

## MICHIGOLD: A YELLOW-FLESHED POTATO CULTIVAR FOR FRESH MARKET

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### Abstract

Michigold (MS704-10Y) is a round, blocky, yellow-fleshed cultivar with medium netting selected at Michigan State University for the fresh market. It could also be used for chip processing out of field or from short-term storage at 10 C. Under Michigan conditions, Michigold matures in 110-120 days with marketable yields of 122% of Yukon Gold and 95% of Atlantic. Plant growth is vigorous and Michigold appears to have moderate resistance to early blight. Internal defects have been minimal. An electrophoretic fingerprint based upon 13 isozyme loci is presented to facilitate cultivar identification during seed certification processes.

### Compendio

Michigold (MS704-10Y) es un cultivar con tubérculos redondeados, pulpa amarilla, y con piel medianamente rugosa. Fue seleccionado en Michigan State University para mercado fresco, pero también puede ser utilizado para procesamiento de hojuelas directamente del campo, o luego de almacenamiento corto a 10 C. Bajo las condiciones de Michigan, Michigold madura en 110-120 días con rendimientos comerciales iguales al 122% de los de Yukon Gold y al 95% de los de Atlantic. El crecimiento vegetativo es vigoroso y aparentemente exhibe resistencia moderada a tizón temprano. Los defectos internos han sido mínimos. Se presenta una caracterización electroforética para facilitar la identificación del cultivar durante el proceso de certificación de la semilla.

### Introduction

Michigold was selected in 1978 from a cross made at Michigan State University to select yellow-fleshed types. In 1988, Michigan State University and the Michigan Agricultural Experiment Station announced the release of a new yellow-fleshed cultivar named Michigold (MS704-10Y).

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It matures in 100-120 days and the tubers are characterized by an attractive yellow flesh. Michigold is a selection from a cross involving Atlantic and bulk pollen collected from a group of yellow-fleshed breeding lines (MS002-171Y, MS003-22Y, MS003-69Y and MS004-198Y). Michigold was tested as MS704-10Y.

### Description

**PLANTS:** Michigold is a medium-sized plant with a spreading growth habit and medium-late maturity.

**STEMS:** Green (5 GY 6/6)<sup>2</sup>, slightly pigmented at the base of the stem, slightly swollen nodes and small wings on the main stems but inconspicuous in the branches.

**LEAVES:** Green (7.5 GY 5/4), non-pigmented, short pubescence consisting of single and multi-celled hairs, leaf margins entire, petiole with sparse pubescence, mid-rib light green with short pubescence, stipule non-pigmented with pubescence only on the lower surface. Terminal leaflets slightly asymmetrical, cuspidate apex, cordate base, index of width to length 0.71. Primary leaflets usually three pairs, lobed asymmetrical base, cuspidate apex, index of width to length 0.65. Secondary leaflets usually three-six pairs. Tertiary leaflets are many.

**INFLORESCENCE:** Flowers are branched, usually carried above the foliage with a long peduncle and pedicel with a moderate amount of short pubescence. Buds are pigmented at the base, changing to light green at the tip. Calyx sepals acuminate, 10-12mm long, slightly pigmented and pubescent. Corolla rotate, petals white with purple tint and medium size. Anthers yellow (5 Y 8/12), short 5-6mm long. Pistil green throughout with dark green stigma extending above the stamens.

**TUBERS:** The tubers of Michigold are round to blocky, slightly flattened with a medium netting and uniform size-distribution (Figure 1). Eyes are medium-shallow. Maturity is medium-late. The haulm growth is vigorous, open in habit and establishes uniform stands. In Michigan trials (1, 2, 3, 4) optimum maturity is reached between 110-120 days with a high percent of U.S. No. 1 tubers (Table 1). It sets heavy and has less tendency to oversize than Yukon Gold. Yields are comparable to Atlantic and higher than Yukon Gold. Tubers have a golden flesh color similar to Yukon Gold. Specific gravity is higher than Yukon Gold and slightly less than Atlantic.

### Characteristics

The primary use of Michigold is for fresh market and is excellent for boiling or baking. It could also be used for chips out of the field or from short-term storage at 10 C. Sensory evaluations indicated a higher rating

<sup>2</sup>Munsell® Color Charts for Plant Tissues, Second Edition (Revised 1977)

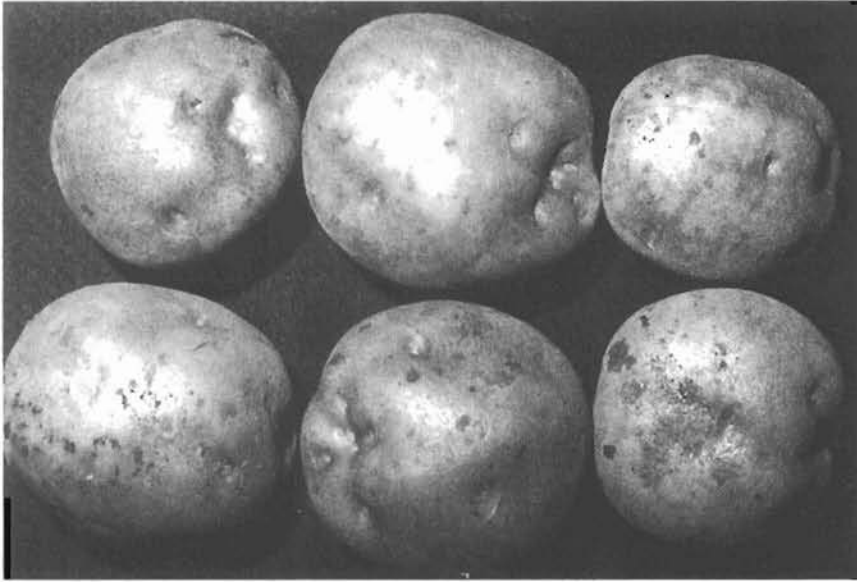


FIG. 1. Tuber samples of Michigan Gold

for appearance, flavor and texture for Michigan Gold when compared with the more common white-fleshed varieties.

Michigan Gold was tested in the North Central Regional Trials in 1986 and 1987. It produced near average U.S. No. 1 yields and total solids in both years (Table 2).

Total glycoalkaloid (TGA) levels were determined by Dr. Stephen L. Sinden at the USDA Northeastern Region Research Center at Beltsville, MD. TGA content of tubers was 3.0 mg/100 g fresh weight compared with 5.9 and 6.2 for Russet Burbank and Atlantic, respectively.

#### *Reaction to Diseases and Disorders*

Michigan Gold has moderate tolerance to *Alternaria solani*. *Phytophthora infestans* has not been observed in foliage or tubers. It does not readily re-infect with most of the common viruses, however, because of its lighter foliage color, it may be more attractive to aphids and subsequent potato leaf roll virus infection.

Michigan Gold produces typical foliage and tuber symptoms when infected with *Corynebacterium sepedonicum* in tests conducted by Dr. Mel Lacy at MSU. Tests conducted in Michigan showed Michigan Gold to be susceptible to *Streptomyces scabies*, similar to Atlantic but less susceptible than Yukon Gold. No phytotoxicity problems were found with metribuzin and metolachlor applied pre-emergence. No observations have been made on post-emergence applications of metribuzin.

TABLE 1.—Tuber yield and specific gravity of Michigold and check varieties at three harvest dates. Montcalm Research Farm, MI.

Years	Tested Variety	Early (90-95 days)				Mid-Season (110-120 days)				Late (135-145 days)			
		U.S. No. 1 T/ha	Total T/ha	% U.S. No. 1	Specific Gravity	U.S. No. 1 T/ha	Total T/ha	% U.S. No. 1	Specific Gravity	U.S. No. 1 T/ha	Total T/ha	% U.S. No. 1	Specific Gravity
5	Michigold	33.4	41.5	80	1.083	45.1	52.2	86	1.083	42.9	49.9	86	1.082
5	Yukon Gold	34.0	38.0	89	1.078	39.7	42.9	92	1.079	39.7	44.3	92	1.077
7	Onaway	45.1	49.3	91	1.066	51.8	55.7	93	1.066	51.5	54.9	93	1.065
7	Atlantic	31.9	42.5	74	1.088	47.6	52.8	89	1.089	47.5	52.2	91	1.089

Under normal harvesting and handling, Michigold is moderately resistant to blackspot. Shatter bruise has been noted when the crop is mature and the soil is wet. Internal defects are minimal but hollow heart can occur if tubers oversize. It has a short rest period and a sprout inhibitor should be used for long-term storage and commercial marketing. Unlike Yukon Gold, Michigold produces vigorous, early growth with uniform stands with both fresh-cut and precut seed. The performance of Michigold in nitrogen and spacing trials conducted at the Montcalm Research Farm is presented in Table 3. The 15.2 cm spacing produced a high percent of tubers under 5.1 cm.

TABLE 2.—*Performance of Michigold in the North Central Regional Trials, 1985-1986*

Year-Variety	Yield T/ha*		% U.S. No. 1	% * Total Solids
	U.S. No. 1	Total		
1985				
Michigold	32.2	38.8	81	19.7
Norchip	30.7	37.7	79	19.3
Average for 18 cultivars	33.1	39.7	80	18.5
1986				
Michigold	22.4	32.1	70	20.2
Norchip	26.7	34.9	76	19.4
Average for 21 cultivars	23.7	33.3	71	18.8

\*Means were not significantly different at 5% level.

TABLE 3.—*The influence of nitrogen and plant spacing on yield and specific gravity of Michigold Montcalm Research Farm 1986-87.*

Nitrogen (Kg/ha)	Yield T/ha*		% U.S. No. 1	Specific* Gravity
	U.S. No. 1	Total		
112	33.9	43.5	78	1.084
168	37.7	47.3	80	1.083
224	37.1	46.6	80	1.082
Spacing (cm)				
15.2	35.9	46.9	77	1.083
22.9	36.5	46.0	79	1.084
30.5	36.5	44.8	81	1.083

\*Means were not significantly different at 5% level.

### Electrophoretic Identification

Tuber and leaf tissue were sampled from Michigold to construct an electrophoretic fingerprint. Procedures and allelic designations were according to Douches and Ludlam (5), and is transcribed below:

*Mdh-1<sup>2</sup>1<sup>3</sup>1<sup>4</sup>1<sup>4</sup>*, *Mdh-2<sup>2</sup>2<sup>2</sup>2<sup>2</sup>2<sup>3</sup>*, *6-Pgdh-3<sup>1</sup>3<sup>1</sup>3<sup>2</sup>3<sup>2</sup>*, *Idh-1<sup>1</sup>1<sup>1</sup>1<sup>1</sup>1<sup>2</sup>*,  
*Pgi-1<sup>2</sup>1<sup>2</sup>1<sup>2</sup>1<sup>2</sup>*, *Aps-1<sup>1</sup>1<sup>1</sup>1<sup>2</sup>1<sup>2</sup>*, *Got-1<sup>3</sup>1<sup>3</sup>1<sup>4</sup>1<sup>4</sup>*, *Got-2<sup>3</sup>2<sup>5</sup>2<sup>5</sup>2<sup>5</sup>*,  
*Pgm-1<sup>1</sup>1<sup>1</sup>1<sup>2</sup>1<sup>3</sup>*, *Pgm-2<sup>2</sup>2<sup>2</sup>2<sup>2</sup>2<sup>3</sup>*, *Dia-1<sup>1</sup>1<sup>1</sup>1<sup>1</sup>1<sup>2</sup>*, *Prx-1<sup>1</sup>1<sup>1</sup>1<sup>3</sup>1<sup>3</sup>*,  
*Adh-1<sup>2</sup>1<sup>2</sup>1<sup>2</sup>1<sup>2</sup>*.

The electrophoretic data for Michigold is maintained in a database comprising electrophoretic fingerprints for over 120 North American potato cultivars at Michigan State University. This fingerprint is unique to all other cultivars tested.

### Acknowledgments

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### Literature Cited

- 1 Chase, R.W., R.B. Kitchen, R. Leep and R. Hammerschmidt. 1986. Michigan Report. *In*: National Potato Germplasm Evaluation and Enhancement Report 1985: 74-88.
- 2 Chase, R.W., G.H. Silva, R.B. Kitchen, R. Leep and R. Hammerschmidt. 1987. Michigan Report. *In*: National Potato Germplasm Evaluation and Enhancement Report 1986: 100-121.
- 3 Chase, R.W., G.H. Silva, D. Douches, R.B. Kitchen, R.H. Leep and R. Hammerschmidt. 1989. Michigan Report. *In*: National Potato Germplasm Evaluation and Enhancement Report 1988: 83-102.
- 4 Chase, R.W., G.H. Silva, R.B. Kitchen, R.H. Leep and R. Hammerschmidt. 1989. Michigan Report. *In*: National Potato Germplasm Evaluation and Enhancement Report 1987: 72-94.
- 5 Douches, D.S. and K. Ludlam. 1991. Electrophoretic characterization of North American potato cultivars. *Am Potato J* 68:767-780.