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Potato Graders Manual

Michigan State University Cooperative Extension Service

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Department of Agriculture

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Potato Grader's

Manual



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AGRICULTURAL ECONOMICS DEPARTMENT

in cooperation with

BUREAU OF FOODS AND STANDARDS

MICHIGAN DEPARTMENT

OF AGRICULTURE



MICHIGAN STATE COLLEGE

COOPERATIVE EXTENSION SERVICE

EAST LANSING

Potato Grader's Manual

(The purpose of this manual is to summarize the grading provisions of the Michigan Potato Marketing Law and to provide practical interpretations of the United States grades for potatoes. The author acknowledges the contribution of F. E. Cole, Extension Specialist, University of Massachusetts, through his "Potato Sorters' Manual" and of Miles Nelson, M. D. Murphy and Hunter Hering of the Bureau of Foods and Standards, Michigan Department of Agriculture.)

MICHIGAN POTATO MARKETING LAW (Act 220, P.A. 1929, as amended)

Summary of provisions relating to grading:

SEC. 1—The latest potato grade standards established by the United States Secretary of Agriculture shall be accepted as the legal standards for Michigan.

A person who buys potatoes with the intent to transport or have them transported by truck shall be a licensed grader or furnish a licensed grader for the grading of said potatoes.

SEC. 3—It is unlawful for any person, firm, etc. to pack, store, transport, offer for sale, sell or otherwise handle potatoes which do not meet the requirements of the declared grade.

SEC. 4—Containers of potatoes prepared for market shall be legibly branded or stenciled with the name and address of the person responsible for grading and packing, the grade and true net contents. Bulk shipments shall be accompanied by two cards showing the name and address of the consignor, the grade, name of the loading station, date of loading, and name and address of the consignee, if known.

SEC. 5—Potatoes held in storage or in transit which show deterioration or decay but are otherwise up to the grade declared shall be inspected as to condition and not as to grade.

SEC. 7—Potato graders are licensed by the Director of the Michigan Department of Agriculture. The fee is \$1.00 per year. Licensed graders designate by their name or identifying symbol each lot of potatoes graded by them or under their supervision.

SEC. 8—The provisions of this act do not apply to growers who sell potatoes produced by themselves directly to consumers.

Copies of the text of the Michigan Potato Marketing Law and of the official United States Standards for Potatoes may be obtained from the Bureau of Foods and Standards, Michigan Department of Agriculture, Lansing 13, Michigan.

U. S. GRADES FOR POTATOES

U. S. FANCY	U. S. No 1
U. S. EXTRA No. 1	U. S. COMMERCIAL
	U. S. No. 2

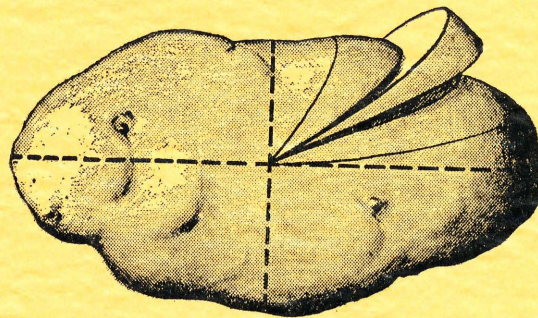
"Unclassified" is not a grade and may not be used in Michigan.

Waste in preparation and appearance are the two main considerations in grade determination.

Each grade is a standard of quality and condition.

A well graded lot of normal potatoes is used as a standard of appearance.

Waste is determined by straight cuts and not by careful digging. Five percent (5%) of a potato is one-quarter of a potato divided into five equal parts. (See drawing.)



The percentage of off-grade potatoes in a bag is determined by weight.

VARIETY

Variety is interpreted as potatoes having "similar varietal characteristics." The practical requirement is only one variety in a container.

MATURITY — SKINNING

Maturity is judged by the tightness of the skin or the amount of skinning.

U. S. Fancy: Firm, tight skin, practically no skinning.

- U. S. Extra No. 1: Same as U. S. No. 1.
- U. S. No. 1: No requirement. "Slightly skinned," which may be used for this grade, means not more than 10% of the potatoes in any lot with more than one-fourth of the skin missing or feathered.
- U. S. Commercial: Same as U. S. No. 1.
- U. S. No. 2: No requirement.

MINIMUM SIZES

Size requirements herein apply to round or intermediate shaped varieties. Size is measured by diameter, and the diameter indicates the screen size.

Two size classifications may be used for all grades except U. S. Fancy:

Size A: Not less than 60% $2\frac{1}{4}$ inches, $1\frac{7}{8}$ inches minimum.

Size B: From $1\frac{1}{2}$ inches to 2 inches.

U. S. Fancy: 2 inches, 60% $2\frac{1}{4}$ inches.

U. S. Extra No. 1: $1\frac{7}{8}$ inches — but not less than 30% $2\frac{3}{4}$ inches and not less than 60% $2\frac{1}{4}$ inches.

U. S. No. 1: $1\frac{7}{8}$ inches.

U. S. Commercial: Same as U. S. No. 1.

U. S. No. 2: $1\frac{1}{2}$ inches.

SHAPE

Consideration of shape is largely a matter of appearance, although waste is also involved.

U. S. Fancy: Well-shaped. Allows for usual slight variations of a normal potato.

U. S. Extra No. 1: Same as U. S. No. 1.

U. S. No. 1: Fairly well shaped. Some variation allowed, but potatoes which are "dumb-bell", "pointed", or "too long" are not permitted. A fairly good looking potato.

U. S. Commercial: Same as U. S. No. 1.

U. S. No. 2: Not seriously misshapen but bad growth cracks and second growth, which seriously detract from appearance, are considered below grade.

CONDITION — SHRIVELING

Shriveled means soft, dried or shrunken.

U. S. Fancy: Only firm potatoes.

U. S. Extra No. 1: Same as U. S. No. 1.

U. S. No. 1: Not more than slightly shriveled.

U. S. Commercial: Same as U. S. No. 1.

U. S. No. 2: May be shriveled but not spongy or flabby.

SPROUTING

U. S. Fancy: No sprouting allowed.

U. S. Extra No. 1: Same as U. S. No. 1.

U. S. No. 1: Not over 10% with sprouts over $\frac{3}{4}$ inch long.

U. S. Commercial: Same as U. S. No. 1.

U. S. No. 2: No requirement.

FREEZING

Injury may occur in the field or in storage. Breakdown and rot usually follow, with discoloration.

None allowed in any grade.

BLACK HEART

A physical breakdown due to smothering or too high temperatures. Has various colors of killed tissue turning to black. May sometimes be detected by moist areas on the surface of the potato, permitting entry of rots.

None allowed in any grade.

LATE BLIGHT

A disease affecting the skin and adjacent tissue that permits entry of other rot organisms.

None allowed in any grade.

RING ROT

Internal discoloration caused by bacteria. Injury very susceptible to rot organisms.

None allowed in any grade.

WET ROT

Soft rot or wet breakdown, means any soft, mushy or leaky condition of the tissue or wet breakdown following freezing injury or sunscald.

None allowed in any grade.

BRUISES — CRACKS — CUTS

Bruises may result in shatter cracks or crushed tissue, opening the way to rots.

Air cracks may be shallow or deep, and frequently curved. Usually occur in harvesting or packing, and without apparent relation to bruising. They may occur in tight packs or result from rough handling.

Growth cracks are considered on the basis of appearance.

Irregular cuts are more serious than smooth ones. Scars from broken off second growth knobs are considered cuts.

U. S. Fancy: Not over 2% loss.

U. S. Extra No. 1: Same as U. S. No. 1.

U. S. No. 1: Not over 5% loss.

U. S. Commercial: Same as U. S. No. 1.

U. S. No. 2: Not over 10% loss.

DIRT — STAIN

Dirt is soil or other foreign matter affecting appearance. Stain is discoloration from decay or rots.

U. S. Fancy: Clean, bright, normal.

U. S. Extra No. 1: Defects same as U. S. No. 1, but must be fairly clean.

U. S. No. 1: Ordinary clean potatoes with only slight amount of dirt or stain. Potatoes from loamy soil and with usual handling.

U. S. Commercial: Same as U. S. No. 2.

U. S. No. 2: May be slightly caked with dirt.

HOLLOW HEART

U. S. Fancy: None.

U. S. Extra No. 1: None, if discolored.

U. S. No. 1: Not more than 5% loss or discolored.

U. S. Commercial: Same as U. S. No. 1.

U. S. No. 2: Shall not seriously damage the potato.

INTERNAL BROWNING OR BLACKENING

Internal discoloration is that caused by net or other types of necrosis, stem-end browning, internal brown spot or other similar forms of discoloration not visible externally, except blackheart.

U. S. Fancy: None allowed.

U. S. Extra No. 1: Same as U. S. No. 1.

U. S. No. 1: Hollow heart shall not be discolored or more than 5% waste.

U. S. Commercial: Same as U. S. No. 1.

U. S. No. 2: Shall not seriously affect the potato.

SURFACE DISCOLORATION, RHIZOCTONIA, SCAB

Rhizoctonia and surface discoloration, such as "burn" following skinning, are surface injuries and are considered on the basis of appearance. Surface injury from scab and discolorations from other causes may be handled on a similar basis of appearance. Surface coverages below are practical guides to grade limits.

U. S. Fancy: Practically none, not over 2% of surface.

U. S. Extra No. 1: Same as U. S. No. 1.

U. S. No. 1: Not over 5% of surface.

U. S. Commercial: Same as U. S. No. 1.

U. S. No. 2: Not over 50% of surface.

DRY ROT

Any kind of dry rot is graded on a percent of loss basis as shown in the list of percentages below.

PITTED SCAB

Pitted scab is a severe or deep scab infection. It is graded on percent of loss as shown in the list below, and may also be graded on appearance.

SUNBURN — GREENING

When sunburn or greening affects edible quality, the internal discoloration due to exposure to light is included in determining amount of injury, according to the following percentage of loss.

U. S. Fancy: None allowed.

U. S. Extra No. 1: Same as U. S. No. 1.

U. S. No. 1: Not over 5% loss.

U. S. Commercial: Same as U. S. No. 1.

U. S. No. 2: Not over 10% loss.

WIREWORM — GRASS

Any hole from wireworm, grass or similar cause is handled on a percent of waste basis. The following examples apply to a 6 to 8 ounce potato, with larger or smaller potatoes in proportion.

U. S. Fancy: Practically none.

U. S. Extra No. 1: Same as U. S. No. 1.

U. S. No. 1: Not more than one hole $\frac{3}{4}$ inch deep or total of all holes $1\frac{1}{4}$ inches; 5% loss.

U. S. Commercial: Same as U. S. No. 1.

U. S. No. 2: Not more than 1 hole $1\frac{1}{4}$ inches deep or total of all holes 2 inches; 10% loss.

TOLERANCES

The following tolerances apply to all grades except U. S. Commercial, which is described separately, and cover unavoidable errors in sorting.

Size: Below grade minimum	3%
Below stated $2\frac{1}{4}$ inch minimum	5%
Above stated maximum	15%

Hollow heart, internal discoloration

U. S. Fancy	None
Other grades	5%

All other grade requirements 6% including not more than 1% wet rot and not more than 3% late blight and ring rot.

Appearance: No tolerance below grade standard.

U. S. Commercial: 20% may fail to meet grade requirements. However, not more than 5% may exceed U. S. No. 2 standards for hollow heart and internal discoloration. And not more than 6% may exceed U. S. No. 2 standards for other grade requirements, but with not over 1% wet rot and not over 3% late blight and ring rot.

The unused portion of the 20% may be used for potatoes with sprouts over $\frac{3}{4}$ inch long.

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