United States
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Visual Reference Images

United States Department of Agriculture
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Visual Reference Images

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Foreword

Visual Reference Images (VRI) are used to ensure consistent and uniform application of grading interpretations. The visual grading aids system represents the foundation for the national inspection system's subjective quality control program, providing an effective management tool for aligning inspectors and assisting them in making proper and consistent subjective grading decisions. This system consists of Interpretive Line Prints (ILP), General Appearance Prints (GAP), and Other VRI.

Interpretive Line Prints (ILP). The interpretive lines consist of a series of commodity specific VRI illustrating types of damage and other factors in conjunction with written descriptions. With regular use, the ILP help reduce the impact of normal perceptional differences between inspectors.

General Appearance Prints(GAP). General Appearance VRI are used as an aid in making subjective grade determinations on general appearance. A special sample box is used to compare the grain being graded with the VRI. To compare the sample with the VRI, place the 5 x 7-inch print in one side of the box and the grain in the opposite side. This allows for the comparison of the grain and the VRI under similar conditions. On the reverse side of each print is an explanation of the condition illustrated on the print and procedures for use of the print and box.

Other VRI. These VRI aid the inspector in identifying types of damage, conditions that are not considered damage, foreign substances, weed seeds, toxic substances, types of commodities, and insects injurious to stored grain.

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BARLEY

Definition of barley

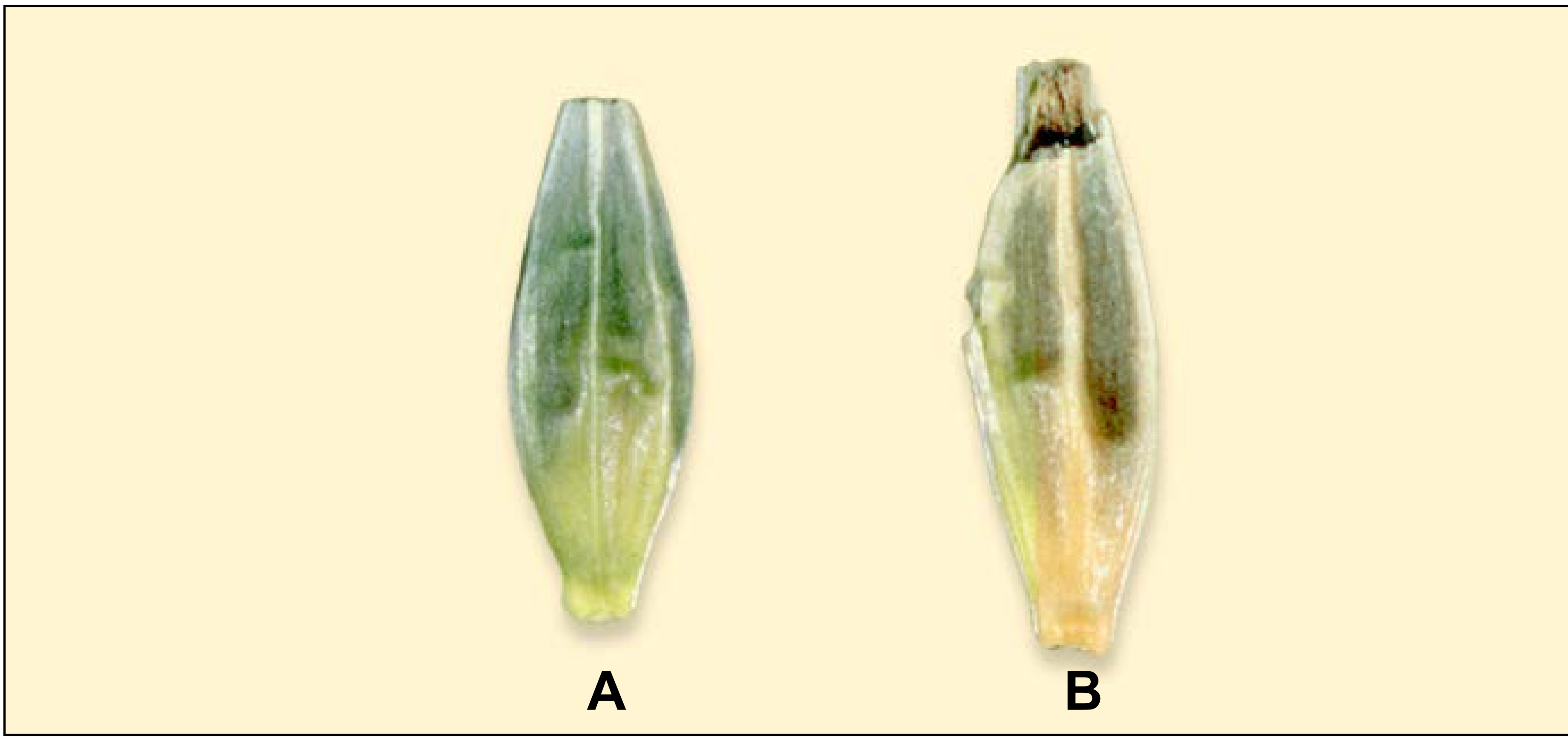
Grain that, before the removal of dockage, consists of 50 percent or more of whole kernels of cultivated barley (Hordeum vulgare L.) and not more than 25 percent of other grains for which standards have been established under the United States Grain Standards Act. The term “barley” as used in these standards does not include hull-less barley or black barley.

BLIGHT DAMAGE

Portion for analysis: approximately 25 grams.

Kernels and pieces of kernels affected with blight to the extent that the discoloration covers at least one-third of the surface area shown (singularly or in combination) with an intensity equal to or greater than shown.

NOTE: Blight is considered damage in all classes of Barley. Do not confuse blight damage with badly stained, weathered, or water-stained kernels. Malting Barley may not contain more than 4.0% blight damage. More than 4.0% of blight makes the special grade “blighted”.



FROST DAMAGE

Portion for analysis: approximately 25 grams.

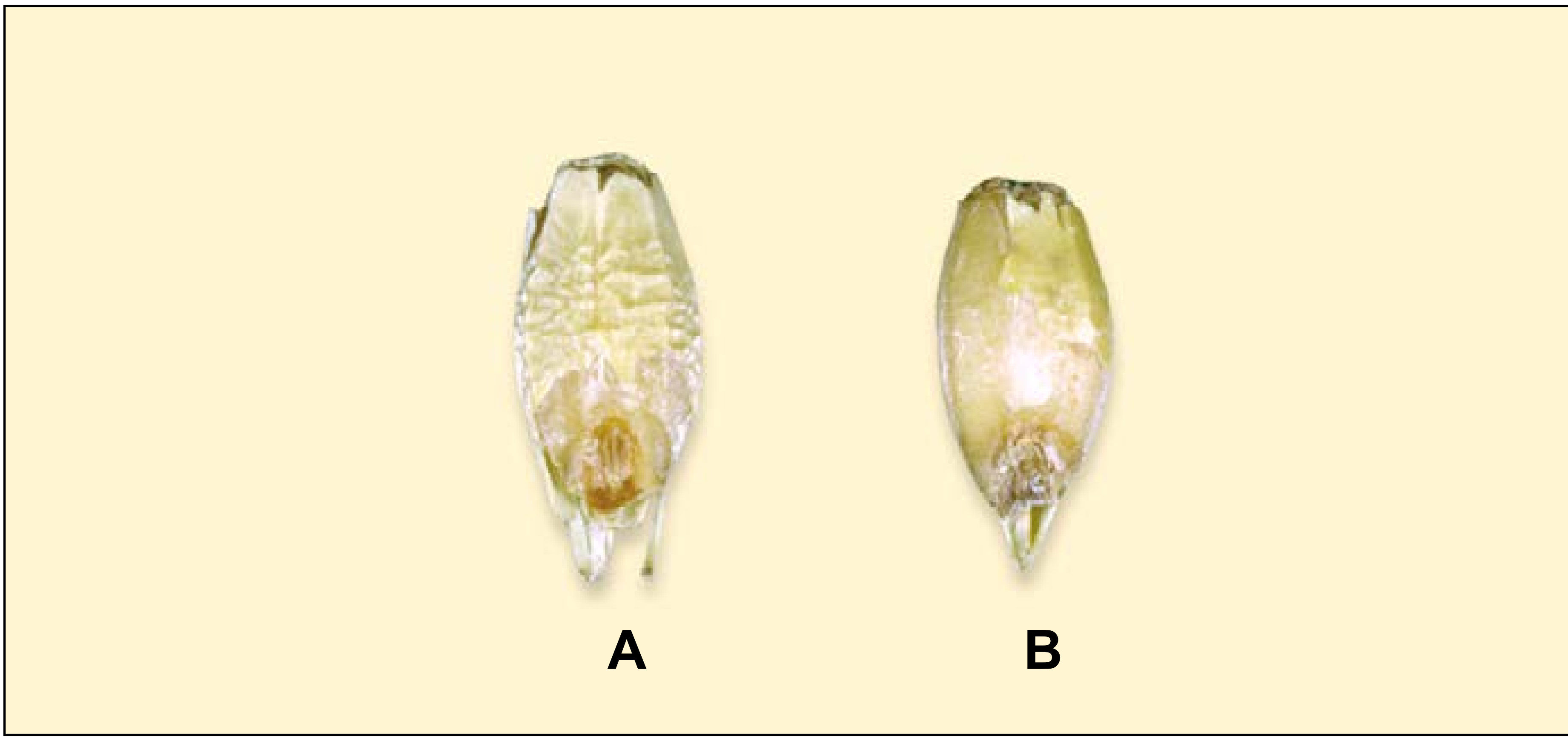
Kernels and pieces of barley (with or without the hull) that are distinctly discolored green, brown, or black to the minimum intensity shown are considered damage.

Illustration shows from left to right:

Kernel A: The minimum degree of discoloration for green.

Kernel B: The minimum degree of discoloration for brown or black.

NOTE: Kernels are usually shrunken or indented. Malting barley may not contain more than 0.4% frost damage.



GERM DAMAGE

Portion for analysis: approximately 25 grams.

Kernels that have discolored or moldy germs as a result of respiration. Scrape the germs carefully to avoid scraping too deeply and destroying the evidence of damage.

Illustration shows from left to right:

Kernel A: Kernels and pieces of barley that have discolored germs as dark or darker than shown shall be damaged.

NOTE: Discolored germs that do not meet the minimum coverage requirement may be considered damage provided the degree of discoloration is greater than shown and the overall "prorated" appearance meets the minimum coverage and intensity level depicted.

Kernel B: Kernels containing any amount of mold shall be damage.

NOTE: Mold occurs in many colors other than shown.

HEAT DAMAGE

Portion for analysis: approximately 25 grams.

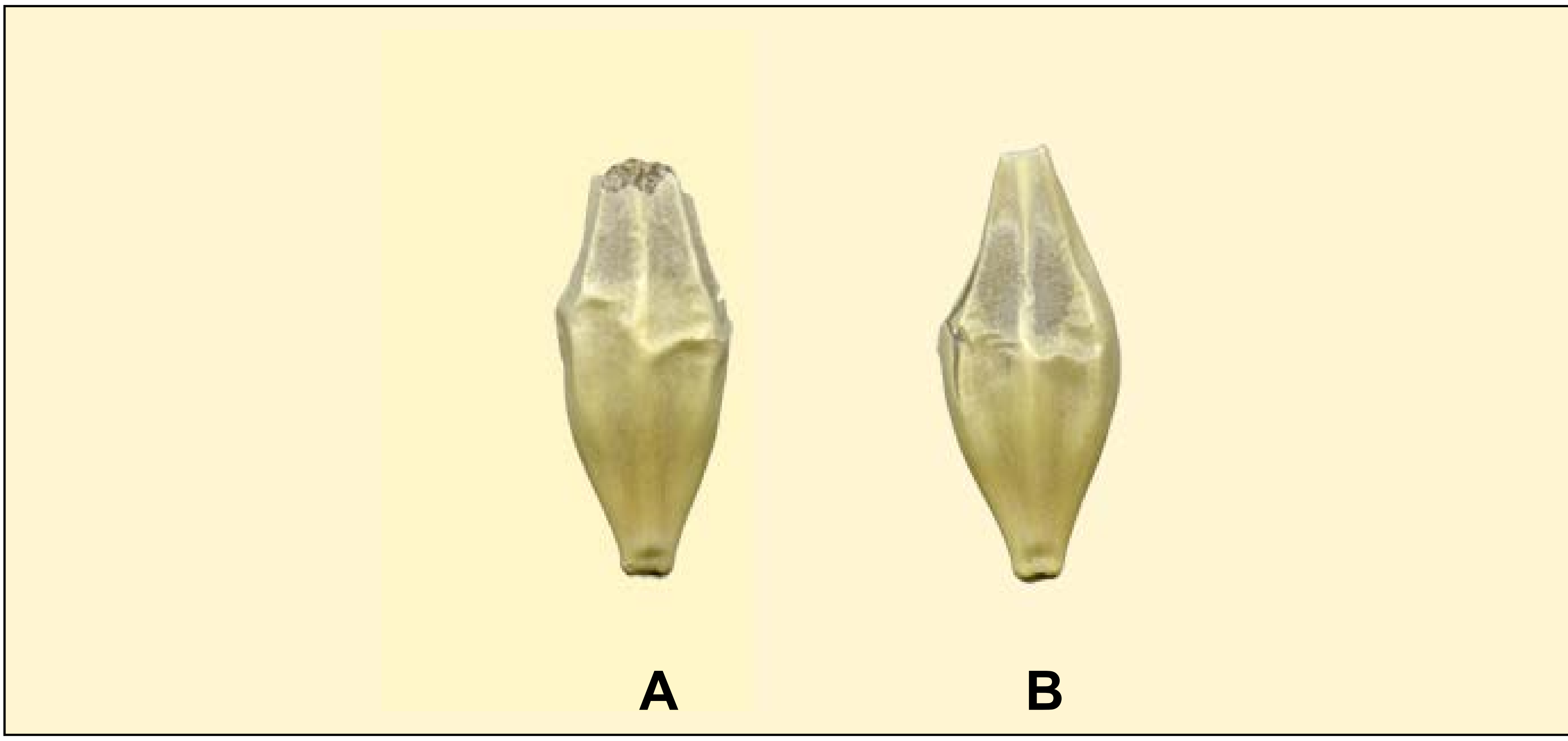
Kernels and pieces of barley which, after the standardized full pearl, are materially discolored (red, black, or brown) with an area of coverage and intensity equal to or greater than shown when-viewed from the top. The surface area does not need to be uniformly discolored. When assessing the “overall” color intensity, disregard those areas of the kernel that have been gouged i.e. extend beyond “full pearl”) during pearling.

Illustration shows from left to right:

Kernel A: Minimum color intensity for Blue Barley.

Kernel B: Minimum color intensity for other than Blue.

NOTE: Prorating is permissible.



INJURED-BY-FROST

Portion for analysis: approximately 25 grams.

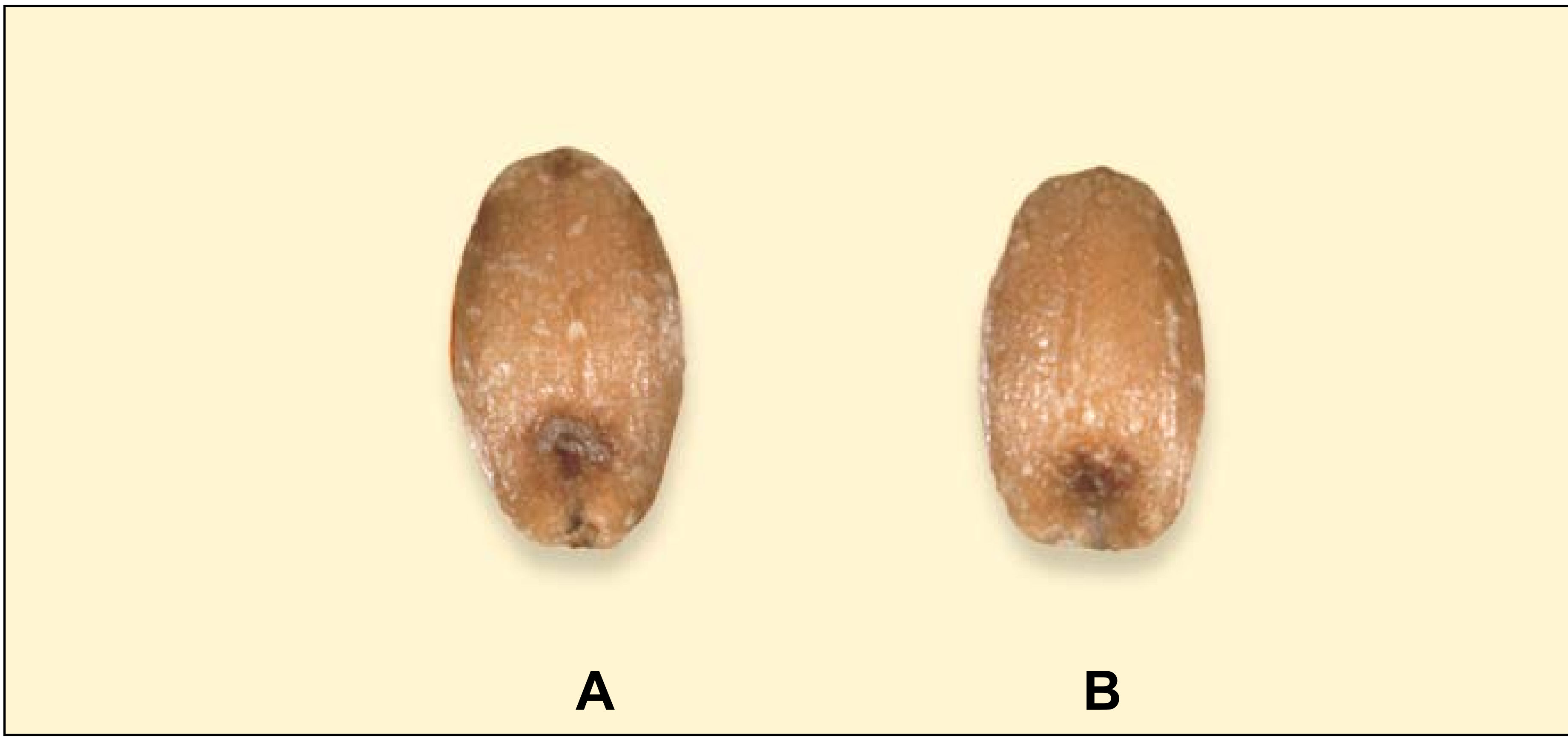
Kernels and pieces of kernels that are distinctly indented, immature or shrunken, or discolored as a result of frost.

Illustration shows from left to right:

Kernel A: The minimum degree of indentation for distinctly indented.

Kernel B: The minimum degree of discoloration for discolored (green, brown or black).

NOTE: Injuried-By-Frost (IBF) is a malting factor only and does not function as damage or against sound barley. Malting barley may not contain more than 1.9% IBF damage.



INJURED-BY-HEAT

Portion for analysis: approximately 25 grams.

Kernels and pieces of barley which, after the standardized one-third pearl, are slightly discolored to the minimum extent shown when viewed from the top.

Illustration shows from left to right:

Kernel A: Minimum color intensity for Blue barley (90.0% or more kernels with Blue aleurone layers).

Kernel B: Minimum color intensity for barley (90.0% or more kernels with White aleurone layers).

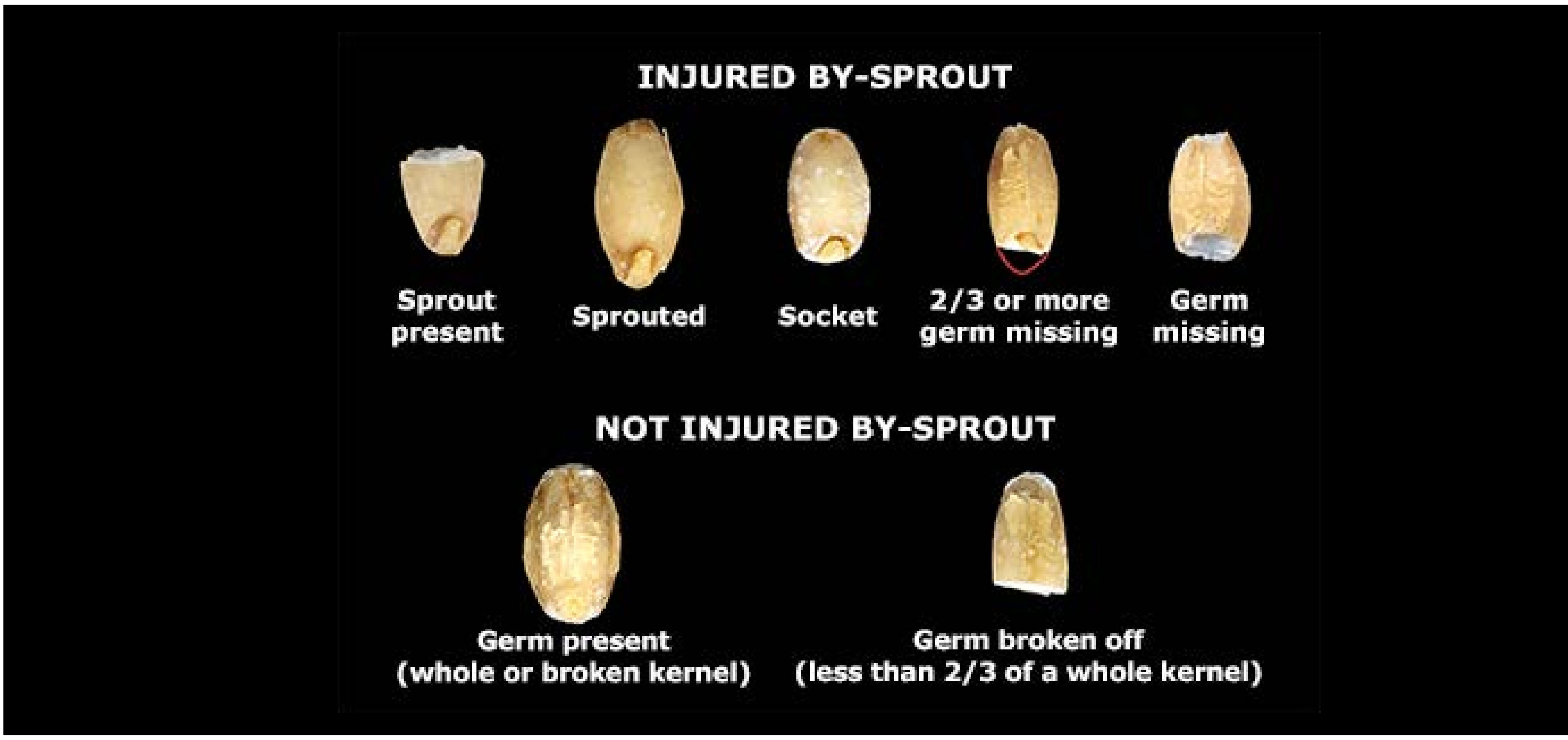
NOTE: Malting barley may not contain more than 0.2% Injured-By-Heat (IBHT). Do not confuse with heat-damaged barley.

INJURED-BY-MOLD

Portion for analysis: approximately 25 grams.

Kernels and pieces of barley that contain slight amounts of mold equivalent to the minimum degree shown or have a slightly weathered appearance are considered Injured-By-Mold (IBM).

NOTE: IBM is a malting factor in Two-rowed barley and does not function as damage or against sound barley. Malting barley may not contain more than 1.9% IBM. Mold can be any color.



INJURED-BY-SPROUT

Portion for analysis: approximately 25 grams.

Kernels and broken kernels of barley which, after pearling, contain a visible germ area showing evidence of sprout, sprout socket, or a significant portion of the germ missing (2/3 or more) are considered “Injured-by-Sprout” (IBS). Also consider kernels as IBS if the germ area has been broken off and the remaining kernel is at least 2/3 of a whole kernel.

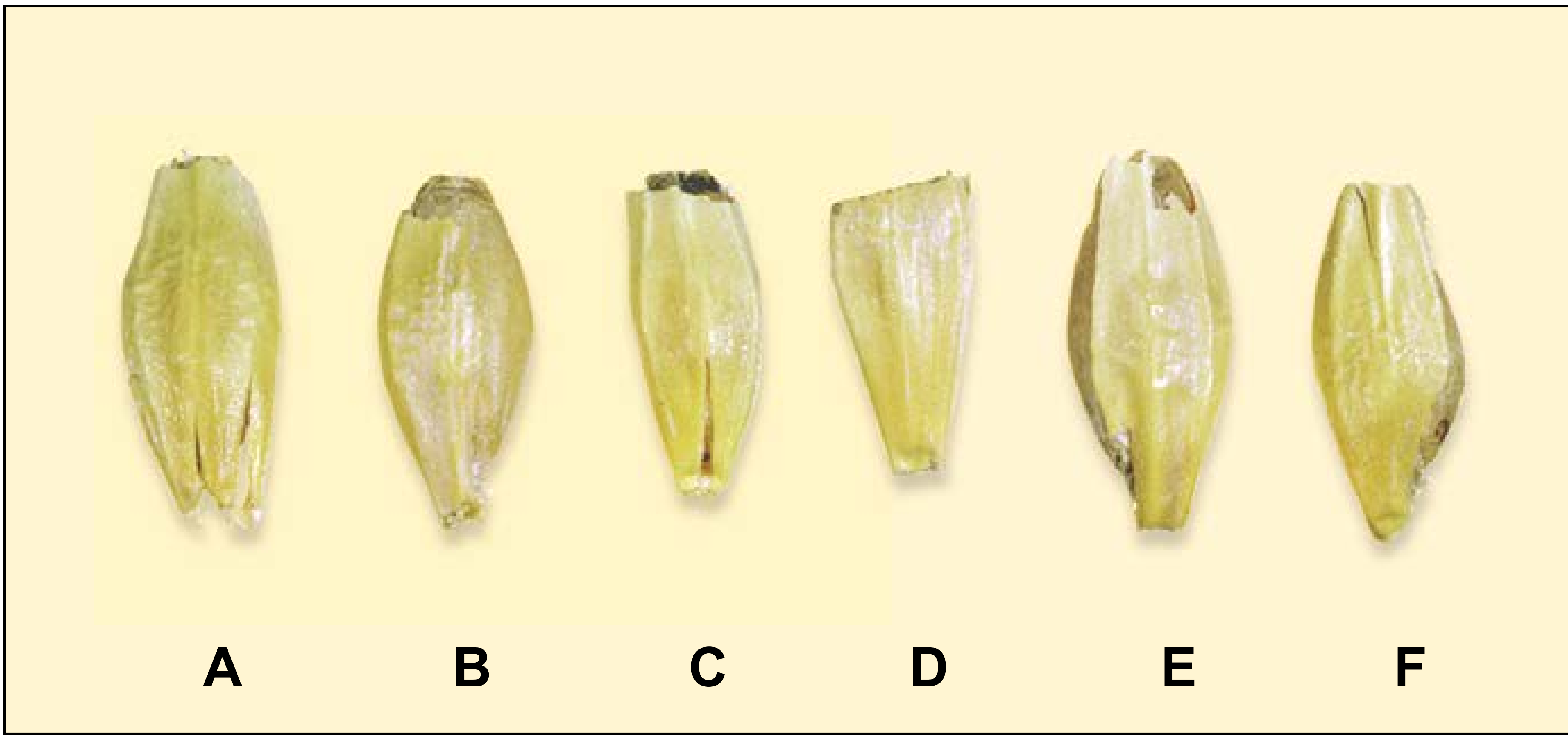
NOTE: Injured-by-Sprout does not function as damage.

MOLD-DAMAGE

Portion for analysis: approximately 25 grams.

Kernels and pieces of kernels in which the discoloration is spotted or blotched. Discoloration may appear on one or both sides but must be equal to or greater than the combined surface area depicted on both kernels.

NOTE: Mold is considered damage in all classes of Barley. Two-rowed Malting Barley may not contain more than 0.4% mold damage.



SKINNED & BROKEN

Portion for analysis: approximately 25 grams.

Illustration shows from left to right Barley in which part of the germ is missing or the hull is:

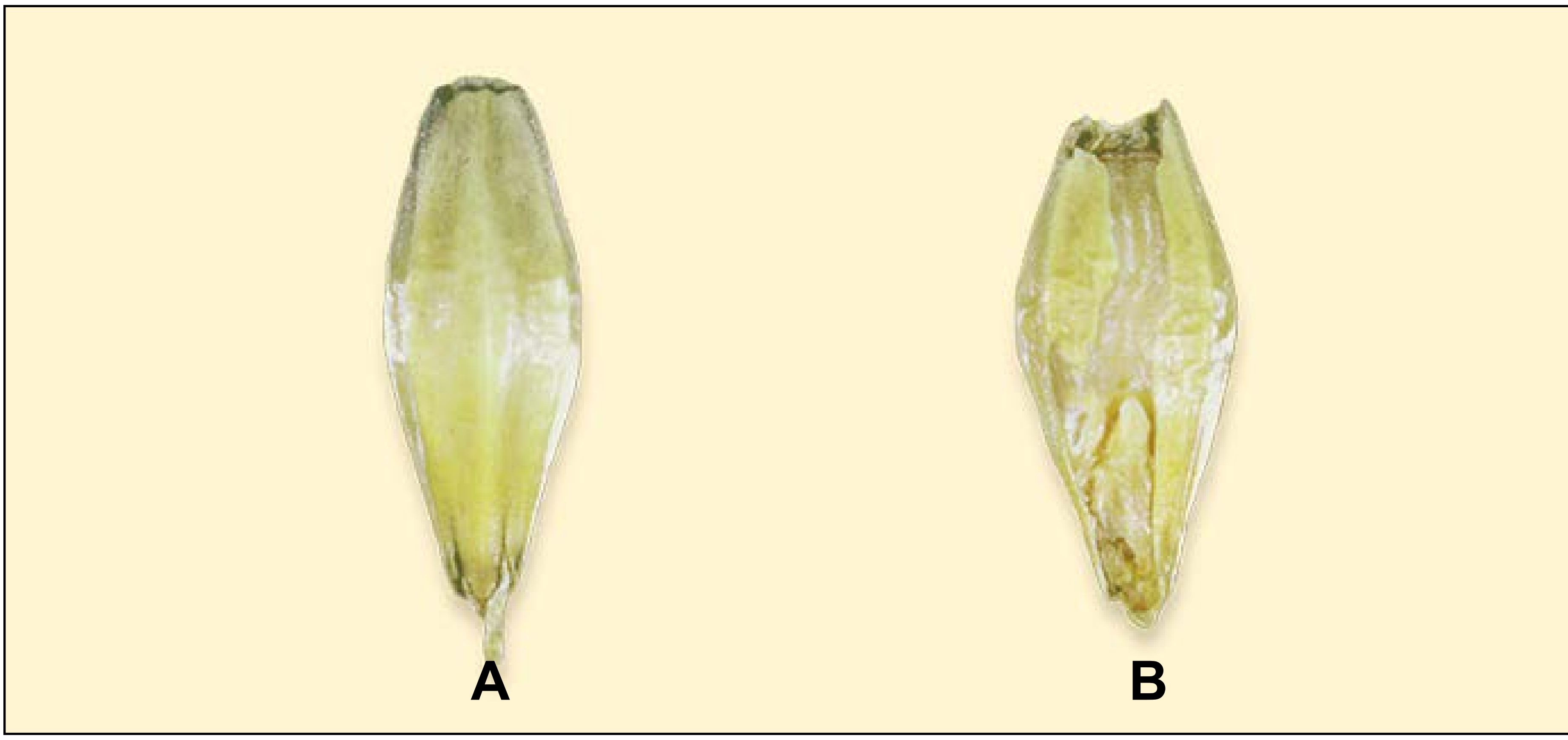
Kernel A: Loose over the germ area on both sides and the front.

Kernel B: Has one-third or more missing from the kernel.

Kernel C: Is missing or split over the germ area (Germ area must be visible when viewing from the top only).

Kernel D: More than one-fourth of the kernel is broken off.

Kernel E & F: Are skinned on both sides of the kernel.



SPROUT DAMAGE

Portion for analysis: approximately 25 grams.

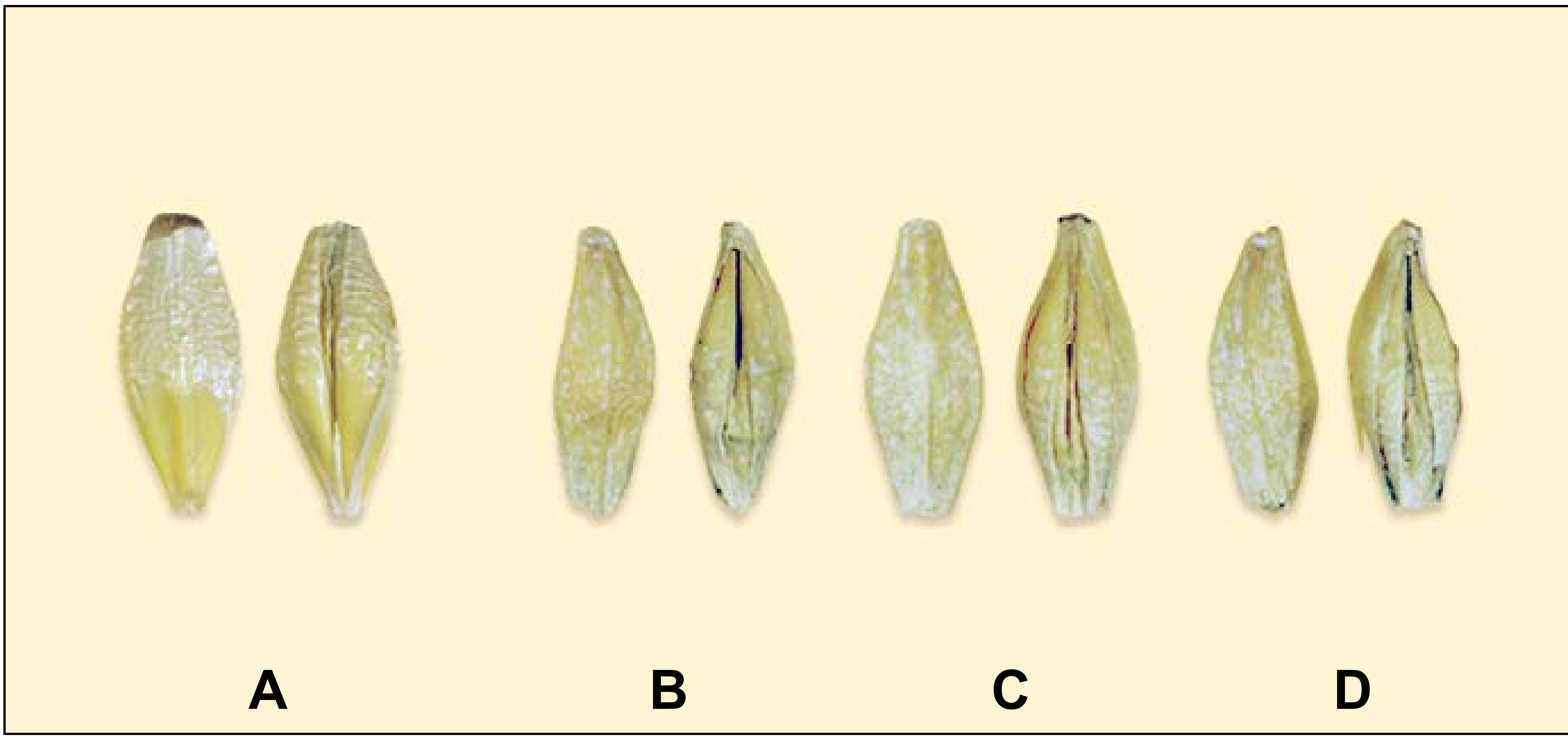
Kernels and pieces of barley that have sprouted or have swelling over the germ and, after examination, show sprout.

Illustration shows from left to right:

Kernel A: Kernel showing visible sprout at the bottom of the germ area.

Kernel B: Kernels which, after careful removal of the seed coat, show any evidence of movement in the germ area. The "sprout" may move towards the top or bottom of the germ or lift upward leaving space between the sprout and germ cavity.

NOTE: Swelling over the germ area may or may not be an indication of sprout.



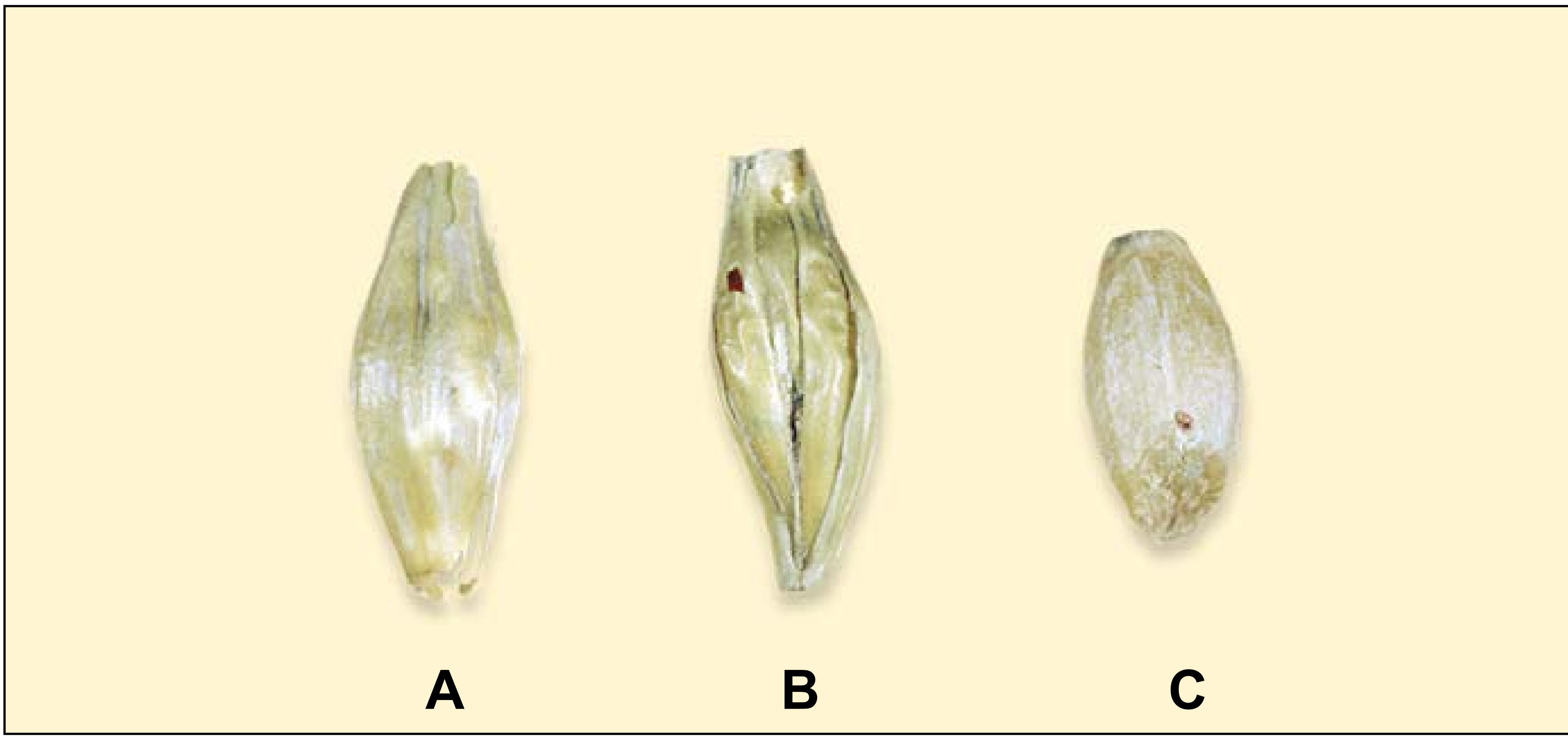
TWO-ROWED & SIX-ROWED

Portion for analysis: approximately 25 grams.

Illustration shows from left to right:

Kernel A: Two-rowed Barley is usually characterized by plump, symmetrical shaped kernels with creases straight down the center of the kernels. Two-rowed Barley often has a slightly wrinkled, thinner skin.

Kernels B - D: Six-rowed Barley is usually characterized by irregularly shaped kernels. The creases in approximately 2/3 of the kernels in Six-rowed Barley are twisted, and the creases in approximately 1/3 of the kernels are straight. The Six-rowed Barley skin is usually thicker, and the veins are usually more prominent than Two-rowed Barley.



WEEVIL OR INSECT BORED

Portion for analysis: approximately 25 grams.

Kernels and pieces of barley that have been bored or tunneled by insects.

Illustration shows from left to right:

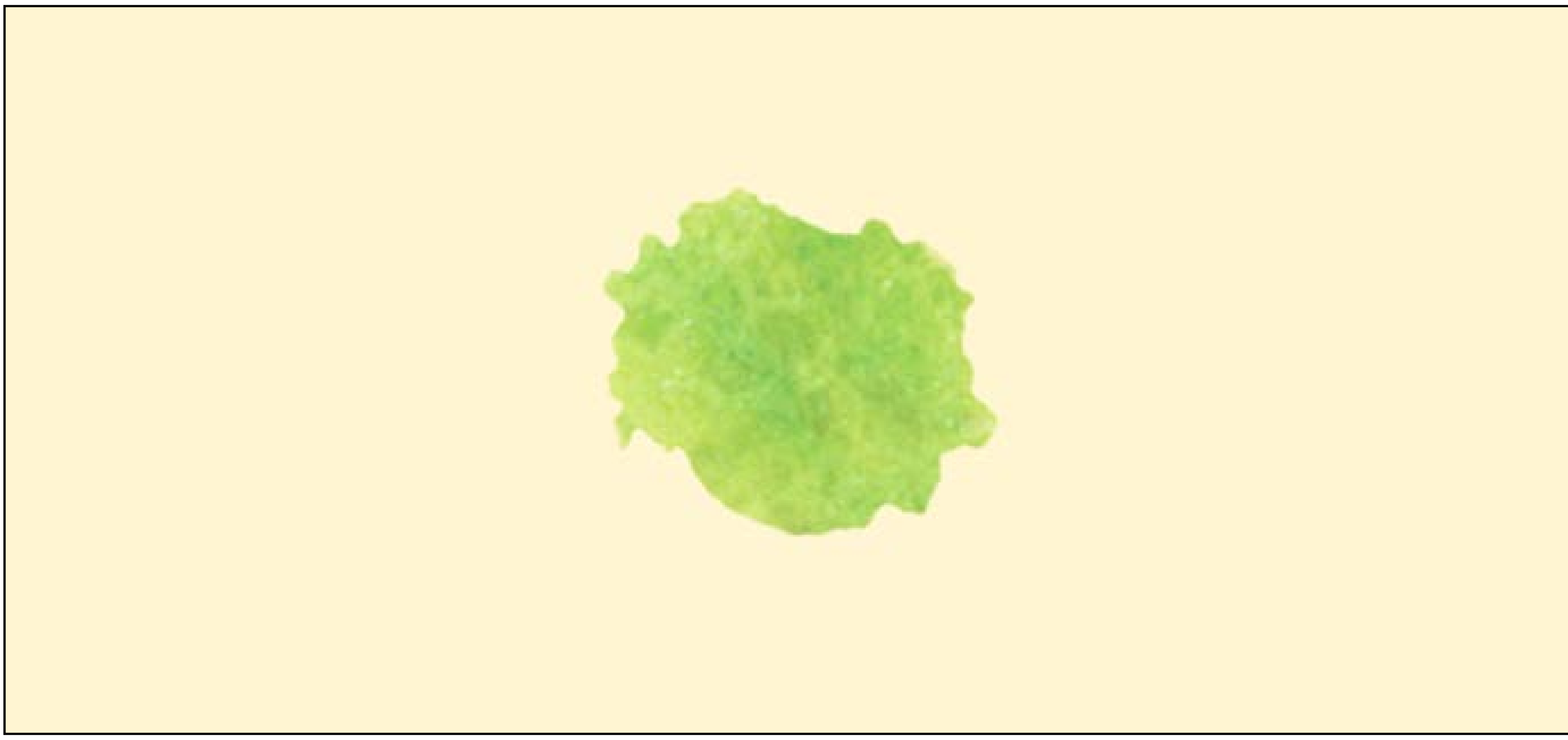
Kernel A: Kernel which has been tunneled.

Kernels B & C: Kernels which have been bored.

CANOLA

Definition of canola

Seeds of the genus Brassica from which the oil shall contain less than 2 percent erucic acid in its fatty acid profile and the solid component shall contain less than 30.0 micromoles of any one or any mixture of 3-butenyl glucosinolate, 4-pentenyl glucosinolate, 2-hydroxy-3-butenyl, or 2-hydroxy-4-pentenyl glucosinolate, per gram of air-dried, oil free solid. Before the removal of dockage, the seed shall contain not more than 10.0 percent of other grains for which standards have been established under the United States Grain Standards Act.

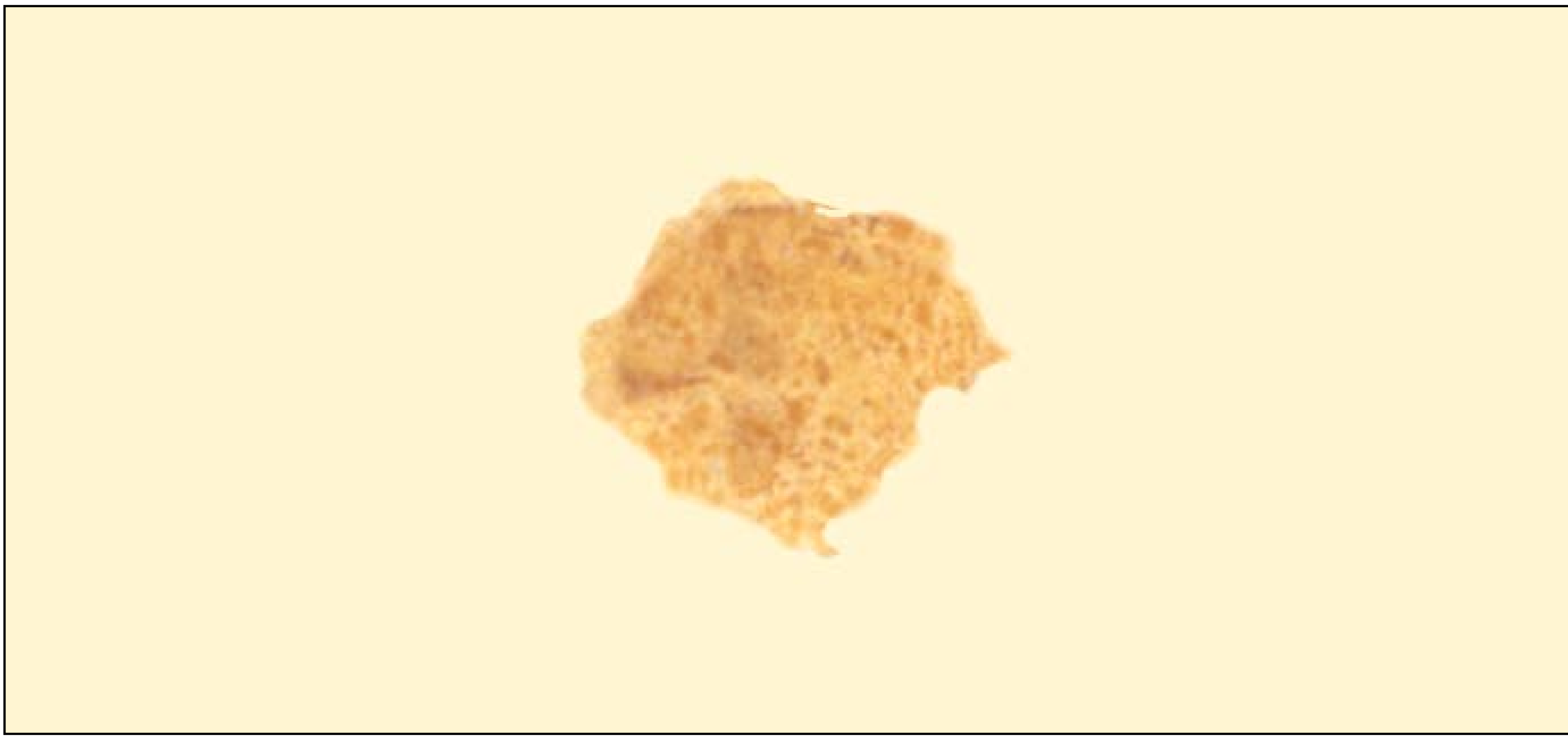


DISTINCTLY GREEN

Portion for analysis: approximately 500 seeds (crushed)

Canola and pieces of canola which, after being crushed, are a distinct green. Any amount of coverage equal to or greater than the intensity shown is considered damage.

NOTE: The crushed seed coat will be disregarded in making this determination.



HEAT DAMAGE

Portion for analysis: approximately 500 seeds (crushed)

Canola and pieces of canola which, after being crushed, are materially discolored and damaged by heat. Any amount of coverage equal to or greater than the intensity shown is considered damage.

NOTE: The crushed seed coat will be disregarded in making this determination.

A B C

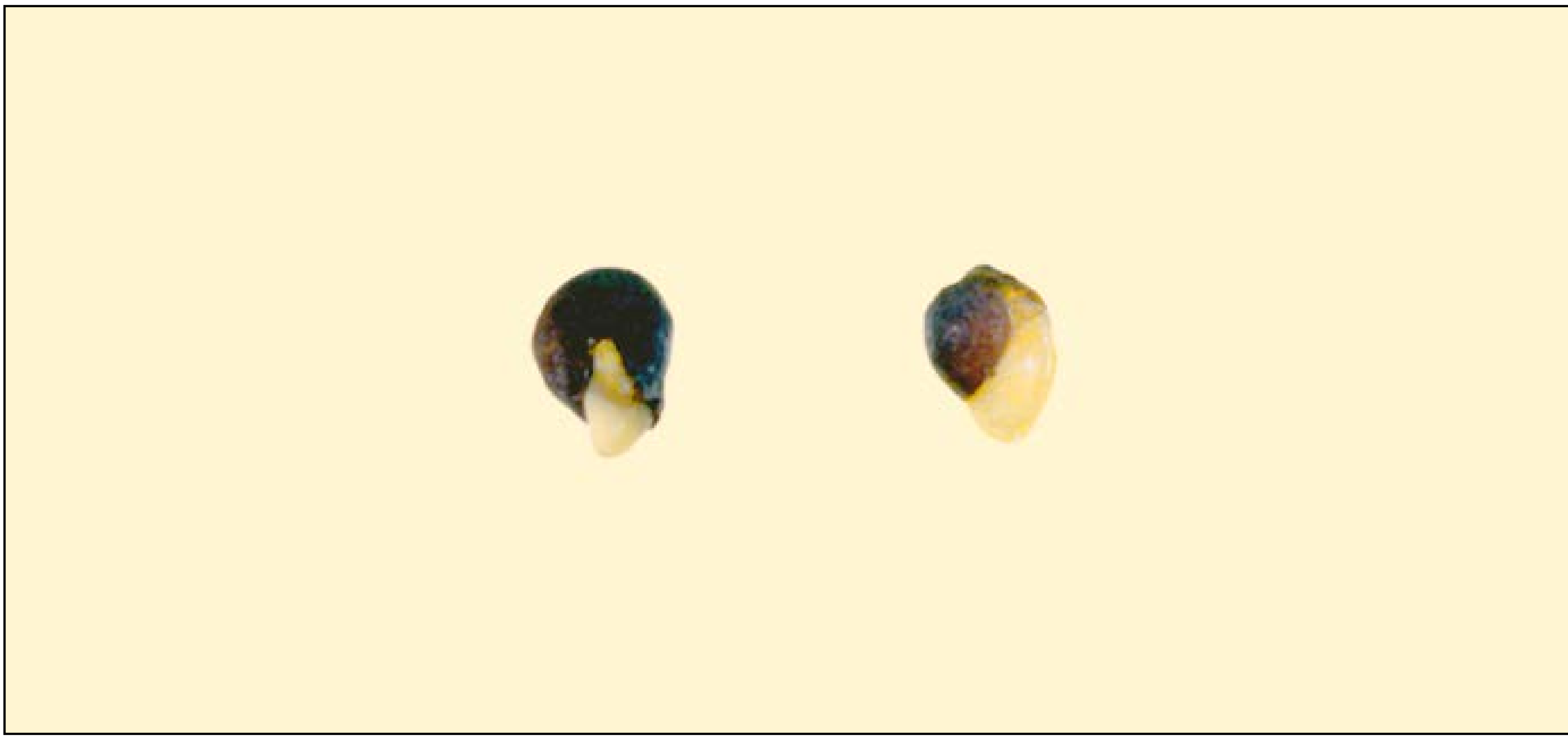
OTHER DAMAGE

Portion for analysis: approximately 10 grams

A. Canola and pieces of canola which are completely covered with a whitish, frosted coloration (rime) shall be considered damage.

B. Canola and pieces of canola which are distinctly shriveled or shrunken (frost damaged) to the degree illustrated shall be considered damage.

C. Canola and pieces of canola containing the amount of surface mold depicted shall be considered damage.



SPROUT DAMAGE

Portion for analysis: approximately 10 grams

Canola and pieces of canola which, after being crushed, are materially discolored and damaged by heat. Any amount of coverage equal to or greater than the intensity shown is considered damage.

NOTE: The crushed seed coat will be disregarded in making this determination.

CORN

Definition of corn

Grain that consists of 50 percent or more of whole kernels of shelled dent corn and/or shelled flint corn (Zea mays L.) and not more than 10.0 percent of other grains for which standards have been established under the United States Grain Standards Act.

BLUE-EYE MOLD DAMAGE

Portion for analysis: approximately 250 grams

A germ affected with blue-eye mold, regardless of the size of the mold is a damaged kernel. If the mold is distinct, it is not necessary to open or scrape the kernel. When necessary, carefully lift the germ cover to avoid destroying evidence of mold.

NOTE: Do not confuse blue-eye mold with purple plumules. Any amount of mold that penetrates the seed coat of the kernel is considered damage (e.g., crown, tip, sides, or back).

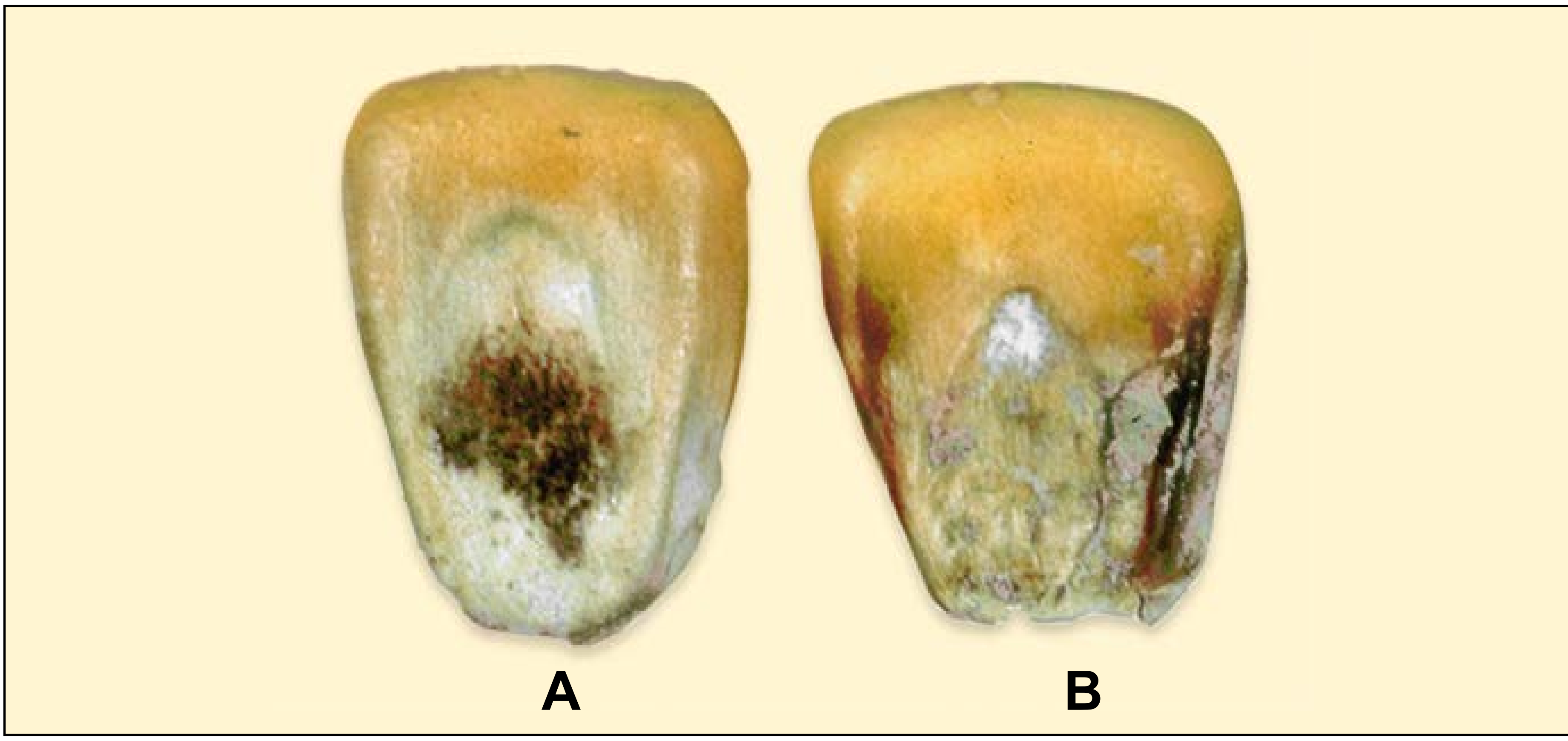
PURPLE PLUMULE (NOT DAMAGE)

Portion for analysis: approximately 250 grams

Purple plumule IS NOT damage.

The condition (light to dark purple discoloration) is due to a genetic or varietal characteristic and is restricted to the plumule area (center of germ).

NOTE: The outward appearance is similar to blue-eye mold. Consequently, it may be necessary to gently lift/remove the germ cover to make an accurate determination.



COB ROT DAMAGE

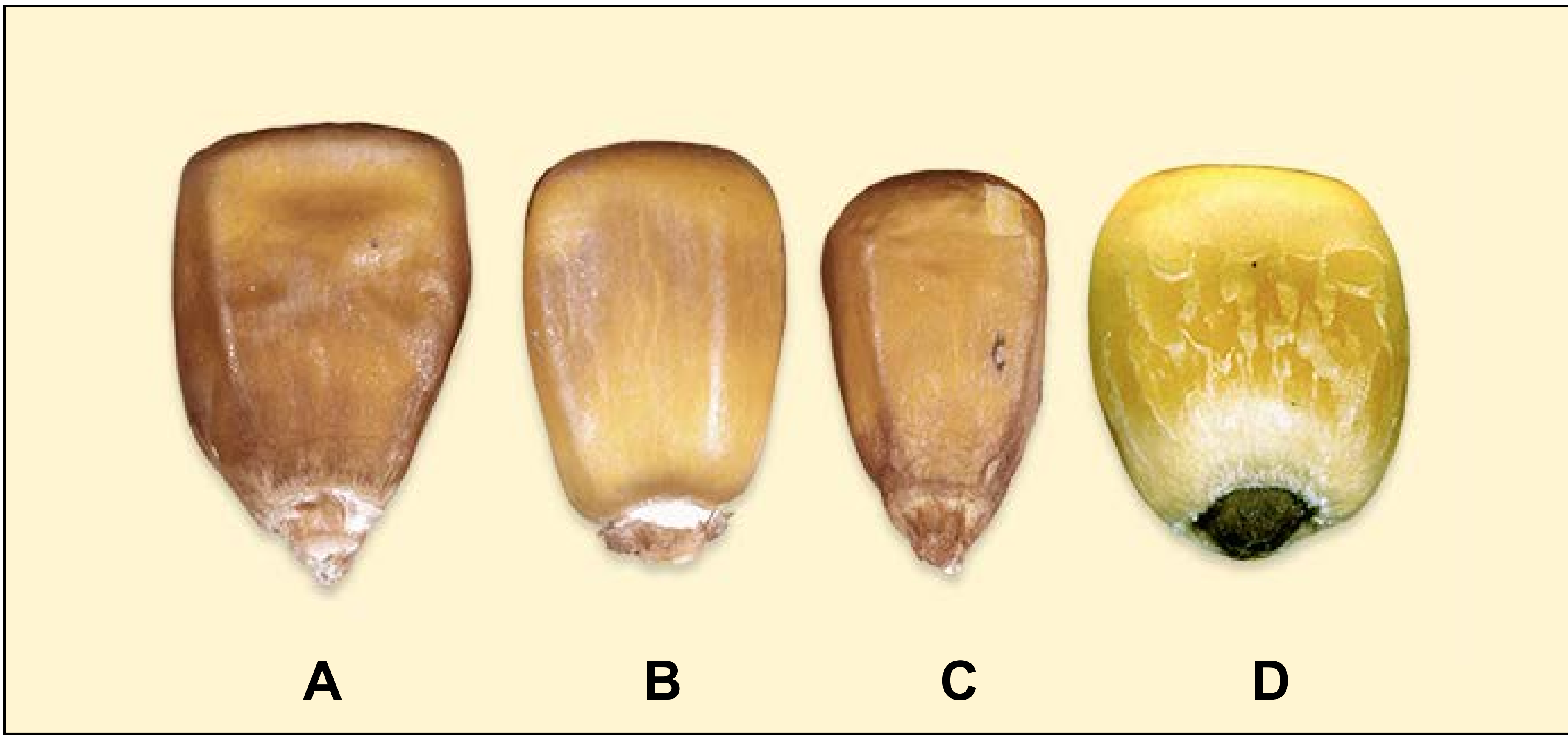
Portion for analysis: approximately 250 grams

A distinct discoloration or rotting caused by a fungus that attacks ears of weakened plants. Since the damage is distinct, it is unnecessary to open the kernel for examination. Illustration shows from left to right:

Kernel A: Minimum area of coverage and degree of discoloration necessary to be considered "distinctly discolored" corn.

Kernel B: Minimum area of coverage and degree of discoloration necessary to be considered "rotted" corn.

NOTE: If kernels do not meet the interpretation, it may be necessary to open the kernels to determine if the kernels are otherwise damaged.



DRIER DAMAGE

Portion for analysis: approximately 250 grams

Illustration shows from left to right:

Kernel A: Kernels which have a discolored, wrinkled, and blistered appearance.

Kernel B: Kernels which are puffed and/or swollen and slightly discolored and often have damaged germs.

Kernel C: Kernels whose seed coats are peeling off and are slightly discolored.

Kernel D: Kernels whose seed coat is peeling off (or has already peeled off), having a crazed or checked appearance.

GERM DAMAGE

Portion for analysis: approximately 250 grams

Kernels of corn which are damaged by respiration or heat, but which are not materially discolored, shall be considered damaged. Kernels with germ areas discolored to the degree shown or worse are considered damage.

If necessary, carefully remove the germ covering from the kernel. Scraping too deeply can destroy the evidence of damage and cause non-uniformity of interpretation.

Discolored germs that do not meet the minimum coverage requirement may be considered damage provided the degree of discoloration is greater than shown and the overall “prorated” appearance meets the minimum coverage and intensity level depicted. For example, to be considered damage, when the degree of discoloration is twice that shown, only half of the germ area needs to be discolored.

NOTE: Disregard the plumule when determining germ damage. Refer to VRI C-4.2 Germ (Not Damage).

GERM (NOT DAMAGE)

Portion for analysis: approximately 250 grams

Kernels of corn with only the plumule discolored **ARE NOT** considered damage. The outward appearance is similar to blue-eye mold. Consequently, it may be necessary to gently lift/remove the germ cover to make an accurate determination.

HEAT DAMAGE (DRIER)

Portion for analysis: approximately 250 grams

Kernels of corn which are often puffed or swollen and materially discolored by external heat from artificial drying methods.

NOTE: The entire kernel must be discolored to this intensity to be heat damage. This applies to all classes of corn.

HEAT DAMAGE (YELLOW)

Portion for analysis: approximately 250 grams

Kernels which are materially discolored by excessive respiration. The discoloration originates from the germ area and continues through the sides and back of the kernel (continuous band). Provided that the band is continuous, there is no minimum width requirement.

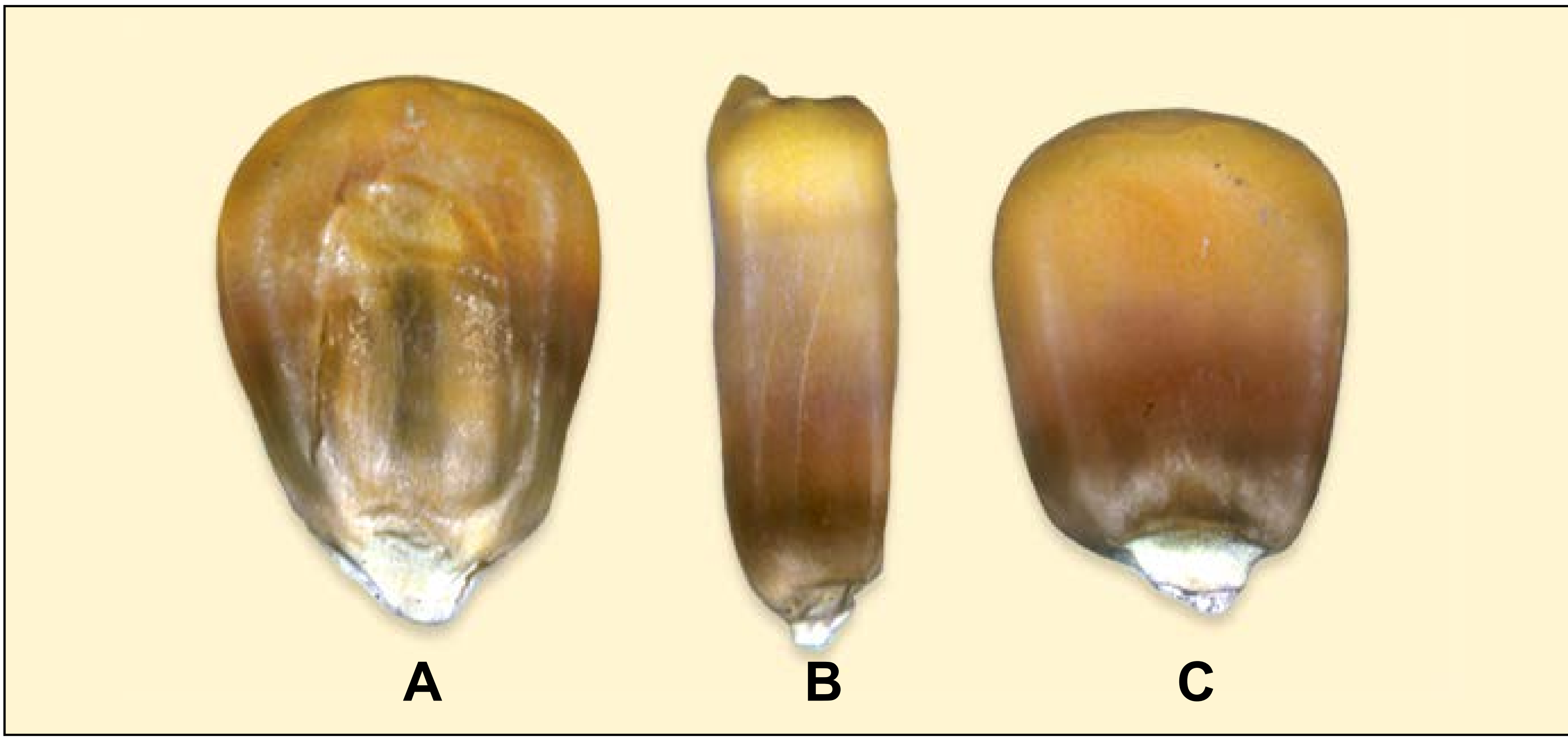
Illustration shows from left to right:

Kernel A: Shows the discoloration extending out of the germ.

Kernel B: Shows the discoloration around the sides.

Kernel C: Shows the discoloration across the back.

NOTE: For heat damage (drier) and heat damage in white corn refer to VRI C-5.0 and C-5.1, respectively.



HEAT DAMAGE (WHITE)

Portion for analysis: approximately 250 grams

Kernels which are materially discolored by excessive respiration. The discoloration originates from the germ area and continues through the sides and back of the kernel (continuous band). Provided the band is continuous, there is no minimum band width requirement.

Illustration shows from left to right:

Kernel A: Shows the discoloration extending out of the germ.

Kernel B: Shows the discoloration around the sides.

Kernel C: Shows the discoloration across the back.

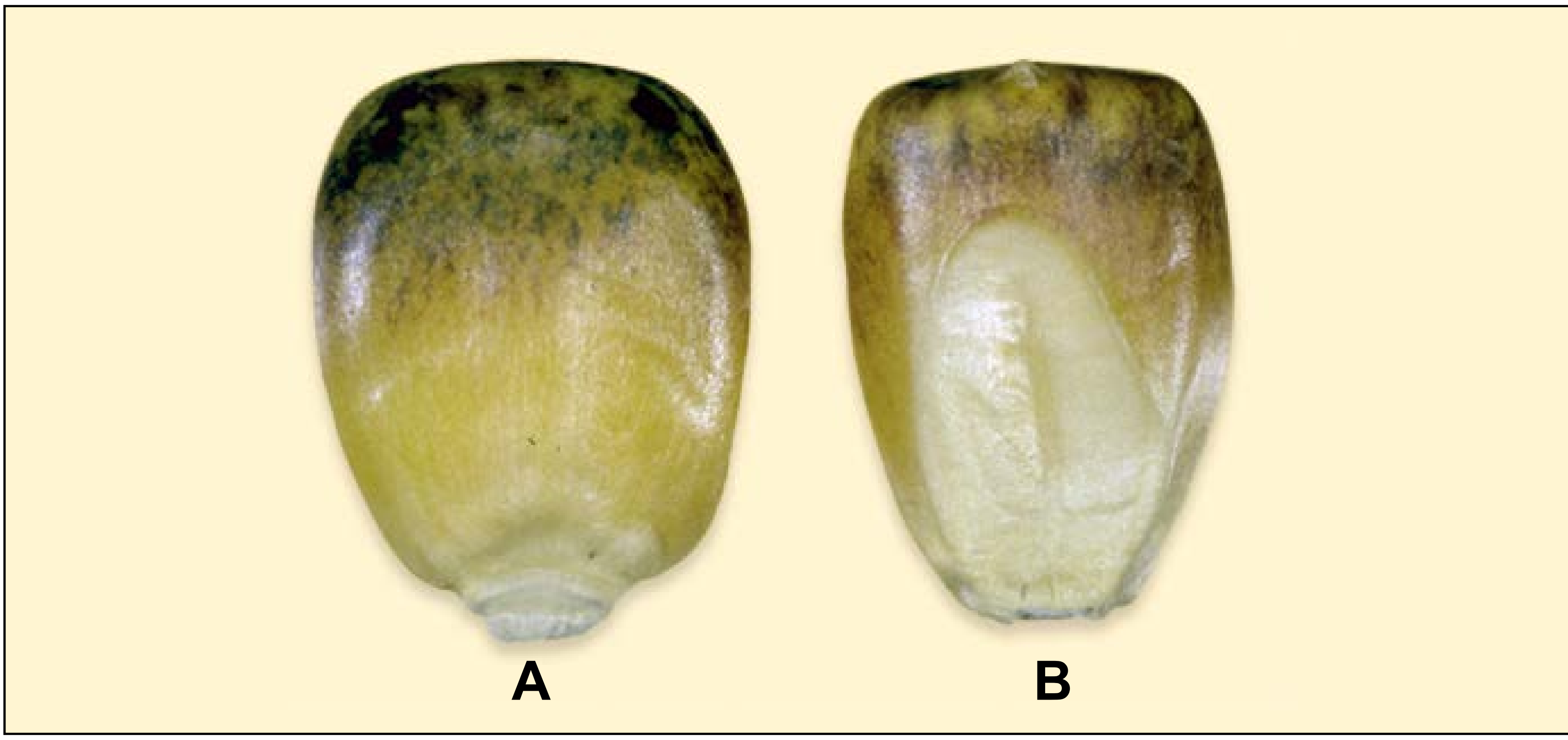
NOTE: Do not confuse with heat-damaged Yellow corn. The degree of discoloration throughout the “band” must be equal to or greater than shown. If any area within the band does not meet the-minimum discoloration requirement, the kernel will NOT be considered heat damage.

INSECT DAMAGE

Portion for analysis: approximately 250 grams

Whole or broken kernels with obvious weevil-bored holes or which have evidence of boring or tunneling (tracings) indicating the possible inner presence of insects, insect webbing, or insect refuse.

NOTE: Do not probe into or further expose weevil-bored holes or tunneling. Weevil bored holes that are completely visible and are free of insect webbing and/or refuse are sound.



MIXED CORN (PURPLE PIGMENTED CORN}

Portion for analysis: approximately 250 grams

Corn of Other Colors (OCOL) in Corn. Corn will be OCOL when the area of coverage and discoloration is:

A. Equal to or greater than shown on the back side of the kernel, or

B. Equal to or greater than shown on the germ side of the kernel.

NOTE: Discoloration and area of coverage is not a combination of both sides of kernel.

MIXED (MORE THAN SLIGHT TINGE-PINK)

Portion for analysis: approximately 250 grams

White Corn With More Than A Slight Tinge of Pink

Kernels of White corn with a pink color on 50 percent or more of the kernel. The color intensity must be equal to or greater than shown.

MIXED (MORE THAN SLIGHT TINGE-STRAW)

Portion for analysis: approximately 250 grams

Kernels of White corn with more than a slight tinge of straw color and the area of coverage and intensity is equal to or greater than shown.

MIXED CORN (WHITE-CAPPED YELLOW CORN)

Portion for analysis: approximately 250 grams

Kernels of Yellow corn with a white cap do not meet the requirements of either Yellow or White corn and function, therefore, as OCOL. Color and extent of coverage shall be equal to or greater than shown.

MOLD DAMAGE

Portion for analysis: approximately 250 grams

Whole or broken kernels which contain any amount of mold on the exposed part of the kernel are considered damage.

NOTE: Do not confuse mold with dirt. Mold occurs in many colors.

MOLD (PINK EPICOCCUM)

Portion for analysis: approximately 250 grams

A germ affected with mold, regardless of the size of the mold, is a damaged kernel.

If the mold is distinct, it is not necessary to open or scrape kernel. If opening kernel is necessary, lift germ cover carefully to avoid destroying evidence ofmold.

NOTE: Do not confuse pink epicoccum with the reddish genetic characteristics found in some corn hybrids.

NOT DAMAGE (Dirt)

Portion for analysis: approximately 250 grams

Whole or broken kernels which have dirt on the exposed part of the kernel.

NOTE: Do not confuse dirt with mold.

CORN OF OTHER COLORS

Portion for analysis: approximately 250 grams

Kernels which are yellow and dark red and which the dark red color covers 50 percent or more of the kernel. The color intensity must be equal to or greater than shown.

SURFACE MOLD (BLIGHT)

Portion for analysis: approximately 250 grams

Kernels which have a mold, caused by corn leaf blight, that appears to be only on the surface but actually penetrates the seed coat. Kernels which contain surface mold (blight) on one or both sides equal to or greater than that shown on both kernels are considered as surface mold (blight) damage.

NOTE: Do not confuse with surface mold (more than slight). No further examination is necessary if the kernel meets the VRI.

SILK CUT

Portion for analysis: approximately 250 grams

Kernels which contain any amount of mold in the silk cut are damaged. Kernels which contain clean silk cuts and are otherwise undamaged are sound kernels.

SLIGHTLY YELLOW IN (WHITE WAXY) CORN

Portion for analysis: approximately 250 grams

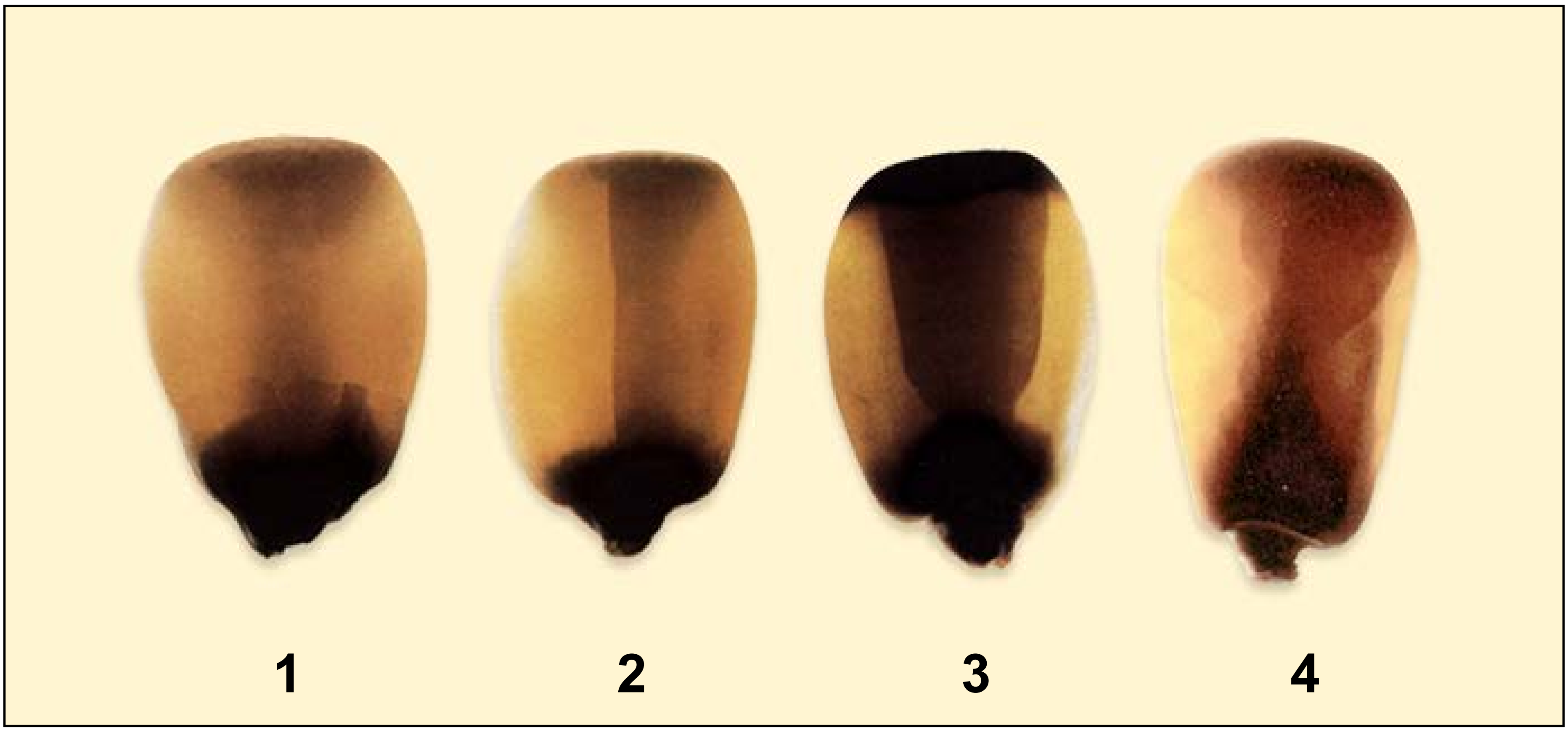
Kernels of corn as yellow or more in the Special Grade (White Waxy) shall be Corn of Other Colors.

SPROUT DAMAGE

Portion for analysis: approximately 250 grams

Kernels which are sprouted or show evidence of sprouting are considered damage.

NOTE: Anytime the sprout extends beyond the germ area, regardless of whether it actually breaks through the seed coat or not, the affected kernel is considered damaged.



STRESS CRACKS

Portion for Analysis: For percent total analysis 50 kernels taken from approximately 25 grams. For percent single, double, and multiple analysis 100 kernels taken from approximately 50 grams.

Illustration shows from left to right.

Kernel 1: No stress crack

Kernel 2: Single stress crack

Kernel 3: Double stress crack

Kernel 4: Multiple stress cracks

NOTE: Do not include kernels that are broken, chipped, or cracked (i.e., a ruptured seed coat), or which otherwise limit the ability to identify stress cracks, e.g., waxy or discolored kernels.

SURFACE MOLD (MORE THAN SLIGHT)

Portion for analysis: approximately 250 grams

Kernels of corn which contain surface mold in any area or combination of areas equal to or greater than shown on the VRI.

WAXY & NON WAXY

Portion for analysis: approximately 100 kernels

Kernels cut lengthwise and exposed to iodine solution.

LEFT: Yellow or White kernels of corn stained red or reddish brown shall be assigned the special grade “Waxy.”

RIGHT: Yellow or White kernels of corn stained blue or violet shall be “Non-Waxy.”

FLOOD DAMAGE

Portion for Analysis: sample as a whole

FDA considers flood water to be inherently insanitary and deems grains, oilseeds, feed, and feed ingredients (including distillers grains) and food that has been in contact with flood water to be unfit for human consumption or animal feed, unless reconditioned. In accordance with the FGIS-FDA Memorandum of Understanding, FGIS reports to FDA certain lots of grain, rice pulses, or food products, which are considered “actionable” under the Food, Drug, and Cosmetic Act (FDA).

FLAXSEED

Definition of flaxseed

Grain that, before the removal of dockage, consists of 50 percent or more of common flaxseed (Linum usitatissimum L.) and not more than 20 percent of other grains for which standards have been established under the United States Grain Standards Act and which, after the removal of dockage, contains 50 percent or more of whole flaxseed.

BEE’S WINGS DAMAGE

Portion for Analysis: Not less than 15 grams

Very thin, whitish, paperlike seeds of flaxseed known as “Fly’s Wings” or “ Bee’s Wings”. These must be empty hulls.

DAMAGED BY HEAT

Portion for Analysis: Not less than 15 grams

Kernels and pieces of kernels of flaxseed which are damaged as a result of heat but which are not materially discolored.

HEAT DAMAGE

Portion for Analysis: Not less than 15 grams

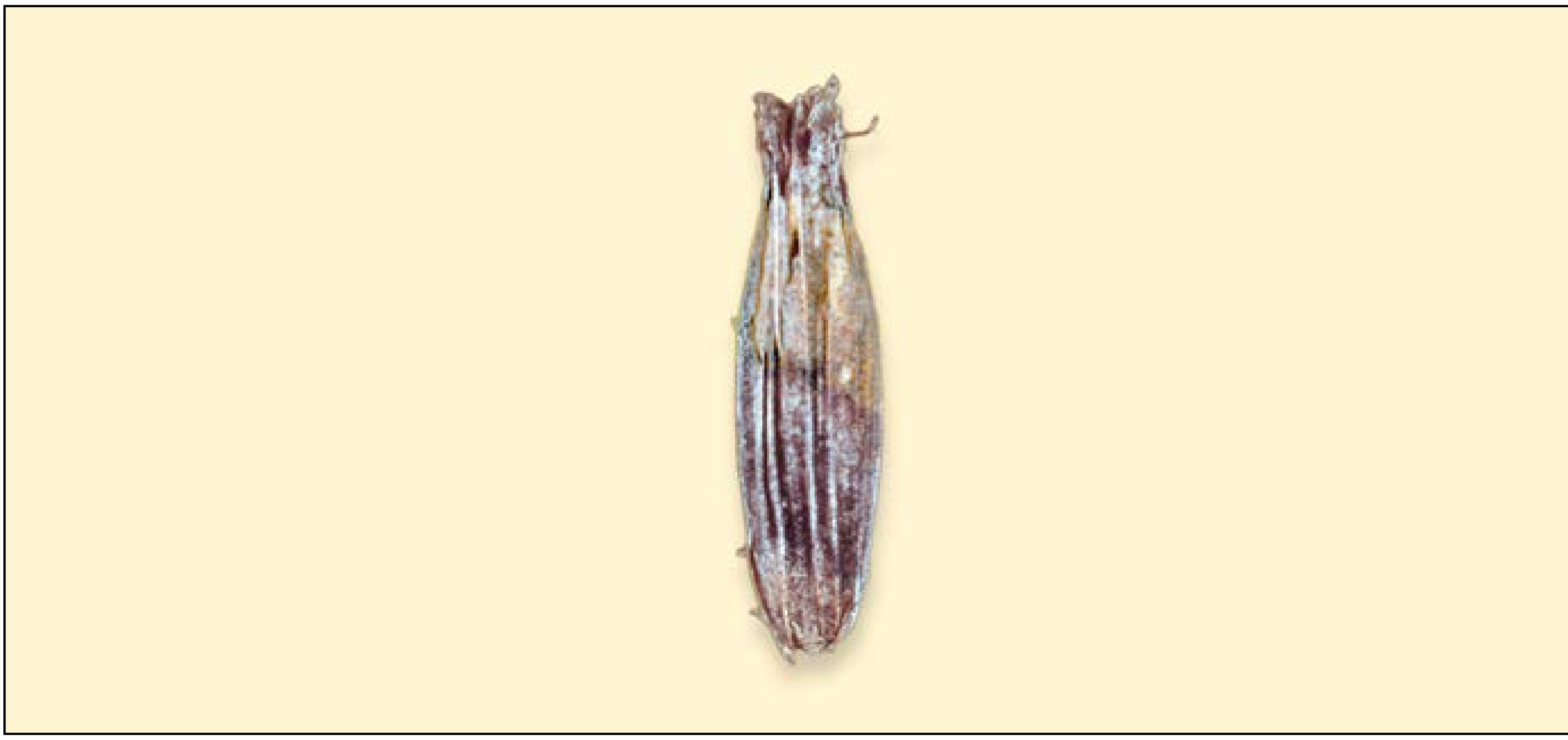
Heat damaged flaxseed shall be flaxseed and pieces of flaxseed which are materially discolored and damaged by heat.

NOTE: It is necessary in most cases to make a cross-section analysis to determine the extent of damage.

OATS

Definition of oats

Grain that consists of 50 percent or more of oats (Avena sativa L. and A. byzantina C. Koch) and may contain, singly or in combination, not more than 25 percent of wild oats and other grains for which standards have been established under the United States Grain Standards Act.

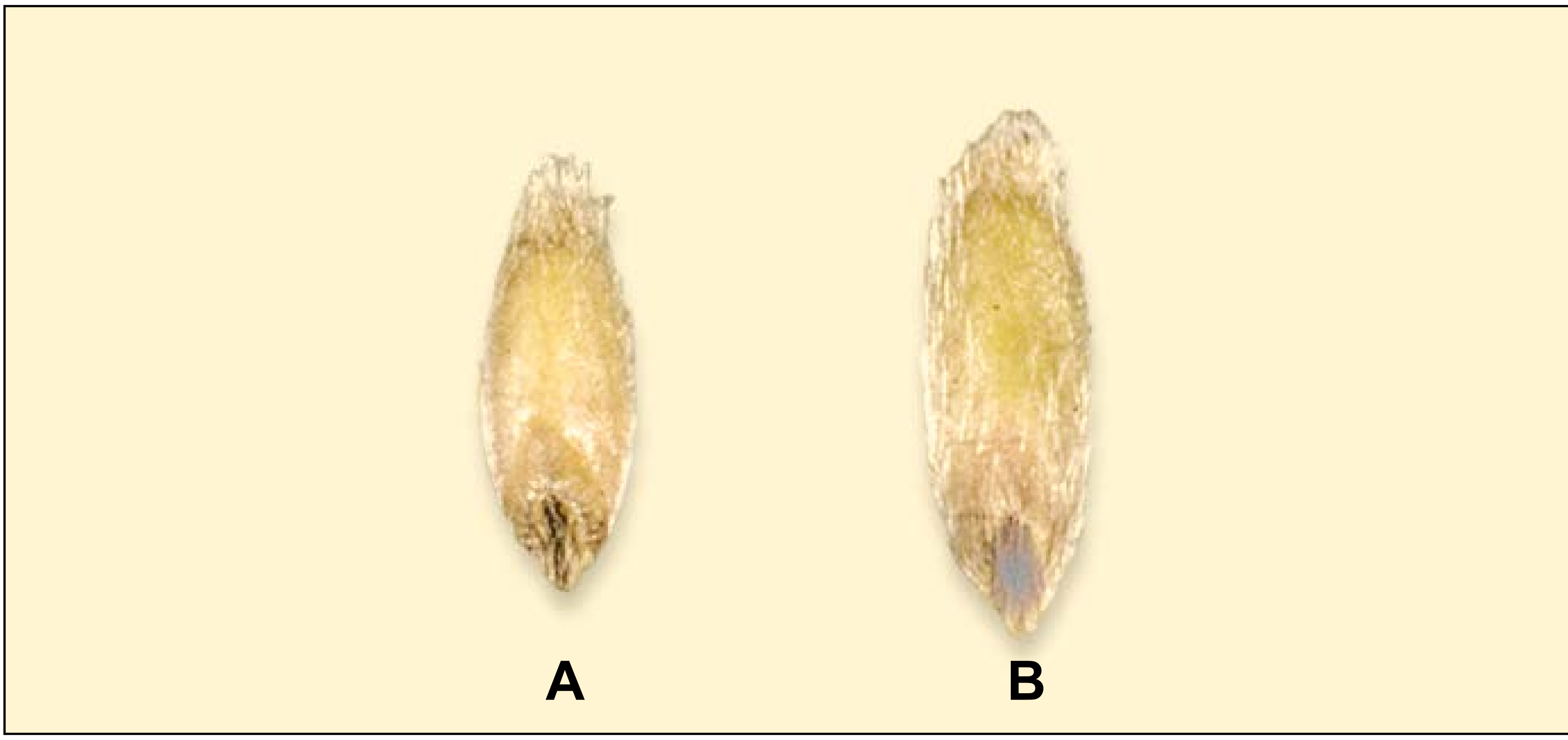


BADLY GROUND AND/OR WEATHER DAMAGE

Portion for Analysis: Approximately 15 grams

Kernels which are badly discolored by ground and/or weather condition. The discoloration must appear on both sides of the kernel equal to or greater than shown to be considered damage.

NOTE: Such kernels are not “sound cultivated oats”.



GERM DAMAGE (SICK AND/OR MOLD)

Portion for Analysis: Approximately 15 grams

Kernels in which the germ is discolored or moldy as a result of respiration.

Illustration shows from left to right:

Kernel A: Kernels and pieces of oats that have discolored germs as dark or darker than shown shall be damaged.

Note: Discolored germs that do not meet the minimum coverage requirement may be considered damage provided the degree of discoloration is greater than shown and the overall “prorated” appearance meets the minimum coverage and intensity level depicted.

Kernel B: Kernels containing any amount of mold shall be damage.

NOTE: Hull must be removed to determine extent of damage to germ. Such damaged kernels are not “sound cultivated oats”.

HEAT DAMAGE

Portion for Analysis: Approximately 15 grams

Kernels which are materially damaged as a result of heating and which show a reddish discoloration extending back from the germ equal to or greater than shown shall be considered heat damage.

NOTE: Hulls must be removed to determine extent of heat damage.

INSECT DAMAGE

Portion for Analysis: Approximately 15 grams

Kernels which have been bored or tunneled by insects.

NOTE: Such kernels are not “sound cultivated oats”.

MOLD DAMAGE

Portion for Analysis: Approximately 15 grams

Kernels in which mold has penetrated the hull leaving a grayish discoloration on the groat to the minimum coverage and intensity as shown are considered damaged.

NOTE: Hull must be removed to determine extent of damage. Such damaged kernels are not “sound cultivated oats”.

SPROUT DAMAGE

Portion for Analysis: Approximately 15 grams

Kernels which have sprouted or generally have a crack in the seed coat over the germ area.

NOTE: Hull must be removed to determine if cracked seed coat indicates sprouting. Such damaged kernels are not “sound cultivated oats”.

WEATHER DAMAGED (STAINED)

Portion for Analysis: Approximately 15 grams

Processing discolored (stained) oats reduce rolled oat yields and may result in a less than desirable flake color, depending on its severity. Oat groats having a dark brown/black discoloration on the surface meeting the minimum coverage and intensity as shown are considered damaged.

Illustration shows from left to right:

A. Suspect Oat: Slightly discolored hulls indicate possible damage. The hull must be removed to confirm the presence and extent of discoloration.

B. Confirmed Damage: Illustrates the minimum coverage and intensity requirement.

SLIGHTLY WEATHERED
Portion for Analysis: sample as a whole

Oats discolored by weather conditions are considered slightly weathered when a dusty, gray appearance is evident of the brush end of the kernels or when a sufficient number of severely weathered kernels are present to affect the appearance of the sample. In either case the entire sample must have a slightly weathered appearance and shall not be graded higher than U.S. No. 3, and the words “Slightly Weathered” shall be recorded on the pan ticket and official inspection certificate.

MATERIALLY WEATHERED
Portion for Analysis: sample as a whole

Oats are materially weathered when many of the kernels are badly stained or discolored by adverse weather conditions. Oats which are materially weathered shall not be graded higher than U.S. No. 4, and the words “Materially Weathered” shall be recorded on the pan ticket and official inspection certificate.

RYE

Definition of rye

Grain that, before the removal of dockage, consists of 50 percent or more of common rye (Secale cereale L.) and not more than 10 percent of other grains for which standards have been established under the United States Grain Standards Act and that, after the removal of dockage, contains 50 percent or more of whole rye.

GERM DAMAGE (SICK AND/OR MOLD)

Portion for Analysis: Approximately 15 grams

Kernels in which the germ is discolored or moldy as a result of respiration.

NOTE: The bran coat should be removed carefully, because scraping too deeply could remove the damage.

OTHER DAMAGE

Portion for Analysis: Approximately 15 grams

Kernels which have cracks, breaks, or “chews” which contain mold or fungus.

SPROUT DAMAGE

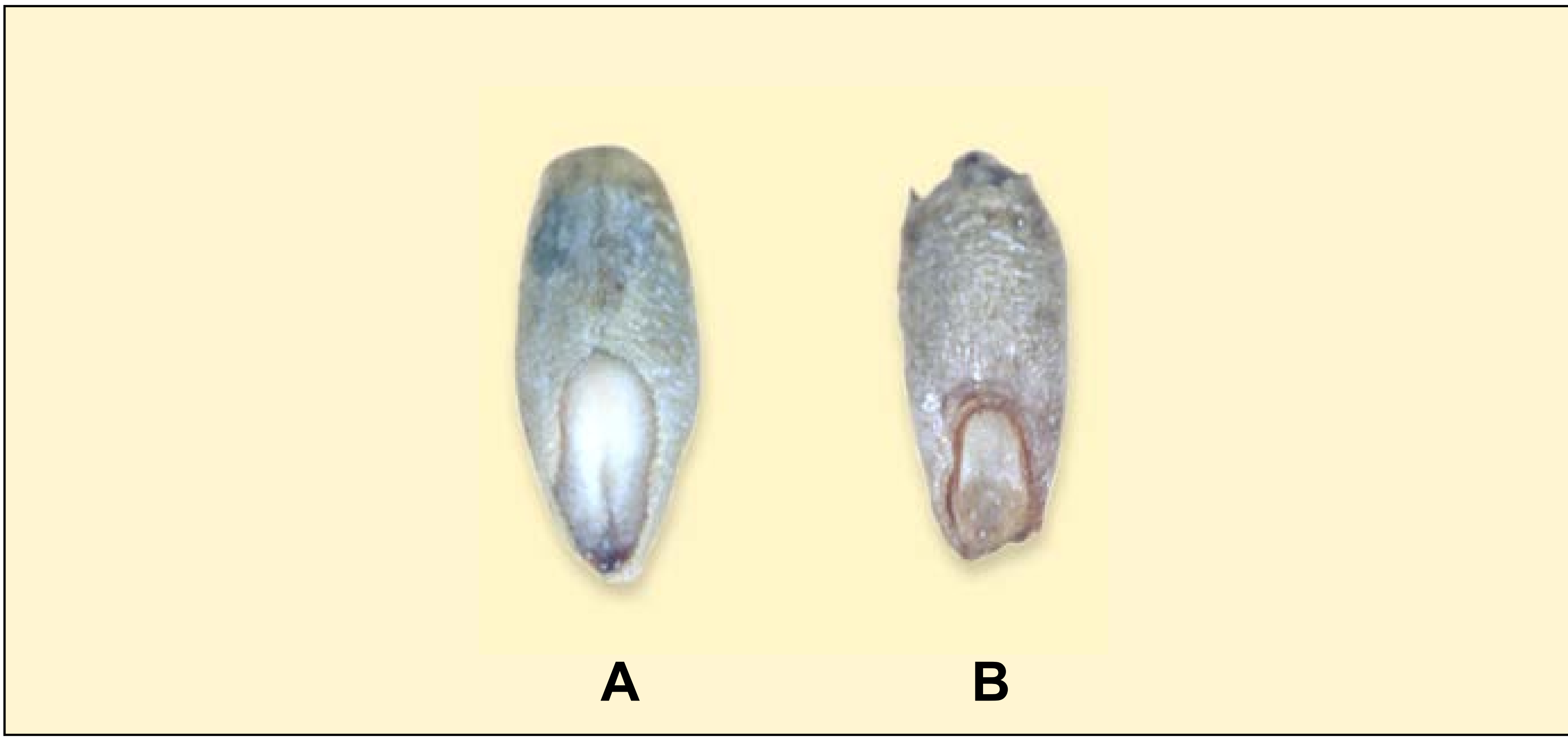
Portion for Analysis: Approximately 15 grams

Kernels in which the germ end has been opened by germination and show sprout; or from which the sprouts have broken off, leaving only the socket.

EXPOSED GERM IN SOUND RYE (NOT SPROUT)

Portion for Analysis: Approximately 15 grams

Kernels on which the bran coat has been rubbed off over the germ area by excessive handling and which usually have the appearance of sprouted kernels.



INSECT CHEWED & SPROUT SOCKETS

Portion for Analysis: Approximately 15 grams

Illustration shows from left to right:

A: Kernels from which the germs have been chewed are sound kernels unless otherwise damaged.

NOTE: Do not confuse with sprouted germs (sockets).

B: Kernels from which the sprouts have broken off are damaged.

WEEVIL OR INSECT BORED

Portion for Analysis: Approximately 15 grams

Kernels which have been bored or tunneled by insects.

SAFFLOWER

NON-STANDARDIZED OILSEED

BADLY GROUND AND/OR WEATHER DAMAGE

Portion for Analysis: Approximately 30 grams

Seeds and pieces of seeds which are discolored due to ground and/or weather conditions and the area of coverage and intensity is equal to or greater than the amount shown.

SPROUT DAMAGE

Portion for Analysis: Approximately 30 grams

Seeds and pieces of seeds with the germ end broken open from germination and show sprout or seeds in which the sprouts have been broken off.

SORGHUM

Definition of sorghum

Grain that, before the removal of dockage, consists of 50 percent or more of whole kernels of sorghum (Sorghum bicolor (L.) Moench) excluding nongrain sorghum and not more than 10.0 percent of other grains for which standards have been established under the United States Grain Standards Act.

GERM DAMAGE (BLEACH METHOD)

Portion for Analysis: Approximately 15 grams

Sorghum and pieces of sorghum which, after bleaching, have discolored germs that are as dark or darker than shown. Discolored germs that do not meet the minimum coverage requirement may be considered damage provided the degree of discoloration is greater than shown and the overall “prorated” appearance meets the minimum coverage and intensity level depicted. For example, when the degree of discoloration is twice that shown, only half of the germ area needs to be discolored.

NOTE: Seed coats that occasionally remain attached to the germ area after bleaching must be carefully removed. Scraping too deeply can destroy the evidence of damage and cause non-uniformity of interpretation.

GROUND AND/OR WEATHER DAMAGE

Portion for Analysis: Approximately 15 grams

Sorghum and pieces of sorghum that have a rough cake-like appearance, and dark stains or discolorations appearing on the seed coat that meet or exceed the area of coverage shown.

Illustration shows from left to right:

Kernel A: Dark Stain

Kernel B: Rough cake-like appearance

Kernel C: Discolored

NOTE: 1. Make determination before bleaching.

2. Do not confuse with mold damage.

HEAT DAMAGE

Portion for Analysis: Approximately 30 grams

Sorghum and pieces of sorghum that are materially discolored and damaged by heat. In most cases, kernels must be cross-sectioned to determine if the exposed starch area is discolored (cream colored) to the extent shown.

DO NOT “PRORATE” SORGHUM HEAT DAMAGE. The starchy area of both halves of the cross-sectioned kernel must be as dark or darker than shown.

NOTE: 1. When cross-sectioning, cut the kernel length-wise through the middle of the germ.

2. Disregard the germ area when making heat damage determinations.

MOLD DAMAGE

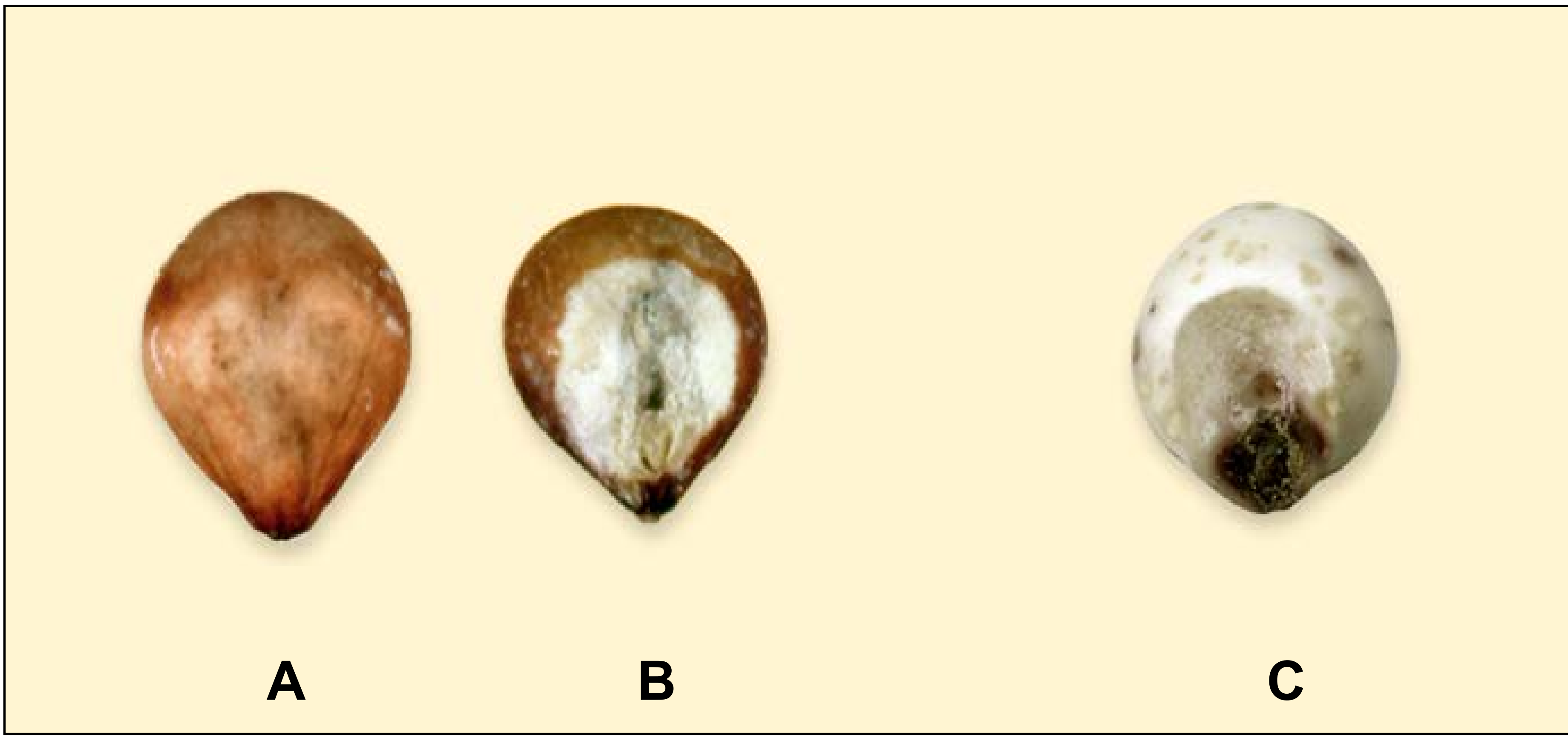
Portion for Analysis: Approximately 15 grams

Sorghum and pieces of sorghum containing surface mold with an area of coverage equal to or greater than the amount shown.

Sorghum containing mold which penetrates the seed coat regardless of size, is damaged.

NOTE: 1. Make determination before bleaching.

2. Do not confuse with dark stains or discolorations caused by ground and/or weather conditions.



MOLD DAMAGE (INTERNAL MOLD)

Portion for Analysis: Approximately 15 grams

Sorghum and pieces of sorghum containing any amount of mold which penetrates the seed coat is considered damage. The mold, usually confined to the germ area beneath the bran layer, may vary in color. The determination may be performed on a pre-bleached, or in the case of weathered sorghum, bleached portion.

<u>Pre-bleached (non-weathered sorghum)</u>

Kernel A: Suspected mold. Slight blue discoloration in the germ area indicates possibility of mold.

Kernel B: Confirmed mold.

<u>Bleached (weathered sorghum)</u>

Kernel C: Confirmed mold. Bleaching turns penetrating molds black. Sorghum germs which have a distinctive black spot(s), or any other color associated with mold, are considered damage.

NOTE: Careful removal of bran over the germ may be necessary to confirm the presence of mold.

NON-GRAIN SORGHUM

Portion for Analysis: Approximately 15 grams

A shiny red, black, lemon yellow, or buff colored round-type kernel generally with tightly clasped hulls. Kernels are smaller in size but more elongated than a sorghum kernel.

PURPLE PIGMENT DAMAGE

Portion for Analysis: Approximately 15 grams

Sorghum and pieces of sorghum which are materially discolored by purple pigment. The color intensity and area of coverage must be equal to or worse than shown. Proration of intensity/coverage is permissible.

NOTE: 1. Make determination before or after bleaching.

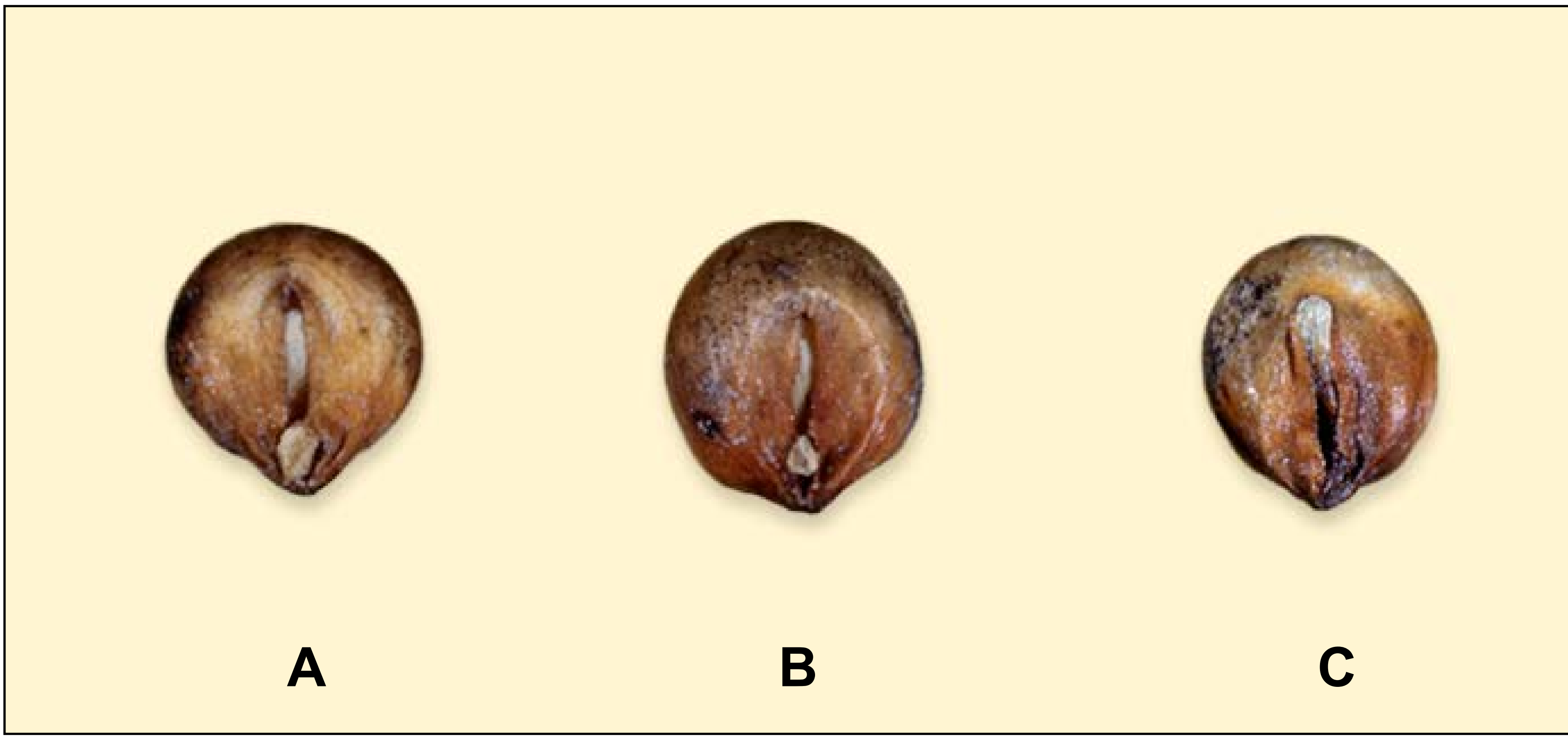
2. Disregard the germ area when making this determination.

SPLIT GERMS (SOUND KERNELS)

Portion for Analysis: Approximately 15 grams

Sorghum and pieces of sorghum which have a split over the germ area (but no protruding sprout) are sound kernels unless otherwise damaged.

Note: Do not confuse with sprout damage (VRI S-6.0).



SPROUT DAMAGE

Portion for Analysis: Approximately 15 grams

Sorghum and pieces of sorghum in which the sprout protrudes from the germ.

Illustration shows from left to right:

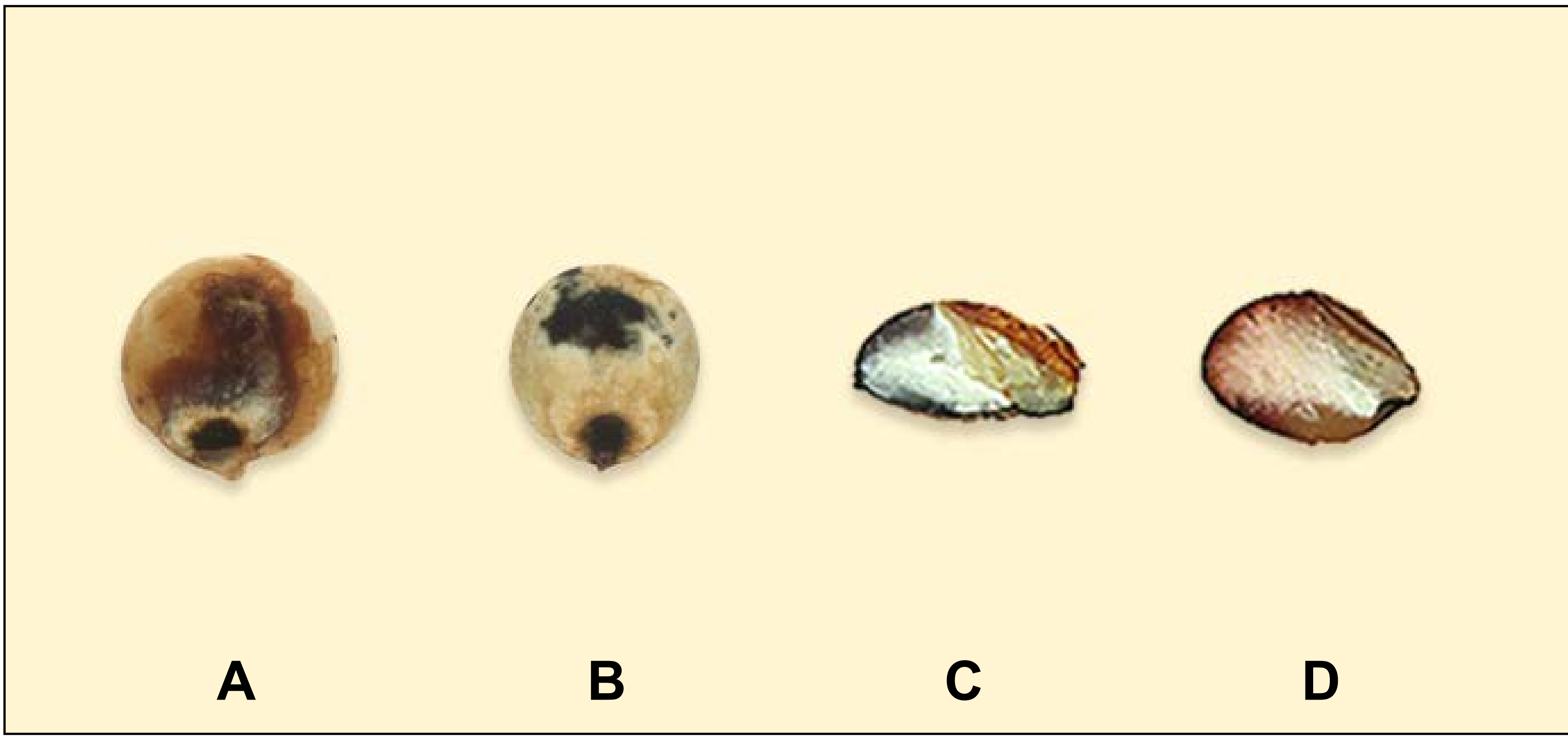
Kernel A: The germ cover is broken open with a sprout protruding from the bottom..

Kernel B: The germ cover is broken open with a sprout showing at the bottom. Sprout has lifted upward extending.beyond the surface plane of the germ area.

Kernel C: The germ cover is broken open with a sprout protruding from the top.

NOTE: 1. Sprout damage is determined before bleaching.

2. Do not confuse with kernels having a split germ (VRI S-7.0).



TANNIN SORGHUM (BLEACHED)

Portion for Analysis: Approximately 15 grams

For classing purposes, bleached Tannin sorghum must have a pigmented testa which shows a dark color and area of coverage on the back of the kernel (singularly or in combination) equal to or greater than shown. Do Not Prorate Area Of Coverage. Illustration shows from left to right:

Kernel A: Bleached Tannin (brown seed coat).

Kernel B: Bleached Tannin (white seed coat).

Kernel C: Cross-sectioned Tannin Kernel, dark testa layer and white starch.

Kernel D: Cross-sectioned weathered sorghum, shows absence of testa layer and purplish/ creamy appearance.

Note: Sorghum kernels exposed to mold, insect, weather, or stress may exhibit similar dark spots depicted on kernels A and B. If this condition exists, it may be necessary to cross-section a questionable kernel to verify it is Tannin.

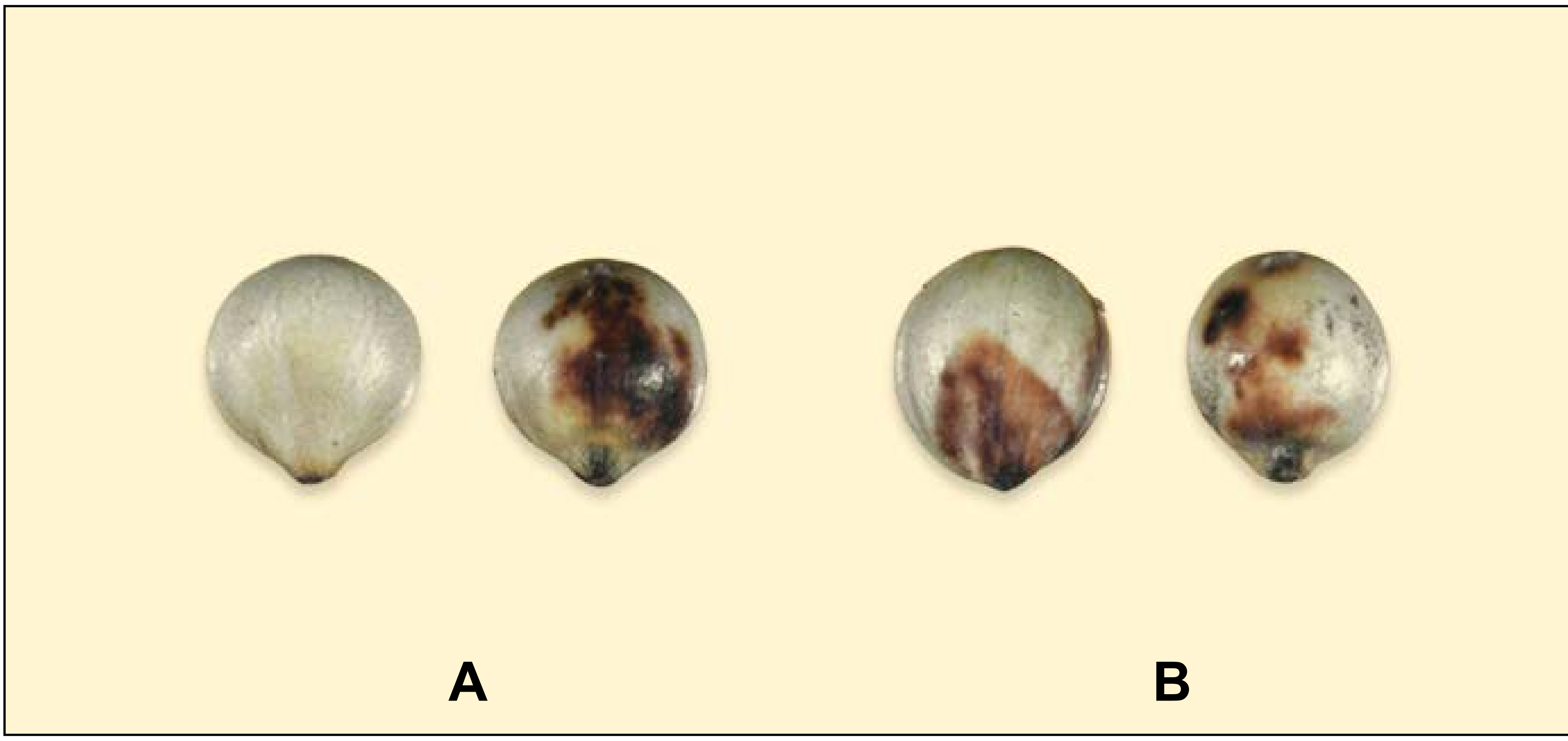
INSECT BORED DAMAGE

Portion for Analysis: Approximately 15 grams

Kernels which have been bored or tunneled by insects.

Note: Insect chewed kernels or pieces of kernels are not considered damage. Pin holes in the germ area are considered damage.

DO NOT lift the seed coat for further examination. Insect damage is determined before bleaching. However, if a kernel of insect damage is found after bleaching, it is considered damaged.



WHITE SORGHUM

Portion for Analysis: Approximately 15 grams

Sorghum with white or translucent pericarps containing spots which singularly, or in combination, cover 25 percent or less of the kernel.

Kernel A. Single spot with 25% or less total coverage.

Kernel B. Combination spots (front & back) with 25% or less total coverage.

BADLY WEATHERED (Sorghum,Tannin, White)
Portion for Analysis: sample as a whole

Badly weathered sorghum has been discolored by adverse weather conditions, giving a badly gray and/or blackened appearance to mixtures of sorghum/tannin and white sorghum. When sorghum is found to be badly weathered the sorghum shall not be graded higher than U.S. Sample Grade and the words “Badly Weathered” shall be recorded on the pan ticket and official inspection certificate.

BADLY WEATHERED (Sorghum,Tannin)
Portion for Analysis: sample as a whole

Badly weathered sorghum has been discolored by adverse weather conditions, giving a badly gray and/or blackened appearance to sorghum or tannin sorghum. When sorghum is found to be badly weathered the sorghum shall not be graded higher than U.S. Sample Grade and the words “Badly Weathered” shall be recorded on the pan ticket and official inspection certificate.

BADLY WEATHERED (White)
Portion for Analysis: sample as a whole

Badly weathered sorghum has been discolored by adverse weather conditions, giving a badly gray and/or blackened appearance to white sorghum. When sorghum is found to be badly weathered the sorghum shall not be graded higher than U.S. Sample Grade and the words “Badly Weathered” shall be recorded on the pan ticket and official inspection certificate.

DISTINCTLY DISCOLORED (Sorghum,Tannin, White)
Portion for Analysis: sample as a whole

Distinctly discolored sorghum has been discolored by adverse weather conditions, giving a badly gray and/or blackened appearance to mixtures of sorghum/tannin and white sorghum. When sorghum is found to be distinctly discolored, the sorghum shall not be graded higher than U.S. No. 3, and the words “Distinctly Discolored” shall be recorded on the pan ticket and official inspection certificate.

DISTINCTLY DISCOLORED (Sorghum,Tannin)
Portion for Analysis: sample as a whole

Distinctly discolored sorghum has been discolored by adverse weather conditions, giving a badly gray and/or blackened appearance to mixtures of sorghum/tannin and white sorghum. When sorghum is found to be distinctly discolored, the sorghum shall not be graded higher than U.S. No. 3, and the words “Distinctly Discolored” shall be recorded on the pan ticket and official inspection certificate.

DISTINCTLY DISCOLORED (White)
Portion for Analysis: sample as a whole

Distinctly discolored sorghum has been discolored by adverse weather conditions, giving a badly gray and/or blackened appearance to mixtures of sorghum/tannin and white sorghum. When sorghum is found to be distinctly discolored, the sorghum shall not be graded higher than U.S. No. 3, and the words “Distinctly Discolored” shall be recorded on the pan ticket and official inspection certificate.

SOYBEANS

Definition of soybeans

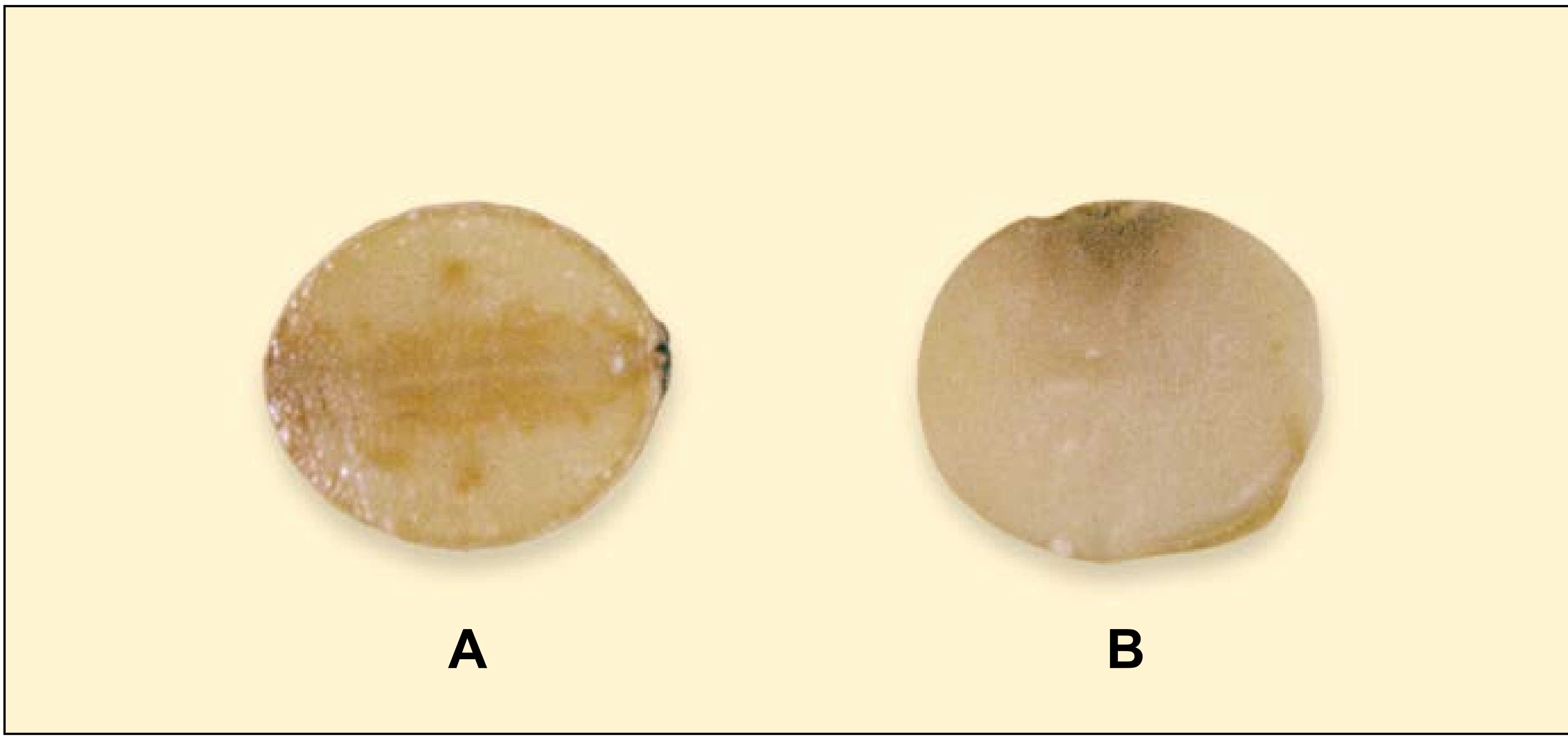
Grain that consists of 50 percent or more of whole or broken soybeans (Glycine max (L.) Merr.) that will not pass through an 8/64 round-hole sieve and not more than 10.0 percent of other grains for which standards have been established under the United States Grain Standards Act.

BADLY GROUND AND/OR WEATHER DAMAGE

Portion for Analysis: Approximately 125 grams

Soybeans and pieces of soybeans in which the seed coats are discolored to the extent that the area of coverage and intensity is equal to or greater than shown. Soybeans that have a discolored area(s) which does not meet the minimum coverage requirement may be considered damage provided the degree of discoloration is greater than shown and the overall “prorated” appearance meets the minimum coverage and intensity level depicted. For example, when the degree of discoloration is twice that shown, the required area of coverage can be reduced by one half.

NOTE: The discoloration may appear on one or both sides of the soybean. Affected soybeans may also be elongated and/or misshapen.



DAMAGED BY HEAT

Portion for Analysis: Approximately 125 grams

Soybeans and pieces of soybeans which have been damaged by heat and the area of coverage and intensity is equal to or greater than shown. Cross-sectioned or pieces of soybeans that have a discolored area(s) which does not meet the minimum coverage requirement may be considered damage provided the degree of discoloration is greater than shown and the overall "prorated" appearance meets the minimum coverage and intensity level depicted. For example, when the degree of discoloration is twice that shown, the required area of coverage can be reduced by one half.

NOTE: The discoloration may appear on one or both sides of the soybean. Affected soybeans may also be elongated and/or misshapen.

A. CROSS-SECTIONED WHOLE SOYBEAN
1. Only half cross-sectioned soybean must meet the VRI.

B. SPLIT SOYBEAN
1. Examine the flat side of the split.
2. Do not cross-section splits and pieces of soybeans.

FROST DAMAGE (WAXY)

Portion for Analysis: Approximately 125 grams

Soybeans and pieces of soybeans which have a glassy, wax-like appearance. The color of affected soybeans may vary provided the color intensity is equal to or greater than shown. Cross-sectioned or pieces of soybeans that have a discolored area(s) which does not meet the minimum coverage requirement may be considered damage provided the degree of discoloration is greater than shown and the overall “prorated” appearance meets the minimum coverage and intensity level depicted. For example, when the degree of discoloration is twice that shown, the required area of coverage can be reduced by one half.

NOTE: Only half of the cross-sectioned soybean must meet the VRI. Do not cross-section splits and pieces of soybeans. Examine the flat side of the split.

GREEN DAMAGE

Portion for Analysis: Approximately 125 grams

Soybeans and pieces of soybeans that are discolored green with an area of coverage and intensity equal to or greater than shown. Cross-sectioned or pieces of soybeans that have a discolored area(s) which does not meet the minimum coverage requirement may be considered damage provided the degree of discoloration is greater than shown and the overall “prorated” appearance meets the minimum coverage and intensity level depicted. For example, when the degree of discoloration is twice that shown, only half of the surface area needs to be discolored.

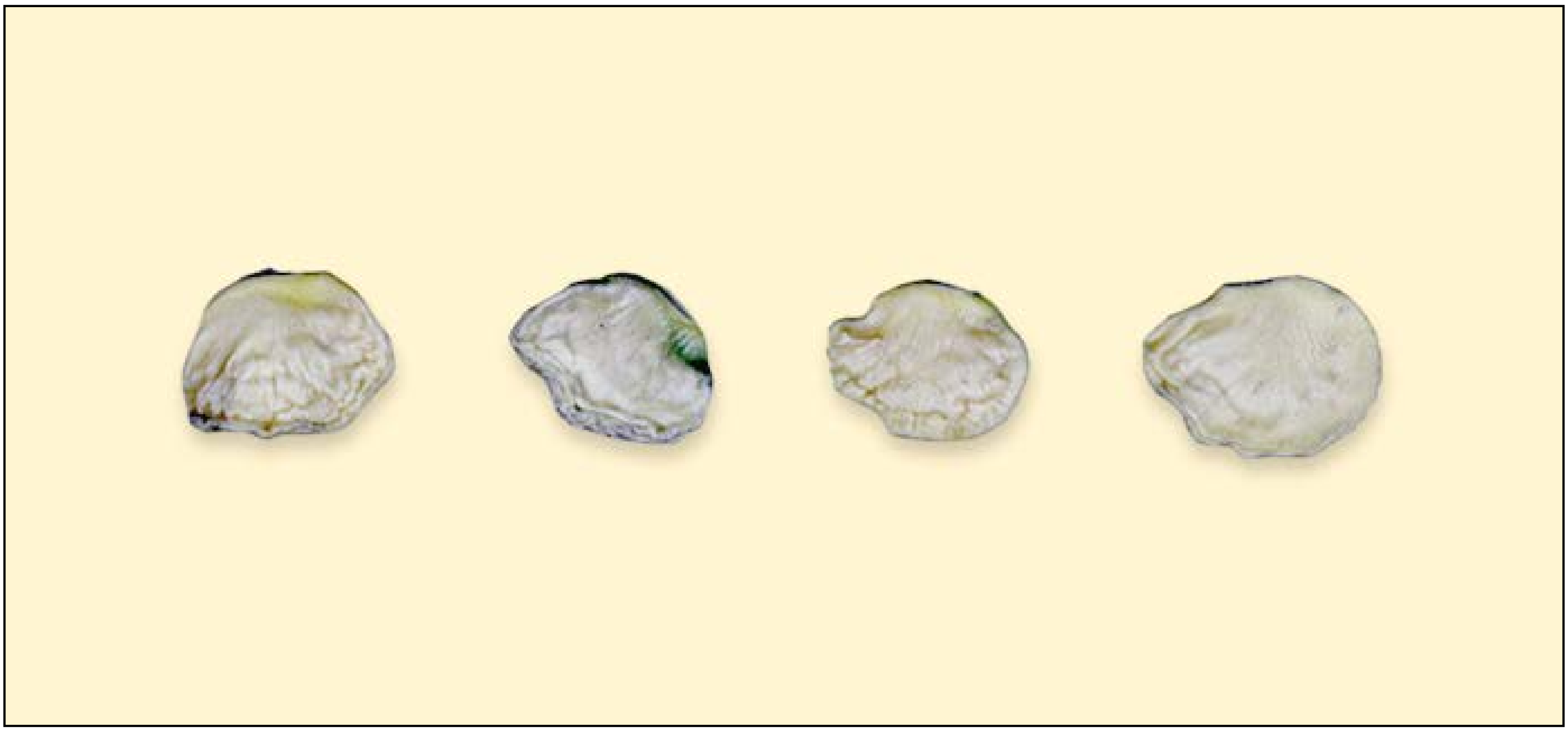
NOTE: Only half of the cross-sectioned soybean must meet the VRI. Do not cross-section splits and pieces of soybeans. Examine the flat side of the split.

HEAT DAMAGE(MATERIALLY DAMAGED/HEATING)

Portion for Analysis: Approximately 125 grams

Soybeans and pieces of soybeans which are materially discolored and damaged by heat with an area of coverage and intensity equal to or greater than shown. Cross-sectioned or pieces of soybeans that have a discolored area(s) which does not meet the minimum coverage requirement may be considered damage provided the degree of discoloration is greater than shown and the overall “prorated” appearance meets the minimum coverage and intensity level depicted. For example, when the degree of discoloration is twice that shown, the required area of coverage can be reduced by one half.

NOTE: Only half of the cross-sectioned soybean must meet the VRI. Do not cross-section splits and pieces of soybeans. Examine the flat side of the split.



IMMATURE (WAFER)

Portion for Analysis: Approximately 125 grams

Soybeans and pieces of soybeans which are immature and have a thin, flat, wrinkled, or wafer like appearance. Immature soybeans are considered sound unless otherwise damage.

NOTE: If cross-sectioned wafers do not contain endosperm (meat), they are considered damaged.

STINKBUG OR INSECT STUNG KERNELS

Portion for Analysis: Approximately 125 grams

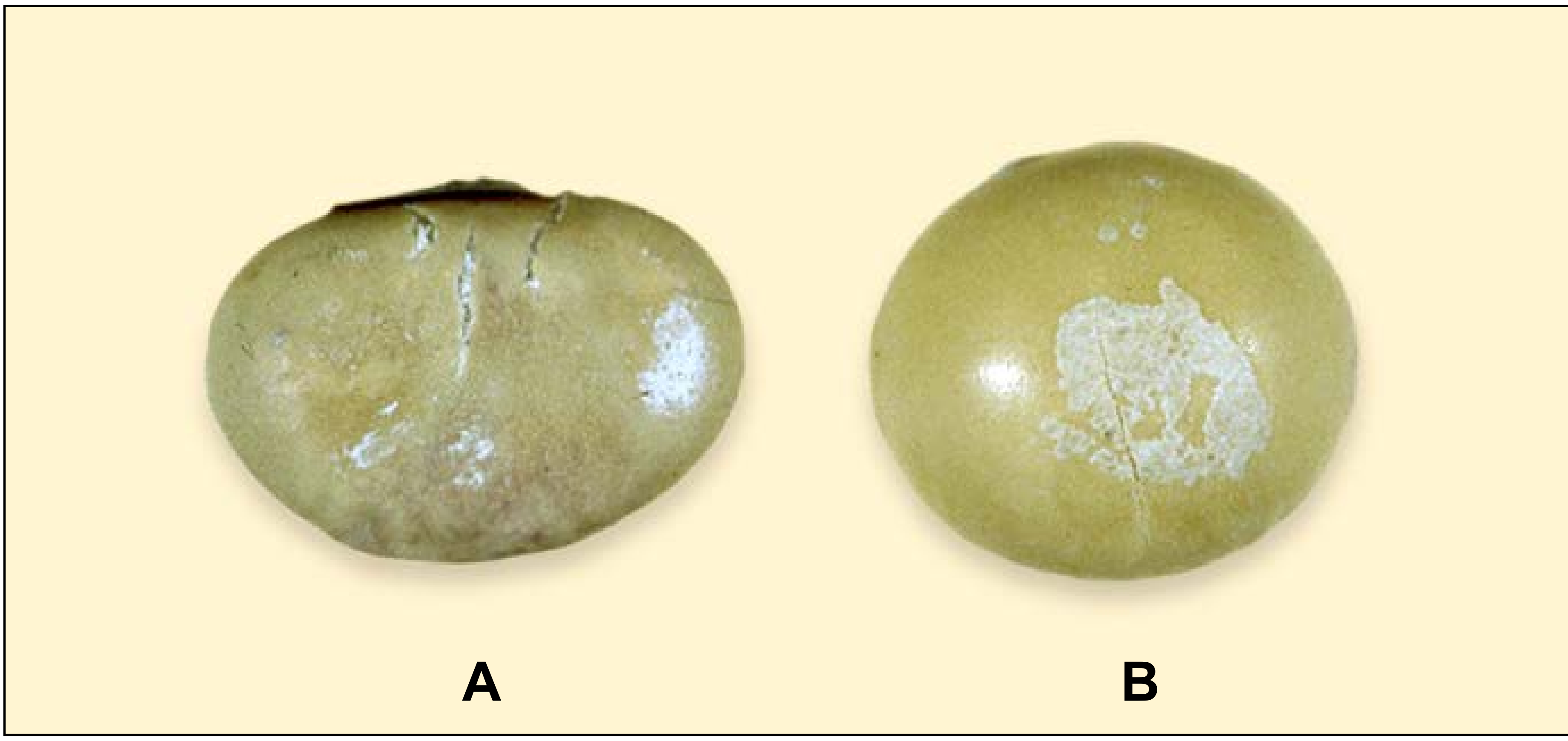
Soybeans or pieces of soybeans which show an indentation or discoloration on the seed coat. To determine the extent of damage, it is generally necessary to cross-section the soybean.

1. The top row contains confirmed stinkbug or insect stung soybeans. The third kernel from the left represents the minimum discoloration/damage requirement.

2. The bottom row contains suspected stinkbug or insect stung soybeans.

Splits and pieces of soybeans may be cross-sectioned to determine damage. Cross-section soybean at the suspected area. If a kernel is otherwise damaged, it functions as other damage.

NOTE: Stinkbug damage is one-fourth of the actual damage.



MOLD DAMAGE

Portion for Analysis: Approximately 125 grams

Soybean A: INVADED BY MOLD
Soybeans that are discolored, elongated, or misshapen, and contain white or gray mold on the seed coat equal to or greater than combined amounts shown. Seed coats may be split or cracked.

Soybean B: SURFACE MOLD GROWTH
Soybeans with little or no apparent deterioration having a milky white or grayish crusty growth caused by downy mildew. Seed coat is not discolored and contains no splits, cracks, or fissures. Soybeans that contain mildew on 50 percent or more of the seed coat in sufficient concentration to meet or exceed the minimum shown shall be considered damage.

NOTE: Soybeans and pieces of soybeans containing mold which penetrates the seed coat, regardless of amount, are damaged.

MOLD DAMAGE (PINK)

Portion for Analysis: Approximately 125 grams

Soybeans and pieces of soybeans that exhibit a pink discoloration (caused by fungal activity) on the seed coat with an area of coverage and intensity equal to or greater than shown. Soybeans that have a discolored area(s) which does not meet the minimum coverage requirement may be considered damage provided the degree of discoloration is greater than shown and the overall “prorated” appearance meets the minimum coverage and intensity level depicted. For example, when the degree of discoloration is twice that shown, the required area of coverage can be reduced by one half.

NOTE: The pink discoloration may appear on one or both sides of the soybean. **DO NOT** confuse the pink fungus with pokeberry juice stains, treated, or purple mottled soybeans.

A B C

SOYBEANS OF OTHER COLORS

Portion for Analysis: Approximately 125 grams

Soybeans that have green, black, brown, or bicolored seed coats. Soybeans that have green seed coats will also be green in cross-section. Bicolored soybeans have seed coats of two colors: yellow and brown, black, or greenish-grey. The non-yellow color must cover at least 50 percent of the seed coat (disregard the hilum) to meet the minimum coverage requirments.

Illustration shows, from left to right, the minimum requirement for bicolored soybeans:

Kernel A: Brown bicolored soybeans.

Kernel B: Yellow soybeans (for comparison purposes only).

Kernel C: Black or greenish-grey bicolored soybeans.

NOTE: When applicable, soybeans of other colors (SBOC) shall function as damaged or splits when analyzed on the same portion. Like whole soybeans, splits require 50 percent or more coverage to function as SBOC.

SHRIVELED AND WRINKLED

Portion for Analysis: Approximately 125 grams

Whole, sound soybeans passing through a 10/64” x 3/4” slotted sieve, and remaining on top of a 8/64” round-hole sieve that are wrinkled to the minimum extent shown are considered shriveled and wrinkled.

SPROUT DAMAGE

Portion for Analysis: Approximately 125 grams

Soybeans and pieces of soybeans in which the sprout protrudes from the seed coat equal to or greater than shown are considered damage.

NOTE: On the soybean illustrated, the sprout has emerged from the seed coat and extends toward the upper end of the hilum.

WEATHER DAMAGE (GRAY/BLACK)

Portion for Analysis: Approximately 125 grams

Soybeans that contain Gray/Black discoloration on the seed coat with the area of coverage and intensity equal or greater than shown are considered damaged.

Soybeans that have a discolored area(s) which does not meet the minimum coverage requirement may be considered damage provided the degree of discoloration is greater than shown and the overall “prorated” appearance meets the minimum coverage and intensity level depicted. For example, when the degree of discoloration is twice that shown, the required area of coverage can be reduced by one half.

NOTE: The discoloration may appear on one or both sides of the soybean.

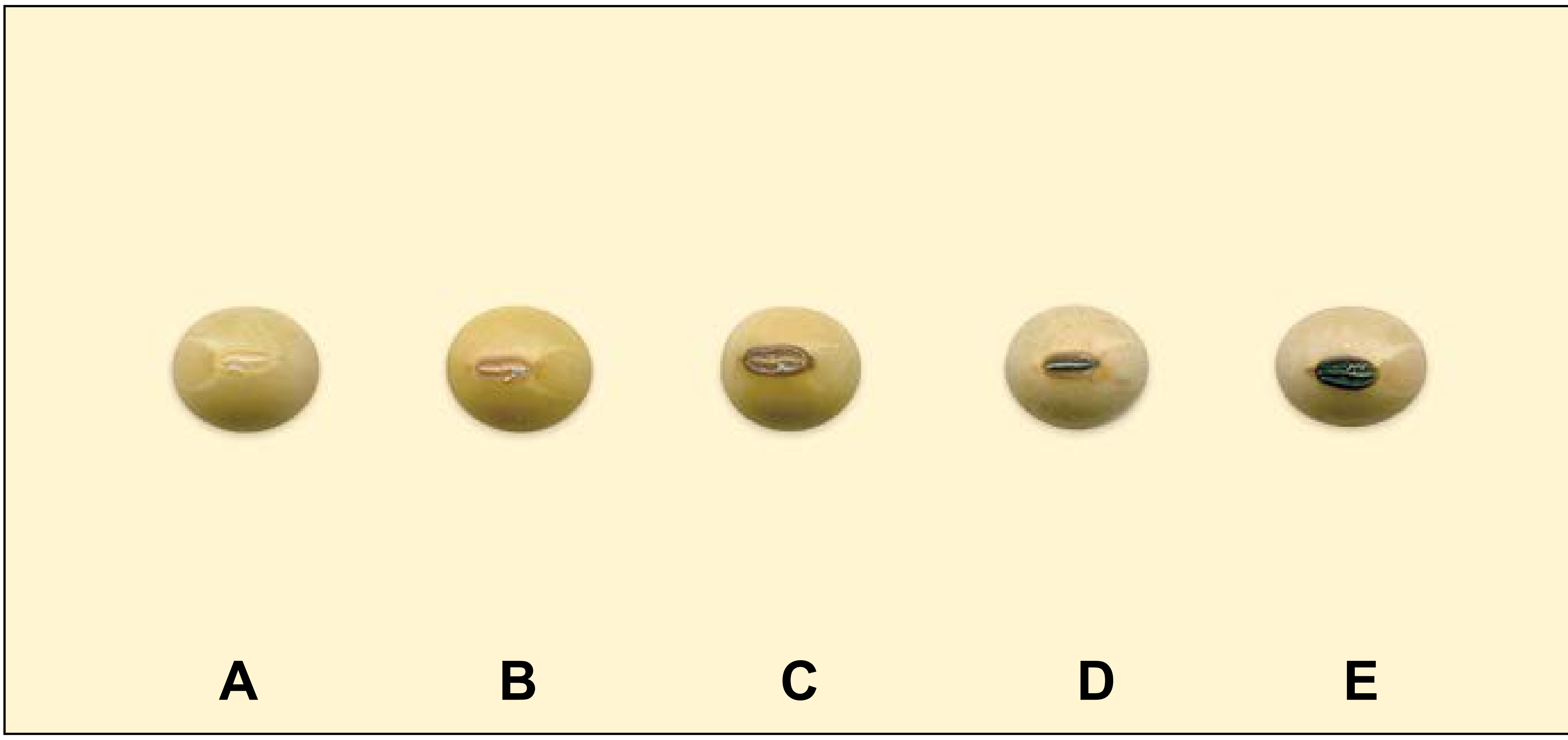
DO NOT confuse discolored soybeans with soybeans containing pigmented streaks or blotches that are considered soybeans of other colors.
(VRI SB-12.0).

INSECT BORED KERNELS

Portion for Analysis: Approximately 125 grams

Soybeans and pieces of soybeans in which the seed coats are discolored to the extent that the area of coverage and intensity is equal to or greater than shown. Soybeans that have a discolored area(s) which does not meet the minimum coverage requirement may be considered damage provided the degree of discoloration is greater than shown and the overall “prorated” appearance meets the minimum coverage and intensity level depicted. For example, when the degree of discoloration is twice that shown, the required area of coverage can be reduced by one half.

NOTE: The discoloration may appear on one or both sides of the soybean. Affected soybeans may also be elongated and/or misshapen.



WHITE HILUM

Portion for Analysis: Approximately 125 grams

HILUM COLOR :

Soybean A: white, yellow, clear*

Soybean B: buff

Soybean C: brown

Soybean D: imperfect black

Soybean E: black

*These descriptors are used interchangeably and represent the only hilum color considered a "white hilum" soybean.

NOTE: For information purposes only.

MOTTLED OR STAINED (POKEBERRY)
Portion for Analysis: sample as a whole

Soybeans with seed coats discolored by pokeberry stain shall be considered purple mottled or stained. Graded lots of soybeans meeting the criteria for purple mottled or stained are to be qualified on the pan ticket and certificate with he special grade designation “Purple Mottled or Stained”.

MOTTLED OR STAINED (FUNGUS)
Portion for Analysis: sample as a whole

Soybeans with pink or purple seed coats shall be considered purple mottled or stained. This discoloration is caused by the growth of a fungus and may cover all or part of the kernel. Graded lots of soybeans meeting the criteria for purple mottled or stained are to be qualified on the pan ticket and certificate with he special grade designation “Purple Mottled or Stained”.

MOTTLED OR STAINED (DIRT)
Portion for Analysis: sample as a whole

Soybeans with seed coats discolored by pokeberry stain shall be considered purple mottled or stained. Graded lots of soybeans meeting the criteria for purple mottled or stained are to be qualified on the pan ticket and certificate with he special grade designation “Purple Mottled or Stained”.

SUNFLOWER SEED

Definition of sunflower seed

Grain that, before the removal of foreign material, consists of 50.0 percent or more of cultivated sunflower seed (Helianthus annuus L.) and not more than 10.0 percent of other grains for which standards have been established under the United States Grain Standards Act.

DAMAGE BY HEAT

Portion for Analysis: Approximately 30 grams

Kernels and pieces of kernels with both sides as dark or darker than the kernel shown shall be damaged.

HEAT DAMAGE

Portion for Analysis: Approximately 30 grams

Kernels and pieces of kernels with both sides as dark or darker than the kernel shown shall be heat damaged.

SURFACE MOLD

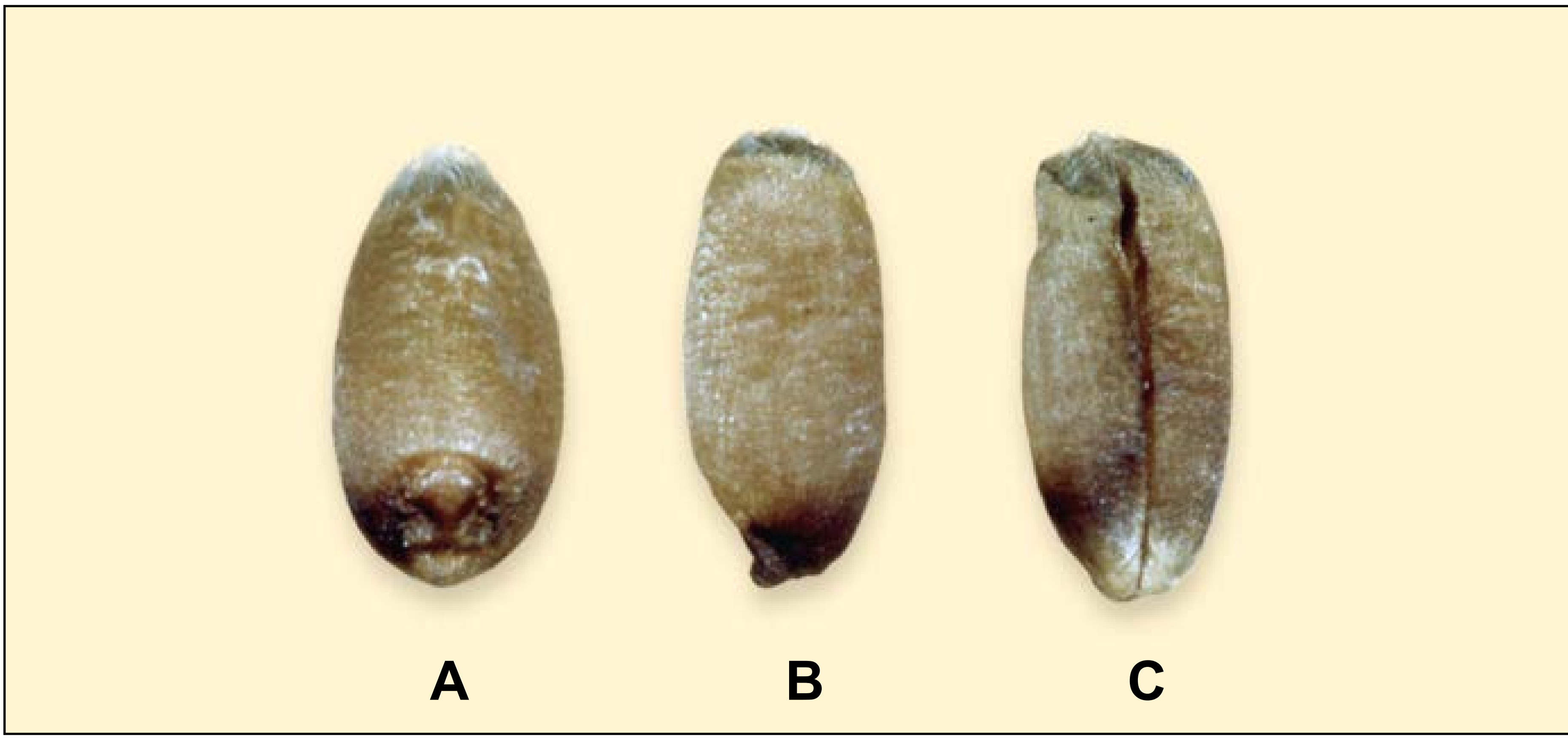
Portion for Analysis: Approximately 30 grams

Sunflower Seeds containing surface mold on one or both sides are considered damaged if the coverage is equal to or greater than the amount of mold shown on both seeds collectively.

WHEAT

Definition of wheat

Grain that, before the removal of dockage, consists of 50 percent or more common wheat (Triticum aestivum L.), club wheat (T. compactum Host.), and durum wheat (T. durum Desf.) and not more than 10 percent of other grains for which standards have been established under the United States Grain Standards Act and that, after the removal of the dockage, contains 50 percent or more of whole kernels of one or more of these wheats.



BLACK TIP DAMAGE (FUNGUS)

Portion for Analysis: Approximately 15 grams

Kernels affected by black tip fungus to the extent that the resulting discoloration extends beyond the germ and continues around at least one cheek and into the crease, thus forming a “continuous band.” All conditions must be met to be considered damage.

Illustration shows from left to right:

Kernel A: The minimum degree of discoloration and amount of coverage required on the germ.

Kernel B: The minimum degree of discoloration required in the “continuous band” that extends around the cheek. The width of the band is irrelevant.

Kernel C: The minimum degree of discoloration required to extend into the crease. The amount of discoloration (area of coverage) is immaterial.

DHV

Portion for Analysis: Approximately 15 grams

Observe the following guidelines when determining dark, hard, and vitreous kernels (DHV) in Hard Red Spring Wheat.

(1) Consider hard red spring kernels which are bleached but are hard, or hard and vitreous as DHV.

(2) Consider hard red spring kernels which have cracks or checks that cause a cloudy or shadowy spot on the kernel but are otherwise dark, hard, and vitreous as DHV.

(3) Consider kernels of Soft Red Winter wheat and Hard Red Winter wheat as DHV when they are dark, hard, and vitreous in texture.

(4) Kernels which are yellow or contain a mottled spot (regardless of size), distinctly green immature kernels, severely affected by scab, sprouted, foreign material, and kernels of Hard White wheat, Unclassed wheat, Soft White wheat, and Durum wheat are not considered DHV.

FROST DAMAGE (DISCOLORED BLACK/BROWN)

Portion for Analysis: Approximately 15 grams

Kernels which are discolored black or brown and have a bleached or blistered appearance with dark lines showing through the sides of the kernels. Also, kernels are completely discolored black or brown.

Illustration shows from left to right:

Kernel A: Bleached kernels which are discolored black.

Kernel B: Kernels which are discolored brown.

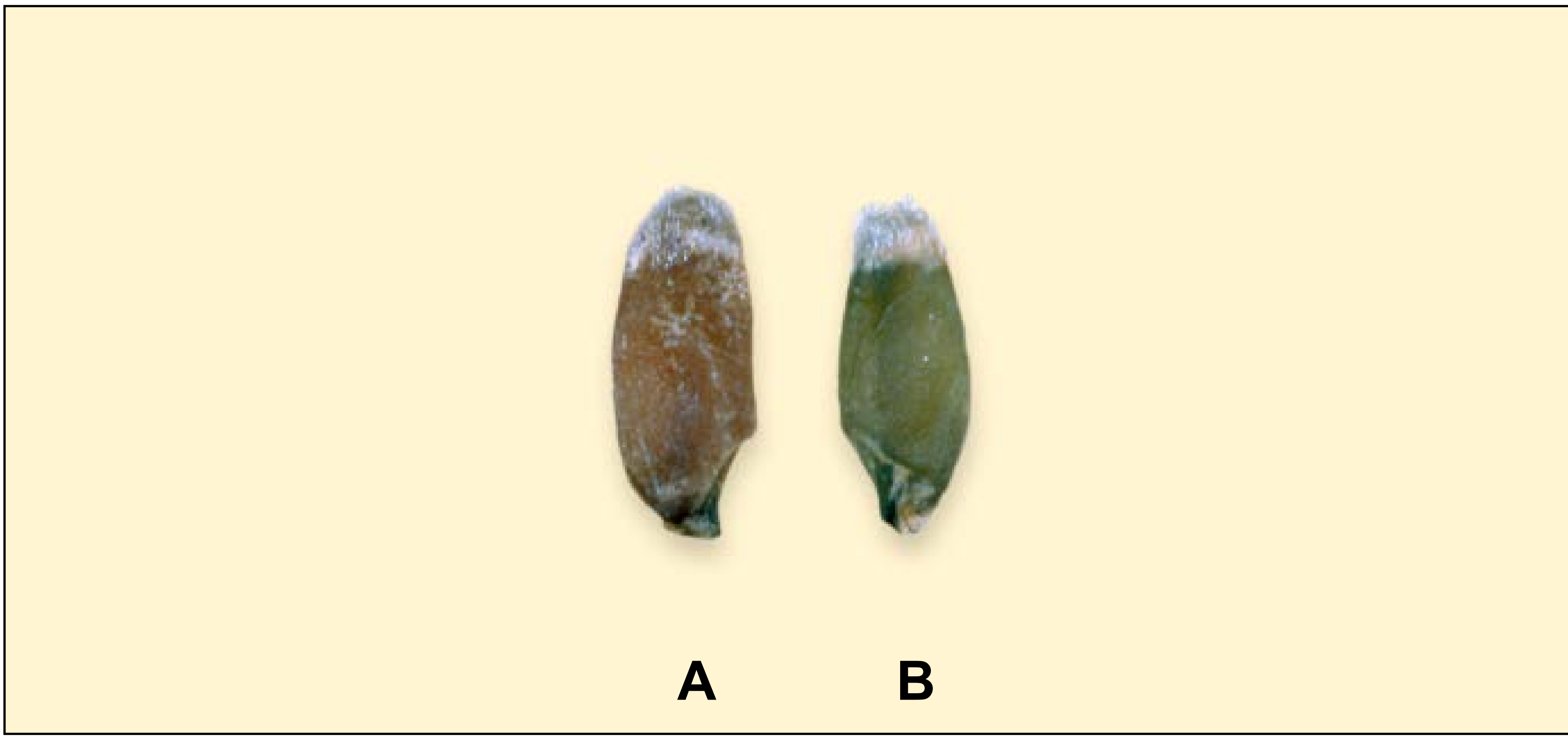
Note: BOTH sides must be discolored equal to or greater than the kernels shown.

FROST DAMAGE (BLISTERED)

Portion for Analysis: Approximately 15 grams

Kernels which have frost blisters extending around the back and into the crease.

Note: Blister and wrinkle effect must be distinct.



FROST DAMAGE (CANDIED)

Portion for Analysis: Approximately 15 grams

Kernels with a wax-like or candied appearance that meet any of the following criteria shall be damage.

Illustration shows from left to right:

Kernel A: Kernel with brown discoloration.

Kernel B: Kernel with green discoloration.

Note: The discoloration on BOTH sides of the kernel must be equal to or greater than shown.

FROST DAMAGE (FLAKED)

Portion for Analysis: Approximately 15 grams

Kernels that have a portion of the bran coat flaked off due to frost. The flaked area singularly or in combination, must be equal to or greater than depicted.

Note: Evidence of frost must be present on suspect kernel(s). Do not confuse with kernels which have bran coat rubbed off due to handling.

GERM DAMAGE (BLEACH METHOD)

Portion for Analysis: Approximately 15 grams

Kernels and pieces of wheat which, after bleaching, have discolored germs that are as dark or darker than shown.

Discolored germs that do not meet the minimum coverage requirement may be considered damage provided the degree of discoloration is greater than shown and the overall “prorated” appearance meets the minimum coverage and intensity level depicted. For example, when the degree of discoloration is twice that shown, only half of the germ area needs to be discolored.

Note: Seed coats that occasionally remain attached to the germ area after bleaching must be carefully removed. Scraping too deeply can destroy the evidence of damage and cause non-uniformity of interpretation.

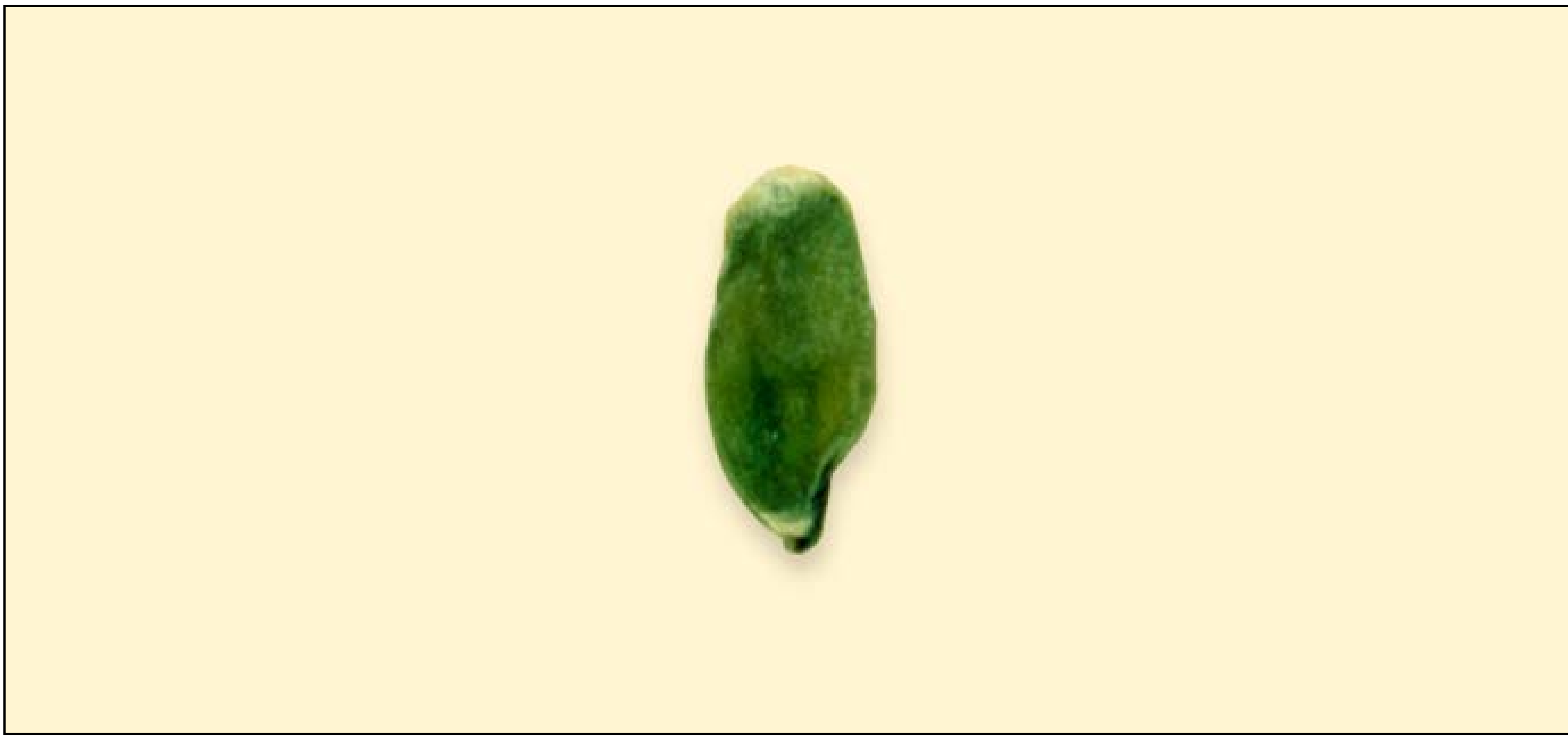
GERM DAMAGE (SCRAPED)

Portion for Analysis: Approximately 15 grams

Kernels and pieces of wheat which have discolored germs that are as dark or darker than shown shall be damage. Scrape the germ carefully to avoid scraping too deeply and destroying the evidence of damage.

Discolored germs that do not meet the minimum coverage requirement may be considered damage provided the degree of discoloration is greater than shown and the overall "prorated" appearance meets the minimum coverage and intensity level depicted.

For example, when the degree of discoloration is twice that shown, only half of the germ area needs to be discolored.

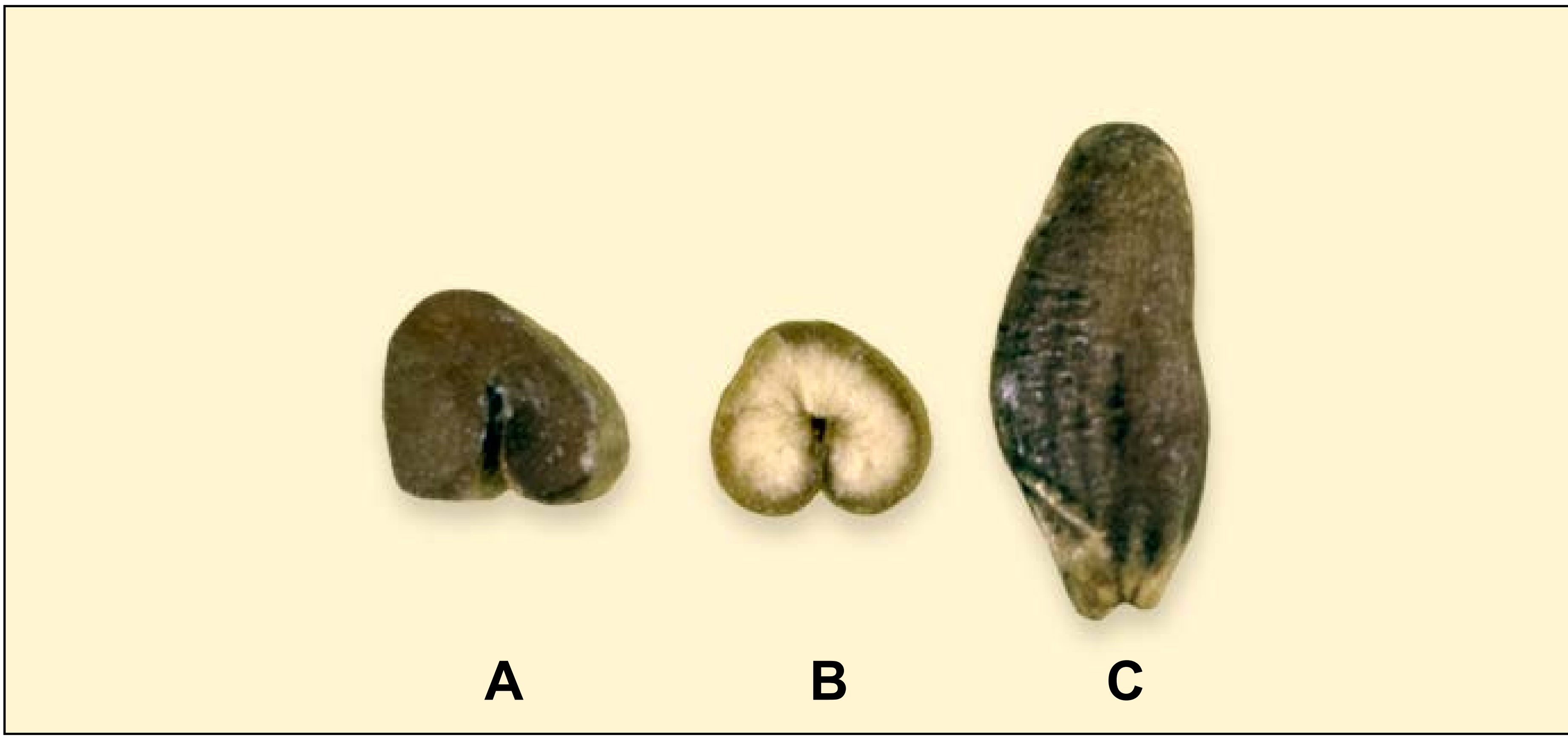


GREEN DAMAGE

Portion for Analysis: Approximately 15 grams

Kernels which are green (immature) in color. The green color must meet the minimum intensity shown on BOTH sides of the kernel. Also, there should be no yellow cast showing through the green.

NOTE: Do not confuse green damaged kernels with candied kernels (VRI W-3.1).



HEAT DAMAGE (DURUM)

Portion for Analysis: Approximately 50 grams

Kernels and pieces of kernels of wheat that are materially discolored to the extent shown. Cross-sectioning of whole kernels may be necessary to confirm that the face of BOTH halves are as dark as shown in Kernel A or B.

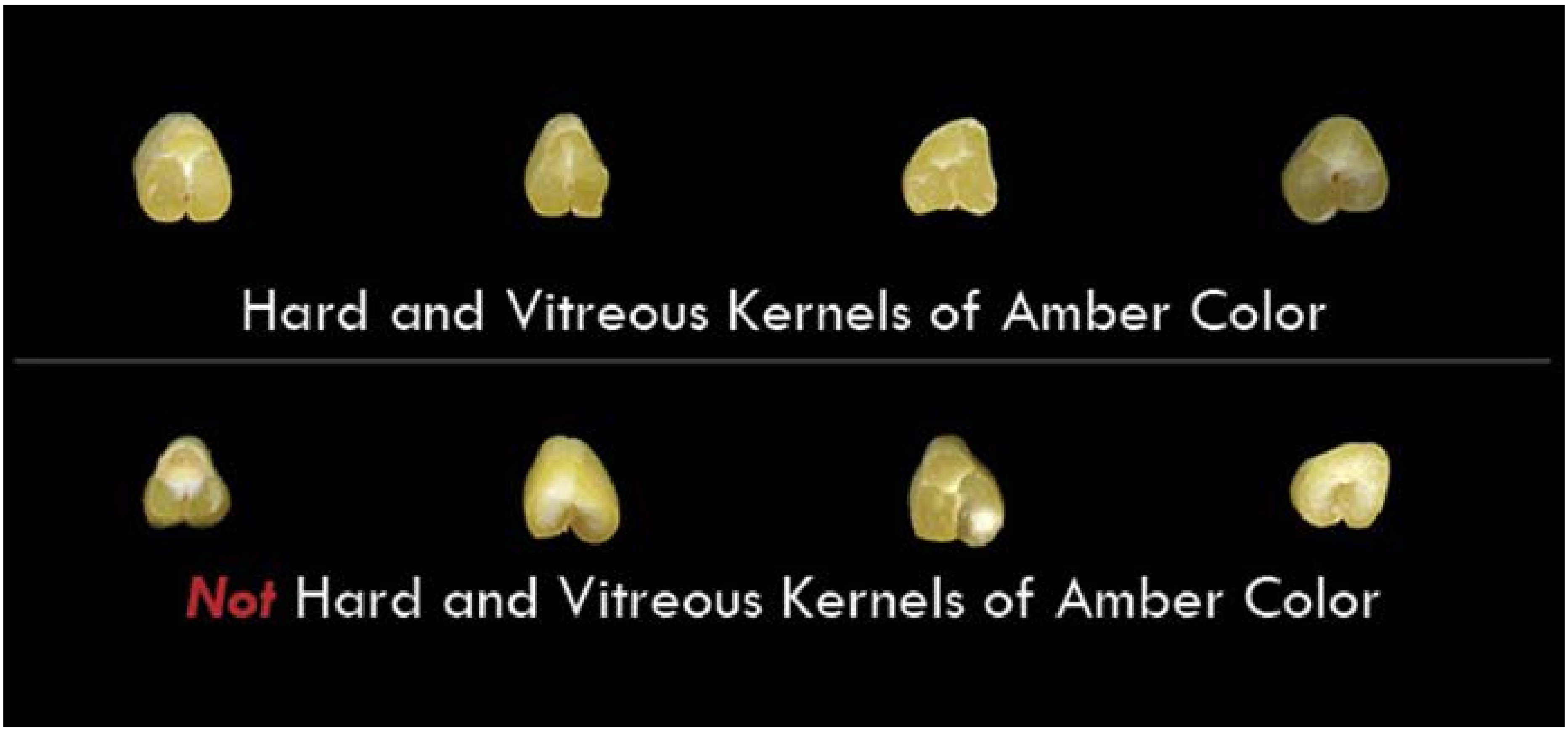
Illustration shows from left to right:

Kernel A: The minimum discoloration for cross-sectioned vitreous kernels.

Kernel B: The minimum discoloration (creamy) for cross-sectioned non-vitreous kernels.

Kernel C: A suspect kernel that requires cross-sectioning.

NOTE: A kernel with a combination of vitreous and creamy discoloration meeting the VRI shall be heat damage.



HVAC

Portion for Analysis: Approximately 15 grams

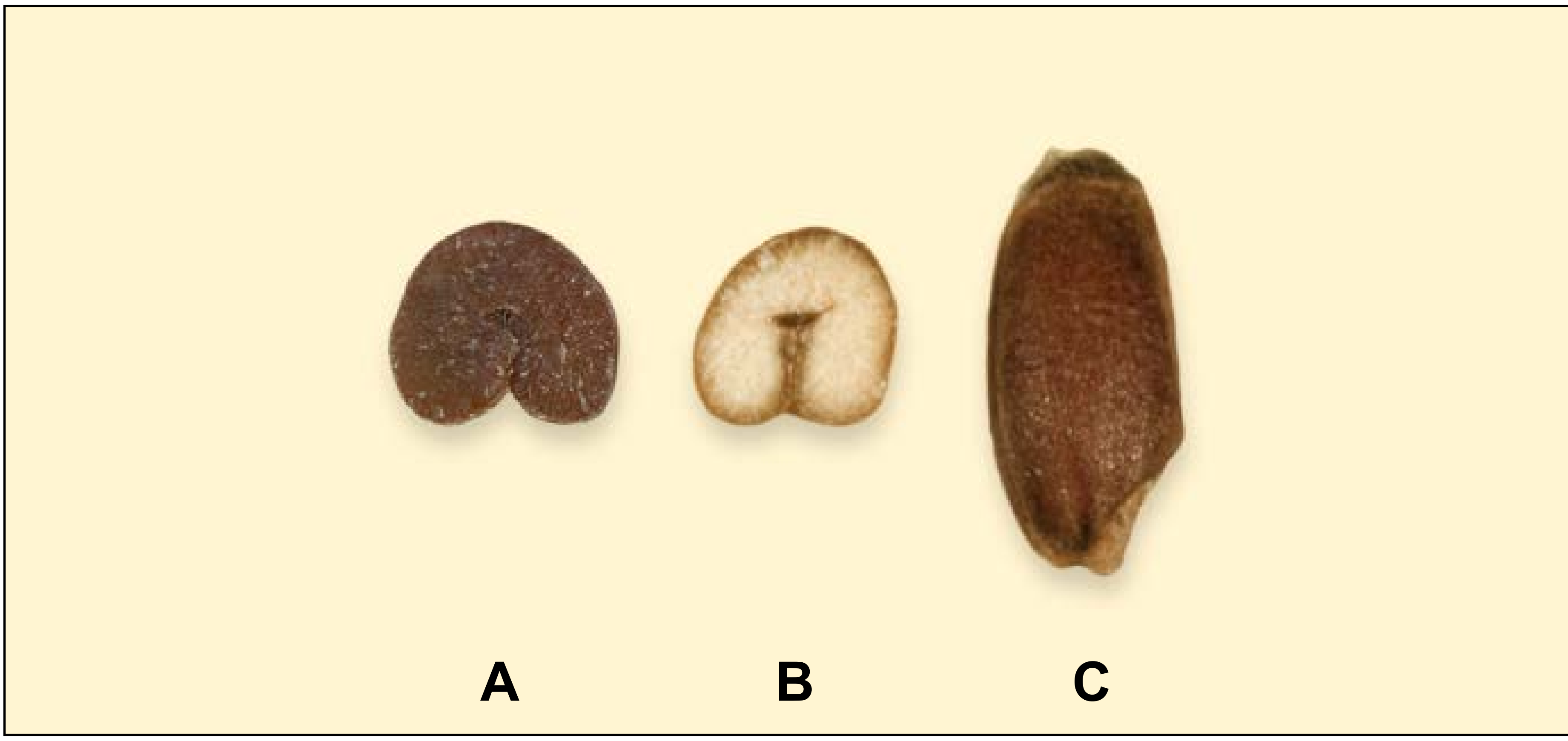
Observe the following guidelines when determining hard and vitreous kernels of amber color (HVAC) in Durum Wheat:

(1) Consider Durum kernels which are bleached but which are hard and vitreous as HVAC.

(2) Consider Durum kernels which have cracks or checks that cause a cloudy or shadowy spot on the kernel but which are otherwise hard and vitreous as HVAC.

(3) Kernels with mottled or chalky spots, regardless of size, are not considered HVAC.

(4) Distinctly green immature kernels, kernels affected by scab, sprouted kernels, foreign material, and all other classes of wheat are not considered HVAC.



HEAT DAMAGE (OTHER THAN DURUM)

Portion for Analysis: Approximately 50 grams

Kernels and pieces of kernels of wheat that are materially discolored to the extent shown. Cross-sectioning of whole kernels may be necessary to confirm that the face of BOTH halves are as dark as shown in Kernel A or B.

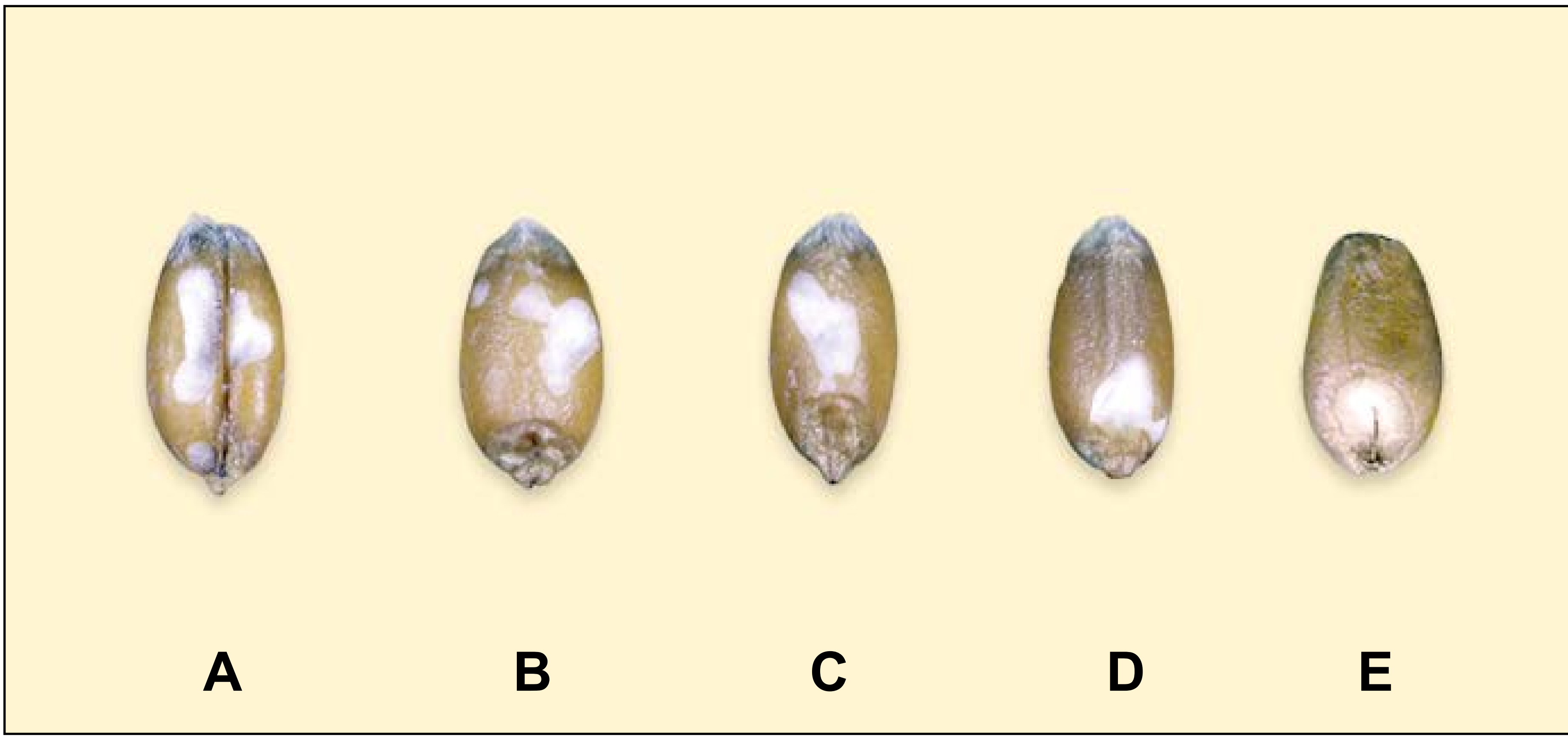
Illustration shows from left to right:

Kernel 1: The minimum discoloration for cross-sectioned vitreous kernels.

Kernel 2: The minimum discoloration (creamy) for cross-sectioned non-vitreous kernels.

Kernel 3: A suspect kernel that requires cross-sectioning.

NOTE: A kernel with a combination of vitreous and creamy discoloration meeting the VRI shall be heat damage.



INSECT CHEWED WHEAT (BUT NOT DAMAGED)

Portion for Analysis: Approximately 15 grams

Illustration shows from left to right:

Kernels A-D: Kernels which are slightly chewed by insects but are otherwise sound.

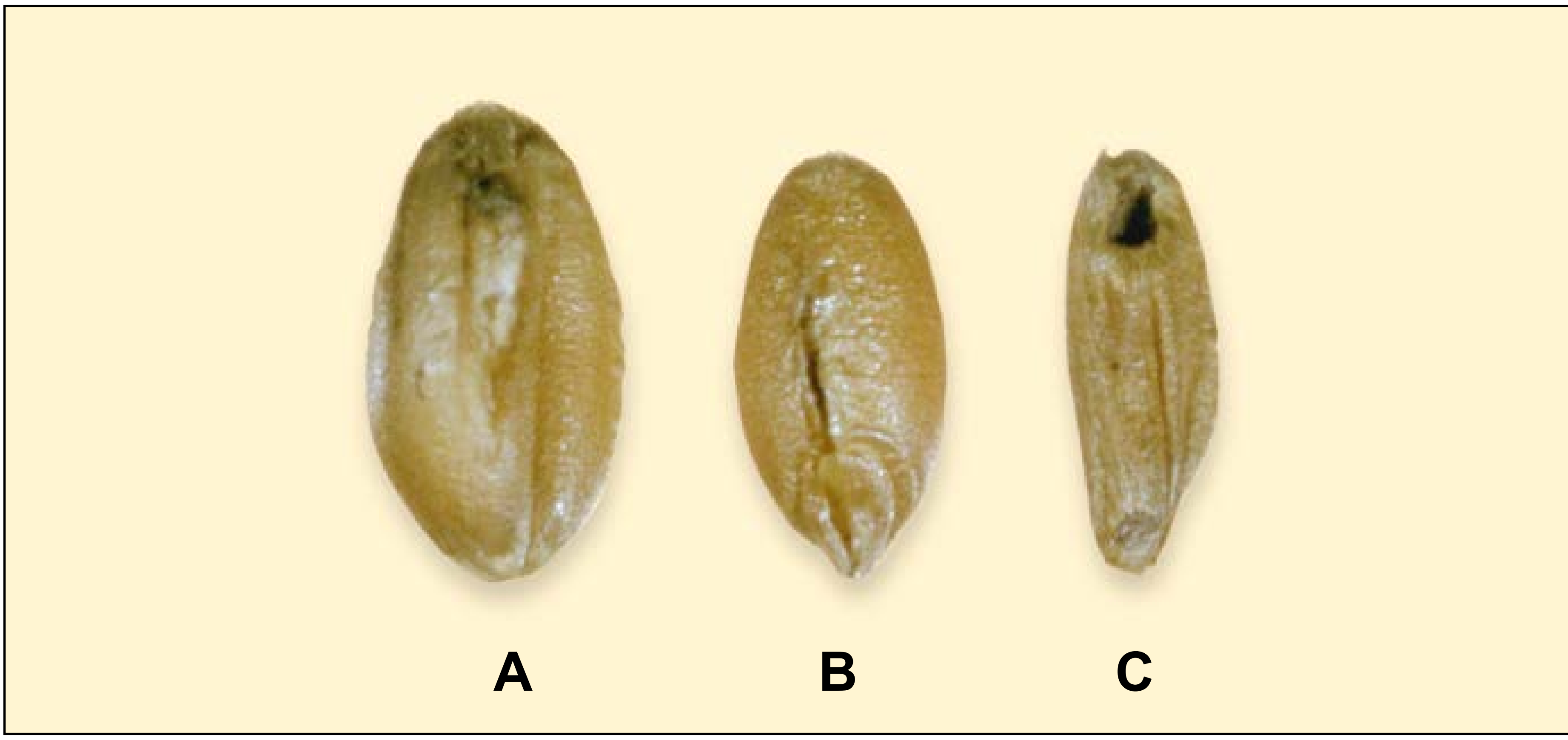
Kernel E: Kernel in which the germ has been chewed are sound unless otherwise damaged. Notice the nice even edge around the germ area and the visible crease.

MOLD DAMAGE

Portion for Analysis: Approximately 15 grams

Kernels containing any amount of mold in the germ or an applicable amount in the crease (illustration shows minimum requirement) shall be damage. Scrape the germ carefully to avoid scraping too deep and destroying the evidence of damage.

NOTE: Mold occurs in many colors.



OTHER DAMAGE (MOLD)

Portion for Analysis: Approximately 15 grams

Kernels which are broken, cracked, or insect chewed and contain distinct mold on the exposed endosperm, regardless of size, are damaged.

Illustration shows from left to right:

Kernel A: Broken kernel containing mold.

Kernel B: Split bran coat containing mold.

Kernel C: Insect chewed kernel containing mold.

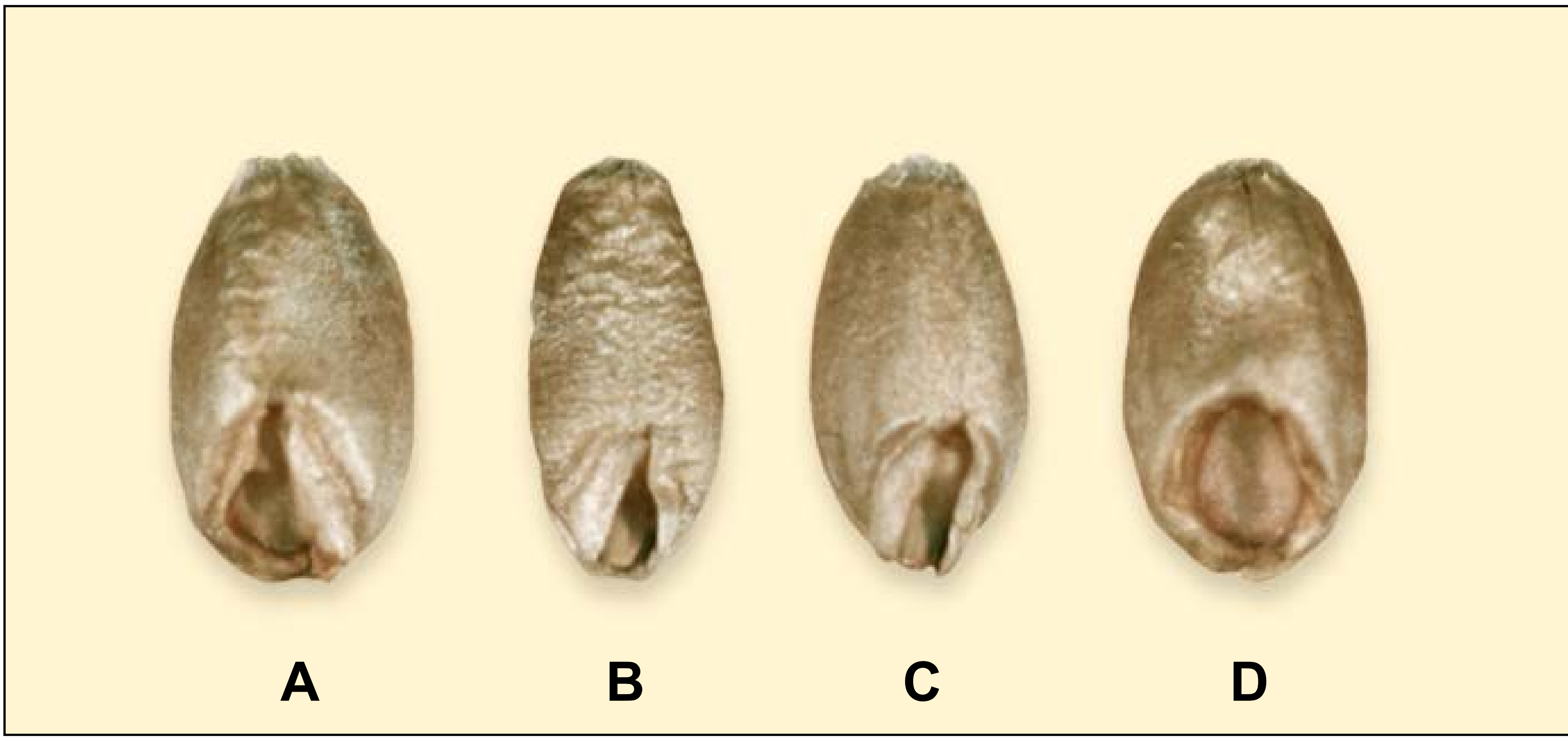
NOTE: Mold occurs in many colors.

SCAB DAMAGE

Portion for Analysis: Approximately 15 grams

Kernels and pieces of wheat which have a dull, lifeless, chalky appearance. To function as scab damage, the entire surface area must meet the minimum appearance criteria shown. Kernels meeting this criteria sometimes contain a pinkish mold.

NOTE: Kernels which do not meet these requirements should be examined for the presence of mold (refer to VRI W-4.1, “MOLD DAMAGE”).



SPROUT DAMAGE

Portion for Analysis: Approximately 15 grams

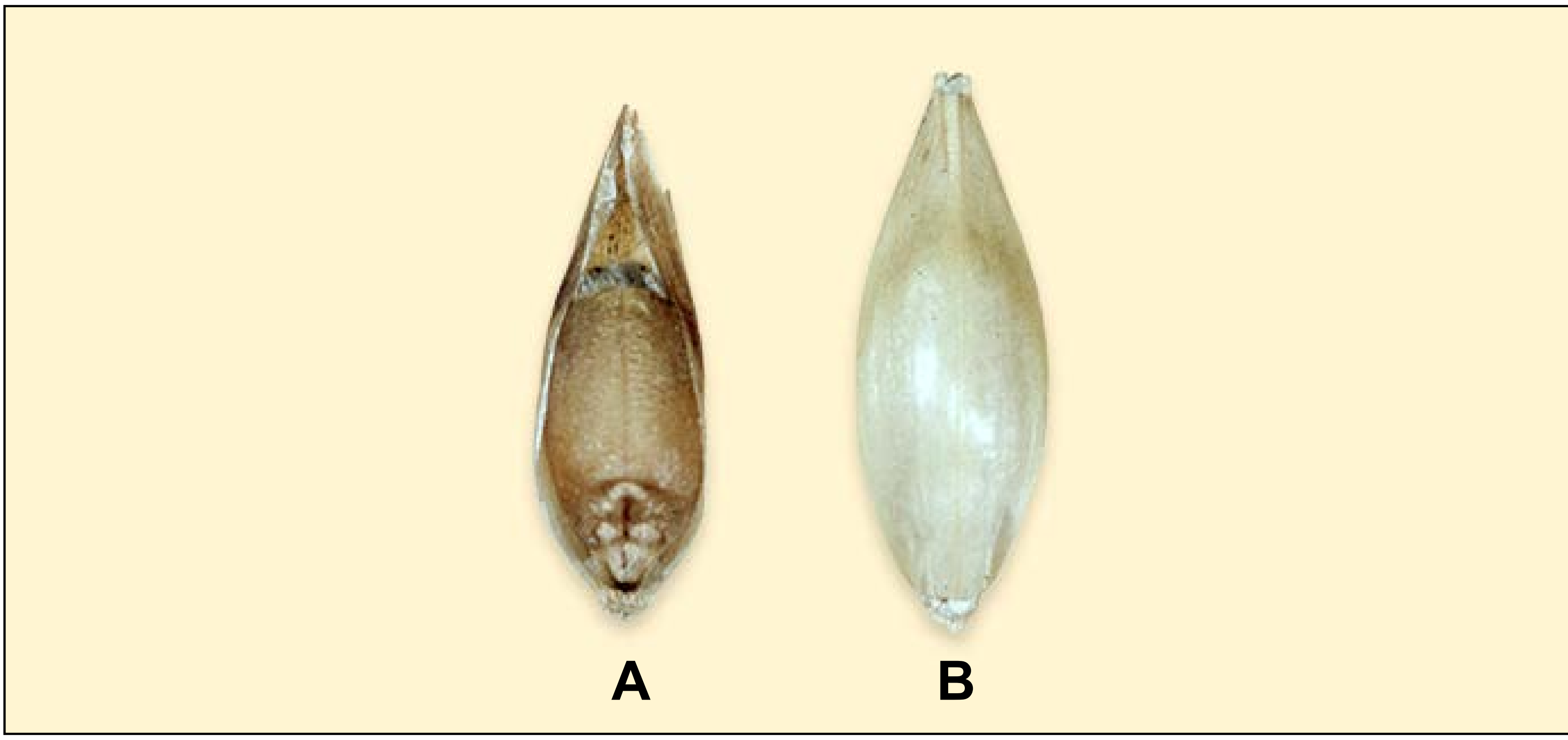
Kernels in which the germ cover has broken open due to germination. The sprout may be intact and visible or, due to handling, may have broken off. The noticeable movement/growth of the "sprout" within the germ area indicates that sprouting has occurred. The "sprout" may move towards the top or bottom of the germ or lift upward leaving space between the sprout and germ cavity. It is not necessary for the "sprout" to extend beyond the germ area to be considered sprout damage. Illustration shows from left to right:

Kernel A: The sprout is broken off leaving part of the germ cover over the socket area.

Kernel B: The germ cover is broken open with a sprout showing at the bottom.

Kernel C: The germ cover is broken open with a sprout showing at the top.

Kernel D: The sprout is broken off leaving no germ cover over the socket area. Sprout sockets typically resembles a "horse collar".



THRESHED & UNTHRESHED KERNELS

Portion for Analysis: Material passing over the riddle

When performing a dockage determination in wheat, threshed kernels that pass over the riddle are not considered dockage. Unthreshed kernels are considered dockage. Kernels with one or less glumes attached shall be considered as threshed kernels. Kernels with more than one glume attached shall be considered as unthreshed kernels. Illustration shows from left to right:

Kernel A: This kernel illustrates a threshed kernel with one glume attached.

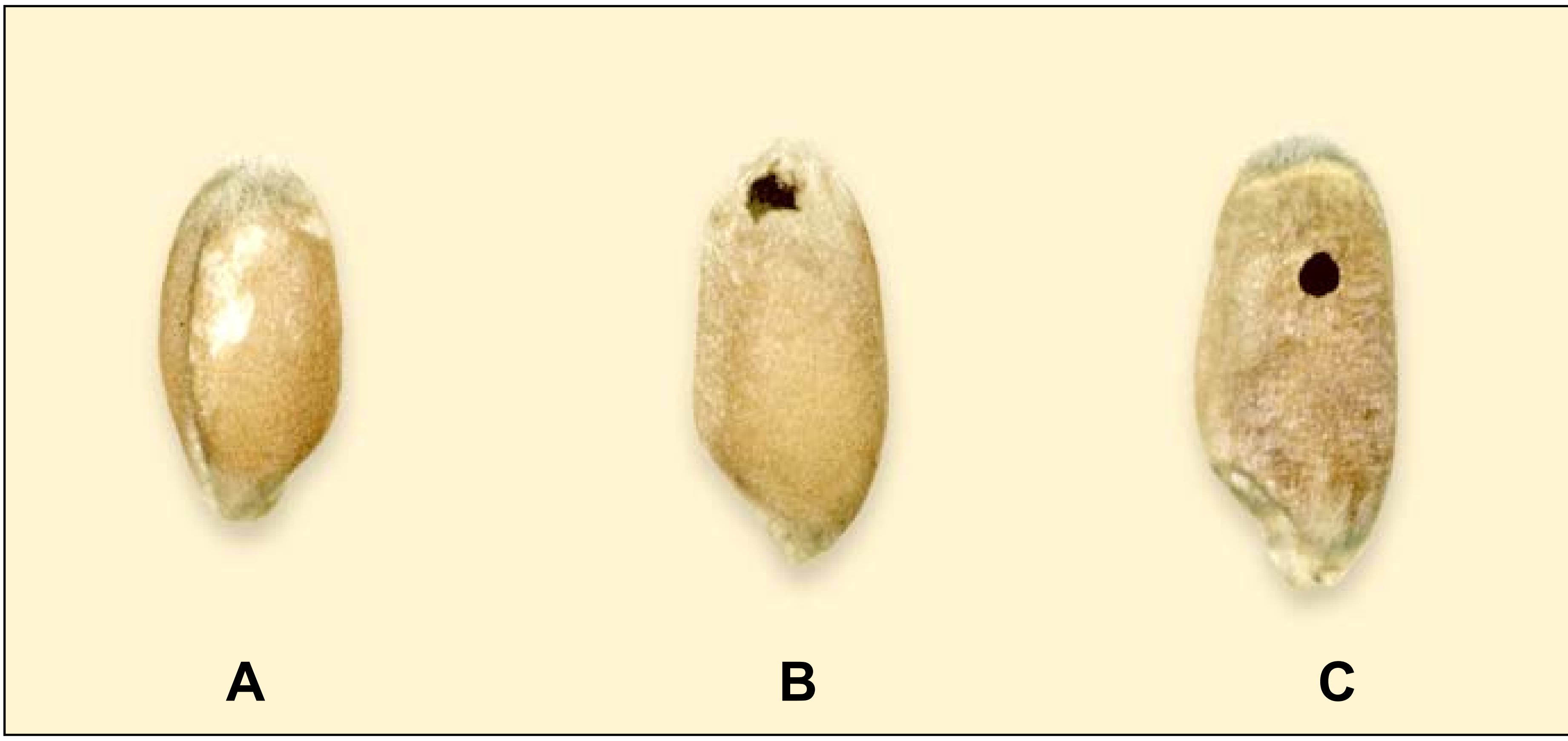
Kernel B: This kernel illustrates an unthreshed kernel with more than one glume attached.

FOREIGN SUBSTANCE (PINK WHEAT)

Portion for Analysis: Sample as a whole

Consider wheat kernels with any discoloration caused by treatment with a fungicide or similar substance as unknown foreign substance. This print illustrates one type of treatment and does not show the amount of coverage. Kernels that contain seed treatment may or may not illuminate under a black light.

NOTE: Some molds will glow under a black light and should not be considered treated seed.



WEEVIL OR INSECT-BORED

Portion for Analysis: Approximately 15 grams

Kernels and pieces of wheat kernels and other grains which have been bored or tunneled by insects are considered damage.

Illustration shows from left to right:

Kernel A: Kernel which has been tunneled.

Kernels B & C: Kernels which have been bored.

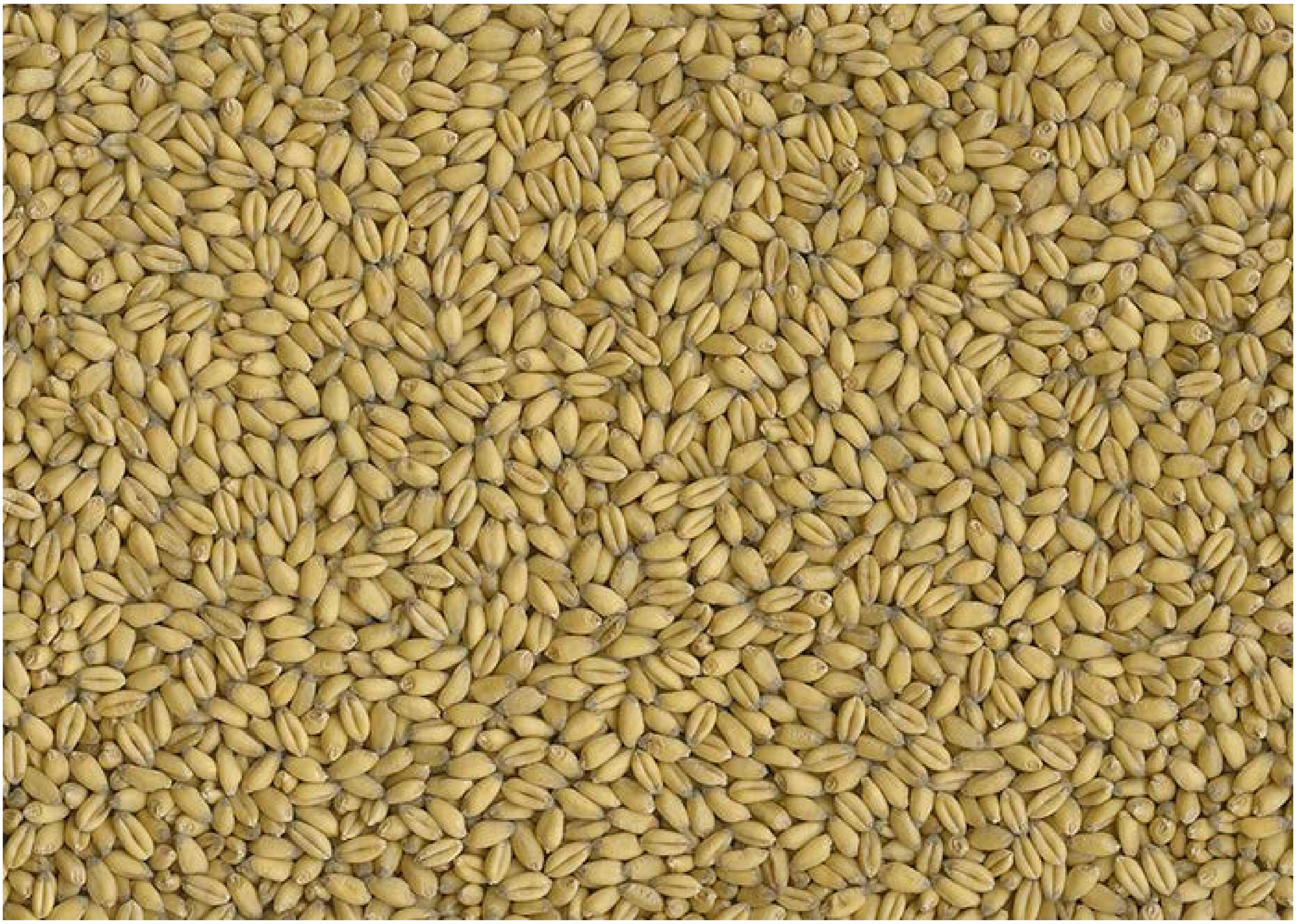
NOTE: Pin holes in the germ area MUST be examined further to determine if penetration extends into the endosperm.

HARD WHITE WHEAT COLOR
Portion for Analysis: sample as a whole

In the U.S., the bran or seed coat color of Hard White wheat (HDWH) varies in color. While this wheat class is widely recognized for its superior milling and baking qualities, to achieve desired milling and baking performance, some domestic and international customers prefer HDWH with a light seed coat color. To provide a basis for communicating color preference to perspective suppliers, customers may request the use of the above visual color standard to distinguish between light and dark colored HDWH. When requested, inspectors will visually examine the market sample, comparing its overall color to that depicted, and will certify in the remarks section of the certificate whether the color meets (as light or lighter) or exceeds (darker) the declared standard.

TAGGED ENDS (SMUT) RED
Portion for Analysis: sample as a whole

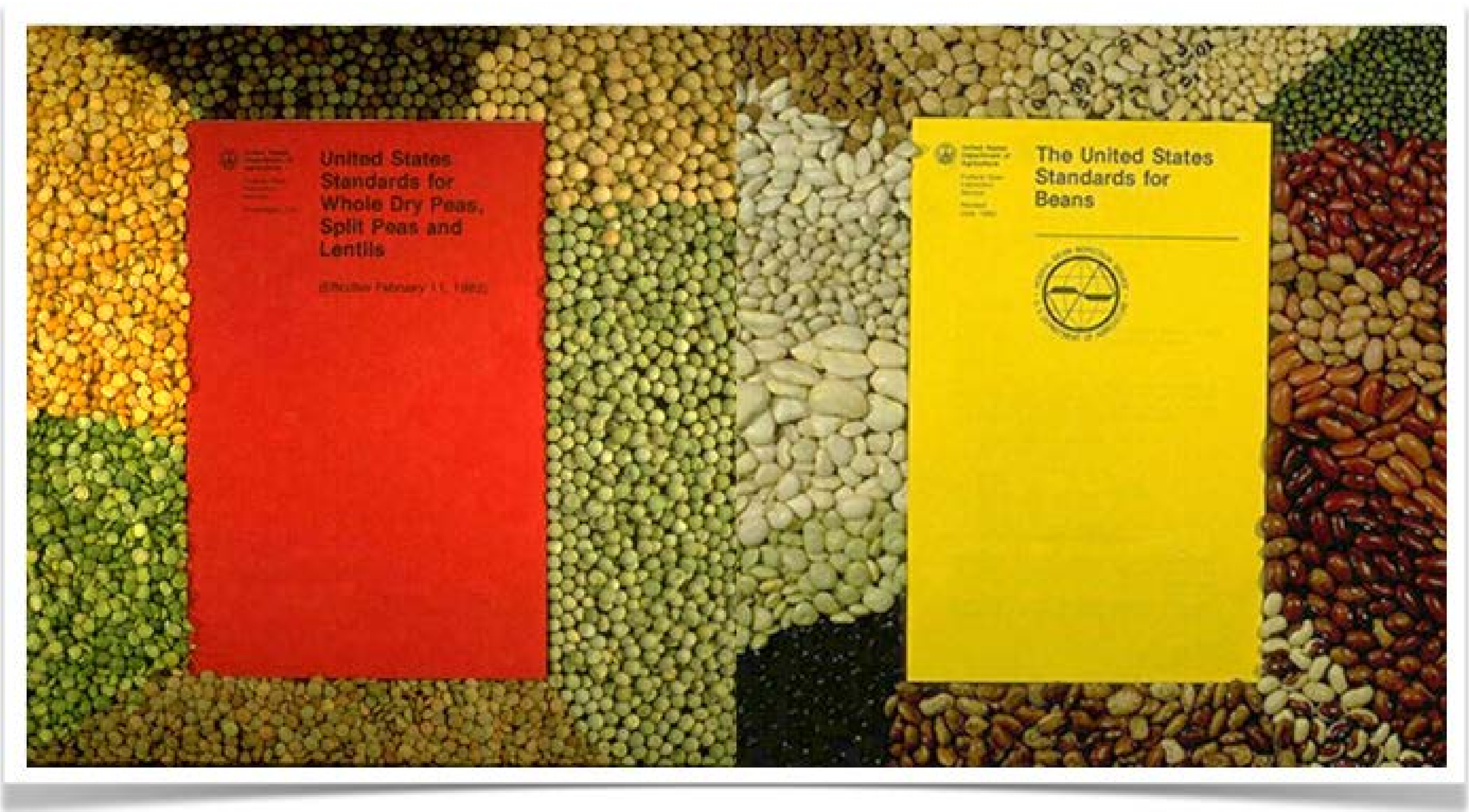
Wheat containing tagged ends (spores of smut in excess of a quantity equal to 30 smut balls shall be graded smutty. Graded lots of wheat meeting the criteria for smutty are to be qualified on the pan ticket and certificate with he special grade designation “Smutty”.



TAGGED ENDS (SMUT) WHITE
Portion for Analysis: sample as a whole

Wheat containing tagged ends (spores of smut in excess of a quantity equal to 30 smut balls shall be graded smutty. Graded lots of wheat meeting the criteria for smutty are to be qualified on the pan ticket and certificate with he special grade designation “Smutty”.

GRADED COMMODITIES



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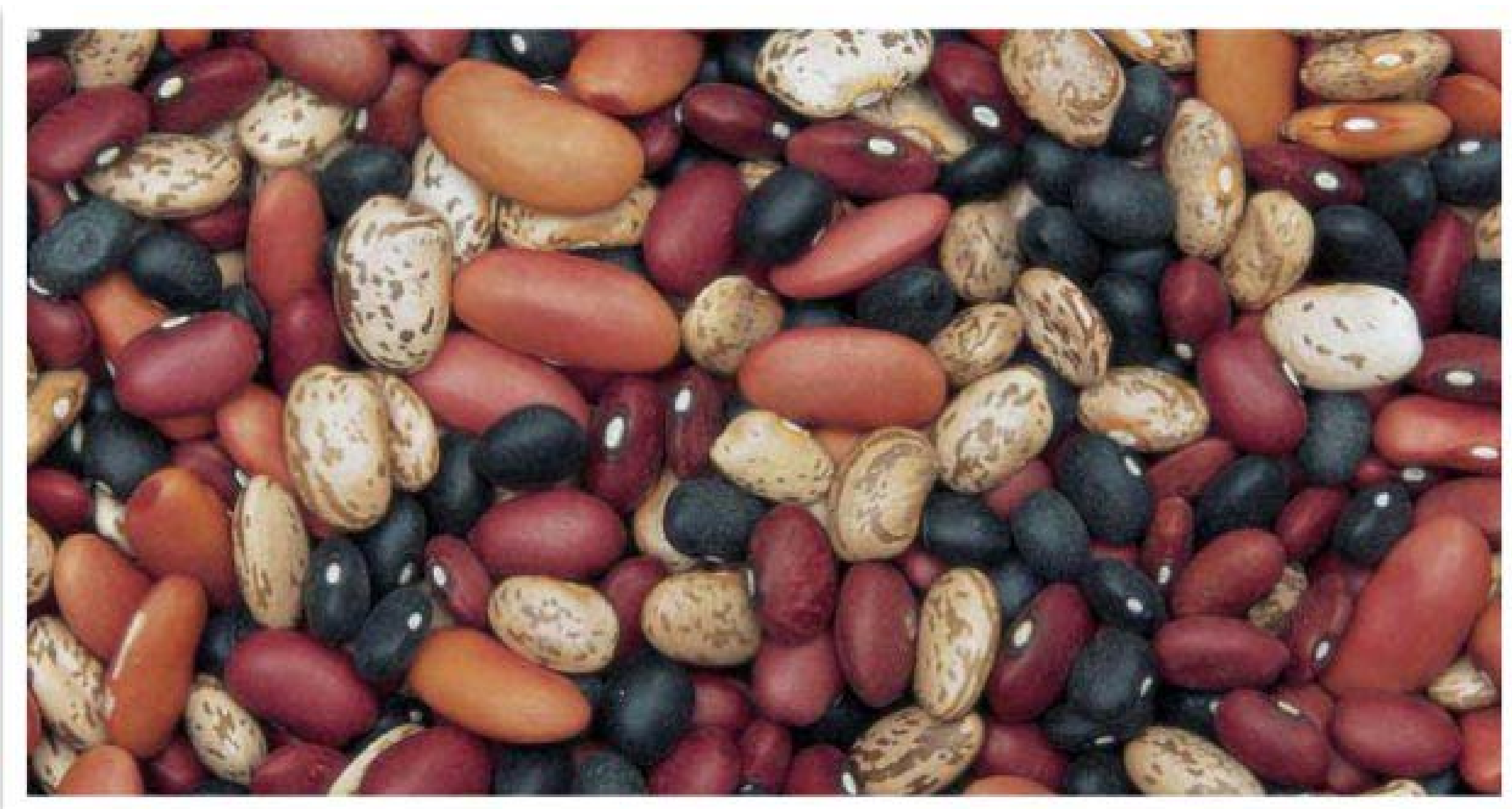


Definition of beans

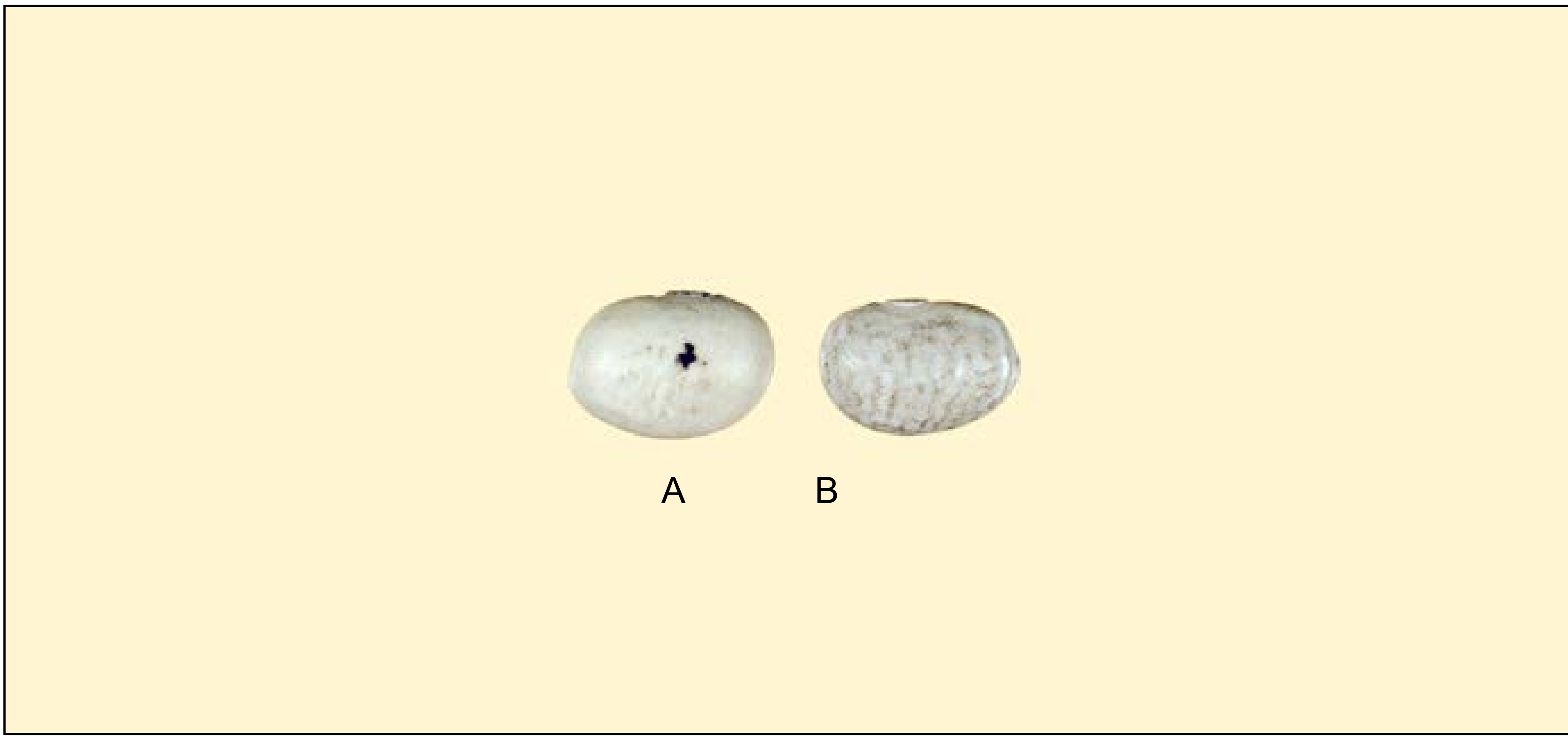
Beans shall be dry threshed field and garden beans, whole, broken, and split, commonly used for edible purposes.

BADLY DAMAGE
Portion for Analysis: Approximately 500 grams

Beans and pieces of beans that are severely damaged or discolored to the extent that it significantly affects the appearance and quality of the bean. Damage or discoloration must be visible from any position or angle.

Images illustrated are intended to provide examples of “significant” discoloration, they do not represent minimum color intensity.

APPLICABLE CLASSES: Pea beans and all classes of Lima beans



DIRT AND GRIME PEA BEANS (NOT DAMAGE)

Portion for analysis: approximately 250 grams.

Bean A. Pea (Navy) beans and pieces of pea beans with dirt adhering to the eye of the bean or seed coat equal to or greater than the coverage and concentration shown.

Bean B. Pea (Navy) beans and pieces of pea beans with grime adhering to the seed coat equal to or greater than the coverage and concentration shown.

NOTE: Determined upon request. Determination based on dirt/grime present on one or both sides of the bean.

A B C D

DIRT & GRIME DAMAGE (OTHER THAN PEA BEANS)

Portion for analysis: Class Dependent

Beans A & B: Beans and pieces of beans with dirt adhering to the eye of the bean or seed coat equal to or greater than the coverage and concentration shown.

Beans C & D: Beans and pieces of beans with grime adhering to the seed coat equal to or greater than the coverage and concentration shown.

APPLICABLE CLASSES: All classes except Pea beans.

NOTE: Determination based on dirt/grime present on one or both sides of the bean. Beans A and C are the reference for all white/off-white (e.g. Garbanzo and Blackeye) beans.

DIRT/GRIME DAMAGED (PIECES)

Portion for analysis: Class Dependent

Pieces of beans that have grime (left) or dirt (right) on the cotyledon equal to or greater tha shown.

NOTE: Refer to other VRI's for other types of damage. A damaged piece functions as damage, not splits.

APPLICABLE CLASSES: All

FROST DAMAGE

Portion for analysis: Class Dependent

Beans and pieces of beans which have been damaged by frost to the extent that the cotyledon has been discolored to the minimum intensity and coverage shown.

APPLICABLE CLASSES: All

NOTE: Suspect frost damaged beans can be identified externally by the shriveled, knife-like edge and discoloration that is characteristic of this type damage. Splitting the bean is necessary to determine the extent of damage.

A B

GREEN DAMAGE (CHICKPEA)

Portion for Analysis: Large Seeded 500 grams, Small Seeded 250 grams

Immature, Green Chickpeas are undesirable because they tend to produce off flavors and, when canned, turn a grayish color creating a moldy appearance. For this reason, beans with any discernible amount of green are damage. **(Suspect kernels may be scraped to confirm discoloration)**.

This illustration is not intended to represent any minimum coverage or color intensity requirement.

Illustrated from left to right:

Bean A: Shows a natural colored bean.

Bean B: Shows a bean with a discernible green color.

APPLICABLE CLASSES: Garbanzo beans (Chickpeas)

INSECT STUNG DAMAGE (BLACKEYE)

Portion for analysis: approximately 250 grams.

Beans and pieces of Blackeye beans which have an insect sting(s) meeting one of the following criteria:

Bean A: Two or more stings/chalky spots that extend into the cotyledon.

Bean B: A single severe sting with discoloration equal to or greater than the amount shown around the sting which penetrates the cotyledon.

Bean C: A single chalky-spot equal to or greater than shown. Chalky spots only apply to Blackeye beans.

NOTE: Carefully remove seed coat to determine size of spot.

INSECT STUNG DAMAGE (WHITE BEANS)

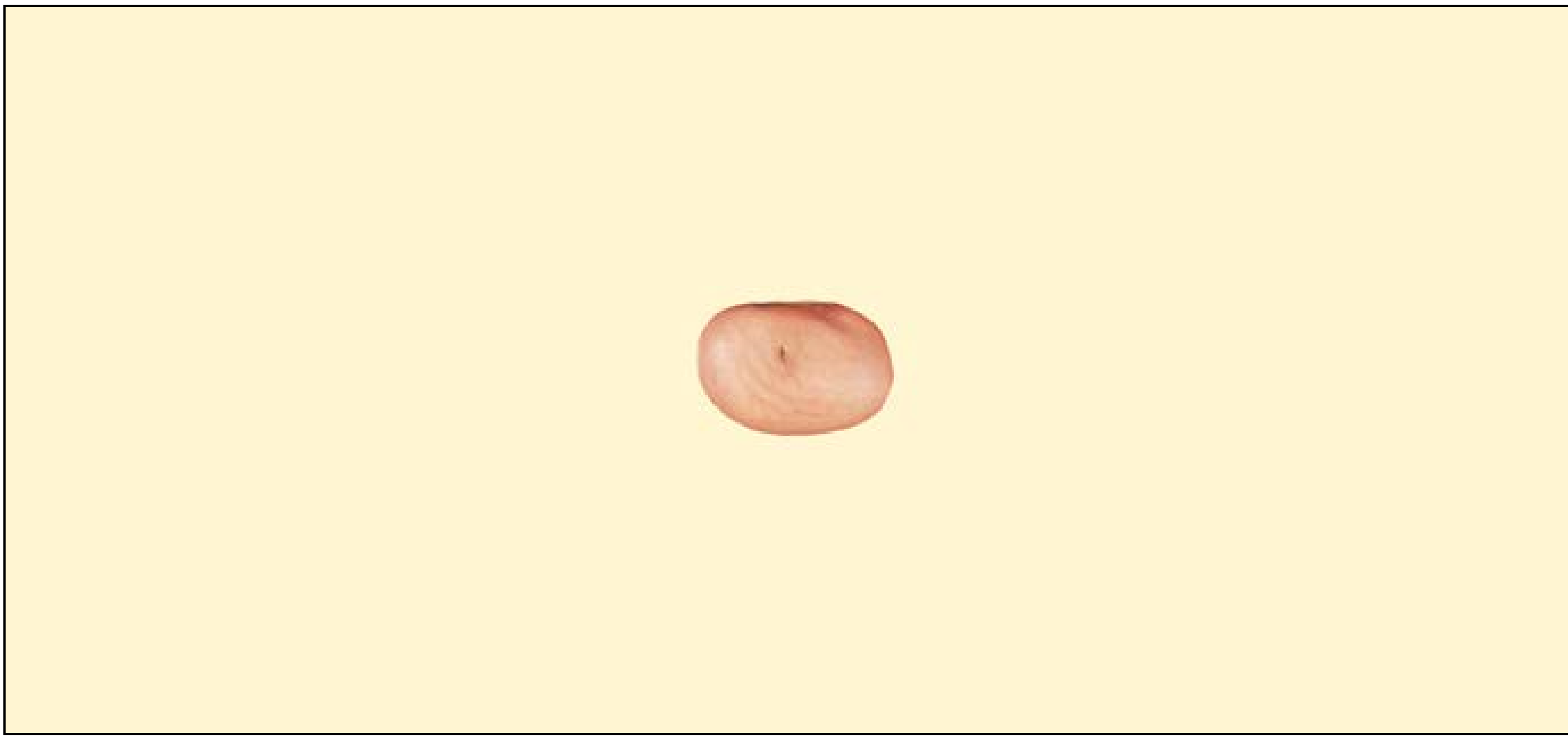
Portion for analysis: Class Dependent

Beans and pieces of beans that have one severe sting with discoloration equal to or greater than shown, or two or more stings extending into the cotyledon. Remove the seed coat from beans that have several small stings to determine if penetration of the cotyledon has occurred.

DO NOT SCRAPE SINGLE STINGS.

APPLICABLE CLASSES: All classes of White beans except, Blackeye beans.

NOTE: Chalky spots only apply to Blackeye beans.



INSECT STUNG (OTHER BEANS)

Portion for analysis: Class Dependent

Beans and pieces of beans that have one severe sting with discoloration equal to or greater than shown, or two or more stings extending into the cotyledon. Remove the seed coat from beans that have several small stings to determine if penetration of the cotyledon has occurred.

DO NOT SCRAPE SINGLE STINGS.

APPLICABLE CLASSES: All classes other than the White and Blackeye beans.

NOTE: Chalky spots only apply to Blackeye beans.

A B

INSECT WEBBING OR FILTH

Portion for Analysis: 1000 gram work sample & 1000 gram file sample

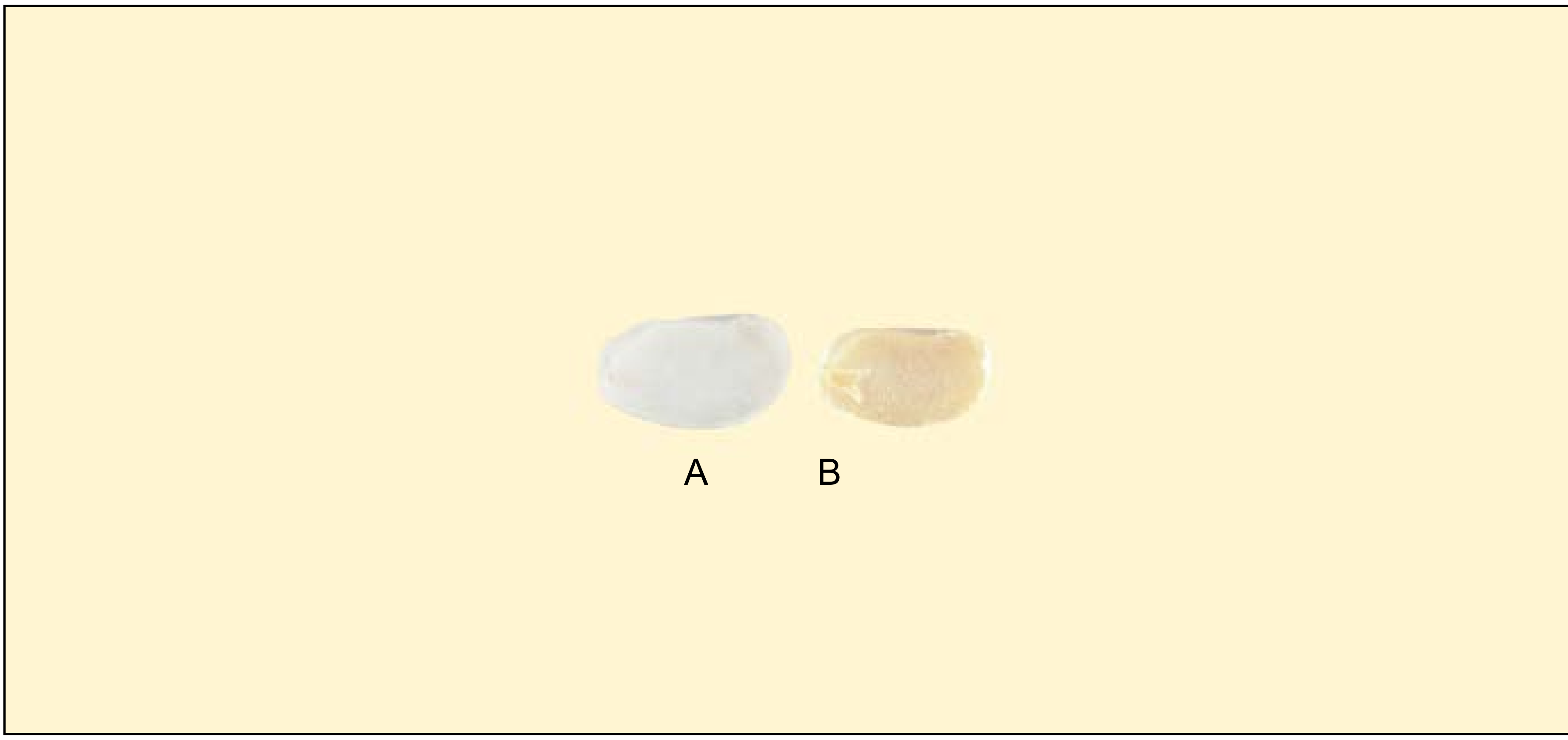
Beans and pieces of beans which contain any webbing, refuse, excreta, dead insects, larvae, or eggs. To confirm the presence of insects/larvae, other than “visible window damage”, it may be necessary to split the bean. Use of low power magnification may be necessary to confirm suspected webbing or filth.

Bean A: Webbing

Bean B: Eggs

APPLICABLE CLASSES: All

NOTE: In addition to functioning as damage, samples containing 2 or more insect webbing or filth beans are considered U.S. Sample grade. Do not confuse with moldy or stained insect/worm chewed beans (refer to VRI Bean - 8.0).



INTERNAL RESPIRATION DAMAGE

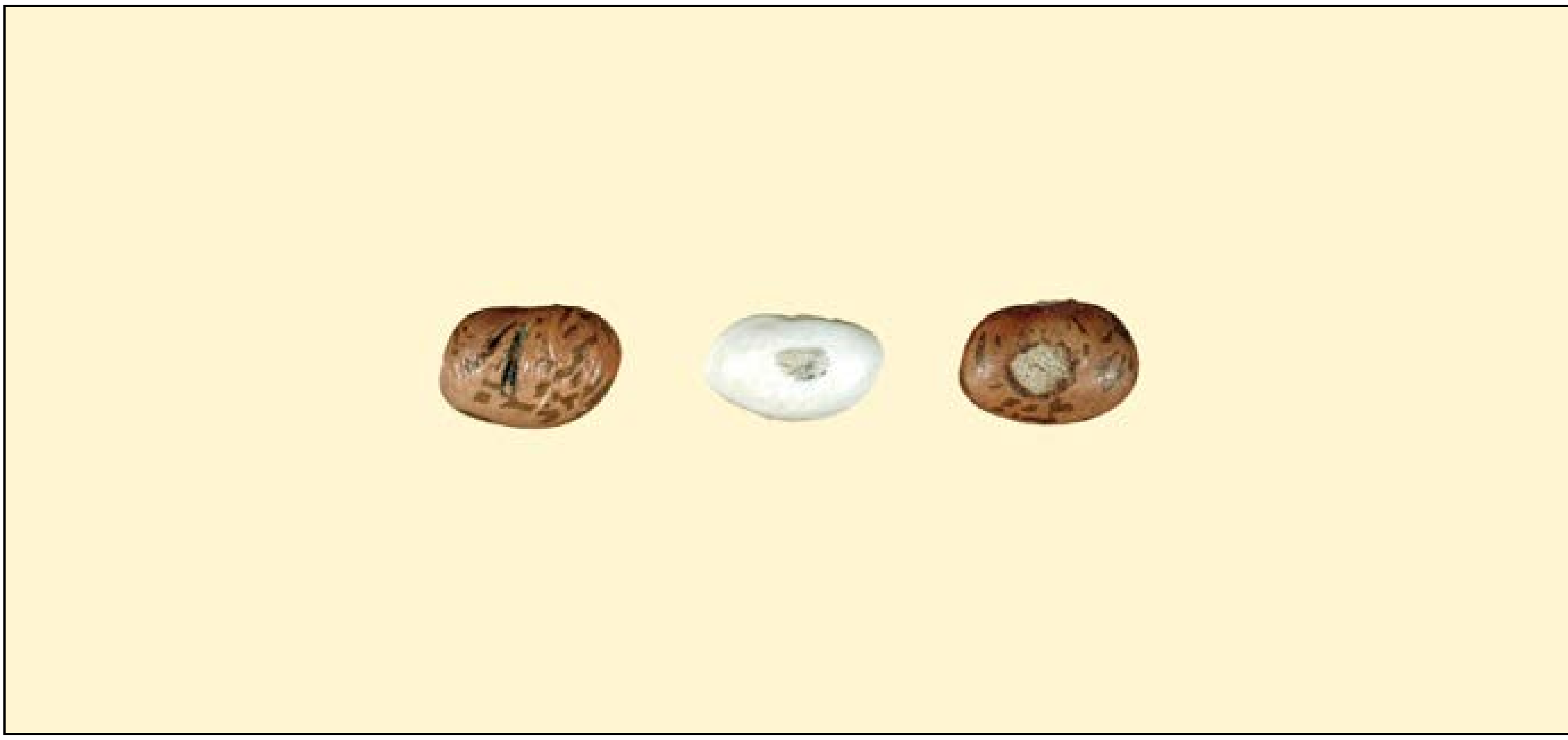
Portion for analysis: Class Dependent

Beans and pieces of beans damaged by respiration or heating to the degree that the cotyledon is discolored (brown) to the minimum extent shown.

Bean A: Sound split (for illustration purposes only).

Bean B: Internally damaged bean.

APPLICABLE CLASSES: All

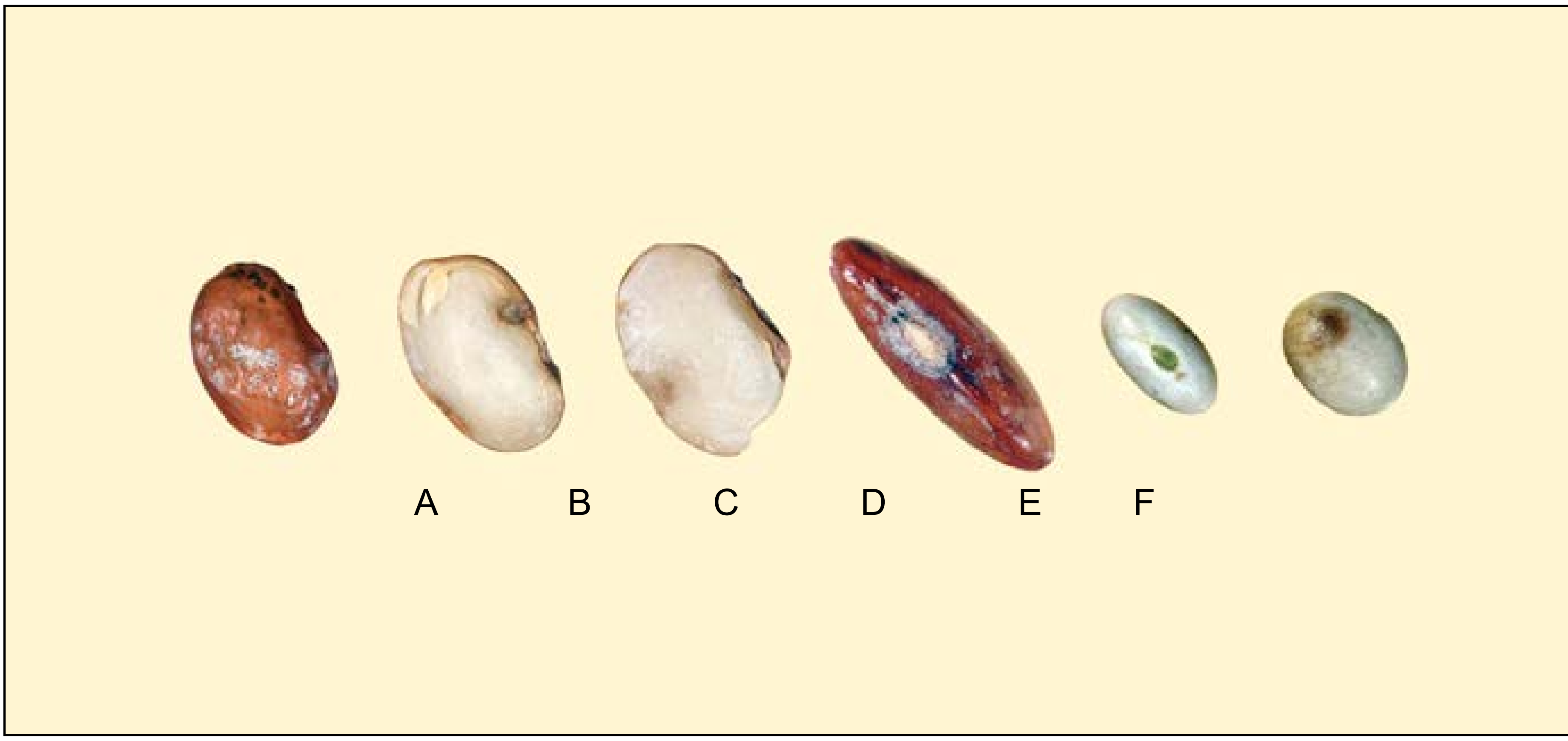


MACHINE DAMAGE

Portion for analysis: Class Dependent

Beans and pieces of beans that are either cut or scraped due to handling and contain dirt or grime on the cotyledon equal to or greater than shown.

APPLICABLE CLASSES: All



MOLD DAMAGE
Portion for analysis: Class Dependent

Beans and pieces of beans which contain mold on or around the hilum, the surface and/or the cotyledon and is applicable to all classes. Illustration shows:

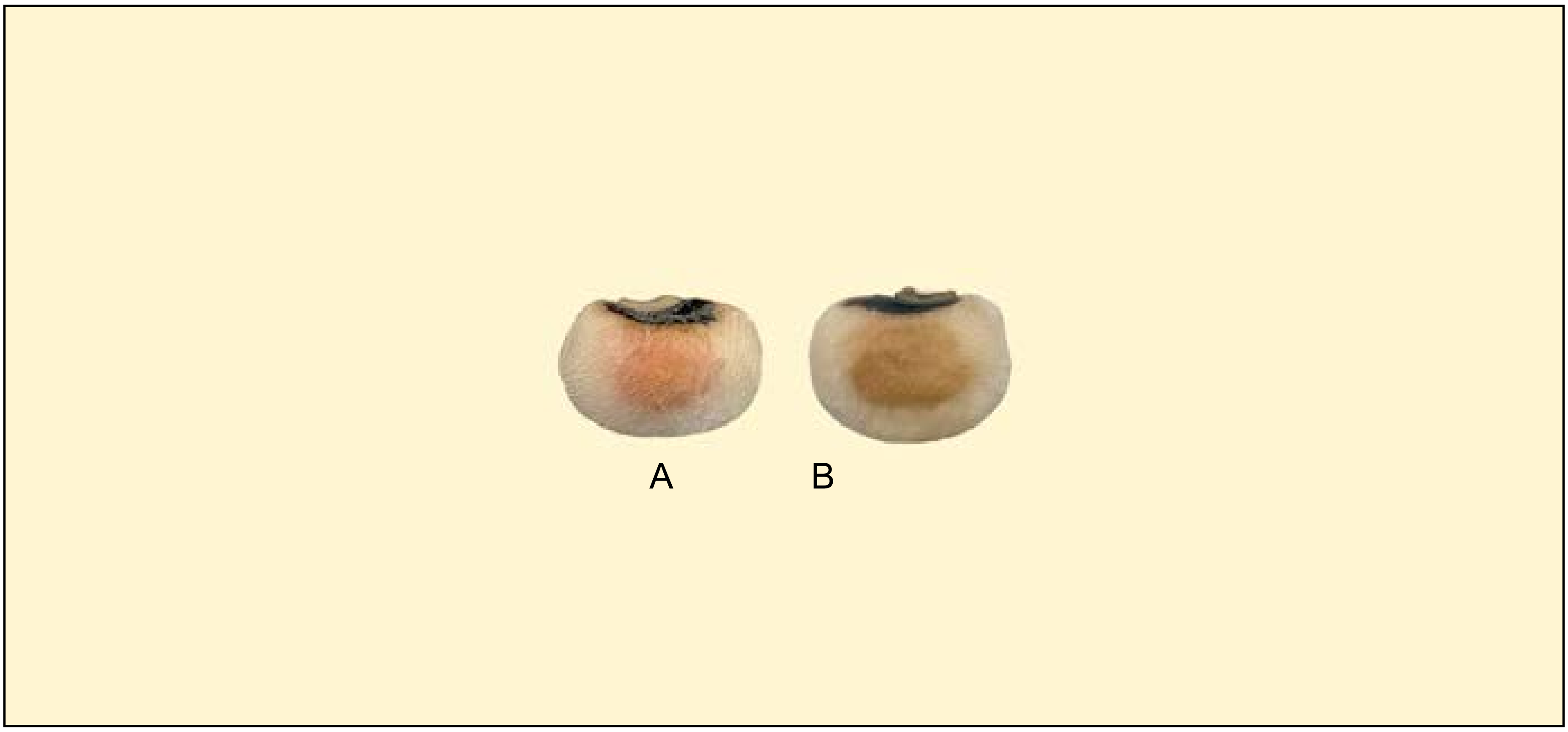
Bean A: Minimum coverage requirement for surface mold/mildew. Surface mold/mildew appearing on larger/smaller beans should be proportional.

Bean B/C: Mold/mildew on the cotyledon. Beans containing any amount of mold/mildew on the cotyledon are damaged.

Bean D: Minimum requirement when mold/mildew encircles the hilum.

Bean E: Mold/mildew covering the hilum and must be completely covered.

Bean F: Surface mold which discolors the seed coat. Illustrated is the minimum intensity and coverage requirement (proportional to the size of bean being considered).



MOLD DAMAGE (PINK/BROWN)

Portion for analysis: Class Dependent

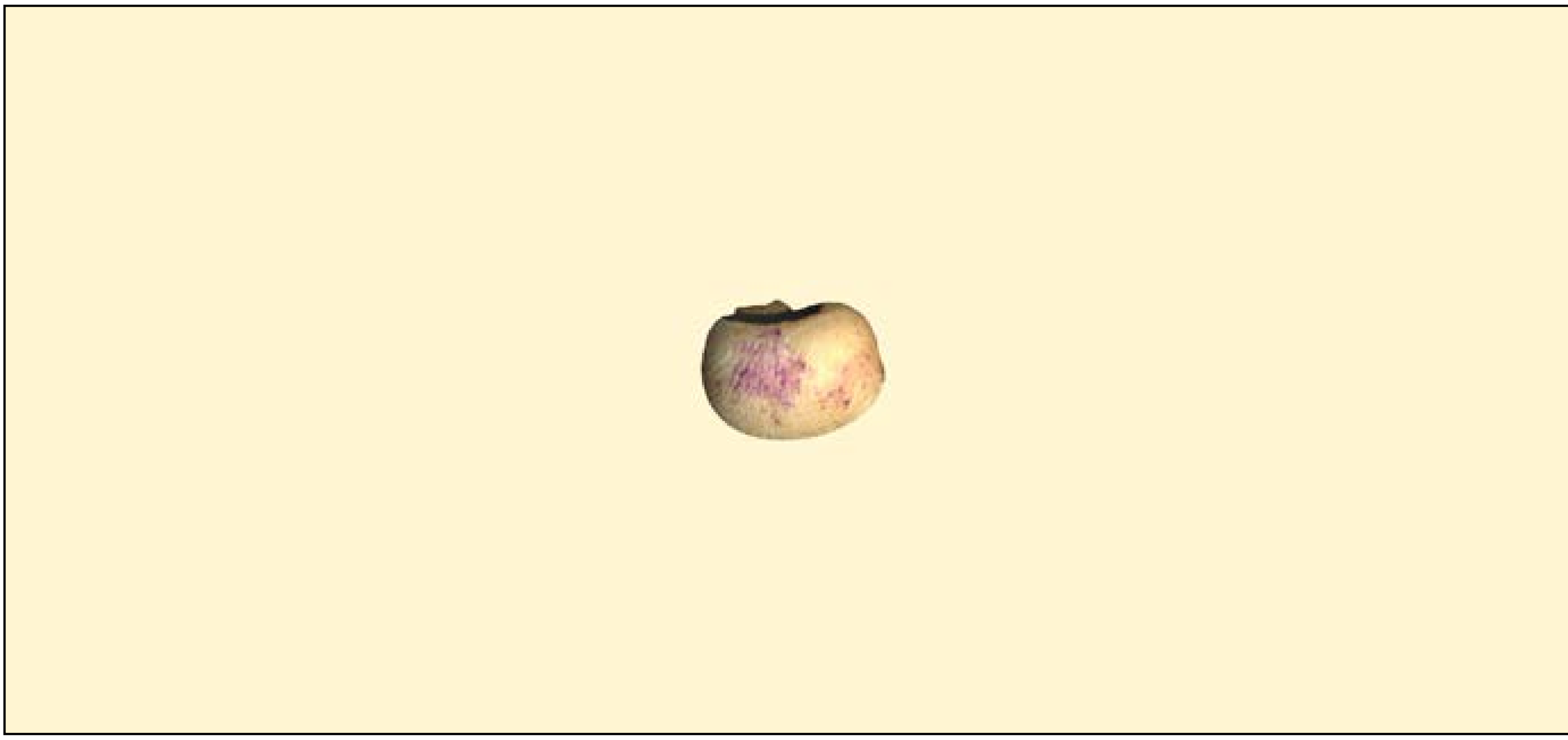
Beans and pieces of beans that exhibit a pink to brown discoloration on the seed coat with an area of coverage and intensity equal to or greater than shown.

APPLICABLE CLASSES: ALL

Bean A: Pink

Bean B: Brown

NOTE: The discoloration may appear on one or both sides of the bean. It is most common in Blackeye beans. Beans containing any amount of mold on the cotyledon are damaged.



NIGHTSHADE DAMAGE

Portion for analysis: Class Dependent

Beans and pieces of beans which have nightshade juice on the seed coat with an area of coverage and intensity equal to or greater than shown. The determination is based on the berry stain on one or both sides of the bean. Black Nightshade berries stain the bean purple during threshing and are most commonly found in Blackeye beans.

APPLICABLE CLASSES: All

NOTE: This interpretation also pertains to beans with bag markings/ink stains on the seed coat. The discoloration appearing on larger/smaller beans should be proportional. Beans containing any amount of berry juice, bag markings, and/or ink stains on the cotyledon are damaged.

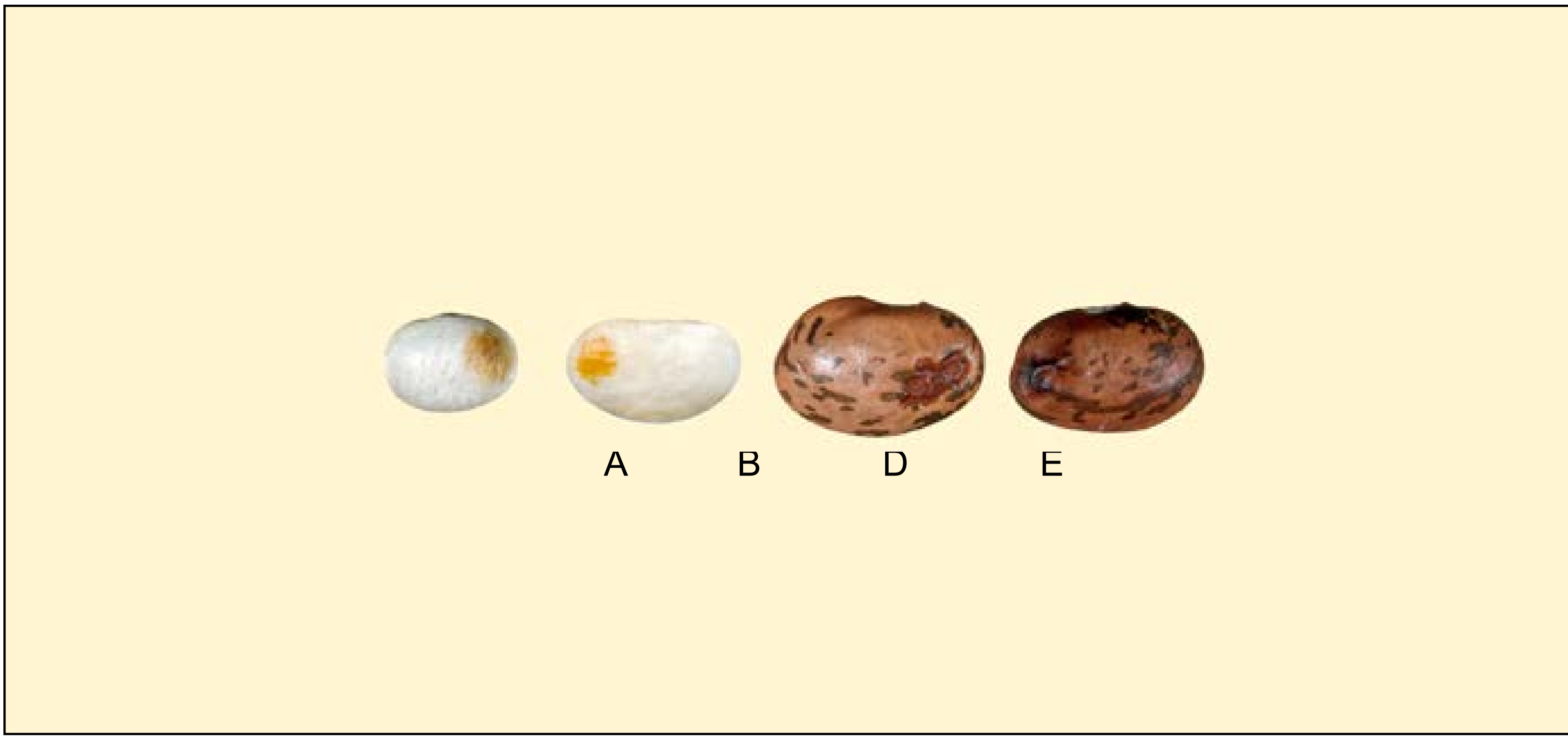
SPROUT DAMAGE

Portion for analysis: Class Dependent

Beans and pieces of beans that are sprouted in which the sprout is equal to or greater than shown.

APPLICABLE CLASSES: All

NOTE: Do not confuse with partially removed or cracked seed coats.



WATER BLISTERED DAMAGE

Portion for analysis: Class Dependent

Beans and pieces of beans damaged by water to the degree that the seed coat is discolored on one or both sides to the minimum size and color intensity shown. Illustrations show minimum coverage and color intensity requirement for:

Bean A: Yellow/Tan All classes of white/off-white (e.g. Garbanzo, Blackeye) beans.

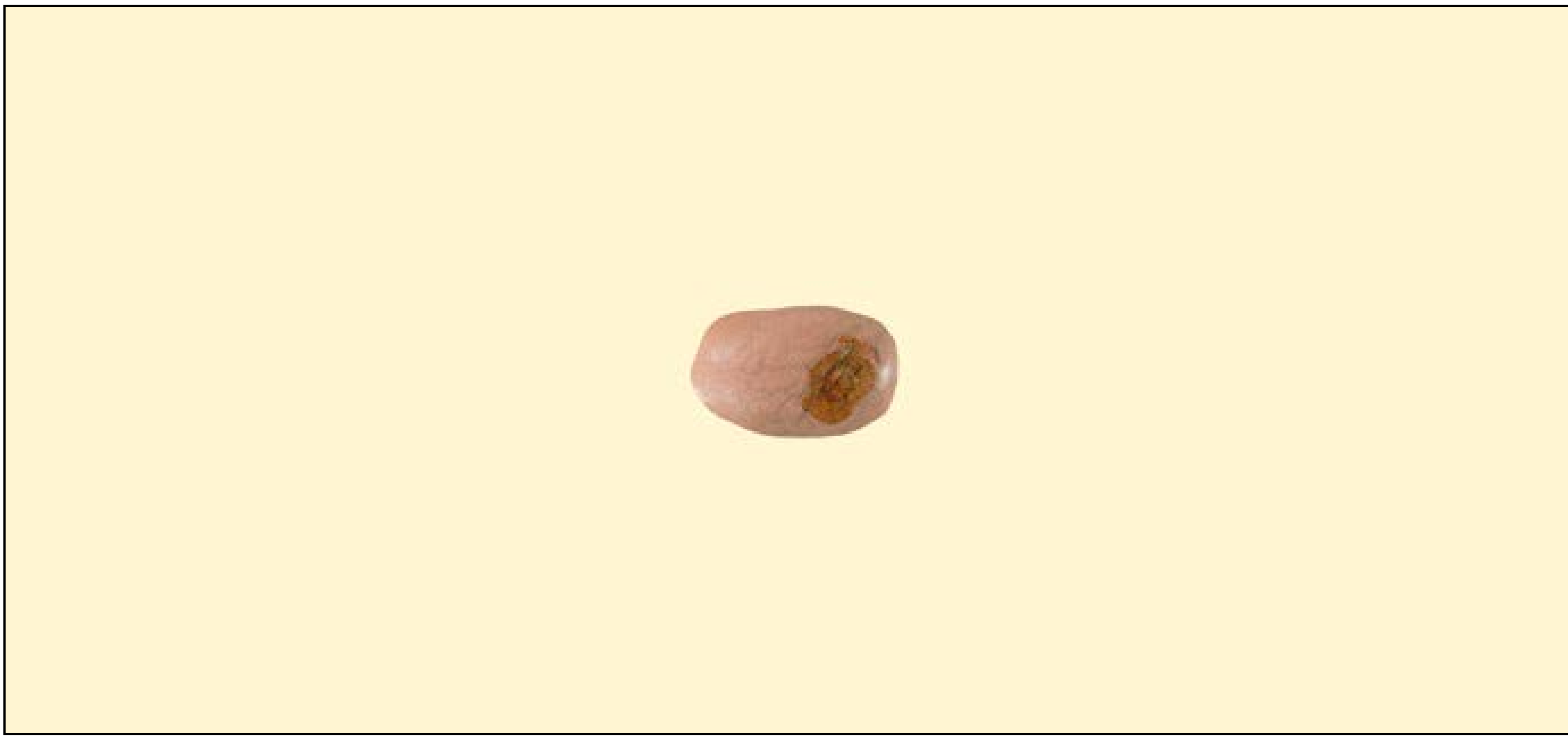
Bean B: Orange All classes of white/off-white (e.g. Garbanzo, Blackeye) beans.

Bean C: All classes of colored beans except Pink beans

Bean D: Discolored stored beans (non-white).

APPLICABLE CLASSES: All classes except Pink beans.

NOTE: Visual reference and inspection criteria are also applicable to hail damaged beans.



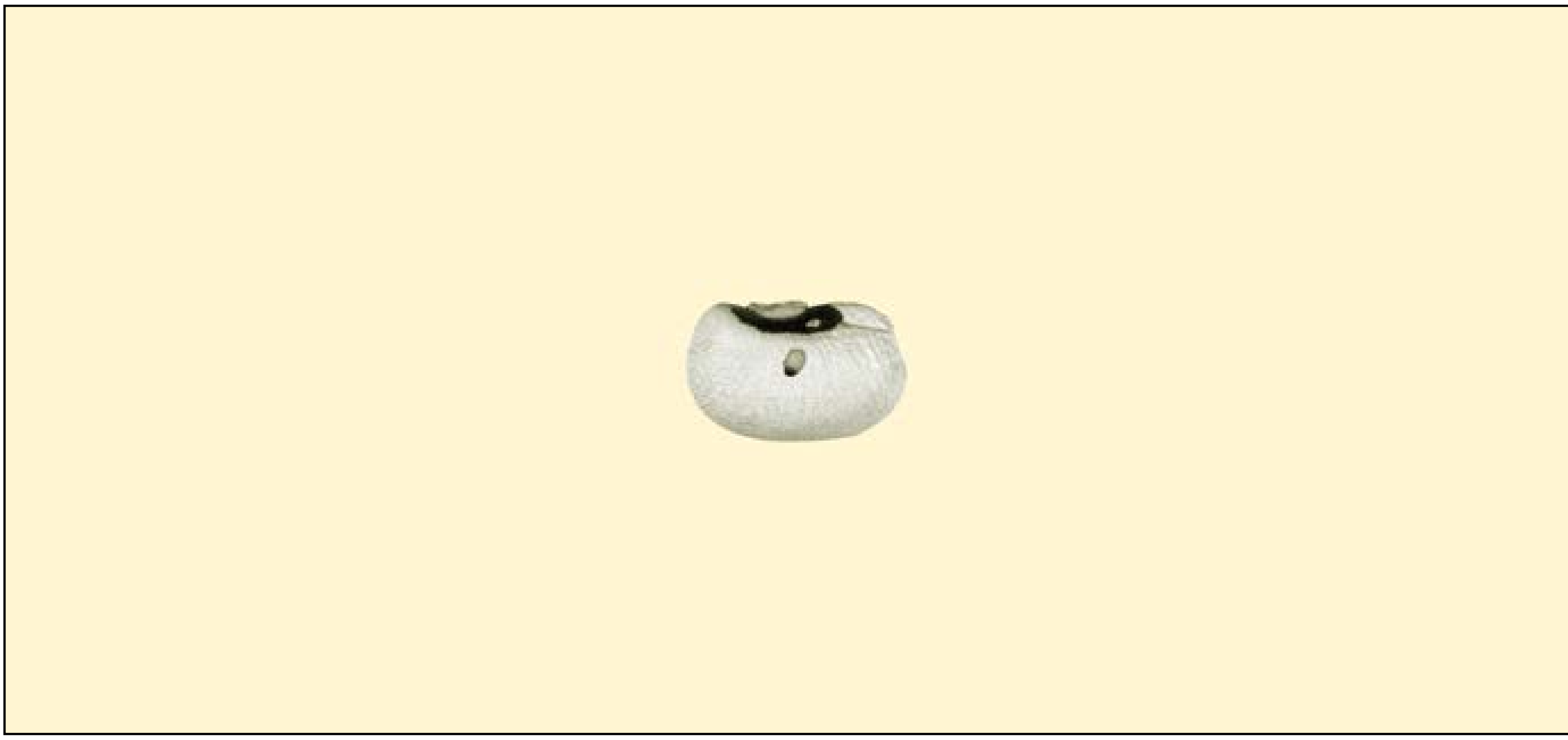
WATER BLISTERED DAMAGE (PINK BEANS)

Portion for analysis: approximately 250 grams

Beans and pieces of beans damaged by water to the degree that the seed coat is discolored to the minimum size and color intensity shown.

APPLICABLE CLASSES: Pink beans.

NOTE: Visual reference and inspection criteria are also applicable to hail damaged beans.



WEEVIL BORED (CLEAN-CUT)

Portion for Analysis: 1000 gram work sample & 1000 gram file sample

Clean-cut weevil-bored beans shall be beans and pieces of beans from which weevils have emerged, leaving a clean-cut open cavity free from any webbing, refuse, excreta, dead insects, larvae, or eggs. It is necessary to split the bean to determine if the inside is also clean. Use of low power magnification may be used.

APPLICABLE CLASSES: All classes.

NOTE: In addition to functioning as damage, samples containing 2 or more clean-cut weevil bored beans are considered “weevily” and shall be graded U.S. Sample grade. Mung beans may not contain more than 0.1, 0.2 and 0.5 percent clean-cut weevil bored beans in grades U.S. No. 1, 2 and 3, respectively.

VISIBLE WINDOW DAMAGE (WEEVIL)

Portion for Analysis: 1000 gram work sample & 1000 gram file sample

Visible window damage beans are beans and pieces of beans which are weevil-bored, but the weevil has not emerged from the bean.

APPLICABLE CLASSES: All classes.

NOTE: In addition to functioning as damage, samples containing 2 or more “visible window damaged beans” are considered contaminated by insect webbing and filth and shall be graded U.S. Sample grade.

WORM EATEN DAMAGE

Portion for analysis: Class Dependent

Beans and pieces of beans which have been chewed by insect larvae. Any distinctly chewed bean, regardless of size, is considered damage.

APPLICABLE CLASSES: All

CHICKPEA TYPE	CONTRASTING CHICKPEAS			
Desi	Kabuli	Blanca	Bronic/Billy	Bronic/Billy round
				
Kabuli	Desi	Blanca	Bronic/Billy round	
				
Blanca	Desi	Kabuli	Bronic/Billy	Bronic/Billy round
				
Bronic/Billy	Desi	Blanca		
				
Bronic/Billy round	Desi	Blanca	Kabuli	
				

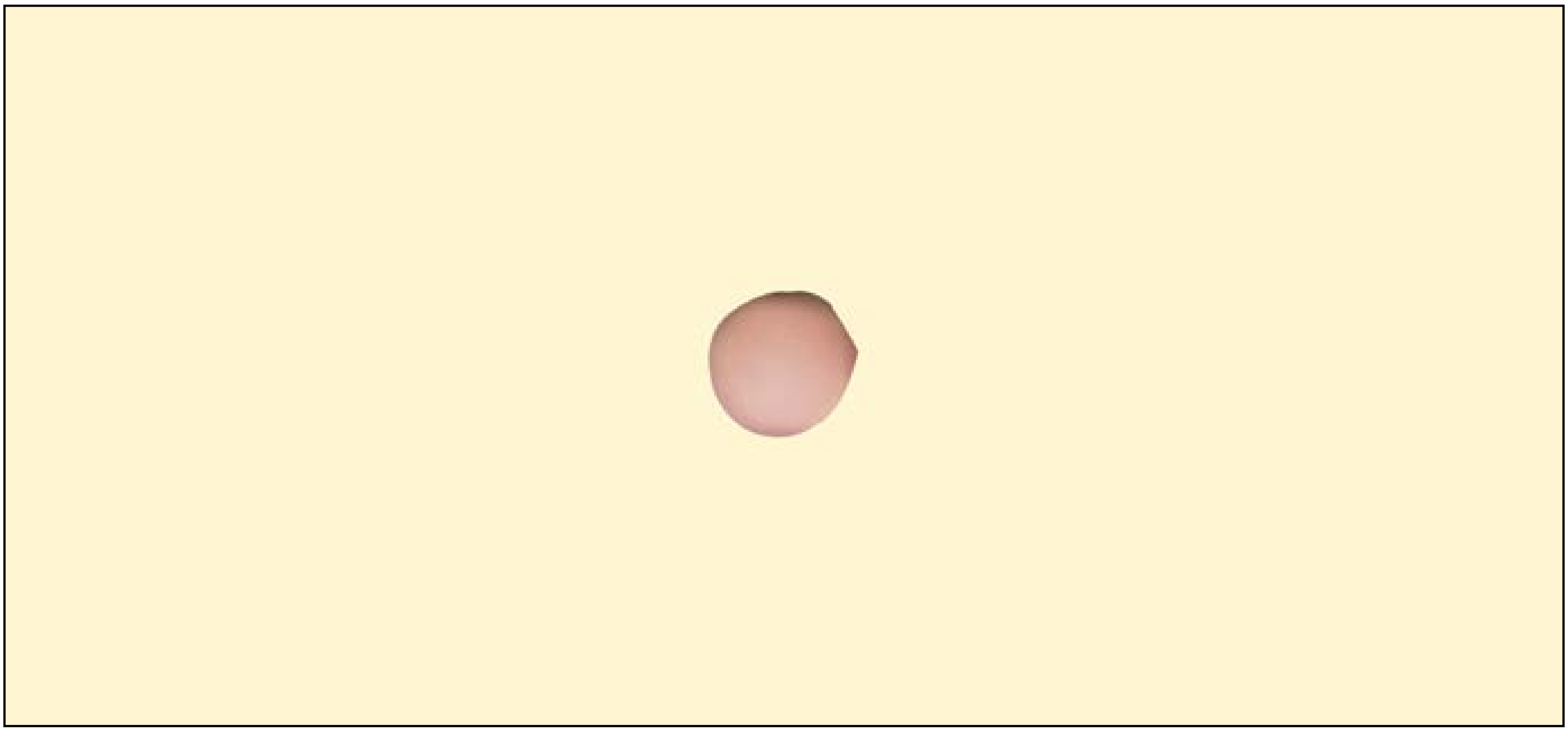
CONTRASTING CHICKPEAS

Portion for Analysis: Approximately 500 grams

PEAS

Definition of peas

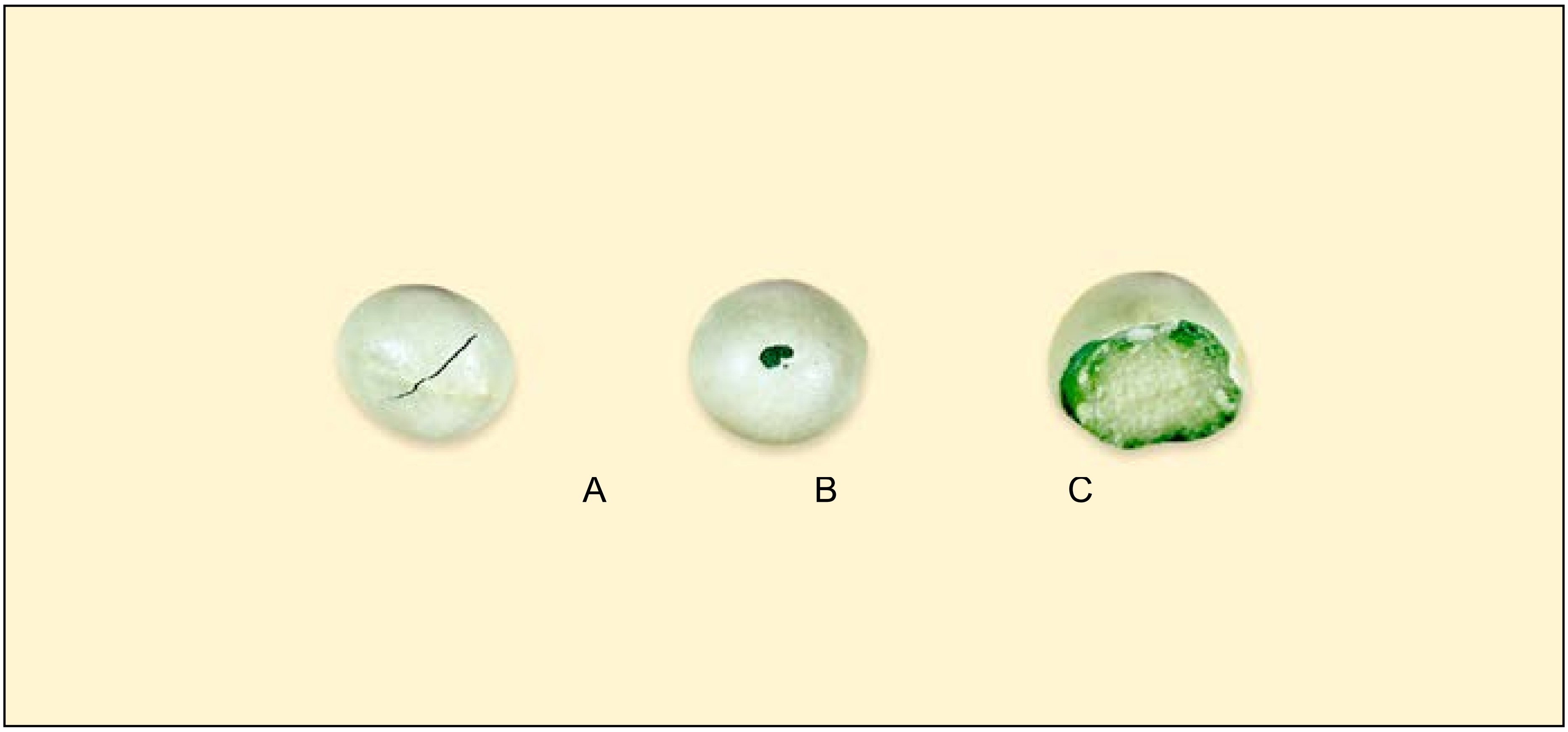
Threshed seeds of the garden type pea plant (Pisum sativum L. and Pisum sativum var. arvense (L.) Poir.), which after the removal of dockage, contain 50.0 percent or more of whole peas and not more than 10.0 percent of foreign material.



BACTERIUM/FUNGAL STAIN

Portion for analysis: approximately 250 grams

Peas and pieces of peas that are stained by bacterium and/or fungal species to the minimum intensity shown at the center of the pea and in which the discoloration covers 50 percent or more of the pea's surface are considered damage. These conditions can affect seed development and color, with severely infected seeds appearing much smaller than normal and having purple to pink discolored seed coats.



CRACKED SEED COATS

Portion for analysis: approximately 250 grams

Peas with cracked seed coats (CSC) shall be peas that meet any of the following:

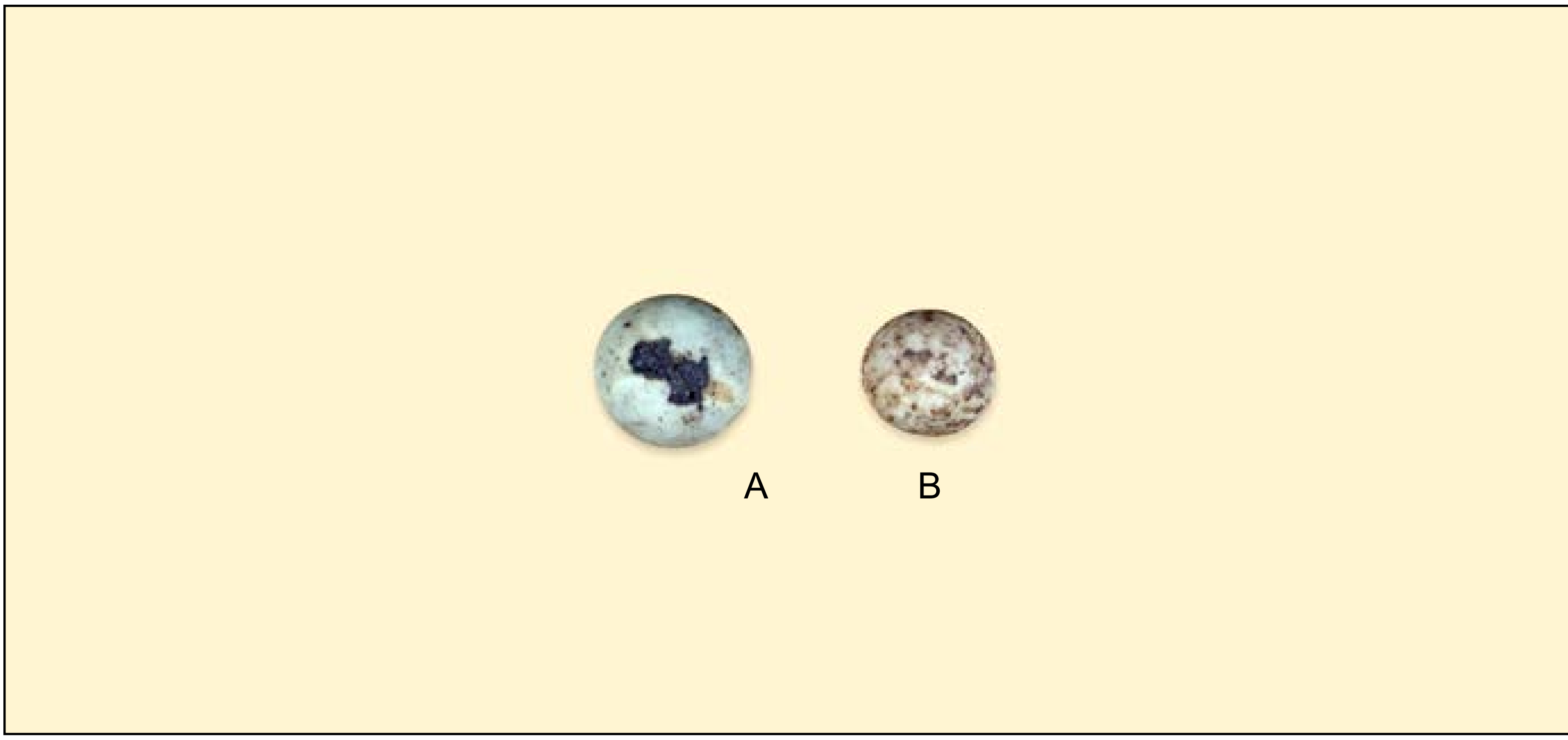
Pea A: Pea having a readily discernible cracked seed coat.

Pea B: Pea having a part of the seed coat removed equal to or greater than shown.

Pea C: Broken pea which is more than one-half of a whole pea.

NOTE: For thresher-run peas, only include the percentage of CSC in excess of 3.0% in “total defects and foreign material.”

Growth stress cracks appearing around the hilum function as CSC.



DAMAGE (DIRT/GRIME)

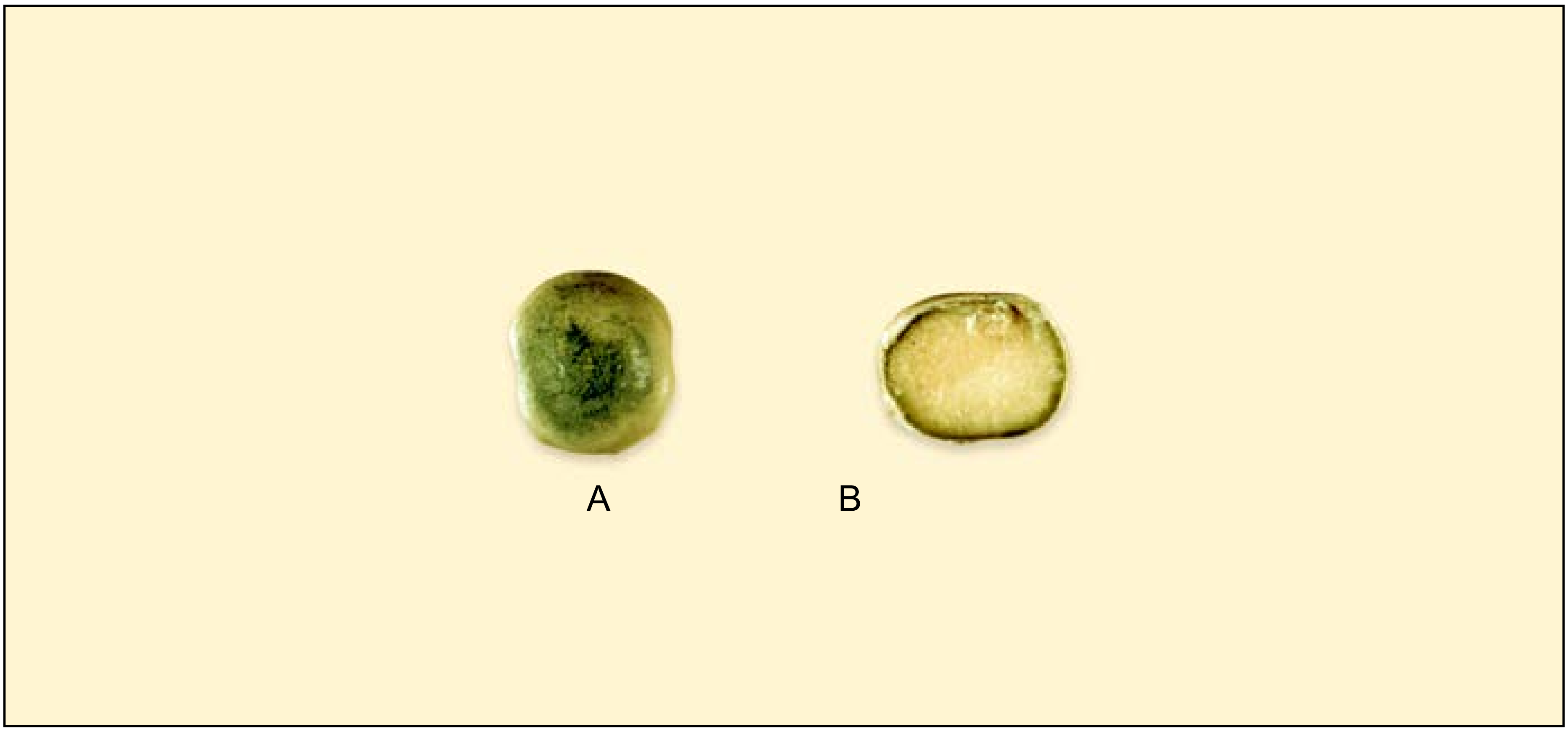
Portion for analysis: approximately 250 grams

Pea A: Peas and pieces of peas with dirt adhering to the seed coat, the eye of the pea or cotyledon equal to or greater than the concentration shown are damage.

Pea B: Peas and pieces of peas with grime adhering to the seed coat or cotyledon equal to or greater than shown are damage.

The same tolerance applies when dirt or grime adheres to the cotyledon of broken peas (more than 1/2 of a whole pea).

NOTE: The same inspection criteria apply to all classes of peas discolored by nightshade juice or container/bag marking inks. The discoloration appearing on larger/smaller peas should be proportional. Dirt/grime is not applicable to wrinkle dry peas or smooth seeded peas grown for seed purposes.



FROST DAMAGE

Portion for analysis: approximately 250 grams

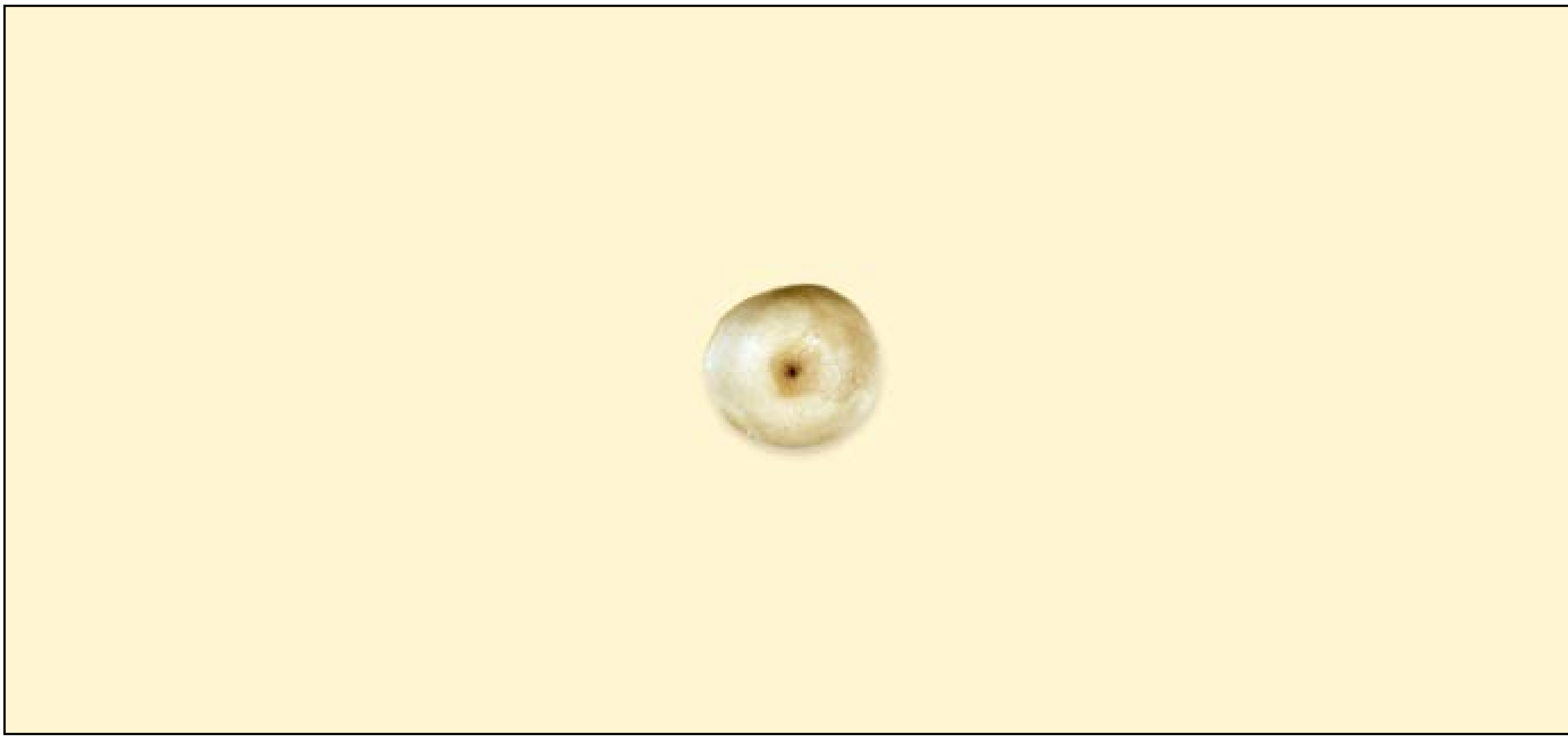
Peas and pieces of peas that are discolored green to the minimum coverage and color intensity shown. It is permissible to prorate the coverage requirement provided the color intensity is such that it sufficiently compensates for any apparent loss in coverage (e.g., 1/2 coverage requires twice the color intensity).

Illustration shows from left to right:

Pea A: Suspected frost damaged pea. The pea must be split in many instances to confirm that the damage extends into the cotyledon and meets the minimum intensity and coverage.

Pea B: Whole pea, after splitting, with the minimum degree of discoloration and area of coverage required. The discoloration is usually evident around the perimeter, however, exceptions have been noted. The amount, not the location, is what is important

NOTE: Only half of the split pea must meet the VRI.



WEEVIL DAMAGE (STING)

Portion for analysis: approximately 250 grams

Peas and pieces of peas with a single insect sting that extends into the cotyledon are weevil damage.

MOLD DAMAGE

Portion for analysis: approximately 250 grams

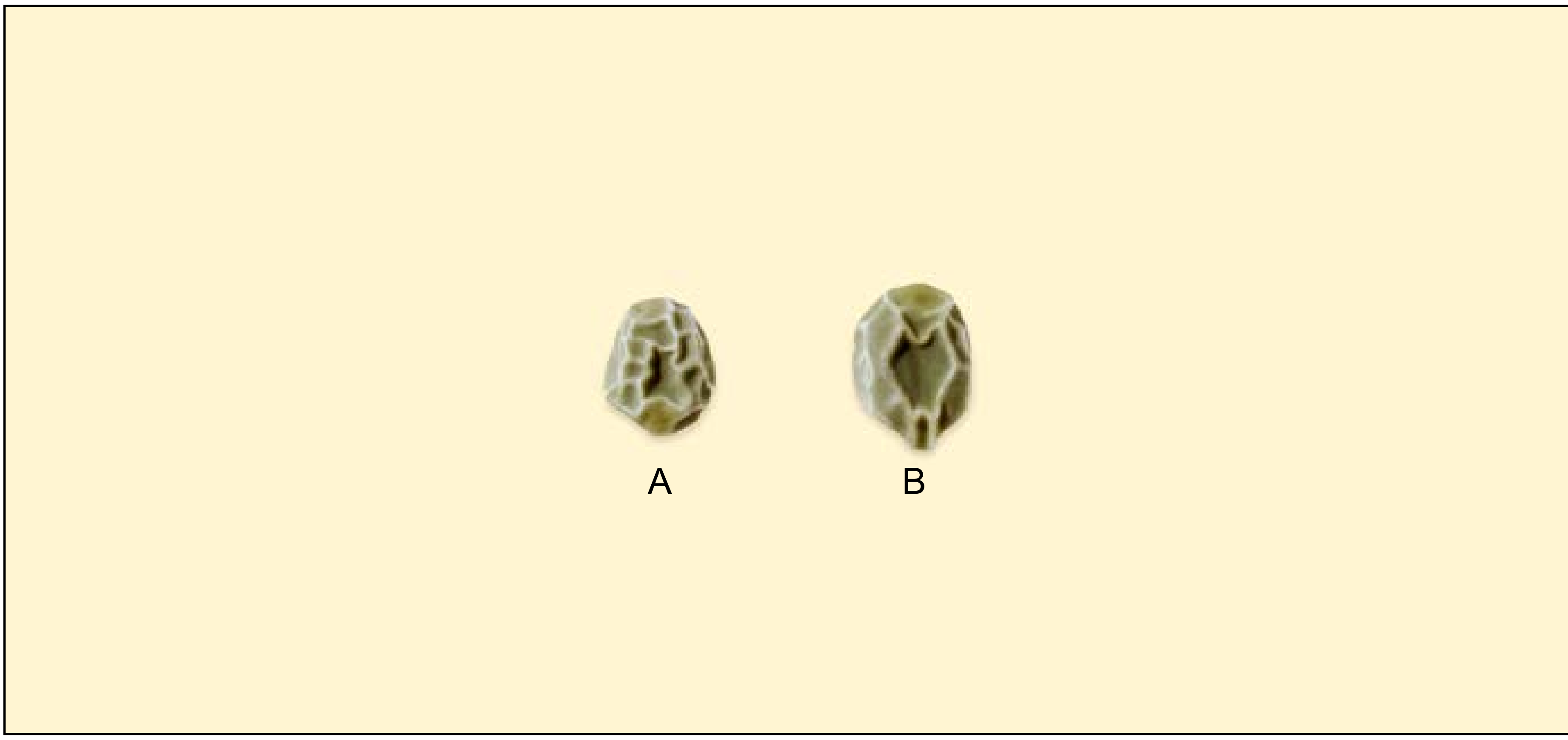
Peas that contain surface mold/mildew equal to or greater than shown are damage.

NOTE: Any amount or color of mold/mildew on the cotyledon (meat) of the pea is damaged. Mold occurs in many colors.

SHRIVELED (SMOOTH)

Portion for analysis: approximately 250 grams

Peas that are distinctly shriveled, discolored, misshapen, and have sharp deep dimpled edges over the entire pea which are equal to or greater than shown shall be considered shriveled.



SHRIVELED (WRINKLED)

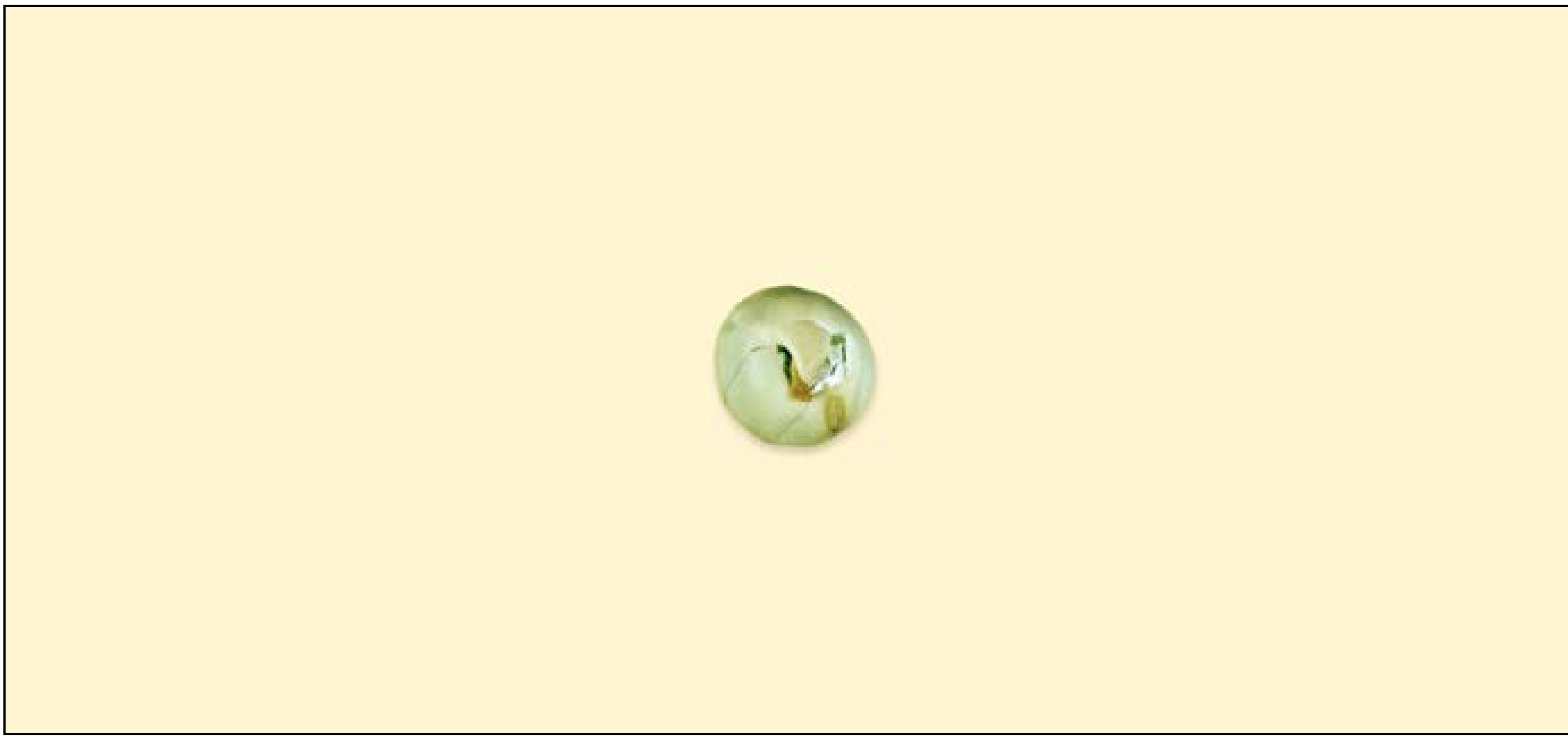
Portion for analysis: approximately 250 grams

Wrinkled Dry Peas that are slightly shriveled and distinctly discolored (caramelized) or slightly discolored with severe dimpling in the seed coat shall be considered shriveled.

Illustration shows from left to right:

Pea A: Pea with heavily dimpled exterior with some “caramel” color showing through. Notice the knife-like edges around the perimeter of the individual dimples or craters. This so-called “webbing effect” must cover at least 50 percent of the surface area

Pea B: Minimum degree of discoloration and shriveling required to be considered shriveled. Peas that are shriveled to the extent they have withdrawn and separated from the seed coat (“shelley” peas) fall into this category.



SPROUT DAMAGE

Portion for analysis: approximately 250 grams

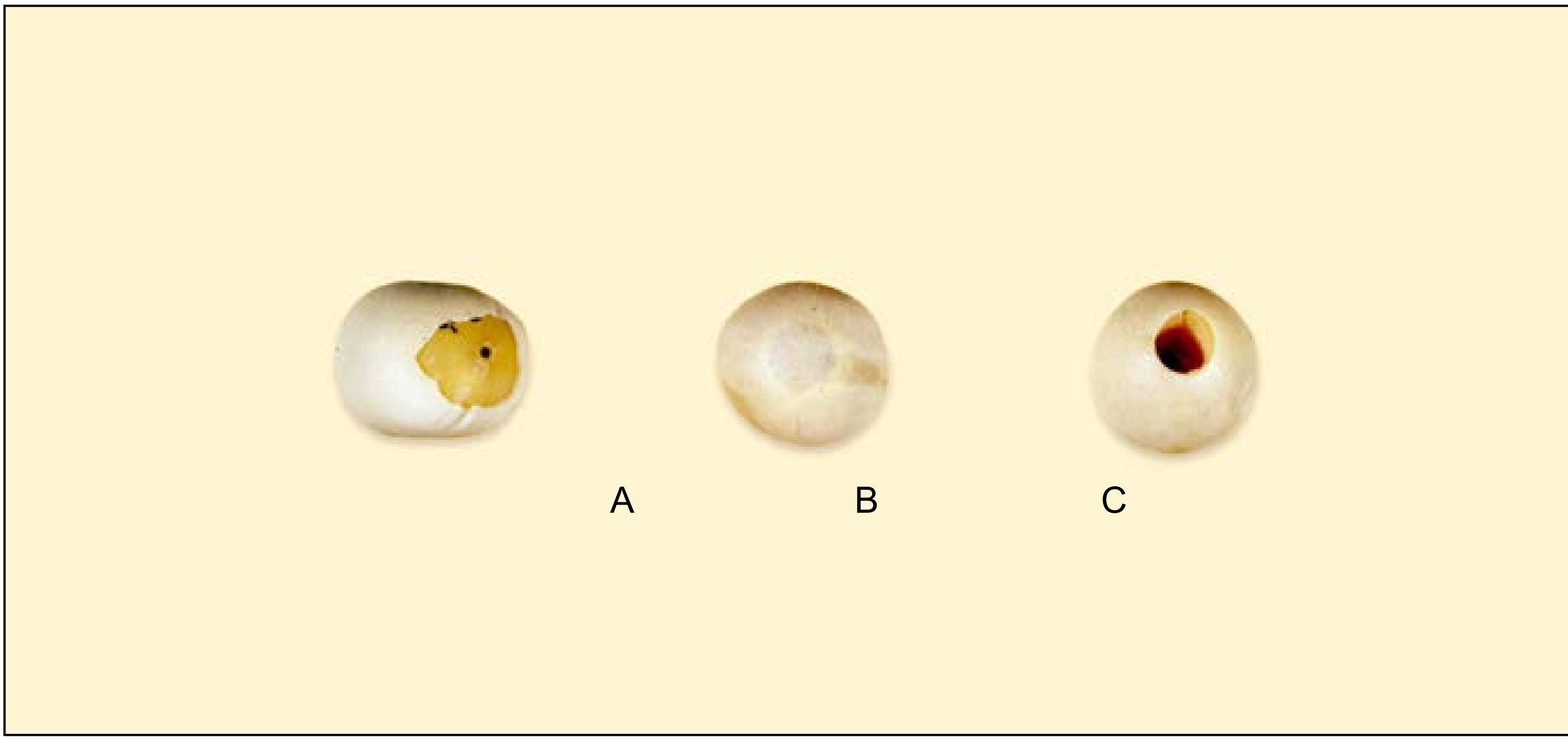
Peas or pieces of peas which have sprouted to the extent that the sprout has cracked/broken through the seed coat and is visible to the minimum degree shown are damage. Also, when it is apparent that the sprouting has occurred (i.e., sprouting is noticeable in representative work sample) but, through handling, the sprout has broken off and is no longer protruding through the seed coat, consider such peas to be damage.

WEATHER DAMAGE

Portion for analysis: approximately 250 grams

Peas and pieces of peas in which the surface area is discolored to the minimum intensity and coverage shown are considered damage.

NOTE: Green peas usually show a black discoloration.



WEEVIL DAMAGE

Portion for analysis: approximately 250 grams

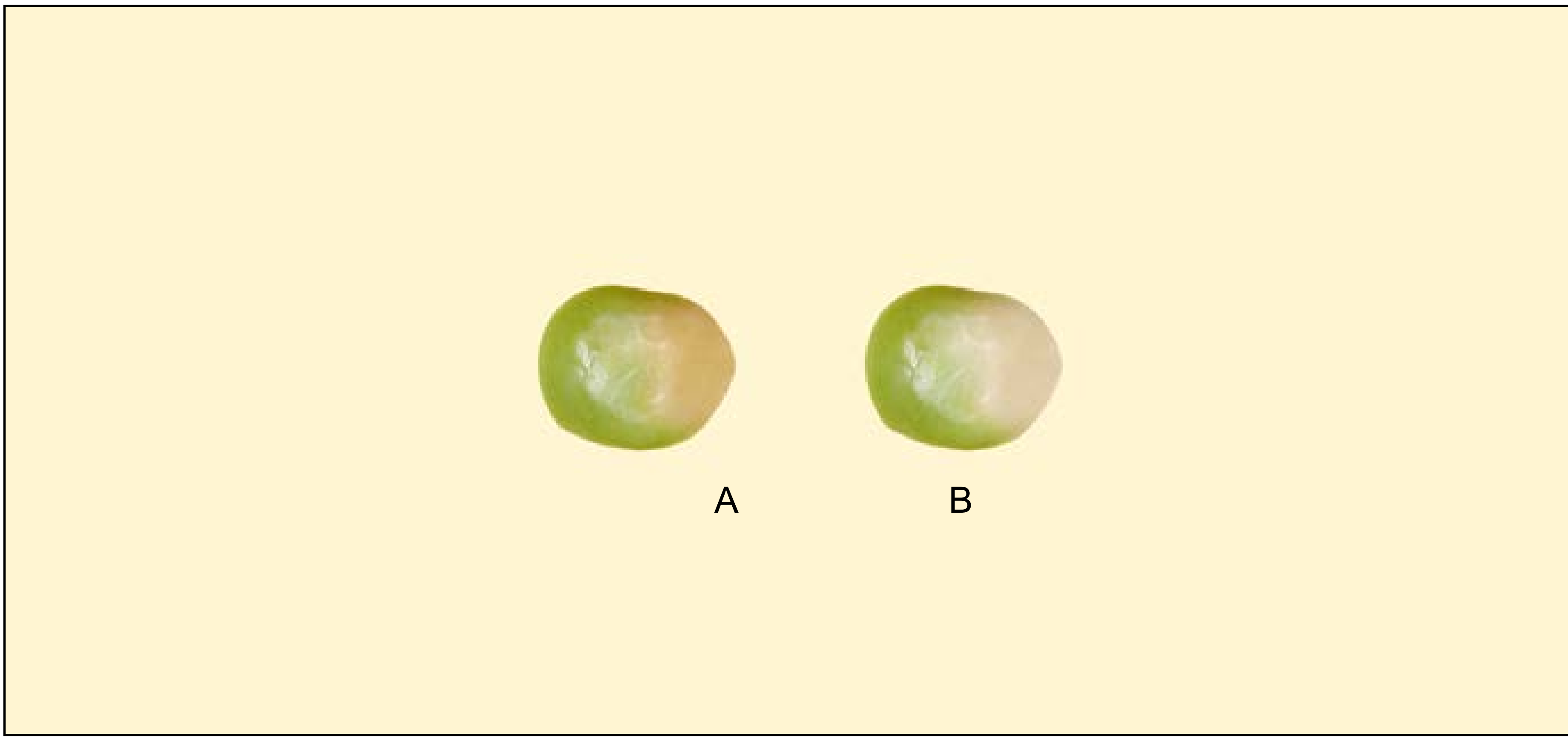
Peas and pieces of peas which meet any one of the following criteria are weevil damage.

Pea A: Weevil Pinhole: Peas and pieces of peas that have been stung by an insect and the damage extends into the cotyledon.

Pea B: Visible Window: Peas and pieces of peas which are weevil-bored; but the weevil has not emerged from the pea. The seed coat (window) still covers the bore hole.

Pea C: Open Eye: Peas and pieces of peas which are weevil-bored and the weevil has emerged from the pea.

NOTE: Insect damage peas should also be checked for live or dead insects/larvae for the presence of insect refuse. (Refer to Pea and Lentil Handbook, Section 4.12 and 4.31).



BLEACHED (GREEN PEAS)

Portion for analysis: approximately 250 grams

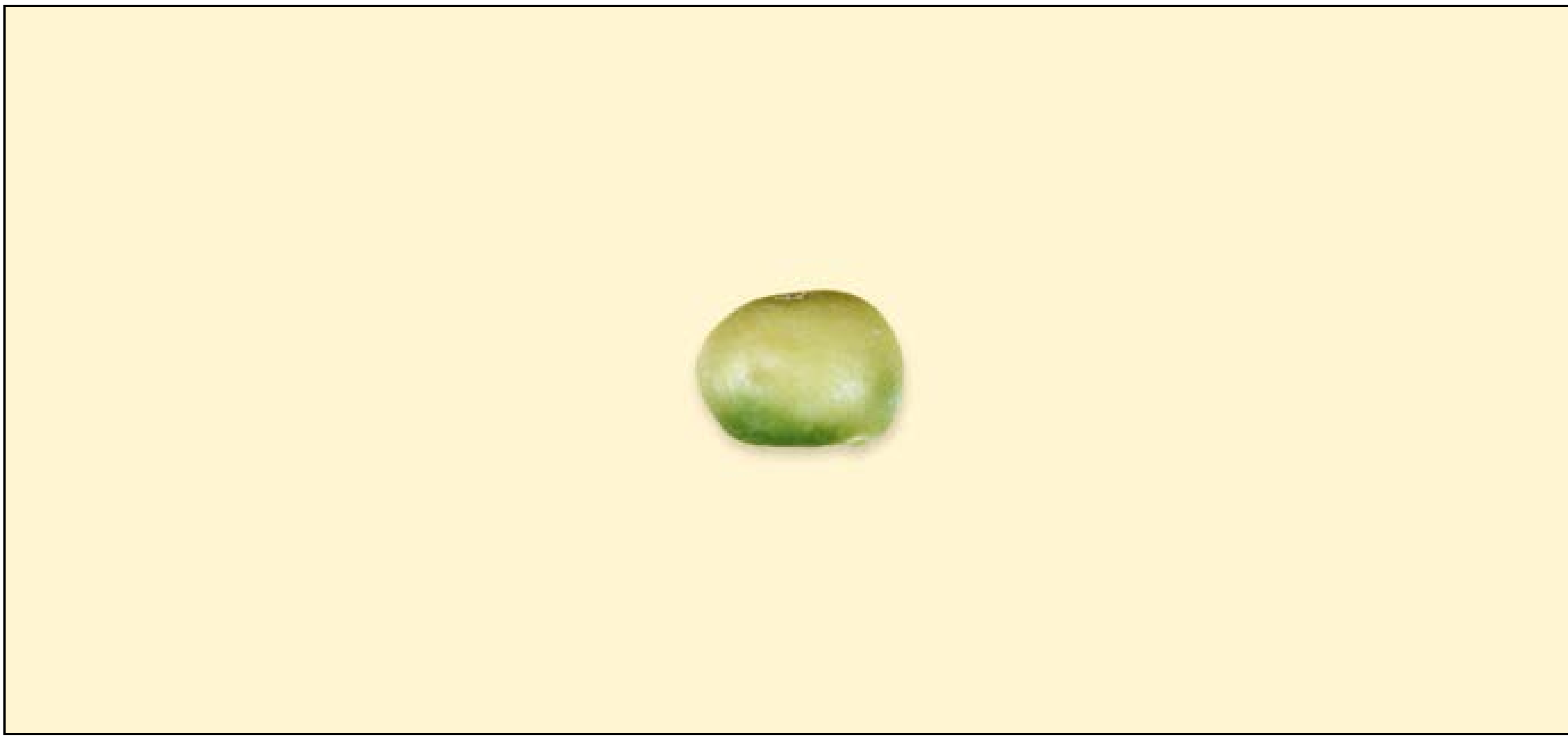
Peas, Split peas, and pieces of peas which have one-eighth or more of the surface distinctly bleached to a white or light creamy yellow or white color equal to or greater than shown are bleached.

Pea A: Light creamy yellow (Newly Harvested peas)

Pea B: White (Stored/Aged peas)

NOTE: No tinge of green shall be “bleeding” through this area to be considered bleached.

Newly harvested bleached peas tend to be yellow or creamy yellow in color. In storage, the color gradually changes to creamy or white.

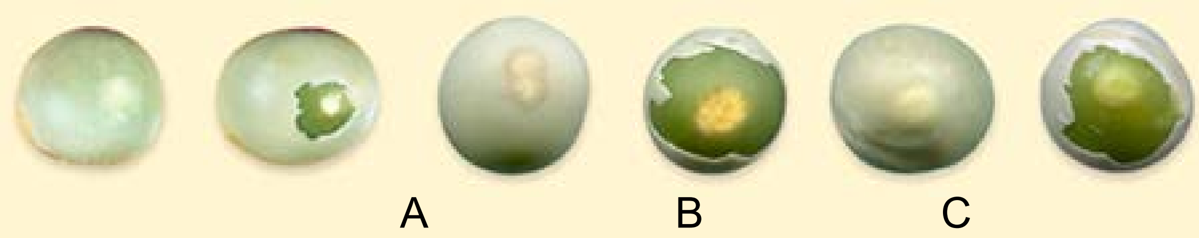


BLEACHED (YELLOW PEAS)

Portion for analysis: approximately 250 grams

Peas, Split Peas and pieces of peas which have one-eighth or more of the surface bleached green to a color equal to or greater than shown are bleached.

NOTE: To function as “Bleached,” the area of green being considered should not have any tinge of yellow bleeding through.



DAMAGE (CHALKY)

Portion for analysis: approximately 250 grams

Peas, split peas, and pieces of peas with a spot (singularly or in combination) that meets the minimum coverage shown on cotyledon A. are considered damage.

Illustrations show suspect and confirmed kernels:

Pea A: Chalky Spot (Lygus) - bright white colored, grainy texture and penetrates into the coyledon.

Pea B: Chalky Spot (Hail) - light beige colored, mealy texture and penetrates deep into the coyledon.

Pea C: Bruised (Not damaged) - cloudy off-white color, smooth texture and is only on the surface of the cotyledon.

NOTE: To check the size and color of the chalky spot, remove the seed coat carefully so as not to chip, scrape, or otherwise disrupt the surface of the coyledon.

A B

DAMAGE BY HEAT

Portion for analysis: approximately 250 grams

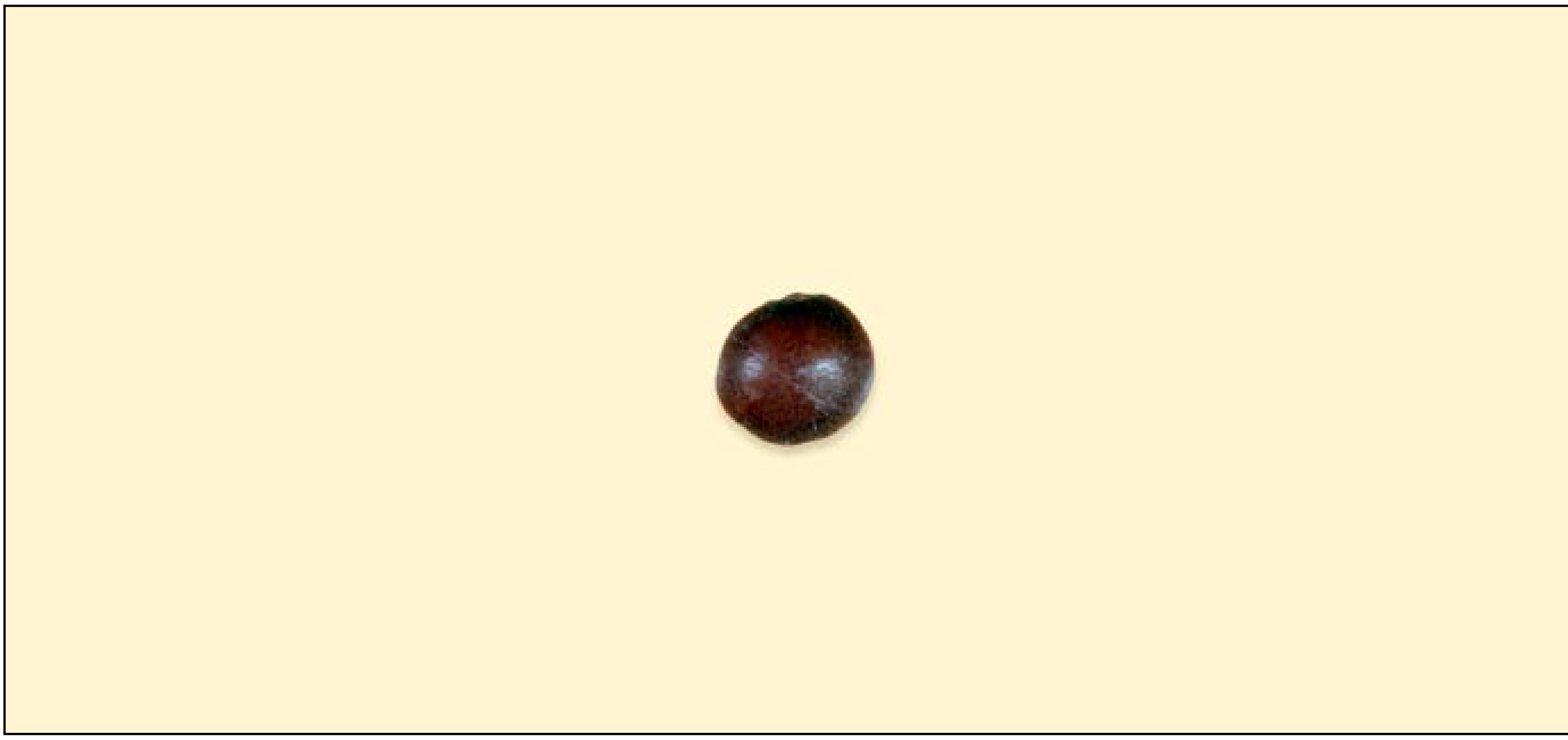
Peas, Split peas, and pieces of peas whose cotyledon is discolored to the minimum color intensity and coverage shown are damage. It is permissible to prorate the coverage requirement provided the color intensity is such that it sufficiently compensates for any apparent loss in coverage (e.g.. 1/2 coverage requires twice the color intensity).

Illustrations show suspect and confirmed kernels:

Pea A: Yellow (peas and split peas)

Pea B: Green (peas and split peas)

NOTE: Whole dry peas shall be split so that the flat side of the split peas can be compared to the print. When split, only one of the halves need to meet the minimum color and coverage requirement.

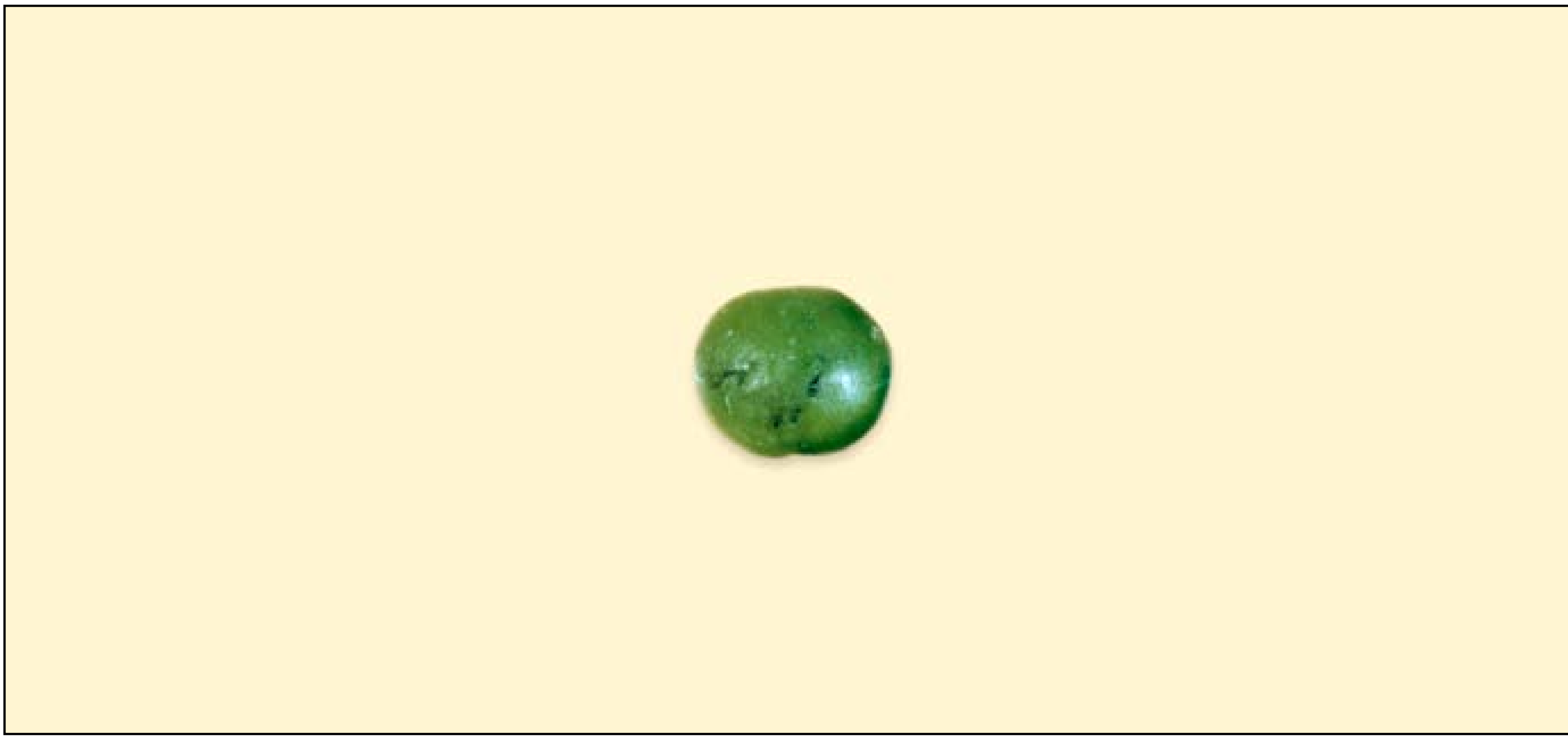


HEAT DAMAGE

Portion for Analysis: Approximately 250 grams

Peas, Split peas, and pieces of peas whose cotyledon had been materially and uniformly discolored to the minimum extent shown are heat damage. It is permissible to prorate the coverage requirement provided the color intensity is such that it sufficiently compensates for any apparent loss in coverage (e.g., 1/2 coverage requires twice the color intensity).

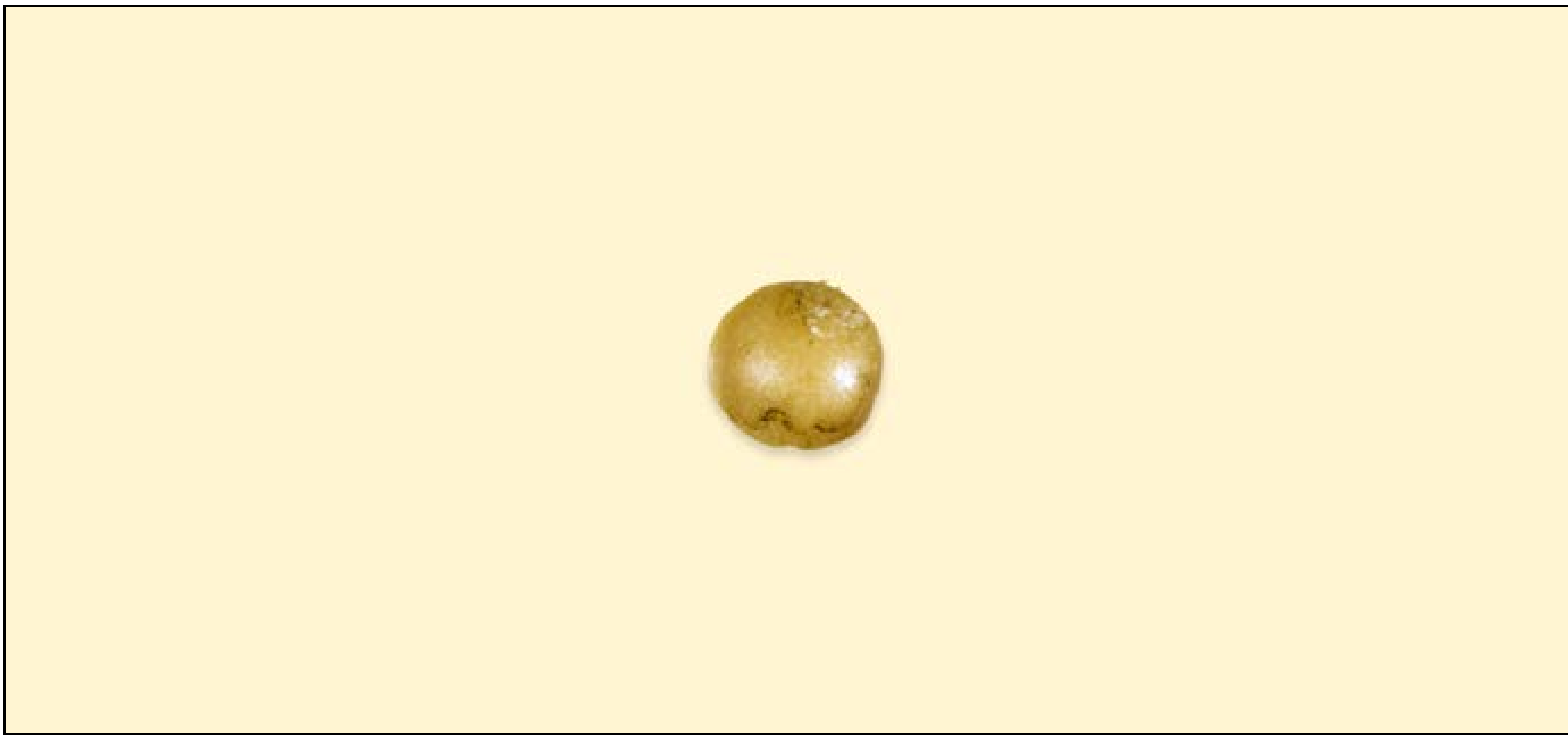
NOTE: For whole peas, chip/scrape the seed coat to confirm that the discoloration extends to the cotyledon. For split or broken pieces of peas, the round or flat side may be considered (it is not necessary for both to meet).



STAINED (GREEN)

Portion for analysis: approximately 250 grams

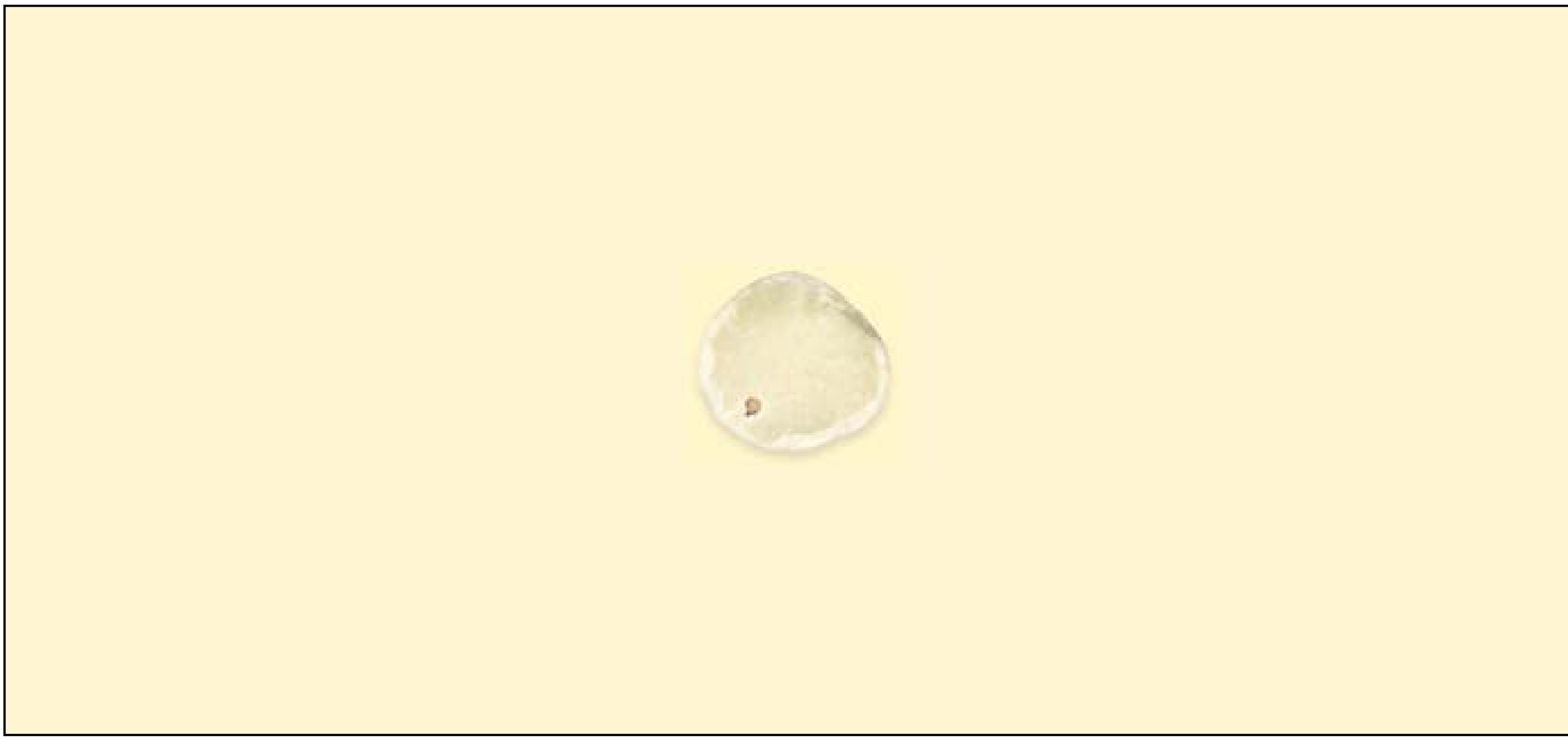
Green split peas with stain adhering to the cotyledon equal to or greater than shown are damage.



STAINED (YELLOW)

Portion for analysis: approximately 250 grams

Yellow split peas with stain adhering to the cotyledon equal to or greater than shown are damage.

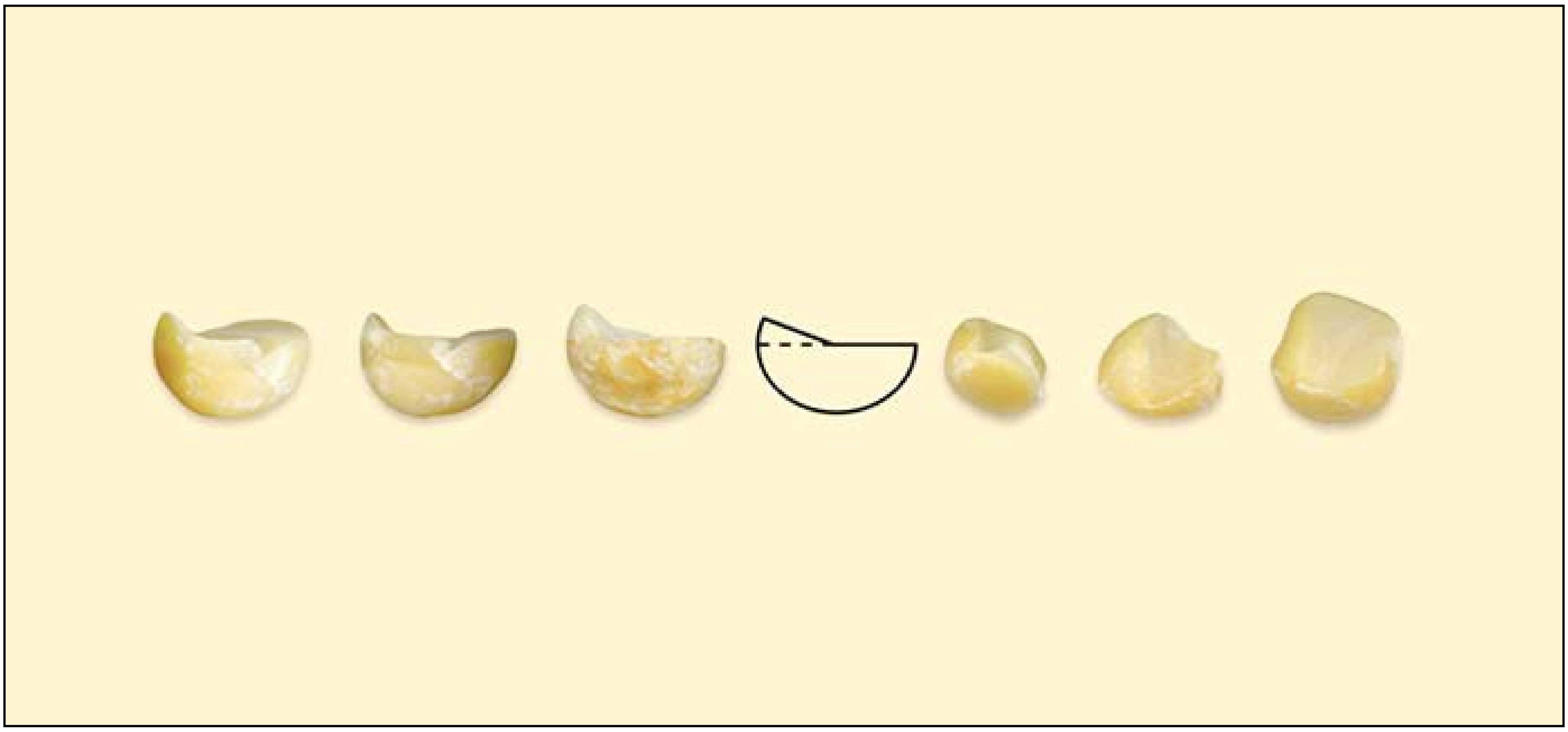


WEEVIL DAMAGE (CAVITY)

Portion for Analysis: Approximately 250 grams

Split Peas which contain a cavity left by the weevil larvae are weevil damage.

NOTE: Insect damage split peas should also be checked for live or dead insects/larvae and for the presence of insect refuse. (Refer to Pea and Lentil Handbook, Section 5.12 and 5.30).



WHOLE DRY PEA

Portion for Analysis: Approximately 250 grams

Whole peas, in split peas, are technically defined as being more than one half of a whole pea. When a pea is “split” successfully along its natural seam, each equal part is considered a split pea and the determination of whole peas is not a consideration. However, when the breakage occurs off the natural seam and one of the divided fractions is estimated to be 55% or more of a whole pea, it is to be considered a “whole pea”. In the assessment of a whole pea, inspectors are to disregard the pea hilum.

The above images provide examples of what constitutes a whole pea and are not intended to represent any visual standard.

SMOOTH YELLOW DRY PEAS (Fair Color)
Portion for Analysis: Approximately 250 grams

Peas, after the removal of dockage, defective peas and foreign material that are reasonably uniform in appearance and have an overall color equal to or better than depicted (but less than good) are considered fair color. Peas whose appearance does not meet this minimum color requirement are considered to be of “poor” color. Record this information on the work record and in the “Remarks” section of the certificate. Peas that are “fair” in color shall grade no higher than U.S. No. 2. Peas that are “poor” in color shall grade no higher than U.S. No. 3.

SMOOTH YELLOW DRY PEAS (Good Color)
Portion for Analysis: Approximately 250 grams

Peas, after the removal of dockage, defective peas and foreign material that are reasonably uniform in appearance and have an overall color equal to or better than depicted are considered good color. Peas whose appearance does not meet this minimum color requirement are considered to be of “fair” or “poor” color. Consult the ILP depiction for “fair” color to determine which of these color descriptions apply. Record this information on the work record and in the “Remarks” section of the certificate. Peas that are “fair” in color shall grade no higher than U.S. No. 2. Peas that are “poor” in color shall grade no higher than U.S. No. 3

LENTILS

Definition of lentils

Threshed seeds of the lentil plant (Lens culinaris Moench), which after removal of the dockage, contain 50.0 percent or more of whole lentils and not more than 10.0 percent foreign material.

BLIGHT (ASCOCHYTA) DAMAGE

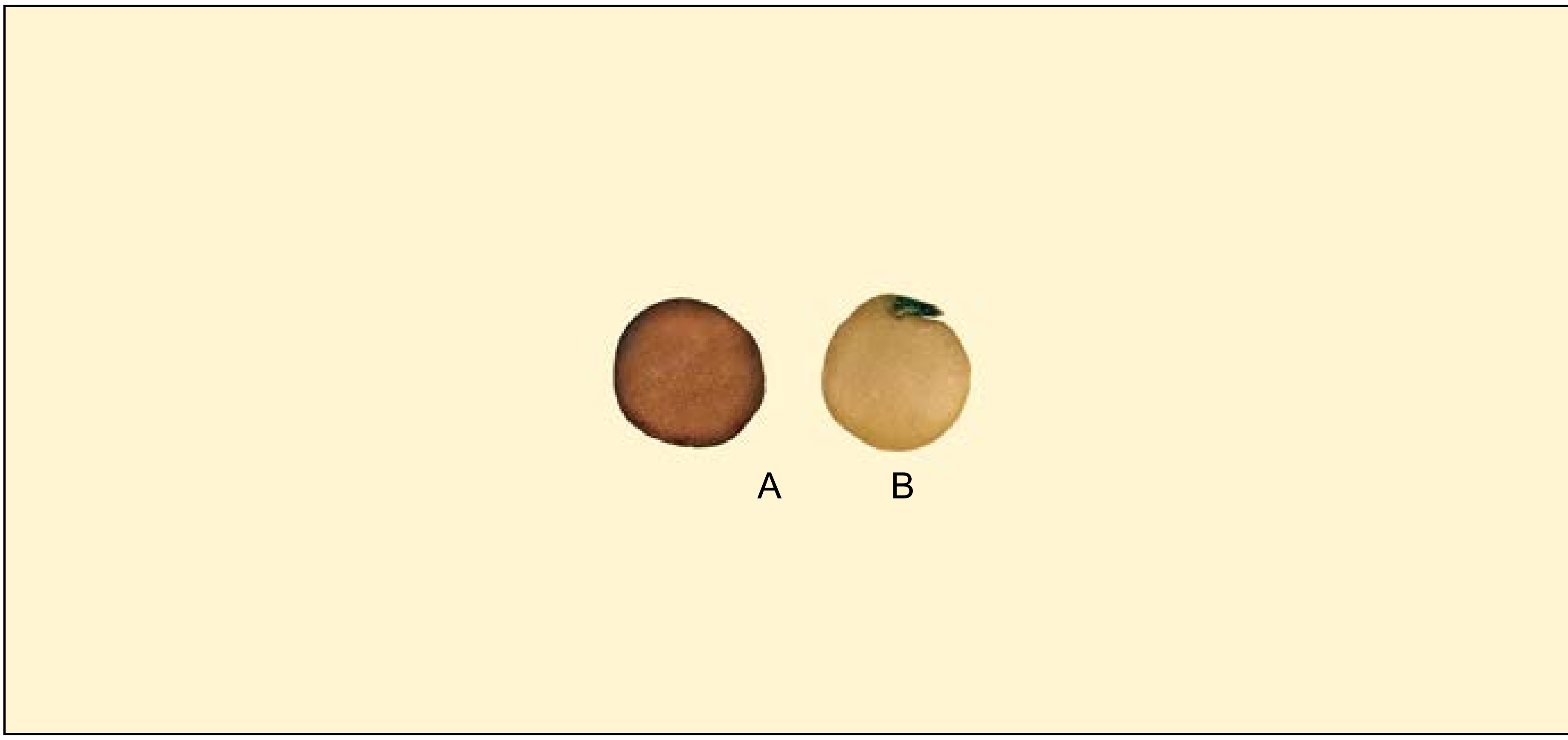
Portion for Analysis: Approximately 125 grams (large seeded) or
Approximately 60 grams (small seeded)

Ascochyta blight is a fungal disease that reduces yields and affects seed quality. Infected seeds have brown blotches on the surface. Severely infected seed is purplish brown, shriveled and small, and may have a white fungal growth on the surface. This VRI depicts what Ascochyta blight looks like and is not intended to represent any minimum coverage or color intensity requirement.

Illustration shows from left to right:

Suspect Damage: Discolored seed coat. Seed coats of suspect seeds must be scraped to determine if the mold penetrates into the cotyledon.

Confirmed Damage: Cotyledon shows some discoloration and mold is evident in the lower central portion of the exposed area. Any amount of mold present on the cotyledon is sufficient evidence of damage.



DAMAGED BY HEAT

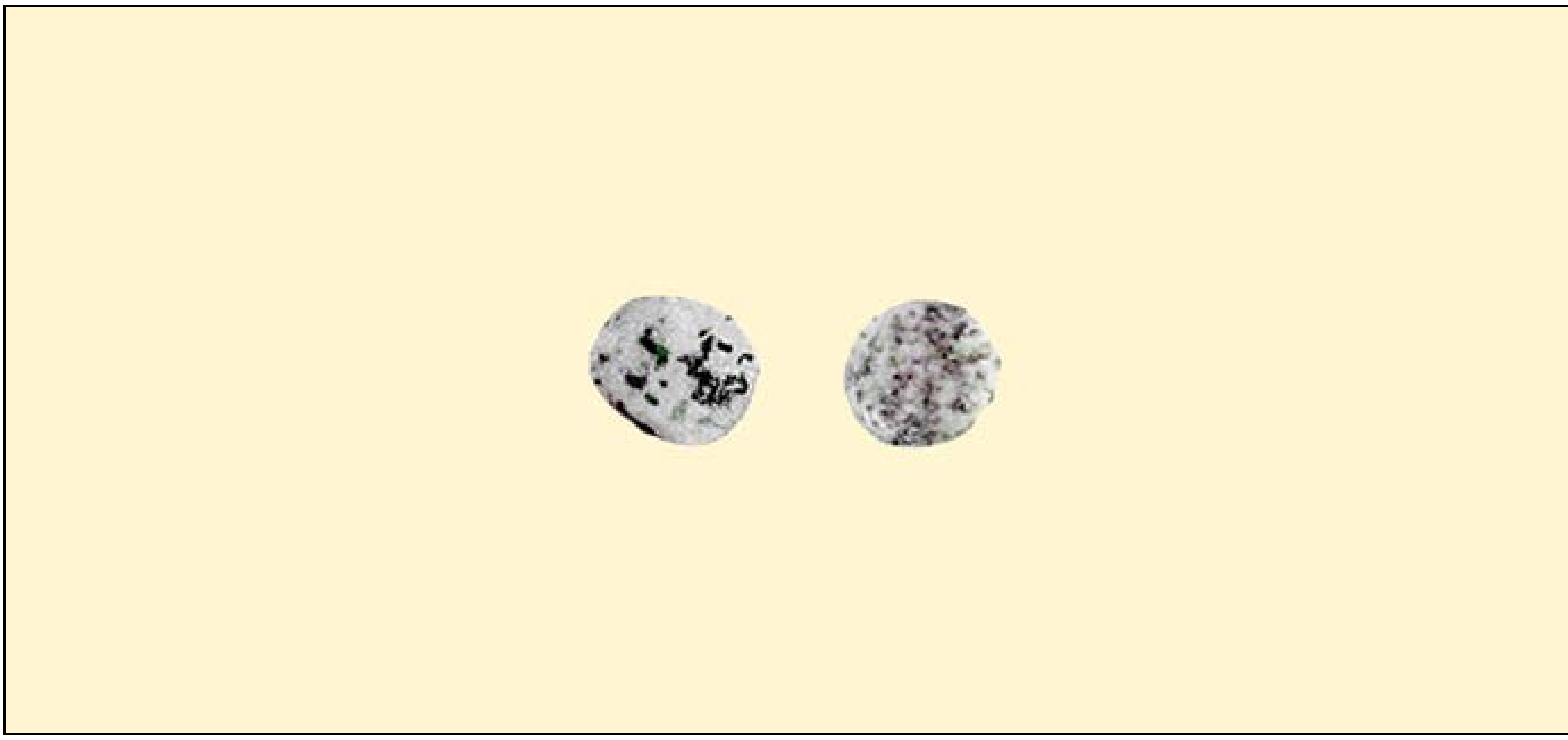
Portion for Analysis: Approximately 125 grams (large seeded) or
Approximately 60 grams (small seeded)

Lentils which have been damaged to an extent that the cotyledon has been discolored equal to or greater than shown.

Illustration shows from left to right:

Lentil A: Seed coat on (suspect).

Lentil B: Seed coat removed (confirmed).



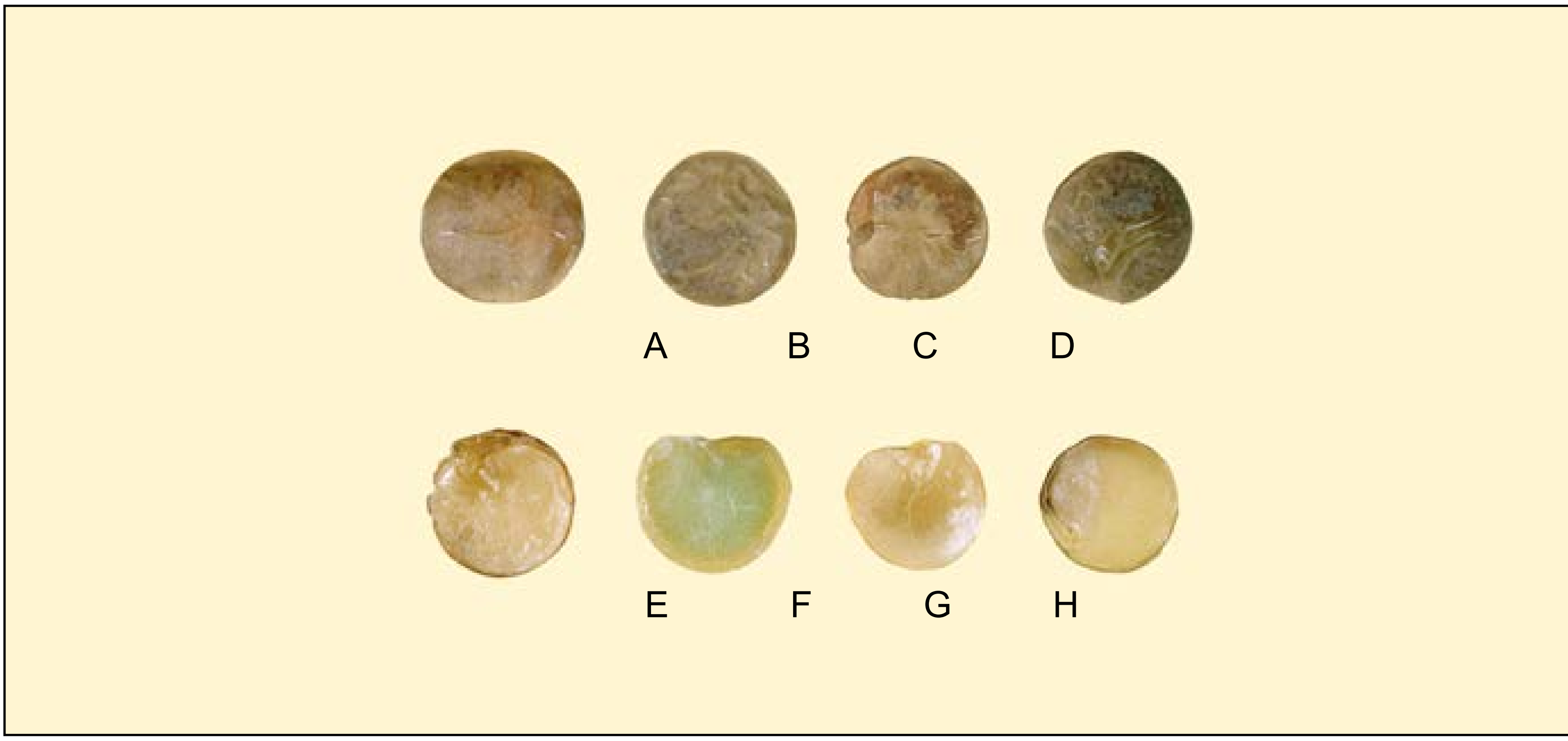
DIRT / GRIME

Portion for Analysis: Approximately 125 grams (large seeded) or Approximately 60 grams (small seeded)

Illustration shows from left to right:

Dirt: Lentils and pieces of lentils with dirt adhering to one or both sides of the seed coat equal to or greater than shown are damage.

Grime: Lentils and pieces of lentils with grime adhering to one or both sides of the seed coat equal to or greater than shown are damage.



FROST DAMAGE

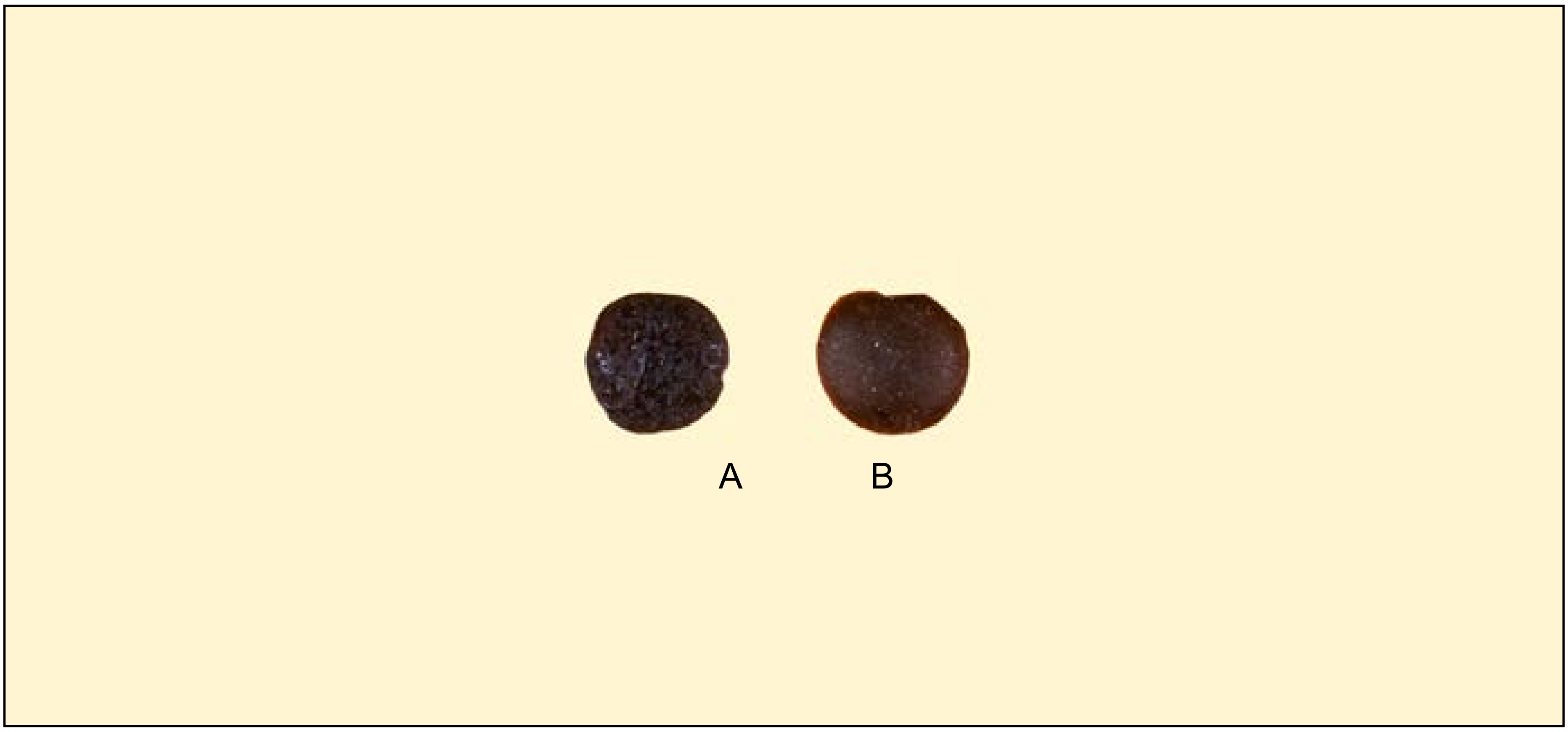
Portion for Analysis: Approximately 125 grams (large seeded) or
Approximately 60 grams (small seeded)

Lentils that have been damaged by frost to the extent that the cotyledon or the seed coat has been discolored equal to or greater than that shown.

Lentils A, B and C: Suspect frost damage.

Lentil D: Confirmed frost. There is no need to split lentil to confirm damage.

Lentils E, F, G and H:The cotyledons are split, showing the different kinds of discoloration that are considered frost damage.



HEAT DAMAGE

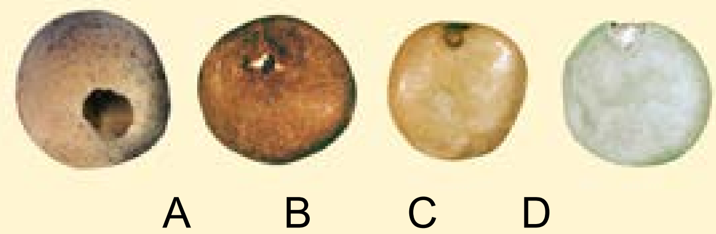
Portion for Analysis: Approximately 125 grams (large seeded) or
Approximately 60 grams (small seeded)

Lentils which have been materially damaged to an extent that the cotyledon has been discolored equal to or greater than shown.

Illustration shows from left to right:

Lentil A: Seed coat on (suspect).

Lentil B: Seed coat removed (confirmed).



INSECT STUNG DAMAGE

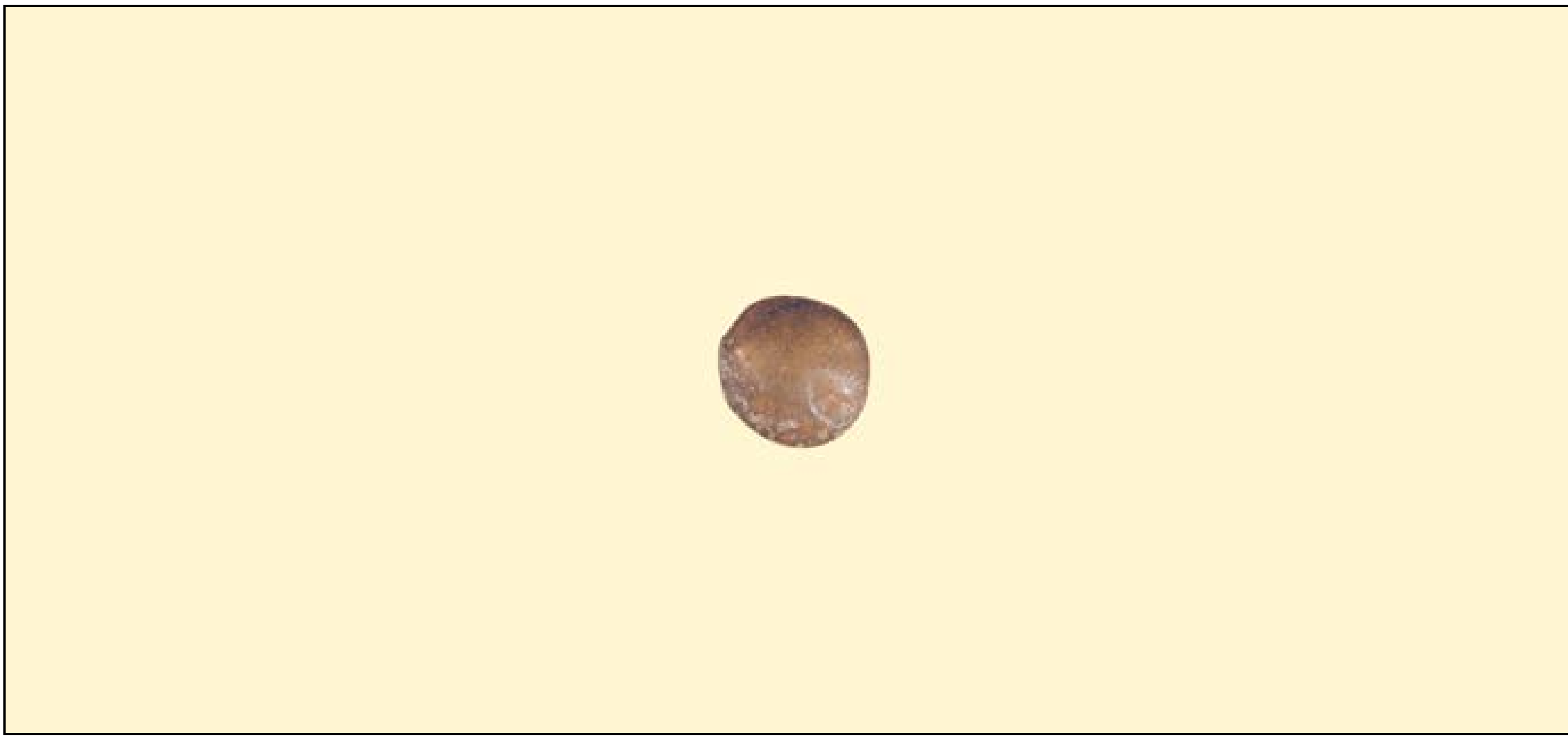
Portion for Analysis: Approximately 125 grams (large seeded) or
Approximately 60 grams (small seeded)

Lentils that have been stung by insects where the damage is distinct and extends into the cotyledon.

Lentil A: Weevil Damage. Lentils containing small “pinhole” entrance holes or larger circular exit holes (shown) are considered weevil damage.

Lentil B: Insect Damage. Stings from other insect pests (e.g. Lygus Bug) are less pronounced, but significant enough to function as damage.

Lentil C/D: Chalky Spot. Pitted, discolored, crater-like depressions in the seed coat (C) must be scraped to confirm the damage extends into the cotyledon, leaving a chalky appearance equal to the minimum size shown (D).



MOLD DAMAGE

Portion for Analysis: Approximately 125 grams (large seeded) or
Approximately 60 grams (small seeded)

Lentils that contain surface mold equal to or greater than shown.

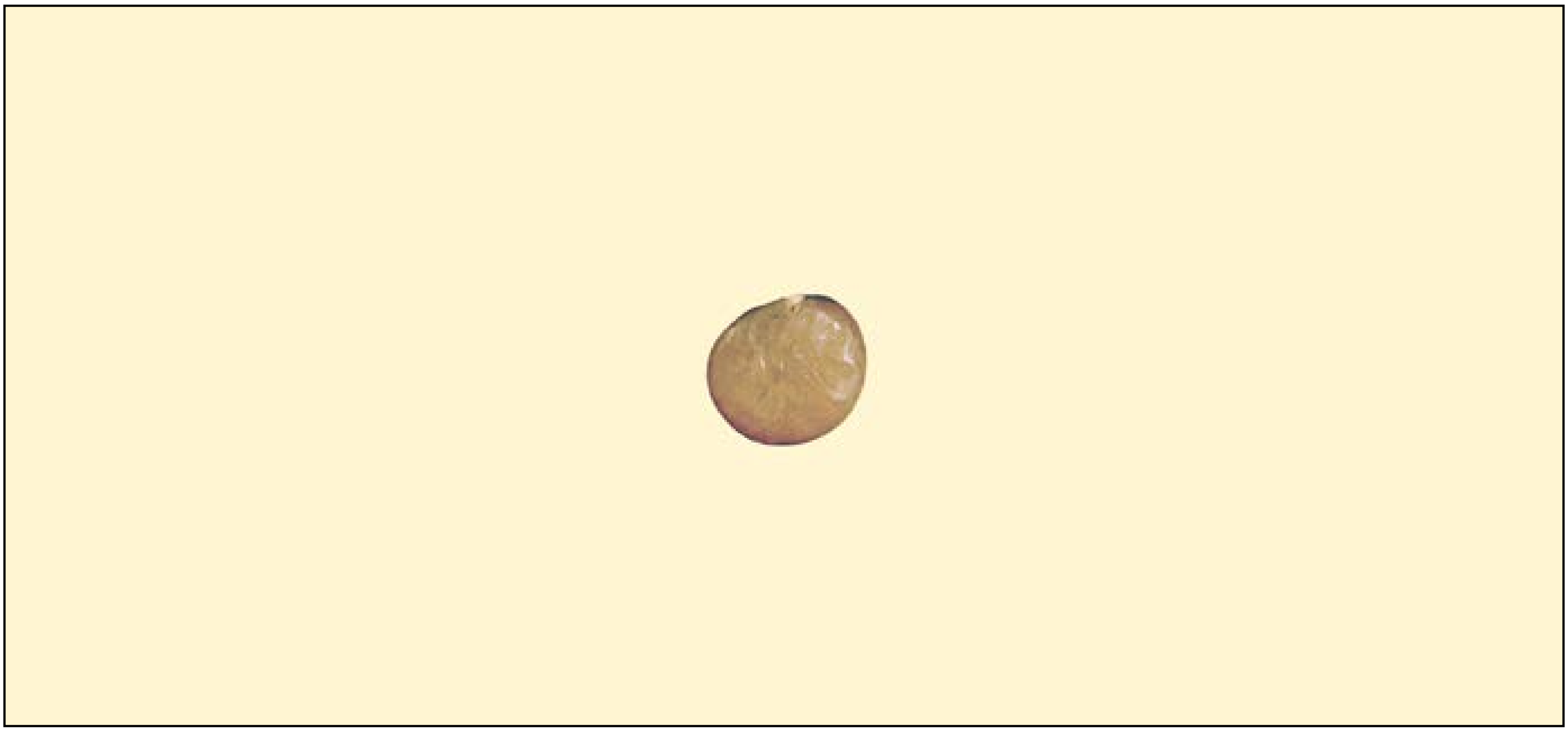
NOTE: Any amount of mold on the cotyledon is damage.

SKINNED

Portion for Analysis: Approximately 125 grams (large seeded) or Approximately 60 grams (small seeded)

Lentils from which three-fourths or more of the seed coat has been removed.

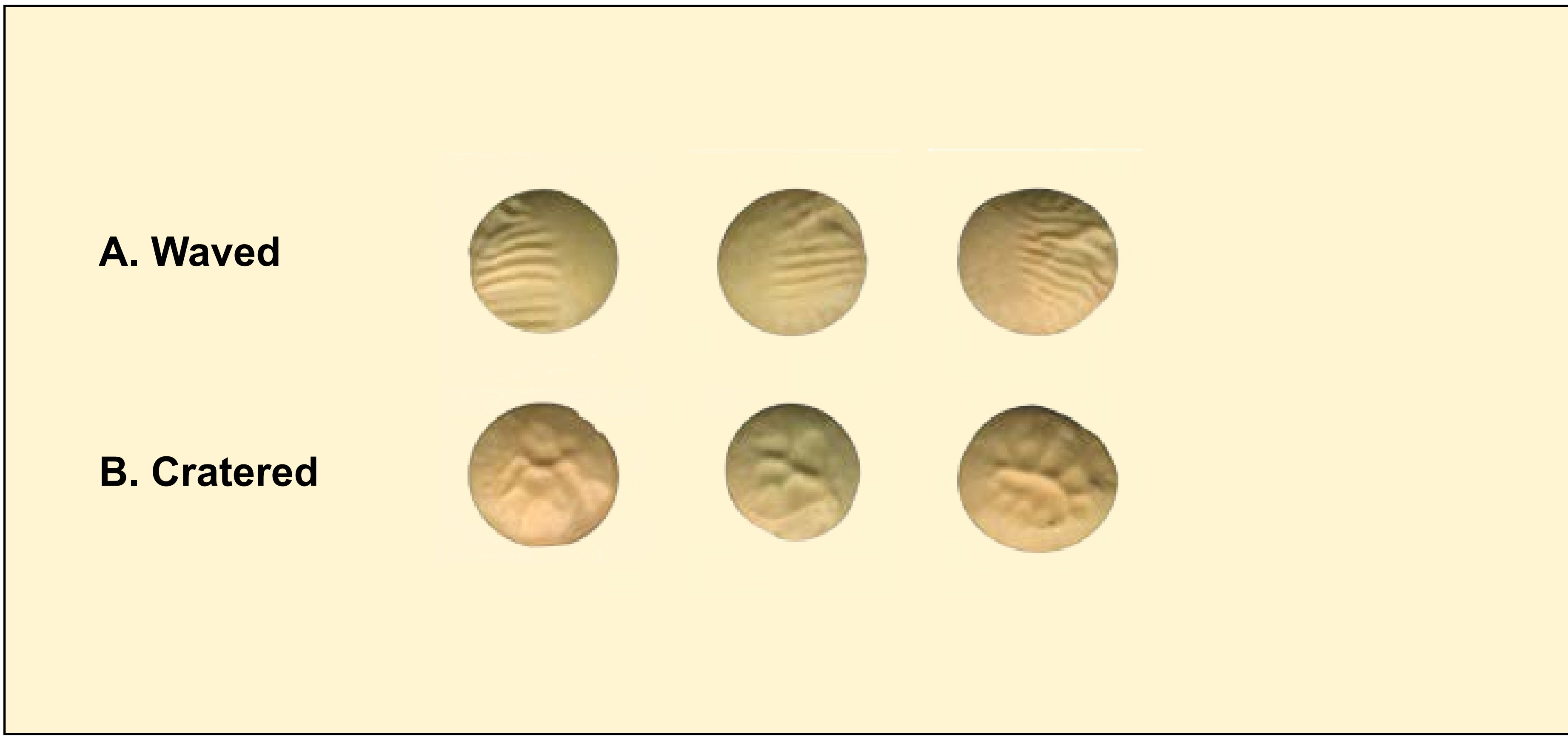
NOTE: Both sides of the lentil are illustrated on the print. This is not considered damage.



SPROUT DAMAGE

Portion for Analysis: Approximately 125 grams (large seeded) or Approximately 60 grams (small seeded)

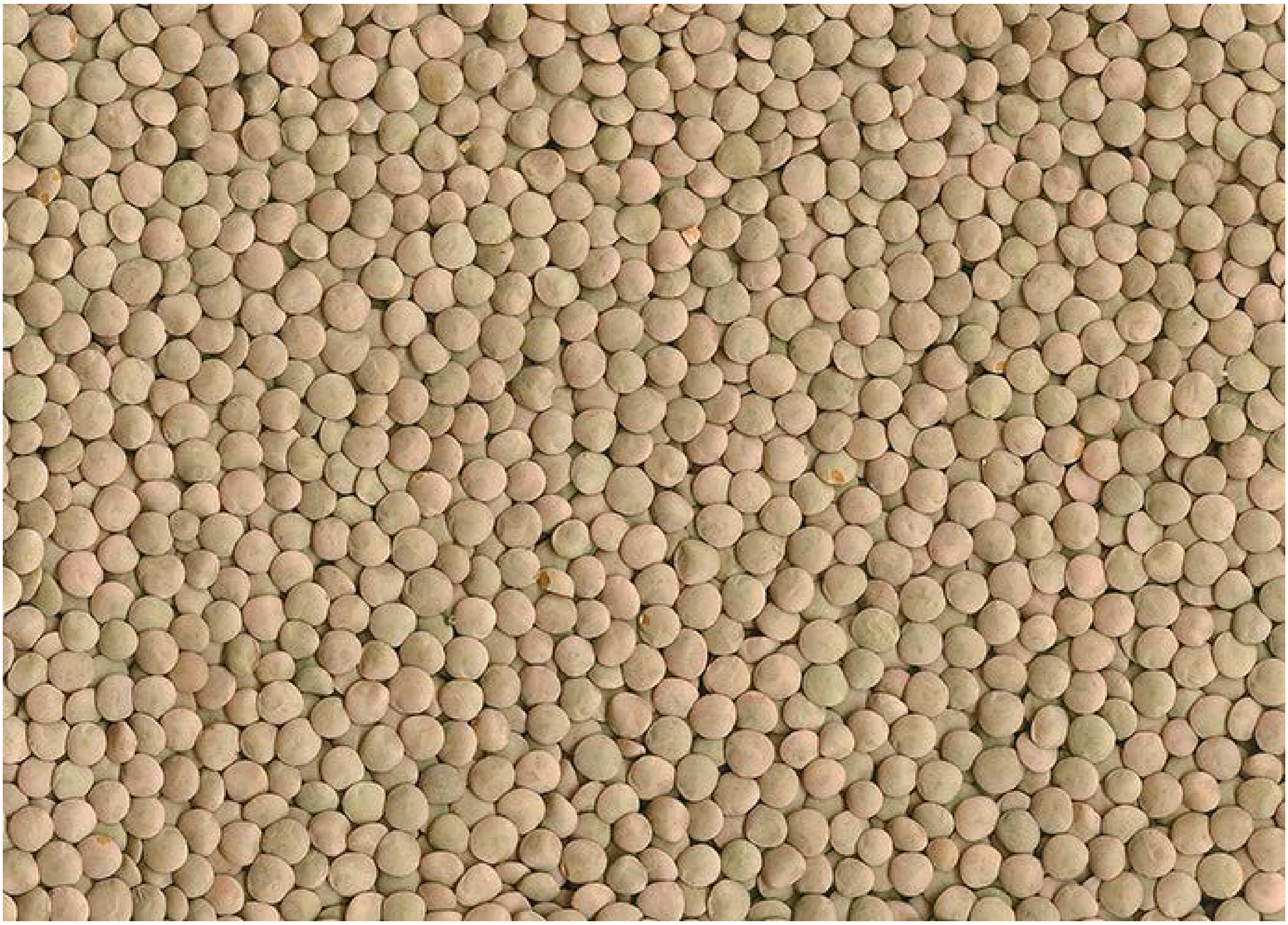
Lentils which are sprouted equal to or greater than shown.



WRINKLED LENTILS

Portion for Analysis: Approximately 125 grams (large seeded) or
Approximately 60 grams (small seeded)

Wrinkled lentils are sound lentils that are substantially wrinkled on at least 50% of one side.



SPECIAL GRADE GREEN LENTILS

1000 grams (sample as a whole)

Special grade (Green Lentils) are clear seeded (Non-Mottled) lentils that possess a natural, uniform green color. Green Lentils are determined after the removal of dockage, but before the removal of defects and must be equal to or better than depicted on the Interpretive Line Print to qualify for special grade “Green Lentils”.

REGULAR GOOD COLOR (UNIFORM)

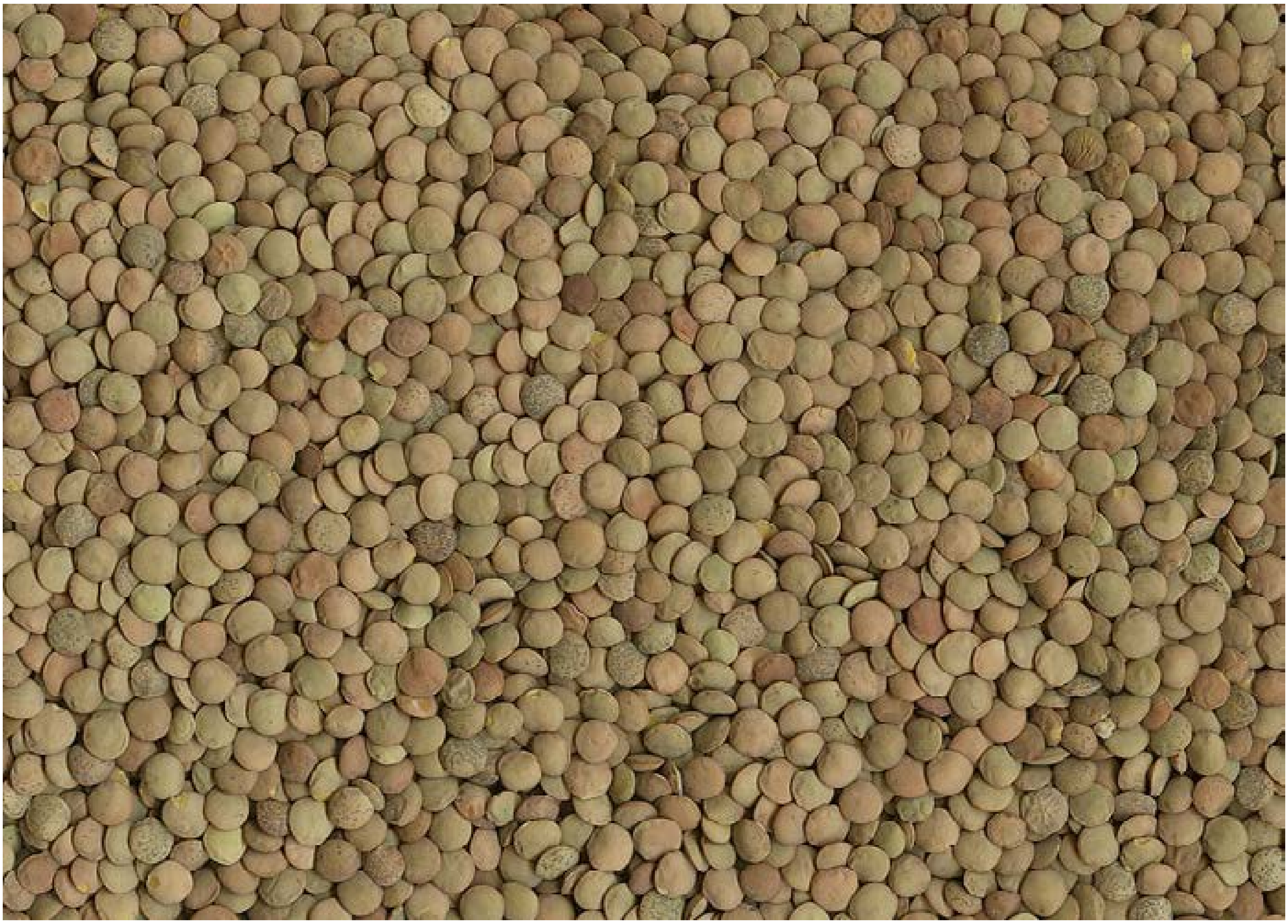
Portion for Analysis: 125 grams (large seeded) 60 grams (small seeded)

Lentils, after the removal of dockage, defective lentils and foreign material that are reasonably uniform in appearance and have an overall color equal to or better than depicted are considered Good Color. Lentils whose appearance does not meet this minimum color requirement are considered to be of “fair” or “poor” color. Consult the ILP depiction for “fair” color to determine which of these color descriptions apply. Record this information on the work record and in the “Remarks” section of the certificate. Lentils that are “fair” in color shall grade no higher than U.S. No.2. Lentils that are “poor” in color shall grade no higher than U.S. No. 3.

REGULAR FAIR COLOR (UNIFORM)

Portion for Analysis: 125 grams (large seeded) 60 grams (small seeded)

Lentils, after the removal of dockage, defective lentils and foreign material that are reasonably uniform in appearance and have an overall color equal to or better than depicted (but less than good) are considered Fair Color. Lentils whose appearance does not meet this minimum color requirement are considered to be of “poor” color. Record this information on the work record and in the “Remarks” section of the certificate. Lentils that are “fair” in color shall grade no higher than U.S. No.2. Lentils that are “poor” in color shall grade no higher than U.S. No. 3.



REGULAR GOOD COLOR (NON-UNIFORM)

Portion for Analysis: 125 grams (large seeded) 60 grams (small seeded)

Lentils, after the removal of dockage, defective lentils and foreign material that lack uniformity in seed coat color (e.g. blend of old/new), but have an overall color equal to or better than depicted are considered Good Color. Lentils whose appearance does not meet this minimum color requirement are considered to be of “fair” or “poor” color. Consult the ILP depiction for “fair” color to determine which of these color descriptions apply. Record this information on the work record and in the “Remarks” section of the certificate. Lentils that are “fair” in color shall grade no higher than U.S. No.2. Lentils that are “poor” in color shall grade no higher than U.S. No. 3.

REGULAR FAIR COLOR (NON-UNIFORM)

Portion for Analysis: 125 grams (large seeded) 60 grams (small seeded)

Lentils, after the removal of dockage, defective lentils and foreign material that are reasonably uniform in appearance and have an overall color equal to or better than depicted (but less than good) are considered Fair Color. Lentils whose appearance does not meet this minimum color requirement are considered to be of “poor” color. Record this information on the work record and in the “Remarks” section of the certificate. Lentils that are “fair” in color shall grade no higher than U.S. No.2. Lentils that are “poor” in color shall grade no higher than U.S. No. 3.

PARDINA GOOD COLOR (UNIFORM)

Portion for Analysis: 60 grams

Lentils, after the removal of dockage, defective lentils and foreign material that are reasonably uniform in appearance and have an overall color equal to or better than depicted are considered Good Color. Lentils whose appearance does not meet this minimum color requirement are considered to be of “fair” or “poor” color. Consult the ILP depiction for “fair” color to determine which of these color descriptions apply. Record this information on the work record and in the “Remarks” section of the certificate. Lentils that are “fair” in color shall grade no higher than U.S. No.2. Lentils that are “poor” in color shall grade no higher than U.S. No. 3.

PARDINA FAIR COLOR (UNIFORM)

Portion for Analysis: 60 grams

Lentils, after the removal of dockage, defective lentils and foreign material that are reasonably uniform in appearance and have an overall color equal to or better than depicted (but less than good) are considered Fair Color. Lentils whose appearance does not meet this minimum color requirement are considered to be of “poor” color. Record this information on the work record and in the “Remarks” section of the certificate. Lentils that are “fair” in color shall grade no higher than U.S. No.2. Lentils that are “poor” in color shall grade no higher than U.S. No. 3.

PARDINA GOOD COLOR (NON-UNIFORM)

Portion for Analysis: 60 grams

Lentils, after the removal of dockage, defective lentils and foreign material that lack uniformity in seed coat color (e.g. blend of old/new), but have an overall color equal to or better than depicted are considered Good Color. Lentils whose appearance does not meet this minimum color requirement are considered to be “fair” or “poor” color. Consult the ILP depiction for “fair color to determine which of these color descriptions apply. Record this information on the work record and in the “Remarks” section of the certificate. Lentils that are “fair” in color shall grade no higher than U.S. No. 2. Lentils that are “poor” in color shall grade no higher than U.S. No. 3.

PARDINA FAIR COLOR (NON-UNIFORM)

Portion for Analysis: 60 grams

Lentils, after the removal of dockage, defective lentils and foreign material that are reasonably uniform in appearance and have an overall color equal to or better than depicted (but less than good) are considered Fair Color. Lentils whose appearance does not meet this minimum color requirement are considered to be of “poor” color. Record this information on the work record and in the “Remarks” section of the certificate. Lentils that are “fair” in color shall grade no higher than U.S. No.2. Lentils that are “poor” in color shall grade no higher than U.S. No. 3.

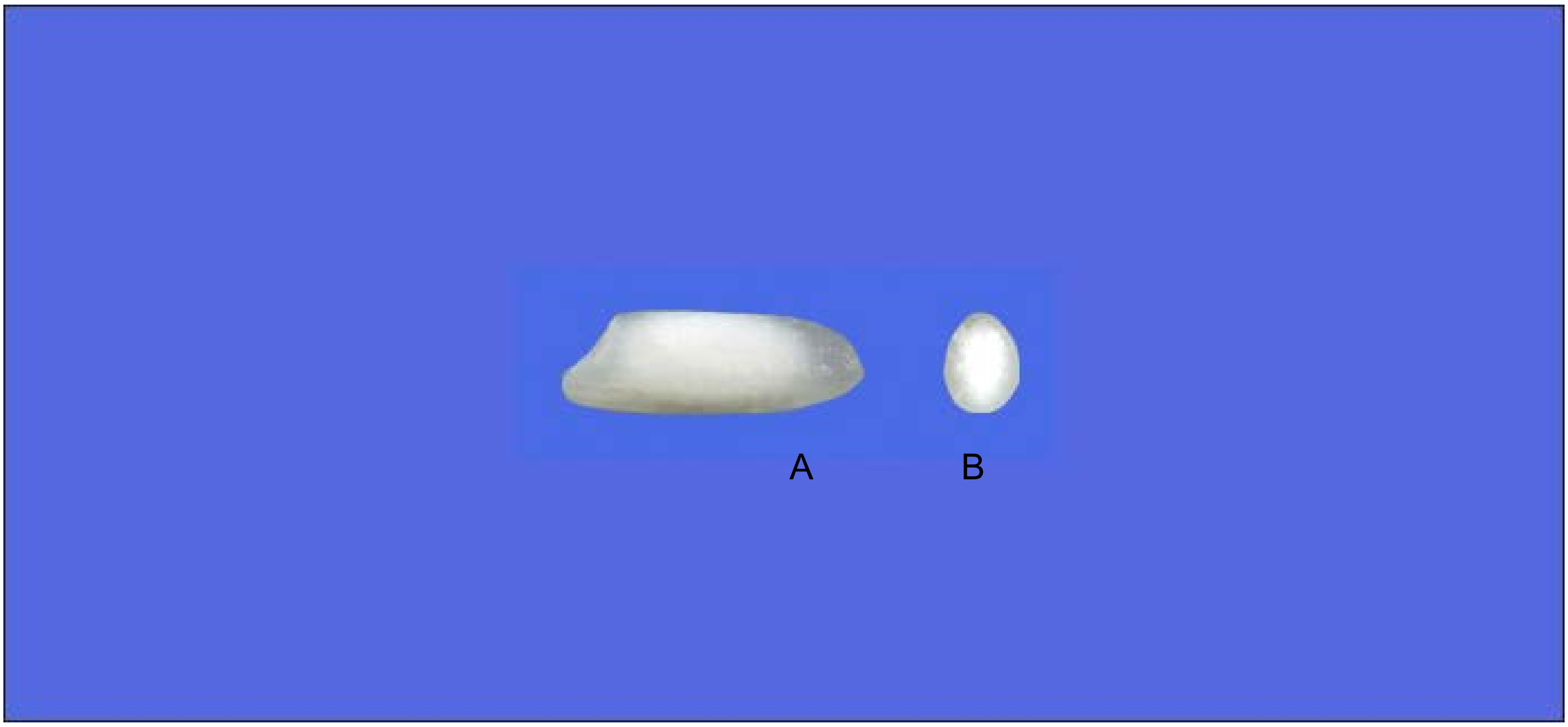
RICE

Definition of rice

Rough Rice: Rice (Oryza sativa L.) which consists of 50 percent or more of paddy kernels of rice.

Brown Rice: Rice (Oryza sativa L.) which consists of more than 50.0 percent of kernels of brown rice, and which is intended for processing to milled rice.

Milled Rice: Whole or broken kernels of rice (Oryza sativa L.) from which the hulls and at least the outer bran layers have been removed and which contain not more than 10.0 percent of seeds, paddy kernels, or foreign material, either singly or combined.



CHALKY KERNELS

Portion for Analysis: Not less than 25 grams

Whole or broken kernels of rice which, in cross-section, contain an opaque white or “chalk-like” area that encompasses one-half or more of the exposed portion.

Illustration shows from left to right:

Kernel A: Whole kernel (suspect)

Kernel B: Cross-section (confirmed)

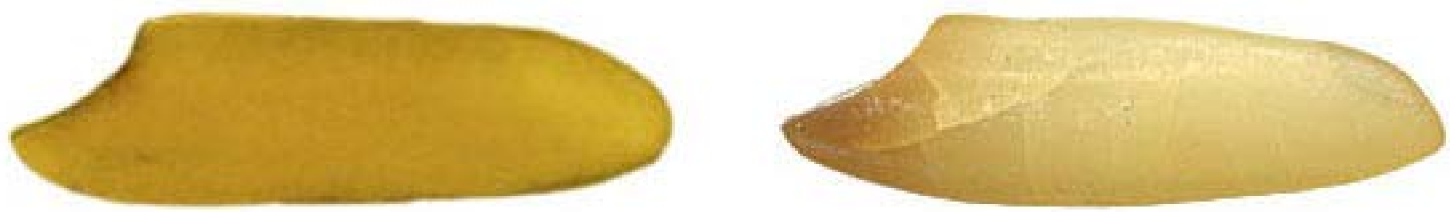
NOTE: Kernel (B) provides an example of what constitutes a chalky kernel and is not intended to represent any visual standard.

DAMAGE BY HEAT (STAIN)

Portion for Analysis: Not less than 25 grams

Whole or broken kernels of rice that are distinctly discolored to the minimum color intensity illustrated. There is no minimum coverage requirement.

NOTE: Any parboiled rice kernels in non-parboiled rice is damage.



A B

HEAT DAMAGE

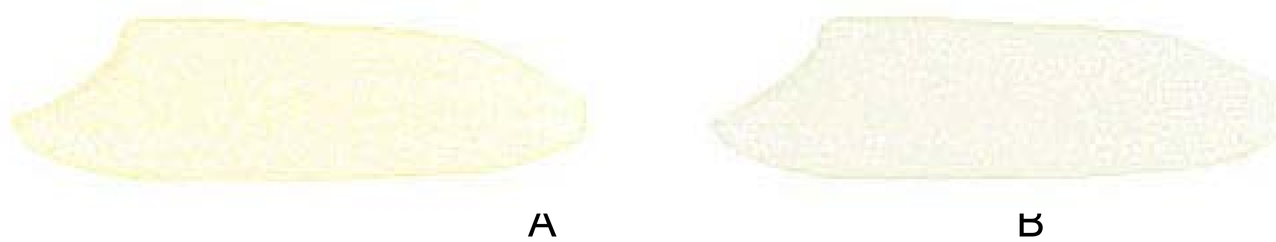
Portion for Analysis: Not less than 500 grams

Whole and broken kernels of rice which have been discolored to the minimum color intensity and coverage shown are considered heat damaged.

Illustration shows from left to right:

Kernel A: Minimum color intensity.

Kernel B: Minimum area of coverage around germ area (collar and tip). The same surface area coverage requirement also applies to other parts of the rice kernel.



LIGHTLY STAINED (NOT DAMAGE)

Portion for Analysis: Not less than 25 grams

Whole or broken kernels of rice that are not damaged, but have a light discoloration (STAIN) equal to or greater than shown on top kernel. There is no minimum coverage requirement.

Illustration shows from left to right:

Kernel A: Lightly stained kernel.

Kernel B: Unstained kernel.

CERTIFICATION: This lot contains ___% lightly stained kernels. Lightly stained kernels are not considered damaged and are not in the damage results.

NON-OBJECTIONABLE SEEDS

Portion for Analysis: Not less than 25 grams for Brewers Milled Rice. All other determinations 500 grams.

Whole of broken seeds of Echinochloa Crusagalli (commonly referred to as Barnyard Grass, Watergrass, and Japanese Millet).

OBJECTIONABLE SEEDS

Portion for Analysis: Not less than 25 grams for Brewers Milled Rice. All other determinations 500 grams.

Whole or broken seeds of plants other than rice and Echinochloa crusgalli (commonly known as-Barnyard Grass, Watergrass, and Japanese Millet).

NOTE: Not inclusive of all seeds.

A B C

PECKY KERNELS DAMAGE

Portion for Analysis: Not less than 25 grams

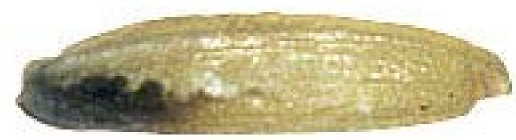
Whole or broken kernels damaged by insects or other means.

Illustration shows from left to right:

Kernel A: If the color intensity is equal to or greater than shown, the kernel is distinctly damaged.

Kernel B: If the damaged area is equal to or greater than the area shown, the color intensity will determine distinctly damaged.

Kernel C: Shows a stain spot.

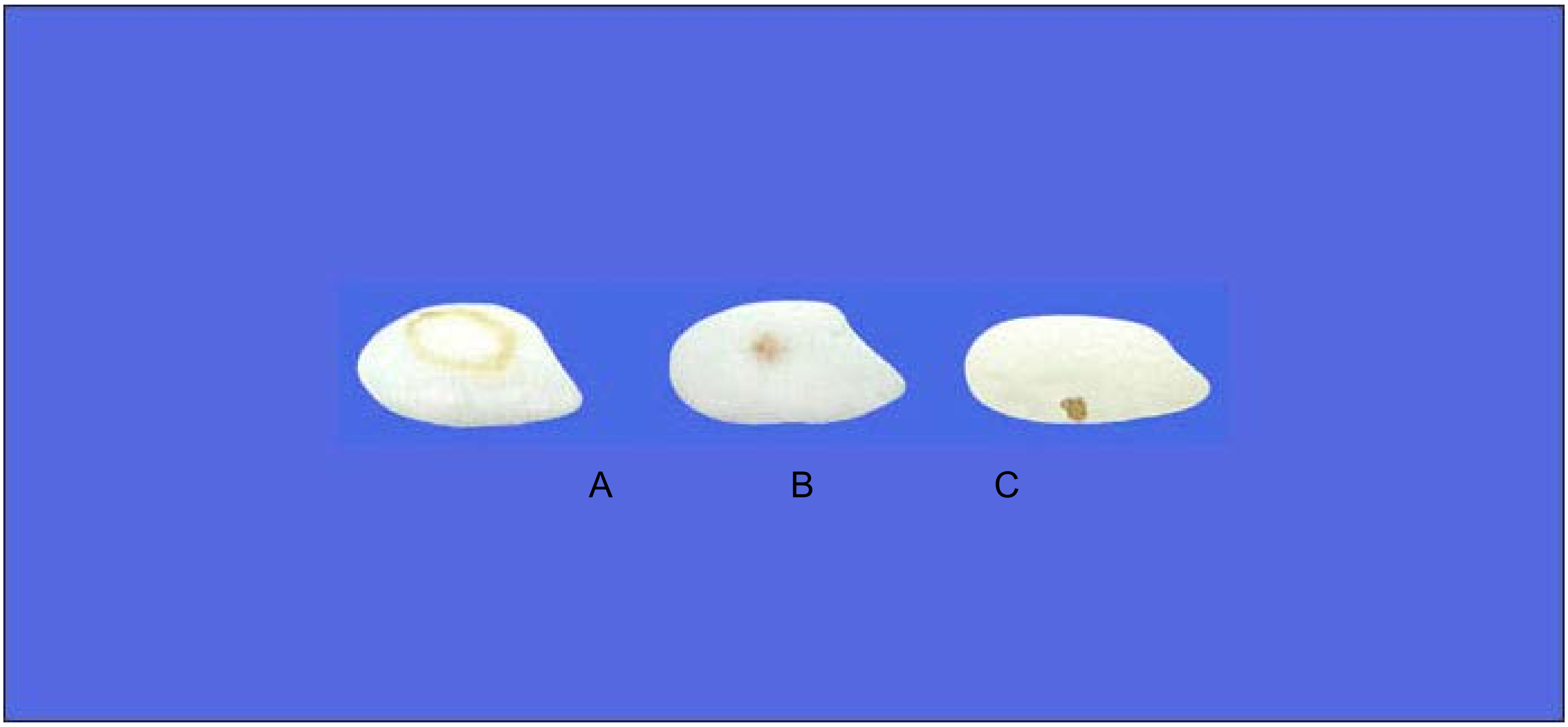


SMUT DAMAGE

Portion for Analysis: Not less than 15 grams

Brown rice kernels infected with smut equal to or greater than shown are considered damage.

When a determination for the special grade “smutty” is necessary, apply the above depiction to determine the percent of kernels “distinctly infected by smut”.



WATER, STAIN & PECK DAMAGED
(GLUTINOUS RICE)

Portion for Analysis: Not less than 25 grams

Whole or broken kernels with any discernible discoloration caused by water, insect, or other means shall be damaged.

Illustration shows from left to right

Kernel A: Shows a water spot (ring).

Kernel B: Shows a stain spot.

Kernel C: Shows an insect peck spot.

WHITE
Portion for Analysis: sample as a whole

EXPLANATION: To Qualify for a U.S. No. 1 grade designation, milled rice must appear white or creamy in color.

CREAMY
Portion for Analysis: sample as a whole

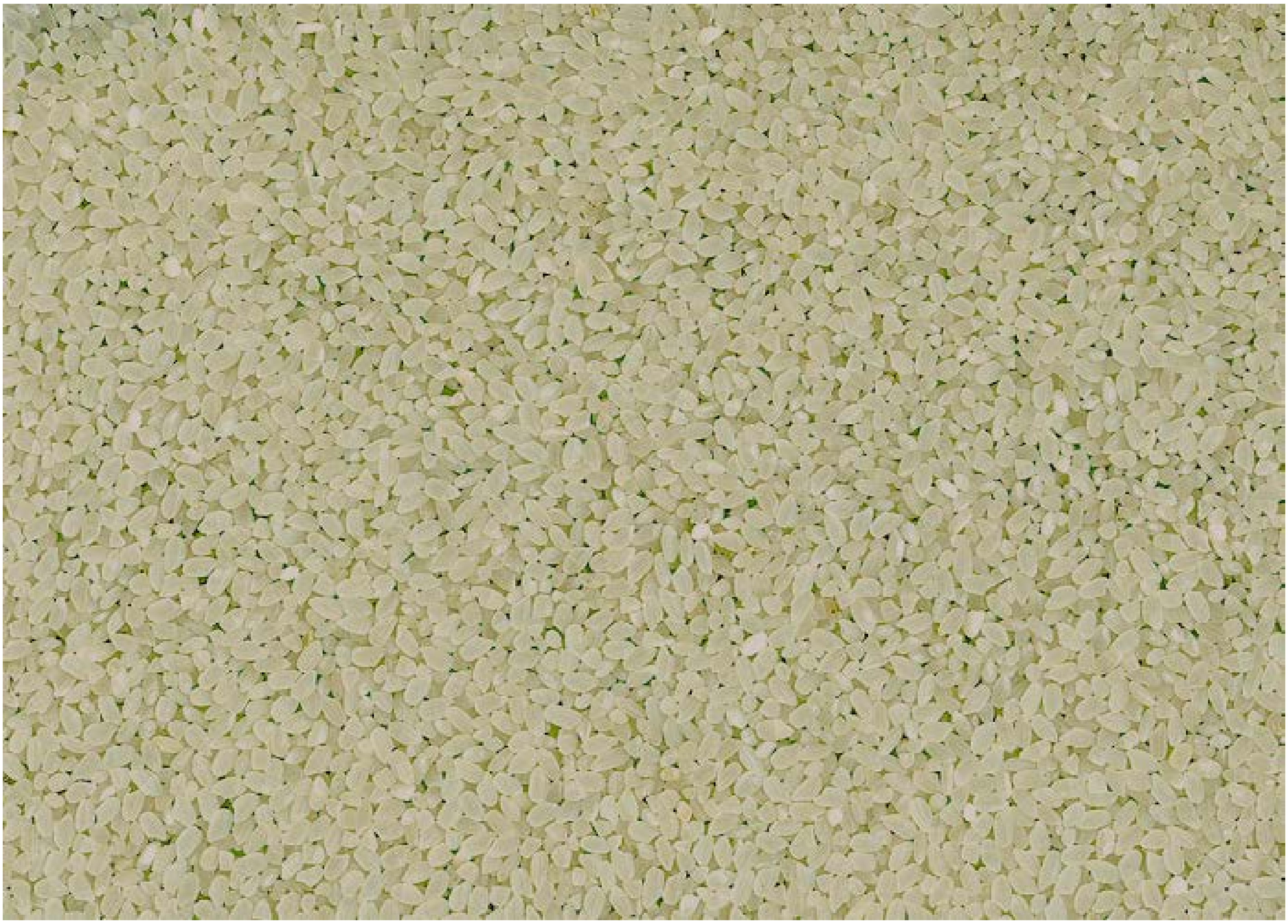
EXPLANATION: To Qualify for a U.S. No. 1 grade designation, milled rice must appear white or creamy in color.

DARK GRAY
Portion for Analysis: sample as a whole

EXPLANATION: Milled rice that is dark gray in color shall be graded not higher than U.S. No. 5.

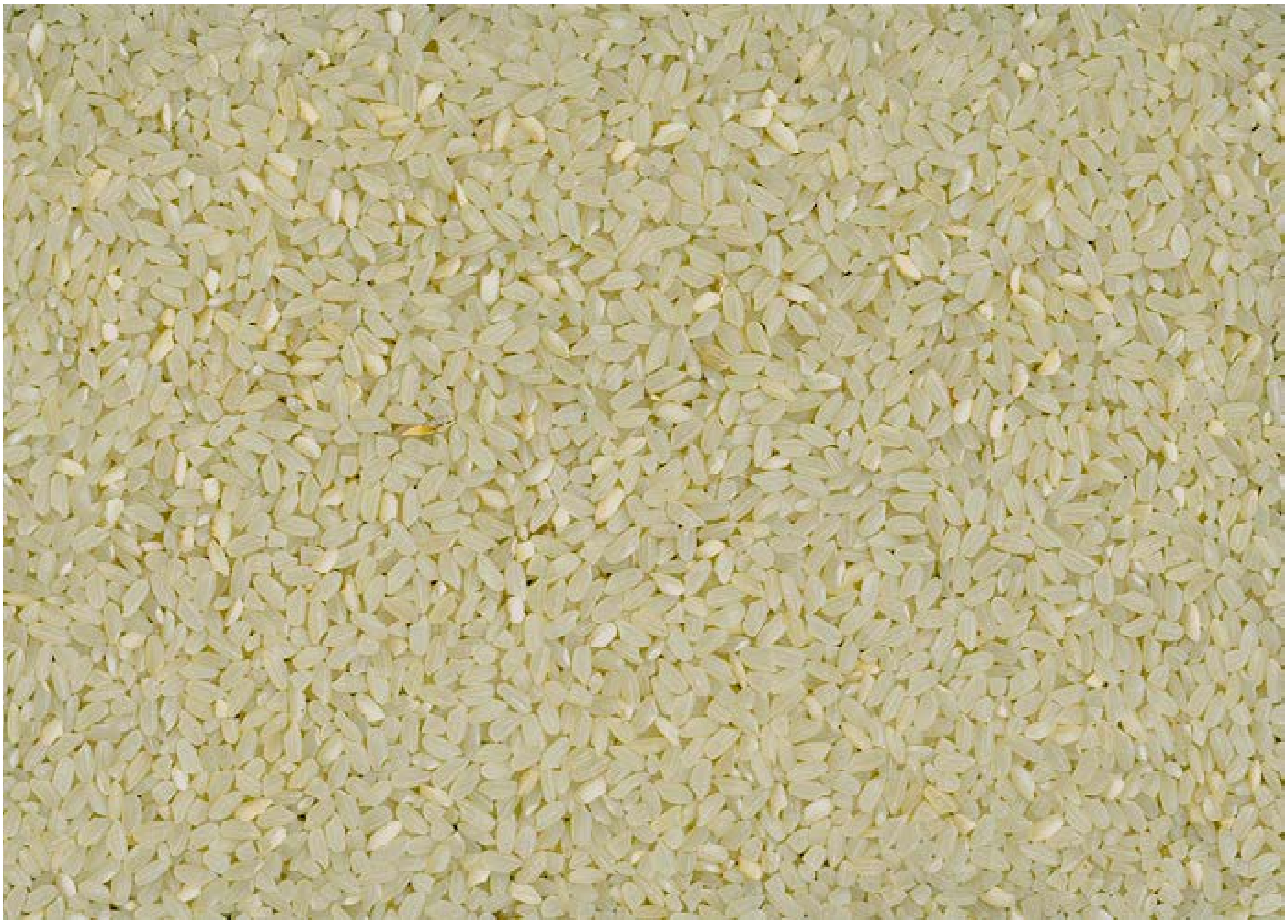
GRAY
Portion for Analysis: sample as a whole

EXPLANATION: Milled rice that is gray in color shall be graded not higher than U.S. No. 4.



LIGHT GRAY
Portion for Analysis: sample as a whole

EXPLANATION: Milled rice that is light gray in color shall be graded not higher than U.S. No. 3.



SLIGHTLY GRAY
Portion for Analysis: sample as a whole

EXPLANATION: Milled rice that is slightly gray in color shall be graded not higher than U.S. No. 2.

ROSY
Portion for Analysis: sample as a whole

EXPLANATION: Milled rice that is rosy in color shall be graded not higher than U.S. No. 5.

SLIGHTLY ROSY
Portion for Analysis: sample as a whole

EXPLANATION: Milled rice that is slightly gray in color shall be graded not higher than U.S. No. 2.

HARD MILLED
Portion for Analysis: sample as a whole

EXPLANATION: Milling degree is one of several inspection criteria used to determine the quality of milled rice. To ensure consistency in the application/characterization of milling degree, a series of Visual Reference Images (VRI) were established to assist inspectors in differentiating between the various milling degrees referenced in the standards. Milled rice whose appearance does not meet this minimum milling degree requirement is considered “well milled,” “reasonably well milled” or “under milled”. Consult the VRI depiction for “well milled” or “reasonably well milled” to determine which of these milling degree descriptions apply.

WELL MILLED
Portion for Analysis: sample as a whole

EXPLANATION: Milling degree is one of several inspection criteria used to determine the quality of milled rice. To ensure consistency in the application/characterization of milling degree, a series of Visual Reference Images (VRI) were established to assist inspectors in differentiating between the various milling degrees referenced in the standards. Milled rice whose appearance does not meet this minimum milling degree requirement is considered “reasonably well milled” or “under milled”. Consult the VRI depiction for “reasonably well milled” to determine which of these milling degree descriptions apply.

REASONABLY WELL MILLED
Portion for Analysis: sample as a whole

EXPLANATION: Milling degree is one of several inspection criteria used to determine the quality of milled rice. To ensure consistency in the application/characterization of milling degree, a series of Visual Reference Images (VRI) were established to assist inspectors in differentiating between the various milling degrees referenced in the standards. Milled rice whose appearance does not meet this minimum milling degree requirement is considered “under-milled”.

OTHER FACTORS

CONTENTS

ANIMAL FILTH

Portion for Analysis: Approximately 1000 grams of original sample

TOP ROW: Rodent pellets

2nd ROW: Bird droppings

3rd ROW: Insect excreta are NOT considered filth but are included in Foreign Material.

CASTOR BEANS
Portion for Analysis: Sample as a whole

Multi-colored bean-like seed of the castor oil plant.

This seed is highly toxic to animals and humans and is not safe to feed until processed.

CHESS
Portion for Analysis: Approximately 50 grams

A weed seed from any of several varieties of brome grass and generally found in wheat fields.

COB JOINT
Portion for Analysis: 50 grams (Dockage -free wheat)

Cob or pieces of cobs from the wheat rachis--that part of the plant where the kernel attaches to the head.

COCKLEBUR
Portion for Analysis: Sample as a whole

Seed capsules of the Cocklebur plant (Xanthium pensylvanicum) commonly appearing in grain. Cocklebuers are toxic and have been known to poison livestock.

COTTON SEED
Portion for Analysis: As requested by applicant

A seed from the cotton plant. The seed is approximately 3/8 inch long and 3/16 inch wide. It is covered by a soft fibrous white substance. Sometimes the seed will appear blackish and fiberless (no cotton adhering to the seed).

CROTALARIA & VELVET LEAF SEEDS
Portion for Analysis: 1000 grams of original sample

TOP: Crotalaia seeds of various colors that are generally kidney or boxing glove shaped.

CENTER: Dried crotalaria seed pod.

BOTTOM: Non-toxic velvet leaf weed seeds of similar size and shape to crotalaria but with a dull rough appearance.

NOTE: Do not confuse non-toxic velvet leaf seeds with toxic crotalaria seeds.

CULTIVATED BUCKWHEAT
Portion for Analysis: Varies with type of grain

A triangular-shaped kernel of cultivated buckwheat.

NOTE: Similar in shape but much larger in size than wild buckwheat.

EINKORN
Portion for Analysis: Varies with type of grain

A pale reddish, slender kernel of a species of wheat--often called “one-grain wheat”--characterized by a taper on the brush end of the kernel.

EMMER
Portion for Analysis: Varies with type of grain

A reddish, slender kernel of a species of wheat--usually remaining in the glume after threshing--characterized by a small germ and a heavy brush.

ERGOT
Portion for Analysis: Varies with type of grain

A fungus disease causing the grains to be replaced by dark-colored growths.

NOTE: Consult the Grain Inspection Manual for its grading function in each grain.

FERTILIZER (FSUB)
Portion for Analysis: Varies with type of grain

Grain containing four or more pieces of material suspected of being commercial fertilizer (FSUB), shall be graded Sample Grade or distinctly low quality as the case may be.

NOTE: Commercial fertilizer varies from fine granular material to larger pellets than shown and therefore, are not limited to the types shown.

FLINT & DENT CORN
Portion for Analysis: Approximately 250 grams

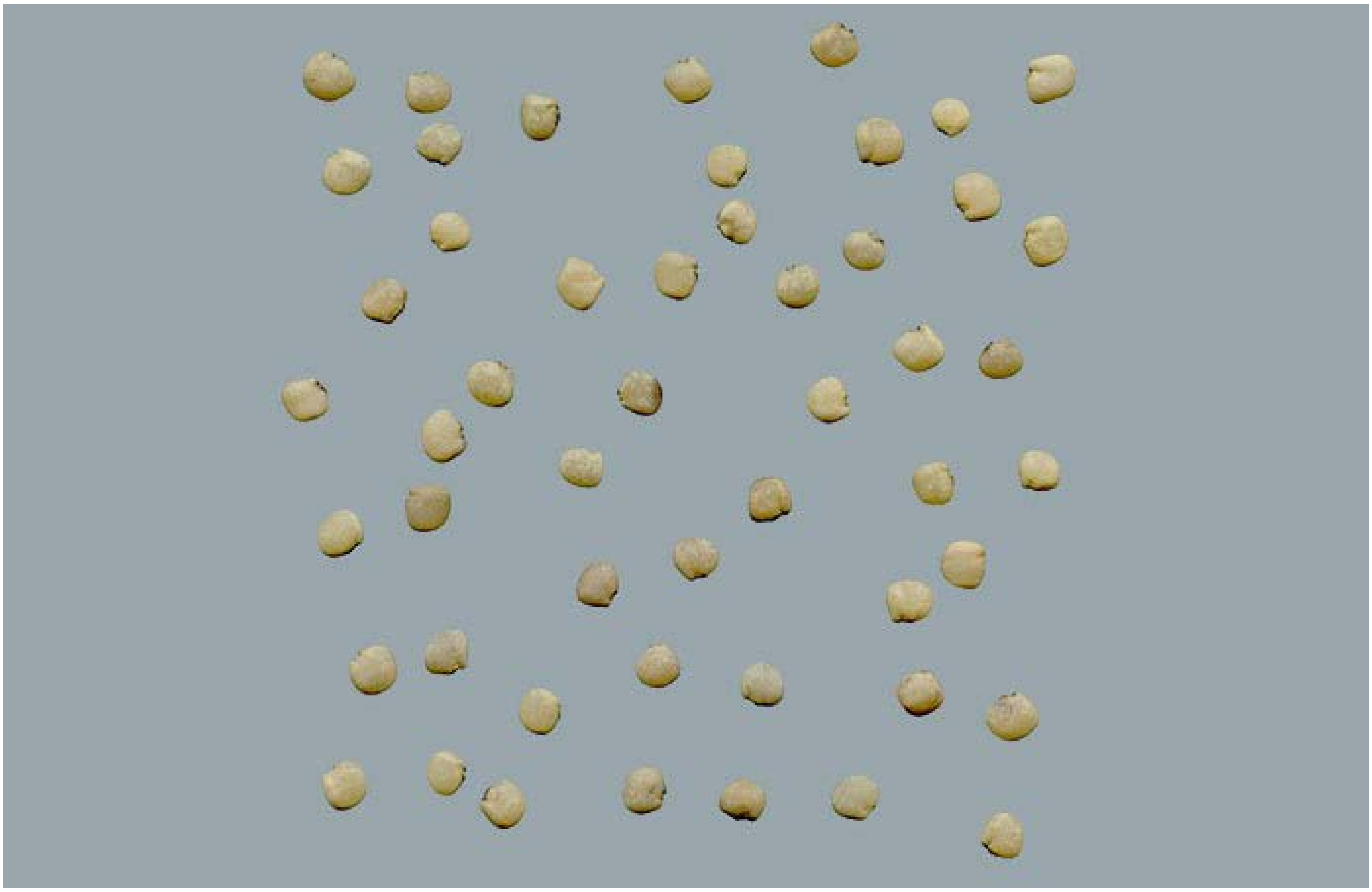
Flint corn (TOP) is a hard, glossy looking, and more rounded kernel and may have a slight depression (but not dent) in the crown. Dent corn (BOTTOM) is a softer textured kernel and normally has a dent in the crown

NOTE: Do not confuse end kernels of dent corn with flint corn. End kernels of dent corn without a dent in the crown are shaped similarly to flint corn.

GARLIC BULBS
Portion for Analysis: Varies with type of grain

TOP: Dry or partially dry garlic bulblets which have lost all or part of the husks and bulblets with cracked or broken husks.

BOTTOM: Green garlic bulblets which have all the husks intact and which show no cracks or breaks.



GUAR

Portion for Analysis: Varies with type of grain

A generally round but wrinkled or dented and relatively small bean of a legume plant and with coloration ranging from dull white to black.

HULLESS BARLEY
Portion for Analysis: Varies with type of grain

A kernel or pieces of kernels of barley--usually spring-grown Six-rowed Barley with a short and plump appearance and to which the palea and lemma (Hulls) do not adhere or adhere loosely.

POLISH WHEAT
Portion for Analysis: Varies with type of grain

A kernel or piece of a kernel of wheat which is very long, narrow, and flinty.

NOTE: Do not confuse with Durum Wheat.

POULARD WHEAT
Portion for Analysis: Varies with type of grain

A kernel or piece of a kernel of wheat which is short, humped, and egg shaped.

NOTE: Do not confuse with White Wheat.

RAGWEED SEED
Portion for Analysis: Varies with type of grain

TOP: Giant ragweed seed (Ambrosia artemisiifolia)

BOTTOM: Common ragweed seed (Ambrosia trifida L.)

RICE TYPES
Portion for Analysis: Varies with type of grain

TOP ROW (From left to right): Kernels of short, medium, and long grain Rough Rice (Paddy Rice).

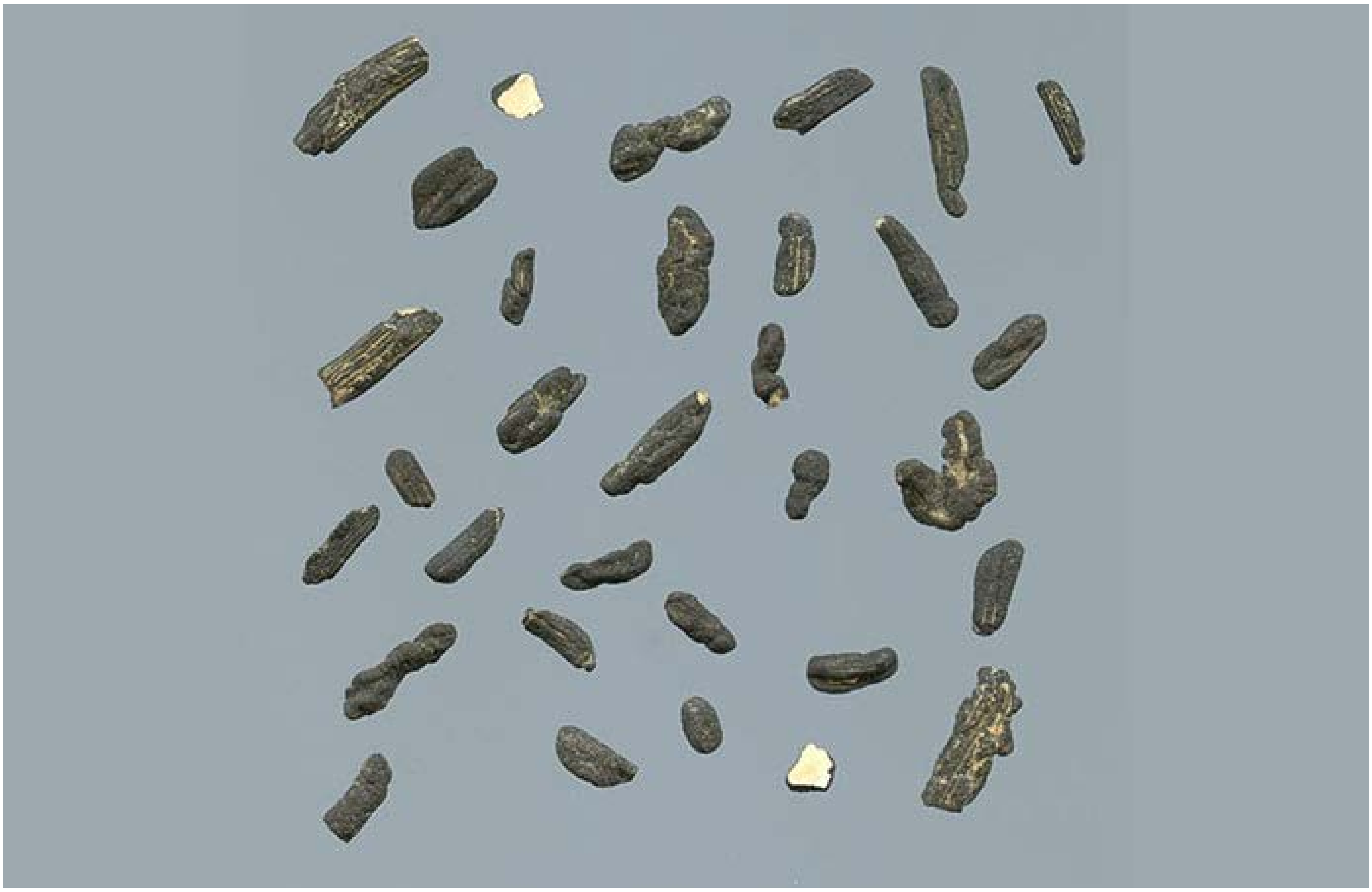
2nd ROW (From left to right): Kernels of short, medium, and long grain Brown Rice for Processing.

3rd ROW (From left to right): Kernels of short, medium, and long grain Milled Rice.

BOTTOM ROW: Red Rice

SAFFLOWER SEED
Portion for Analysis: Varies with type of grain

A mostly white but occasionally gray colored seed from the Safflower plant and used primarily for its oil content.



SCLEROTINIA
Portion for Analysis: Approximately 1,000 grams

The fungus Sclerotinia Sclerotiorum causes a stem disease (stem rot) in soybeans which results in large black growths (Sclerotia) of the stem and pods. The growths may resemble ergot in shape, possess the same type of dark striated exterior and has a CREAMY white inner tissue.

The inner tissue of Sclerotinia Sclerotiorum has a light white inner tissue.

The inner tissue of ergot has a light tinge of purple.

SMUT BALLS
Portion for Analysis: Not less than 250 grams cut from dockage-free
“work” sample

A black ball-shaped spore containing body caused by plant disease. These balls frequently break into smaller pieces or into a fine black powder.

SPELT
Portion for Analysis: Varies with type of grain

A black (some specialty varieties may be gray), thin-hulled, fairly large sized seed of the oil-producing variety of sunflower plant (bottom) or a black and white striped, thick-hulled, seed of the non-oil variety of sunflowers (top).

SUNFLOWER SEED
Portion for Analysis: Varies with type of grain

A black (some specialty varieties may be gray), thin-hulled, fairly large sized seed of the oil-producing variety of sunflower plant (bottom) or a black and white striped, thick-hulled, seed of the non-oil variety of sunflowers (top).

SWEET CORN & POPCORN
Portion for Analysis: Sample as a Whole

Typical kernels of Sweet corn (top) and Popcorn (bottom), both of which function as foreign material.

TRITICALE
Portion for Analysis: Varies with type of grain

Kernels of pieces of kernels of triticale -- a hybrid cross between wheat and rye -- with a very pronounced shriveled appearance.

WILD BROME GRASS SEEDS
Portion for Analysis: 1000 grams dockage free

Seeds distinguishable by harsh awns of Brome grasses.

WILD BUCKWHEAT AND SIMILAR SEEDS
Portion for Analysis: Approximately 50 grams

Triangular-shaped hulled and unhulled wild buckwheat (TOP) with seeds of similar size and/or shape, such as yellow foxtail (BOTTOM RIGHT) and millet (BOTTOM LEFT).

WILD OATS
Portion for Analysis: Varies with type of grain

Wild oats of various colors are usually slender kernels with twisted awns (sucker mouths) and basal hairs or bristles on the germ end of the kernel.

INSECTS

CONTENTS

ANGOUIMOIS GRAIN MOTH
Sitotroga cerealella (OLIVIER)

A moth with a wing expanse of 13-19 mm and a length of 6-9 mm. The forewings are clay-yellow and without markings; the rear wings are grey. The rear edges of the forewings and rear wings have long fringes.

A primary pest of grain, which may be attacked in the field, although most damage occurs in storage. It attacks all types of grains, particularly corn and wheat. Badly infested grain has a sickening smell and taste that makes it unpalatable.

The larvae damages grain, pulses, cocoa beans and other seeds. It is the only moth species which lives entirely inside the kernels.

ANSIOPTEROMALUS CALANDRAE
Anisopteromalus calandrae (Howard)

Anisopteromalus calandrae wasps are beneficial insects that are important natural enemies of Sitophilus weevils. The species is reared in commercial insectaries for release in grain bins.

The females of the parasitic wasp Anisopteromalus calandrae actively search for and parasitize hidden larvae of various beetles infesting stored products and kills them.

Because this wasp successfully withstands higher dosages of pesticide than the weevils it preys upon, it is extremely useful in storage systems known or suspected to contain residual pesticides.

Not injurious to stored grain.

AUSTRALIAN SPIDER BEETLE
Ptinus tectus (Boield)

An oval beetle of 2.5-4 mm length, sharply waisted between neck shield and abdomen; dark brown, with flat-lying yellowish-brown hairs; the wing covers have fine lines of dots and no patches. They have long antennae which are segmented and positioned between the eyes, a waist like constriction at the base of the thorax and six long thin legs.

The larvae are yellowish-white, grub-like, have a brown head and sparse hair growth, and grow to 5-7 mm length.

Originally only found in Australia, now practically world-wide.The beetles and larvae are omnivorous and attack grain and grain products, pulses, rice, dried fruit, cocoa, spices, herbs and animal products such as fish meal and casein.

BRACON HEBETOR (Parasitoid)
Bracon hebetor

A Bracon hebetor is a minute Braconidae wasp that is an internal parasite to the caterpillar stage of Plodia interpunctella, the Indian meal moth, in the late larval stage of the mediterranian flour moth and the almond moth.

Females paralyze and lay eggs in late instar moth larvae. Each female produces about 100 eggs. On the average, eight larvae develop in one host.

Not injurious to stored grain.

CADELLE
Tenebroides mauritanicus (LINNÉ)

A slim, flat, 6-11 mm-long beetle, dark brown to black; ventral side, antennae and legs are red-brown. A particular feature is the waisting between wing covers and neck shield, whose outer front corners extend toward the head.

A serious pest in the tropics, found in mills, silos, and warehouses, on grain, mill products, and feeds. Irregular borings are found in kernels; germs are preferred.

The dirty-white larva, has a black head, behind this a black shield, two black hooks at the end of the body and long body hairs.

CARPET BEETLE
Anthrenus scrophulariae (L.)

A 3-5 mm long beetleof striking coloration. Wing covers and neck shield have black scales with a white, wavy design. The wing seam, margins and parts of the neck shield have marked red scales. The olive brown larvae have black-brown hairs and grow to a length of 6 mm.

Beetles and larvae are found outside as well as inside. The eggs are deposited preferably on animal substances. The life cycle takes approximately 6 months, depending on climatic conditions. The larvae are found in woolen goods, rugs, upholstered furniture, feathers, etc. Through mass infestation they can cause great damage.

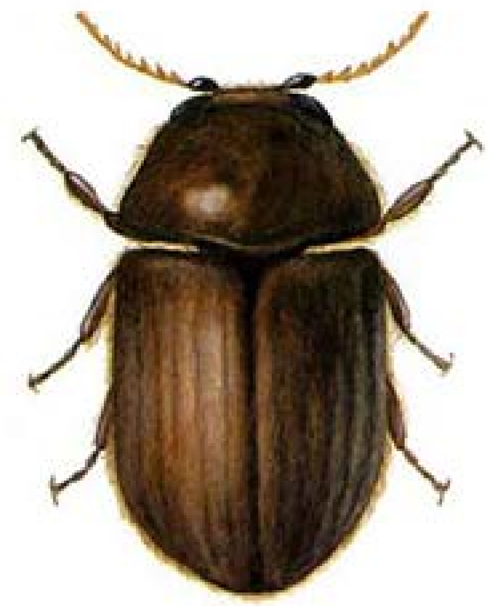
BLACK CARPET BEETLE
Attagenus unicolor (Brahm)

A 2.8 to 5 mm long beetle, black to reddish brown and covered with short, sparse pubescence. The first segment of the tarsi of the hind legs is much shorter than the second segment. The last antennal segment of the male is twice as long as that of the female.

The larvae of the black carpet beetle, which may reach 12.7 mm in length, are very different from other carpet beetles' larvae. They are elongate, carrot-shaped, golden to chocolate brown, and have a tuft of very long, curled, golden-brown hair at the tail end of their body.

Damage to materials can be blamed on the larval stage of this fabric pest. Known as general feeders carpet beetles feed on animal and plant substances such as wool, fur, feathers, hair, hides, horns, silk, velvet, felts and bone as well as seeds, grain, cereals, cake mixes, red pepper, rye meal and flour. Other substances include powdered milk, dog and cat food, leather, book bindings, dead insects, bird and rodent nests, and even cotton, linen, rayon, and jute, especially when stained with spilled food and animal excreta.

The black carpet beetle is found throughout the United States, Canada, and Mexico.



CIGARETTE BEETLE
Lasioderma serricorne (F.)

A 2-4 mm long, squat beetle, almost hemispherical, reddish-brown and covered with fine hairs; the head is hidden under the domed neck shield; the wing covers have no markings. The antennae are saw-like; the segments are practically identical. The larva is very hairy and grows to a length of up to 4 mm.

They are frequently carried from warmer areas to temperate zones, where they can only survive in warm storages. Attacks not only leaf and processed tobacco but also a large number of other dry vegetable products such as herbs, oilseed cake, rice, cocoa, groundnuts, figs, dates, paprika, etc. Practically all damage is done by the larvae.

DRIED BEAN BEETLE
Acanthoscelides obtectus

Bean weevils are 3-5mm long, yellow-green to olive, mottled with darker brown and grey. The end of the abdomen is is yellow-red. The white larvae are hairy and grow to a length of 4mm.

Bean weevils, unlike pea weevils, develop on the mature beans in the field and are able to develop in storage. They occur worldwide, but are most common in subtropical areas.

They can develop on a range of seeds, from cowpea, broad bean, kidney bean, chick pea, and wild pea. The female lays 40-50 eggs loosely between the beans and in the ripening pods in the field. The larvae develops in the bean. Before pupation the larvae prepares a circular exit hole which remains covered only by the skin of the bean (window).

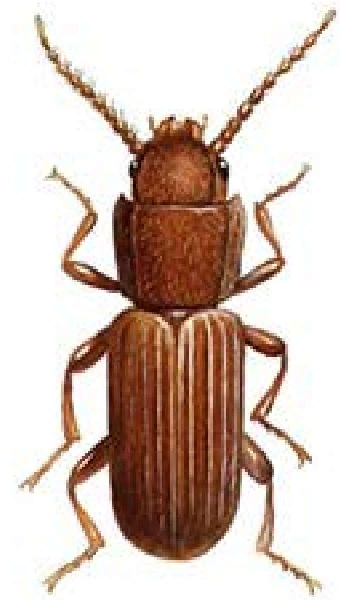
DRUGSTORE BEETLE

Stegobium paniceum (L.) (Sitodrepa panicea L.)

A 2-4 mm long beetle, of reddish-brown color, with fine hairs on its oval body. The head is hidden under the uniformly-domed neck shield; the wing covers are finely patterned with lines of dots; the last three antennal segments are particularly long. The larvae grow to a length of 5 mm.

They have a worldwide distribution and can be more commonly found in warmer climates. They are similar in appearance to the Cigarette beetle, but are slightly larger. Additionally, Drugstore beetles have antennae ending in 3-segmented clubs, while Cigarette beetles have serrated antennae (notched like teeth of a saw). The Drugstore beetle also has grooves running longitudinally along the elytra, whereas the Cigarette beetle is smooth.

Their larvae are small, white grubs, and are responsible for most of the amage that this species can cause. As their name suggests, Drugstore beetles have a tendency to feed on pharmacological products, including prescription drugs. The beetles and larvae are dangerous pests in the dried fruit industry. But they also infest oilseeds, dried vegetables and herbs.



FLAT GRAIN BEETLE

Cryptolestes sp. (GANGLBAUER) = Laemophloeus (DEJEAN)

A small Flattened, oblong, reddish-brown beetle of 2 mm length, with elongate antennae about two-thirds as long as the body.

Prefers grain and grain products but damages also many foodstuffs and animal feeds.

This insect is not a primary pest of stored grain, and the adult is unable to survive in sound uninjured grain. It follows up the attack of more vigorous grain pests and infests grain and meal that are in poor condition.

FLOUR MITE
Tyroglyphus farinae (Linné)

Flour or grain mites are pale, pearly or grayish white, with legs varying in color from pale yellow to reddish-brown. Each leg has one claw at the end. As with all mites, they are smooth, wingless, soft-bodied creatures. The males are from 0.3 to 0.4 mm long, and the female is from 0.3 to 0.6 mm. The males have enlarged forelegs which bear a thick spine on the ventral side. These two characters can be used to separate Acarus sp. from other genera.

Juvenile mites are similar in appearance to the adults. The first or larval stage has only six legs. However, when they molt into the nymphal stage, they have eight legs like the adults. Mite eggs are oval, smooth, white, and are 0.12 mm long.

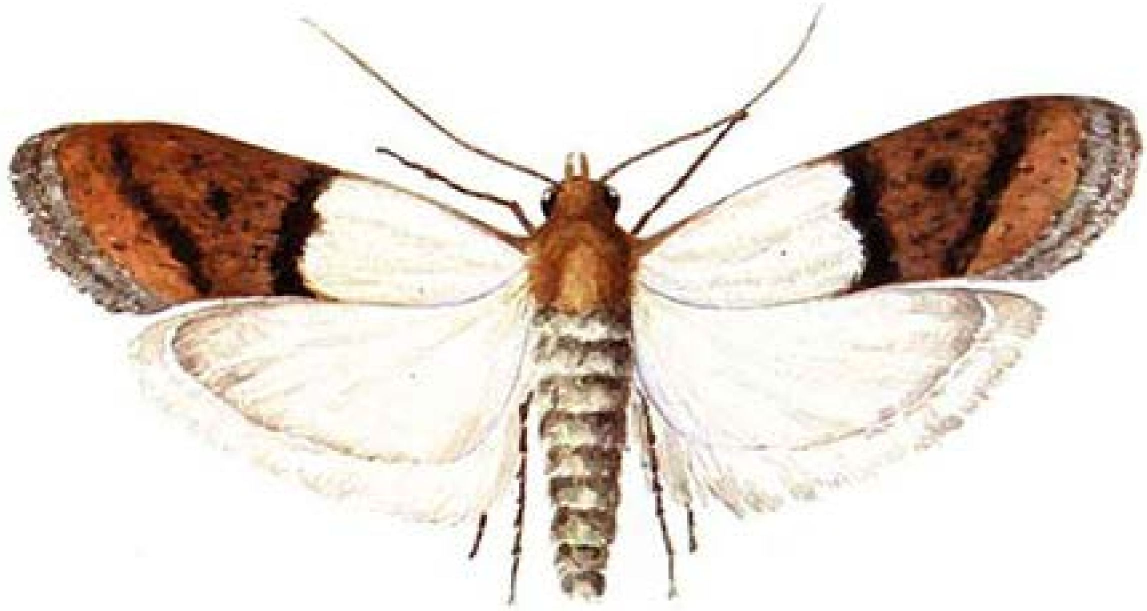
Grain mites are pests that can feed on a variety of processed or finely ground grains, wheat germ, yeast, cheese, powdered milk, flour, or mold spores. Grain mites primarily attack the germ. However, they will feed on other parts of the kernel, as well as mold growing on the grain. These mites are
responsible for the spread of various fungal spores throughout a grain mass and into adjoining bins. When present in large numbers, the flour or grain mites promote sweating and impart a disagreeable odor to the grain.

GRANARY WEEVIL
Sitophilus granarius (LINNÉ)

A weevil of 3-5 mm length; black-brown (red-brown shortly after hatching); the head ends in a slightly curved proboscis; the neck shield has depressed markings and is almost as long as the longitudinally-grooved wing covers.

The granary weevil is the main stored grain pest in countries of the temperate zones. Damage is caused primarily by the larvae but also by the adults.

Prefers wheat and rye, but also feeds on corn, barley, millet, rice, and buckwheat. After mass infestation the grain becomes damp and warm leading to infestation of secondary pests and mold.



INDIAN MEAL MOTH
Plodia interpunctella (HÜBNER)

A moth with a wing expanse of 14-20 mm. When at rest with closed wings, it is 8-10 mm long. The outer halves of the forewings are bronzy; the inner halves light grey to ochre yellow. The caterpillars are yellowish white,
some-times reddish or greenish, with a brown head; they grow to a length of 17 mm.

Found in warehouses, silos, mills and food processing plants they infest a large variety of dry vegetable products.

Feeds on dried fruit, nuts, almonds, nougat, and other chocolate fillings but also on grain, grain products, confectionary and drugs.

KHAPRA BEETLE
Trogoderma granarium (EVERTS)

An oval beetle 2-3 mm long, dark brown with smudgy yellowish-brown and reddish-brown transverse strips on the wing covers and covered with fine hairs.

The yellowish-brown, spindle-shaped larvae grow to a length of up to 5 mm. They have thick, reddish-brown hairs, with characteristic bunches of tail hairs growing out of the rear end. They have barbed arrow-hairs with which they adhere easily to sacks and transport containers and are thus widely disseminated. They can exist without feeding for up to 3 years.

The larvae is a very serious stored product pest but the beetle itself does no damage. It is found in warehouses, silos, mills, breweries, and malt plants. It attacks all types of grain, malt, cereal products, and pulses. Grain kernels are often hollowed out until only the husk remains.

LARGER GRAIN BORER
Prostephanus truncatus

A beetle 3 to 4.5 mm long and dark brown in colour. It has a cylindrical body shape, when viewed from above the rear of the insect is square shaped. The thorax bears rows of teeth on its upper front edge and the head is turned down underneath the thorax so that it cannot be seen from above.

The larger grain borer usually is restricted to corn (maize) and does not commonly occur north of Mexico. The insect is larger and darker in color than the lesser grain borer.

The larger grain borer is a serious pest of stored maize and will attack maize on the cob, both before and after harvest. Adults bore into the maize husks, cobs or grain, making neat round holes and tunnelling extensively producing large quantities of grain dust as they tunnel. The adults prefer grain on cobs to shelled grain.

Eggs are laid in tunnels and chambers bored by the females in the food source. Larvae hatch from the eggs after three to seven days. The larvae are white, fleshy and sparsely covered with hairs and have three pairs of legs. They develop within the grain or in the flour that accumulates by the feeding action of the adults. They pupate inside the food source.

LESSER GRAIN BORER
Rhizopertha dominica (FABRICIUS)

A beetle of 2-3 mm length, red-brown to black-brown, slim, cylindrical in body. The hood shaped, rounded neck shield extends beyond the head; the spots on the shield gradually become smaller towards the rear. The larvae are white, similar to grubs, and have brown head capsules. Both lar-vae and
beetles bore into the grain.

The lessor grain borer mainly attacks wheat, rye, corn, rice and millet. Also attacked are beans, lentils, and chick-peas.

The eggs are deposited on the outside of the kernels. Badly infested wheat takes on a honey-like odor. Also attacks whole kernels as a primary pest.
Irregularly-shaped boreholes are made and the flour produced by boring
appears on the surface. The larvae bore their way into kernels which they only leave again as adult beetles.

MAIZE WEEVIL
Sitophilus zeamais

The maize weevil is a small snout beetle about 2-3mm in length. It varies from dull red-brown to nearly black and is usually marked on the back with four light reddish or yellowish spots. It is slightly larger than the rice weevil and has more distinct colored spots on the forewings.

The maize weevil has fully developed wings beneath its wing covers and can fly readily. It is a stronger flier than the rice weevil allowing it to distribute itself more easily. Its endemic in tropical and temperate, where maize is grown.

The thorax is densely pitted with somewhat irregularly shaped punctures, except for a smooth narrow strip extending down the middle of the dorsal (top) side.

An egg hatches in a few days into a soft, white, legless, fleshly larvae, which are approximately 4 mm, in length. They eat the internal contents of the maize while developing, which takes approximately 18 to 23 days. At this point, the larvae become pupae, and they begin the transformation into the adult weevil form. During this process, the pupae do not eat or move.The rate of development is slightly slower for the maize weevil than for the rice weevil. A minimum of thirty days is required for passing through the egg, larval and pupal stages.

MEDITERRANEAN FLOUR (MILL) MOTH
Ephestia (Anagasta) kuehniella Zell

A pale-gray moth from 6-12mm long, with a wingspread of 20-22mm. The wings are marked with two indistinct, black zigzag lines. The hind wings are a dirty white. This moth is easily recognized by its characteristic pose when resting. When at rest, the moth extends the forelegs which raises the head and gives the body a sloping appearance.

The Mediterranean Flour Moth is somewhat larger than the Indian Meal Moth. Development and damage is similar to the Indian meal moth, except the larvae live and feed in small silken tubes they spin.

Although flour is the favorite food, grains, bran, breakfast foods and pollen in beehives are also attacked. The webbing and matting of the larvae often cause the greatest amount of damage by this insect, whether it is contaminating foods in the home or clogging industrial machinery.

PSOCIDS
Psocids (SO-sids)

Soft bodied insects, less than 4 mm long with long, slender antennae and chewing mouthparts. They may have four wings or be wingless. They are generally gray or brown in color. Psocids are readily identified (under magnification) by the presence of a large, conspicuous clypeus (nose). Psocids live outdoors and have wings for the most part. They can be found on tree bark, tree and shrub foliage, and under stones. This type is known as “bark lice.” Psocids can be found indoors, and this type is extremely tiny and difficult to see. They are often referred to as “book lice” since they are common around old books in damp locations (such as the basement). This type is also wingless.

The female psocid attaches up to one hundred sticky white eggs to food. The eggs hatch into nymphs and will go through several molts before becoming an adult. In optimum development conditions the life cycle can be completed in as little as eight weeks. The adults survive for around six months. Psocids need to live in moist areas since they feed primarily on microscopic molds.

Psocids do not usually feed directly upon human food, but they will when there has been mold or fungal development within the food itself. Psocids are often found within dry products such as flour, bagged nuts, milk powder, chocolate, yeast, and stored cereal grains. They may also be found on books, furnishings, walls, and newly plastered surfaces which are still damp.

RED AND GRAY SUNFLOWER WEEVIL
Red sunflower seed weevil (Smicronyx fulvus)
Gray sunflower seed weevil (Smicronyx sordidus)

The adults of red sunflower seed weevil are 12.5 to 3 mm long and are reddish-brown. The adults of gray sunflower seed weevil are slightly larger and gray in color. The larvae of both species are small, cream-colored, legless and C-shaped in appearance.The red seed weevil is the more common of the two weevils.

Newly emerged adults feed on the bracts of sunflower buds. When the sunflower head begins to bloom, the adults feed on the pollen, and as the seeds begin to fill, lay eggs within the seed.

The small, white, oval-shaped eggs hatch in approximately one week. Larvae consume the meat of the seed, causing the economic loss. Most seeds are only partially consumed or destroyed by the larvae and the damaged seeds have lower oil content than the undamaged seeds. The economic loss caused by the larval feeding includes the loss of both seed weight and oil content.

Larvae normally drop from the head to the soil after completing their development, but a small percentage may remain in the seed and be present in the harvested seed. If larvae drop from the seed, an exit hole is present on the side of the seed. The insect cannot survive in storage, and is not a stored product pest.

RED/CONFUSED FLOUR BEETLE
Tribolium castaneum (HERBST)

A slim beetle of 3-4 mm length, of uniform red-brown to black color. Beetles and larvae feed on a very wide variety of dry vegetable substances, such as, milled cereal products. A frequent mill pest; it can also attack undamaged wheat kernels.

Besides grain and grain products it infests foodstuffs and animal feeds of all kinds; also spices and drugs.

Badly infested flour has a sharp odor and turns brown; its baking properties are damaged.

RICE MOTH
Corcyra cephalonica (Stainton)

The rice moth is similar in size to the Indianmeal moth, but is much less common. The larvae are general feeders and prefer warm climates.

The adult moth has pale buff-brown forewings with 15-25mm ingspan the hindwings are almost transparent and uniform in color. The wing tips are rounded and tightly folded to the body when at rest. There are no distinctive markings on the wings, although veins may be slightly darkened. Adults do not feed and live for one to two weeks. Females lay from 100 to 200 eggs near food sources.

The larvae are dull white, with long fine hair and dark brown head. Larvae spin silken threads as they feed and web grains, debris and other particles into galleries in which they live and feed. When they are fully-grown, they form dense white cocoons to pupate. Pupae are usually found in food or they may be found between pallets and sacks. Adults emerge from pupae within four to eight weeks and repeat their life cycle.

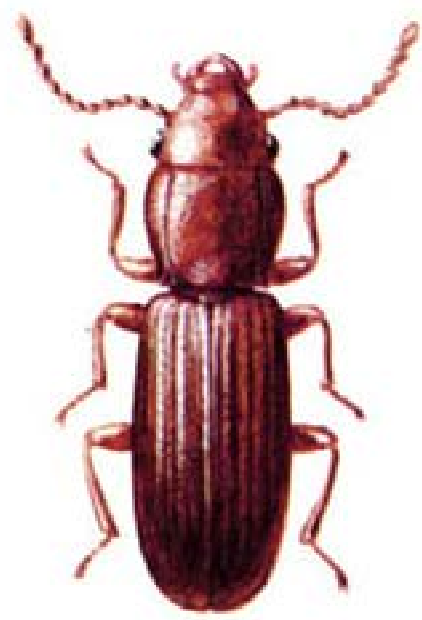
The rice moth is one of the key pests of rice, cocoa, biscuits, pearl millet, sorghum and seeds. Larvae also contaminate foods by secreting silken threads that web together food particles, dusts and frass “debris or excrement produced by insects”. These will render infested products unaccepted for sale, manufacturing and consumption.

RICE WEEVIL
Sitophilus oryzae (LINNÉ)

Similar in appearance to the granary weevil but is smaller (2.3-3.5 mm long) and has reddish spots on the brown wing covers.

A dangerous stored grain pest in warmer climates; it infests all types of grain and is often found together with granary weevils.

The larvae can also develop in farinaceous products, buckwheat, peas, acorns, chestnuts, and cottonseed; the weevil also feeds on flour, hemp-seed, biscuits, waffles, white bread, and tobacco.

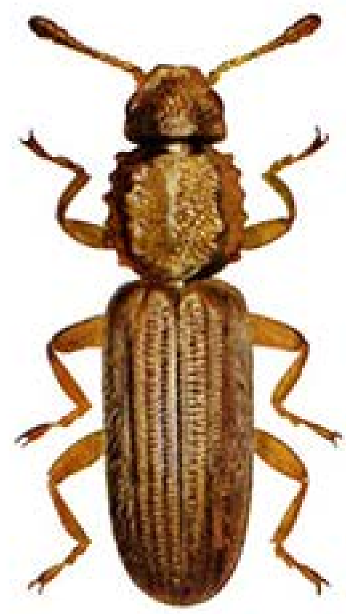


RUSTY GRAIN BEETLE
Cryptolestes ferrugineus

A 1.5-2 mm long beetle, flat, wing covers almost twice as long as wide, reddish-brown, head and neck shield relatively large; long, fine antennae.

Each female is capable of laying 200 to 500 eggs, which are deposited loosely on or among the grain kernels. The slim yellowish-white larvae have two amber projections at the tail end and are freely mobile and grow to 3-4 mm length. In feeding they penetrate the germ-end of wheat kernels where they pupate.

The rusty grain beetle is the most common insect pest of stored wheat in the United States and Canada. Adults and larvae feed mostly on the wheat germ and cause considerable damage.Heavy infestations of the insects also contribute to other damage by causing the grain to heat and spoil, and by spreading fungal spores in the stored grain.



SAW-TOOTHED GRAIN BEETLE
Oryzaephilus surinamensis (LINNÉ)

A slim beetle 2.5-3.5 mm long, dark brown; neck shield has two deep longitudinal grooves and six sharply-pointed projections on each side. The slim whitish-yellow larvae are freely mobile and grow to a length of 3.5-4 mm.

Found in warehouses, silos, mills, and food processing plants; it infests grain and grain products. In granaries, it is usually found as a secondary pest together with other grain pests but is occasionally found alone as the primary pest.

TROPICAL WAREHOUSE (ALMOND) MOTH
Cadra cautella (Walker)

A tropical or subtropical species which is frequently found on imported cargoes. The adult is 7—9mm in length with a wingspan of 12—20mm. The upper forewing is dull grey- brown; straight dark inner band has broad pale band along inner edge; outer band is obscure.

The moths live for only two weeks, but during this period females may lay up to 250 eggs on the surface of the grain. The larvae are dirty-white and may be tinged brown or have purple spots. The larvae spin webs on the grain surface and consume kernels within the webbing.

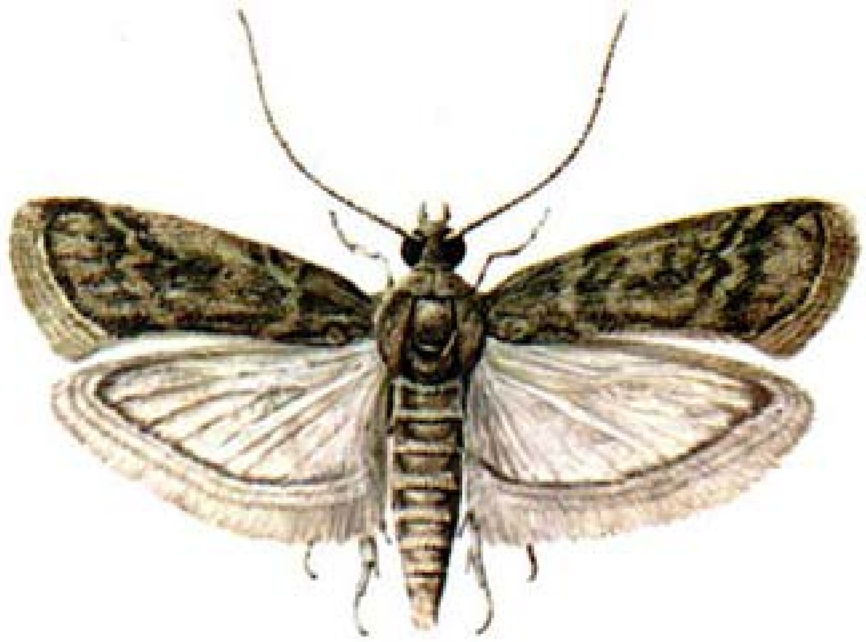
Often linked with imported food cargoes. A particular problem in dried fruit and nuts, although this moth will attack cereals, oil seeds and chocolate products.

VETCH BRUCHID
Bruchus brachialus (Fahr)

The vetch bruchid is a bruchid seed weevil that attacks the seeds of several species of vetch plants. The weevil is common in Kentucky and the Carolinas where it can infest 90 percent of hairy vetch seeds, although little foliage damage occurs.

The adults overwinter in the host fields or in nearby areas where vetch is used for cover crop. After harvest, wheat can be planted. The vetch bruchid can be found in wheat harvested from these fields.

The insect has only one generation per year, cannot survive in storage, and is not a pest of wheat or stored products.



WAREHOUSE, COCOA, OR TOBACCO MOTH
Ephestia elutella (Huebner)

A moth with a wing span of 16 mm often found in warehouses and other areas where food or tobacco is stored. This species is closely related to the meal moth and is very common insect in tropical and temperate climates.

The adult moth has brownish grey forewings crossed with two light bands. The hindwings are paler and plain grey. The caterpillar is dark to start with, becoming yellow with a dark line down its back, and a dark brown head. It shelters in loose silk web amongst the food source. The pupae are light brown turning black before the adult emerges.

The Tobacco Moth caterpillar is a pest on stored products, especially cocoa beans and tobacco, but also infests nuts, dried fruit and cereals. Adult moths do not feed.

The female lays eggs on or near the products. The eggs hatch into larvae which feed on the product producing large webs of silk. The larvae move off the food to pupate in the storage packaging or in the storage structure.

WAREHOUSE PIRATE BUG

Warehouse Pirate Bug, Xylocoris flavipes (Reuter)
Larger Pirate Bug, Lycotcoris campestris

This 3mm long and dark brown beneficial insect is a general predator that is commonly found in grain storages. It looks like a small stink bug or boxelder bug.

The nymphs and adults of this beneficial insect prey on eggs, larvae, and pupae of many species of grain insects. Among its favorite prey are the larvae of Indianmeal moths. In addition to Indianmeal moths, it attacks and eats a varied menu, including Mediterranean flour moths, almond moths, red flour beetles, sawtooth grain beetles, and warehouse beetles.

The Pirate Bug is a beneficial insect that is often found in stored corn, but is not injurious to stored grain.

YELLOW AND DARK MEAL WORM BEETLE
Yellow Mealworm (Tenebrio molitor)
Dark Mealworm (Tenebrio obscurus)

The adult is a dark brown or black beetle about 12mm long. Its thorax is finely punctured, and its wing covers are longitudinally striated or grooved. Both yellow meal-worms and dark mealworms have well-developed wings and are attracted to light. Yellow meal-worm adults are shiny, dark-brown or black, whereas dark mealworm adults are dull, pitchy black.

Mealworms have a smooth, highly polished, shiny, elongate, hard, cylindrical (wormlike) body about 3mm thick and up to 32mm long at maturity. Young larvae are white, darkening with age. Larvae of yellow mealworms are honey-yellow, while dark mealworms are dark-brown.

Mealworms are among some of the largest insect pests of stored products. Their common names are derived from the color of the wireworm-like larvae. Both yellow and dark mealworms are in the genus Tenebrio, meaning "darkness," owing to the nocturnal habits of the larvae. Believed to be of European descent, both insects are cosmopolitan, with the yellow mealworm more prevalent in the cooler northern states.

The larva can do serious injury to whole grains in storage for long periods. The majority of the damage is largely limited to contamination of the products by the worms and their waste products.

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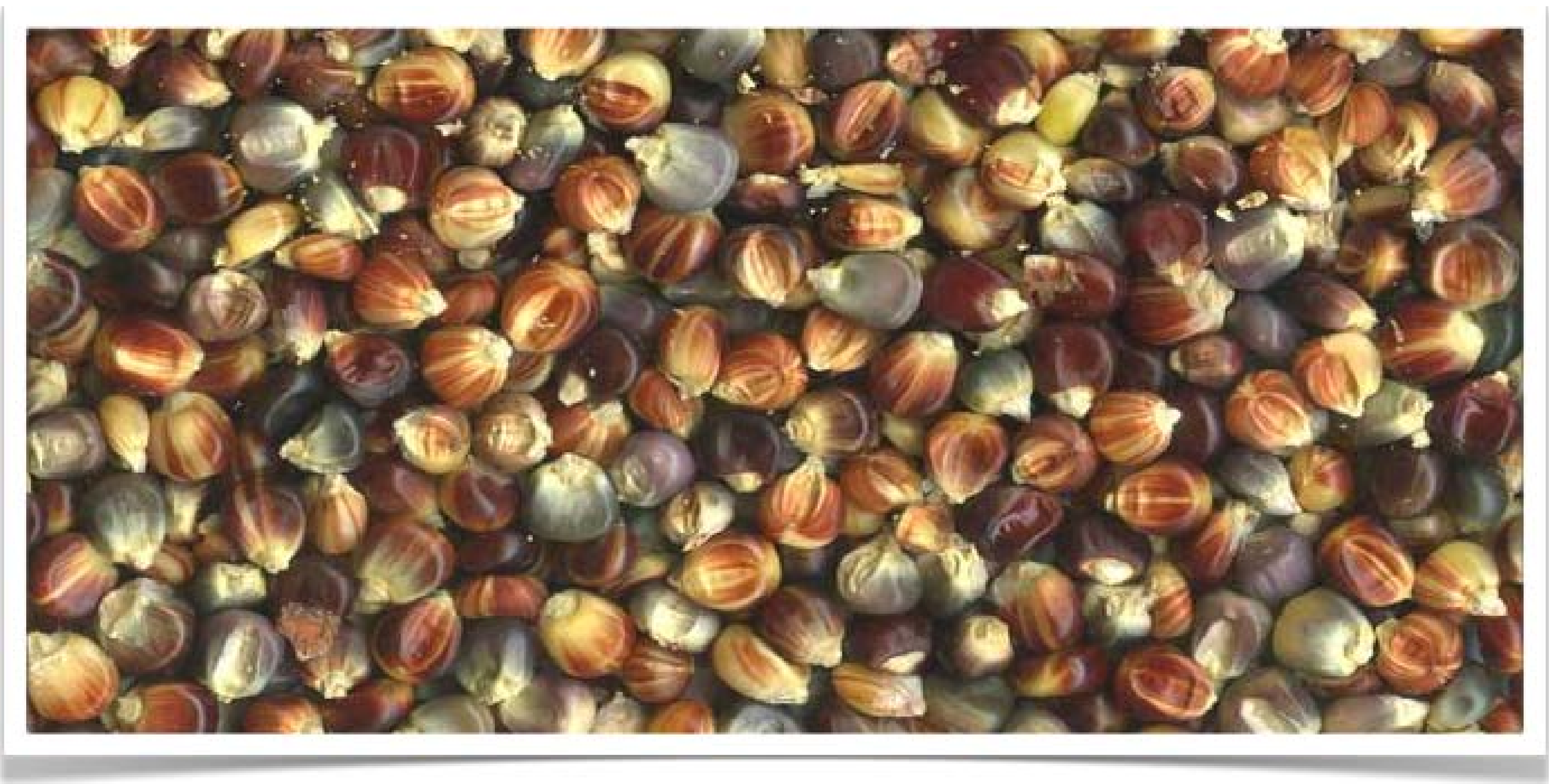
GRAINS



Barley

Barley (Hordeum vulgare) is a cereal grain, which serves as a major animal feed crop, with smaller amounts used for malting and in health food.

Barley is standardized under the U.S. Standards for Barley.

Two-Row Malted Barley

Malted Barley is barley that has been steeped, germinated, and kilned to prepare it for use in brewing. Malting converts insoluble starch to soluble starch, generates nutrients for yeast development, and reduces complex proteins.

There are two types of barley: two-rowed and six-rowed. Two-rowed barley develops two rows of kernels on the seed head. The kernels are plump, straight, symmetrical, and less tapered than six-rowed kernels. Two-rowed barley has less protein, more starch, lower enzyme content, and a slightly wrinkled, thinner husk than six-rowed barley.

Six-Row Malted Barley

Malted Barley is barley that has been steeped, germinated, and kilned to prepare it for use in brewing. Malting converts insoluble starch to soluble starch, generates nutrients for yeast development, and reduces complex proteins.

There are two types of barley: Two-rowed and Six-rowed. Six-rowed barley develops six rows of kernels on the seed head. Since the rows of kernels overlap, they twist as they grow. As a result, two-thirds of the kernels are irregularly shaped in appearance because of insufficient space for symmetrical development. The six-rowed barley skin is thicker, and the veins are usually more prominent than two-rowed barley. Six-rowed barley has more protein, less starch, and higher enzyme content than two-rowed barley.

Black Barley

Black Barley is also known as Purple Hull-less Barley is originally from Ethiopia This is actually the only grain that can go from field to table without being processed, because the gloom or bran layer stays attached to the kernel, and is edible.

Hullness Barley

Hulless barley also known as naked barley has a recessive gene which prevents the hulls (flowering glumes) from adhering to the seed.

Cultivated Buckwheat

Buckwheat seed is used as a source of food and feed. It is not a true cereal and is one of the very few plants, other than those of the Gramineae family, used for their starchy seed, which is processed as a meal or flour.

Yellow Dent Corn (Maize)

Yellow dent corn is produced primarily for animal feed and industrial uses such as ethanol, cooking oil, etc. Some hybrids with specific starch properties are also grown for food. Food corns are typically contracted and sold to dry-mill processors and used in alkaline cooking processes for making masa, tortilla chips, snack foods, and grits.

Dent corn is standardized under the U.S. Standards for Corn.

White Dent Corn

White food corn hybrids are dent corn with specific starch properties typically contracted and sold to dry-mill processors and used in alkaline cooking processes for making masa, tortilla chips, snack foods, and grits. White food grade has a limited wet milling use for food grade starch and paper uses.

Dent corn is standardized under the U.S. Standards for Corn.

Blue Corn (Maize)

Blue corn contains soft starch useful in the milling of specialty foods. Currently, these foods include tortillas, pancake mixes, cornbread mixes, corn chips, and cereal.

Blue corn is considered “corn of other colors” and classed as mixed corn under the U.S. Standards for Corn.

Ornamental Corn (Maize)

Ornamental corn also known as “Indian Corn” includes varieties of maize grown for ornamental use. For this purpose, variegated and colored leaf forms as well as those with colorful seeds are used.

Ornamental Corn is considered “corn of other colors” and classed as mixed corn under the U.S. Standards for Corn.

Popcorn

Popcorn or Popping Corn is a type of maize which explodes from the kernel and puffs up when heated. Special varieties are grown to give improved popping yield. Some wild types will pop, but the cultivated strain is Zea mays subsp. mays, which is a special kind of flint corn.

There are no U.S. Standards for popcorn and popcorn seed functions as foreign material under the U.S. Standards for Corn.

Sweet Corn Seed (Maize)

Sweet Corn is produced for human consumption as either a fresh or processed product.

There are no U.S. Standards for sweet corn and sweet corn seed functions as foreign material under the U.S. Standards for Corn.

Einkorn

Einkorn is a diploid species of hulled wheat, with tough glumes ('husks') that tightly enclose the grains. Einkorn wheat was one of the earliest cultivated forms of wheat, alongside emmer wheat (T. dicoccon). Today it is rarely planted. It remains as a local crop, often for bulgur (cracked wheat) or as animal feed, in mountainous areas of France, Morocco, the former Yugoslavia, Turkey and other countries. It often survives on poor soils where other species of wheat fail.

Emmer

Emmer wheat (Triticum dicoccon), also known as farro especially in Italy, is a low yielding, awned wheat. It was one of the first crops domesticated in the Near East. It was widely cultivated in the ancient world, but is now a relict crop in mountainous regions of Europe and Asia.

Khorasan

Khorasan (Triticum turgidum) is an ancient relative of modern durum wheat. Kamut® is a registered trademark of Kamut International, Ltd., used in marketing products made with this grain. Kamut Brand Wheat is used in cereals, breads, cookies, snacks, waffles, pancakes, bread mixes, baked goods, and prepared and frozen meals.

Millet

The millets are a group of small-seeded species of cereal crops, or grains, widely grown around the world for food and fodder. Millet sprays are often used as healthy treats to for pet birds and in some cultures millets are traditionally important grains used in brewing millet beer.

White Oats

The Oat (Avena sativa) is a species of cereal grain. White oats are preferred for milling and are used for food for people, and also as fodder for animals, especially poultry and horses. Oat straw is used as animal bedding and also sometimes used as animal feed. White oats, which account for most U.S. production, are grown north of the Ohio River and east of the Rocky Mountains.

White oats are standardized under the U.S. Standards for Oats.

Black Oats

Black oats (Avena sativa) is an annual cereal used as animal forage, cover crop and green manure. Black oats are grown in small amounts in various parts of the country.

Black oats are standardized under the U.S. Standards for Oats.

Grey Oats

Most grey oats (Avena sativa) are winter types produced in the Pacific Northwest for animal feed.

Grey oats are standardized under the U.S. Standards for Oats.

Red Oats

Red oats (Avena byzantina) are considered to be hay oats and are grown south of the Ohio River, in Texas, Oklahoma and Kansas.

Red oats are standardized under the U.S. Standards for Oats.

Rough Rice

Rough rice or paddy rice is rice as it comes from the field with the rice kernels are still encased in an inedible, protective hull.

Brown Rice

Brown rice is the least processed form of rice. It has the outer hull removed, but still retains the bran layers giving this rice a chewier texture than white rice.

Milled Rice

Rice kernels that have been milled to remove the bran, leaving “white” or milled rice. After removal of broken kernels, whole milled rice is the type most often found in stores for normal cooking.

Wild Rice

Wild Rice is a North American grass (not related to rice), that is cooked like rice and often served with game. The grains are long, slender and black.

Rye

Rye (*Secale cereale*) is a grass grown extensively as a grain and forage crop. It is closely related to barley and wheat. Rye grain is used for flour, rye bread, rye beer, some whiskies, some vodkas, and animal fodder. It can also be eaten whole, either as boiled rye berries, or by being rolled, similar to rolled oats.

Rye is standardized under the U.S. Standards for Rye.

Grain Sorghum

Sorghum is species of grass raised for grain. The grain can be a source of grain and butyl alcohol. In the United States, sorghum is a principal feed ingredient for both cattle and poultry.

Sorghum is standardized under the U.S. Standards for Sorghum.

White Grain Sorghum

White sorghum is a feed ingredient for poultry, but is also a food grade product found in flour, tortillas, chips, popped variety (caramel covered), and is used mostly to either blend with wheat or as a substitute for wheat flour for those allergic to the gluten found in wheat.

Sorghum is standardized under the U.S. Standards for Sorghum.

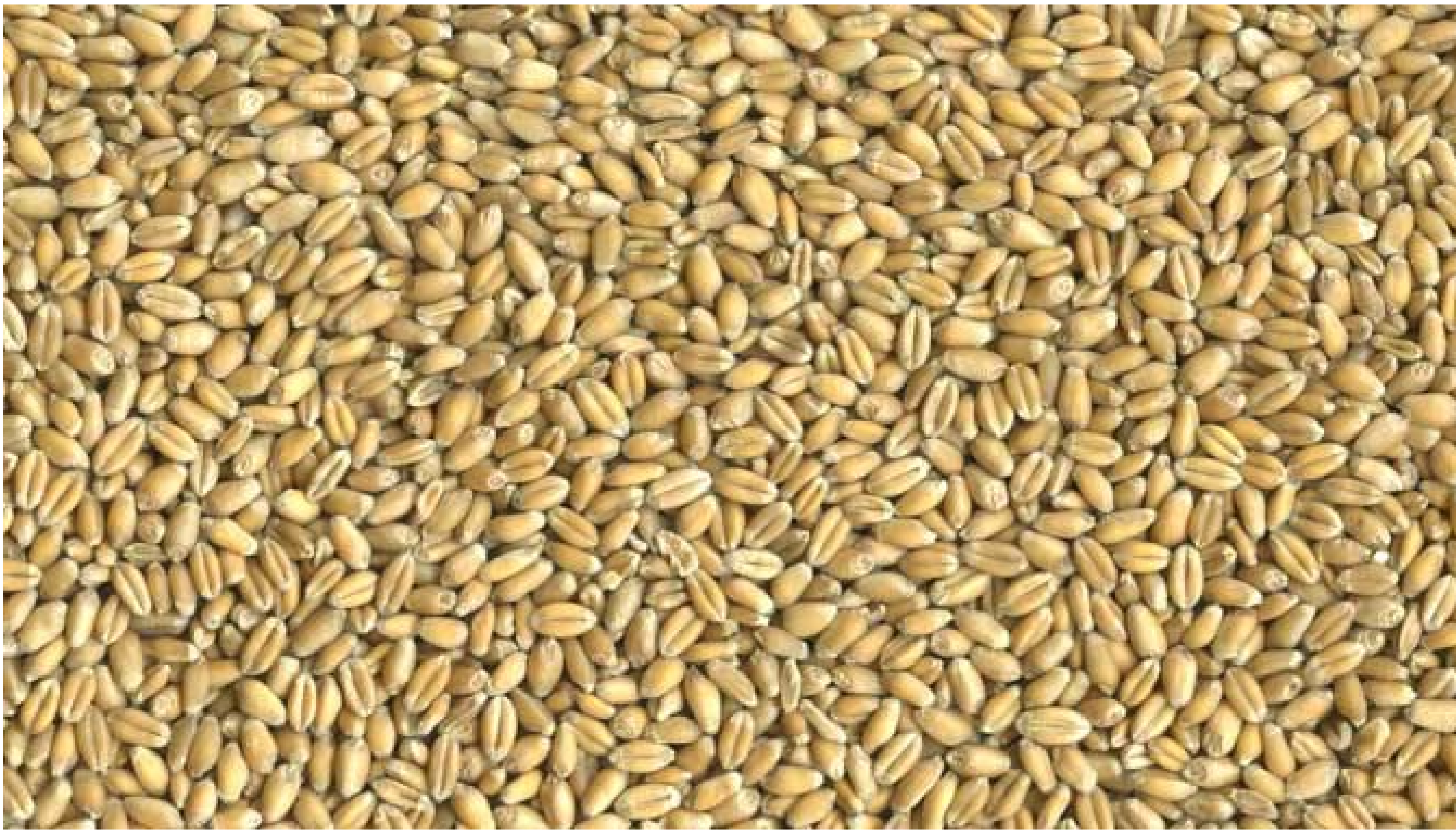
Spelt

Spelt (Triticum spelta) is a hexaploid species of wheat. Spelt was an important staple in parts of Europe from the Bronze Age to medieval times; it now survives as a relict crop in Central Europe and has found a new market as a health food. In the Middle Ages, spelt was cultivated in parts of Switzerland, Tyrol and Germany. Spelt was introduced to the United States in the 1890s. In the 20th century, spelt was replaced in almost all those areas in which it was still grown by bread wheat. As spelt requires fewer fertilizers, the organic farming movement made it more popular again towards the end of the century.

Triticale

Triticale (trit-ih-KAY-lee) is an artificial or man-made hybrid of rye and wheat. It is grown mostly for forage or animal feed although some triticale-based foods can be purchased at health food stores or are to be found in some breakfast cereals.

Triticale is standardized under the U.S. Standards for Triticale.



Soft Red Winter Wheat

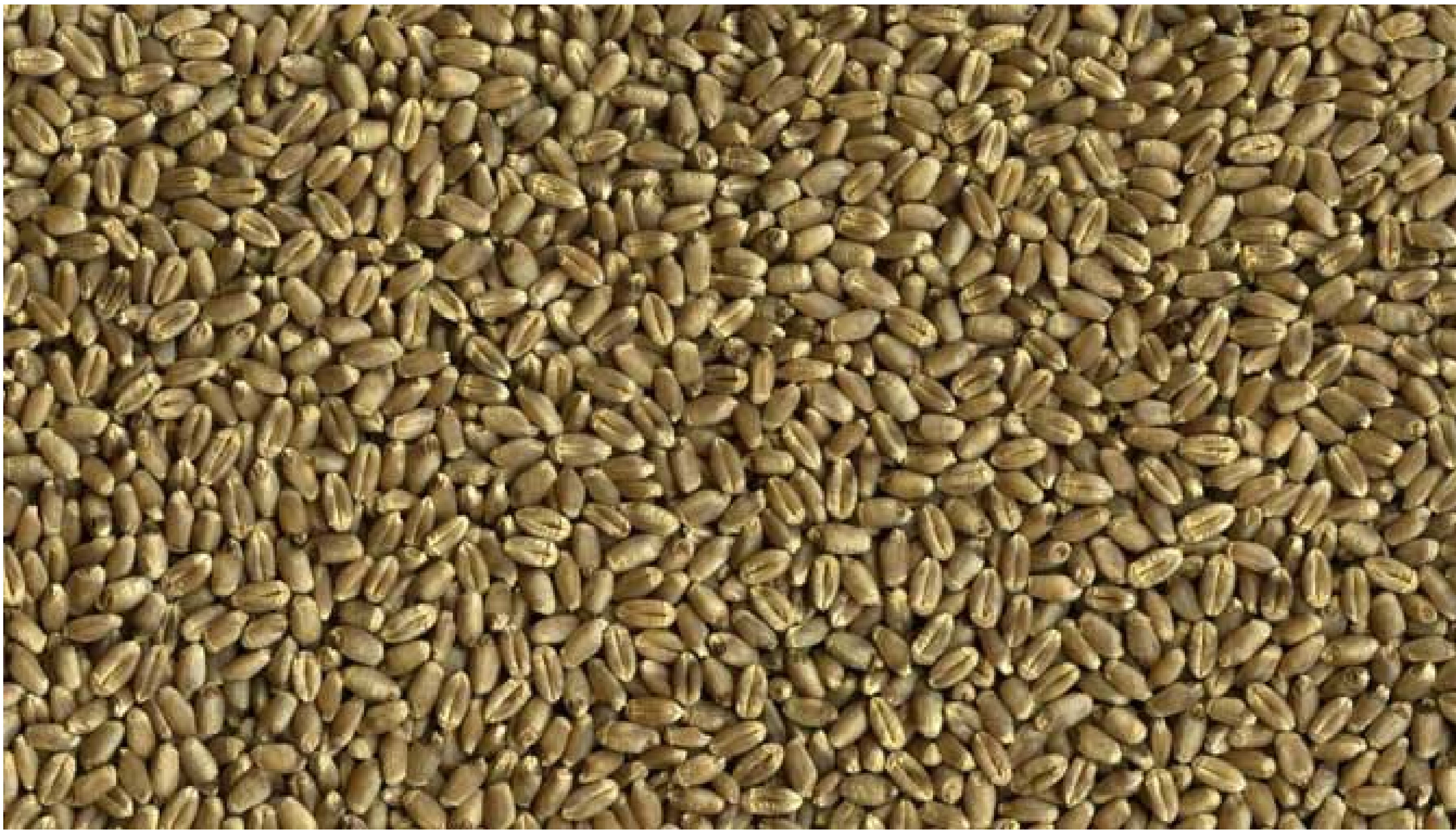
Soft red winter (SRW) wheats are typically used to produce flat breads, cakes, cookies, snack foods, crackers and pastries. Soft Red Wheat is grown in more humid environments, not suited to hard wheat production from central Texas, towards the northeastern Great Lakes and east to the Atlantic.

SRW is standardized under the U.S. Standards for Wheat.

Hard Red Winter Wheat

Hard Red Winter (HRW) is the most prevalent class of Wheat grown in the Untied States. HRW is grown predominantly in Kansas, Nebraska, Oklahoma, and the Texas panhandle. The cold, sub zero winters and the general lack of precipitation make these regions of the country ideal for Hard Red Winter Wheat production. The primary use of Hard Red Winter Wheat Flour is for bread making.

HRW is standardized under the U.S. Standards for Wheat.



Hard Red Spring Wheat

Hard Red Spring Wheat is grown in the Northern Plains states where the winters are too severe for Winter Wheat production. The major producing states are Montana, Wyoming, North and South Dakota, as well as Idaho. This high grade Wheat is suitable for milling and used primarily in breads.

HRS is standardized under the U.S. Standards for Wheat.

Soft White Wheat

Soft white (SWH) wheat is used to make flour for bakery products other than bread such as cakes, crackers, cookies, pastries, quick breads, muffins, and snack foods. There are both winter and spring varieties of SWH wheat but no distinction is made between the two. SWH is grown primarily in Idaho, Oregon, and Washington.

SWH is standardized under the U.S. Standards for Wheat.

Hard White Wheat

Hard white (HDWH) wheat is a relatively new class of wheat developed from hard red wheats. While hard white wheat has the same nutritional claims as traditional red wheats, products made from white wheat are lighter in color and sweeter in taste. Hard White is used primarily for yeast breads, hard rolls and noodles.

HDWH is standardized under the U.S. Standards for Wheat.

Durum Wheat

U.S. Durum (DU) wheat (Triticum durum) production is primarily in North Dakota. Durum is the hardest of all wheats. Its high protein content and gluten strength make durum good for pasta and bread. Durum grains are amber-colored and larger than those of other types of wheat. When durum is milled, the endosperm is ground into a granular product called semolina.

DU is standardized under the U.S. Standards for Wheat.

OILSEEDS

Canola (Onyx)

Canola is a low erucic acid derivation of rapeseed, an oilseed plant with roots in ancient civilization. The word “canola” is derived from “Canadian oil, low acid.” Once considered a specialty crop in Canada, canola has evolved into a major North American cash crop.

Canola is standardized under the U.S. Standards for Canola.

Crambe

Crambe (Crambe abyssinicia Hochst.) which is also referred to as Abyssinan mustard, Abyssinian kale, colewart, or katran is a member of the mustard family. Crambe seed yields an industrial oil which contains a high level of erucic acid.

Flaxseed (Brown)

Flax (L. usitatissimum) is a blue flowering crop grown for its oil-rich seeds. The seeds of flax are tiny, smooth and flat, and range in color from light to reddish brown. Linseed oil pressed from flaxseed is an “industrial” oil that is used for paints, coatings, linoleum, and many other products. Industrial linseed oil is not useable for food or feed, although the linseed oil meal remaining after linseed oil extraction is used for animal, principally dairy, feed.

Brown flaxseed is standardized under the U.S. Standards for Flaxseed.

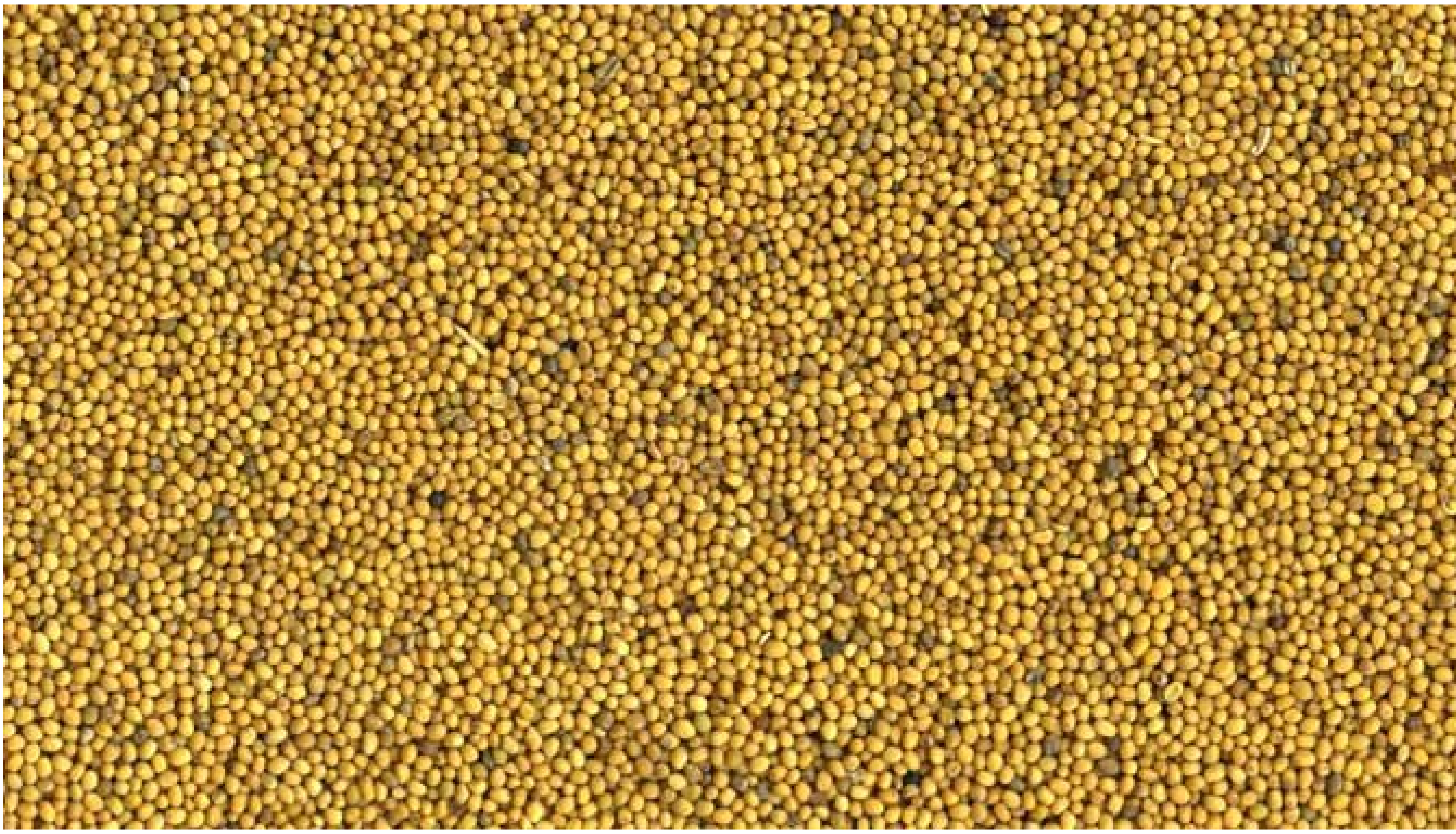
Flaxseed (Golden)

Golden Flax Seed is produced from flax varieties developed for human consumption and is preferred for the food market because of its nutty-buttery flavor. The nutritional value of golden flaxseed vs. brown flaxseed are very similar.

Golden flaxseed is standardized under the U.S. Standards for Flaxseed.

Brown Mustard Seed

Brown mustard seeds (Brassica Juncea) are also known as black mustard seeds. These hot and pungent seeds are commonly used for Indian cuisine. The seeds are combined with cumin seeds and fried in oil until they pop. Then, they're added to various vegetable dishes and curries.



Oriental Mustard Seed

Oriental Mustard Seed (Brassica Juncea) is very hot and pungent, has a higher oil content than brown mustard, and is not often used for other than mustard flour production; mainly used as a low grade Chinese mustard, but also is used as an ingredient by some spice blending houses for its hot, pungent properties.

Yellow Mustard Seed

Yellow or White Mustard Seed (Sinapis Alba) is used for prepared mustards and in prepared meats. The whole seeds are used primarily in pickles, relishes and condiments where the appearance of the seed is an attraction.

Rapeseed

Rapeseed (Brassica napus), also known as Rape, Oilseed Rape, and Rapa, is used in the production of animal feed, vegetable oil for human consumption, and biodiesel.

Safflower

Safflower (Carthamus tinctorius L.) is an oilseed crop adapted chiefly to the small-grain production areas of the western Great Plains. Safflower was originally grown for the flowers that were used in making red and yellow dyes for clothing and food preparation. Today this crop is now primarily grown for the oil.

Soybean (Small Type)

Small-seeded varieties of soybeans are typically used to make a food called natto, a sticky, brown substance made from fermented soybeans in Southern Japan.

Natto type soybeans are standardized under the U.S. Standards for Soybeans.

Soybean (Typical)

The soybean (U.S.) or soya bean (UK) (Glycine max) is a species of legume native to Eastern Asia. It has high (38–45%) protein content as well as its high (20%) oil content. The bulk of the soybean crop is grown for oil production, with the high-protein defatted and “toasted” soy meal used as livestock feed.

Soybeans are standardized under the U.S. Standards for Soybeans.

Soybean (Large)

Large-seeded varieties of soybeans are prefered for making tofu. Large size is important in tofu soybeans because bigger beans swell more and make tofu production easier. These varieties often have light colored hilums and their seed coat and meat are a creamy yellow-white color, highly prized in tofu processing.

Large Seeded Soybeans are standardized under the U.S. Standards for Soybeans.

Sunflower Seed (Confectionery Type)

The husks of confectionery sunflower seeds are striped, and the seeds are called striped sunflower seeds or “stripers.” Due to their lower oil content, the crops are primarily used for food.

Confectionery sunflower seed is standardized under the U.S. Standards for Sunflower Seed.

Sunflower Seed (Oil Type)

The husk of these sunflower seeds is solid black and the seeds are called black oil sunflower seeds. These seeds are usually pressed into sunflower oil but are also the seed of choice for bird feeders.

Oil sunflower seed is standardized under the U.S. Standards for Sunflower Seed.

DRY BEANS

Adzuki Bean

Adzuki beans are small, reddish-brown beans, rounded in shape with a point at one end. They have a strong, nutty, sweet flavor. Adzuki beans can be purchased whole or powdered at Asian markets. They are particularly popular in Japanese cooking where they're used in confections such as the popular YOKAN, made with adzuki-bean paste.

Alubia Beans

Alubia beans are thick and soft white beans similar to butter beans and a particular favorite in Moroccan and Middle Eastern foods.

Baby Lima Beans

With their buttery flavor, lima beans are great in soups or stews, or on their own as a side dish. One of the most popular varieties is the small baby lima. Baby limas probably originated in present day Guatemala.

Black Matte Bean

This is a black version of the more common red azuki bean. Like their red relatives, black matte beans are sweet and relatively easy to digest. They also don’t take as long to cook.

Black Beans

Black beans are also called black turtle soup beans, Mexican, or Spanish black beans. These beans are a staple of Latin American and Caribbean cuisine, where they're used to make side dishes, soups, bean dips, and salads. They have a strong, earthy flavor, so they're often combined with assertive flavorings.

Blackeye Pea (Beans)

The black-eyed pea, also called black-eyed bean, blackeye, or field peas, is a subspecies of the cowpea, grown for its medium-sized edible bean, which mutates easily giving rise to a number of varieties, the common commercial one called the California Blackeye being pale-colored with a prominent black spot.

Brown Speckled Lima Beans

A Southern adpated lima bean that sets well in hot weather, and is very productive under hot, dry conditions. The skins of the seed are pigmented and the external colors range from variegated speckling of green,pink, red, and/or lavender to purple.

Calico Lima Beans

This is a large, quarter dollar-sized, flat bean that is colored light cream with maroon spots, splashes, and swirls. An heirloom bean dating back to the 1840s, it has been a favorite for many generations. These taste a bit like chestnuts when cooked.

Cannellini Beans

This Italian bean is used in minestrone soup or a bean salad. It’s prized for its smooth texture and nutty flavor.

Chickpeas (Garbanzo Beans)

The Chickpea or Garbanzo is grown in tropical, sub-tropical and temperate regions. Chickpea is valued for its nutritive seeds with high protein. Chickpea seeds are eaten fresh as green vegetables, parched, fried, roasted, and boiled; as snack food, sweet and condiments; seeds are ground and the flour can be used as soup, dhal, and to make bread; prepared with pepper, salt and lemon it is served as a side dish.

Split Chickpeas (Garbanzo Beans)

The split chickpea without its seedcoat, is dried and cooked into a thick soup (Dhal) or ground into flour for snacks and sweetmeats.

Chickpeas (Desi)

The desi type chickpea is grown in the semi-arid tropics.

Chickpeas (Black Desi)

The desi type chickpea is grown in the semi-arid tropics.

Chickpea (Green Desi Khana)

The desi type chickpea is grown in the semi-arid tropics.

Chickpea (Kubuli Khana)

The Kabuli type of chickpea is grown in temperate regions.

Cowpea Beans

Cowpea (Vigna unguiculata L. Walp.), originated in Africa and is widely grown in Africa, Latin America, Southeast Asia and in the southern United States. It is chiefly grown for grain and animal fodder.

Cranberry Beans

These beans have an excellent, nutty flavor, and are commonly used in Italian soups and stews.

Fava Beans

These meaty, strongly flavored beans have been around for ages, and they work well in sides dishes, soups, or salads. The larger ones are the best.

Flageolet Beans

The French make good use of this small, creamy bean, often serving it with lamb.

Flat Small White Beans

Small white oval beans with a mild flavor and powdery texture.

Garden Beans

Common Garden Beans, also known as Phaseolus beans, originated in Central and South America. Common beans are grown mainly in Brazil, Argentina, the USA, China and India. There are two types with different uses: determinate growth habit for dry seed production and indeterminate growth for green pods (snap beans).

Great Northern Beans

Great Northern Beans are a delicately flavored white bean related to the kidney bean and the pinto bean. They are typically grown in the Midwestern US. Though called a white bean, the color of Great Northern Beans tends toward cream and look like white baby lima beans.

Dark Red Kidney Beans

The kidney bean with its dark reddish-brown skin is named for its visual resemblance to a kidney. The kidney bean is also known as the red bean, although this usage can cause confusion with other red beans. Kidney beans are a part of the cuisine of North India. These gorgeous and versatile beans are often used in chili, refried beans, soups, and salads.

Light Red Kidney Beans

As its name implies, the light red kidney bean is a lighter colored variant of the dark red kidney bean. Kidney beans are a part of the cuisine of North India. These gorgeous and versatile beans are often used in chili, refried beans, soups, and salads.

White Kidney Beans

White kidney beans are large, white, oblong beans with a creamy texture and nutty flavor. They are typically used for salads, soups, spreads, stews, patés, and Italian dishes.

Fordhook Lima Beans

With their buttery flavor, lima beans are great in soups or stews, or on their own as a side dish. One of the most popular varieties is the fordhook lima.

Jackson Wonder Lima Beans

This is a small colored lima, that is white during the green shell stage. However when cooked it turns slate grey. They have very strong flavor and are a good choice for soups.

Large Lima Beans

With their buttery flavor, lima beans are great in soups or stews, or on their own as a side dish. The ancestors of large limas are found in Venezuela.

Thorogreen Lima Beans

With their buttery flavor, lima beans are great in soups or stews, or on their own as a side dish. Thorogreen is super for canning and freezing. It is the more popular of the green seeded baby limas in the southeast.

Lupin Beans

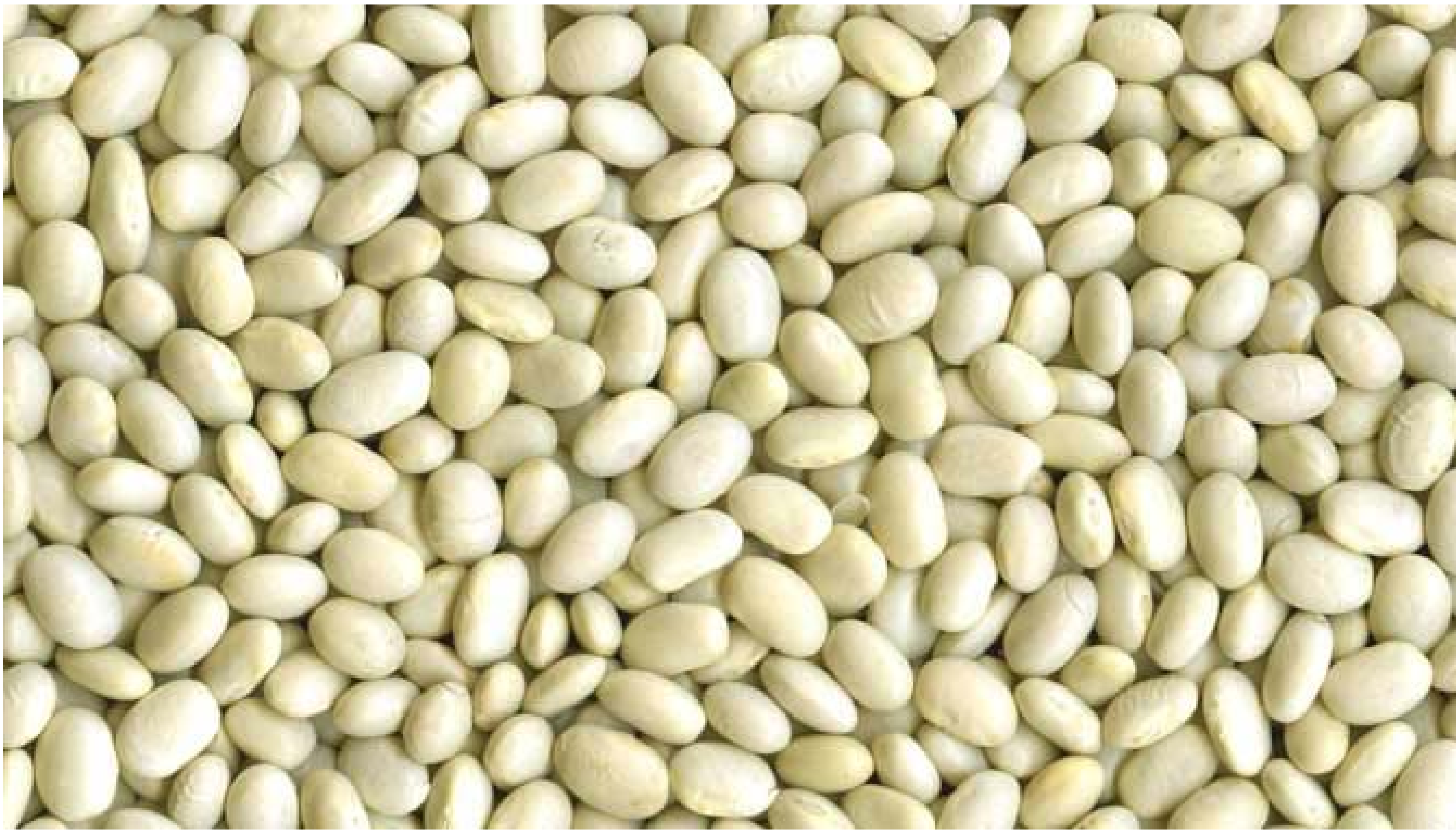
The fiber-rich lupin flour is used as a food source for humans. The nutritionally-rich lupin floucan be used to enrich pastas, cake mixes, cereals, and other baked goods. Sweet lupin seeds lack trypsin inhibitors and can make a valuable contribution to dairy, beef, swine, sheep, and poultry rations at the farm since high temperature cooking to eliminate anti-nutritional factors is not needed.

Large Lupin Beans

The fiber-rich lupin flour is used as a food source for humans. The nutritionally-rich lupin flour can be used to enrich pastas, cake mixes, cereals, and other baked goods. Sweet lupin seeds lack trypsin inhibitors and can make a valuable contribution to dairy, beef, swine, sheep, and poultry rations at the farm since high temperature cooking to eliminate anti-nutritional factors is not needed.

Maicoba Beans

These are medium sized oval beans with a mild flavor used for soups, salads, and Hispanic dishes. They are also called Mayocoba, Canaria or Canario beans.



Marrow Beans

A classic white bean with none of the gummy texture of Navy beans, but with more moisture than traditional Cannellini or Great Northerns. Because it holds its shape so well, the Marrow bean is ideal as a pot bean or in salads.

Mung Bean

Whole mung beans are small and green, and they’re often sprouted to make bean sprouts. When skinned and split, the beans are flat and yellow, and called moong dal.

Pea Beans

These small white beans are commonly used to make baked beans, but they’re also good in soups, salads, and chili. They’re relatively difficult to digest.

Pink Beans

Small, pale, pink-colored; rich, meaty flavor with a slightly powdery texture. These are very similar to pinto beans, only they're smaller and rounder. Used in Mexican-American dishes, they're often used to make chili and refried beans.

Pinto Beans

These dried beans are beige with brown streaks, but they turn a uniform pinkish-brown when cooked. They’re often used to make refried beans and chili.

Small Red Beans

These are similar to red kidney beans, only smaller, rounder, and darker. In the Southwest, they're often used to make refried beans and chili. In Louisiana, they're used to make the classic red beans and rice.

Small White Beans

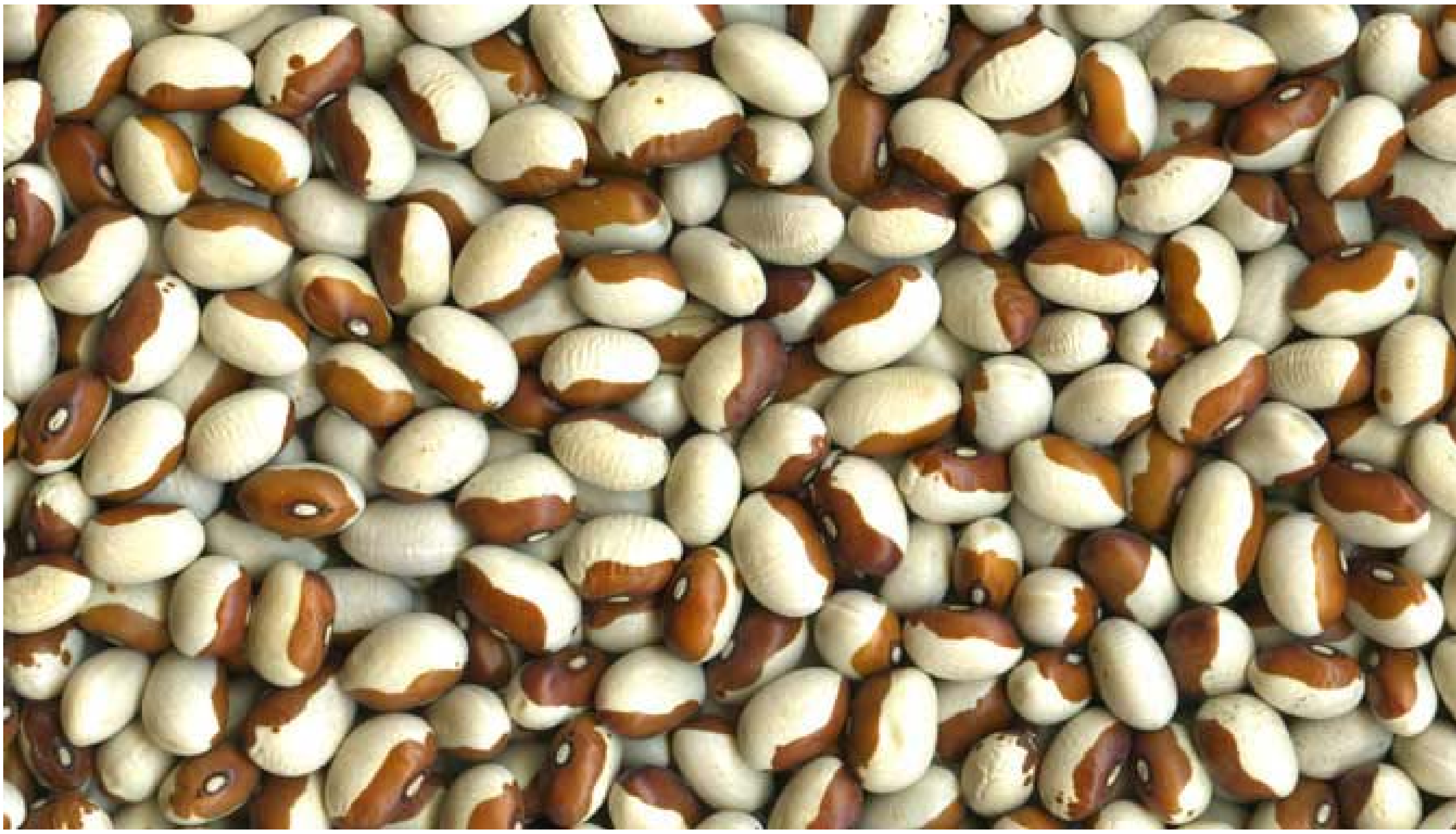
Small white oval beans with a mild flavor and powdery texture. Also known as Navy beans, small white beans are excellent for soups, chowders, and are most often called for in bean pot recipes.

Swedish Brown Beans

Swedish brown beans, also referred to simply as brown beans, are closely related to black turtle soup beans. Settlers from Sweden who arrived in Montana during the late 19th century brought Swedish brown beans to North America. The rich flavor of this variety makes it ideal for use in baked-bean recipes and they are especially good in soups.

Violet Blackeye Beans

A variety of The black-eyed “pea” bean, with a violet rather than black spot.



Yelloweye Beans

This heirloom bean is sometimes used to make Boston baked beans.

DRY PEAS

Green Peas

Dry peas with a light green seed coat and dark green cotyledon. Peas are a cool-season vegetable crop. A pea is the small, edible round green bean which grows in a pod on the leguminous vine Pisum sativum, or in some cases to the immature pods. This legume is cooked as a vegetable in many cultures.

Green Split Peas

Green peas that have been split. Split peas don’t need to be soaked and cook fairly quickly. They’re commonly used to make soups.

Yellow Peas

Dry peas with a light yellow seed coat and dark yellow cotyledon. Peas are a cool-season vegetable crop. A pea is the small, edible round green bean which grows in a pod on the leguminous vine Pisum sativum, or in some cases to the immature pods. This legume is cooked as a vegetable in many cultures.

Yellow Split Peas

Yellow peas that have been split. Split peas don’t need to be soaked and cook fairly quickly. They’re commonly used to make soups.

Marrowfat Peas

In the United Kingdom, dried, rehydrated and mashed marrowfat peas, known by the public as mushy peas, are popular, especially as an accompaniment to fish and chips or meat pies. Marrowfat peas are also used to make pease pudding (or “pease porridge”), a traditional dish.

Yellow Pod Peas

Yellow seeds of a pea variety that’s completely edible, including the pod.

Brown Pod Peas

Brown seeds of a pea variety that's completely edible, including the pod.

Austrian Winter Peas

Dry peas with a mottled dark green/brown seed coat and yellow cotyledon. Austrian winter peas are a fall seeded cover crop that can be used for grazing, hay, and green manure.

Maple Field Peas

The pigeon feed market has been a valuable niche market for Maple peas. Varieties of field peas (Pisum sativum L.) intended for specialty markets, such as maple peas, often have brown colored seeds. These varieties have higher levels of tannin that may reduce palatability in livestock rations.

LENTILS

Lentils (Athena)

The Lentil is one of the oldest cultivated annual legume, and is believed to be native to South Western Asia and Northern Syria. Unlike dried beans, lentils do not need to be soaked before cooking. They are a popular vegetarian food, due to their high protein content and are often served in winter soups and casseroles.

Lentil (Beluga)

Beluga Lentils which, as the name implies, are black and once cooked they glisten which makes them look like beluga caviar.

Lentil (Blaze Red)

Red lentils are less common than brown lentils and have a slightly sweeter taste than the brown. They take a little less time to cook although they tend to become somewhat mushy and are therefore more suitable to soups and stews.

Lentil (Brewer)

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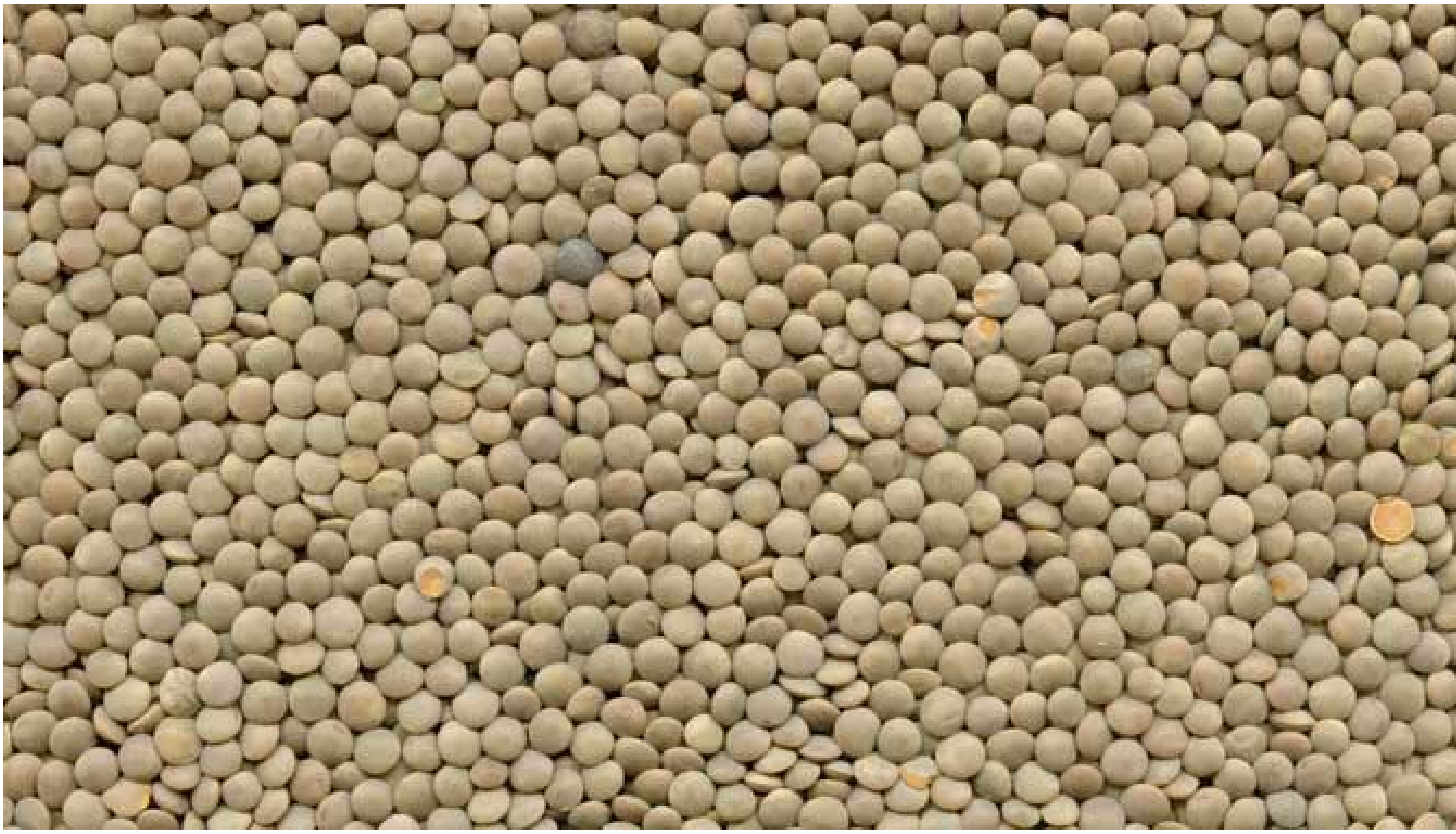

Lentil (Crimson)

This Lentil has a reddish-brown seed coat and red cotyledon. The Lentil is one of the oldest cultivated annual legume, and is believed to be native to South Western Asia and Northern Syria. Unlike dried beans, lentils do not need to be soaked before cooking. They are a popular vegetarian food, due to their high protein content and are often served in winter soups and casseroles.

Lentil (Eston)

This Lentil has a tan to green seed coat and yellow cotyledon. The Lentil is one of the oldest cultivated annual legume, and is believed to be native to South Western Asia and Northern Syria. Unlike dried beans, lentils do not need to be soaked before cooking. They are a popular vegetarian food, due to their high protein content and are often served in winter soups and casseroles.

Lentil (French Green)

Green lentils, also know as Puy or French lentils, are the finest but most expensive lentils. They are the meatiest, richest tasting and remain quite firm after cooking making them an excellent choice for salads. Originally grown in the volcanic soils of Puy in France, the are now also grown in North America and Italy.

Lentil (Mason)

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Lentil (Merrit)

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Lentil (Milestone)

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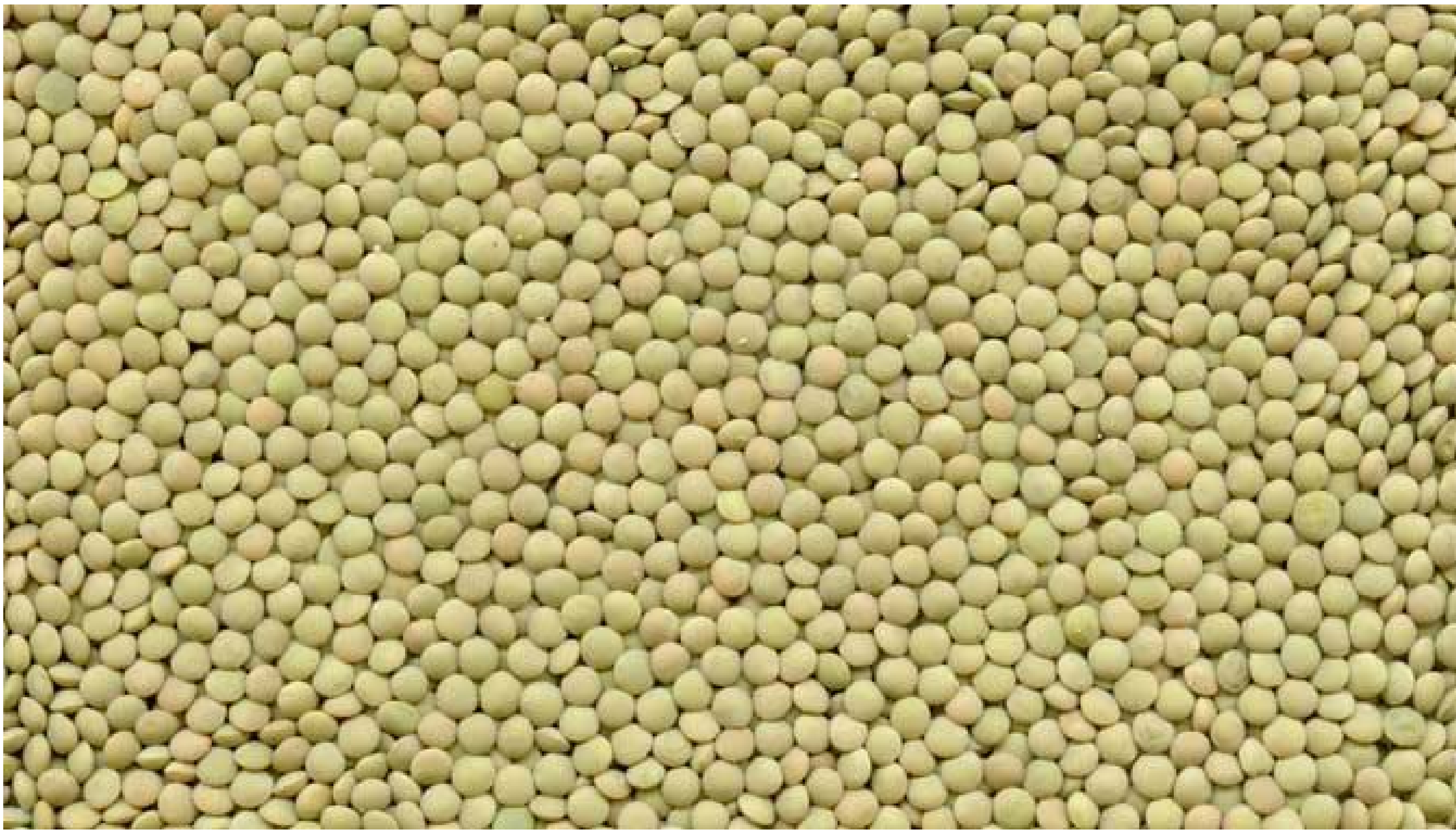

Lentil (Morton)

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Lentil (Palouse)

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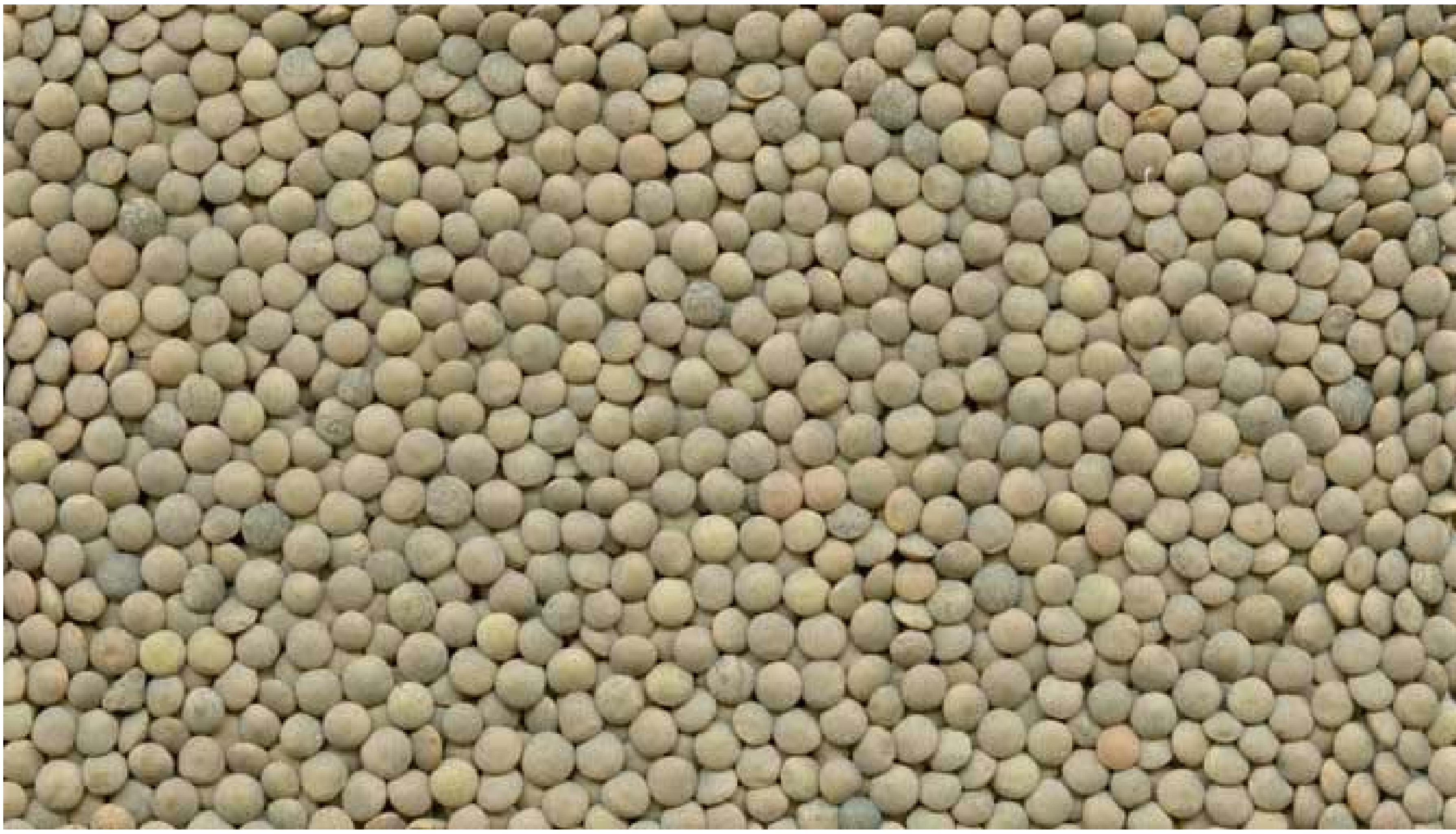

Lentil (Pardina)

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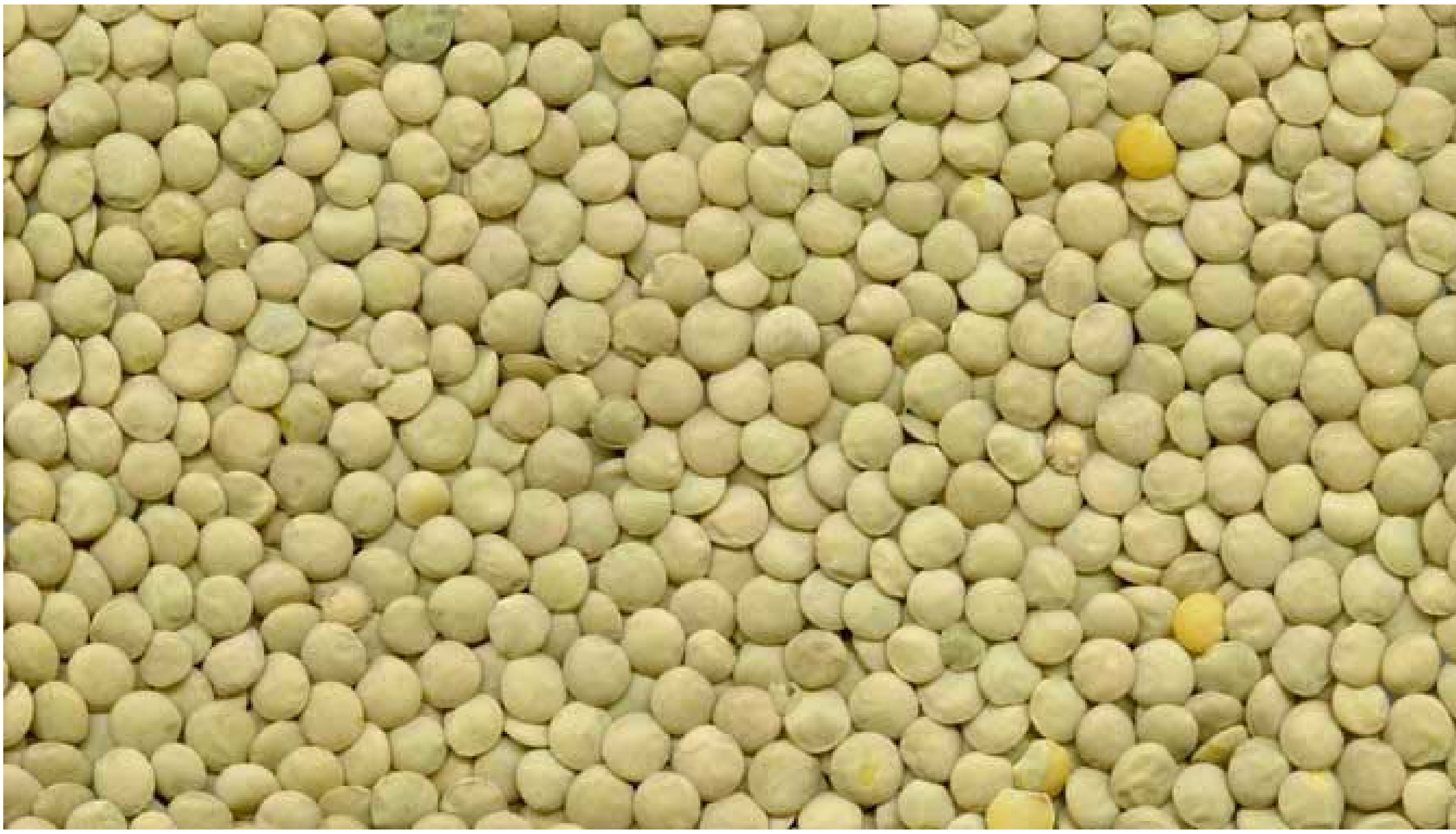

Lentil (Pennel)

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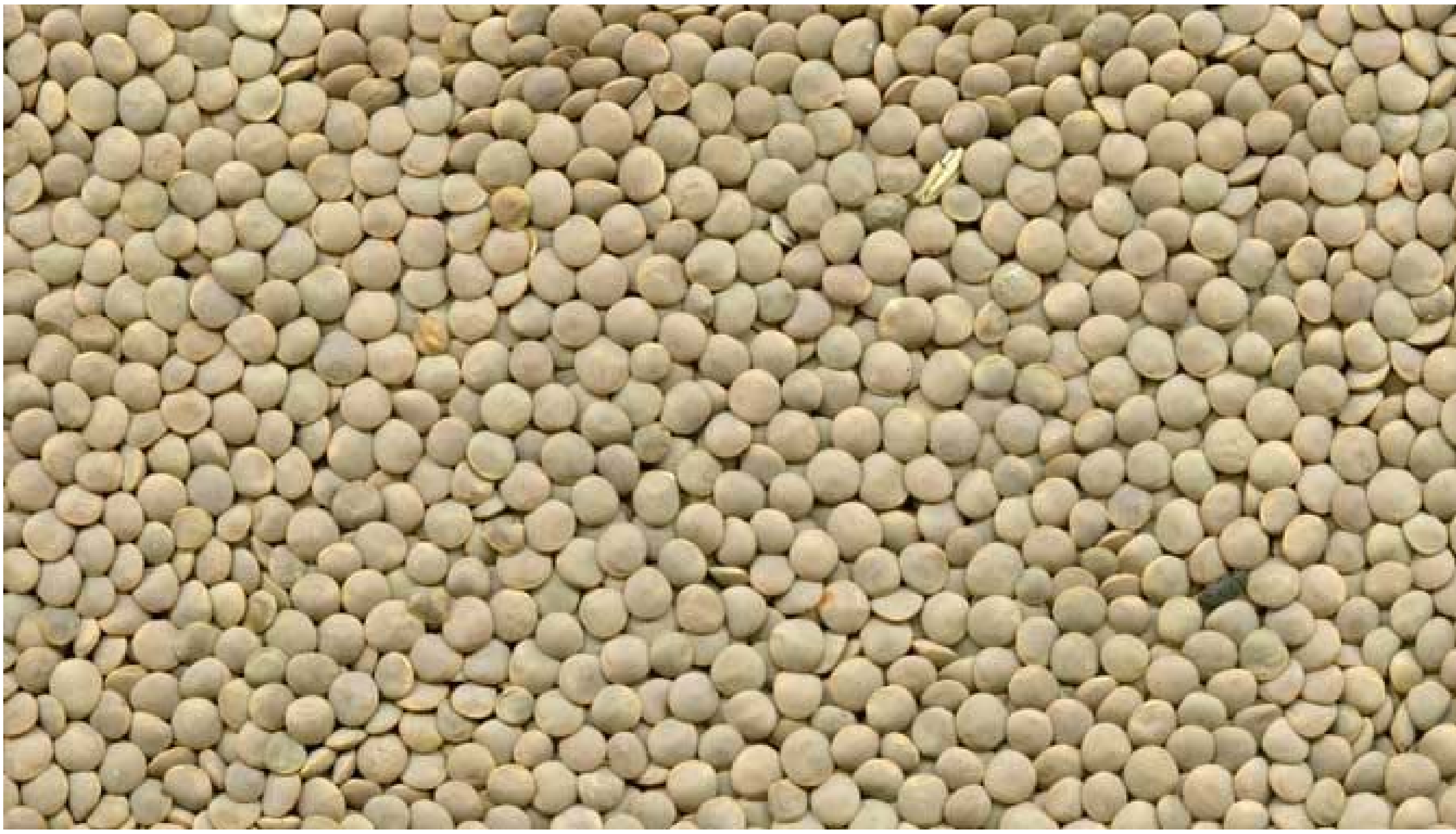

Lentil (Redberry)

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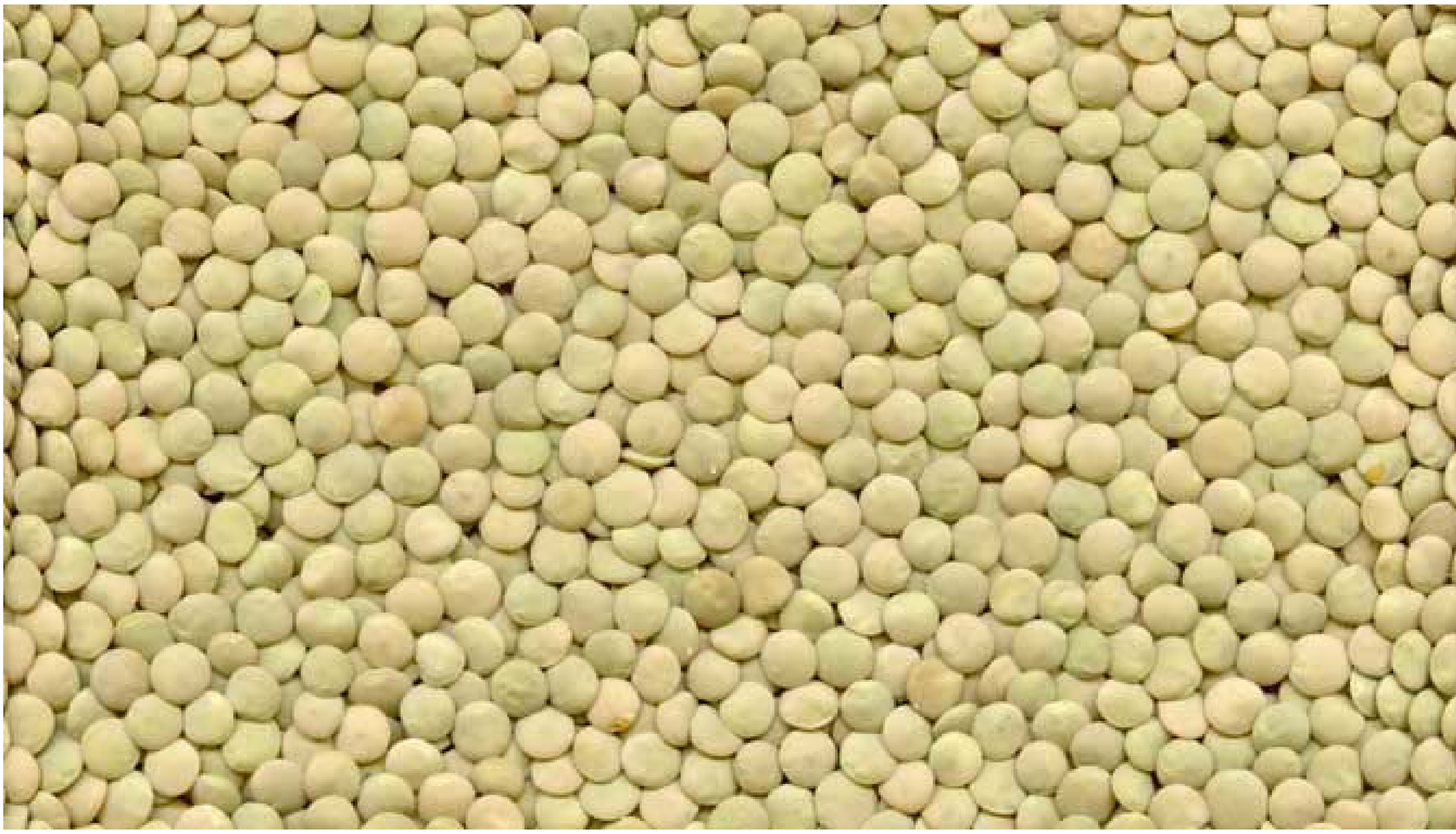
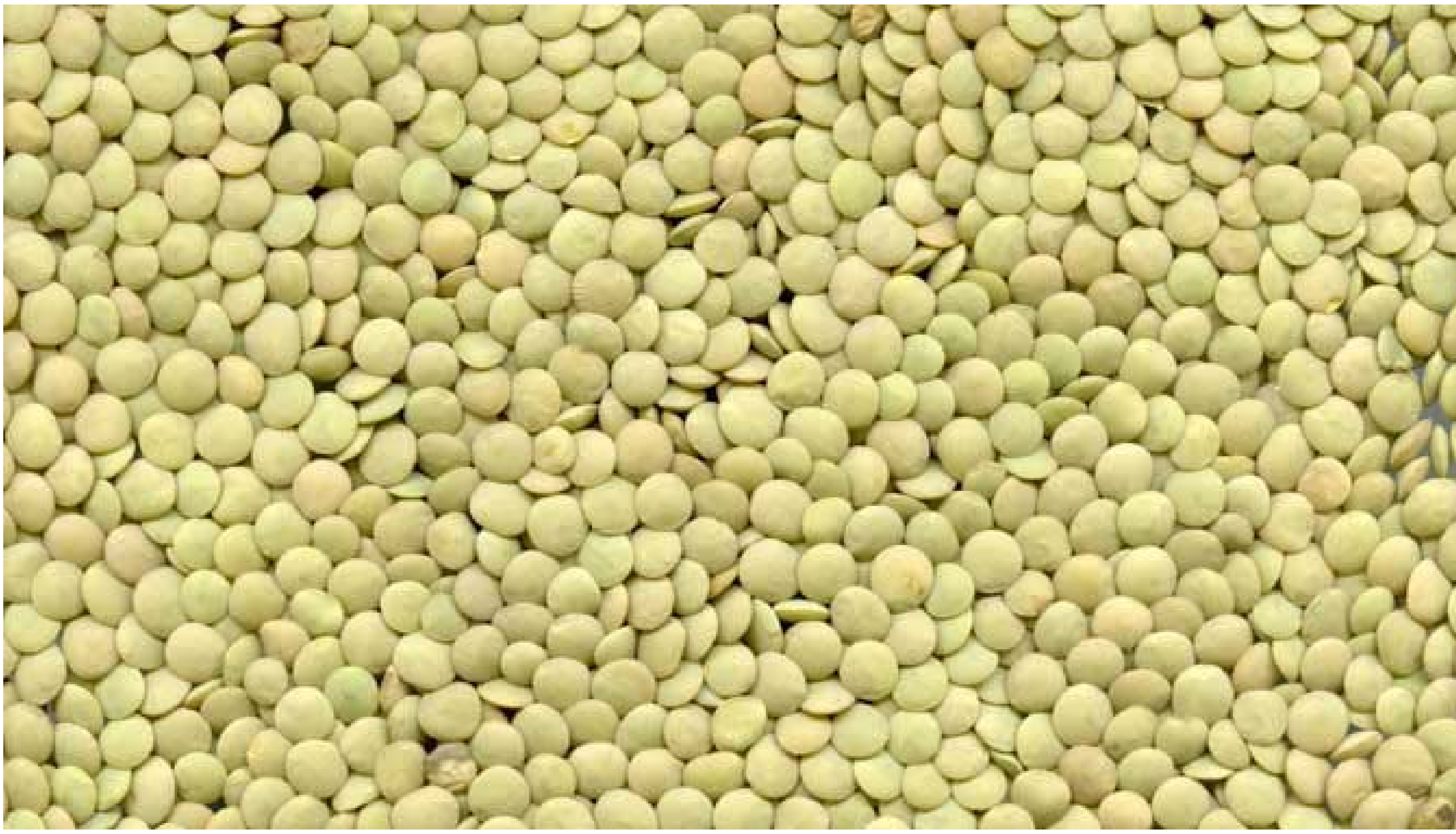


Lentil (Red Chief)

This Lentil has a light tan seed coat and red cotyledon. The Lentil is one of the oldest cultivated annual legume, and is believed to be native to South Western Asia and Northern Syria. Unlike dried beans, lentils do not need to be soaked before cooking. They are a popular vegetarian food, due to their high protein content and are often served in winter soups and casseroles.



Lentil (Richlea)

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Lentil (Robbins)

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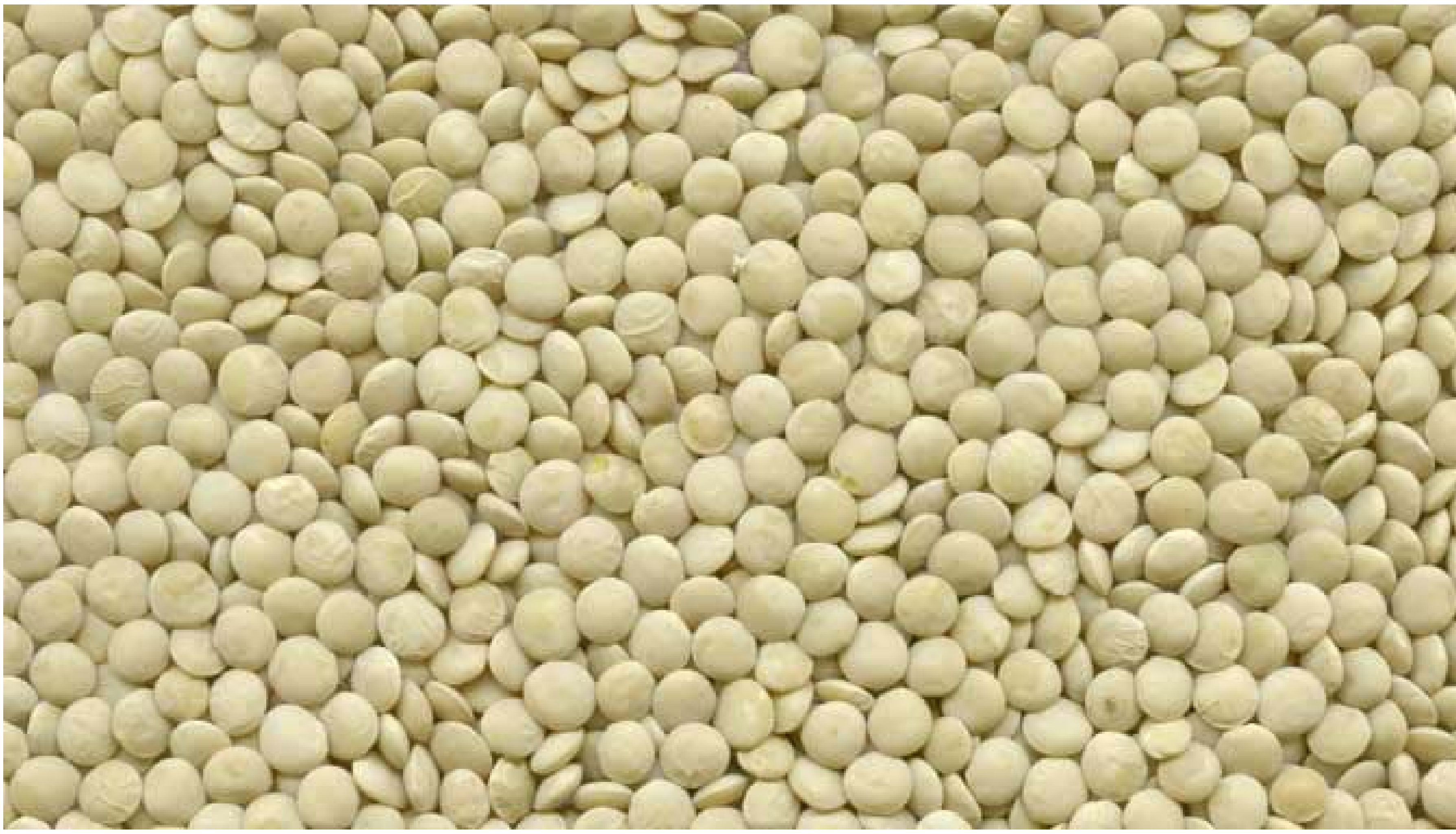

Lentil (Shasta)

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