

Title: EVALUATION OF NEW CRANBERRY GERMPLASM FOR FRESH FRUIT PRODUCTION IN THE PACIFIC NORTHWEST

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Objectives:

- Objective 1)* Maintain the new cranberry germplasm planting
- Objective 2)* Assess horticultural traits
- Objective 3)* Assess the incidence of diseases

Procedures:

A field planting, using a randomized complete block design, was planted in summer 2003. Vines were obtained from Rutgers University (NJS98-23, NJS95-37, CNJ96-44-83, CNJ97-105-4, CNJ95-20-20, CNJ93-9-42, CNJ93-13-100, NJS98-65, NJS98-28) and elsewhere (BE4, AR2, Bain Favorite #1). Plots were maintained using standard horticultural practices. Yield, fruit size, fruit rot and keeping quality, vine disease resistance, growth and fruiting characteristics were collected from 2005 to 2008. Selected data representing these variables are presented in the results.

Results: Based on production and other variables, none of the new selections out-yielded Pilgrim. CNJ 44-83, CNJ95-37 and CNJ93-9-42 appear to be the most promising new selections in the trial. Of the two new releases, Crimson Queen and Mullica Queen, only Crimson Queen has distinguished itself as a superior cultivar for the PNW. None of the advanced selections distinguished themselves in terms of resistance to foliage disease or fruit rot at harvest or after storage, although CNJ95-37 consistently had lower rot than other advanced selections. Grower ratings for ease of dry harvesting and potential for the fresh fruit market consistently gave highest values to Crimson Queen, CNJ 44-83, CNJ95-37 and CNJ93-9-42.

Table 1. Yield from 2003 cultivar/advanced selection trials in Long Beach WA

Selection	Fruit size g/fruit 06+07 mean	Yield bbl/ac				
		2005	2006	2007	2007	2005 to 2008
Crimson Queen	1.72 ab	77 cd	179 bc	347 abc	242 abc	846 bcd
NJS95-37	1.33 e	85 c	277 a	322 bcd	246 abc	931 bc
Mullica Queen	1.80 a	23 cde	20 d	252 cd	178 bc	473 fg
CNJ96-44-83	1.58 c	54 cde	204 b	288 bcd	270 ab	816 b-e
CNJ95-20-20	1.34 de	32 cde	181 bc	253 cd	173 bc	639 ef
CNJ93-9-42	1.43 d	61 cde	187 bc	451 a	266 ab	964 ab
CNJ93-13-100	1.31 e	46 cde	136 c	295 bcd	213 bc	690 de
BE	1.17 f	150 b	217 b	383 ab	229 abc	980 ab
AR	1.56 c	16 cde	223 b	290 bcd	239 abc	768 cde
Bain Favorite	1.81 a	46 cde	178 bc	212 d	200 bc	636 ef
Pilgrim	1.68 b	257 a	202 b	327 a-d	345 a	1132 a
Stevens	1.35 de	3 e	48 d	209 d	138 c	398 g
NJS98-65	1.79 a	11 de	201 b	335 a-d	196 bc	743 de
NJS93-13-100	1.55 c	27 cde	172 bc	352 abc	153 bc	704 de
LSD (P=.05)	0.093	61	46	112	104	161
Treatment prob (F)	0.0001	0.0001	0.0001	0.0088	0.0371	0.0001

Table 2. Foliage diseases in 2003 cultivar/advanced cranberry selection trials in Long Beach WA

Selection	Misshapen fruit % by wt harvest 2008	Foliage diseases			
		Red leaf spot rating 0=none 5=100% infested October 2004	Rose bloom # infest upright/0.25m ² May 2007	Rose bloom % infested upright May 2008	Rose bloom # infested upright/ft ² Rating 1=0, 5>20 June 2008
Crimson Queen	8.1 ab	3.1 ab	13.3 bcd	15.0 a	4.7 ab
NJS95-37	0.4 ef	3.1 ab	13.5 bcd	8.3 a	3.0 cd
Mullica Queen	3.8 bcd	2.2 cde	11.3 bcd	9.0 a	4.0 abc
CNJ96-44-83	6.4 bc	2.9 abc	57.5 ab	8.7 a	4.0 abc
CNJ95-20-20	14.0 a	2.8 abc	19.6 bcd	8.3 a	3.0 cd
CNJ93-9-42	2.7 b-e	3.2 ab	14.5 bcd	7.7 a	3.7 a-d
CNJ93-13-100	0.6 def	2.6 a-d	30.6 a-d	9.3 a	2.7 cd
BE	0.7 def	2.7 abc	52.9 abc	20.0 a	5.0 a
AR	0.5 ef	1.8 de	5.6 cd	6.7 a	2.3 d
Bain Favorite	2.0 def	2.8 abc	70.2 a	6.0 a	2.7 cd
Pilgrim	2.8 b-e	2.4 b-e	40.4 a-d	5.0 a	2.7 cd
Stevens	0.1 f	1.8 e	3.6 d	10.0 a	2.3 d
NJS98-65	1.7 c-f	3.3 a	35.3 a-d	10.7 a	3.3 bcd
NJS93-13-100	2.2 def	2.3 b-e	20.0 bcd	11.7 a	4.0 abc
LSD (P=.05)	6.1	0.74	40.74	10.20	1.29
Treatment Prob (F)	0.0001	0.0023	0.0427	0.3267	0.0020

Table 3. Fruit rot in 2003 cultivar/advanced cranberry selection trials in Long Beach WA

Name	% Rotten fruit				
	Harvest rot 2006	Rot at 6 week storage 2006	Harvest rot 2007	Rot at 6 week storage 2007	Harvest rot 2008
Crimson Queen	1.9 a	0 a	8 a	14 a	22.1 abc
NJS95-37	0.5 a	0 a	2 a	2 a	7.0 cd
Mullica Queen	2.2 a	0 a	7 a	4 a	21.3 ab
CNJ96-44-83	1.6 a	0 a	11 a	16 a	19.4 a-d
CNJ95-20-20	1.2 a	0 a	17 a	2 a	7.8 cd
CNJ93-9-42	1.2 a	0 a	10 a	7 a	15.9 a-d
CNJ93-13-100	1.2 a	1 a	35 a	4 a	11.5 bcd
BE	0.7 a	0 a	3 a	2 a	6.6 d
AR	1.0 a	1 a	9 a	4 a	11.3 bcd
Bain Favorite	0.7 a	1 a	15 a	9 a	28.3 a
Pilgrim	0.6 a	0 a	5 a	2 a	16.6 a-d
Stevens	4.2 a	2 a	3 a	2 a	10.7 bcd
NJS98-65	0.7 a	0 a	7 a	2 a	9.8 bcd
NJS93-13-100	3.1 a	2 a	8 a	6 a	9.9 bcd
LSD (P=.05)	3.1	1.7	25	11	10
Treatment Prob(F)	0.4	0.3	0.5	0.2	0.02

Accomplishments: The goal of this project was to assess new cranberry breeding selections for their suitability for use in the PNW cranberry industry, in particular for fresh fruit production. Those goals were accomplished and several new selections were released and will continue to be released based on results from this project.

Potential significance to the industry: This trial indicates that Crimson Queen would be a good choice for a new cultivar for the PNW. Based on these data, new plantings of Crimson Queen are already being planted in Washington. The data also clearly confirm that for total tonnage growers would be hard pressed to find a selection superior to Pilgrim. Pilgrim is now being used as a parent for all crosses being made for the PNW. Based on this data, either CNJ 44-83, CNJ95-37 or CNJ93-9-42 will be released to the PNW in 2009 or 2010. This will provide additional germplasm opportunity for the industry. These data were also used to secure one million dollars of USDA Specialty Crop funding for Rutgers and WSU for breeding & genetics of field fruit rot resistance in cranberries.

Funding sources: NCSFR, Washington State Cranberry Research Commission & Ocean Spray all provided funding during the 5 years of this project

Research Impact Statements: There are three immediate impacts of this study: 1) new plantings of Crimson Queen have been initiated by growers in the PNW and will come into fruition in 2012; 2) growers wanting to achieve only high tonnage know to select Pilgrim; 3) these data were used to obtain \$1 million in additional funding. Over the next several years this project will result in one or more new selections being named and released. Over the long term, this project will result in increased overall production and fresh fruit production of cranberries in the PNW.

Citations:

Patten, K. 2005, 2006 & 2007. Evaluation of new cranberry varieties for the Pacific Northwest. Progress Reports to Washington State Cranberry Commission and Ocean Spray.

Patten, K.D. 2007. Evaluation of new cranberry germplasm for fresh fruit production in the Pacific Northwest. Proceeding of the Northwest Center for Small Fruit Research 2007. p 13-14.