YUKON GEM CHARACTERISTICS

Proposed name: (Yukon Gem)
Experimental designation: NDA5507-3Y
Botanical name: Solanum tuberosum L.
Intended Market: Fresh Market/Possible Processing

General Description:

Yukon Gem is a product of the North Dakota State University (NDSU) potato breeding program. It resulted from a 1994 cross between the Scottish cultivar, Brodick and Yukon Gold (Figure 1). It was sent as a seedling tuber by NDSU to the USDA/ARS, University of Idaho potato breeding program at Aberdeen, Idaho. It was selected in the field at Aberdeen in 1995, and was evaluated for 10 years in public and industry trials throughout the western U.S. The release will be made jointly by the partners of the Northwest (Tri-State) Potato Variety Development Program including the USDA/ARS and the Idaho, Washington, and Oregon state experiment stations. The contribution of the North Dakota experiment station will also be recognized with an invitation to join in the release of Yukon Gem.

Yukon Gem is a mid-season selection with light-yellow flesh and higher yield potential than Yukon Gold (its paternal parent). It is also is notable for its PVY^{O} and tuber blight resistances that are derived from its Scottish parent, Brodick. Yukon Gem completed four years of evaluation (2002-2005) in the Western Regional Red/Specialty Potato Trial. Total yield across all Western regional sites was 36, 82, 118, and 79 cwt greater than Yukon Gold in 2002-2005 respectively. Merit ratings for fresh pack characteristics including postharvest evaluations for boiling, baking, and microwave characteristics were comparable to those for Yukon Gold in all four years. Yukon Gem has moderately low specific gravity and good resistance to tuber malformations and most internal and external defects; its tubers exhibit little or no after-cooking darkening. It produces acceptable potato chips, but its lower specific gravity may limit its use for this purpose.

Plant Characteristics:

Yukon Gem has an erect, medium vine that matures relatively early in the season. It produces medium red-purple flowers that have a tendency to abort. Pollen is produced with some limited success as a male parent. See Table 1 for a description of plant characteristics and Figure 2 for photographs.

Table 1. Foliage characteristics of Yukon Gem compared with those of Yukon Gold. Comparisons were made on plants growing in Aberdeen, Idaho in 2003 and 2005.

Characteristic	Yukon Gem	Yukon Gold
Maturity	Medium to Early	Medium to Early
Flower color	Medium red-purple	Light red-purple
Pollen production	Yes-limited success as male parent	Yes

Tuber Characteristics:

Yukon Gem produces round to oval, light yellow skin with pink splash around the eyes. The eyes are intermediate in depth and number and are evenly distributed. Tuber set is low to medium, and tuber size is medium (Table 2). See Figure 2 for photographs.

Table 2. Physical tuber characteristics of Yukon Gem compared with those of Yukon Gold. Comparisons were made using tubers grown at Aberdeen, Idaho in 2003 and 2005.

Characteristic	Yukon Gem	Yukon Gold
Skin Color	Yellow	Yellow
Skin texture	Smooth to scaley	Smooth to scaley
Size[1]	Medium (Ave. 5.5 oz)	Medium (Ave. 6.5 oz)
Shape	Round to oval(2.5[2])	Round to oval(2.3)
Thickness	Slightly flattened	Slightly flattened
Eye depth	Shallow	Shallow
Eye number	Intermediate	Intermediate
Eye distribution	Evenly distributed	Evenly distributed
Eyebrow prominence	Slight prominence	Slight prominence
Flesh color	Yellow	Yellow
Tuber set	Low to medium (7.9[3])	Low (5.9)
Dormancy		

[1] Tuber size data were collected from 16 trials grown in Idaho, Oregon and Washington in 2002 - 2005.

[2] Shape is a 1-5 rating scale with 1 = round and 5 = long and narrow; data taken from 3 trials between 2003 and 2005.

[3] Tuber set data collected from 4 trials grown in Idaho in 2002-2005.

Tuber Yield:

Yukon Gem produced higher average total yields than Yukon Gold in early harvest trials in eastern Idaho, Oregon, and Washington (Table 3). Average yields were 12% higher than Yukon Gold in Idaho, 41% higher in Oregon and 21% higher in Washington. Yukon Gem produced higher yields of 4-10 oz. tubers at all locations but also produced lower yields of >10 oz. tubers than Yukon Gold at all locations.

Table 3. Yukon Gem total and U.S. No. 1 yields as compared to those of Yukon Gold in early harvest trials.

Location	Variety	Total Yield	> 10 oz. Yield	4-10 Yield	< 4 oz. Yield
		(cwt/A)	(cwt/A)	(cwt/A)	(cwt/A)
Eastern Idaho[1]	Yukon Gem	399	50	250	93
	Yukon Gold	355	74	228	48
Oregon[3]	Yukon Gem	699	167	409	58
	Yukon Gold	495	182	242	30
Washington[4]	Yukon Gem	440	82	241	70
	Yukon Gold	361	98	158	35

[1] Data from 4 trials conducted from 2002-2005 in Aberdeen.
[2] Data from 11 trials conducted from 2002-2005 in Corvallis, Hermiston, and Klamath Falls, OR.
[3] Data from 4 trials conducted from 2002-2005 in Granger, Mt. Vernon, and Toppinish, WA.

Tuber Quality Characteristics

In 20 trials grown in Idaho, Oregon, and Washington, average specific gravity and percent solids for Yukon Gem was lower than that of Yukon Gold. Yukon Gem also produced slightly lighter fry color than Yukon Gold out of 45^{o}F storage (Table 4).

Table 4. Tuber specific gravity, solids, and french fry color of Yukon Gem as compared with Yukon Gold.

Characteristic	Yukon Gem	Yukon Gold
Specific gravity[1]	1.075	1.085
Fry color (45°F storage)[2]	0.9	1.1
Solids (%)	19.47	21.64

[1] Specific gravity data from 20 trials grown in Idaho, Oregon and Washington.
[2] French fry color data from 3 trials grown in Idaho. Tubers were stored for 2 months at 45°F prior to frying.
USDA color chart [00 – 4.0(darkest)]

Tuber Culinary Quality Characteristics

Postharvest sensory ratings relative to Yukon Gold (Table 5) were conducted at Washington State University in 2002-2005. Cooked samples were rated on a 5-point scale (5 is best) for after-cooking-darkening, texture, flavor, tuber center, and skin characteristics. The values were then totaled for an overall score (75 point max.). Yukon Gem ranked among the top four clones in 3 out of 4 years (avg. of 19 clones/yr). Yukon Gold ranked first or second among all clones in each of the 4 years.

Table 5. Summary of cooking and culinary evaluations for Yukon Gem and Yukon Gold from 2002-2005.

Evaluations[1]	Yukon Gem	Yukon Gold
Boiling	18.9	20.7
Baking	18.8	21.9
Microwave	18.9	20.2
Total (75 max)	56.6	62.8

[1] 25 possible points for each cooking/culinary evaluation.

Internal and External Defects

Yukon Gem, like Yukon Gold, is resistant to growth cracks, secondary growth, and hollow heart, (Table 6).

Table 6. Internal and external defects of Yukon Gem tubers compared with those of Yukon Gold. Data taken are from trials grown in Idaho, Oregon and Washington from 2002-2005.

Defect	Yukon Gem	Yukon Gold
Growth cracks[1]	4.7	4.8
Second growth[1]	4.7	4.8
Hollow heart/Brown Center[2]	3%	4%

[1] Growth cracks and second growth rated on a scale 1-5 where 1 = severe occurrence of the defect and 5 = no occurrence of the defect.

[2] Hollow heart/Brown Center measured as percent of >10 oz tubers with the defect.

Biochemical Composition:

Yukon Gem and Yukon Gold tubers have similar glycoalkaloid, reducing sugar and protein concentrations. However, Yukon Gem has lower vitamin C and sucrose concentrations than Yukon Gold (Table 7).

Table 7. Biochemical composition of Yukon Gem tubers compared with those from Yukon Gold. Data was taken from four trials grown from 2002-2005 at Aberdeen, Idaho.

Component	Yukon Gem	Yukon Gold
Glycoalkaloids (mg/100g)	3.6	3.0
Reducing sugars (% FWB)	0.01	0.02
Sucrose (% FWB)	0.11	0.21
Protein (%DWB)	5.5	5.6
Vitamin C (mg/100g)	33.8	40.4

Disease Reactions:

Yukon Gem is more resistant to PVY^O and late blight than Yukon Gold (Table 8). It also appears to be more resistant to common scab, early blight tuber lesions, PLRV net necrosis, and more susceptible to Pectobacterium soft rot than Yukon Gold, although the Yukon Gem information is based on 2003 data only.

Table 8. Disease reactions of Yukon Gem tubers compared with those of Yukon Gold.

Disease[1]		Yukon Gem	Yukon Gold
Common Scab (Streptomyces)		MS	S
Verticillium wilt (Verticillium)		S	S
Foliar Early Blight (Alternaria)		S	S
Tuber Early Blight (Alternaria)		R	MR
Dry Rot (Fusarium)		MR	MR
Soft Rot (Pectobacterium)		MS	MR
PVY^O		R	S
PVX		S	S
PLRV Foliar Infection		S	MR
PLRV Net Necrosis		R	MR
Late Blight (Phytophthora)	Foliar	MR/MS	S
	Tuber	R	MR

[1] Data are from trials grown in Aberdeen, ID, Corvallis Hermiston, OR.

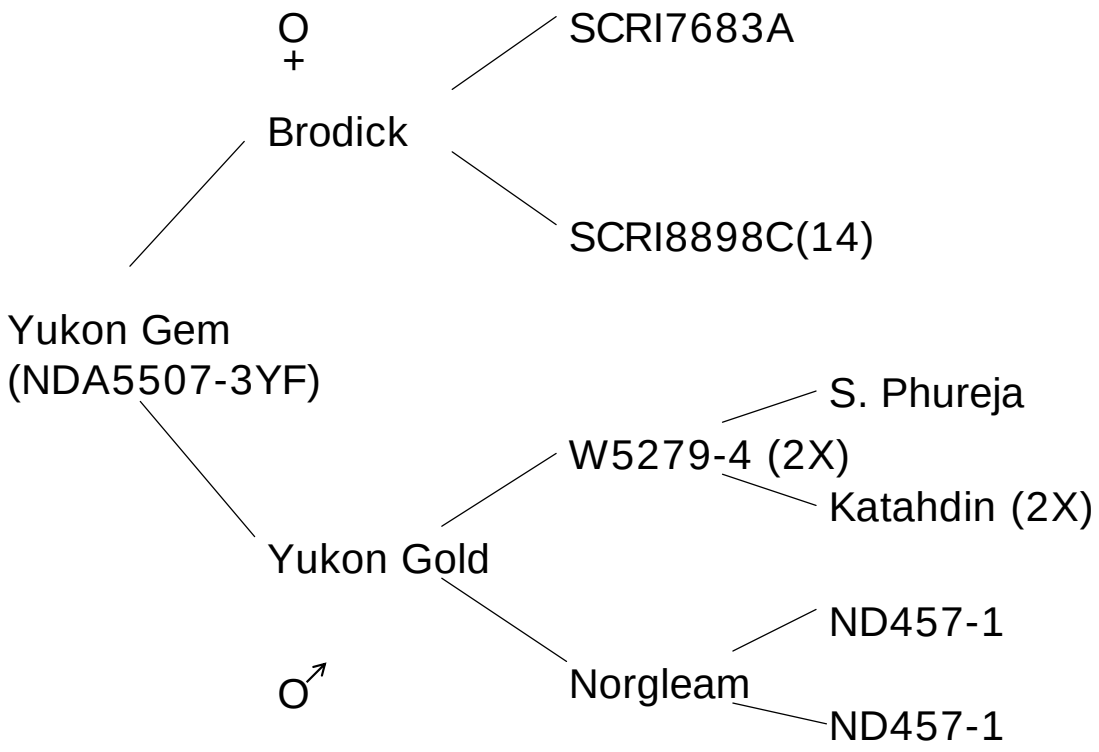

Figure 1. Four-generation pedigree of Yukon Gem (NDA5507-3Y).

NDA5507-3Y

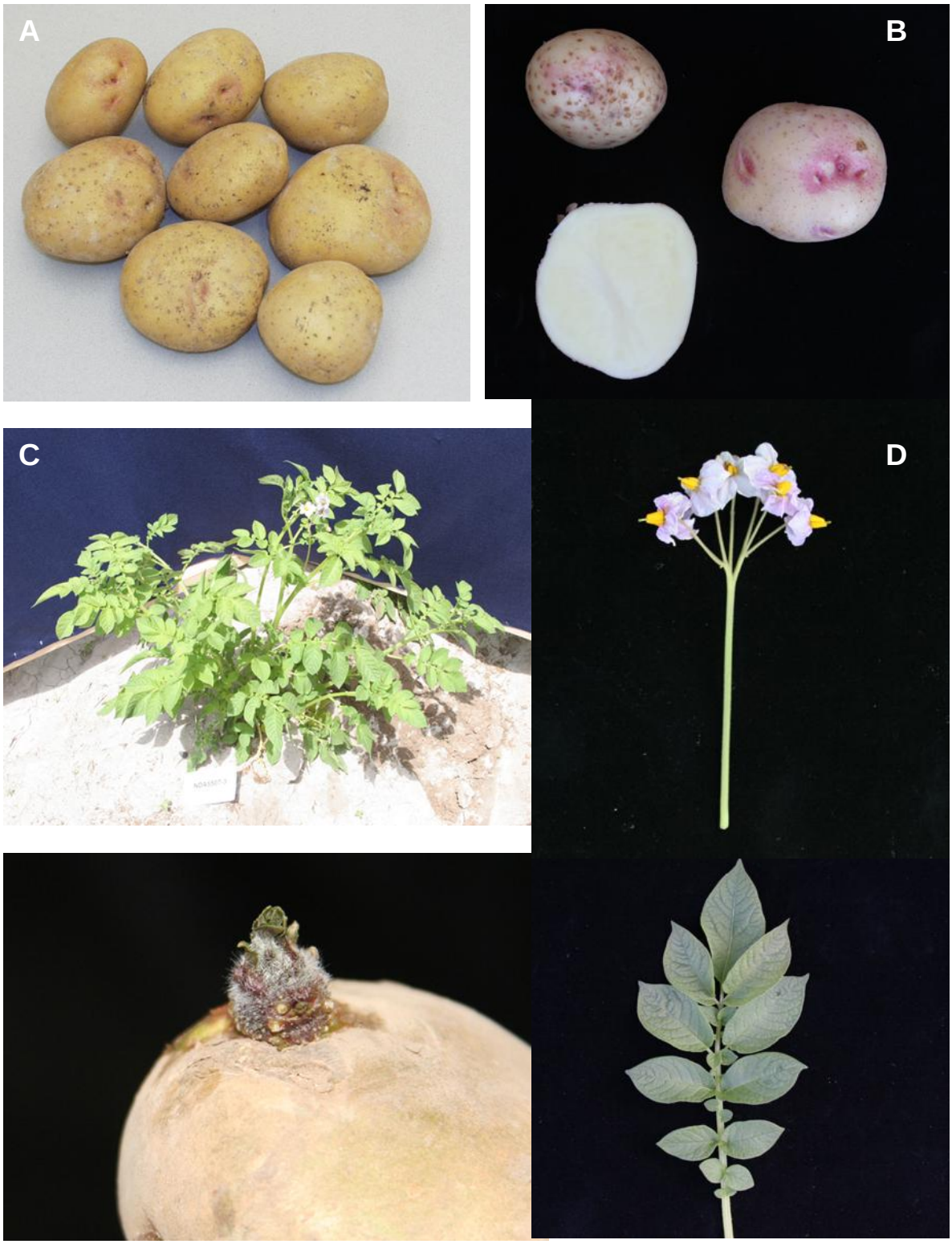

Figure 2. Photographs of NDA5507-3Y showing a) field tubers, b) external and internal tuber appearance, c) whole plant, d) flower, e) light sprout, and f) compound leaf.