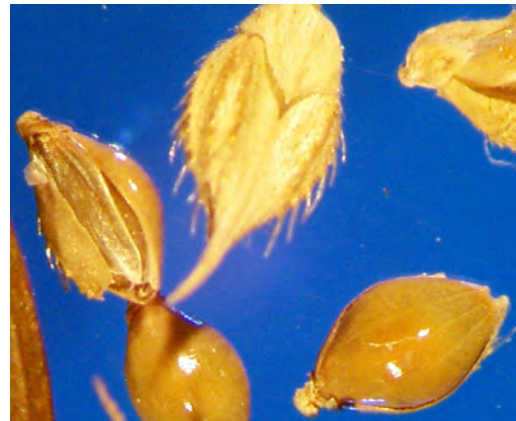


A Pictorial Guide to Selected Crop and Weed Seeds



2003

*Dr. E. Brent Turnipseed
SDSU Seed Testing Laboratory*

In the following pages you will find color photographs of all seeds that are used in the South Dakota State FFA and 4H Crops Contests. In each picture a scale in millimeters (mm) has been used so you can determine actual seed size. A brief seed description accompanies each seed, sometimes with arrow(s) pointing out key features. Terminology used is not always precise botanical terms, but everyday terminology. When precise terminology is used it is usually explained, or listed in the glossary. Seeds are not in alphabetical order, but similar seeds, or similarly shaped seeds are put in proximity to one another for comparison purposes. Multiple seeds of each species are in most pictures so that variation in size, shape, and color can be noted.

Pictures are only on one side of each page, leaving the opposite side empty for anyone to write notes, or tape in actual seed samples.

The contents page is ordered by page number. To find a specific species quickly, look it up in the index, which is alphabetized by common species names.

Flash card sets (for studying, quizzes, tests, contests) of seed photographs are also available through the SDSU Seed Testing Laboratory. For ordering and information contact Dr. Brent Turnipseed at 605-688-4590.

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***Published by:
SDSU Seed Testing Laboratory
South Dakota State University
Brookings, South Dakota
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2003***

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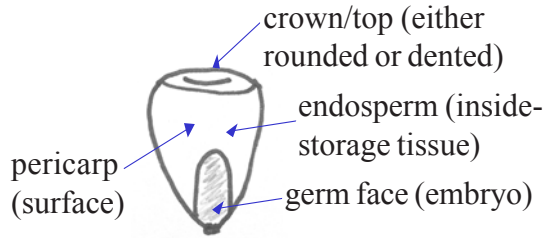
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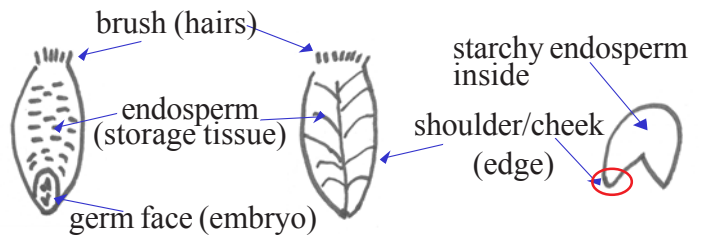
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Seed Diagrams

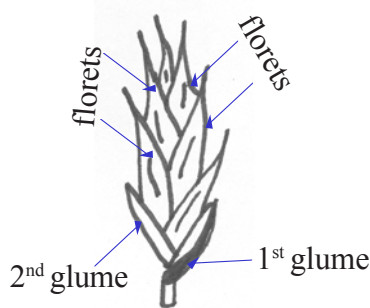
POACEAE - Grass Family



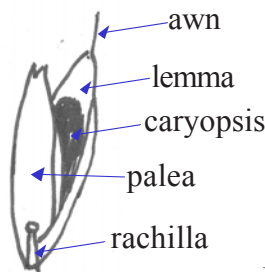
Corn



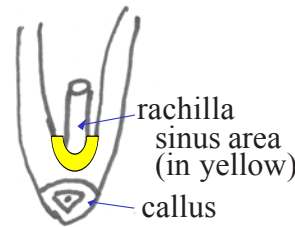
Wheat



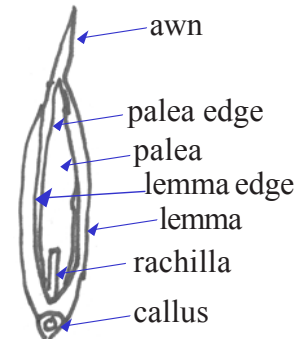
Spikelet



Floret

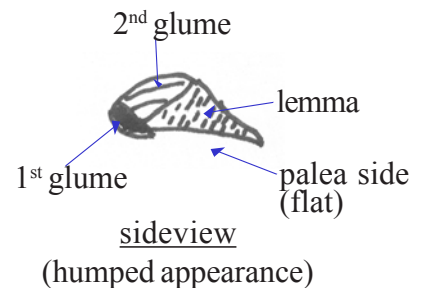
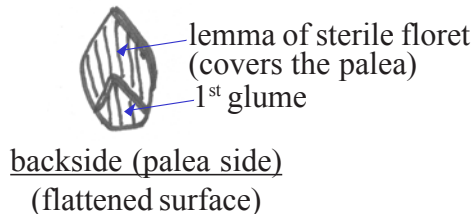
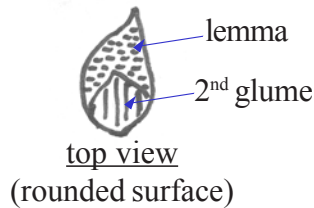


Floret base



Floret

Wheatgrass-type



Yellow Foxtail

Terms unique to the grass family

Spikelet - One or more florets subtended by one or two glumes.

Floret - Basic seed unit of grasses/cereals consisting of the lemma, palea, and all other structures inside. A mature fertile floret consists of the lemma, palea, and caryopsis. An immature flowering floret consists of the lemma, palea, stamens, and pistil.

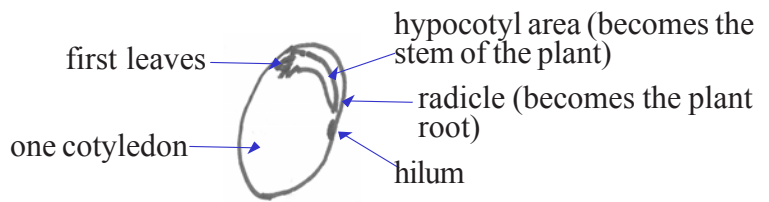
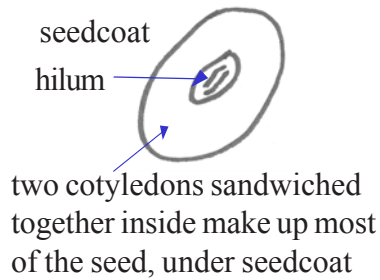
Lemma - The larger of the two papery coverings around the caryopsis.

Palea - The smaller of the two papery coverings around the caryopsis.

Glumes - Scaly bracts, usually a pair of outer hulls of a grass spikelet (subtending the floret(s)).

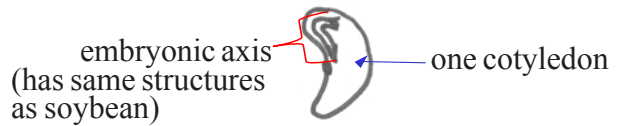
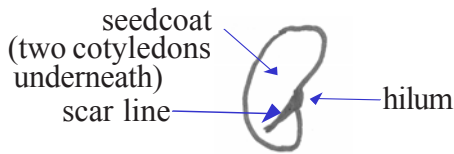
Rachilla - The axis (central stem) of the spikelet in grasses. The secondary axis. Short axis portion connected to the grass floret.

FABACEAE - Legume Family



view between cotyledons (seed cut in half)

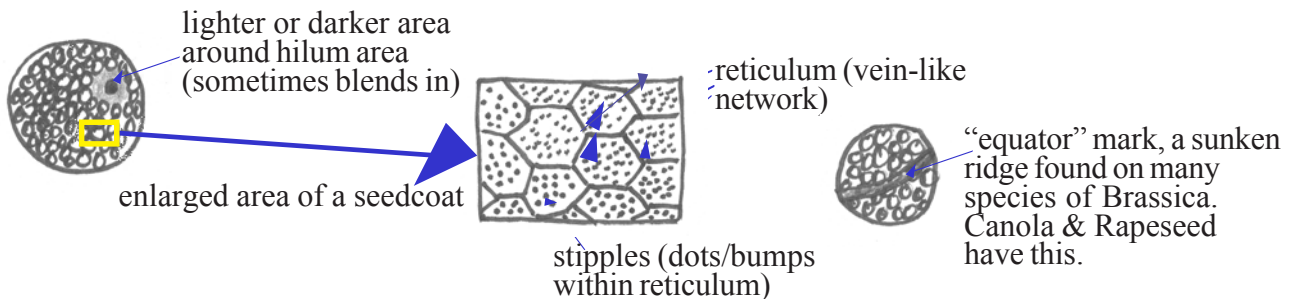
Soybean



view between cotyledons
(seed cut in half)

Alfalfa

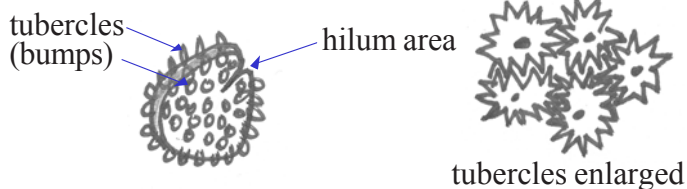
BRASSICACEAE - Mustard Family



Under lighted magnification you can see a reticulation pattern that is characteristic of the species. The reticulum is very strong and distinct in some species, while faint and indistinct in others. The stipples (dots) are very small bumps within the reticulum. Stipples sparkle under lighted magnification.

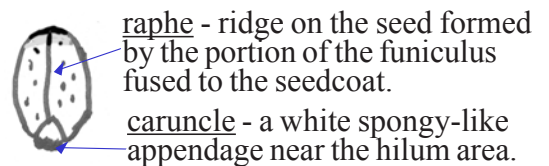
Wild mustard and Canola/Rapeseed have very similar reticulation and are primarily distinguished by their seed size and the "equator" mark. Wild mustard seed tastes bitter when eaten, Canola doesn't.

CARYOPHYLLACEAE Pink Family



Tubercles are small bumps/protruberances on the surface of the seed. They are usually in a pattern. Tubercles can be simple (i.e. - chickweed), or have complex gear-teeth that mesh with neighboring tubercles (i.e. - white cockle, catchfly, etc.)

EUPHORBIACEAE Spurge Family



Leafy spurge

Grain Seeds

(uses and scientific names)

- amber durum wheat** (*Triticum turgidum* subsp. *durum*) - used for pasta and noodles
- hard red winter wheat** (*Triticum aestivum* subsp. *aestivum*) - used for breads
- hard red spring wheat** (*Triticum aestivum* subsp. *aestivum*) - used for breads
- triticale** (*XTriticosecale*) - livestock feed or green manure crop (a cross between wheat and rye)
- rye** (*Secale cereale* subsp. *cereale*) - bread, winter cover and green manure crop, distilled alcoholic beverages
- oats** (*Avena sativa*) - livestock feed, straw production, human food
- two-rowed barley** (*Hordeum vulgare* subsp. *vulgare*) - primarily used for malting and production of alcoholic beverages (Synonym - two-row barley)
- six-rowed barley** (*Hordeum vulgare* subsp. *vulgare*) - livestock feed and malting (Synonym - six-row barley)
- yellow dent corn** (*Zea mays*) - primarily livestock feed
- white dent corn** (*Zea mays*) - used to produce snack chips (i.e. - tortilla chips, etc.)
- flint corn** (*Zea mays*) - animal feed
- pop corn** (*Zea mays*) - heated and popped for human consumption
- sweet corn** (*Zea mays*) - human consumption
- grain sorghum** (*Sorghum bicolor*) - primarily for poultry and livestock feed
- proso millet** (*Panicum miliaceum*) - primarily poultry and bird feed
- buckwheat** (*Fagopyrum esculentum*) - ground up for buckwheat flour (i.e. - pancakes), most exported to Japan
- flax** (*Linum usitatissimum*) - grown for its seed oil, seed also eaten as a health food. Linen is produced from plant fibers
- rapeseed** (*Brassica napus* var. *napus*) - crushed for its oil which is used in industry (i.e. - paints, brake fluids, rubber products, etc.)
- canola** (*Brassica napus* var. *napus*) - a low erucic acid type of rapeseed. Oil used in edible cooking oils, also same uses as rapeseed. Canadians termed the name canola (from Canada and oil low acid)
- yellow mustard** (*Brassica alba* subsp. *alba*) - leaves of plant used for greens or salads, seed oil used for cooking
- soybeans** (*Glycine max*) - seed oil has multiple uses from human foods to industrial uses, meal by product used as a livestock feed
- safflower** (*Carthamus tinctorius*) - principally grown for its' seed oil, used in paint, varnish, edible cooking oils, margarine, salad oil, and mayonnaise
- sunflower, confectionary** (*Helianthus annuus*) - human consumption, bird feed
- sunflower, oil type** (*Helianthus annuus*) - seed oil, used for human consumption, bird feed
- hulless oats** (*Avena sativa*) - livestock feed (horses)
- emmer** (*Triticum dicoccum*) - used for livestock feed
- pinto fieldbeans** (*Phaseolus vulgaris*) - seed produced for human consumption, boiled, stewed, or fried (Synonym - pinto bean)

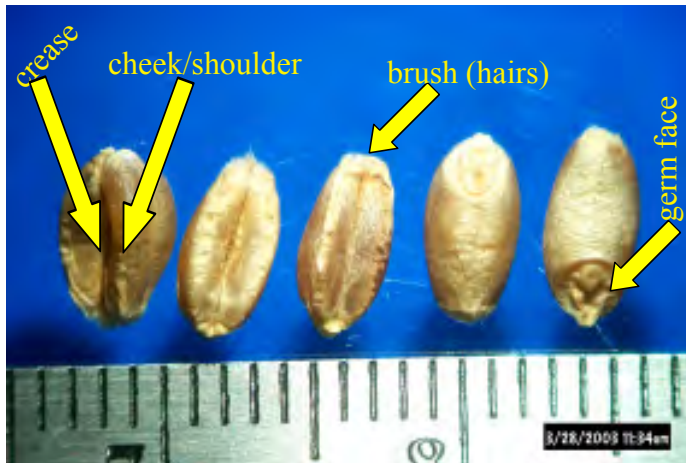
amber durum wheat



Characteristics:

- amber/golden color
- longest, largest wheat
- hump backed, arched
- no brush or minute hairs

hard red spring wheat



Characteristics:

- open crease "V"
- cheeks/shoulders sharp
- width is broad
- length is considered short
- germ size is medium
- has a medium brush

hard red winter wheat



Characteristics:

- tight crease
- cheeks/shoulders semi-round
- sides are parallel
- length is considered long
- germ size is small
- has a light brush

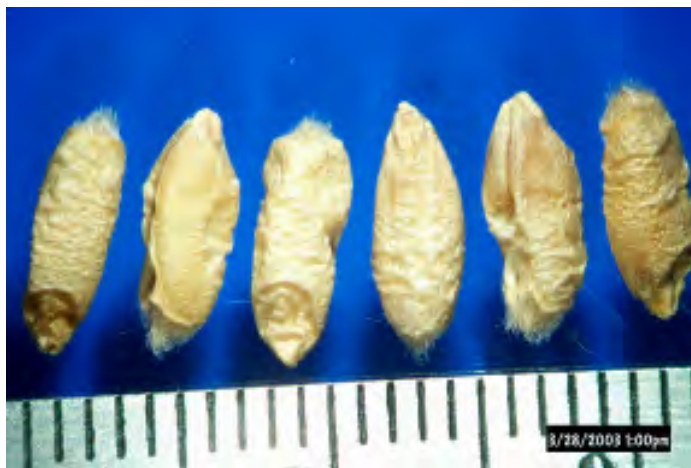
rye



Characteristics:

- greenish brown to blackish in color
- no brush to few sparse hairs
- elongated, pointed germ face
- somewhat barrel-shaped in cross-section
- pericarp smooth to wrinkled

triticale



Characteristics:

- cross between wheat and rye
- straw to wheat colored
- large kernel
- has a heavy brush
- elongated, pointed germ face
- somewhat barrel-shaped in cross-section
- pericarp (surface) very wrinkled

oats



Characteristics:

- white, yellow, or red hulls
- notice point of attachment
- three hulled oats in picture (arrows)

two-rowed barley



Characteristics:

- short neck, straighter crease
- tight, thin skin, wrinkled back half
- back end of kernel points upwards
- germ end doesn't point down as rapidly as six-rowed does
- symmetrical kernel with a fat belly
- germ end of seed more blunt
- middle vein is not predominant on the back 1/2 of the kernel
- seed head has only 2 rows of seed, allowing all seed to be symmetrical and straight

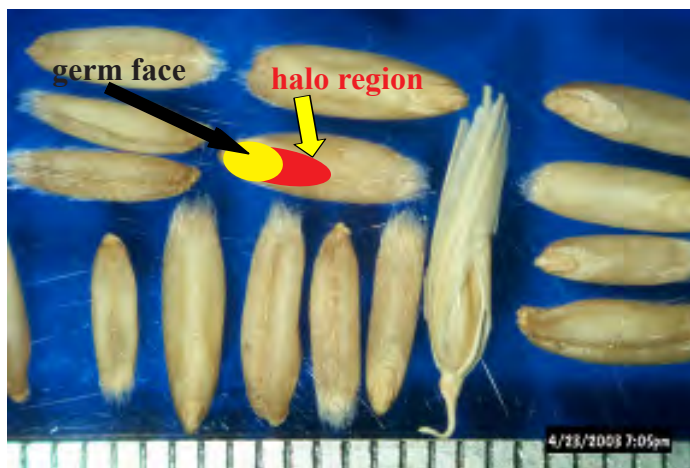
six-rowed barley



Characteristics:

- longer necked
- 2/3rds of kernels have a "twist", or are not symmetrical. The reason is the seed head has 6 rows of seed, causing 2/3rds of the seed to twist (crease)
- veins are predominant
- veins form "bottle" neck
- often has a "hump" appearance
- note the skinned/hulled barley

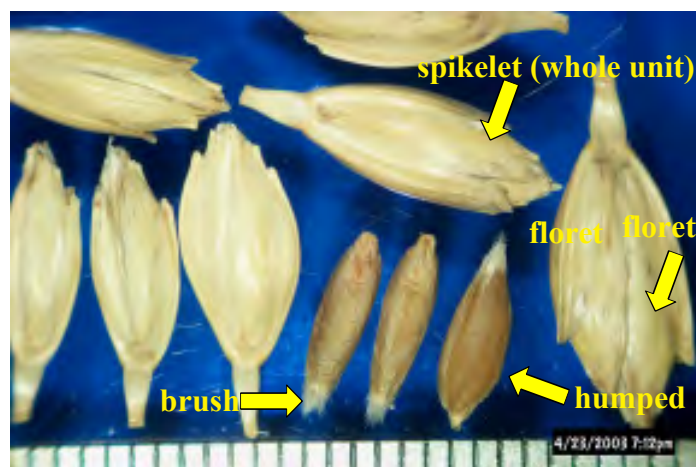
hulless oats



Characteristics:

- looks like a hulled oat groat
- has lots of pubescence
- seed is somewhat soft and sticky
- note halo region above germ face (see arrows)
- hulless oat varieties are not 100% hulless, but will have a small percentage with hulls still attached.

emmer



Characteristics:

- 2 florets (seeds) per spikelet
- hulled out kernels look similar to wheat, but brush end (opposite end from germ) is more pointed and hairy than wheat
- more humped (side view) and typically larger than the red wheats

pinto fieldbeans

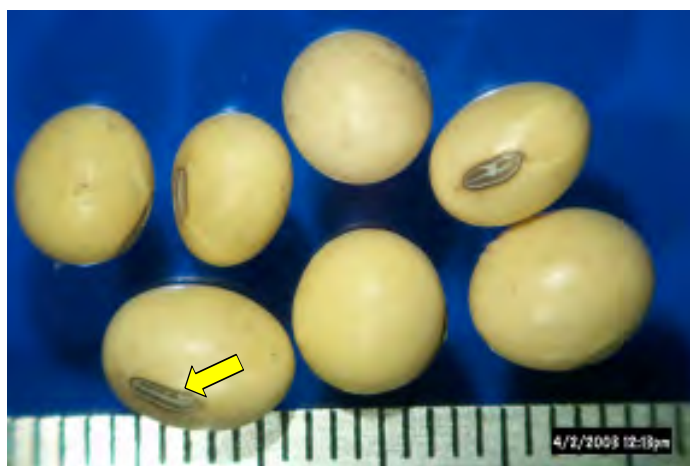


Characteristics:

- midsize fieldbean
- brown marbled seed
- white hilum

Note: There are many other types (navy, great northern, black turtle, red kidney, etc.) of fieldbeans than the pintos. They can be many different colors, shapes and sizes. The one constant is that the hila is typically all white in color.

soybeans



Characteristics:

- commercial varieties are yellow, but soybean color can also be black, brown, or bicolored
- Hila color can be black, imperfect black, brown, gray, buff, tan, or yellow (see arrow marking hila) (imperfect black hila seeds are pictured)

Note: Hilum = singular Hila = plural

dent corn (mixed colors)



Characteristics:

- has a dent in the top of the kernel
- softer type of endosperm than flint corn,
and dent forms as the seed dries down
- can be any color of kernel
- can be round or flat kernels

White Dent Corn - two kernels on the left

Yellow Dent Corn - two kernels on the right

White vs. Yellow - look at the crown color on the backside of the kernel (circled in red)

yellow dent corn

Characteristics:

- pericarp color is yellow
- may have red streaks (varietal)



white dent corn

Characteristics:

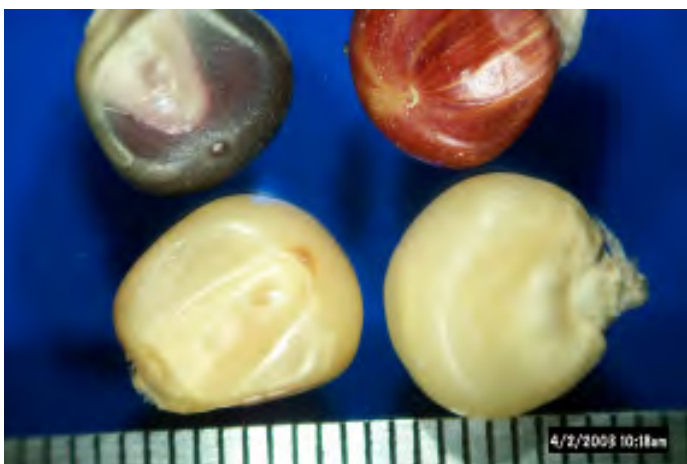
- pericarp color is white

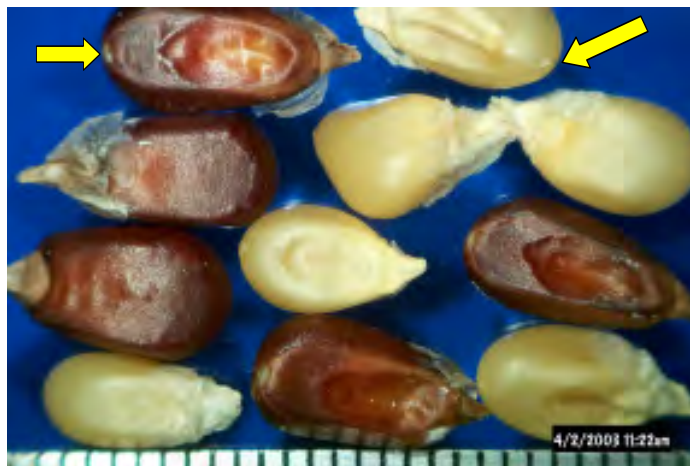


flint corn

Characteristics:

- top of kernel is rounded, no dent
- pericarp can be any color
- harder type of endosperm than dent

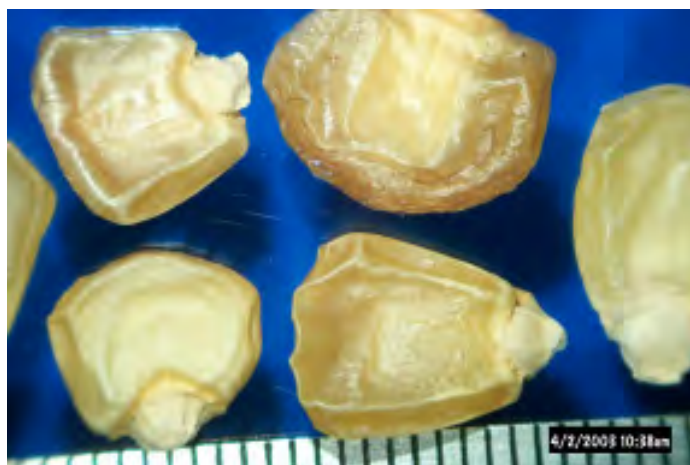




pop corn

Characteristics:

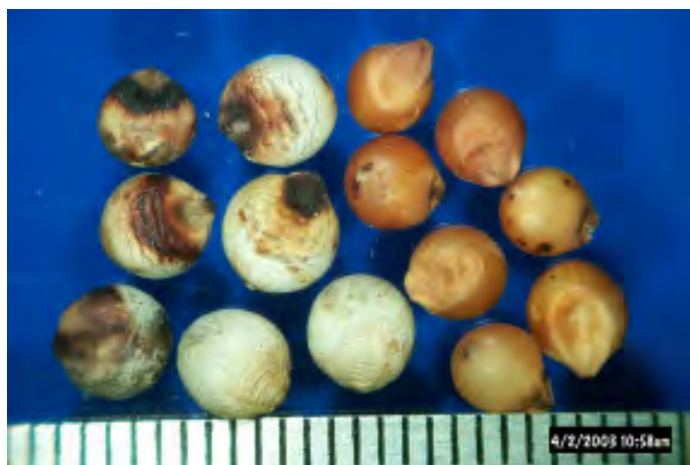
- kernel colors are usually white, yellow, red, black, or brown
- extremely hard endosperm
- typically smaller and rounder corn
- note yellow arrow, pop corn has a distinct and easily seen silk point attachment bump in the crown area.
- There is one silk for every kernel on a corn cob.



sweet corn

Characteristics:

- pericarp can be any color
- seeds go from slightly wrinkled and shrunken, to extremely wrinkled
- has unconverted sugars in kernel



grain sorghum

Characteristics:

- pericarp can be any color
- seed has a 1:1 ratio (length:width)
- size can vary greatly depending on yearly environment and variety



proso millet

Characteristics:

- lemma and palea are glossy
- cultivated proso is usually white or red, but other colors exist
- it is common to have some hulled seeds in the samples
- may see faint longitudinal stripes on lemma and palea

buckwheat



Characteristics:

- large triangular shaped seed
- surface may have variegated pattern
- edges “sharper” than wild buckwheat, also much larger than wild.

flax



Characteristics:

- seed color is brown or yellow
- seed is thin (edge view)
- shape is somewhat tear-shaped with the lower point curving slightly
- can have scabby kernels (arrows)

Note: Scab is a disease caused by the fungus *Fusarium* spp.

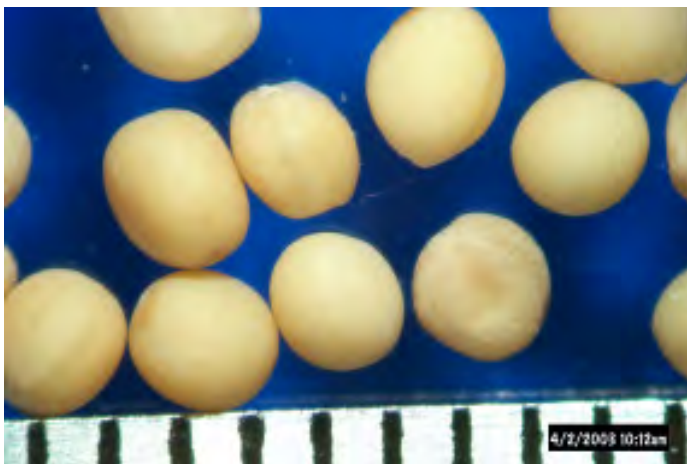
rapeseed (canola)



Characteristics:

- seed color is usually brownish-red to almost black. Can also be yellow.
- seeds have a distinct “equator” mark, sunken/raised crease (see arrow)
- seed is basically round
- Canola is a low erucic acid type of rapeseed
- larger than wild mustard

yellow mustard



Characteristics:

- seed color is yellow
- basically a round seed
- might have a slight “equator” mark, not as prominent as rapeseed.
- may be slightly larger seeded than some varieties of rapeseed/canola

safflower

Characteristics:

- seed color (hull) is white
- resembles a smaller sunflower
- looks like a Russian knapweed, only much larger.
- not as flat as sunflower seeds



sunflower - oil type

Characteristics:

- solid color black (often shiny) or faintly striped



sunflower - confectionary

Characteristics:

- dull black seeds with distinct white stripes
- seeds usually larger than oil type



Forage Seeds

Used for production of hay and/or pasture. A few species are used in the Federal Conservation Reserve Program (CRP). Scientific names are in parentheses.

alfalfa (*Medicago sativa* subsp. *sativa*)
sweetclover (*Melilotus* spp.)
red clover (*Trifolium pratense*)
birdsfoot trefoil (*Lotus corniculatus*)
alsike clover (*Trifolium hybridum*)
white clover (*Trifolium repens*)
switchgrass (*Panicum virgatum*)
reed canarygrass (*Phalaris arundinacea*)
common foxtail millet (*Setaria italica*) (synonym - foxtail millet)
Siberian foxtail millet (*Setaria italica*) (synonym - foxtail millet)
big bluestem (*Andropogon gerardii*)
blue grama (*Bouteloua gracilis*)
creeping foxtail (*Alopecurus arundinaceus*)
creeping red fescue (*Festuca rubra* subsp. *rubra*)
orchardgrass (*Dactylis glomerata*)
crested wheatgrass (*Agropyron desertorum*)
slender wheatgrass (*Elymus trachycaulus* subsp. *trachycaulus*)
western wheatgrass (*Pascopyrum smithii*)
intermediate wheatgrass (*Elytrigia intermedia* subsp. *intermedia*)
Russian wildrye (*Psathyrostachys juncea*)
bromegrass (*Bromus inermis* subsp. *inermis*)
buffalograss (*Bouteloua dactyloides*)
forage sorghum (*Sorghum bicolor*)
sudangrass (*Sorghum x drummondii*)
Kentucky bluegrass (*Poa pratensis*)
timothy (*Phleum pratense*)
green needlegrass (*Nasella viridula*)
hairy vetch (*Vicia villosa*)

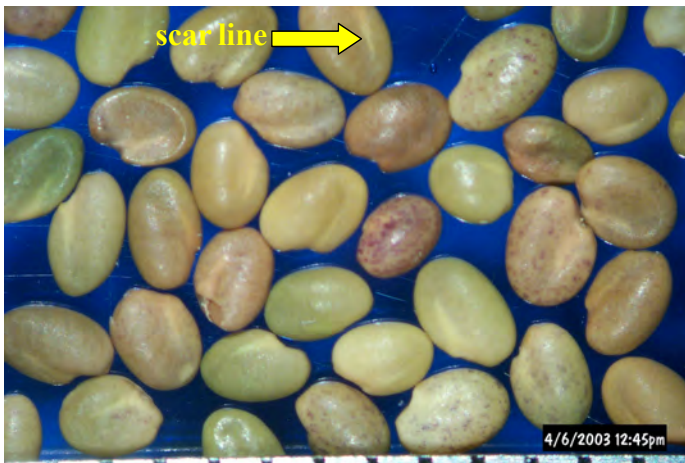
alfalfa



Characteristics:

- seed is kidney shaped, but often misshapen
- seed color is yellowish or greenish, but darkens with age
- scar line angles inward

sweetclover



Characteristics:

- uniform close mitten (thumb in tight), shape similar to a first baseman's glove
- yellowish or greenish yellow
- purple mottling on some seeds
- scar line runs more parallel with sides of seed

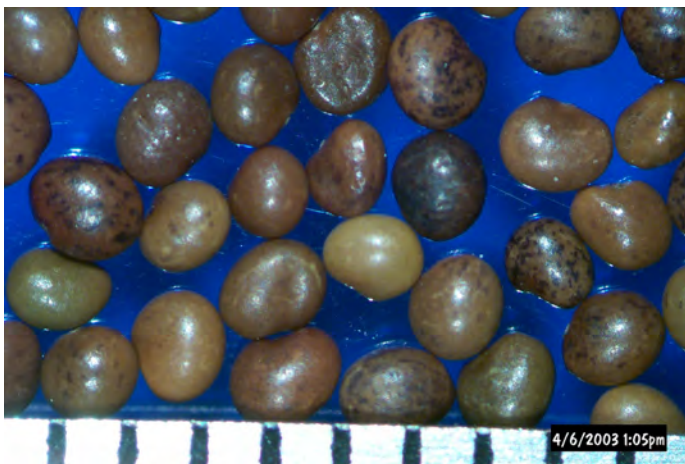
red clover



Characteristics:

- open mitten (thumb sticking out)
- yellow on narrow end, shading to purple below; sometimes entirely purple
- seed coat is shinier than alfalfa or sweetclover

birdsfoot trefoil



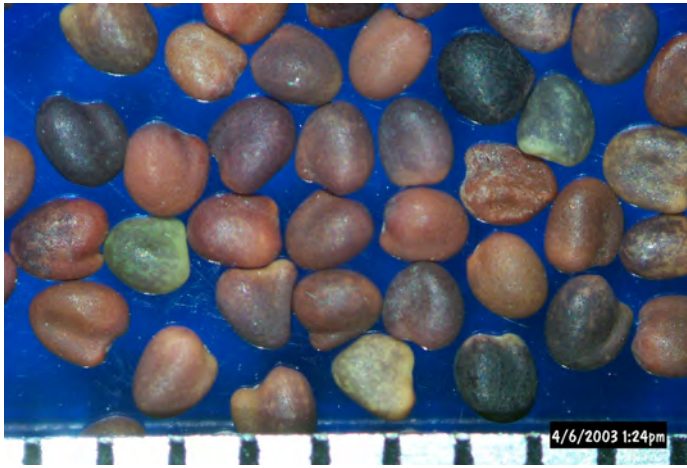
Characteristics:

- chocolate to olive-brown oval (round) seeds, some with speckling/mottling

alsike clover

Characteristics:

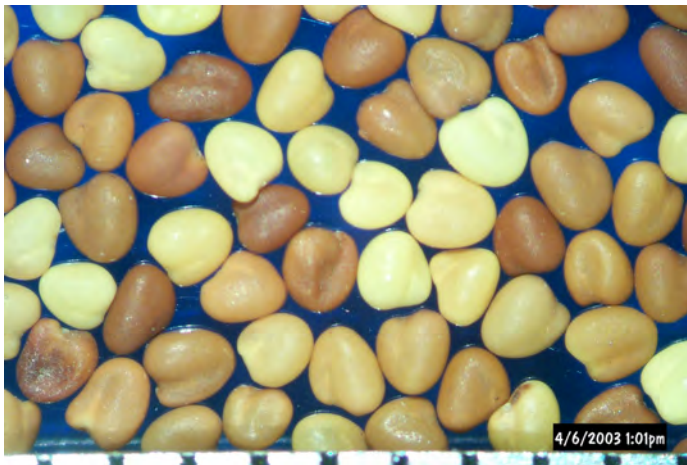
- broadly oval or heart shaped
- same size and shape as white clover
- seeds are dark green to almost black, may have some speckling/mottling



white clover

Characteristics:

- broadly oval or heart shaped
- same size and shape as alsike clover
- seed is bright yellow to light brown
- seed coat color darkens with age



switchgrass

Characteristics:

- seeds plump, ovate, enclosed in light brown straw-colored lemma and palea
- lemma and palea smooth and glossy
- pointed end rises off flat surface when laying on it's palea side



reed canarygrass

Characteristics:

- seeds somewhat carrot shaped
- long, pointed solid olive brown, and shiny
- hairs around basal end (larger end)



common foxtail millet



Characteristics:

- yellow, semi-glossy seed about the same size as yellow foxtail
- seed convex, not humped like yellow foxtail
- lemma not as rough as green and yellow foxtail
- also known as German foxtail millet and Italian foxtail millet

Siberian foxtail millet



Characteristics:

- seeds identical to common foxtail millet except color
- seeds are orange or mixture of yellow and red

big bluestem



Characteristics:

- seed may have awn and hairy arms
- larger seed than little bluestem
- backside of seed has a lengthwise groove in it.
- straw colored to dark brown

blue grama



Characteristics:

- smaller than big bluestem
- one fertile floret with usually one sterile attached (smaller)
- one to several awns

creeping foxtail

Characteristics:

- “flat” seed is very soft with villous hairs (long soft hairs)
- immature seed is white to gray
- mature seed is dark gray to black
- distinctive seed



creeping red fescue

Characteristics:

- narrow seed with a short awn
- round rachilla with a slight knob at top
- smaller than orchardgrass or crested wheatgrass



orchardgrass

Characteristics:

- similar in shape and size to crested wheatgrass
- lemma and palea thinner and looser around seed
- top of midrib vein on lemma with mohawk hairs
- lemma tips awned and curved



crested wheatgrass

Characteristics:

- seed is keel shaped (boat shaped) and tapered with a toothed lemma (teeth along edges of lemma)
- sunken crease in palea lengthwise



slender wheatgrass

Characteristics:

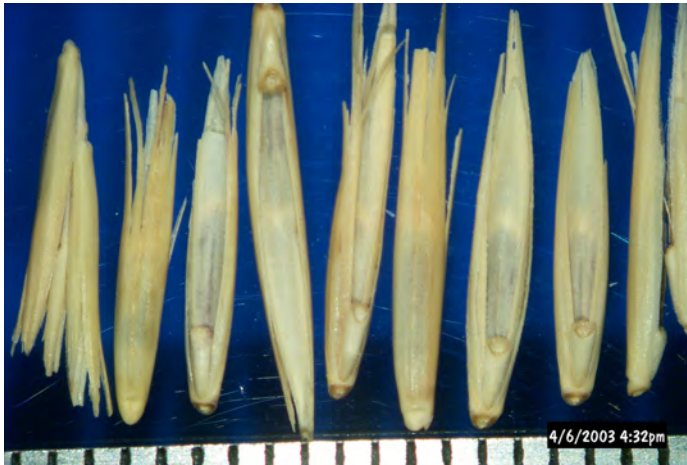
- seed lies flat on lemma, non-symmetrical seed (lemma top “twisted”)
- has a V-shaped sinus
- unweathered seed a pale/blonde yellow
- caryopsis color lighter than western wheatgrass
- rachilla usually with villous hairs on it
- sometimes awned (short)
- no crease in palea



western wheatgrass

Characteristics:

- same size and general shape as slender wheatgrass
- palea side has shallow lengthwise crease, causing seed to lay slightly on one side of the lemma
- sinus is V-shaped
- lemma and palea straw colored
- much darker caryopsis than slender
- rachilla not as appressed as quackgrass



intermediate wheatgrass

Characteristics:

- largest and heaviest of wheatgrasses
- palea has a deeper V-crease lengthwise
- seed lays on one side of lemma
- pointed tip (not sharply)
- U-shaped sinus
- can have a shinier appearance than other wheatgrasses



Russian wildrye

Characteristics:

- very hairy seeds, otherwise similar in shape and size to quackgrass (p. 33)
- hairs are very short



bromegrass

Characteristics:

- large flattened dark brown seeds with papery paleas
- larger, flatter, and wider than downy bromegrass
- has large, coarse, lengthwise veins/ribs
- compare to downy bromegrass (p. 33)



buffalograss

Characteristics:

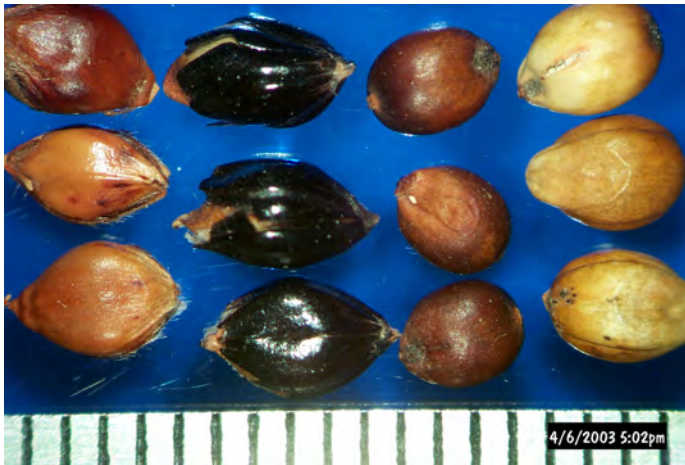
- seed unit is a bur-like spike, more than one seed per bur
- distinctive looking
- very hard bur



forage sorghum

Characteristics:

- seed has a 2:1 length to width ratio
- seed can be in glumes (fat sudangrass-like) or seed can be naked caryopsis
- colors can vary greatly
- also known as sorgo type sorghums



sudangrass

Characteristics:

- seed has a 3:1 length to width ratio
- thinner and longer than forage sorgo
- can be many colors, often bicolored
- double rachilla without knobs at top (see arrows pointing out rachillas), often one of the rachillas broken off during harvest and threshing.
- seed may be slightly larger than johnsongrass



Kentucky bluegrass

Characteristics:

- seeds are small and laterally appressed do not see much of palea as lemma wraps around
- lemma and palea are grayish straw colored
- rachilla lies tight against palea



timothy

Characteristics:

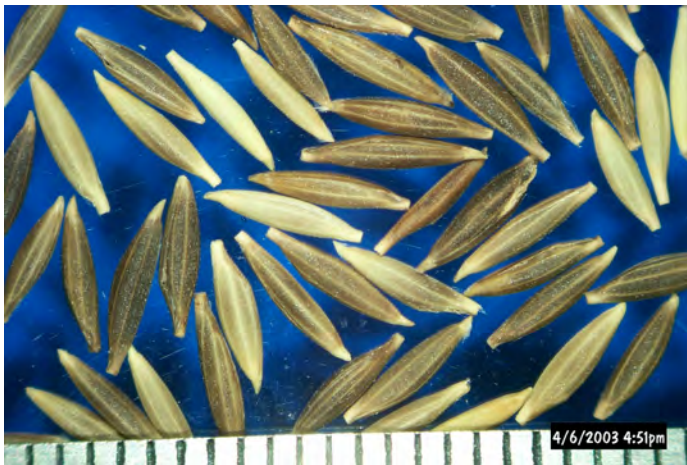
- seed caryopses are plump or tear shaped and light tan/brown, about half of seeds still covered with thin, papery, silvery to whitish lemmas and paleas
- seed samples appear two-toned (due to seeds with hulls and seeds without hulls)



green needlegrass

Characteristics:

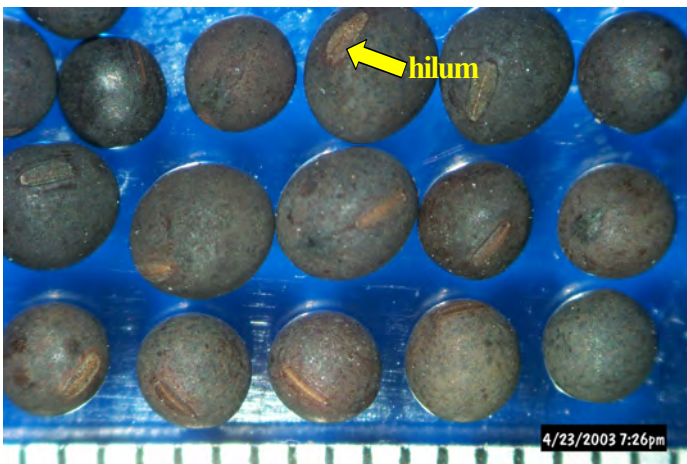
- seed is cylindrical with tapered ends
- yellow to dark green/black in color
- may have short sparse pubescence (hairs) on the lemma and palea
- prior to combining/processing, seed has a long awn



hairy vetch

Characteristics:

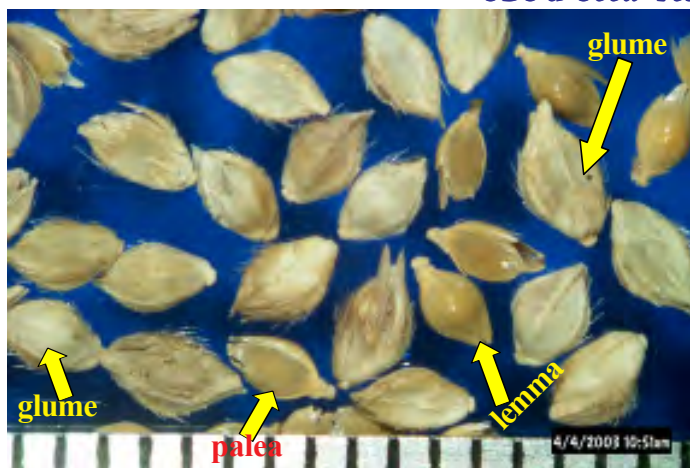
- usually almost round
- hilum color blends in with seedcoat color
- seedcoat can be mottled a bit, but is usually very dark, almost black
- surface is almost shiny when seed is rubbed between your fingers



Weed Seeds

barnyardgrass (*Echinochloa crus-galli*)
yellow foxtail (*Setaria pumila*)
green foxtail (*Setaria viridis*)
witchgrass (*Panicum capillare*)
wild proso millet (*Panicum miliaceum*)
blue lettuce (*Lactuca tatarica* subsp. *pulchella*)
prickly lettuce (*Lactuca serriola*)
perennial sowthistle (*Sonchus arvensis*)
hemp dogbane (*Apocynum cannabinum*)
bull thistle (*Cirsium vulgare*)
Canada thistle (*Cirsium arvense*)
musk thistle (*Carduus nutans*)
gumweed (*Grindelia squarrosa*)
Russian knapweed (*Acroptilon repens*)
spotted knapweed (*Centaurea stoebe* subsp. *micranthos*)
wild sunflower (*Helianthus annuus*) (synonym - common sunflower)
marshelder (*Cyclachaena xanthiifolia*)
wild carrot (*Daucus carota* subsp. *carota*)
absinth wormwood (*Artemisia absinthium*)
common milkweed (*Asclepias syriaca*)
chickweed (*Stellaria* spp.)
shepherdspurse (*Capsella bursa-pastoris*)
greenflower pepperweed (*Lepidium densiflorum*)
hoary cress (*Lepidium draba* subsp. *draba*)
field pennycress (*Thlaspi arvense*)
common ragweed (*Ambrosia artemisiifolia*)
giant ragweed (*Ambrosia trifida*)
cocklebur (*Xanthium* spp.) (synonym - common cocklebur)
field sandbur (*Cenchrus incertus*)
curly dock (*Rumex crispus*)
wild buckwheat (*Fallopia convolvulus*)
dodder (*Cuscuta* spp.)
field bindweed (*Convolvulus arvensis*)
hedge bindweed (*Calystegia sepium*)
ivyleaf morningglory (*Ipomoea hederacea*)
buffalobur (*Solanum rostratum*)
dwarf mallow (*Malva neglecta*) (synonym - common mallow)
velvetleaf (*Abutilon theophrasti*)
wild rose (*Rosa* spp.) (synonym - Arkansas rose)
downy bromegrass (*Bromus tectorum*)
foxtail barley (*Hordeum jubatum*) (synonym - wild barley)
large crabgrass (*Digitaria sanguinalis*)
quackgrass (*Elytrigia repens*)
redroot pigweed (*Amaranthus retroflexus*)
prostrate pigweed (*Amaranthus blitoides*)
lambsquarters (*Chenopodium album*) (synonym - common lambsquarters)
purslane (*Portulaca oleracea*) (synonym - common purslane)
kochia (*Bassia scoparia*)
Russian thistle (*Salsola* spp.)
hoary vervain (*Verbena stricta*)
horse nettle (*Solanum carolinense*)
lanceleaf sage (*Salvia reflexa*)
leafy spurge (*Euphorbia esula*)
wild oats (*Avena fatua*)
wild mustard (*Sinapsis arvensis* subsp. *arvensis*)
pale smartweed (*Polygonum lapathifolium*)
ladysthumb (*Polygonum persicaria*)

barnyardgrass



Characteristics:

- pointed at the tip of the seed
- lemma & palea are smooth & glossy
- lemma & palea are yellow/green to gray in color
- flattened on the bottom (palea side)
- glumes (when attached) are straw colored and may have spikelike hairs
- side view shows a humped kernel.

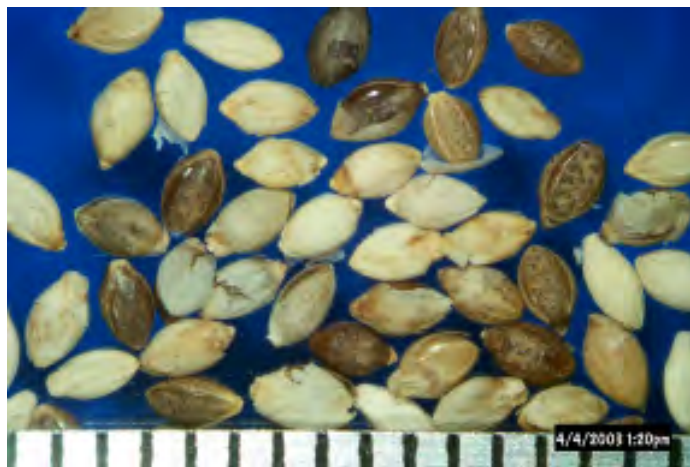
yellow foxtail



Characteristics:

- similar shape & size to barnyardgrass
- top glume covers 1/3rd to 1/2 of lemma
- lemma side humped, lemma very rough
- flat on bottom (palea side)
- apex pointed, sometimes curved down
- yellow to dark brown in color

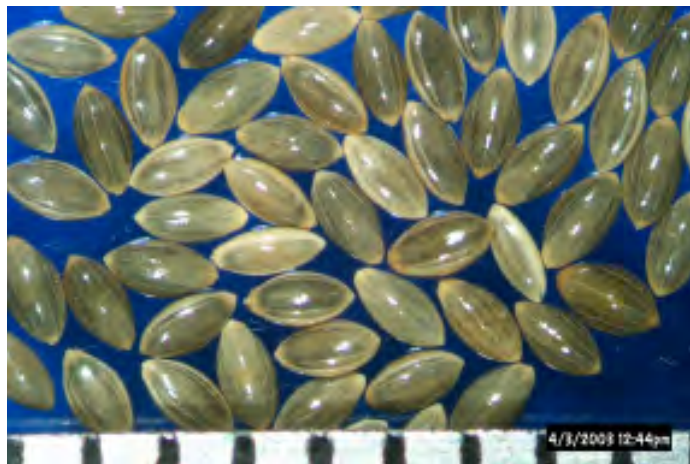
green foxtail



Characteristics:

- seed is convex, does not have hump
- top glume almost entirely covers lemma
- lemma slightly roughed on surface
- lemma and palea often speckled
- flattened on the bottom (palea side)
- not as pointed as the above 2 species
- seed 1/3rd to 1/2 size of yellow foxtail

witchgrass



Characteristics:

- similar to wild proso (p. 24) only much smaller (<1/2 size of green foxtail) and more elongated looking
- glumes usually missing
- lemma and palea smooth and glossy
- glossy greenish colored with prominent lengthwise lines

wild proso millet



Characteristics:

- same shape and size as cultivated proso
- color is greenish to grayish with prominent lengthwise lines
- glumes are usually gone

blue lettuce



Characteristics:

- long necked point of attachment
- distinct lengthwise ridges/lines
- no spikelike hairs like prickly lettuce

prickly lettuce



Characteristics:

- grayish/yellow to brownish in color
- prominent lengthwise ribs/ridges with fine bristly hairs on shoulders (broader end)

perennial sowthistle



Characteristics:

- dark brown to dark red seeds
- similar in shape to Canada thistle, but flattened and blunt at both ends
- each side is closely and deeply ridged, with the surface almost “wood-file” type

hemp dogbane

Characteristics:

- long “needlelike” seed
- brownish-red in color
- may have pappus (tuft of hairs at top)



bull thistle

Characteristics:

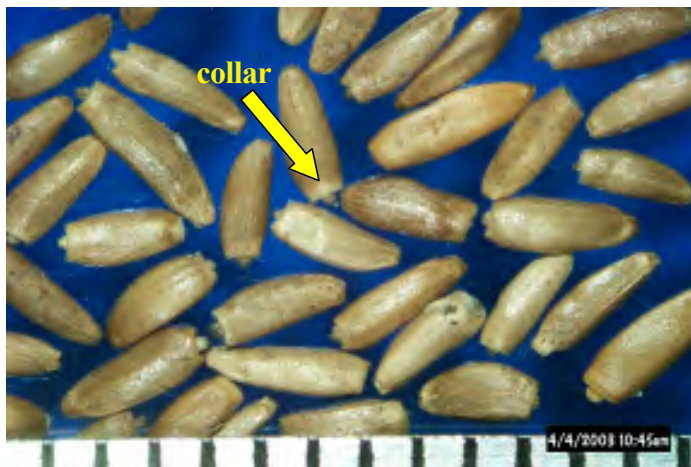
- similar shape and size to Canada thistle
- surface has distinct black or dark purple lines on it
- somewhat curved and angled seed



Canada thistle

Characteristics:

- smooth light to dark brown seed
- often slightly curved seed
- sometimes angled along length
- circular lighter-colored collar at top



musk thistle

Characteristics:

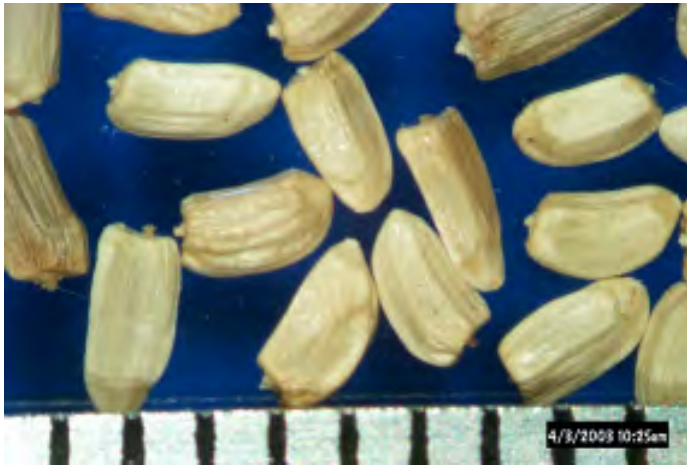
- similar shape and size to Canada thistle
- straw colored to light brown
- glossy and sometimes sticky surface
- lengthwise lines/grooves with slight “crosshatch” pattern
- collar at top of seed is thin



gumweed

Characteristics:

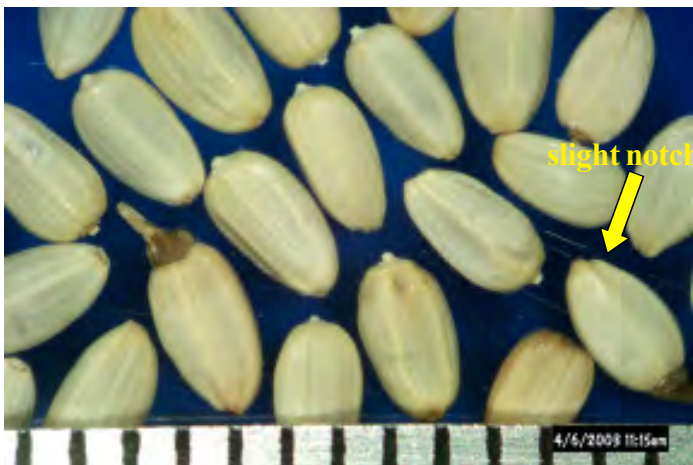
- small white to dirty white seed
- similar in shape but smaller than Russian knapweed
- more lengthwise angles than Russian knapweed
- may have a sticky surface
- can be more ribbed than Russian knapweed



Russian knapweed

Characteristics:

- looks like a miniature safflower
- white to bluish-white color
- slight notch at base end (pointed end), not as pronounced as spotted knapweed notch
- smoother appearance than gumweed



spotted knapweed

Characteristics:

- olive-green to blackish-brown color with faint lengthwise white stripes
- may have short-medium bristles (pappus) attached at top of seed
- has a prominent notch (arrow) in side of seed at base



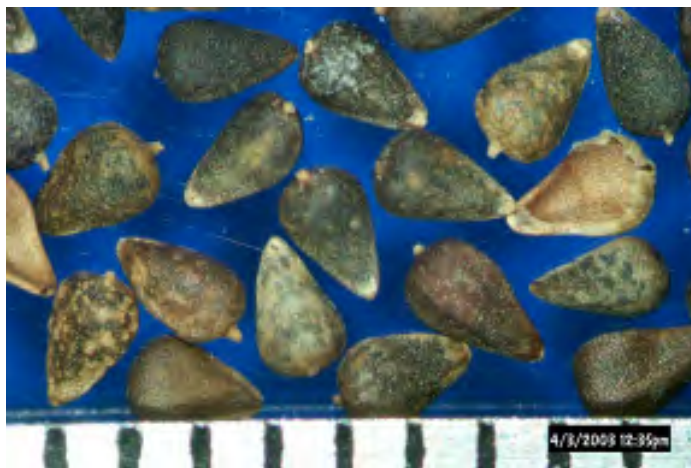
wild sunflower

Characteristics:

- same shape as cultivated sunflowers
- much smaller than cultivated sunflower
- may be solid black to variegated black/brown/white patterns
- may have pubescence (hairs) on surface



marshelder



Characteristics:

- triangular in outline
- top of seed broadly rounded
- base is pointed (sometimes lighter colored)
- surface of seed finely ribbed
- brownish-black to black

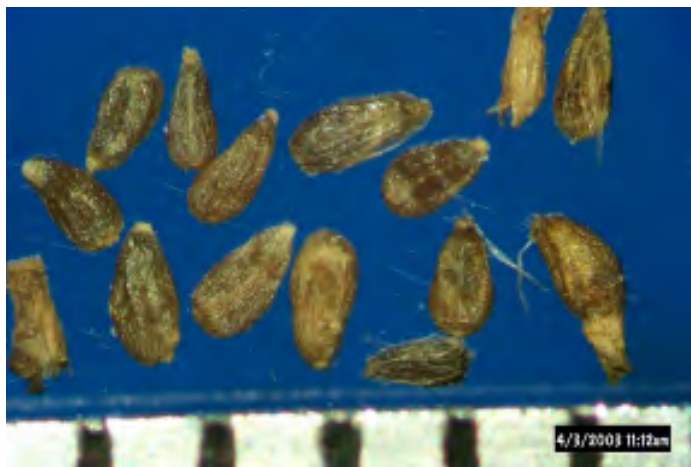
wild carrot



Characteristics:

- seed is half oval with one side flattened
- rounded side has distinct lengthwise ridges
- ridges may have stiff hairs (hasn't gone through a combine yet)
- seed with hairs look "spider-like"

absinth wormwood



Characteristics:

- small dark brown-reddish seed
- has lengthwise lines (striate)
- elongated teardrop shape

common milkweed



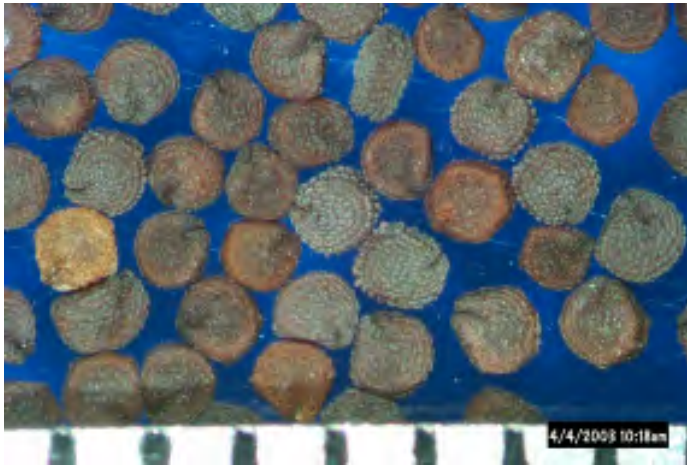
Characteristics:

- somewhat pear-shaped, thin and flattened
- sides may curve up - forming a "bowl"
- outer edge is winglike around center embryo
- brownish to reddish in color

chickweed

Characteristics:

- seed somewhat heart-shaped
- curved rows of tubercles (small bumps/spines)
- dull reddish-brown to grayish color and flattened



shepherdspurse

Characteristics:

- orange-brown to yellow colored small seed
- grooved on both sides



greenflower pepperweed

Characteristics:

- seed is a flattened egg shape
- dull orange-yellowish color
- can see line going up 2/3rds of length
- narrow whitish wing around seed edge



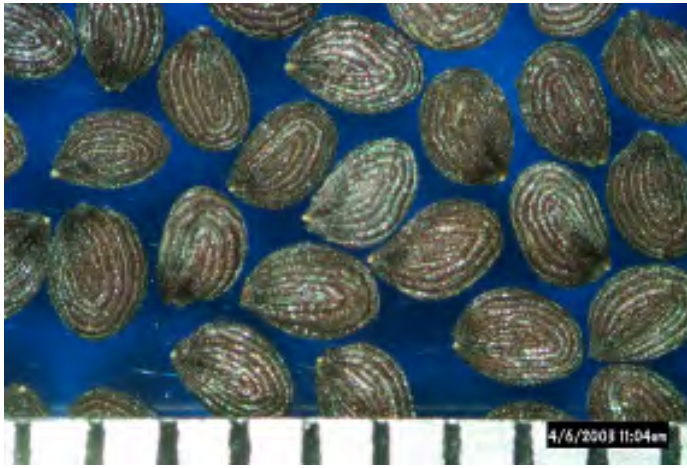
hoary cress

Characteristics:

- flattened to rounded egg shape
- dark reddish to blackish in color
- line comes up "middle" of seed 3/4 of seed length
- minutely roughened surface



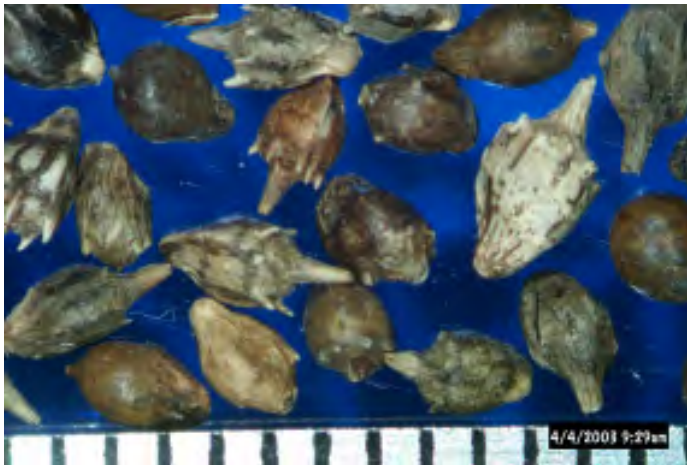
field pennycress



Characteristics:

- very distinctive seed
- “thumbprint” pattern on surface
- dark red to black seeds

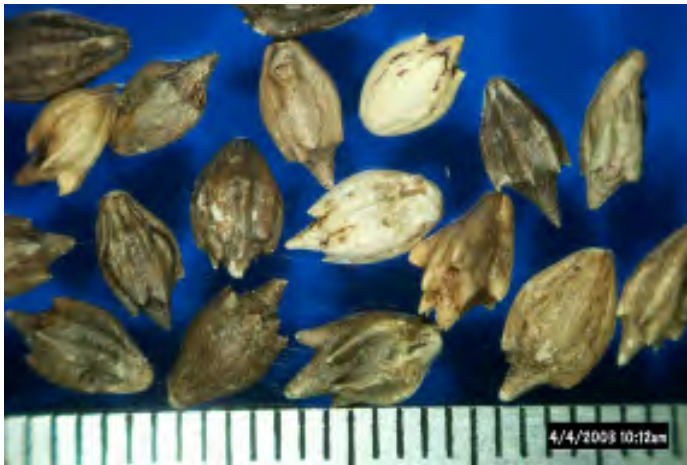
common ragweed



Characteristics:

- small version of giant ragweed
- top is crown-like with large sharp spines (when not broken off)

giant ragweed



Characteristics:

- larger (>2X) than common ragweed
- woody-like involucre (outer layer you see in picture)
- has large “crown-like” top with blunter spines than common ragweed

cocklebur



Characteristics:

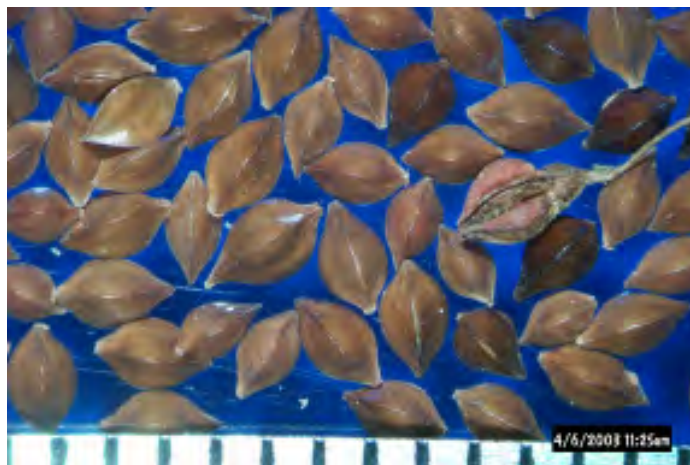
- the seed unit is a bur
- each bur typically has 2 seeds inside
- has sharp-pointed stiff spines covering the surface



field sandbur

Characteristics:

- bur has numerous flexible spines
- spines mainly angled in same direction
- caryopsis a flattened oval shape
- when broken out of bur, seed is covered by lemma and palea (below picture), naked caryopses shown in both pictures
- bur can have 1-3 seeds inside



curly dock

Characteristics:

- triangular shaped, smooth and glossy red to brown seeds
- edges are somewhat sharp



wild buckwheat

Characteristics:

- dull black triangular achene
- when floral parts still present - dull straw to light brown color
- minutely roughened surface
- edges not sharp but blunt
- larger than curly dock

dodder

Characteristics:

- seed surface is very rough
- size varies
- sometimes seeds look like miniature field bindweed seed
- color varies from tan to black

Note: Dodder is primarily a problem in small seeded legumes. Surface texture is the characteristic used to clean dodder out of small seeded legumes (most have smooth surface).



field bindweed

Characteristics:

- seeds brown to almost black
- many seed 3 angled (flat on 2 sides, rounded backside)
- surface is rough
- dark scar at base of seed



hedge bindweed

Characteristics:

- larger and smoother than field bindweed
- darker colored than field bindweed
- seed shape from “orange-slice” to globular shaped
- scar at base sometimes pinkish



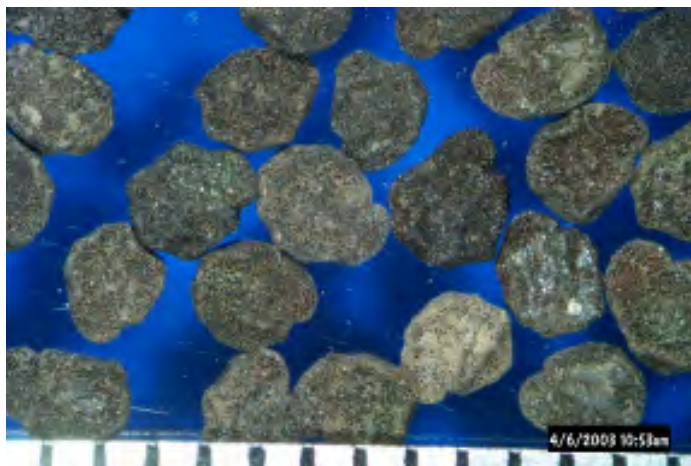
ivyleaf morningglory

Characteristics:

- angular “orange slice”
- very prominent hilum scar
- black, minutely roughened surface, appears glossy when compared to hedge and field bindweed



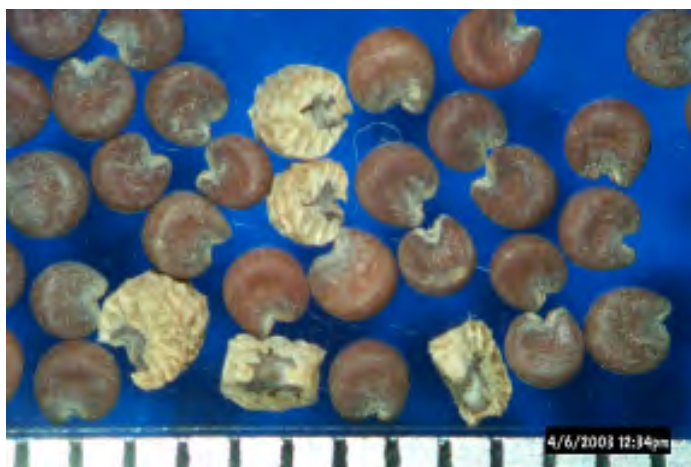
buffalobur



Characteristics:

- seed color is dull brownish to black
- surface covered with “lava rock” pits/holes, causing it to “sparkle” in light
- some describe this seed as a “sponge”
- part of seed edge looks like edge of a penny
- seed nearly circular in outline, but flattened

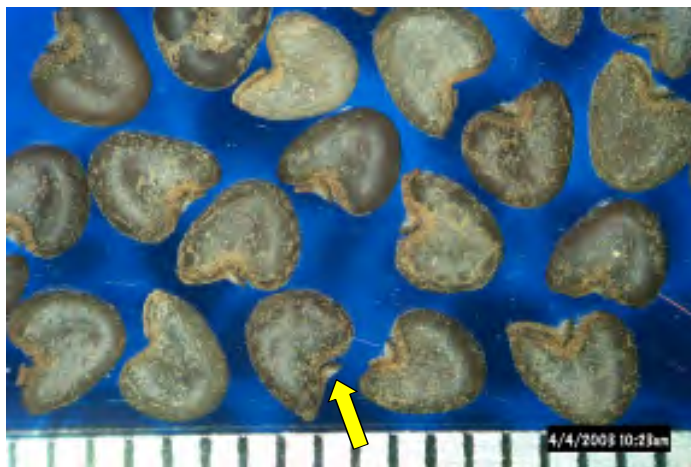
dwarf mallow



Characteristics:

- shape is like a “cheese wedge” with a bite out of it
- dull brown to reddish seed

velvetleaf



Characteristics:

- large boomerang-shaped seed
- surface a dull grayish-brown color
- has a “hood” over the hilum area (see arrow)

wild rose



Characteristics:

- angular irregularly shaped seed
- almost looks rocklike
- light yellowish to brownish color
- seed surface is often shiny

downy brome grass

Characteristics:

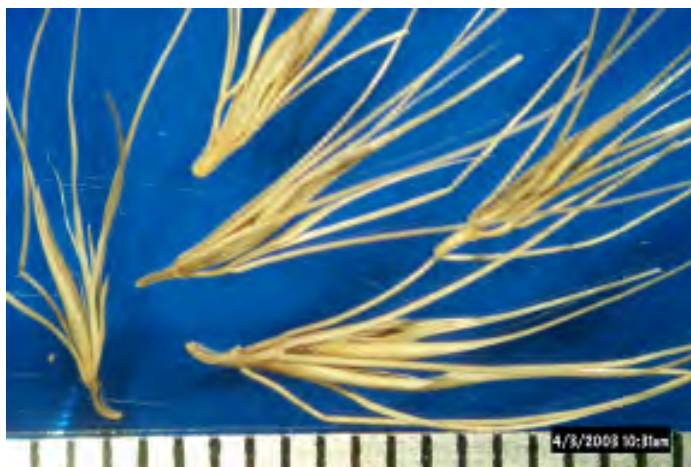
- slender arched seed with narrow lemma
- lemma with fine lengthwise veins/ribs
- rough brownish color
- may have long awn (hasn't been through a combine)



foxtail barley

Characteristics:

- small barley-like seed with long awn-like appendages



large crabgrass

Characteristics:

- elongated seed
- flattened on one side
- sometimes a "patch" glume attached at base end of seed (see arrow)
- similar in shape to Kentucky bluegrass



quackgrass

Characteristics:

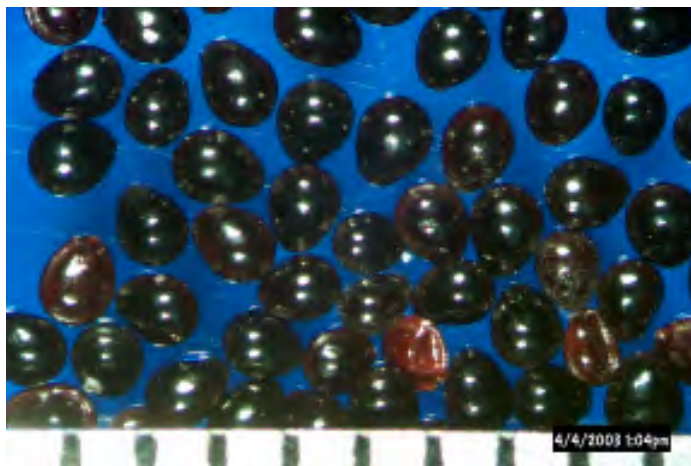
- seed is somewhat boat-shaped
- U-shaped sinus (where rachilla meets lemma and palea - exaggerated in yellow)
- palea often with one raised ridge/crease running lengthwise
- lemma side smooth
- straw to light brown color
- rachilla lays tight against palea



redroot pigweed

Characteristics:

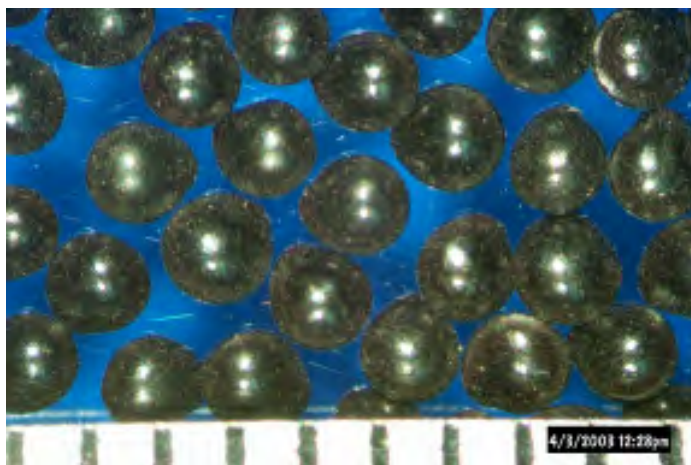
- slightly smaller and more elongated seed than prostrate pigweed
- glossy dark red to almost black seed
- edge of seed more “winged”



prostrate pigweed

Characteristics:

- slightly larger and rounder than redroot pigweed
- glossy black seed
- not quite as “winged” as redroot pigweed

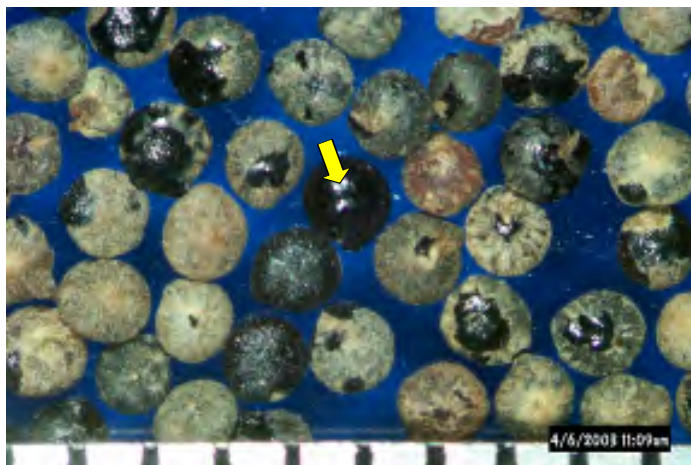


lambsquarters

Characteristics:

- seed almost circular lens-shaped
- dull black or dull brownish color
- from center out almost see a spoked pattern to outer edge

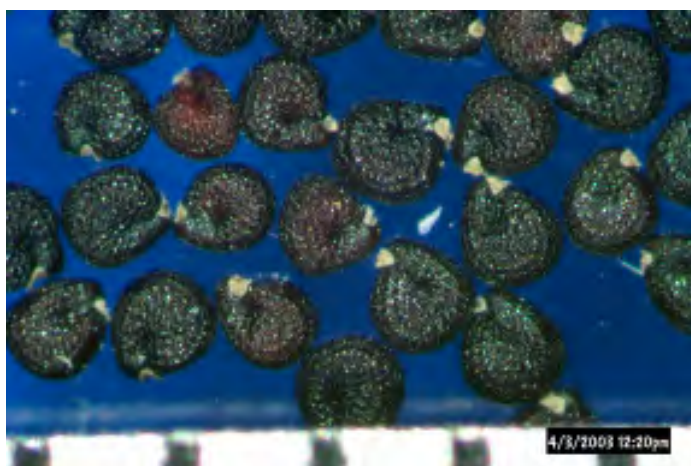
Note: one redroot pigweed in center of picture for comparison (see arrow)



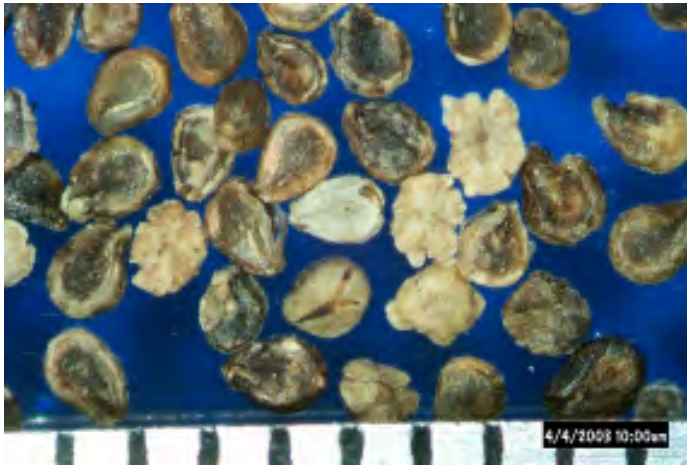
purslane

Characteristics:

- very small seed (<1mm)
- round to kidney shaped black seeds
- surface covered with blunt tubercles (bumps)
- seed is flattened on both sides



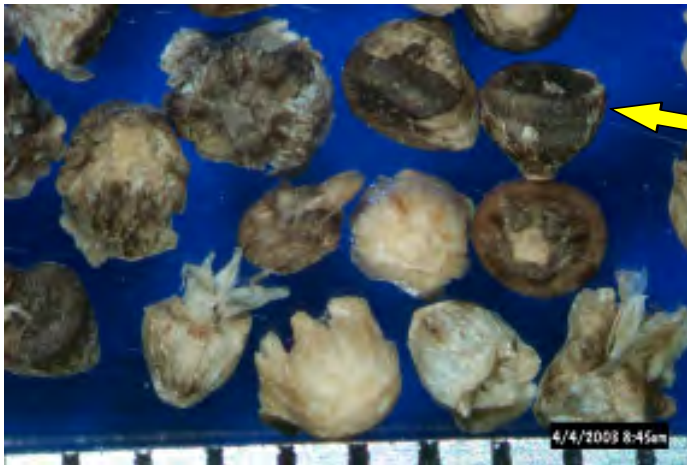
kochia



Characteristics:

- flattened, teardrop shaped seeds
- dull lustre, brown to blackish in color
- center of seed sunken on both sides
- when in floral parts a light brown color

Russian thistle



Characteristics:

- coiled spiral conical "top" shaped seeds (like a toy top)
- gray to brownish/blackish in color
- can still see conical shape when covered in floral parts

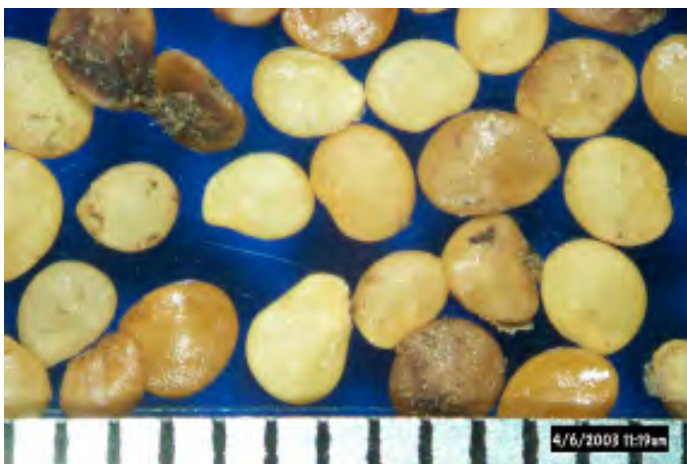
hoary vervain



Characteristics:

- long 3-sided seed (2 flat, 1 rounded)
- 2 flat sides sparsely covered with short hairs
- rounded backside has shallow scoops/craters
- brownish colored seed

horse nettle



Characteristics:

- flattened disc-shaped seed
- yellow to light brown in color
- surface minutely roughened (almost smooth) and often shiny
- 25 to 125 seeds per berry (berry juice can darken seeds)

Compared to black nightshade:

- 1/2 to 2X larger than black nightshade
- black nightshade surface rough and

lanceleaf sage

Characteristics:

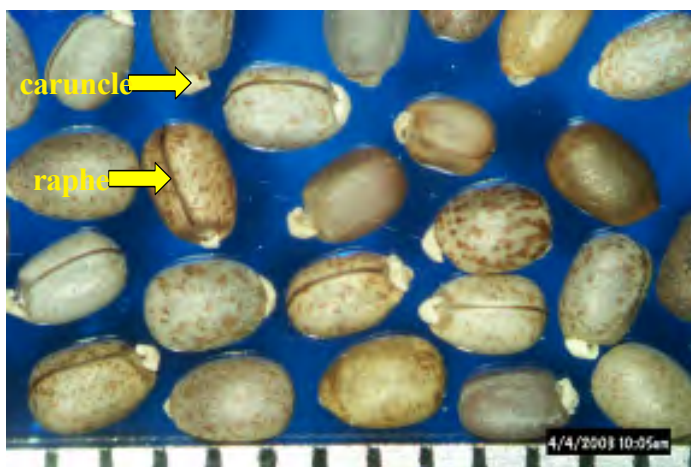
- shaped like an orange slice (2 flat sides, 1 rounded backside)
- surface a mottled brown/gray color



leafy spurge

Characteristics:

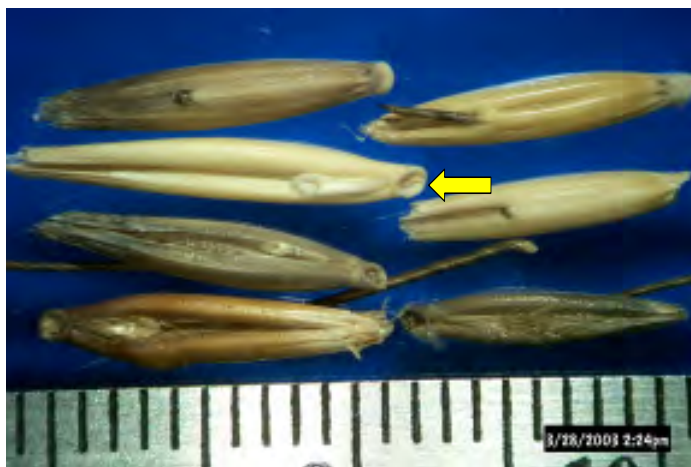
- egg shaped seed
- surface a mottled gray/brown color
- often has distinctive caruncle (sponge-like structure) at the base
- has distinct raphe (lengthwise line)



wild oats

Characteristics:

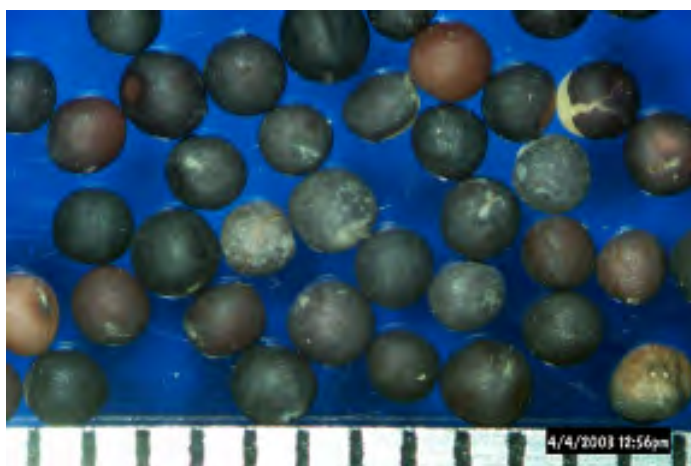
- thinner than cultivated oats
- has a heavy, twisted awn
- has a distinct, strong sucker mouth at base (horseshoe shaped) (see arrow)
- color ranges from yellow to black
- if awn is gone, you can see the indentation where it laid (right below yellow arrow)



wild mustard

Characteristics:

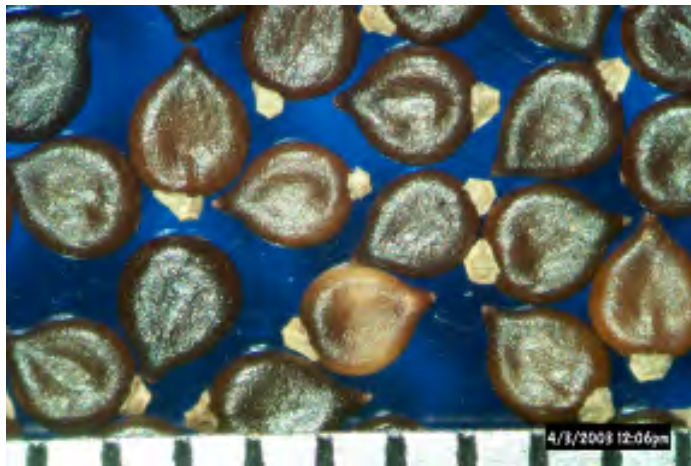
- round globular dark red to black colored seeds
- smaller than canola/rapeseed
- no "equator" mark
- surface minutely roughened (same as canola/rapeseed)



pale smartweed

Characteristics:

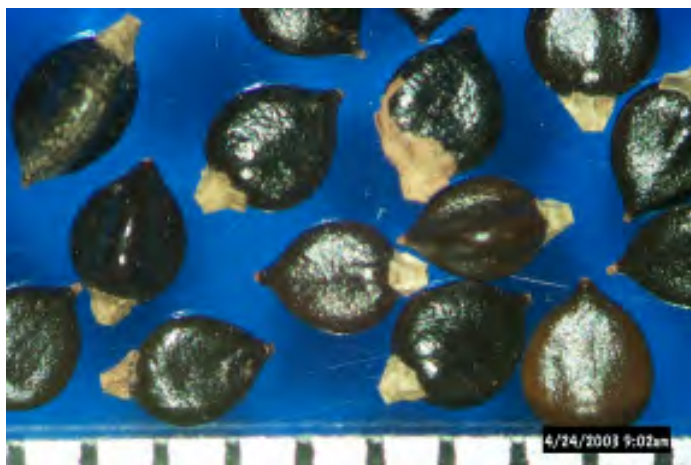
- “heart” shaped flattened seeds
- reddish-brown to almost glossy dark-red/brown
- smaller seed (1/2 size) than Pennsylvania smartweed, and lighter in color.



ladysthumb

Characteristics:

- “heart” shaped flattened seeds
- most seeds are glossy black color
- smaller seed (1/2 size) than Pennsylvania smartweed
- some seeds almost triangular like wild buckwheat (see arrow)



smartweeds

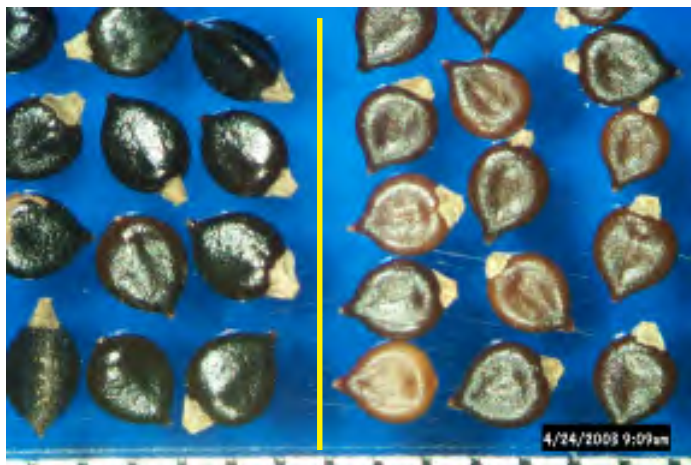
Characteristics:

left side - ladysthumb

- “heart” shaped flattened to triangular seeds, thicker seed than pale smartweed, also darker in color

right side - pale smartweed

- reddish-brown color, dimple in middle of seed, thinner seed, and lighter in color, maybe a little smaller than ladysthumb



GLOSSARY

- Achene** - A dry, one-seeded fruit with a thin, dry wall that does not split open at maturity (examples - buckwheat, wild buckwheat, sunflowers, thistle seeds, etc.)
- Angled** - Having an angle or angles.
- Apex** - Referring to the tip, point or top of a seed.
- Awn** - A bristle-like, or beard-like appendage.
- Bristles** - Stiff hairs.
- Brush** - Refers to the hairs commonly found on many of the cereals. The brush is at the opposite end from the embryo.
- Caruncle** - A protruberance or appendage near the hilar area on a seed. Looks “sponge-like”.
- Caryopsis** - The grain of grasses/cereals. (Caryopses - plural)
- Cotyledons** - Main food storage structure in legume seed.
- Embryo** - Germ face area in the cereals and grasses. In soybeans, sunflowers, flax, etc., the whole seed is the embryo with the cotyledons making up the bulk of the seed.
- Endosperm** - Main food storage product in cereals and grass seeds.
- Floret** - Basic seed unit of grasses/cereals consisting of the lemma, palea, and all other structures inside. A mature fertile floret consists of the lemma, palea, and caryopsis. An immature flowering floret consists of the lemma, palea, stamens, and pistil.
- Globular** - Spherical, or nearly so. Globe-shaped.
- Glumes** - Usually a pair of outer hulls of a grass spikelet (subtending the floret(s)). The first glume is the larger of the two glumes and is on the lemma side of the seed. Scaly bracts. The second glume is smaller and on the palea side.
- Hilum** - Scar where the seed was attached to the plant, i.e.; the “eye” of a soybean (Hila - plural).
- Hull** - The covering around the seed, it can be glumes or a lemma and palea in grasses/cereals, it can be the pod in legumes, or the hard covering on a sunflower seed unit.
- Hulled** - Meaning the outer covering (the hull) has been removed.
- Keeled (or keel)** - With a projecting ridge on a surface. Like the keel of a boat.
- Lemma** - The larger of the two papery coverings around the caryopsis.
- Lengthwise** - Extending parallel to the long axis. See “Longitudinal”.
- Longitudinal** - Extending parallel to the long axis. See “Lengthwise”.
- Millimeter (mm)** - The 1000th part of a meter.
- Mottled** - Irregularly spotted with two or more colors. Also termed speckled.
- Oblong** - Narrow, with parallel sides.
- Oval** - Broadly elliptical.
- Ovate** - Egg-shaped in outline. One end of the seed is broader than the other.
- Ovoid** - Shaped like a hen’s egg.
- Palea** - The smaller of the two papery coverings around the caryopsis.
- Pappus** - Crown of hairs at the summit of achenes. (Example - the “fuzz” or “parachute” on dandelion or Canada thistle seeds.
- Pericarp** - The wall of the fruit. The outer layer of a grass/cereal seed (pericarp and seed coat fused.) Considered the “seed coat” on caryopses.
- Pitted** - Marked with small depressions or pits.
- Rachilla** - The axis of the spikelet in grasses. The secondary axis. Short axis portion connected to the grass floret.
- Radial** - Spaced from a common center.
- Raphe** - A seam or suture.
- Reniform** - Kidney shaped.

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Reticulated - In the form of a network.

Ribbed - With ribs, primary or prominent veins in a leaf, or ridges on a glume, lemma, or palea.

Ridge - (Often referred to as a vein) A raised line or strip.

Speckled - See Mottled.

Spikelet - One or more florets subtended by one or two glumes.

Taper - To gradually become narrow.

Teeth - Projecting marginal points. Thick, short, stiff hairs.

Terminal - End, or extremity.

Tip - The point, extremity, or upper or top part.

Translucent - Partially transparent.

Truncate - Has a blunt tip.

Tubercles - Small knob-like structures (i.e. - bumps). Can be blunt or sharp.

Unhulled - Seed still surrounded by the hull.

Veins - On seeds and seed structures refers to ridges/ribs. A true vein is a vascular bundle found on leaves.

Villous - Having soft, long hairs.

Winged - With any membranous or thin expansion around edge of seed.

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