

Research Progress Report for 1991
"Physiological and Cultural Studies
on Potatoes"

Submitted to the
SLV Research Center Committee
and the
Colorado Potato Administrative
Committee (Area II)

by

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RESEARCH PROGRESS REPORT FOR 1991

"Physiological and Cultural Studies on Potatoes"

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Research was conducted in the following areas in 1991:

- A) Postharvest Evaluations
 - 1 - Blackspot Susceptibility
 - 2 - Storage Weight Loss and Dormancy
 - 3 - Enzymatic Browning
 - 4 - Specific Gravity, Chip Color, French Fry Color and Texture
- B) Raw Product Processing Quality Survey
- C) Influence of Row Size and Nitrogen Fertility on Yield, Grade, and Internal Pink Discoloration of Russet Nugget Tubers
- E) Influence of Cut vs. Single Drop Seed on Yield and Grade of Five Cultivars

POSTHARVEST EVALUATIONS

A total of 131 clones (including duplicates and checks) were evaluated for two or more of the following characteristics: blackspot susceptibility, storage weight loss, dormancy, enzymatic browning, specific gravity, chip color, french fry color, and french fry texture. Data collected for specific gravity and chip color for chipping selections is presented in the "Potato Breeding and Selection Report". Twenty-one clones were selected for additional quality evaluations by Dr. Joe Maga. Results of these evaluations are found in his report.

Blackspot

Ten randomly selected tubers for each clone tested were bruised on the stem and bud ends with a 150 g weight dropped from a height of 60 cm. Tubers were stored at 40F prior to bruising. After bruising, tubers were stored at room temperature for three days prior to evaluation. Blackspot susceptibility was evaluated by cutting the tubers in half longitudinally and rating the extent of damage.

High levels of blackspot resistance (indices >4.0) were exhibited by 55% of the samples tested (Figure 1). Blackspot ratings (average of bud- and stem-end readings) ranged from 1.4-5.0, with an average of 3.9 (Table 1). Selections which should be observed carefully for potential blackspot

problems are A80559-2, AC83311-2, AC83311-5, AC84610-5, A082283-1, C084111-6, C086142-3, C086224-1, ND651-9, ND2008-2, ND2109-7, and Snowden.

Storage Weight Loss and Dormancy

Ten randomly selected tubers were weighed into storage on October 22, 1991 and held at 45F for a three month period under low relative humidity conditions to evaluate storage weight loss potential. These tubers were also observed weekly for sprout growth. Dormancy was reported as days after harvest to first visible growth. Results are summarized in Figures 2 and 3 and Table 1.

The average storage weight loss was 3.1% for the three month period. Weight loss ranged from 1.7-5.1%.

Length of dormancy ranged from 74-151 days. Most selections evaluated had shorter dormancy periods than Russet Burbank. A few selections approached the dormancy of Russet Burbank. They are: AC83044-1, AC83306-1, and C086153-2. These selections will be useful in breeding for longer dormancy.

Continuing emphasis will be placed on breeding for longer dormancy, which will be needed if the use of sprout inhibiting chemicals were to be restricted.

Enzymatic Browning

Five tubers of each clone were cut in half lengthwise and rated for degree of darkening at 30 and 60 minutes after cutting. Results are shown in Figure 4 and Table 1.

Little or no browning was observed for 38% of the samples even 60 minutes after tuber cutting. Enzymatic browning potential at 60 minutes ranged from 2.0-5.0, with an average of 3.4. Atlantic is very resistant to enzymatic browning. Red LaSoda is very susceptible.

Continuing emphasis will also be placed on breeding for reduced enzymatic browning potential because of the concern over the use of sulfites in processed food products.

Specific Gravity

Data on specific gravity are summarized in Figure 5 and Table 2.

Specific gravities ranged from 1.066-1.121; 68% were >1.080. The average specific gravity was 1.086. The lowest specific gravity generally considered ideal for processing is 1.080.

Fry Color and Texture

Data are presented in Figures 6 and 7, and Table 2 on french fry color and texture.

Thirty-four samples (47%) produced french fries with acceptable color and texture.

RAW PRODUCT PROCESSING QUALITY SURVEY

Thirty-two lots of potatoes representing six cultivars (Centennial Russet, Frontier Russet, Russet Burbank, Russet Norkotah, and Russet Nugget) were evaluated for raw product processing quality for the Processing Committee. Specific gravity ranged from 1.072 for Russet Norkotah to 1.088 for Russet Nugget (Figure 8). Additional data on sugar content at various storage intervals was collected and will be reported by Joe Maga.

INFLUENCE OF ROW SIZE AND NITROGEN RATE ON RUSSET NUGGET YIELD, GRADE, AND INTERNAL PINK DISCOLORATION

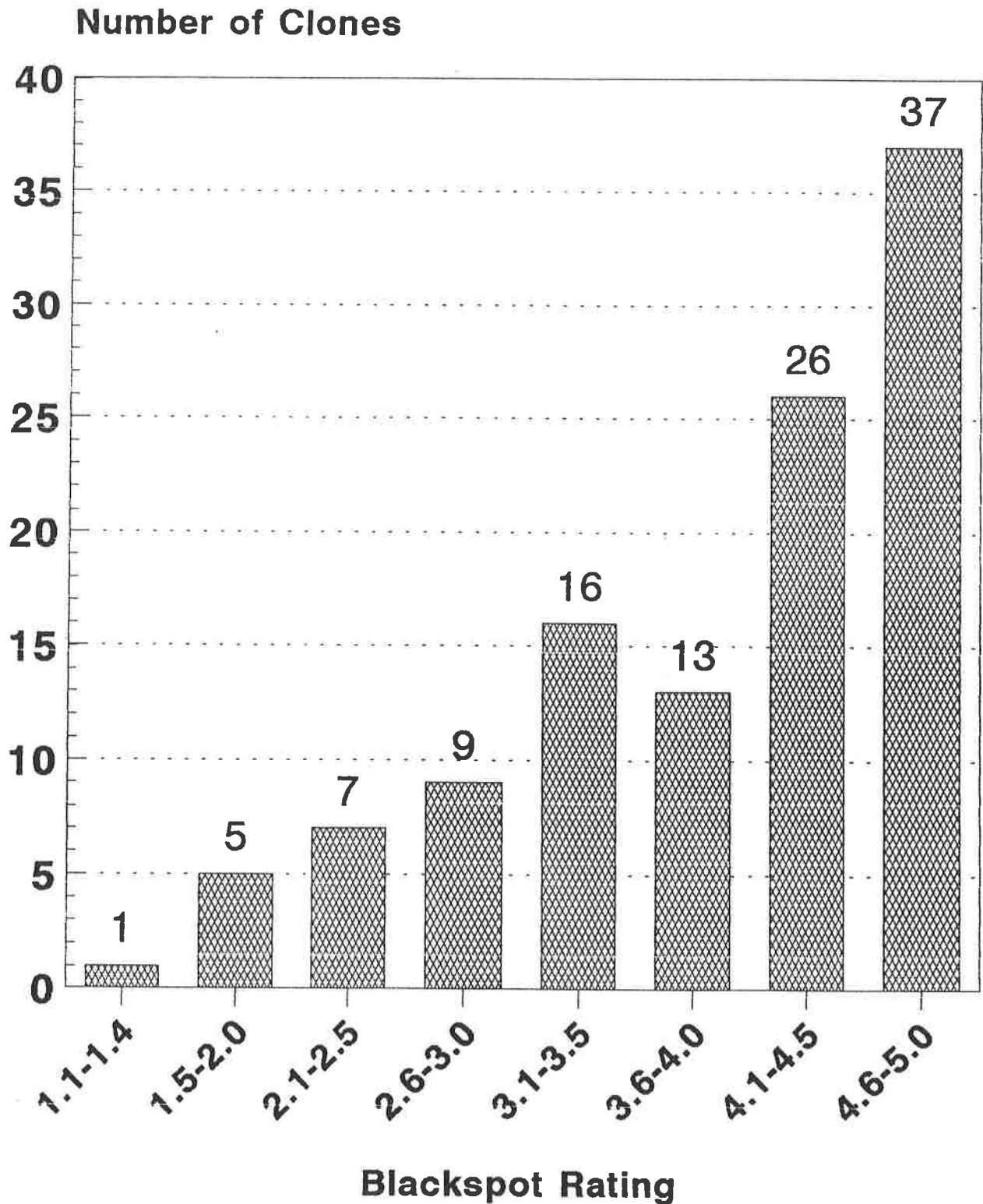
The influence of row size and nitrogen fertility on yield, grade, stand, and internal pink discoloration of tubers of Russet Nugget was evaluated. Nitrogen rate had no significant effect on any of the variables measured. Small row size resulted in significantly lower total, US #1, and >10 oz tuber yields. Small row size also resulted in slightly less internal pink discoloration.

INFLUENCE OF CUT VS. SINGLE DROP SEED ON YIELD AND GRADE

The influence of single-drop and cut seed on yield, grade, stand and stem number of Centennial Russet, Russet Burbank, Russet Norkotah, Russet Nugget, and Sangre was studied. Planting single-drop seed resulted in greater total yields, greater yields of <4 oz tubers, slightly lower stands, and more stems per plant.

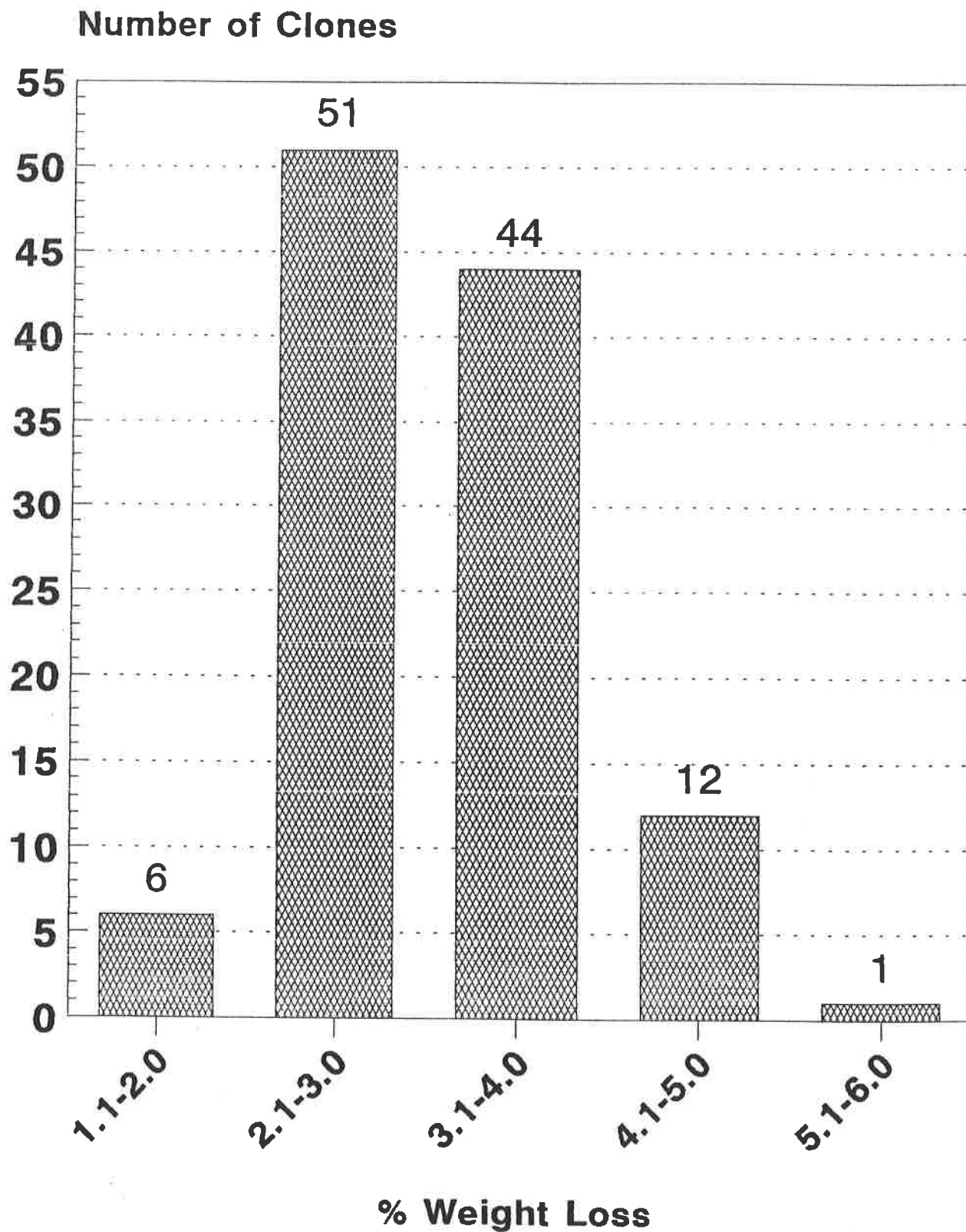
Significant differences were observed between cultivars for all characteristics measured except % stand.

**Figure 1. Blackspot
Distribution (114 Clones) - 1991**

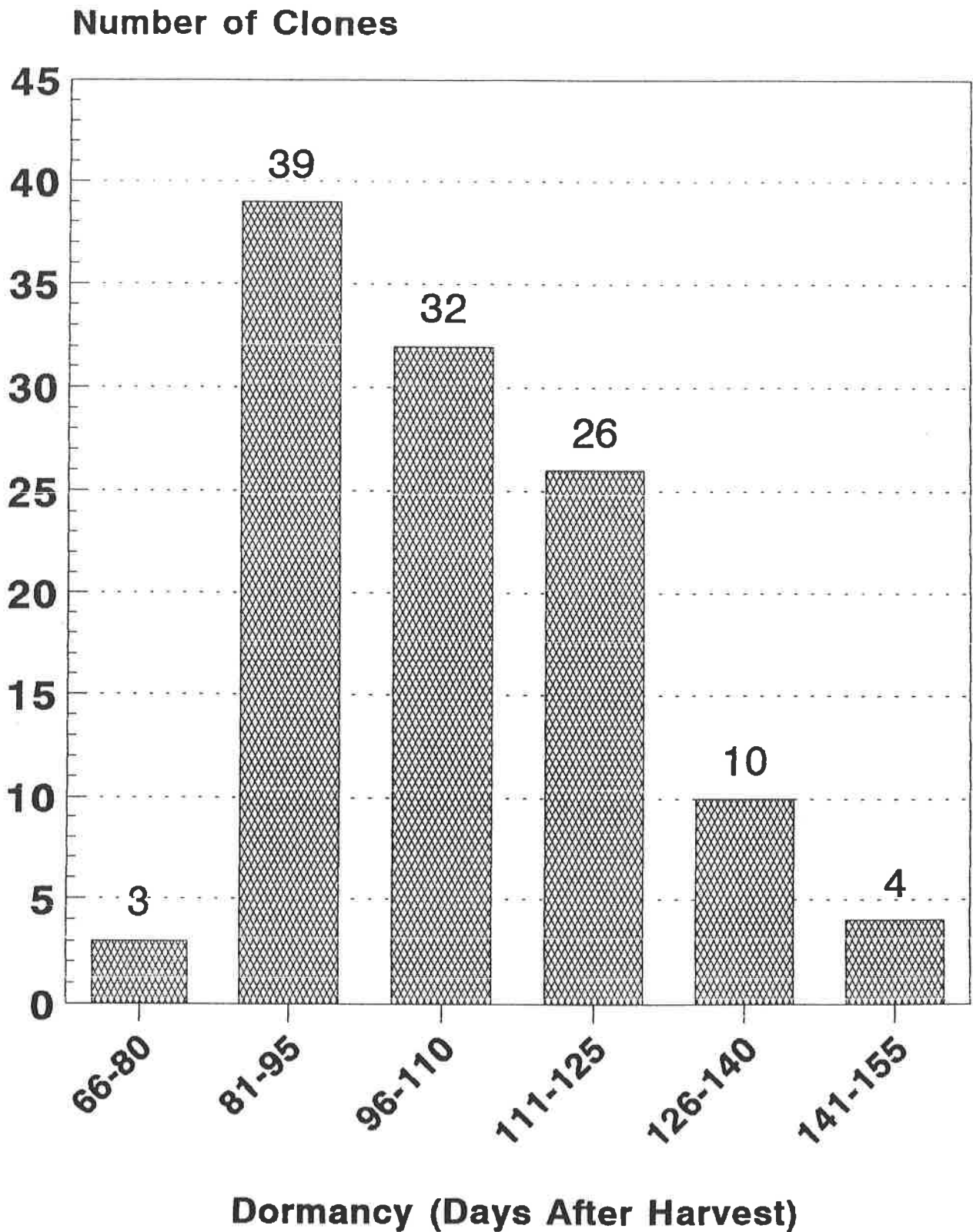


5=No Discoloration

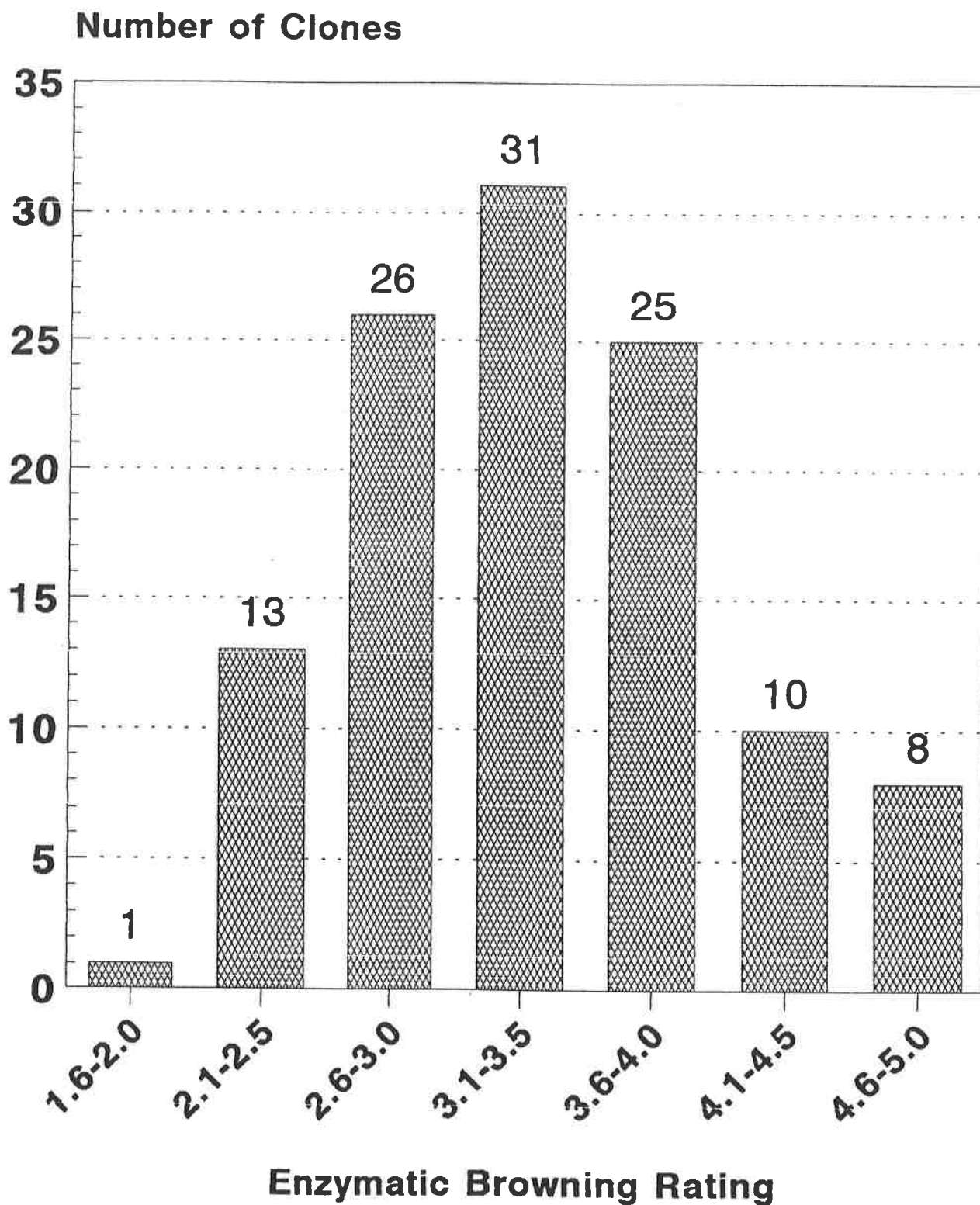
**Figure 2. % Weight Loss
Distribution (114 Clones) - 1991**



**Figure 3. Dormancy
Distribution (114 Clones) - 1991**



**Figure 4. Enzymatic Browning (60 Min)
Distribution (114 Clones) - 1991**



5=No Discoloration

Table 1. Blackspot, storage weight loss, dormancy, and enzymatic browning evaluations for chipping, intermediate, advanced, and Regional Trial clones - 1991.

Clone	Blackspot Index ¹			% Weight Loss ²	Dormancy (Days) ³	Enzymatic Browning ⁴	
	Bud End	Stem End	Average			30 Min	60 Min
** SLV Chipping Study **							
A80559-2	3.0	2.7	2.9	3.5	133	4.4	3.4
AC80545-1	4.3	4.4	4.4	3.0	112	4.0	3.6
AC83306-1	4.9	3.9	4.4	2.9	139	3.8	3.4
AC83311-2	3.3	2.1	2.7	3.0	118	4.0	3.2
AC83311-5	2.5	2.1	2.3	3.1	104	3.0	2.8
AC84610-2	4.7	3.4	4.1	4.7	125	4.8	4.0
AC84610-5	2.4	1.3	1.9	5.1	90	3.6	3.4
AC85438-4	4.6	4.6	4.6	3.0	90	4.8	4.6
AC86444-5	4.7	3.4	4.1	5.0	112	3.8	3.4
AC86449-1	5.0	4.6	4.8	3.7	98	5.0	4.6
AC86449-2	3.1	2.8	3.0	4.0	91	4.0	3.4
ATX7-85404-8	3.7	2.7	3.2	3.9	105	4.4	3.8
BC0894-2	4.6	4.1	4.3	2.8	112	3.6	2.8
CO84111-6	1.7	1.2	1.5	3.9	111	3.8	3.2
CO86106-3	4.2	4.7	4.5	3.4	133	4.8	4.4
CO86106-4	4.2	4.1	4.2	4.1	133	5.0	4.4
CO86224-1	2.9	1.8	2.4	3.9	126	4.4	3.4
ND651-9	1.7	2.6	2.2	4.7	97	3.8	2.8
ND2008-2	3.0	1.7	2.4	3.2	112	3.8	3.0
ND2109-7	2.3	1.9	2.1	2.9	111	3.6	2.8
NDO1496-1	4.2	4.6	4.4	4.1	98	3.8	3.4
Atlantic	3.2	3.0	3.1	3.2	112	5.0	5.0
Norchip	3.5	3.1	3.3	3.5	112	3.6	3.2
Snowden	3.4	3.4	3.4	3.4	101	4.8	4.0
** Intermediate Trial **							
A74212-1	4.8	4.9	4.9	3.2	98	3.8	3.4
AC86114-4	5.0	4.9	5.0	3.9	119	4.4	3.4
AC86135-4	5.0	4.8	4.9	3.2	126	4.4	3.6
AC86385-1	4.8	4.6	4.7	3.1	119	4.6	3.4
AO81216-1	4.8	4.3	4.6	3.2	119	3.6	3.2
CO86030-1	5.0	4.9	5.0	2.4	126	4.6	3.8
CO86051-3	4.1	5.0	4.6	2.5	112	4.8	4.0
CO86058-1	4.9	4.1	4.5	3.3	91	4.4	4.4
CO86081-1	4.7	3.0	3.9	2.2	133	3.8	3.6

Continued

Table 1. Continued.

Clone	Blackspot Index ¹			% Weight Loss ²	Dormancy (Days) ³	Enzymatic Browning ⁴	
	Bud End	Stem End	Average			30 Min	60 Min
** Intermediate Trial (continued) **							
CO86142-3	2.0	3.3	2.7	3.5	133	4.2	3.8
CO86153-2	4.8	4.7	4.8	3.8	140	3.8	4.0
CO86218-2	5.0	5.0	5.0	2.9	119	3.2	2.2
CO080014-1	4.7	4.0	4.4	2.7	105	3.8	3.4
COT8-86146-2	4.7	4.1	4.4	3.2	119	4.0	3.4
Centennial Russet	4.7	5.0	4.9	4.4	109	5.0	4.8
Frontier Russet	5.0	5.0	5.0	2.6	112	5.0	4.6
Lemhi Russet	3.8	4.1	4.0	2.9	112	3.6	2.8
Norgold Russet	4.9	4.0	4.5	3.0	98	3.2	2.6
Ranger Russet	5.0	5.0	5.0	3.1	84	3.8	3.4
Russet Burbank	4.1	4.9	4.5	2.8	151	4.0	4.0
Russet Norkotah	5.0	5.0	5.0	2.7	101	4.0	3.8
Russet Nugget	4.5	4.8	4.7	1.8	103	4.4	4.2
Sangre	5.0	5.0	5.0	2.7	104	4.0	4.0
** Advanced Yield Trial **							
AC75430-1	4.3	3.2	3.8	2.5	123	4.4	3.6
AC82052-1	4.1	2.8	3.5	2.3	102	4.4	2.6
AC83044-1	3.4	3.3	3.4	4.0	151	4.4	2.8
AC83044-2	4.1	2.8	3.5	3.1	88	4.8	3.8
AC83064-1	5.0	4.8	4.9	2.4	81	4.8	3.8
AC83064-6	4.1	4.9	4.5	3.6	88	4.6	3.6
AC83068-1	3.4	4.2	3.8	2.6	116	3.6	2.4
AC83172-1	4.3	3.7	4.0	3.4	81	4.4	3.0
AC84028-4	4.8	4.4	4.6	4.3	95	4.0	3.0
AC84069-3	4.6	4.6	4.6	2.6	88	4.2	3.2
AC84413-4	5.0	4.6	4.8	3.0	81	4.4	2.8
AC84487-1	4.8	4.6	4.7	4.0	109	4.2	3.4
AC84638-1	4.7	4.6	4.7	2.6	116	2.4	2.4
CO80011-5	4.4	4.5	4.5	3.0	109	4.8	3.4
CO83027-2	5.0	4.9	5.0	3.4	81	4.6	4.0
CO84074-2	5.0	4.1	4.6	2.1	123	5.0	4.4
CO84205-5	5.0	4.7	4.9	3.7	109	4.6	4.8
CO85026-4	3.8	3.1	3.5	2.3	95	4.4	3.4
CO85168-4	3.9	3.3	3.6	4.0	81	4.0	2.8
NDTX8-731-1R	4.1	4.7	4.4	3.7	95	4.2	3.2
TX6-1216-1RU	4.7	4.2	4.5	2.3	74	4.0	2.2

Continued

Table 1. Continued.

Clone	Blackspot Index ¹			% Weight Loss ²	Dormancy (Days) ³	Enzymatic Browning ⁴	
	Bud	End Stem	End Average			30 Min	60 Min
** Advanced Yield Trial (continued) **							
TXAV657-27	4.0	2.9	3.5	2.3	95	4.0	2.6
Centennial Russet	4.7	4.3	4.5	4.6	95	5.0	3.8
Eide Russet	2.7	4.0	3.4	2.6	102	4.2	3.0
Russet Burbank	4.8	4.8	4.8	2.4	151	3.2	2.2
Russet Norkotah	5.0	4.7	4.9	3.5	102	4.0	3.2
Russet Nugget	4.9	4.5	4.7	1.7	109	4.6	3.6
Sangre	3.3	4.4	3.9	2.4	102	4.0	3.4
** Western Regional Trial **							
A74212-1	5.0	4.4	4.7	2.6	102	3.4	3.2
A81473-2	4.9	4.9	4.9	2.6	116	4.6	4.2
A82119-3	4.2	3.9	4.1	2.5	81	2.2	2.2
A82705-1	2.3	4.0	3.2	3.4	116	3.2	2.8
AC78069-17	4.9	4.2	4.6	2.7	109	4.2	3.4
AC81198-11	4.0	2.9	3.5	2.4	102	3.6	3.4
A082283-1	4.0	1.6	2.8	2.7	95	4.2	3.2
A082611-7	4.6	4.9	4.8	2.7	109	3.0	2.4
A083037-10	4.5	4.1	4.3	2.0	102	4.0	3.0
ATX6-84378-1RU	3.8	3.0	3.4	2.5	116	3.8	2.8
CO81082-1	4.3	4.5	4.4	3.3	88	4.4	3.6
CO82142-4	4.5	3.3	3.9	2.9	88	3.2	2.2
CO083008-1	3.7	3.9	3.8	2.6	102	3.0	2.2
ND671-4RU	2.7	3.9	3.3	3.3	109	4.6	4.2
ND1538-1RU	3.9	4.4	4.2	3.4	81	4.6	3.8
Centennial Russet	3.7	4.6	4.2	3.7	95	5.0	4.2
Lemhi Russet	3.5	2.1	2.8	2.6	109	3.4	2.2
Red LaSoda	3.5	4.1	3.8	2.6	95	2.8	2.0
Russet Burbank	3.6	3.4	3.5	1.9	151	3.6	2.4
Russet Norkotah	5.0	5.0	5.0	3.2	95	3.4	2.6
Sangre	3.8	4.4	4.1	2.2	95	4.0	2.8
Shepody	4.6	4.5	4.6	2.0	95	4.4	4.0
** Western Regional Chipping Trial **							
A80559-2	2.2	1.8	2.0	3.3	95	4.8	3.8
AC80545-1	2.9	2.8	2.9	2.2	109	4.2	3.0

Continued

Table 1. Continued.

Clone	Blackspot Index ¹			% Weight Loss ²	Dormancy (Days) ³	Enzymatic Browning ⁴	
	Bud End	Stem End	Average			30 Min	60 Min
** Western Regional Chipping Trial (continued) **							
AC83306-1	4.6	3.6	4.1	2.5	116	3.4	2.4
AC83311-2	1.4	1.4	1.4	2.7	88	4.0	3.0
AC83311-5	2.2	2.1	2.2	3.2	81	4.0	2.8
AC84601-1	4.4	3.4	3.9	3.8	109	3.4	2.6
AC84610-2	4.0	3.1	3.6	4.7	102	5.0	4.6
AC84610-5	2.8	1.5	2.2	4.4	74	4.2	3.0
AC85438-4	4.5	4.9	4.7	2.6	74	4.4	4.6
CO84111-6	1.9	2.1	2.0	4.2	95	3.4	2.4
ND651-9	3.0	4.0	3.5	4.2	81	4.2	3.4
ND2109-7	2.1	1.9	2.0	3.2	95	4.6	3.2
NDA2031-2	5.0	4.9	5.0	1.9	95	4.8	4.2
Atlantic	3.1	2.9	3.0	3.0	88	4.8	4.2
Gemchip	4.3	3.4	3.9	3.5	95	4.2	3.2
Norchip	4.6	4.4	4.5	3.2	88	4.0	2.8
Snowden	2.7	2.5	2.6	2.4	95	4.8	3.8

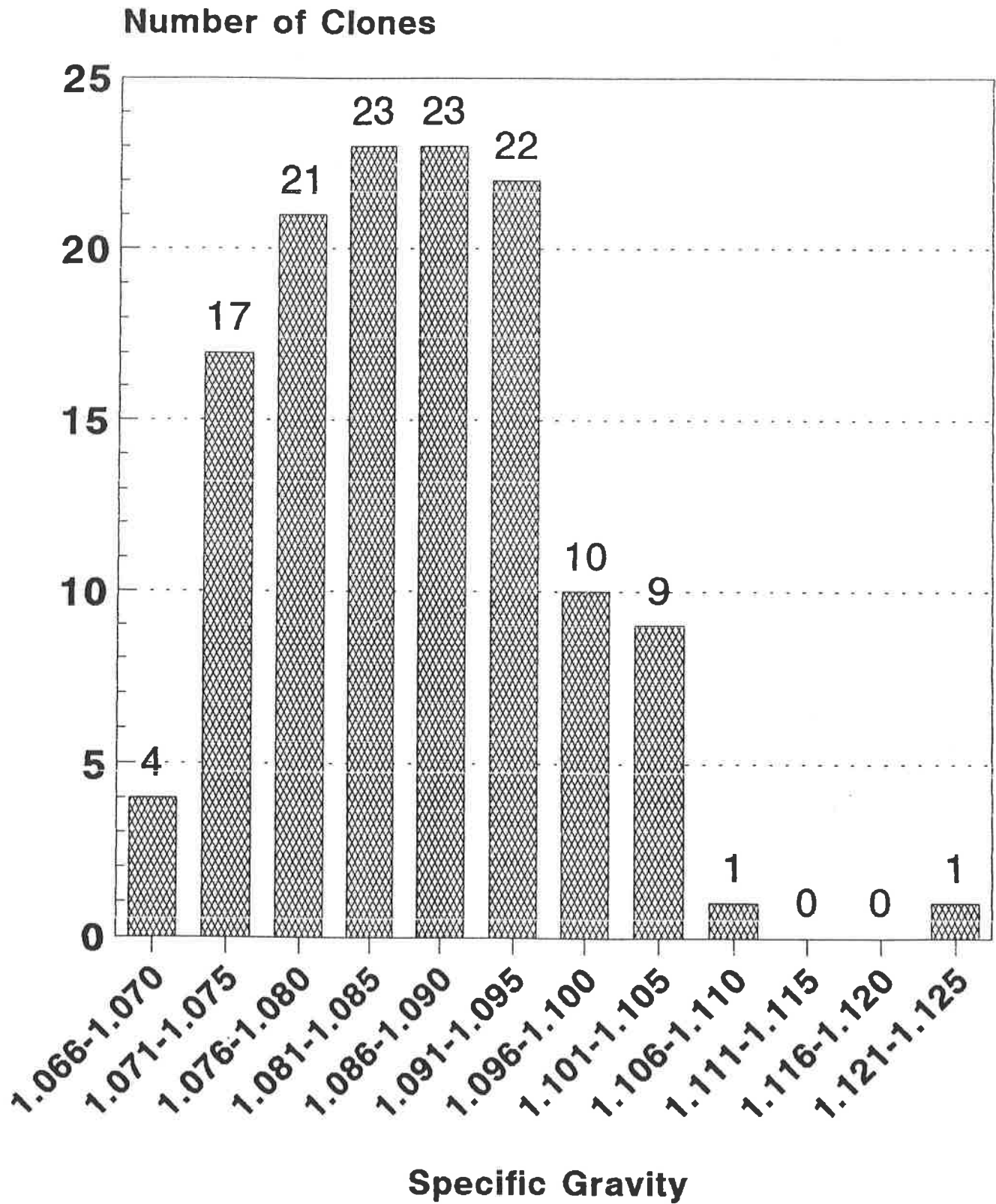
¹Blackspot was rated on a 1 to 5 scale, with 5 indicating no discoloration.

²Tubers were stored at 45F for a three month period.

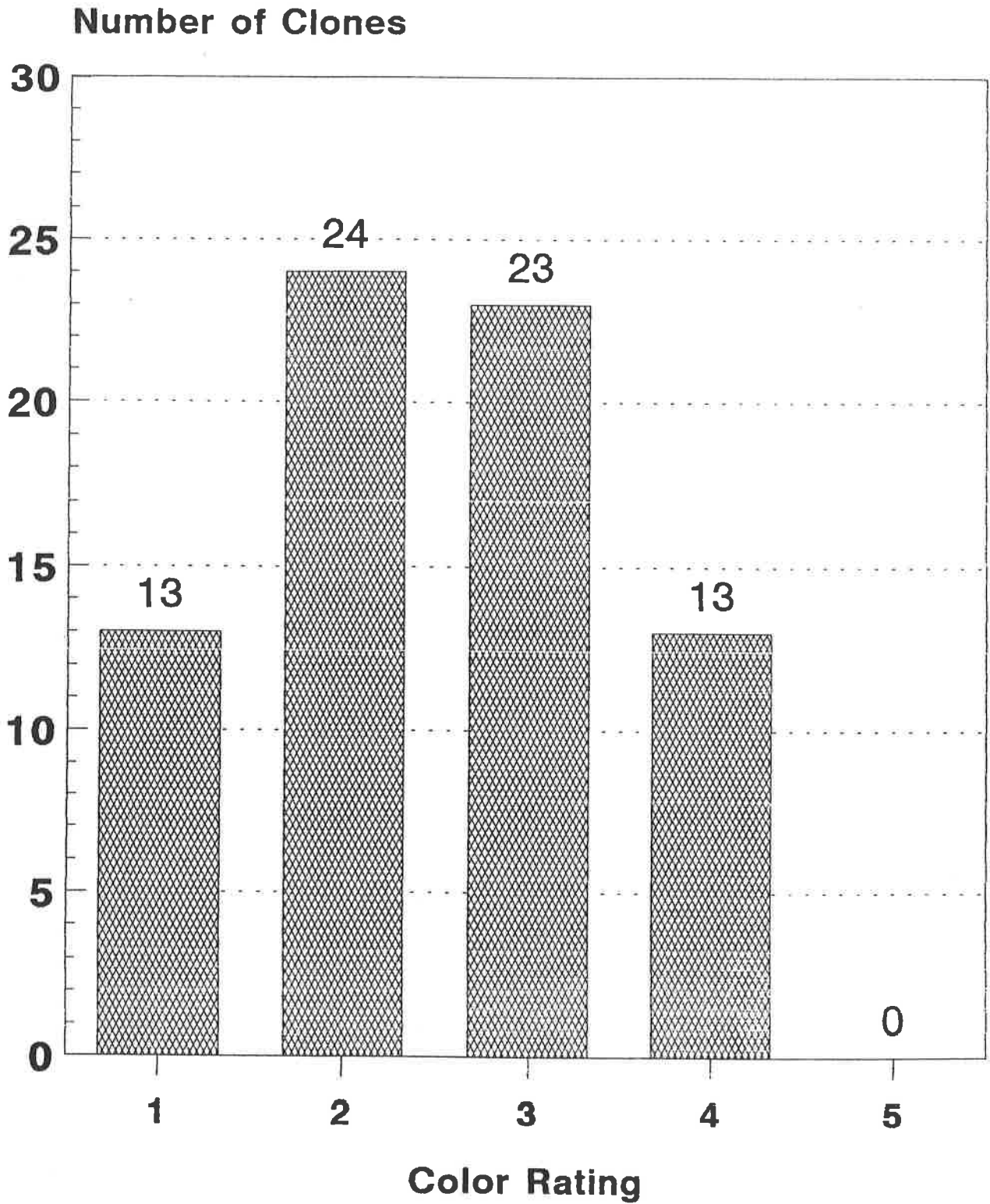
³Days from harvest to first visible growth. Tubers were stored at 45F.

⁴Degree of darkening rated at various time intervals after slicing fresh lengthwise. Rated on a 1 to 5 scale, with 5 indicating no discoloration.

Figure 5. Specific Gravity Distribution (131 Clones) - 1991

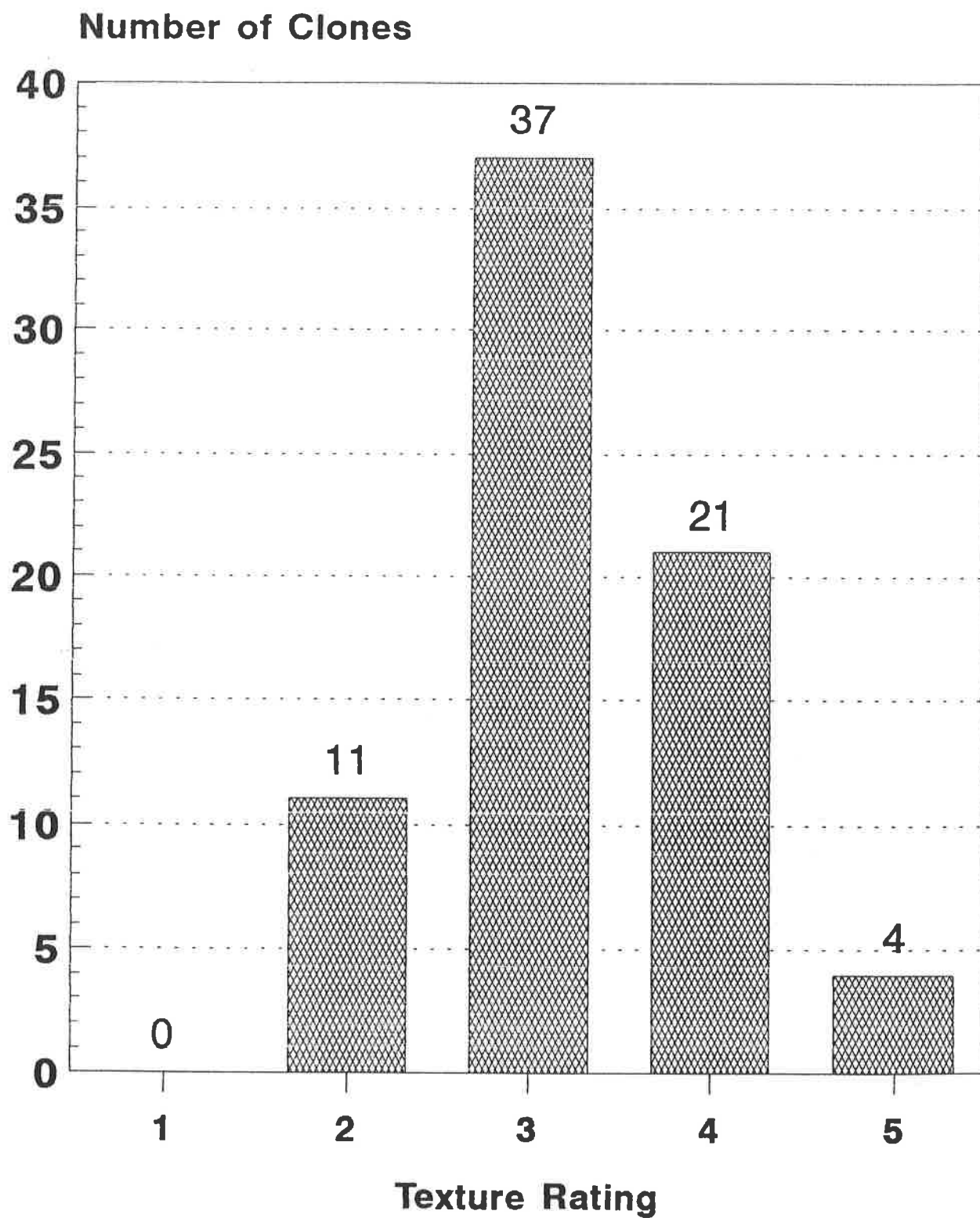


**Figure 6. Fry Color
Distribution (73 Clones) - 1991**



5=Lightest

**Figure 7. Fry Texture
Distribution (73 Clones) - 1991**



5= Dry Texture

Table 2. Specific gravity, french fry color, and texture for intermediate, advanced, and Western Regional Trial clones - 1991.

Clone	Specific Gravity	Fry Color ¹		Fry Texture ²	
		At Harvest	4 wks 50F+ 8 wks 45F	At Harvest	4 wks 50F+ 8 wks 45F
**** Intermediate Trial ***					
A74212-1	1.072	3	2	2	3
AC86114-4	1.087	2	2	3	3
AC86135-1	1.087	2	2	4	4
AC86385-1	1.087	2	2	3	3
A081216-1	1.082	2	2	2	3
CO86030-1	1.071	3	3	1	2
CO86051-3	1.073	4	4	3	3
CO86058-1	1.070	2	2	2	2
CO86081-1	1.070	4	2	3	4
CO86142-3	1.078	2	1	2	2
CO86153-2	1.081	3	2	3	4
CO86218-2	1.072	3	1	2	4
CO080014-1	1.088	4	3	5	5
COT8-86146-2	1.081	2	2	3	2
Centennial Russet	1.078	3	1	2	2
Frontier Russet	1.074	3	2	3	3
Lemhi Russet	1.088	3	3	3	4
Norgold Russet	1.076	1	1	3	4
Ranger Russet	1.072	3	4	3	3
Russet Burbank	1.070	4	3	3	3
Russet Norkotah	1.072	3	4	3	3
Russet Nugget	1.100	4	4	4	5
Sangre	1.066	3	2	2	3
** Advanced Yield Trial **					
AC75430-1	1.101	3	3	4	3
AC82052-1	1.093	2	2	3	3
AC83044-1	1.089	3	4	3	3
AC83044-2	1.079	2	2	3	3
AC83064-1	1.081	3	2	4	3
AC83064-6	1.083	4	3	3	4
AC83068-1	1.092	2	3	3	3
AC83172-1	1.104	3	3	4	4
AC84028-4	1.079	4	3	3	3
AC84069-3	1.094	2	2	4	3
AC84413-4	1.084	3	3	3	4

Continued

Table 2. Continued.

Clone	Specific Gravity	Fry Color ¹			Fry Texture ²		
		At Harvest	4 wks 8 wks	50F+ 45F	At Harvest	4 wks 8 wks	50F+ 45F
** Advanced Yield Trial (continued) **							
AC84487-1	1.074	4		3	4		3
AC84638-1	1.077	2		2	3		3
CO80011-5	1.075	3		2	2		3
CO83027-2	1.096	4		4	4		3
CO84074-2	1.082	1		1	2		3
CO84205-5	1.072	1		1	1		2
CO85026-4	1.093	4		3	3		3
CO85168-4	1.105	4		3	3		3
NDTX8-731-1R	1.073	2		3	3		2
TX6-1216-1RU	1.076	1		2	2		3
TXAV657-27	1.099	3		4	3		4
Centennial Russet	1.081	2		1	3		2
Eide Russet	1.080	2		2	3		3
Russet Burbank	1.087	3		3	4		4
Russet Norkotah	1.076	3		3	3		3
Russet Nugget	1.110	4		4	4		4
Sangre	1.079	2		1	3		3
** Western Regional Trial **							
A74212-1	1.098	2		2	3		2
A81473-2	1.092	4		4	4		4
A82119-3	1.095	4		4	4		5
A82705-1	1.081	1		1	3		4
AC78069-17	1.092	4		4	4		4
AC81198-11	1.085	1		1	3		3
A082283-1	1.091	4		4	3		5
A082611-7	1.095	3		3	4		3
A083037-10	1.090	4		3	3		4
ATX6-84378-1RU	1.091	3		3	3		4
CO81082-1	1.077	1		1	2		2
CO82142-4	1.092	2		2	3		2
CO083008-1	1.098	4		4	4		4
ND671-4RU	1.072	2		3	2		3
ND1538-1RU	1.079	2		3	3		3
Centennial Russet	1.085	2		1	2		3
Lemhi Russet	1.094	3		3	4		4
Red LaSoda	1.076	2		2	2		3

Continued

Table 2. Continued.

Clone	Specific Gravity	Fry Color ¹		Fry Texture ²	
		At Harvest	4 wks 50F+ 8 wks 45F	At Harvest	4 wks 50F+ 8 wks 45F
** Western Regional Trial (continued) **					
Russet Burbank	1.088	4	3	3	3
Russet Norkotah	1.073	3	2	2	4
Sangre	1.075	2	1	2	3
Shepody	1.089	3	2	4	4

¹Fry color was rated on a 1 to 5 scale, with 5 being the lightest or best color. Color ratings of ≥ 3 are acceptable.

²Fry texture was rated on a 1 to 5 scale, with 5 indicating the cooked flesh was dry, with 1 representing a soggy, wet texture.

**Figure 8. Specific Gravity
Raw Product Quality Evaluations - 1991**

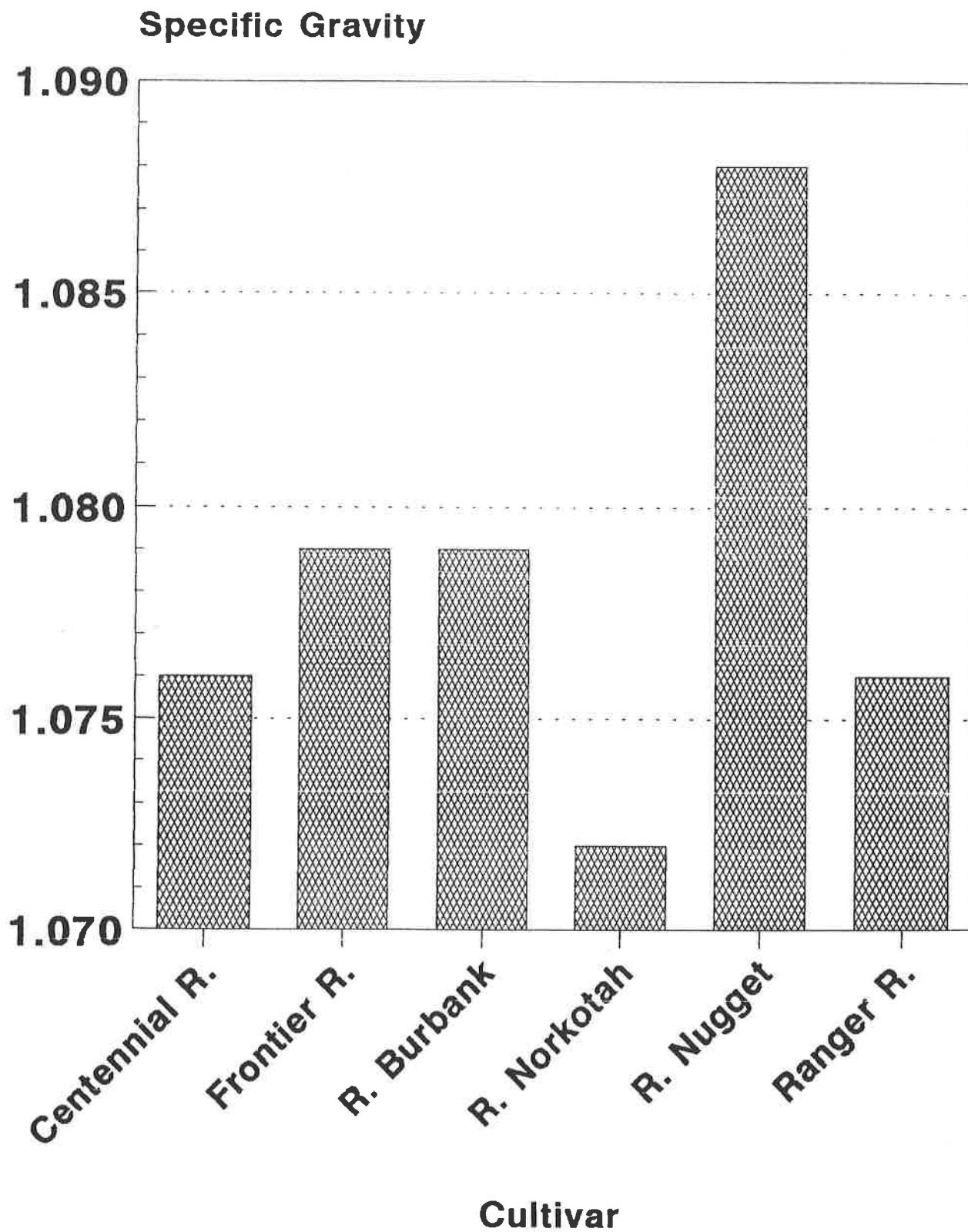


Table 3. Influence of row size and nitrogen rate on Russet Nugget yield, grade, stand, vine maturity, and internal pink discoloration - 1991.

Treatment	Yield (Cwt/A)					% Stand	Vine Maturity ¹	Color Index ²
	Total	Total	US #1 %	>10 oz	<4 oz			
Standard Row								
140 lbs N/A	364	304	83.2	84	56	100	3.2	9.5
200 lbs N/A	346	290	83.5	80	54	98	3.2	7.2
Small Row								
140 lbs N/A	328	272	83.0	69	55	98	3.2	3.5
200 lbs N/A	340	270	79.2	66	66	97	3.2	3.0
Interaction								
Row Size x Nitrogen								
LSD ²	NS	NS	NS	NS	NS	NS	NS	NS
Main Effects								
Row Size								
Standard Row	355	297	83.3	82	55	98	3.2	8.4
Small Row	334	271	81.1	67	61	98	3.2	3.2
Significance ²	*	*	NS	*	NS	NS	NS	+
Nitrogen Rate								
140 lbs N/A	346	288	83.1	76	55	99	3.2	6.5
200 lbs N/A	343	280	81.3	73	60	97	3.2	5.1
Significance ²	NS	NS	NS	NS	NS	NS	NS	NS

¹Vine maturity is rated on the following basis: 1=very early; 2=early; 3=medium; 4=late; and 5=very late.

²The color index integrates the number of tubers observed with pink discoloration and the severity of the discoloration.

³LSD=least significant difference. NS=not significant; +P=0.10; *P=0.05.

Table 4. Influence of seed type on yield, grade, stand, vine maturity, average tuber weight, stems per plant, and tubers per stem of four cultivars - 1991.

Treatment	Yield (Cwt/A)					% Stand	Vine Maturity ¹	Avg. Tuber Weight (oz)	Stems/Plant	Tubers/Stem
	Total	Total	US #1 %	>10 oz	<4 oz					
Centennial Russet										
Cut Seed	244	186	76.2	14	58	96	3.0	4.6	2.9	2.0
Whole Seed	282	220	77.6	20	62	94	2.8	4.6	3.0	2.2
Russet Burbank										
Cut Seed	377	263	69.5	70	80	97	2.5	5.7	3.8	1.9
Whole Seed	403	257	63.7	63	104	95	2.5	5.4	4.0	2.1
Russet Norkotah										
Cut Seed	281	219	78.2	52	58	98	1.0	5.4	3.8	1.5
Whole Seed	280	210	74.9	58	64	95	1.0	5.3	4.4	1.3
Russet Nugget										
Cut Seed	406	341	84.2	103	62	99	4.0	5.9	3.4	2.1
Whole Seed	440	366	83.2	123	71	98	3.8	5.8	3.7	2.2
Sangre										
Cut Seed	389	333	85.5	76	53	100	2.5	5.6	3.3	2.2
Whole Seed	397	347	87.2	93	48	94	2.8	5.6	3.6	2.2
Interaction										
Cultivar x Seed Type										
LSD ²	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Main Effects										
Cultivar										
Centennial Russet	263	203	77.0	17	60	95	2.9	4.6	3.0	2.1
Russet Burbank	390	260	66.6	66	92	96	2.5	5.5	3.9	2.0
Russet Norkotah	280	215	76.5	55	61	96	1.0	5.3	4.1	1.4
Russet Nugget	422	354	83.7	113	66	98	3.9	5.9	3.6	2.1
Sangre	393	340	86.4	84	51	97	2.6	5.6	3.4	2.2
LSD ²	31*	33*	5.1*	24*	14*	NS	0.4*	0.4*	0.4*	0.3*
Seed Type										
Cut Seed	339	269	78.7	63	62	98	2.6	5.4	3.4	2.0
Whole Seed	360	280	77.3	71	70	95	2.6	5.3	3.7	2.0
Significance ²	*	NS	NS	NS	+	*	NS	NS	*	NS

¹Vine maturity is rated on the following basis: 1=very early; 2=early; 3=medium; 4=late; and 5=very late.

²LSD=least significant difference. NS=not significant; +P=0.10; *P=0.05.