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4-H Plant & Seed Identification & Crop Judging



Leader Guide



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Introduction

Plant and seed identification teaches the 4-H member to recognize the plant and seed characteristics of common crop and weed plants found in Oregon. A study of these plants provides an excellent learning activity for members of crop, livestock, or horticultural projects.

The ability to recognize the plants that surround us and appreciate their role in life is of value to everyone. Many of these plants are important in food and fiber production, others are of value to the home owner for lawns, while still others commonly are recognized as weed plants. Many of these plants serve to conserve our soil and contribute to Oregon's natural beauty. The

ability to recognize these plants by name helps give the club member a greater appreciation of the environment.

The purpose of this Leader Guide is to provide supplemental information on plant and seed identification.

Encourage club members to make collections of pressed specimens of the plants on the list. Leaders should take advantage of tours to observe and study plants in their natural surroundings.

Seed samples for study may be obtained from the Extension office. Encourage club members to make a collection for their own use. Contact seed stores in your area.

Plant Identification

Plants can be identified by learning to recognize certain outstanding and unique characteristics. Features used in identification include seed head type, flower type and color, root characteristics, leaf shape and arrangement, and leaf and stem surface texture. Learning to recognize a new plant is easier when additional information about plant characteristics and other features is provided, such as where it grows, under what conditions, how it got its name, and how it's used.

Members can associate the name of a plant with an outstanding plant feature. For instance, the fiddle-neck tarweed has a characteristically-shaped flower head; and the meadow foxtail plant has a tail-like head. With encouragement and imagination, club members can establish an association with every plant and its name. This helps them to recall plant names.

After members become familiar with a group of plants, recognition games may be helpful in developing quick recall of the name. For example, have the club members sit in a circle. Hold up one plant specimen or picture and ask those who recognize it to hold up their hand. Call on someone to identify the plant and name the characteristics which helped that member to make the identification. Other similar games are helpful; be sure to give an opportunity for each member to participate, not just the older or faster learners.

Encourage each club member to participate in the county identification contest. To prepare for this contest, lay the seed samples or plant mounts out on a table. Have the club members move around the table and write the identification of each plant specimen. Members should learn the correct spelling as well as the correct name.

Identifying Seeds

Often one clue or characteristic which is unusual may be sufficient to identify a seed. Most often, however, several different features are required for positive identification.

The most useful identifying characteristics are the shape, size, coloring, and unusual irregularities of the seed coat surface. Seed coats vary from smooth to rough with irregularities such as pits. The seed attachment scar (hilum) often is important in identification. Special external features, such as hairs, may be helpful in identification.

Relative size and color of similar-shaped seeds can be used in identification, but remember that these characteristics may vary. Seed size may vary slightly with maturity or conditions under which the seed was produced. Color may vary with area of production or age of seed.

Some sort of magnifying glass is necessary for making plant identification and is essential for identifying certain kinds of seed. A low-power glass can be of value, but a 10- to 14-power lens is the best choice.

Plant Names

Common names are given to plants by individuals who encounter them in the field or garden. Often, plants in one community or region have a different common name than the same plant in another region. This causes confusion when a common name is used as a means of identification or reference. To eliminate this problem, botanists have agreed upon definite scientific names for all known plant species. These names, usually of Latin or Greek derivation, are recorded in international botanical literature.

The binomial system of nomenclature used in scientific literature originated with Linnaeus, an eighteenth century Swedish botanist. For example, the scientific name of alfalfa is *Medicago sativa*, *Medicago* being the genus name and *sativa* the species term.

A species is a group of plants possessing no constant heritable difference. It is the basic unit in classification of organisms. A common test of whether two plants belong in the same species or not is to determine whether they are naturally interfertile. In most cases, when plants can cross in nature, they can be considered to belong to the same species.

Some species share with other species structural and physiological similarities which suggest a close relationship. Such a group of related species is known as a genus. In some cases, a species may be so unique that it alone will constitute a genus; but usually a genus is a group of several species, and it may include a great number.

Plant and Seed Descriptions

The following list includes common and economically important plants that should be familiar to everyone. It includes plants found in both eastern and western Oregon. Each plant listed has a brief description of some important characteristics which can be used in identifying the plant. Plants are listed alphabetically by their common name. Scientific names are given for those who wish to learn these names or as an aid in locating the plant in scientific literature.

Alfalfa (*Medicago sativa*). Erect with deep tap root, trifoliolate leaves hairy on underside, leaflet edges unevenly indented (serrated) on outer one-half to one-third of leaflets. Flowers blue, purple, some yellowish-white. Seed: tan, kidney shaped.

Annual bluegrass (*Poa annua*). Annual tufted grass with light-green, flattened stems. Leaf blades folded in bud with boat-shaped point. Inflorescence is a terminal panicle 1 to 4 inches long. Common in lawns in western Oregon, especially in open areas of the turf.

Annual ryegrass (*Lolium multiflorum*). Vigorous, plants smooth, ribs on upper leaf surface, large auricles. Ligule small, collar wide. Spikelets edge-wise to rachis. Seed: awned from tip, boat-shaped with flat, rectangular rachilla.

Barnyardgrass (*Echinochloa crusgalli*). A stout annual, stems 2 to 4 feet tall, often branching from base, stem more or less flattened. Panicle purple-tinged, 4 to 8 inches long. A heavy seed producer.

Bentgrass (*Agrostis tenuis*). Sod-forming perennial, rhizomes. Leaves rolled in bud. Short ligule. Seed: very small, transparent lemma and palea.

Birdsfoot trefoil (*Lotus corniculatus*). Plants nearly hairless, five leaflets, weak stem, flowers bright yellow and reddish-orange, fairly large, borne in clusters of three to seven. Seed pods resemble a bird's foot. Seed: full, round, or slightly flattened, buff or olive-brown to purple-brown and sometimes flecked with dark spots. Hilum has a white dot.

Blue lettuce (*Lactuca pulchella*). A perennial with erect, leafy stem from 1 to 3 feet tall. Leaves smooth, 2 to 6 inches long, narrow with parallel sides; or long, lance-shaped, smooth to deeply cleft, with a winged petiole. Distinguished from common lettuce by its purple flower.

Bracken fern (*Pteris aquilina* var. *lanuginosa*). A perennial with slender, branching rootstocks. Plant 1 to 4 feet tall. Leaves (fronds) have long, slender stalks. Leaflets deeply lobed, more or less hairy on under surface. Ferns do not produce seed but reproduce by means of spores produced in brown spore cases clustered along lower edges of leaflets. Can be poisonous to livestock.

Bristly hawkbeard (*Crepis setosa*). Annual, stem erect, angled, stiffly branched, sometimes purplish at the base, sparsely covered with whitish spreading bristles; leaves dull to dark green, more or less hairy; inflorescence loosely branched into arrangement of three heads; heads yellow. Very common in Willamette Valley.

Buckhorn plantain (*Plantago lanceolata*). Perennial, rosette habit. Leaves narrow, slightly hairy, ribbed. Flowers in cylindrical cluster 1 to 3 inches long on the end of a long, slender stalk. Common in lawns and roadsides.

Buckwheat (*Fagopyrum sagittatum*). Annual. Grows 2 to 5 feet in height with a single stem and several branches. Seed inside hull is pale brown color and roughly triangular in shape. May be milled for flour or grain. Often used as bird feed.

Bull thistle (*Cirsium lanceolatum*). A biennial herb, stems leafy, stout, 2 to 5 feet tall, generally branched, somewhat woolly. Leaves elongated, irregularly lobed, terminal lobe longer tipped with spine. Flowers rose-colored. Common throughout state.

Canada thistle (*Cirsium arvense*). Perennial with rhizomes. Leaves irregularly lobed, spiny, dark green, crinkled. Flowers rose-purple, composite head. Seed: light to dark brown, smooth, long, apex cup-shaped with small nodule in center. Seed rounded on basal end but flattened toward top.

Carrots (*Daucus carota*). Seed: small, dry; requires fine, well-tilled seedbed and a uniform supply of moisture for maximum germination.

Cheatgrass (*Bromus secalinus*). An annual reaching 1 to 3 feet. Leaf sheaths are smooth. Inflorescence is rather open, branches bearing two to three spikelets, drooping at maturity. Lemmas bear short awn.

Cheatgrass brome (*Bromus tectorum*). Slender annual, leaf blades narrow, soft, fine short hairs. Panicles open, often purple-tinged, common throughout much of the state.

Chicory (*Cichorium intybus*). Erect perennial from a large tap root. Stem 1 to 4 feet tall. Basal leaves numerous in spreading rosette 3 to 6 inches long. Lower leaves harsh-pubescent, upper alternate and smaller. Heads in remote clusters. Flowers blue. Found on roadsides and waste ground.

Club wheat (*Triticum compactum*). Club wheat differs from common wheat in developing short, compact (club-shaped) heads (spikes). Spikelets usually contain five fertile florets and spread at nearly right angles to the rachis. Seed: most kernels have a small, short brush; and a narrow, shallow crease; and non-symmetrical cheeks. The grain is used largely for cake and pastry flours and is considered to be the finest wheat for these purposes.

Common dandelion (*Taraxacum officinale*). Leaves and flower stalks clustered at base of plant. Leaves thin, deep green. Flowers bright yellow. Common plant blossoming early in spring. (Differs from false dandelion by producing single flower at end of stalk.)

Common vetch (*Vicia villosa*). Also referred to as "spring vetch" or "tares." Semi-viney plant with slightly larger leaves and stem than those of hairy vetch. Seed can vary in color from yellow to brown and is elongated to oval in shape.

- Common wheat** (*Triticum aestivum*). Common wheat is most easily distinguished from club wheat by a spike long in proportion to its thickness. The spike is usually wider when seen in face view than across the two-row profile. Grain is used in making noodles, pasta, cookies, flat breads, and other baked foods.
- Creeping buttercup** (*Ranunculus repens*). A perennial with stems prostrate at the base, creeping, rooting at the nodes; leaves more or less stiff-hairy, the blades somewhat triangular in outline on long petioles. Flowers ½ to 1 inch or more broad, spreading saucerlike, deep gold.
- Creeping red fescue** (*Festuca rubra*). Leaf narrow, folded in bud. Auricles absent, ligule short, collar indistinct. Seed: long, blunt tip, narrow tapering into sharp point. Smaller, narrower than tall fescue.
- Crested wheatgrass** (*Agropyron desertorum*). Medium height, bunch type perennial, head 2 to 4 inches long with crested or comb-like appearance. Leaves rolled in bud, prominently veined, light bluish-green. Auricles claw-like. Seed: long, narrow, straight with short terminal awn. Lemma tightly inrolled in palea side.
- Crimson clover** (*Trifolium incarnatum*). Pubescent, leaflets obovate to heart-shaped. Plant erect with large stipules, sometimes fringed with purple. Flowers crimson, heads elongate. Seed: not uniformly kidney-shaped, rounding with very small groove, glossy. Yellowish-orange to dull brown.
- Curly dock** (*Rumex crispus*). Perennial, stem stout, somewhat woody at base. Leaves long, narrow, crinkled edges. Flowers produced in whorls. An abundant and widely distributed weed.
- Deathweed** (*Iva axillaris*). Coarse perennial with rank, unpleasant odor; develops horizontal woody roots; stems 8 to 20 inches high, usually in clusters; leaves numerous, small, narrowly oval, grey-green; flowering heads are greenish and hang downward from the ends of short stalks.
- Dodder** (*Cuscuta campestris*). Annual, parasitic, orange to yellow, twining, string-like plant attached to host plant. Seed: pink to yellowish brown, irregularly rounded, rough. Found on many hosts, especially alfalfa and clover.
- Dog fennel** (*Anthemis cotula*). An ill-smelling upright annual, ½ to 2 feet tall. Leaves finely divided. Ray flowers white. Common on cultivated and waste ground, especially west of the Cascades.
- Durum wheat** (*Triticum durum*). Kernels are free threshing and the largest of all commonly grown wheats. Amber in color and with a glossy endosperm. Highest protein (generally greater than 15 percent), hardest wheat.
- False dandelion** (*Hypocheris radicata*). A perennial with thick, fleshy tap root, 8 to 24 inches long. Leaves in a cluster at base of plant, 1½ to 8 inches long, ¾ to 1 inch wide, usually lobed or toothed, covered with coarse yellow hairs. Stems one to several, smooth, slender, 1 to 2 feet tall. Flowering heads yellow, about 1 inch in diameter.
- Fanweed** (*Thlaspi arvense*). Annual or winter annual. Leaves oblong, somewhat notched. Flowers white. Seed borne in racemes of winged pods each with terminal notch.
- Fiddle neck** (*Amsinckia intermedia*). Annual rough-hairy with erect, simple or branching stems, 1 to 2 feet tall; leaves alternate, very harsh-hairy; flowers numerous, light yellow, grouped in one-sided, curling, spike-like inflorescences 5 to 10 inches long; form nutlets, brown to black.
- Field corn** (*Zea mays*). A dent type corn with a flinty endosperm surrounding a softer, flowery endosperm core. Feed corns are yellow while those for food usage generally are white.
- Field peas** (*Pisum arvense*). Annual herbaceous plant with stems 2 to 4 feet long. Pods are 3 inches long containing four to eight seeds. Seeds: round, angular, or wrinkled. Most are yellow to green in color. Ground seeds may be mixed with grains for livestock. Pea hays are common in western Oregon.
- French pink, Bachelor button** (*Centaurea cyanus*). Annual. Stems erect, 1 to 2½ feet tall, somewhat woolly. Flowers produced singly on main stems and branches. Flowers blue, purple, pink, or white. Seed: light yellow, often with hair-like structure (pappus) adhering to upper end. A common grain-field weed. Believed to have escaped from cultivation.
- Garbanzo bean** (*Ciser arietinum*). Also known as the chickpea, the garbanzo, or gram. Seed: roughly globular, flattened on the sides and somewhat wrinkled, with a tan to light brown color. Seeds range in size from ¼ to ¾ inch in diameter. Used as a food crop.
- Gray oat** (*Avena sativa*). Annual cereal. Auricles absent. Kernels tightly enclosed within lemma and palea. Seed: gray lemma/palea (hull) color.
- Green peas** (*Pisum sativum*). Cool season, hardy annual, tendril-climbing plant. Divided into two types—smooth- and wrinkled-seeded. Wrinkled varieties are hardy but low in quality. Seeds vary in size, skin toughness, and color; most are oval to round in shape and measure about ¼ inch in diameter.

- Harvested as immature crop for vegetable, as mature crop for whole or split pea.
- Green snap beans** (*Phaseolus vulgaris*). Pods are thick walled and free from strings in early stages of development. Seeds: shaped in form of a kidney and $\frac{1}{4}$ to $\frac{1}{2}$ inch long. Seeds vary in color—white, black, buff, brown, tan, purple, etc.
- Gorse** (*Ulex europaeus*). A densely branched, spiny shrub, 2 to 4 feet tall. Reproduces by seed and creeping rootstocks (rhizomes). Stems are stiff, dark green, without foliage leaves. Leaves are mere spines or scales. Flowers are yellow and showy.
- Hairy vetch** (*Vicia villosa*). Weak stems, produces tendrils, compound pinnate leaves, hairy (pubescent), 20 to 30 flowers on long raceme, 4 to 10 seeds per pod. Seed: small, round, nearly black, hilum oval.
- Halogeton** (*Halogeton glomeratus*). An annual with lower stems divergent from crown, then becoming erect. General growth habit resembles tumbleweed. Leaves are alternate, sessile, $\frac{1}{4}$ to $\frac{3}{4}$ inch long. They are fleshy, cylindrical to somewhat angled, blunt at tip with conspicuous bristle-like hair. Tuft of whitish hairs in leaf axils. Flowers inconspicuous, yellowish-green, borne in leaf axils. A prolific seeder.
- Hard red spring wheat** (*Triticum aestivum*). Kernels are free threshing, small, red in color, and have a vitreous endosperm. The “premier” bread-making wheat (protein generally 14 percent).
- Hard red winter wheat** (*Triticum aestivum*). Kernels are free threshing, large, red in color, and have a vitreous endosperm. This variety of wheat is high in protein (generally 11 to 13 percent) and high in gluten.
- Heal-all** (*Prunella vulgaris*). Spreading or ascending, $\frac{1}{3}$ to $1\frac{1}{2}$ feet tall, smooth or sparsely hairy above; leaves long-petioled, glabrous, broadly angled or rounded at base; inflorescence a dense spike, flowers in whorls of sixes, violet.
- Hopclover** (*Trifolium dubium*). Clover with slender stems from base, lying on ground at base but rising at tip (decumbent), leaflets notched at tip, minutely toothed. Flowers small, yellow. Pod one-seeded.
- Horsetail rush** (*Equisetum arvense*). Perennial plants of two kinds. In early spring, a short-lived, spore-bearing stem appears, 4 to 8 inches tall, pale brown, whitish or flesh-colored, bearing a cone-shaped group of spore cases at the tip; the stem withers when spores mature and are discharged. The later, vegetative plant is 6 to 24 inches tall, green, with several fine lengthwise ridges and many slender branches in whorls (circles) around the stem.
- Intermediate wheatgrass** (*Agropyron intermedium*). Grown for pasture and hay.
- Kentucky bluegrass** (*Poa pratensis*). Perennial, rhizomes, leaves folded in bud, stems round. Leaf tip is boat-shaped (splits when flattened). Seed: lemma sharp pointed, boat shaped, small, symmetrical with pointed lemma and tuft or small white hairs at base of lemma.
- Knotweed** (*Polygonum aviculare*). Annual, with long-branching, wiry, low-growing stems. Flowers produced along nearly full length of stem. Leaves narrow, oblong, $\frac{1}{4}$ to $\frac{1}{2}$ inch long. Flowers small, white or pinkish. Common in gardens, often in hard beaten paths and yards.
- Lambsquarters** (*Chenopodium album*). Annual, upright grooved stems. Leaves wedge-shaped at base, grayish white. Flowers inconspicuous green in irregular spikes, clustered. A common garden weed.
- Larkspur** (*Delphinium menziesii*). Stem erect, 7 to 20 inches tall, arising from a cluster of tubers, nearly smooth or more often minutely hairy. Basal leaves generally short-hairy, roundish in outline, $\frac{3}{4}$ to 2 inches in diameter, palmately cleft nearly to the base. Flower sepals dark purple-blue, somewhat hairy, lower petals purplish, upper generally white or veined with purple. Found in thickets and open ground in Cascade Mountains and westward. Less plentiful eastward.
- Leafy spurge** (*Euphorbia esula*). A deep-rooted perennial attaining a height of 1 to 3 feet. The stems are erect. Contains a milk sap. Leaves are lanceolate, $\frac{1}{6}$ to $\frac{1}{2}$ inch wide, and approximately $1\frac{1}{2}$ to 4 inches long. Inflorescence terminates the stem. Flowers are yellowish-green, the entire inflorescence turns a bright yellow. The fruit consists of a three-valved capsule each containing one seed.
- Lentil** (*Lentilla lens*). Branched, upright, semi-viney annual. Pods contain two or three seeds which are thin, lens shaped, and slightly smaller than pea seeds. Used as food.
- Mallow** (*Malva rotundifolia*). Annual or biennial herb with low growing stems 1 to 2 feet long arising from a large root. Leaves are rounded, slightly lobed, with long slender petioles. Flowers are pale blue or white.
- Meadowfoam** (*Limnanthes alba*). Low-growing winter annual. The unique composition of oil extracted from its seeds has made this crop an attractive new oil source. Unique in its ability to grow in water-logged soils.
- Meadow foxtail** (*Alopecurus pratensis*). Perennial, short rhizomes, leaves rolled in bud, glabrous,

- uniform ligule, no auricles, collar divided. Seed head round. Seed: flattened, remain in floret, light, fluffy, flat.
- Mediterranean sage** (*Salvia aethiopsis*). A biennial, forming a rosette of very large leaves during the first season and a many-branched flowering stem the second. The herbage is softly white-woolly. Stems squarish, leaves opposite. Flowering stems about 3 feet tall, stout, much divided to form a spectacular inflorescence of many small white flowers. Top may become detached to roll about and spread seeds.
- Medusahead rye** (*Elymus caput-Medusae*). Annual, branching at base, with slender stems 8 to 24 inches tall. Leaf blades narrow and short. Flowers are in a very bristly spike 1 to 2½ inches long. The lemmas bear a flat, spreading awn 2½ to 4 inches long. A range weed of major importance.
- Morning glory** (*Convolvulus arvensis*). Perennial with rhizomes, stems twining or trailing. Leaves narrow, arrow-shaped with lobes. Flower bell-shaped, white to pink. Bracts ¼ to 1 inch below flower. Persistent weed. Seed: dull, grayish-brown to black, three-angled with corners rounded, slightly rough and pitted.
- Mouseear chickweed** (*Cerastium viscosum*). Spreading stem branched from base, pubescent. Leaves oblong to oval, pubescent on both surfaces, flowers compact, inconspicuous. Common, generally distributed.
- Mustard** (*Brassica campestris*). Winter annual, sometimes biennial, with erect habit, 1½ to 3 feet tall, widely branched from below. Leaves bluish-green, smooth, clasping the stem. Flowers are ½ inch across, yellow. Pods awl-shaped, ¼ to ½ inch long. Seed: round, black with reddish tinge, minute ridges on seed coat.
- Onion** (*Allium cepa*). Cool-season plant that grows well over a wide range of temperature. Seed: black. For best germination results, should be kept dry and at temperature near 65°F.
- Orchardgrass** (*Dactylis glomerata*). Erect bunchgrass, auricles absent. Leaves folded in bud, V when opened. Spikelets three to five flowers. Seed: boat-shaped, not symmetrical, bent or curved with short, curved awn.
- Oxeye daisy** (*Chrysanthemum leucanthemum*). Perennial, stems upright, generally many from base, 1 to 2 feet tall, somewhat branched. Branches bearing solitary terminal heads. Leaves somewhat lobed. Heads 1¾ to 2 inches broad, ray flowers white, disk yellow.
- Peppergrass** (*Lepidium densiflorum*). Erect, 1 to 2 feet tall, herbage smooth to sparsely pubescent. Lower leaves deeply cut to shortly toothed, 1 to 3 inches long, narrowing toward the stem; flowers small, white, pods smooth, ½ inch long, narrowly winged.
- Perennial ryegrass** (*Lolium perenne*). Short-lived (3 to 4 years) perennial. Plants grow 1 to 2 feet in height. Used primarily in permanent pasture mixtures to furnish early grazing while long-lived grasses are becoming established.
- Pigweed** (*Amaranthus retroflexus*). Annual, stem stout, erect, somewhat branched. Leaf blades somewhat oval with uneven margins. Flowers green, small. Stem and root often reddish. A common garden weed.
- Poison hemlock** (*Conium maculatum*). A tall, branching biennial sometimes reaching a height of 10 feet. It has a long, white, often branched tap root. Stem is stout, smooth, and dotted with purple marks. Leaves are thrice-compound. Flowers are white and in large, open heads (umbels), flower stalks ¾ to 1¼ inches long. All parts of the plant are poisonous.
- Poison oak** (*Rhus diversiloba*). An erect, deciduous shrub which may climb over other shrubs and trees. Leaves are three-foliolate, leaflets glistening, variable in shape, 1 to 4 inches long, smooth or irregularly toothed. Flowers are small, greenish. Leaves brightly colored in fall. Plant contains oil which acts as a skin irritant.
- Popcorn**. Same species as field corn, but flinty endosperm entirely surrounds a small, soft endosperm core. When heated by air or oil, moisture in the core is turned to a vapor and causes the kernel to explode.
- Puncture vine** (*Tribulus terrestris*). Annual, prostrate; stems radiate from crown, branching freely; tap root; oval leaves borne in pairs on opposite sides of stem. Bright yellow flowers borne in axils of leaves; fruit consists of a cluster of five shiny nutlets or burs.
- Quackgrass** (*Agropyron repens*). Perennial, white creeping rootstocks, small auricles, open leaf sheath. Seed: glossy texture to seed coat. Sub-terminal awns, rachilla and base smooth (slender wheatgrass, rachilla hairy).
- Rape seed** (*Brassica napus*). Grown for the oil. Meal can be used for livestock feed. Seed is small, black, and round in shape.
- Rattail fescue** (*Festuca myuros*). A slender annual with culms 8 to 24 inches tall. Spikelets are loosely one to five, flowered, in narrow erect panicles. Awned from apex.

Red clover (*Trifolium pratense*). Stems and leaves hairy, pale spot in leaflet center, leaflets ovate (egg-shaped). Stipules large, purple-veined. Plant 1 to 3 feet tall, erect with large stems. Flowers red or purplish and borne in heads. Seed: mix yellow and purple, mitten or irregular heart-shaped.

Red oats (*Avena byzantina*). Different species than common oats. Several varieties grown in Oregon for feed and hay uses.

Reed canarygrass (*Phalaris arundinacea*). Tall, erect, coarse, perennial plant. Large rhizomes, wide leaf. No auricles, large white ligule, leaf blade margins rough. Seed: short, boat shaped, hulls shiny, pointed, blackish-brown or gray, sparsely covered with long hairs.

Russian knapweed (*Centaurea repens*). A perennial growing from creeping rootstocks. Basal leaves are thick, somewhat hairy, longer than wide, and grayish blue-green in color. Stem leaves are thin and smoother than lower. All more or less clasping to the stem. Flowers produced at tip of branches. Heads are small, rounded in outline, lilac colored.

Russian thistle (*Salsola kali* var. *tenuifolia*). A bushy annual with numerous slender stems horizontal at base but growing upward 10 inches to 3 feet long. Stems smooth, grooved, often reddish in color, becoming rigid and spiny at maturity. Young leaves 1 inch or longer, narrow, pointed. Flowers inconspicuous, greenish, borne from base to tip. A single plant may produce 20,000 to 50,000 seeds. Plant may break off at ground line and tumble when blown by the wind, scattering seeds widely.

Rye (*Secale cereale*). Tall growing, most winter-hardy cereal. Spike awned. Seed: mixture grey-green and surface is wrinkled. Crease is very deep. Used as cover crop primarily, but also grown for food.

Sheep sorrel (*Rumex acetosella*). Perennial with horizontal root. Lower leaves somewhat arrow-shaped with two ear-like lobes at base. Flower stalks branched, reddish. Seed: three-angled, reddish-brown, glossy, but usually surrounded by rough perinath. A widely distributed weed.

Shepherdspurse (*Capsella bursa-pastoris*). Erect annual, 3 to 18 inches tall, sparsely hairy; basal leaves spread to form rosette, blades of upper leaves are toothed and clasp the stem with ear-like lobes; flowers small, borne on short stems; pods heart-shaped and contain numerous seeds.

Six-rowed barley (*Hordeum vulgare*). Generally resembles wheat plant. Plant tends to be shorter, with broader and softer leaves. Head is compact spike with three fertile spikelets at each joint of the rachis.

Seed: one-third of kernels have straight crease, two-thirds have crooked crease indicating one-third central and two-thirds lateral kernels. Not uniform in size. Lemma and palea cling to caryopsis.

Small seeded false flax (*Camelina microcarpa*).

Annual, stem erect, more or less branched, slightly hairy. Leaves 1 to 1½ inches long, lower lance-shaped, upper arrow-shaped and clasping the stem. Flowers pale yellow, borne on slender branches ½ to 1 inch long, seed pods ¼ inch long, rounded.

Smooth bromegrass (*Bromus inermis*). Tall perennial, leaves rolled in bud, usually glabrous. Leaf construction appears as "M." Auricles absent. Seed: large, flat, blunt at tip, usually with lemma and pale brown to purplish color. Blunt, wrinkled.

Soft white winter wheat (*Triticum aestivum*). Kernels are free threshing, yellow to light gold in color, with a white, flowery endosperm. A low protein, poor gluten quality wheat.

Sorghum (*Sorghum bicolor*). Drought tolerant grain. Kernels tend to be small, spherical, hard looking in appearance, and polished. Kernels range in color from white to yellow, red, brown, or black.

Soybeans (*Glycine max*). Erect, bushy, leafy plant of 2 to 4 feet. Pod contains one to four seeds which are round to elliptical and range in color from straw-yellow to green, brown, or black. Can be used as an oil, a hay crop, seed, silage, for soybean-cake and soybean-meal.

Subterranean clover (*Trifolium subterranean*). Annual plant, stoloniferous, leaves pubescent. Some leaflets watermarked, some with black flecks. Large stipules. Flowers with three or four light-colored florets per head. Seed head forms burr which matures underground. Seed: larger than crimson clover or black alfalfa.

Sudangrass (*Sorghum vulgare* var. *Sudanense*). Tall, erect summer annual, wide leaf with heavy midrib. Leaves rolled in bud, no auricles. Seed: plump, glossy, mostly black, some greenish-yellow.

Sugarbeets (*Beta vulgaris*). Biennial. During the first year, it develops a large succulent root in which reserve food is stored. During the second year, it produces flowers and seeds. Individual beets vary widely in sugar content but usually range from 10 to 20 percent. Mature seed is a shiny, lentil-like structure about 3 millimeters long and 1½ millimeters thick. Mature reddish-brown outer seed coat is very brittle and separates easily from the seed.

Sweet clover (*Melilotus* spp.). Trifoliate leaves, underside of leaves smooth. Leaflet serrations around to the base of the leaflet. Plant relatively leafy. Flowers

yellow (*Melilotus alba*) or white (*Melilotus officinalis*). Plants tall, erect with coarse stems. Seed: tan with mitt or heart shape.

Sweet corn (*Zea mays*). Relative to other grains, corn has a large kernel measuring $\frac{1}{4}$ to $\frac{1}{2}$ inch in length and $\frac{1}{4}$ to $\frac{3}{8}$ in width, coming to a point at one end. The germ is quite large and is located at the pointed end of the kernel. The top of the kernel has a depression or dent in it and is pale yellow in color compared to the rest of the kernel. Inside the kernel is a thin layer of hard yellow starch surrounding the major portion of the kernel, the soft white starch.

Tall fescue (*Festuca arundinacea*). Bunchgrass, short rhizomes, leaves rolled in bud, flat when open. Auricles blunt, figure low. Deep ribs on upper side of leaf. Leaf margins barbed. Seed: long, blunt tip, rachilla round and slender with knob on upper end (resembles a golf tee).

Tansy ragwort (*Senecio jacobaea*). Perennial form short, thickened rootstocks. Stems erect, $1\frac{1}{2}$ to 4 feet tall, somewhat woolly at first, often reddish or purplish. Leaves divided. Heads numerous, showy. Flowers brownish-yellow. Becoming widely established in Western Oregon.

Timothy (*Phleum pratense*). Perennial bunchgrass, corm at base of culm. Leaves rolled in bud, glabrous except for cilia at collar. Auricles absent. Ligule white, points at outer end. Cylindrical head. Seed: rounding, naked seed brown, round. Good seed usually has many thin, silvery, papery lemmas attached.

Treated wheat. Any variety of wheat or small grain may be treated. A seed treatment in the form of a powder, dust, or liquid is applied to the whole grain. This treatment is usually a fungicide and, in special cases, an insecticide. The chemical treatment is colored so that treated grain is either pink, red, or purple in color.

Triticale (*x triticoscale*). A man-made crop which is a cross between wheat and rye. High in protein, but poor gluten quality. Has food and feed applications. Kernels tend to be very large, yellowish to bluish grey in color, and very wrinkled. Endosperm tends to be flowery.

Two-rowed barley (*Hordeum distichum*). Same general vegetative characteristics as six-row. Head is compact spike with one fertile spikelet at each joint of the rachis. Seed: all kernels have straight crease and uniform size.

Velvetgrass (*Holcus lanatus*). A perennial with grayish velvety surface. Stems erect, 1 to 3 feet tall. Leaves have soft flat blades, 6 inches or less in length.

Inflorescence is a soft, plume-like, purplish panicle, 2 to 5 inches long.

Water hemlock (*Circuta douglasii*). Water-loving, tall, smooth perennial herbs. Stems stout, hollow, somewhat branched, often reddish, 2 to 5 feet tall. Leaves have soft, flat blades, 6 inches or less in length. Inflorescence is a soft, plume-like, purplish panicle, 2 to 5 inches long.

White clover (*Trifolium repens*). Smooth stems and leaves, leaflets serrated, leaflets usually watermarked. Plant stoloniferous. Flowers white. Seed: small, yellow to dark brown, almost heart shaped.

White oat (*Avena sativa*). Annual. Auricles absent. Kernels tightly enclosed within the lemma and palea, which remain with the kernel when threshed. Seed: white to yellow lemma/palea (hull) color.

White top (*Cardaria draba*). Perennial with rhizomes. Stems erect, hairy. Leaves simple, oblong, toothed. Flowers white, showy. Pod a globular capsule with prominent, persisting style. Seed: Reddish-brown, roughened surface, flattened, depressed area darker in color.

Wild carrot (*Daucus carota*). Generally biennial, plant develops clump of much-dissected leaves the first year; second-year stem erect, $1\frac{1}{2}$ to 3 feet tall, stiff-hairy, branching from fleshy root with carrot odor; umbels (flower head) 2 to 4 inches broad, flowers small and white.

Wild oat (*Avena fatua*). Annual, resembles cultivated oats; heavy, brown, twisted awn. Seed: usually smaller than cultivated oats. Usually dark reddish. Rachilla hairy, sucker mouth at point of attachment (callus).

Wild onion (*Allium aplectens*). Low growing, producing several grass-like leaves. Flowers borne in head (umbel), flowers white or pale pink. Plant has characteristic onion taste and odor.

Yarrow (*Achillea millefolium*). A hairy, perennial herb, 2 to 3 feet tall, from creeping rootstocks. Leaves are finely divided (carrot-like). Flowering heads are numerous, small, and of white or yellow flowers grouped in flattened clusters at end of stem branches.

Yellow starthistle (*Centaurea solstitialis*). Annual, grows 1 to $2\frac{1}{2}$ feet with rigid, spreading stems, branched from base. Stems and leaves covered with loose, cottony "wool"; lower leaves 2 to 3 inches long, deeply lobed; upper leaves $\frac{1}{2}$ to 1 inch long, narrow, sharply pointed. Single flowering head at end of branches armed with long spines. Flowers are bright yellow.

Yellow-White-Tan oats (*Avena sativa*). In animal feeds, the hulls remain on the grain; in food applications, the hull must be removed. The naked oat kernel is called a groat. Oat groats have a higher nutritional quality than most other cereal grains. Hull color can vary from white to black, though most are yellow-tan in color.



Glossary of Terms

- alternate**—when one leaf occurs at each node.
- annual**—a plant which completes its life-history and dies within a single growing season.
- anther**—the pollen-bearing part of a stamen.
- auricle**—a small basal lobe like the lobe of an ear.
- awn**—a bristle-like appendage, as in the heads of many grasses.
- axil**—the angle between a leaf and a stem.
- axis**—a central support.
- beaked**—tipped with a point.
- biennial**—a plant which completes its life-cycle in two growing seasons.
- blade**—the expanded, usually flat part of a leaf or a petal.
- boot stage**—the growth stage of grasses at the time the head is enclosed by the sheath of the uppermost leaf.
- calyx**—the lowest (outermost) set of modified leaves that constitute the flower.
- cereal**—member of the grass family in which the seed is the most important part, used for food and feed.
- collar**—the region at the junction of the sheath and blade of the leaf.
- compound**—an inflorescence that is branched; a pistil consisting of more than one carpel; a leaf that is divided into leaflets.
- culm**—the type of slender, hollow, or pitted stem found in grasses and sedges.
- decumbent**—lying on the ground at the base, but rising at the tip.
- dicot**—a short synonym for dicotyledonous plant; the term refers to plants which have two leaves in the seed. Dicot stems always have definite wood and bark layers and the leaves are branched.
- embryo**—the rudimentary plant within the seed.
- entire**—not cut or toothed, without indentations of the margin.
- floret**—a little flower. In grasses, the floret consists of the small, inconspicuous flower with its small greenish bracts, the lemma and palea.
- forage**—plant stems and leaves used for livestock feed, such as hay, pasture, straw, silage, and browse.
- germination**—the resumption of growth by the embryo and development of a young plant from seed.
- glabrous**—without hairs.

head—a close, compact cluster of flowers; technically, one in which the lateral flowers blossom first.

herb—a plant whose stem above ground dies at the end of the season's growth.

herbicide—a chemical or mixture of chemicals for killing plants by application to the plants or soil.

hilum—the scar left on the seed at the place of detachment from its base or seed stalk.

inflorescence—the flower arrangement of a flower cluster.

internode—part of stem between nodes or "joints."

lanceolate—broadest near base and gradually tapering to apex; lance-shaped.

lateral—at the side.

lemma—the larger of the two scales or bracts enclosing the flower in the grass family.

ligule—a small appendage at the juncture of the blade and sheath of certain families.

margin—edge.

midrib—main vein of leaf.

node—the place on a stem which normally bears a leaf.

opposite (leaves)—two at a node.

palatability—the relative attractiveness of a food or feed; pleasant to the taste.

palea—the smaller of the two bracts that enclose the flower in grasses.

parasite—a plant which secures its food from a living plant or animal, and therefore is without chlorophyll.

perennial—a plant which lives and fruits year after year.

petiole—the stalk of a leaf.

pubescent—hairy.

raceme—a flower cluster in which the flowers are borne along the stem on individual stalks about equal in length, the lateral flowers blossoming before the terminal.

rachilla—the axis of a spikelet in the grass family.

rachis—the axis of a pinnate or pinnately compound leaf or of a flower cluster.

rhizome—an underground (or underwater) perennial stem which is generally prostrate, and sends new shoots above ground each year and roots below.

rootstock—rhizome.

serrate—having the margin evenly and sharply indented with small projecting points.

sheath—part of a leaf which enfolds the stem.

species—a group of closely related organisms; for example, *Medicago sativa* is the botanical name for alfalfa. *Medicago* is the genus and *sativa* is the species. Several species belong to the genus *Medicago*.

spatulate—narrow at base, wide at apex.

spike—a dense raceme (flower cluster).

spikelet—a small, spike-like unit of an inflorescence, especially of the grass family.

spore—a one-celled reproductive body.

stipule—appendages of the leaf borne in pairs at the base of the petiole.

stolon—a runner or sucker which roots at the nodes.

stoloniferous—having stolons or "runners."

tap-root—the main descending root, forming a direct continuation of the stem.

tendrils—a slender, coiling stem or modified leaf or portion of a leaf by which a climbing plant supports itself.

terminal—at the end.

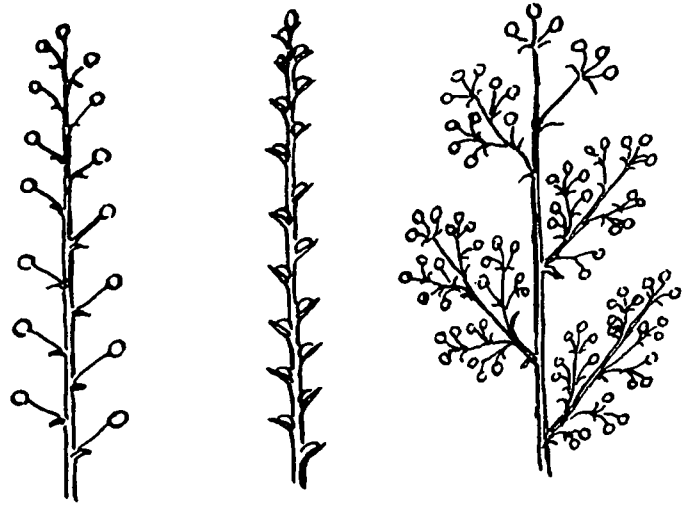
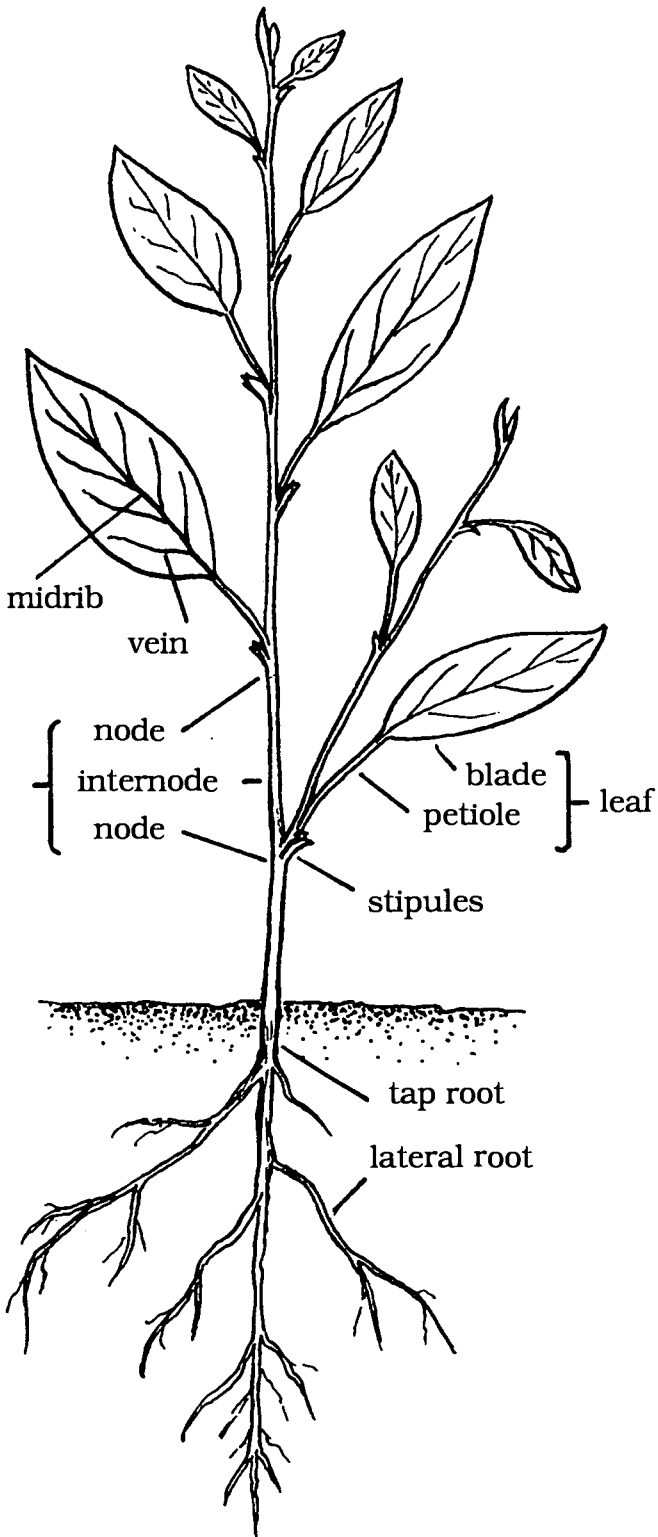
tuber—a short, very fleshy, underground stem or part of a stem, as a potato.

umbel—a flat-topped flower cluster whose branches arise from the same place.

whorl—several borne in a circle.

Types of Inflorescences

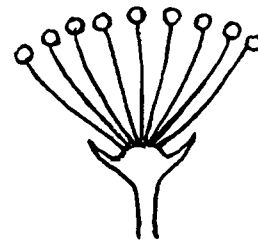
Root and Shoot Systems



simple raceme

spike

panicle



umbel

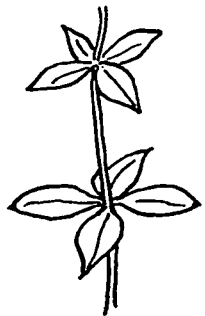
Leaf Shape and Arrangement



alternate



opposite

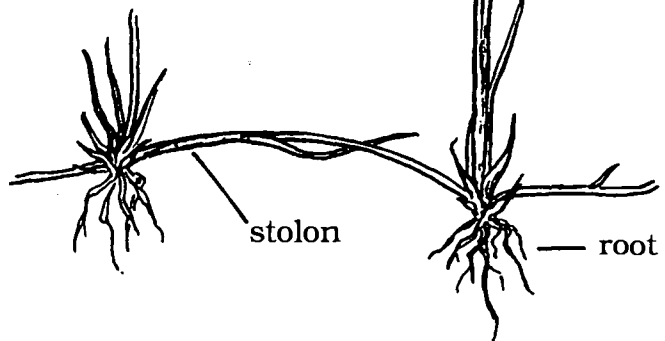
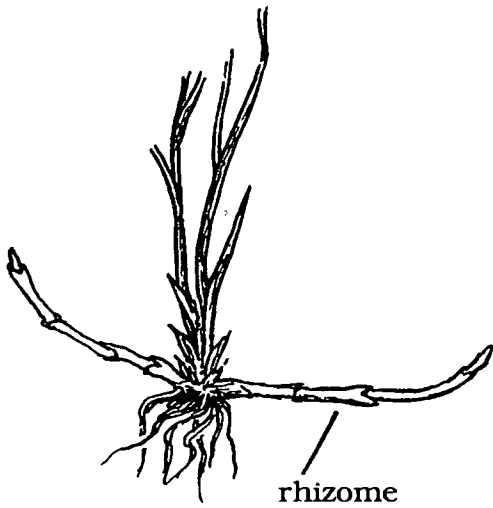
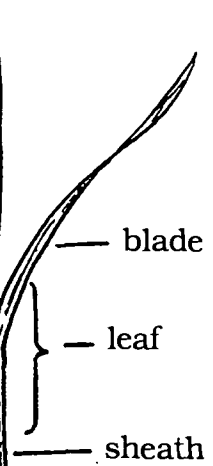
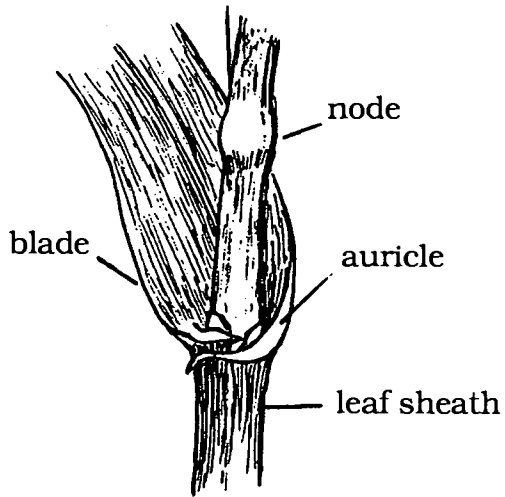
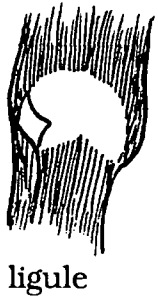
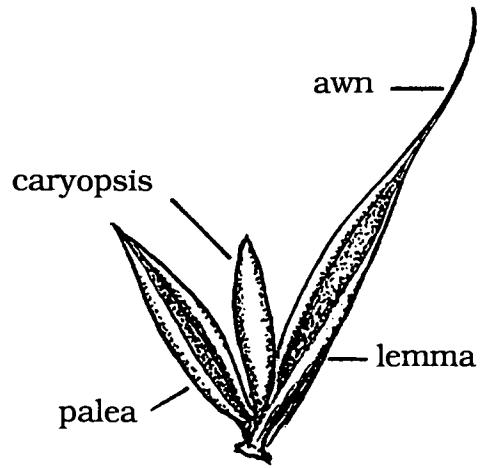
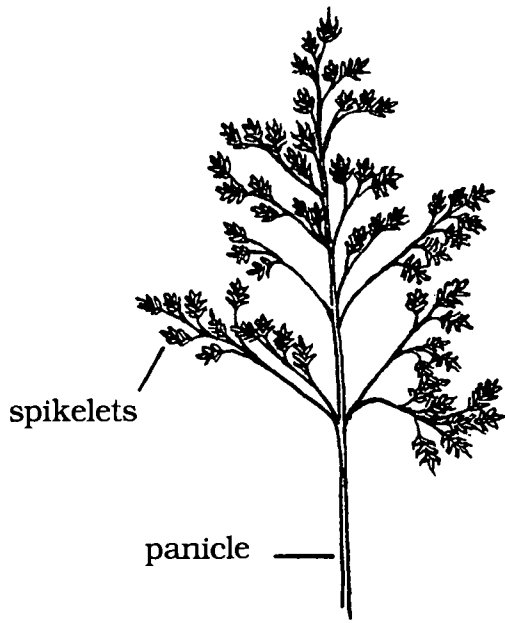


whorl



lanceolate leaf

The Grass Plant



Crop Judging

Grain

Grain is used for food, livestock feed, and seed. Some grains have special uses; for example, certain varieties of barley are used for malting. Malting is the controlled germination of barley to convert stored starches to sugars. Malting barley must be uniform in size, of a single variety, and have a bright color.

The samples of grain to be judged are placed on the basis of their value as used in feed. The following defects may be present in a grain sample, and the club members should be able to recognize and identify each defect by name.

Quality factors

1. Plumpness
2. Foreign material (weed seed, inert matter, etc.)
3. Color
4. Mixtures
5. Treated seed
6. Diseased grain

Sample score card

Small Grain	
	Value
Plumpness	30
Grain should be well filled, of high test weight	
Foreign material	30
Grain should contain a minimal amount of contaminate such as stalks, chaff, stones, stems, dirt, etc.	
Color	20
Grain should be free of weather staining, heat damage, etc.	
Mixtures	15
Sample should be free of seed of other crops, other varieties of the same crops, and of weed seed. Noxious weeds are more objectionable than non-noxious weed seed.	
Treated seed	automatic rejection
Unacceptable in feed grain	
Other factors	5
Total	100

For more information, see *Evaluating Grain for Livestock Feed*, FS 309.

Hay

Hay is used as livestock feed and should be judged for characteristics that affect its value as feed. Several quality factors are associated with or determine the feeding value of hay.

Quality factors

Stage of Maturity

The stage of maturity at cutting influences quality more than variety, production location, soil fertility, or seasonal influences. Alfalfa hay harvested in the pre-bud or early-bud stage has the highest nutritive value for livestock. Maturity at the time of cutting also makes a great difference in the palatability and digestibility. Palatability and digestibility both decrease as the crop grows older.

Leafiness

At least two-thirds of the protein is found in the leaves. Leaf shatter during raking and baling greatly reduces hay quality. The percentage of leaves remaining in the bale is an important indicator of hay quality.

Color

Bright green color is an indication of proper curing, high carotene content, and good palatability. Any change from a bright green color indicates loss in feed value. However, hays which have been slightly sun-bleached or have had a small amount of rain damage still make high-quality feed.

Foreign Material

This refers to weeds, straw, wire, or other material having little or no feeding value. Foreign material can be harmful, resulting in problems such as loss in palatability and lower consumption, or possibly "hardware disease" due to consumption of wire, nails, and similar foreign objects.

Odor and Condition

The smell of new-mown hay is the standard by which all odor comparisons should be made. Any other odor, such as a musty or putrefied (rotten) odor, indicates lowered quality. Odor problems are associated with lowered livestock acceptability. Dustiness also detracts from the value of the hay. Dusty or moldy hay should not be fed to horses or dairy cows, but can be used for beef cows or heifers, which have lower nutritional needs.

Sample score card

Hay		Value
Stage of Maturity		30
Alfalfa should be cut in the bud or early bloom stage, clovers at one-fourth to one-half bloom. Most grasses should be cut in the boot to early heading stage. These stages of maturity score highest (25 to 30 points). Alfalfa and clovers cut at the full bloom stage or grasses cut between the late heading and full bloom stages score low because they have lower feed value (1 to 10 points).		
Leafiness		20
Hay with a high ration of leaves to stems and with a high proportion of the leaves attached scores high (15 to 20 points). Stemmy hay and hay with leaves shattered scores low (0 to 5 points).		
Color		20
Hay with a bright green color scores high (15 to 20 points). Golden yellow to yellow colored hays score 5 to 15 points. Dark brown or black colored hays score 0 to 5 points.		
Foreign Material		10
Hay with non-injurious foreign material should receive a lower score than that without (0 to 10 points). Hay with injurious foreign material should be disqualified and placed at the bottom of the class with no score.		
Odor and Condition		20
Smell of new-mown hay scores high (15 to 20 points). Hays with musty or other off-odors score 5 to 15 points. Moldy or unusually dusty hays are scored very low (0 to 5 points).		
Total		100

Potatoes

Potatoes are used in many different ways, but most commonly for food or planting stock. Tubers are made into potato chips, french fries, dehydrated mashed potatoes, potato starch, and many other products. Desirable tuber characteristics differ according to the use. Potatoes in the judging contest are evaluated on the basis of their value for fresh table use.

Quality factors

Desirable characteristics which increase the value of potatoes for table stock are:

1. **Uniformity of size and shape.** Tuber shape will vary with the variety. The exhibit should consist of tubers that are typical of the variety, have the same shape, same size, and same skin texture. Uneven shape and skin texture are not desirable.
2. **Few and shallow eyes.** Many deep-set eyes are undesirable because they result in considerable waste when tubers are peeled.
3. **Maturity.** Immature tubers do not store well and are subject to damage in handling. Rough handling of immature tubers results in feathering of the skin, which may be followed by a blackening of the tissue exposed by the loss of skin.

Defects

Defects in potatoes are factors that detract from the appearance of the tuber or decrease its value to the buyer. Common tuber defects in potatoes are:

1. **Mechanical injury.** Cuts, punctures, or bruises may be the result of rough handling during harvesting or transporting. These mechanical injuries cause losses in peeling. Bruises may appear as slightly discolored depressions on the skin. (When demonstrating damage caused to the tuber by these defects, cut open a tuber to show the damage beneath the skin. This will show how much of the tuber must be cut away to make the tuber useable.)
2. **Misshapen tubers.** Unevenly shaped tubers are caused by growing potatoes in heavy clay or corky soil. Irregular irrigation may result in knobby (second growth) tubers.
3. **Growth cracks.** Uneven or sudden changes in the growing conditions may cause large cracks in the tubers.
4. **Sunburn or greening.** Exposure to light in the field or during storage for a long period will cause the tuber to produce chlorophyll and turn green. This is a very serious defect because it causes a bitter taste.

5. **Wireworm damage.** Wireworm injury to the young tuber causes deep, funnel-shaped cavities that form as the potatoes mature. Late season injury causes clean-cut round holes.
6. **Flea beetle damage.** Surface injury consists of pimple-like eruptions or rough, winding trails about $\frac{1}{16}$ inch wide and of varying length, caused by larval feeding just below the surface. In addition, another type of internal injury causes narrow, brown feeding tunnels which extend into the tuber for $\frac{1}{4}$ to $\frac{3}{4}$ inch. (This damage can be shown best by peeling away some of the surface skin.)
7. **Nematode damage.** This injury is recognized by small pimples on the surface of the skin.
8. **Scab.** This defect is caused by a fungus-like disease which causes small pustules that break through the skin, exposing dark spore masses.
9. **Rots.** Several types of rots are caused by fungi and bacteria. This is a very serious type of defect.
10. **Quackgrass root injury.** The stolons of quackgrass grow into or completely through the tuber. This defect can be recognized by a portion of the quackgrass attached to the tuber.
11. **Dirty potatoes.** Potatoes ready for market should be clean.

12. **Sprouting.** Sprout development reduces the value of the tuber for table use or processing.

Sample score card

Table Stock Potatoes

	Value
Uniformity	40
Size, type, color, skin texture, shape	
Size	10
Desirable size for table use, usually 8 to 10 oz	
Condition and soundness	50
Maturity; freedom from defects including rot, dirt, mechanical injury, insect damage, growth cracks, greening, scab, second growth, etc.	
Total	100

Practice classes of potatoes can be made from home-grown potatoes. If these are not available, selection can be made from bulk potatoes at the grocery store.

Giving Reasons

Contestants should be ready to give reasons for their placing, whether or not reasons are called for in the contest. To decide who is the best judge in a contest, descriptive reasons often are required.

Written Reasons

When preparing reasons, the contestant must consider carefully each placing. When writing reasons, it's unnecessary to describe every detail of the sample, but list the outstanding good points and defects that influenced the placing.

Each set of reasons should include the contestant's name (or number), the name of the class, and the order of placing the addition to the reasons.

Sample reason for a class of hay

Final Placing 3—1—4—2

Contestant's Number 15

Reasons:

Sample No.

- 3 Good color, leafy, fine stemmed
- 1 Color not as good as #3, more mature than #3, finer stems than #4
- 4 Coarse stemmed, weathered, more leaves than #2
- 2 Coarse stemmed, few leaves, contains thistle

Oral reasons

Contestants may be called upon to give oral reasons for placing. A suggested score card for oral reasons is:

	Value
Presentation	25
Grooming, posture, poise, eye contact, clear and audible voice, correct English	
Organization	25
Introduction, logical order, conclusion	
Knowledge of Subject	25
Recognized major strengths, weaknesses, and important differences	
Used Appropriate Terms	25
Descriptive adjectives, correct names of parts	
Total	100

4-H Activities

Contests

Separate junior, intermediate, and senior contests are recommended at the county level. The junior contest is for 4th, 5th, and 6th graders. It should be designed to give them practice and stimulate their interest in further identification contests. Intermediate and senior contests can be developed similarly.

Ten seed specimens and 20 plant mounts are suggested for junior contests, 20 seeds and 30 plants for intermediate and senior contests. Plant specimens for the contests are listed in *Know Your Crops And Weeds*, 4-H 2101L.

Ten points will be given for each correct identification, with two points deducted for incorrect spelling of a plant name.

Demonstrations

Here are several topics that could be used for demonstrations or talks:

1. How to identify plants
2. How to identify seeds
3. How to make a plant press
4. How to mount plants for a collection
5. Characteristics that make a particular plant a weed
6. Life cycles of annual, biennial, and perennial plants

Programs

1. Make a plant press.
2. Make a plant collection—collect and identify 10 plants.
3. Make a seed collection.
4. Visit a seed store and list kinds of seed available.
5. Visit a seed cleaning establishment, and learn how they separate one kind of seed from another.
6. Visit a seed laboratory.
7. Visit Central or Branch Experiment Station.



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