Judging Agricultural Crops

Judging is a learned skill and not an exact science. In crop judging, the judge must keep in mind a standard of perfection and attempt to reach a decision based on this standard along with current facts and values.

Before show day, a judge should familiarize themselves with the rules set by the sponsoring organization. All entries should conform to these rules and regulations. If the exhibits do not conform, the samples should be rejected. For instance, if the rules call for a 1-gallon sample, the sample size should be very close to 1 gallon.

What follows is a series of scorecards that serve as guidelines for judging various farm crops. They are not hard and fast. A judge will need to use his individual judgement under different situations.

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Seed Grain

(Wheat, Oats, Barley, etc.)

	Highest Score
Soundness and condition	40
Disease	
Insect damage	
Discoloration	
Mustiness	
Shrunken, cracked, and broken kernels	
Hulled or partly hulled kernels	
Seed size and bushel weight	
Purity	25
Freedom of mixture from other crops and varieties	
Freedom from foreign material	35
Prohibited weed seeds; deduct up to 35 pts	
Restricted weed seeds; deduct up to 25 pts	
Common weed seeds; deduct up to 10 pts	
Inert matter; deduct up to 5 pts	
Total Score	100

Soundness: Seed grain should be plump, have good bright color, and show strong vitality. It should not be damp, musty, moldy, sprouted, discolored, heat damaged, bleached, shriveled, shrunken, broken, smutty or insect damaged. Kernels of oats or barley without hulls or with damaged hulls are not desirable. These conditions indicate that the vitality of the seed may have been compromised. Slight discoloring is not to be discriminated against as severely as more serious damage such as moldiness or heat damage.

Purity: When varieties are not separated in judging, for example, one oat class including all varieties, each sample should be judged with uniformity in kernel size, shape and color as a basis. If variety is to be considered, it will be necessary to learn distinguishing varietal characteristics.

The kernels should be characteristic of the variety, as shown by the size, shape, and color, and should be uniform in these respects. Color refers to the natural hue, as white, yellow, etc., hence discoloration of grains due to weathering should not be considered under this heading.

In wheat the presence of “yellow berries” does not necessarily indicate mixture, since under certain seasonal and soil conditions these develop in the purest strains.

Some varieties of rye vary considerably in color, containing brown, gray and green kernels.

Freedom from foreign material: Samples which contain prohibited noxious weed seeds should be rejected or placed on the bottom of the class. Restricted noxious weed seed content is not quite as

serious, but still places the sample in the lower group or placing. Common weeds are not as serious as noxious weeds, but the kind and amount will determine the discount.

Defects found in small grain and ranked from most to least serious defect:

1. Noxious weed seeds
    a. Prohibitive – quackgrass, leafy spurge, field bindweed
    b. Restricted – wild mustard, dodder, white cockle and others
2. Seed of other crops that cannot be removed easily
3. Disease or insect damage
4. Variety mixture
5. Sprouted seeds
6. Badly weathered, shriveled or immature
7. Common weed seeds
8. Hulled or damaged seeds
9. Slight amounts of weathering, others in #6
10. Inert matter
11. Some lack of uniformity in size, color, etc.

Large Seeded Legume Seed

(soybeans, peas, cow peas, beans, etc.)

	Highest Score
Soundness and Condition	40
Maturity	
Freedom from Damage:	
Moldy, musty, sprouted, frosted, insect damage, broken, cracked, split, shriveled, discolored	
Freedom from foreign matter	
Freedom from foreign disease	
Purity	45
Freedom from variety mixture	
Freedom from other crop seeds	
Freedom from weed seeds	
Uniformity	15
Total Score	100

Soundness: Seeds should be free from injury, plump, bright and smooth (varies by crop) in appearance, as this indicates strong germination and good seed condition. The more common defects are broken, cracked, shrunken, shriveled, wrinkled, split, immature and discolored seeds. Occasionally samples are moldy, musty, sprouted, or insect damaged. Dull color or fading usually indicates advanced age.

Purity: Mixture of varieties is a serious fault in large seeded legumes, since the time of maturity and commercial uses of the different varieties may vary greatly. For example, mixture of other varieties in peas used for canning often makes the seed useless for that purpose. Size, shape, and seed coat color should be typical of the variety. If the variety is not known, purity should be determined by uniformity of the seeds, using as a basis the prevailing size, shape, and color. Weed seeds and inert matter are not commonly found in samples of large seeded legumes. Where present they should be discounted.

Uniformity: Uniformity of size, shape and color, aside from its use in indicating purity and trueness to type, may help differentiate between samples equal in soundness and purity, and up to standard in weight per bushel.

Small Seeded Legumes and Grasses

	Highest Score
Luster	20
Plumpness	20
Freedom from other crop seed	15
Freedom from noxious and/or semi harmful weeds	35
Freedom from common weeds	5
Freedom from inert material	5
Total Score	100

Luster: A dull, lifeless appearance is apt to be due to weathering or age, and is considered an indication of reduced viability. A dull, reddish tinge is an indication of extreme age.

Plumpness: Shrunken seed of an unnatural brown or greenish color are immature and of low viability

Freedom from other crop seed: Includes other crop seed of the group.

Freedom from Noxious and semi-harmful weeds: Prohibited and restricted noxious weeds are listed in the Wisconsin Seed Law. Semi-harmful weeds also include sheep sorrel, dock, perennial peppergrass, johnsongrass and semi-harmful weeds – bracted plantain and wild carrot.

Freedom from common weeds: Especially Russian thistle, Rugel's plantain, common peppergrass, rough pigweed, redroot pigweed, green foxtail, yellow foxtail, lambsquarter, large crabgrass and barnyard grass.

Freedom from inert material: Chaff, stems, dirt, broken seed are classed as inert material.

Shelled Corn

		Highest Score
Soundness		90
Test weight, maturity and moisture content	25	
Freedom from heat damage	25	
Freedom from damage	25	
Freedom from foreign matter, broken and cracked corn	15	
General appearance		10
Uniformity of kernel color and luster		
Kernel size and uniformity		
Total Score		100

Explanations: Shelled corn is judged on feeding or industrial uses. In either case, soundness, freedom from foreign materials such as chaff, pieces of cob, dirt, etc. and general appearance are important factors in quality. For some industrial uses, it is important that the corn be either yellow or white, but not a mixture.

Maturity of sample: The sample shall be well matured. Immature corn often appears somewhat chaffy, the seed coat may be blistered and the cap may be shriveled.

Moisture content: If the class is specifically stated as #2 corn, the moisture content shall be 15.5% or less. If there is no grade or moisture content stated in the premium book, drier corn would be preferred as 12-13% corn keeps better in storage.

Test weight: A high-test weight usually indicates good maturity and dry corn. High moisture corn usually has a lower test weight. As most exhibitors and judges do not have access to the equipment needed to determine test weight, a visual assessment of kernel plumpness (correlates to test weight) is suitable.

Freedom from heat damaged: Heat damaged kernels are kernels and pieces of corn which have been discolored to the extent they are dark brown and the endosperm shows discoloration.

Freedom from damage: Damaged kernels are kernels and pieces of corn which are sprouted, frosted, ground damaged, weather damaged, moldy, diseased, etc.

Foreign material: Anything which is not corn should be considered foreign material. This includes materials such as; soybeans, oats, other crop seeds, dirt, stones, cobs, etc.

Broken and cracked kernels: For corn grades in the U.S., any corn which passes through a $12/64^{th}$ round hole sieve is considered broken (commonly called fines). Kernels which are broken, but do not pass through the sieve are considered whole. However, when judging a market class, one might consider the amount of corn where a portion of the kernel has broken off, is cracked or shows silk cuts.

General appearance: In a market class, uniformity of seed is not as important as in a seed class. However, it is important to examine the sample for uniformity of maturity and corn types, which could indicate mixing or blending of corn samples. Along with general appearance corn should also have good luster.

Ear Corn

		Highest Score
Ear Type		40
	Uniformity of ear confirmation	
	Uniformity of ear length and diameter	
	Uniformity of tip and butt development	
	Size of ear for maturity	
Quality		40
	Diseased	
	Damaged kernels	
	Foreign material	
	Bright-healthy color	
	Well filled kernels – Deep kernel	
Maturity		20
	Not over 20% moisture	
	Kernels not loose on the cob	
	Total Score	100

Ear type: In hybrid corn there are many different ear types. Therefore, selection must be made for a uniform sample in ear conformation length and diameter. Tip and butts should be well filled and straight rowed. With higher plant populations, size of ear is reduced, therefore, preference should not be given to a sample that may contain some large ears or all poorly developed long ears. Open row corn ears should be discounted. Early maturity corn may also be shorter in length than the later maturing hybrids.

Quality: Ears should not contain kernels that have been damaged by insects, disease, mold, birds, rodents and harvesting equipment. Entries that have been stored or transported in containers that cause dirty or discolored samples should be discounted. It is desirable that the kernels should be well filled and deep. However, if the exhibitor doesn't have the option of removing two or three kernels to check kernel depth, the judge should not take this option. The grain should have a bright healthy color, indicating quality and that the sample is not too old.

Maturity: Drier more mature samples should receive preference. Ear corn should not contain over 20% moisture. The kernels should not be loose on the cob.

Corn Silage

	Range
Crop Quality (50 points) based on grain content	
High proportion of corn grain to stalks and leaves	46-50
Medium proportion of corn grain to stalks and leaves	26-45
Low proportion of corn grain to stalks and leaves	26-35
None: either no corn ears have developed or ears have been removed	20-25
Preservation (50 points) based on color and odor	
Color (25 points)	
Desirable: Natural green to olive green color	21-25
Acceptable: Yellowish green to slight brownish: if frosted, faded light yellow; slight mold spots evident	11-20
Undesirable: Deep brown or black indicating excessive heating or putrefaction, predominantly white or gray indicating excessive mold development	5-10
Odor (25 points)	
Desirable: Clean, pleasant odor with no indication of putrefaction	21-25
Acceptable: Yeasty and fruity indicate a slightly improper fermentation. Slight burnt, sweet, caramelized or musty odor indicate excessive air. Very rank or sour indicate high moisture	11-20
Undesirable: Strong odor indicates excessive heating. Putrid odor indicates improper fermentation. Very moldy or musty odor with excessive mold visible throughout the silage.	5-10
Total Score	100

Scoring: excellent 100-90, good 89-76, fair 75-60, poor below 60

Quality: Corn silage with a high grain content, preservation being equal, makes livestock feed superior to corn silage with little or no grain. One hundred pounds of "high grain" silage may contain 20 to 21 pounds of digestible nutrients, while "low grain" silage at the same moisture content may contain only 15-16 pounds of digestible nutrients.

Color: A natural green is most desirable. While slight variations from this are not heavily penalized, brown, yellow, or strongly faded colors are seriously criticized. Deep brown or char-red black indicates excessive air in the silage mass, resulting in high temperatures and a serious loss in digestibility of the silage. Yellow or faded color often results when corn is ensiled after frost. It indicates a heavy loss of carotene; but if there is sufficient moisture for good packing, the feed value, except for carotene, may be good in spite of the color. Molds; white, gray or pink, when present in appreciable amounts indicate loss of feed value and should be penalized in proportion to the amount present. Corn kernels should retain a bright yellow color.

Odor: Good corn silage has a clean, slightly sharp odor and taste, indicating a proper amount of acidity for preservation. Silages with fruity odors should be penalized, but not severely. Strong musty, moldy or burnt odors are undesirable. They may indicate serious feed loss and should be heavily penalized. High moisture corn silage, often found in the bottom of poorly-drained silos, may have a strong sour odor. Although not desirable, if livestock consume the silage, it is still an acceptable feed source.

Hay

	Range
Maturity at harvest (40 points)	
Before bloom or heading	35-40
Early bloom or early heading	28-34
Mid-to-full bloom or heading	21-27
Ripe seed	15-20
Leafiness (35 points)	
Very leafy	30-35
Leafy	24-29
Slightly stemmy	18-23
Stemmy	0-17
Color and Condition (25 points)	
Natural green color	22-25
Light green/slightly brown	18-21
Yellow to brownish, musty	14-17
Brown or black, moldy	0-13
Deducted points	
Trash, weeds, dirt and other foreign matter	Minus 0-35
Noxious insects (blister beetles, others)	Minus 0-50
Total Score	100

Scoring: excellent 100-90, good 89-76, fair 75-60, poor below 60

Exhibits must be from this year's crop. Hay must be cured, air-dried to a safe storage moisture. The hay sample should be firm, neat and attractively packed. Read and follow fair book specifications, if asked; identify the species, approximate grass percent, which cutting, date cut and/or approximate stage of maturity when cut.

Maturity: Maturity influences both yield and composition of hay. Highest quality legume hay is cut when 1/10th of the field is in bloom. Highest quality grass hay is cut before flowering. Young plants are higher in protein, minerals, and carotene than older plants. They are also more tender, palatable and less fibrous.

Leafiness: In legumes, percentage of leaves is the best index of feed value. Leaves in alfalfa hay contain over twice as much crude fiber as stems. Leafiness is not a major factor in grass hay.

Color: A high percentage of natural green color in hay indicates early cutting, good curing, pleasant aroma, high palatability, freedom from must or mold and a relatively high carotene content. Storage of hay causes the loss of some color, especially if the hay has a high moisture content, is tightly packed, or has poor ventilation.

Condition: Refers to the soundness of hay when it is well cured. Unsound hay has too much moisture, has not cured properly and smells musty or moldy.

Foreign Matter: Hay samples should be free from trash, weeds, dirt and noxious insects. Points should be deducted for undesirable foreign matter.

Grass Silage

(Grasses, Legumes or Combinations of Both)

	Range
Crop Quality (40 points) Based on stage of growth at cutting	
Before blossom or early heading (fine stems high leaf content)	36-40
Early blossom	31-35
Mid-to-late bloom	21-30
Seed stage (very stemmy, coarse, low leaf content)	10-20
Preservation (60 points) Based on color and odor	
Color (30 Points)	
Desirable: Natural forage green or slightly yellowish green. Light to dark green depending on crop and/or additive used. Red clover may have a darker color	26-30
Acceptable: Deep dark green or very yellowish-green or slight brownish green	16-25
Undesirable: Brown or black indicating excessive heating or putrefaction Predominantly white or gray indicating excessive mold	5-15
Odor (30 Points)	
Desirable: Clean, pleasant with no indication of putrefaction	26-30
Acceptable: Somewhat strong, yeasty, fruity or musty, slight burnt odor, sweet	16-25
Undesirable: Strong, burnt or caramelized odor indicating excessive heating. Sliminess and a putrid odor indicate improper fermentation. Very musty or moldy odor with excessive mold visible	5-15
Total Score	100

Scoring: excellent 100-90, good 89-76, fair 75-60, poor below 60

Grass Silage

Quality: Grasses and legumes, have higher digestibility and contain more protein in the early stages of growth. Alfalfa should be harvested by early bloom stage, clovers by ½ bloom stage and the grasses before flowering for highest quality and good yield. Late cut, mature, stemmy forage even though well preserved cannot make high quality feed. Foreign Matter: Weeds and stubble may also have a good preservation, but the total amount of nutrients per acre will be reduced due to lower quality and yields. Although not listed in this scorecard, judgement should be used in the evaluation of silages with high foreign matter content and those samples should be penalized.

Color: Natural rather than artificial light should be used in grading samples on color. A natural color is desired and slight changes should not be seriously penalized. Dark brown or charred black is an indication of excessive heating. This is usually caused by poor packing or material with too low of a moisture content. Silage on the outside of stacks is usually this color even where the forage was of high moisture when stacked. Molds indicate a feed loss and are caused by air. To prevent molding, use higher moisture material, pack better and cover with plastic. Deep green or black is often seen in very high moisture silage. It is sometimes associated with strong odors and occasionally with a slippery slimy feel, which is seriously objectionable.

Odor: Silage odors range from a very mild crushed grass smell to very strong and penetrating. Odor reflects the type of silage fermentation. While silages with strong odors often are objectionable to people who must handle them, they may still be good feed and readily eaten by livestock. These objectionable silages, however should not be kept in storage for too long a period of time and should be fed carefully to prevent “off-flavors” in milk. Strong ammonia and moldy or musty odors indicate considerable loss in feed value and should be heavily penalized. Reserve the “Desirable” rating for silages with no strong, objectionable odors. High moisture silages are usually the ones with the strong odors.

Moisture Content: High moisture silage (75% or above) will contain less feed value per pound than lower moisture silage. High moisture may indicate excessive juice loss with corresponding loss of nutrients. However, heavy nutrient loss may also result from ensiling material too dry as it will not pack well. Moisture content can be approximated by squeezing in the hand, if juice runs free it is high moisture.

Forage Sheaves

		Highest Score
Stage of maturity when cut;		25
Leafiness and fineness of stems;		20
Condition;	freedom from mustiness and evidence of curing without loss of color or quality	20
Purity;	freedom from weeds and other kinds	15
Size of sheaf and length of straw;	sheaf should be at least 4 inches in diameter at neck	10
Attractiveness;	Symmetry, firmness and neatness of material and placing and attractiveness of bands	10
	Total Score	100

Small Grain Sheaves

	Highest Score
Grain and straw quality	60
Large spike or panicle development	
Well-developed kernels	
Plant maturity	
Freedom from evidence of disease	
High quality straw	
Preparation of Sheaf	40
Total Score	100

Sheaves should demonstrate the exhibitor's ability to take good grain and prepare an attractive display.

Development and plant maturity: Large, well filled and disease-free spikes or panicles are desired. The seed should be plump and well matured. Straw should be bright colored, disease free and straight.

Preparation of sheaf: The leaves should be stripped. The base of the head or panicle should be at a uniform level. The stems should be straight and parallel. The butts are to be cut off to form a square, uniform base of the sheaf. The diameter should meet fair book specifications; usually 2 to 3 inches in diameter. The sheaf should be firmly tied 3 to 5 times with an attractive ribbon or according to specification.

Corn Sheaves or Bundles

	Highest Score
Physical condition of plant	35
Plant maturity	40
Preparation of sheaf	25
Total Score	100

Physical condition of plants: Leaves should have a good green color, be well developed and numerous. The leaves should be sound and not weather damaged or contain holes caused by insect feeding. The stalks should be uniform in size and height and show good strength. Diseased plants should be discounted.

Plant maturity: Well developed, uniform and dented ears are preferred. In Wisconsin, this is not possible with summer fairs, therefore, general maturity and uniformity of maturity must be considered

Preparation of sheaf: The sheaf should be prepared according to fair book specifications, some require roots and others may not. If roots are required, they should be well wrapped so that the soil is retained with the plants and does not dirty the exhibit area.

The bundle or sheaf should be tied neatly so it can be readily handled and still permit the display of the plants.

Preparing a Grain Sheaf for Exhibit

1. Cut several hundred stalks before harvest. This should be done when the grain is ripe, but before it becomes extremely brittle or shatters easily.

2. Select plants that have bright, straight straw that is free of disease and true to variety type.

3. The grain should have good heads with plump, good quality seed.

4. Strip off the leaves from each straw, not just those on the outside of the bundle. Avoid breaking the straw while doing this.

5. Spread the harvested stalks out under a roof to dry.

6. Tie them into a neat, attractive firm bundle. Use colored string or ribbon to hold them in place. The sheaf should usually be tied in 3 to 5 places, following fair regulations. Bundle them carefully so the base of the heads are even on all stems.

7. Carefully square off the butts with a shears.

8. Always handle the sheaf carefully. Make certain the straw doesn't break or become bent in storage.

9. The workmanship, as well as, grain and straw quality will be considered in judging your sheaf.

10. Read and follow all regulations regarding sheaf size, the year of production, class and lot numbers and other entry tag labelling requirements.

Preparing Small Grain Seed for Exhibit

1. Make certain the grain is fully mature and under 13-14% moisture before harvesting. Harvest before discoloration due to weathering occurs. Some exhibitors hand harvest small bundles which are capped in the field to prevent weathering or they are brought into a building for storage before threshing.

2. Avoid damage to the seed while combining. Threshing too close or hulling should be avoided.

3. Clean the sample to remove inert matter, weed seeds, hulled and broken kernels and small seeds. The samples can be run through the cleaning machinery several times. If available, a screen having slightly larger holes may be used. Using greater amounts of wind will remove small, lightweight seeds.

4. Examine the sample carefully. Hand sorting may be needed to remove a few remaining weed seeds, hulled or off-type kernels from the seed that is to be exhibited. This takes time and patience, but may give your sample the final edge it needs to win.

5. Read the fair book carefully and be sure to follow all regulations: amount of seed required; year of production; container for exhibits; labeling, such as class and lot numbers, variety name, etc.; entry and judging dates and time.

Preparing Ear Corn Samples for Exhibit

1. Select ears that are uniform in size, shape, color, and kernel type and true to variety type.

2. Ears should be medium sized, usually avoid exceptionally large or small ears.

3. Ears should be well filled at the tips, free of disease, insect or mechanical damage.

4. Ears should be firm and well matured

5. Kernels should be deep, wide and free of roughness.

6. Follow all regulations and instructions: number of ears; entry information, such as class, lot, relative maturity, variety name, year of production, etc.

Preparing Corn Plants for Exhibit

1. Select stalks that are uniform in size, height, type and stage of growth.

2. The corn should be of proper maturity for your area. This is indicated by the ear development.

3. Avoid plants that are unusually tall, especially if this is accompanied by an indication it lacks maturity.

4. Stalks should be straight and sturdy.

5. Stalks, leaves and ears should be free of disease, insect or other damage. Avoid damaging the leaves as much as possible in handling.

6. Ears should be uniform in height. Ears should be attached soundly. Avoid long ear shanks.

7. Read and follow fair book specifications regarding number of stalks and manner of display regarding the roots. Some require them removed, others require they be well-wrapped in cloth. Tie the stalks together for ease in handling. Be certain all entry tag information is given.

Closing Thoughts

Seed Laws should be considered, as most seed exhibits are judged as seed. If we are judging from the standpoint of seed, the samples should at least comply with current seed laws. Carefully review and become familiar with the prohibited and restricted noxious weed seeds. This is a critical determination when judging seeds. As an example, since quackgrass is a prohibited noxious weed seed in Wisconsin, any sample which contains this weed seed should certainly be downgraded. There may be a difference of opinion on the detrimental effect of some of the prohibited noxious weed seed, however, we certainly must comply with the state statue.

Test Weight: Kernel plumpness is considered an important characteristic of good grain. This quality factor is most commonly indicated by the test weight per bushel of the grain. As an example, the recognized bushel test weight of shelled corn in most states is 56 lbs. per bushel. The minimum for the U.S. #2 corn is 54 lbs. Corn test weight is a measure of the weight per volume, or bulk density, of shelled corn at 15.5% moisture. This is determined by weighing the amount of shelled corn needed to fill a volume equivalent to a bushel (32 quarts) and adjusting for moisture content. Many commercial grain moisture meters provide grain test weight measurements. However, since most exhibitors and judges do not have easy access to the necessary equipment, a visual assessment of kernel plumpness is the typical approach when judging fair entries.

This document was reworked by Craig Saxe, UW-Madison, Agriculture Educator-Emeritus. Comments and suggested changes can be emailed to: craig.saxe@wisc.edu . The original publication was entitled: "Judging Farm Crops", prepared by E.A. Brickbauer, D.A. Rohweder and E.S. Opplinger, Agronomy Department, College of Agricultural and Life Sciences, University of Wisconsin – Extension, Madison, Wisconsin.

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