none |
| flower color | pinkish white |
| flower type | head |
| other | leaflets shiny underneath |



NO PETIOLULE – NO LEAF VARIEGATION

Birdsfoot trefoil

Vegetative characteristics

| | |
|---------------|---|
| growth habit | prostrate, semi-erect or erect depending on variety |
| leaflets/leaf | 5 |
| leaf margin | smooth |
| petiolule | absent |
| pubescence | none |
| variegation | none |
| flower color | yellow |
| flower type | umbel |



Crown vetch

Vegetative characteristics

| | |
|---------------|------------------|
| growth habit | prostrate |
| leaflets/leaf | many |
| leaf margin | smooth |
| petiolule | absent |
| pubescence | none |
| variegation | none |
| flower color | purple and white |
| flower type | umbel |



Hairy vetch

Vegetative characteristics

| | |
|---------------|-------------------------|
| growth habit | prostrate |
| leaflets/leaf | many |
| leaf margin | smooth |
| petiolule | absent |
| pubescence | present |
| variegation | none |
| flower color | purple |
| flower type | raceme |
| other | tendrils at end of leaf |





LEGUME MANAGEMENT & DESCRIPTIONS

Alfalfa

Seeds/seedling, p. 10;

vegetative characteristics, p. 18.

Alfalfa (*Medicago sativa* L.) is the most widely grown forage legume in Wisconsin. It is a productive, high quality, long-lasting legume adapted to both hay and grazing. It is sensitive to low pH and soil drainage and its use as a pasture legume is somewhat limited.

Growth habit

Alfalfa is an erect growing plant with main stems arising from a large crown. Branches also occur from axillary buds on the stems. Alfalfa has a strong, deep taproot which makes it well adapted to sandy soils. It has good winterhardiness although may winterkill in cold, open winters.

Establishment

Alfalfa is easily established in conventional seedbeds or killed sods. It is not a good choice for frost seeding or interseeding into existing pastures. It does not reseed itself due to autotoxicity caused by older, established plants that produce chemicals that inhibit the growth of seedlings.



Management

Alfalfa does well in a cut forage system when three cuttings are made with 28- to 35-day intervals and root carbohydrate levels are allowed to replenish. Harvesting typically takes place more frequently in grazing systems and root storage may not be adequate for regrowth after grazing. As a result, alfalfa should not be grazed closely, so some leaf area remains. Plants should be allowed to regrow to at least 10 inches tall between grazings. Quality is best when grazed prior to the flowering stage. This effect is most pronounced in spring. Quality drops less rapidly in late summer and fall. Allow a 6-week rest period prior to October 15 to reduce winter injury.

Harvesting for hay

Three cuttings of alfalfa prior to September 1 provide the greatest yield and quality of alfalfa. First cutting should be early and based on quality. Second cutting should be at bud stage and the third at 10 to 25% bloom. This later cutting allows rebuilding of root reserves and better over-wintering.

Varieties

There are many alfalfa varieties available. Generally, good hay types will also be good grazing types. Consider yield, disease resistance, winterhardiness and quality. Of particular interest in grazing systems are grazing-tolerant alfalfas. These types have a lower set crown and put more energy into carbohydrate storage than other types, making them better able to withstand grazing pressure.

Alsike clover

Seeds/seedling, p. 15;

vegetative characteristics, p. 23.

Alsike clover (*Trifolium hybridum* L.) is an annual or biennial clover best adapted to moist or poorly drained soils. It prefers cooler temperatures than red clover and so is well adapted to low-lying areas in the northern half of the state. It is not tolerant of drought or high temperatures. It will tolerate a soil pH as low as 5.0.

Growth habit

Alsike clover has erect stems like red clover but as they are more fine it is subject to lodging. Flowers are borne along the entire length of the stem rather than at the tip as is red clover. Because the plant resembles red clover but the flower resembles white clover, alsike clover was once thought to be a hybrid between red and white clover. This has since been shown to not be the case.

Establishment

Alsike clover establishes best in a tilled seedbed or tilled sod. It is not a good candidate for frost or interseeding.

Management

Alsike clover forage is often of higher quality than alfalfa or red clover. It should be grazed at full bloom.

Varieties

There are no U.S. varieties of alsike clover available. Most seed is common. Tetra, a Swedish variety, has performed as well as common types in Minnesota trials.



Birdsfoot trefoil

Seeds/seedling, p. 11;

vegetative characteristics, p. 24.

Birdsfoot trefoil (*Lotus corniculatus* L.) is a common pasture legume. It is well adapted to poorly drained, acidic soils. It is shallow rooted and therefore performs poorly on sandy soils. It is the only forage legume in Wisconsin not known to cause bloat. It can reseed itself, resulting in long-lived stands.

Growth habit

Three types of birdsfoot trefoil are grown in Wisconsin: prostrate, erect and semi-erect. Prostrate types are low growing, more winterhardy, have less vigorous seedlings and recover more slowly than the more erect types. The prostrate types are more adapted to grazing. The erect types are best for haying. Semi-erect types are dual purpose and are the most commonly grown.

Birdsfoot trefoil has very fine stems and is prone to lodging. Many branches develop from the lodged stems and from the lower part of erect stems.

Establishment

Seedling vigor of birdsfoot trefoil is lower than other common legumes. It is readily established in tilled seedbeds or killed sods but is not a good candidate for frost seeding or inter-seeding in established pastures. Birdsfoot trefoil often has high levels of hard seed, so seed sown using these methods may germinate some time after planting.

Management

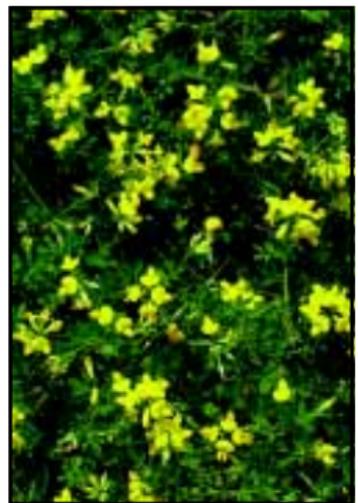
Birdsfoot trefoil utilizes root reserves to fuel early spring growth. Unlike most legumes, trefoil does not replenish root reserves again until late summer. Regrowth between grazings must come from photosynthesis. It is critical therefore to not graze trefoil too closely or regrowth will be slowed and plant health will decline. A stubble height of at least 4 inches is recommended. Prostrate varieties of trefoil are preferred for grazing as more leaf area remains following grazing. Trefoil will reseed itself, so allowing the plants to flower and set seed occasionally will help maintain long-lived stands. Trefoil tends to be of higher quality than alfalfa at similar growth stages and so can be grazed into the flower stage and still provide good forage quality.

Harvesting for hay

Trefoil is best adapted to grazing but can be used as a hay crop on poorly drained, acidic soils. Harvest trefoil for hay in the early flower stage. Leave a stubble height 2 to 4 inches to allow regrowth. Trefoil may be difficult to harvest as a hay crop due to fine leaves which tend to shatter easily. Time of baling is more critical than for other hay crops.

Varieties

Erect types of trefoil include Maitland and Viking. Prostrate types include AU-Dewey, Dawn and Empire. Semi-erect types are Mackinaw and Norcen. While all are suited to grazing, prostrate and semi-erect types are best.



Crown vetch

Seeds/seedling, p. 8;

vegetative characteristics, p. 25.

Crown vetch (*Coronilla varia* L.) is used primarily for land reclamation and roadside stabilization. It has not been used widely as a forage crop in the United States. It is tolerant of low soil pH and, once established, can tolerate prolonged dry periods.

Growth habit

Crown vetch has a prostrate growth habit. Much of the above-ground growth consists of long, pinnately compound leaves. It spreads by way of a creeping rootstock.



Establishment

Crown vetch is slow to establish due to low seedling vigor. It is best planted with a faster growing grass species. Adequate stands of crown vetch may not be realized until the second year.

Management

Crown vetch is a poor choice for forage as it lacks sufficient winterhardiness in Wisconsin, particularly when harvested for hay or grazed. It also contains compounds that reduce palatability. Crown vetch regrows from axillary buds after haying or grazing so a sufficient stubble (6 inches) should be left to ensure adequate stem area. Grazing should take place 10 to 14 days after the first flowers appear then grazed at 10 to 14 inches after that.

Harvesting for hay

Because of its prostrate growth habit and succulent nature, crown vetch is not a good choice for harvesting as hay. If necessary, harvest for hay 10 to 14 days after flowering begins.

Varieties

The most commonly used varieties of crown vetch are Chemung, Emerald and Penngift.

Hairy vetch

Seeds/seedling, p. 9;

vegetative characteristics, p. 26.

Hairy vetch (*Vicia villosa* Roth L.) is an annual or winter annual legume. It is most often grown for soil improvement, roadside or bank stabilization. It can also be grown as a pasture or hay crop. It grows well on a broad range of soils but is best adapted to sands or loamy sands.

Growth habit

Above-ground growth consists of viny, branched stems up to 6 feet long. Leaves are pinnately compound with a tendril at the tip.

Establishment

In Wisconsin vetch is best seeded from July 25 to August 30. Winterhardiness may be a problem in open winters with no snow cover.



Management

When seeded the previous summer, hairy vetch can be grazed in May and June of the following year. Following grazing, vetch may then be plowed down and a subsequent crop seeded for late summer pasture.

Harvesting for hay

Hairy vetch is typically seeded with a small grain companion crop when grown for hay. Winter rye is a common choice for this purpose. Hairy vetch should be harvested when the first pods are well developed. Earlier harvesting improves quality if rye is included in the mixture, but reduces total yield. These combinations make for a tangled hay which is difficult to handle.

Varieties

Madison is a cold-tolerant variety developed in Nebraska. Auburn, Oregon, and Lana are less cold tolerant and should only be grown in areas with mild winters.

Kura clover

Seeds/seedling, p. 12;

vegetative characteristics, p. 20.

Kura clover (*Trifolium ambiguum* L.) is a rhizomatous clover well adapted to grazing. It is a high yielding, persistent legume. Like most other clovers, it is well adapted to low pH soils. Kura clover is slow to establish as most early growth is devoted to rhizome rather than top growth. Once established, however, kura clover will persist indefinitely.

Growth habit

Kura clover spreads by an extensive rhizome system. Above-ground growth consists only of petioles and leaves arising from a crown. It tolerates poorly drained, acidic soils but, due to the rhizome system, it is also fairly drought tolerant. It is one of the most cold tolerant legume species.

Establishment

Kura clover has poor seedling vigor and is difficult to establish. Seedlings initially establish, then appear to stop growing as most energy is devoted to below ground rhizome growth. This allows for weed encroachment during the seeding year. Kura clover should be established with some companion crop such as oats or other fast growing forage species. Best results will be obtained with a clean, tilled seedbed. No-till establishment is possible if weeds are controlled. Interseeding into existing pastures will likely fail. Establishment of kura clover is enhanced by the use of the proper inoculum and by nitrogen applications of 50 lb/acre in the establishment year.

Management

Due to underground rhizomes, kura clover is extremely tolerant of grazing. While it can be grazed in the seeding year, most forage production will take place in the second and subsequent years. As above-ground growth is all leaves, kura clover forage is of very high quality. Kura is best grown with a grass species as grazing pure stands can lead to bloat. Kura clover tolerates close grazing, but also maintains high quality with less-intensive grazing systems, so graze the mixed stand according to the grazing needs of the grass species.

Harvesting for hay

The succulence of the above-ground growth makes cutting and drying kura clover difficult. If grown for hay, it should be grown in mixed stands with forage grasses.

Varieties

Three varieties of kura clover are currently available: Rhizo, Cossack, and Endura. Endura, the most recently released variety, has improved seedling vigor. It is likely that additional, more easily established varieties will be released in the future.



Red clover

Seeds/seedling, p. 13;

vegetative characteristics, p. 21.

Red clover (*Trifolium pratense* L.) is the most widely used clover in Wisconsin. It is adapted to a wide range of soil types and tolerates a pH as low as 5.5. It is a short-lived perennial which usually persists only two or three years due to susceptibility to a number of root diseases. Newer varieties may last longer than this.

Growth habit

Red clover has an erect growth habit similar to alfalfa, but the main stems originate lower on the plant. New shoots form from axillary buds at the crown. The crown of red clover is not as deep in the soil as alfalfa, making it more susceptible to winter injury. It has a shallow, highly branched root system and so grows poorly on sandy soils without adequate rainfall.

Establishment

Red clover is one of the easiest of the clovers to establish. Successful stand establishment may be achieved by using a companion crop or by direct seeding with herbicides. Red clover is also an excellent candidate for frost seeding or interseeding for improvement of existing pastures.

Management

Red clover provides high quality forage throughout the grazing season. Red clover quality does not decline as rapidly as alfalfa. Ideally, red clover should be grazed between first flower and 20% bloom. However, in mixed pastures, grasses would be beyond the ideal grazing stage at this time. Graze red clover as close to flowering as the accompanying grass allows. If possible, allow the clover to flower once during the year.

Harvesting for hay

First cutting for hay should be made when the stand is between first flower and 20% bloom. One or two additional cuttings can be made at 5- to 7-week intervals. Allow 6 weeks for regrowth before a killing frost in fall. Red clover is difficult to dry for hay and should be used as haylage when possible.

Varieties

Many good varieties of red clover are available. Look for varieties with resistance to anthracnose and powdery mildew. Avoid seed labeled as common or medium red clover. These are unlabelled varieties which may not be adapted to this region.



Sweet clover

Seeds/seedling, p. 14;

vegetative characteristics, p. 19.

Sweet clover is a biennial plant used mainly as a green manure or honey crop. It is not widely used as a forage crop. There are two types common in Wisconsin, yellow (*Melilotus officinalis* Lam.) and white (*Melilotus alba* Medik.).

Growth habit

As a biennial, sweet clover grows vegetatively the first year and forms a large taproot in fall. It flowers, produces seed and dies in the second year of growth. It is an erect plant with large, coarse stems which can reach 4 to 5 feet. It is not well adapted to acidic soils and requires a pH of at least 6.5. It is not tolerant of poor drainage, but its deep taproot makes it drought tolerant. It has good winterhardiness. Yellow types are smaller and leafier but lower yielding than white and flower about 2 weeks earlier.

Establishment

Establishment practices for sweet clover are similar to alfalfa. As sweet clover is sensitive to soil pH, lime should be applied well ahead of planting.



Management

Sweet clover is a poor choice as a pasture legume. It contains coumarin which gives it a bitter flavor and reduces palatability. It may also give milk an off flavor. Grazing sweet clover in the first year reduces root size and production the following year. Regrowth following grazing comes from axillary buds on the stem rather than crown buds as in the case of alfalfa. Sweet clover should not be grazed until plants are 14 inches tall and a stubble of 10 inches should be left to allow for regrowth

Harvesting for hay

Sweet clover should be cut for hay in the early bud to blossom stage of the second year. A stubble of 8 to 12 inches should be left. Due to high moisture content sweet clover may be hard to dry for hay. This is particularly important as moldy hay may contain dicoumarol, a derivative of coumarin, which causes excessive bleeding in animals.

Varieties

Most varieties of sweet clover were developed prior to the 1960s when it was widely used as a green manure crop. More recently, low coumarin types have been developed, including Norgold, Polara and Denta.



White clover

Seeds/seedling, p. 16;

vegetative characteristics, p. 22.

White clover (*Trifolium repens* L.) is common throughout Wisconsin. It is found in lawns, athletic fields and waste areas, as well as in pastures. It is very shallow rooted and has little drought tolerance. It is best adapted to areas with cool temperatures and adequate rainfall. It tolerates a soil pH as low as 5.5. It has not been a major cultivated forage in Wisconsin due to poor persistence and low productivity.

Growth habit

White clover is a short-lived perennial with prostrate growth habit. Leaves are borne on long petioles. There are no upright stems. Seedlings 6 to 8 weeks old begin forming stolons. These stolons spread and root at nodes along the stem. After 1 to 2 years the original plant dies. White clover is less winterhardy than red clover and plants may die without snow cover. It is a prolific seed producer, however, and while individual plants are not persistent, stands may persist almost indefinitely.

Establishment

Pure stands of white clover are rare. It is included in many pasture mixes. It is very small seeded and should be seeded on the surface or no deeper than 1/4 to 1/2 inch. Conventionally prepared seedbeds or killed sods are best for establishing white clover. It is not a good candidate for frost or interseeding.

Management

White clover is well adapted to close grazing. Pastures should be grazed to about 2 inches and allowed to regrow to 8 to 10 inches. Close grazing allows light penetration to the low-growing clover and allows for better reseeding. Grazed forage of white clover is very high quality as animals graze mainly leaves, petioles and flowers and very few stems. White clover should be seeded with grasses that tolerate close grazing such as perennial ryegrass or Kentucky bluegrass.

Harvesting for hay

Due its low, succulent growth, and relatively low yields, white clover is rarely harvested as a hay or haylage crop.

Varieties

Three types of white clover are grown in Wisconsin, wild white clover, white Dutch clover and ladino clover. Wild white clover and white Dutch clover are very prostrate, have small leaves and are low yielding. They are widespread in lawns and continuously grazed pastures. Ladino white clover is larger and more productive. Recently, even larger, more robust white clover selections have been



introduced from Holland and New Zealand. These selections are significantly more productive and show promise for use in Wisconsin. Alice white clover is one of these selections.

Species Information

| Species | Growth habit | Seedling vigor | Drought tolerance | Winter hardiness | Grazing tolerance | Seed alone (lb/a) | Seed mixture (lb/a) |
|-------------------|--------------|----------------|-------------------|------------------|-------------------|-------------------|---------------------|
| Alfalfa | upright | G | VG | G | G | 12-15 | 8 |
| Alsike clover | upright | G | G | G | G | — | 3 |
| Birdsfoot trefoil | upright | F | P | VG | upright – F | 8 | 6 |
| | or prostrate | | | | prostrate – G | | |
| Crown vetch | prostrate | P | G | P | P | 10 | 5 |
| Hairy vetch | prostrate | G | G | F | F | 25-35 | 18-25 |
| Kura clover | prostrate | P | VG | VG | VG | 10 | 6-8 |
| Red clover | upright | VG | G | G | G | 10 | 6-8 |
| Sweet clover | upright | G | G | G | F | 12 | 8 |
| White clover | prostrate | G | G | G | VG | — | 1-2 |

Abbreviations: **VG** = very good, **G** = good, **F** = fair, **P** = poor.

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