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The Hunt Institute for Botanical Documentation, a research division of Carnegie Mellon University, specializes in the history of botany and all aspects of plant science and serves the international scientific community through research and documentation. To this end, the Institute acquires and maintains authoritative collections of books, plant images, manuscripts, portraits and data files, and provides publications and other modes of information service. The Institute meets the reference needs of botanists, biologists, historians, conservationists, librarians, bibliographers and the public at large, especially those concerned with any aspect of the North American flora.

Hunt Institute was dedicated in 1961 as the Rachel McMasters Miller Hunt Botanical Library, an international center for bibliographical research and service in the interests of botany and horticulture, as well as a center for the study of all aspects of the history of the plant sciences. By 1971 the Library's activities had so diversified that the name was changed to Hunt Institute for Botanical Documentation. Growth in collections and research projects led to the establishment of four programmatic departments: Archives, Art, Bibliography and the Library.

Where do Figs 1, 2, 3, 4 go?
See galley 19 – Is this correct for placement of Fig 4?
" 20 – Fig. 3? or here?

In references – check middle initial on Bill Jones –

See last sentence in Discussion of Group 3 – something left off.

Table XVIII should have analysis for hop. 323 and 325

Table VIII missing
" XIII "
XVI "
XVII "
XVIII "
XX "
XXIII "
XXV "
XXX "
XXXII "
XXXIII "
XXXIV (put missing)

These have already been revised

OCT: 2 - References

Tables 1, 2, 3, 7

TABLE I

Galley 12

Manihot

TABLE I

Manihot esculenta, CHARACTERS

Root Characters

1. Surface of Root
   1. smooth
   2. rough

2. External color of root
   1. light brown-yellow
   2. brown, dark brown, reddish brown
   3. light brown, tan, light tan
   4. pinkish brown, pinkish tan
   5. pinkish white, light pink, pink

3. Root flesh color
   1. white to cream
   2. white to cream with pink
   3. cream-yellow to yellow
   4. cream-yellow to yellow with pink

	1	2	3	4
1	1			
2	75	1		
3	0	0	1	
4	0	0	75	1

Stem Characters

4. Color of stem
   1. silver
   2. silver-brown
   3. 0
   4. 0
   5. brown
   6. yellow

5. Storey length
   1. 4 - 8 cm.
   2. 9 - 20 cm.
   3. 21 - 28 cm.

6. Nature of scars on stem (N = 4, k = 1)*
   1. smooth
   2. slightly raised
   3. moderately raised
   4. very large

7. Branching of plant
   1. one branch at top or no branches
   2. one or two branches but not one branch if at top
   3. more than two branches

Leaf Characters

8. Number of lobes of leaf
   1. 3 or 4 lobes
   2. 3, 4 or 5 lobes
   3. 5 or 6 lobes
   4. 4, 5 or 6 lobes
   5. 7 or 8 lobes
   6. 9 or 10 lobes

9. Leaf lobe shape
   1. obovate
   2. linear

10. Sinuosity of lobes of linear leaves
    1. pandurate
    2. some sinuosity
    3. simple (not sinuous)
    4. logical (linear)

11. Sinuosity of lobes of obovate leaves
    1. pandurate
    2. some sinuosity
    3. simple (not sinuous)
    4. logical (linear)

12. Length of median lobe
    1. less than 14 cm.
    2. 14 - 17 cm.
    3. greater than 17 cm.

13. Width of median lobe (widest point)
    1. narrow (1.5 - 2.4 cm.)
    2. medium (2.5 - 4.8 cm.)
    3. broad (5.0 cm.+)

14. Petiole color
    1. red
    2. greenish red
    3. reddish green
    4. green

	R	GR	RG	G
R	1			
GR	75	1		
RG	25	75	1	
G	0	25	75	1

15. Color of young foliage
    1. reddish blue
    2. bluish green
    3. green

*The parenthetic expression indicates a special instruction in the computer program, in which the individual states of the character are not distinct, but show some relation the one to another (See Estabrook & Rogers, 1966).

Galley 13
Market

TABLE II
DISTRIBUTION OF CULTIVARS IN THE STATES OF EXTERNAL COLOR OF ROOT BY GROUPS

Group	Light brown-yellow	Brown, dark brown, reddish brown	Light brown, tan, light tan	Pinkish brown, pinkish tan	Pinkish white, light pink, pink	No information	
			Cultivars with Rough Roots				
1		14					
2		8					
3	1	9					
4		6	1				
5		12		1			
6		13		1			
7	4	13	3				
8		6					
9		13					
10		14					
11		10					
12	1	5				3	
13	3	15					
Total	9	138	4	2		3	= 156
			Cultivars with Smooth Roots				
14			13	1	3		
15			16				
16			5				
17				1	3		
18	1		16	1			
19			11		1		
Total	1		61	3	7		= 72

Table III

Galley 14

Manhet

TABLE III

DISTRIBUTION OF CULTIVARS IN THE STATES OF COLOR OF STEM BY GROUPS

Group	Silver	Silver-Brown	Brown	Yellow	
		Cultivars with Rough Roots			
1		1	13		
2		1	7		
3			10		
4	1		6		
5		1	12		
6		1	13		
7	1	1	16	2	
8		1	4	1	
9			1	12	
10			8	6	
11		2		8	
12		1	6	2	
13			13	5	
TOTAL	2	9	109	36	= 156
		Cultivars with Smooth Roots			
14	17				
15	14	2			
16	5				
17	4				
18	18				
19	12				
TOTAL	70	2			= 72

TABLE IV

MORPHOLOGICAL AND OTHER DESCRIPTIVE INFORMATION FOR GROUP 1

Population Number*	Character Number / Character State															Country†	Common Name	Color of Root Sub-epidermis	Age at Collection	Date of Collection
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15					
90	2	2	1	5	2	4	3	5	1	4	2	2	2	4	1	Jamaica	Yellow Saunders		12 months	June 1954
93	2	2	1	5	2	3	3	6	1	4	3	2	2	4	3	Jamaica	Blue Bud		12 months	June 1954
108	2	2	1	2	2	4	2	6	1	4	3	2	2	4	3	Jamaica	Elmo Stick	Pink	12 months	June 1954
260	2	2	1	5	2	3	3	5	1	4	3	2	2	4	3	Jamaica		Light Tan	12 Months	June 1954
264	2	2	1	5	2	2	3	5	1	4	3	2	2	4	1	Jamaica		Light Tan	12 months	July 1955
268	2	2	1	5	2	2	3	5	1	4	3	2	2	4	3	Jamaica		Light Yellow	12 months	July 1955
†281	2	2	1	5	2	2	3	5	1	4	3	2	2	4	3	Jamaica		Light Tan	12 months	July 1955
284	2	2	1	5	2	3	2	6	1	4	3	2	2	1	3	Jamaica		White	12 months	July 1955
320‡	2	2	1	5	2	3	2	6	1	4	3	2	2	4	3	Jamaica		White	15 months	June 1960
322‡	2	2	1	5	2	3	3	5	1	4	3	2	2	4	3	Brazil[9]	Pretinha	Light Tan	10 months	June 1960
330‡	2	2	1	5	1	2	3	2	1	4	3	1	2	1	1	Brazil[9]	Amazonas	White	10 months	June 1960
377	2	2	1	5	2	4	3	5	1	4	3	2	2	1	1	Brazil[6]	Macacheira Rosa	Pink	24 months	Feb. 1961
486	2	2	1	5	2	3	3	2	1	4	3	2	2	1	1	Peru[10]	Pira Rica	White	?6 months	Feb. 1962
487	2	2	1	5	2	3	3	2	1	4	3	2	2	4	1	Peru[10]	Machoa	White	6 months	Feb. 1962

*Population and D. J. Rogers collection number.
†See Appendix for exact localities.
‡Amino acid analysis follows (Table V).

TABLE VI

MORPHOLOGICAL AND OTHER DESCRIPTIVE INFORMATION FOR GROUP 2

Population Number*	Character Number / Character State															Country†	Common Name	Color of Root Sub-epidermis	Age at Collection	Date of Collection
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15					
94	2	2	1	5	1	4	3	5	1	4	3	3	2	4	3	Jamaica[1]	Esther	Light Tan	12 months	June 1954
222	2	2	1	5	2	2	3	5	1	4	3	3	2	2	2	Costa Rica[2]	Cubana	White		June 1955
267	2	2	1	5	2	2	3	6	1	4	3	3	3	2	2	Jamaica[1]		Light Tan	12 months	July 1955
278	2	2	1	5	2	2	3	5	1	4	3	3	2	4	3	Jamaica		Light Tan	12 months	July 1955
280	2	2	1	5	2	2	3	6	1	4	3	3	3	2	3	Jamaica		Light Tan	12 months	July 1955
285	2	2	1	5	2	2	3	5	1	4	3	3	2	4	3	Jamaica		Light Tan	12 months	July 1955
376	2	2	1	5	1	3	3	5	1	4	3	3	2	4	3	Brazil[6]	Macacheira "Sabará"	Light Tan	24 months	Feb. 1961
440	2	2	0	=	1	4	3	6	1	4	1	3	2	1	3	Bolivia[31]	Coila	Light Tan	15 months	Jan. 1962

*Population and D. J. Rogers collection number.
†See Appendix for exact localities.

TABLE VII

MORPHOLOGICAL AND OTHER DESCRIPTIVE INFORMATION FOR GROUP 3

Population Number*	Character Number / Character State															Country†	Common Name	Color of Root Sub-epidermis	Age at Collection	Date of Collection
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15					
97	2	2	1	5	2	2	2	5	1	4	3	2	2	2	3	Jamaica[1]	Bunch of Keys		12 months	June 1954
103	2	2	1	5	2	2	2	5	1	4	3	2	2	1	3	Jamaica	Brown Stick		12 months	June 1954
221	2	2	1	5	3	2	2	5	1	4	2	2	1	4	3	Costa Rica[2]	Camota Blanca[1]	White		June 1955
233	2	1	1	5	2	1	2	5	1	4	2	3	2	4	1	Costa Rica	Siete Meses	Light Brown		June 1955
243	2	2	1	5	2	1	2	5	1	4	3	2	2	3	1	Costa Rica		White		June 1955
312‡	2	2	1	5	2	3	2	5	1	4	3	2	2	4	1	Jamaica[1]		Light Tan	15 months	June 1960
382	2	2	1	5	2	2	2	5	1	4	3	2	2	1	3	Brazil[8]		Tan	11 months	Feb. 1961
393	2	2	1	5	2	1	2	5	1	4	2	2	2	3	1	Brazil[9]	Pereirinha S. A. 10	Pink	8 months	Feb. 1961
470	2	2	1	5	2	1	2	5	1	4	3	2	3	4	3	Peru[21]		Purplish-Red	5 months	Feb. 1962
483	2	2	1	5	2	3	2	5	1	4	3	2	2	1	1	Peru[22]	Umisha Rumo	White	6 months	Feb. 1962

*Population and D. J. Rogers collection number.
†See Appendix for exact localities.
‡Amino acid analysis follows.

TABLE IX

MORPHOLOGICAL AND OTHER DESCRIPTIVE INFORMATION FOR GROUP 4

Population Number*	Character Number 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Country†	Common Name	Color of Root Sub-epidermis	Age at Collection	Date of Collection
	Character State																			
250	2	3	1	1	1	3	2	3	1	4	3	2	2	1	1	Costa Rica[2]	Brazil	White		June 1955
252	2	2	1	5	2	2	2	3	1	4	3	2	3	1	1	Costa Rica‡		White		June 1955
333	2	2	1	5	1	1	3	3	1	4	1	2	2	4	3	Brazil[5]	Manivão	White	10 Months	June 1960
388	2	2	1	5	1	2	2	3	1	4	3	2	2	4	1	Brazil[9]	Verdinha	White to Light Tan	8 Months	Feb. 1961
389	2	2	1	5	2	2	2	3	1	4	3	2	2	1	1	Brazil[9]	Mana Ferro	White	8 Months	Feb. 1961
392	2	2	1	5	2	2	2	1	1	4	3	1	1	1	1	Brazil[9]	Guaju	White	8 Months	Feb. 1961
424	2	2	1	5	3	2	3	3	1	4	3	2	2	4	1	Bolivia[30]		White	9 Months	Jan. 1962

*Population and D. J. Rogers collection number.
†See Appendix for exact localities.
‡Variety originally from Managua, Nicaragua.

TABLE X

MORPHOLOGICAL AND OTHER DESCRIPTIVE INFORMATION FOR GROUP 5

Population Number*	Character Number / Character State															Country†	Common Name	Color of Root Epi-dermis	Age at Collection	Date of Collection
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15					
82	2	2	1	5	2	2	1	5	1	4	3	2	2	2	3	Jamaica[1]	Blue Bud		12 months	June 1954
83	2	2	1	5	2	2	1	5	1	4	3	2	2	4	3	Jamaica	Black Stick Buck Buck		12 months	June 1954
86	2	2	1	5	2	2	1	5	1	4	3	2	2	4	3	Jamaica	Gordon		12 months	June 1954
91	2	2	1	5	2	2	1	5	1	4	3	2	2	4	1	Jamaica	Blue Bitter		12 months	June 1954
101	2	2	1	5	2	2	1	5	1	4	3	2	2	1	3	Jamaica	Bullet Tree	Pink	12 months	June 1954
136	2	2	1	5	2	4	1	5	1	4	3	3	2	4	3	Jamaica	Bobby Hanson		12 months	June 1954
231	2	2	1	2	2	1	1	5	1	4	3	2	3	1	3	Costa Rica[2]	Nativa	White		June 1955
249	2	2	1	5	2	2	1	5	1	4	3	3	3	1	3	Costa Rica	Chilena	White		June 1955
277	2	2	1	5	2	1	1	5	1	4	3	2	2	1	3	Jamaica[1]		Light Pink	12 months	July 1955
387	2	4	1	5	2	2	1	5	1	4	3	3	2	1	3	Brazil[9]	Pasarinha	Deep Pink	8 months	Feb. 1961
452	2	2	1	5	2	4	3	5	1	4	3	3	3	2	3	Peru[2]		Light Reddish Purple	10 months	Feb. 1962
464	2	2	1	5	2	3	3	5	1	4	3	3	3	1	3	Peru[11]		Deep Purplish Pink	7 months	Feb. 1962
479	2	2	1	5	2	2	1	5	1	4	3	3	3	1	3	Peru[23]		Strong Reddish Purple	7 months	Feb. 1962

*Population and D. J. Rogers collection number.
†See Appendix for exact localities.

TABLE XI

MORPHOLOGICAL AND OTHER DESCRIPTIVE INFORMATION FOR GROUP 6

Population Number*	Character Number / Character State															Country†	Common Name	Color of Root Sub-epidermis	Age at Collection	Date of Collection
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15					
88	2	2	1	5	1	2	1	6	1	4	3	1	2	4	1	Jamaica[1]	New Green		12 months	June 1954
95	2	2	1	5	2	3	1	6	1	4	3	3	2	3	2	Jamaica	Eye Water		12 months	June 1954
96	2	2	1	5	2	4	2	6	1	4	3	3	2	4	1	Jamaica	Agricultural Portland #3		12 months	June 1954
105	2	2	1	5	2	2	2	6	1	4	3	3	2	4	3	Jamaica	New Green		12 months	June 1954
110	2	4	1	2	2	2	1	6	1	4	2	3	2	2	3	Jamaica	Walters		12 months	June 1954
135	2	2	1	5	3	2	1	6	1	4	3	3	2	4	3	Jamaica	Bobby Hanson		12 months	June 1954
226	2	2	1	5	3	2	1	6	1	4	3	3	2	4	1	Costa Rica[2]	#1	White		June 1955
263	2	2	1	5	2	2	1	6	1	4	3	3	2	4	3	Jamaica[1]		Light Tan	12 months	July 1955
269	2	2	1	5	2	2	1	6	1	4	3	3	2	4	2	Jamaica		Light Tan	12 months	July 1955
270	2	2	1	5	2	2	1	6	1	4	3	3	2	3	3	Jamaica		Light Tan	12 months	July 1955
282	2	2	1	5	2	2	1	6	1	4	3	2	2	4	3	Jamaica		Light Tan	12 months	July 1955
439	2	2	3	5	2	4	1	6	1	4	3	3	3	4	1	Bolivia[31]		Light Tan	15 months	Jan. 1962
455	2	2	1	5	1	3	1	2	1	4	3	2	2	4	4	Peru[14]		Light Purplish Pink	11 months	Feb. 1962
477	2	2	1	5	3	2	2	6	1	4	3	3	2	4	1	Peru[19]		Light Reddish Purple	6 months	Feb. 1962

TABLE XII

MORPHOLOGICAL AND OTHER DESCRIPTIVE INFORMATION FOR GROUP 7

Population Number*	Character Number / Character State															Country†	Common Name	Color of Root Sub-epidermis	Age at Collection	Date of Collection
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15					
92	2	2	1	5	2	3	2	5	1	4	3	3	2	1	3	Jamaica[1]	Mullings		12 months	June 1954
104	2	3	1	5	2	2	2	5	1	4	3	3	2	4	3	Jamaica	Smalling		12 months	June 1954
106	2	2	1	5	2	3	2	5	1	4	3	3	2	2	3	Jamaica	Cashew Long Leaf		12 months	June 1954
227	2	2	1	5	2	1	3	5	1	4	3	3	3	4	2	Costa Rica[2]	Camota	White		June 1955
234	2	3	1	1	2	2	2	5	1	4	3	3	2	1	3	Costa Rica	Sra. Esta in La Mesa	Light Pink		June 1955
236	2	2	1	5	2	2	2	5	1	4	3	3	3	4	2	Costa Rica	#2	White		June 1955
238	2	3	1	6	3	2	2	5	1	4	3	3	3	3	1	Costa Rica	Amarillo Correinte	Light Yellow Brown		June 1955
239	2	1	1	5	2	2	3	5	1	4	3	3	3	4	1	Costa Rica	Zopilota	White		June 1955
241	2	2	3	5	2	2	2	5	1	4	3	3	3	3	1	Costa Rica	Camote Corriente	White Yellow		June 1955
274	2	2	1	5	2	2	2	5	1	4	3	3	2	4	1	Jamaica[1]		Light Tan	12 months	July 1955
275	2	2	1	5	2	2	2	5	1	4	3	3	2	4	1	Jamaica		Light Tan	12 months	July 1955
295	2	2	1	5	2	2	2	5	1	4	3	3	2	4	3	Jamaica		Pink	12 months	July 1955
315‡	2	2	1	5	2	2	2	5	1	4	3	1	2	4	3	Jamaica		Light Tan	12 months	June 1960
379	2	2	1	5	2	4	2	5	1	4	3	3	2	1	3	Brazil[6]	Pacarú	Tan	24 months	Feb. 1961
417	2	1	4	2	3	2	1	5	1	4	3	3	2	1	1	Bolivia[29]		White	5 months	Jan. 1962
447	2	1	1	5	2	3	3	6	1	4	3	3	3	3	1	Bolivia[27]		Light Tan	9 months	Jan. 1962
457	2	2	1	5	3	2	2	5	1	4	3	3	2	1	1	Peru[17]		Mod. Purplish Red	Ca. 5 mo.	Feb. 1962
465	2	1	1	5	2	2	2	5	1	4	3	3	3	1	3	Peru[11]	Negro	Mod. Purplish Red	5 months	Feb. 1962
469	2	2	1	5	2	2	2	5	1	4	3	3	3	1	1	Peru[21]		Deep Purplish Pink	5 months	Feb. 1962
481	2	2	1	6	2	4	2	2	1	4	3	3	3	1	3	Peru[23]		Light Tan	12 months	Feb. 1962

*Population and D. J. Rogers collection number.
†See Appendix for exact localities.
‡Amino acid analysis followa description (Table X).

TABLE XIV

MORPHOLOGICAL AND OTHER DESCRIPTIVE INFORMATION FOR GROUP 8

Population Number*	Character Number / Character State														Country†	Common Name	Color of Root Sub-epidermis	Age at Collection	Date of Collection
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15					
100	2	2	3	5	3	3	2	5	1	4	3	3	2	4	1	Jamaica[1]	New Stick		12 months	June 1954
272	2	2	3	5	2	2	2	5	1	4	3	3	2	4	3	Jamaica		Light Tan	12 months	July 1955
290	2	2	3	5	2	2	2	5	1	4	3	3	2	4	3	Jamaica		Light Tan	12 months	July 1955
463	2	2	3	6	2	1	2	4	1	4	3	2	2	3	1	Peru[17]	Inquiri Rumo	Light Tan	9 months	Feb. 1962
480	2	2	3	2	3	3	2	4	1	4	3	2	2	4	1	Peru[23]		Light Tan	7 months	Feb. 1962
490	2	2	3	5	2	4	2	5	1	4	3	3	2	4	3	Brazil[3]	Mandioco	White	?	Feb. 1962

*Population and D. J. Rogers collection number.
†See Appendix for exact localities.

TABLE XV

MORPHOLOGICAL AND OTHER DESCRIPTIVE INFORMATION FOR GROUP 9

Population Number*	Character Number / Character State															Country†	Common Name	Color of Root Sub-epidermis	Age at Collection	Date of Collection
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15					
73	2	2	3	6	2	2	1	5	1	4	3	3	2	4	3	Jamaica[1]	Foul Fat		12 months	June 1954
74	2	2	3	6	2	2	2	5	1	4	3	3	2	4	2	Jamaica	Smalling		12 months	June 1954
76	2	2	3	6	2	2	2	5	1	4	3	3	2	4	3	Jamaica	Yellow Heart		12 months	June 1954
77	2	2	3	6	2	3	2	5	1	4	3	3	2	3	3	Jamaica	White Heart		12 months	June 1954
78	2	2	3	6	1	3	2	6	1	4	3	3	2	4	3	Jamaica	Yellow Belly		12 months	June 1954
255	2	2	3	6	2	2	1	5	1	4	3	3	2	4	3	Jamaica		White	12 months	July 1955
256	2	2	3	6	2	2	1	5	1	4	3	3	2	4	1	Jamaica		Yellow	12 months	July 1955
266	2	2	3	6	2	3	3	5	1	4	3	3	2	4	1	Jamaica		Light Yellow	12 months	July 1955
279	2	2	3	6	2	3	3	6	1	4	3	2	2	4	3	Jamaica		Light Pink	12 months	July 1955
313‡	2	2	3	6	2	3	2	5	1	4	3	2	2	4	3	Jamaica		Yellow	15 months	June 1960
314‡	2	2	3	6	2	2	2	5	1	4	3	1	1	4	3	Jamaica		Pinkish Tan	15 months	June 1960
488	2	2	3	6	2	3	2	5	1	4	3	2	3	1	3	Peru[20]	Senorita	Orange Yellow	6 months	Feb. 1962
492	2	2	3	5	2	3	1	5	1	4	2	3	2	3	1	Brazil[3]	Mandioca	Light Purplish Pink	?	Feb. 1962

*Population and D. J. Rogers collection number.
†See Appendix for exact localities.
‡Amino acid analysis follows discussion.

TABLE XVII

MORPHOLOGICAL AND OTHER DESCRIPTIVE INFORMATION FOR GROUP 10

Population Number*	Character Number / Character State															Country†	Common Name	Color of Root Sub-epidermis	Age at Collection	Date of Collection
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15					
80	2	2	3	5	1	3	3	5	1	4	3	1	2	4	3	Jamaica[1]	Norsuck Portland #2		12 months	June 1954
89	2	2	3	5	1	3	3	5	1	4	3	1	2	4	3	Jamaica	Bygrave		12 months	June 1954
98	2	2	3	5	2	4	3	5	1	4	3	2	2	4	3	Jamaica	Blue Bud		12 months	June 1954
107	2	2	3	5	2	4	3	5	1	4	3	2	2	4	3	Jamaica	White Stick		12 months	June 1954
109	2	2	3	5	2	4	3	5	1	4	3	1	2	4	1	Jamaica	Catch Thief		12 months	June 1954
265	2	2	3	5	3	1	3	5	1	4	3	1	2	4	3	Jamaica		Light Tan	12 months	July 1955
323‡	2	2	3	6	2	3	3	5	1	4	3	1	2	1	3	Brazil[5]	Cachimbo	Brilliant Yellow	10 months	June 1960
325‡	2	2	3	6	1	4	3	3	1	4	3	1	2	4	3	Brazil[5]	Mameluca	Light Tan	10 months	June 1960
433	2	2	3	6	2	2	3	5	1	4	3	2	2	1	3	Bolivia[33]	Amarilla	Pale Pink	12 months	Jan. 1962
436	2	2	0	5	2	2	3	5	1	4	3	1	2	1	3	Bolivia[34]	Gancho	Pale Orange Yellow	18 months	Jan. 1962
438	2	2	1	5	1	3	3	5	1	4	3	2	2	1	3	Bolivia[31]	Chaparalosa	Light Tan	15 months	Jan. 1962
442	2	2	3	5	2	3	3	5	1	4	3	1	2	1	3	Bolivia[32]	Moja Blanca	Light Tan	12 months	Jan. 1962
482	2	2	0	6	2	3	3	2	1	4	3	1	2	1	3	Peru[23]		Strong Reddish Purple	7 months	Feb. 1962
485	2	2	0	6	2	3	3	2	1	4	3	1	2	1	3	3	Paloma Rumo	Moderate Purplish Pink	6 months	Feb. 1962

*Population and D. J. Rogers collection number.
†See Appendix for exact localities.
‡Amino acid analysis follows discussion.

TABLE XIX

MORPHOLOGICAL AND OTHER DESCRIPTIVE INFORMATION FOR GROUP 11

Population Number*	Character Number / Character State															Country†	Common Name	Color of Root Sub-epidermis	Age at Collection	Date of Collection
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15					
79	2	2	1	6	2	3	3	5	1	4	3	2	2	3	1	Jamaica[1]	Dunbarton Dist. Sweet Cassava		12 months	June 1954
81	2	2	1	6	2	2	2	6	1	4	3	2	2	4	3	Jamaica	Yellow Stick		12 months	June 1954
102	2	2	1	6	2	3	2	5	1	4	3	2	2	4	3	Jamaica	New Green		12 months	June 1954
115	2	2	1	2	2	3	2	5	1	4	3	2	2	3	3	Jamaica	Who Fe Patrick		12 months	June 1954
118	2	2	1	2	2	3	2	5	1	4	3	3	2	4	3	Jamaica	Sour Bammy	Pink	12 months	July 1955
257	2	2	1	6	2	2	3	5	1	4	3	1	2	4	3	Jamaica		Light Tan	12 months	July 1955
258	2	2	1	6	2	2	3	5	1	4	3	1	2	4	1	Jamaica		Light Tan	15 months	June 1960
321‡	2	2	1	6	2	3	2	5	1	4	3	1	2	4	3	Jamaica		Light Tan	10 months	Jan. 1962
420	2	2	1	6	2	4	3	5	1	4	3	2	2	4	3	Bolivia[30]	Yuca Enana	Tan	12 months	Feb. 1962
472	2	2	1	6	2	3	3	5	1	4	3	2	2	3	3	Peru[21]	Palo Blanco	Light Purplish Pink		

*Population and D. J. Rogers collection number.
†See Appendix for exact localities.
‡Amino acid analysis follows discussion.

TABLE XXI

MORPHOLOGICAL AND OTHER DESCRIPTIVE INFORMATION FOR GROUP 12

Population Number*	Character Number / Character State															Country†	Common Name	Color of Root Sub-epidermis	Age at Collection	Date of Collection
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15					
368	2	0	0	5	2	2	3	3	1	4	3	2	2	1	3	Brazil[4]	Cacau		24 months	Feb. 1961
369	2	0	0	5	3	1	2	3	1	4	3	1	1	1	3	Brazil[4]	Mata Fome		18 months	Feb. 1961
370	2	0	0	5	2	2	3	3	1	4	3	1	2	1	3	Brazil[4]	Peri-Peri		24 months	Feb. 1961
390	2	2	1	5	2	1	3	1	1	4	3	1	2	3	3	Brazil[9]	Manipeba	Light Pink	8 months	Feb. 1961
391	2	2	1	5	1	3	3	1	1	4	3	1	1	3	3	Brazil[8]	Joao Borges	White	8 months	Feb. 1961
421	2	1	1	2	2	2	3	3	1	4	3	2	2	1	3	Bolivia[29]	Yuca Enana	White	8 months	Jan. 1962
434	2	2	4	6	2	4	3	3	1	4	3	2	2	1	3	Bolivia[33]	Negra	White with Pink Stripes	24 months	Jan. 1962
476	2	2	1	5	3	1	3	2	1	4	3	1	2	2	3	Peru[19]		Strong Reddish Purple	6 months	Feb. 1962
484	2	2	1	6	3	2	3	1	1	4	3	1	1	1	3	Peru[22]		Light Pink	6 months	Feb. 1962

*Population and D. J. Rogers collection number.
†See Appendix for exact localities.

TABLE XXII

MORPHOLOGICAL AND OTHER DESCRIPTIVE INFORMATION FOR GROUP 13

Population Number*	Character Number / Character State															Country†	Common Name	Color or Root Sub-epidermis	Age at Collection	Date of Collection
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15					
84	2	2	1	5	2	2	2	6	2	2	4	2	1	3	1	Jamaica[1]	Government		12 months	June 1954
99	2	2	1	5	2	3	1	6	2	2	4	3	2	3	3	Jamaica	Long Leaf Black Stem		12 months	June 1954
246	2	2	1	5	2	2	1	5	2	3	4	2	1	4	3	§Costa Rica[2]	Colorado (2)	White		June 1955
247	2	2	1	5	2	2	1	6	2	2	4	3	2	4	2	Costa Rica*	Blanco	White		June 1955
261	2	2	1	5	2	2	3	5	2	2	4	2	1	3	2	Jamaica[1]		Light Tan	12 months	July 1955
273	2	2	1	5	1	3	2	6	2	2	4	2	1	4	3	Jamaica		Light Pink	12 months	July 1955
276	2	2	1	5	2	2	1	6	2	2	4	3	2	3	3	Jamaica		White	12 months	July 1955
326‡	2	2	1	6	1	4	3	5	2	2	4	3	1	4	1	Brazil[5a]	Abaete	Light Tan	10 months	June 1960
328‡	2	2	3	5	1	3	3	5	2	2	4	2	1	1	1	Brazil[5b]	Wapchuna (Uapichuna)	Orange Yellow	10 months	June 1960
331‡	2	2	3	5	2	2	3	5	2	2	4	2	1	1	3	Brazil[5c]	Paica	Light Tan	10 months	June 1960
380	2	2	1	5	1	3	3	5	2	2	4	2	2	4	3	Brazil[6]	Macacheira "Picui"	White	24 months	Feb. 1961
419	2	2	1	5	2	4	3	3	2	2	4	2	1	4	3	Bolivia[30]	Yuca Blanca	Light Tan	14 months	Jan. 1962
446	2	1	1	6	1	4	3	5	2	1	4	3	2	3	3	Bolivia[27]		Light Tan White	9 months	Jan. 1962
451	2	2	1	5	2	4	3	5	2	2	4	1	1	4	1	Bolivia[28]		Light Tan	16 months	Jan. 1962
460	2	1	1	6	2	2	1	5	2	3	4	3	1	1	3	Peru[16]		White	8 months	Feb. 1962
462	2	1	1	5	2	2	2	2	2	3	4	2	1	1	1	Peru[10]	Negro	White	6 months	Feb. 1962
475	2	2	1	6	2	4	3	5	2	3	4	3	1	1	3	Peru[19]		Light Tan	6 months	Feb. 1962
478	2	2	1	6	3	1	2	5	2	3	4	3	1	4	3	Peru[19]		Reddish Purple	6 months	Feb. 1962

*Population and D. J. Rogers collection number.
†See Appendix for exact localities.
‡Amino acid analyses follow discussion.
§Variety originally from San Rafael del Sur, Nicaragua.

TABLE XXIV

MORPHOLOGICAL AND OTHER DESCRIPTIVE INFORMATION FOR GROUP 14

Population Number*	Character Number / Character State															Country†	Common Name	Color of Root Sub-epidermis	Age at Collection	Date of Collection
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15					
111	1	3	1	1	1	2	1	5	2	2	4	2	1	3	2	Jamaica[1]	Blue Top		12 months	June 1954
114	1	4	1	1	2	3	2	6	2	2	4	2	1	4	3	Jamaica	Tall Leaf Cotton Tree	White	12 months	June 1954
130	1	5	1	1	2	4	1	5	2	2	4	3	2	4	2	Jamaica	Long Leaf White Tuber	Light Pink	12 months	June 1954
131	1	5	1	1	2	3	2	6	2	2	4	3	2	4	3	Jamaica	Marlie Hill Big Yard	Pink	12 months	June 1954
132	1	3	1	1	2	3	1	6	2	2	4	2	1	4	3	Jamaica		Richmond Stick	12 months	June 1954
224	1	3	1	1	2	2	1	5	2	2	4	3	2	1	1	Costa Rica[2]	Flor de Lis	White		June 1955
225	1	3	1	1	2	2	3	5	2	3	4	2	1	4	2	Costa Rica		White		June 1955
242	1	3	1	1	2	2	3	6	2	3	4	3	1	3	3	Costa Rica	Vainilla	White		June 1955
244	1	3	1	1	2	2	1	5	2	3	4	3	1	3	2	Costa Rica	Mangi	Pink		June 1955
288	1	3	1	1	1	2	2	5	2	2	4	3	2	3	2	Jamaica[1]		White	12 months	July 1955
300	1	3	1	1	2	3	1	5	2	2	4	3	1	4	2	Jamaica		White	12 months	July 1955
303	1	3	1	1	2	3	1	6	2	2	4	3	1	4	3	Jamaica		White	12 months	July 1955
319‡	1	3	1	1	2	2	2	5	2	2	4	2	1	4	3	Jamaica		Light Pink	15 months	June 1960
416	1	5	1	1	3	2	2	5	2	2	4	3	2	4	3	Bolivia[29]		Light Pink to Light Tan	5 months	Jan. 1962
450	1	3	1	1	1	2	1	5	2	2	4	3	1	3	3	Bolivia[26]	Mojito	Tan	4 months	Jan. 1962
454	1	3	3	1	2	2	2	5	2	2	4	3	1	4	2	Peru[13]		Light Brown to Tan	10 months	Feb. 1962
456	1	3	1	1	3	2	1	5	2	2	4	3	1	1	1	Peru[14]		White	11 Months	Feb. 1962

*Population and D. J. Rogers collection number.
†See Appendix for exact localities.
‡Amino acid analysis follows.

TABLE XXVI

MORPHOLOGICAL AND OTHER DESCRIPTIVE INFORMATION FOR GROUP 15

Population Number*	Character Number / Character State															Country†	Common Name	Color of Root Sub-epidermis	Age at Collection	Date of Collection
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15					
120	1	3	1	1	2	2	1	5	1	4	3	3	2	1	3	Jamaica[1]	Agricultural (A.G.R.)	Light Pink	12 months	June 1954
129	1	3	1	1	2	3	1	6	1	4	3	3	2	1	3	Jamaica	White Margaret	White	12 months	June 1954
134	1	3	1	1	2	2	1	5	1	4	3	3	2	4	2	Jamaica	Short Leaf Cotton Tree	Light Tan	12 months	June 1954
232	1	3	1	1	3	2	2	5	1	4	3	3	3	2	1	Costa Rica[2]	Camote Blanca[2]	White		June 1955
235	1	3	1	1	2	2	1	5	1	4	3	2	2	4	1	Costa Rica	Crema	White		June 1955
237	1	3	1	1	2	1	1	5	1	4	3	3	3	1	1	Costa Rica	Higuerilla	White		June 1955
240	1	3	1	1	2	2	1	5	1	4	3	2	3	1	2	Costa Rica	Rosada-Jorge Leon	Pink		June 1955
254	1	3	1	1	3	2	2	5	1	4	3	3	3	3	2	Costa Rica	Cubana Blanca	White		June 1955
286	1	3	3	2	2	3	1	5	1	4	3	2	2	1	3	Jamaica[1]		White	12 months	July 1955
287	1	3	1	1	2	3	1	6	1	4	3	3	3	1	3	Jamaica		Light Tan	12 months	July 1955
291	1	3	1	1	2	3	1	6	1	4	3	3	2	4	2	Jamaica		Light Tan	12 months	July 1955
292	1	3	1	2	2	3	1	6	1	4	3	3	2	1	3	Jamaica		Pink Tan	12 months	July 1955
415	1	3	1	1	3	2	1	6	1	4	3	3	3	1	3	Bolivia[29]		Light Tan	5 months	Jan. 1962
444	1	3	3	1	2	3	1	5	1	4	3	3	3	4	3	Bolivia[24]	Amarilla	Light Tan	8 months	Jan. 1962
461	1	3	3	1	2	3	1	5	1	4	3	3	2	3	3	Peru[10]	Amarilla		6 months	Feb. 1962
466	1	3	3	1	2	2	1	6	1	4	3	3	3	3	3	Peru[11]		Light Tan	4 months	Feb. 1962

*Population and D. J. Rogers collection number.
†See Appendix for exact localities.
‡Amino acid analysis follows.

TABLE XXVII

MORPHOLOGICAL AND OTHER DESCRIPTIVE INFORMATION FOR GROUP 16

Population Number*	Character Number / Character State															Country†	Common Name	Color of Root Sub-epidermis	Age at Collection	Date of Collection
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15					
122	1	3	1	1	2	2	2	5	1	4	3	3	2	1	3	Jamaica[1]	Cuba (cuban)	Light Pink	12 months	June 1954
297	1	3	1	1	2	2	2	5	1	4	3	3	2	1	3	Jamaica		Light Tan	12 months	June 1954
432	1	3	1	1	2	3	2	5	1	4	2	3	2	1	2	Bolivia[33]	Moja Blanca	Pale Pink	6 months	Jan. 1962
441	1	3	2	1	2	2	2	5	1	4	2	3	2	1	1	Bolivia[31]	Rosada	Light Tan	15 months	Jan. 1962
448	1	3	1	1	2	2	2	5	1	4	2	3	2	1	2	Bolivia[24]	Rosada	Pale Pink	3 months	Jan. 1962

*Population and D. J. Rogers collection number.
†See Appendix for exact localities.
‡Amino acid analysis follows.

TABLE XXVIII

MORPHOLOGICAL AND OTHER DESCRIPTIVE INFORMATION FOR GROUP 17

Population Number*	Character Number / Character State															Country†	Common Name	Color of Root Sub-epidermis	Age at Collection	Date of Collection
	1	2	3	5	5	6	7	8	9	10	11	12	13	14	15					
112	1	5	1	1	2	3	2	5	1	4	2	3	2	4	3	Jamaica[1]	John Henry		12 months	June 1954
123	1	5	1	1	2	4	2	5	1	4	3	1	2	4	3	Jamaica	Rodney		12 months	June 1954
124	1	4	1	1	2	3	2	6	1	4	2	2	2	4	3	Jamaica	White House		12 months	June 1954
453	1	5	1	1	3	3	2	3	1	4	3	2	2	4	3	Peru[12]		Light Purplish Pink	10 months	Feb. 1962

*Population and D. J. Rogers collection number.
†See Appendix for exact localities.

TABLE XXIX

MORPHOLOGICAL AND OTHER DESCRIPTIVE INFORMATION FOR GROUP 18

Population Number*	Character Number / Character State															Country†	Common Name	Color of Root Sub-epidermis	Age at Collection	Date of Collection
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15					
121	1	4	1	1	2	3	3	5	1	4	3	3	2	1	3	Jamaica[1]	Agricultural White Stick		12 months	June 1954
126	1	3	1	1	1	3	3	5	1	4	3	1	1	4	3	Jamaica	Cotton Tree (Portland #4)		12 months	June 1954
127	1	3	1	1	1	4	3	5	1	4	3	1	2	4	3	Jamaica	White Stick (Portland #1)		12 months	June 1954
128	1	3	1	1	2	3	3	5	1	4	3	3	2	4	3	Jamaica	Laura		12 months	June 1954
271	1	3	1	1	1	4	3	5	1	4	3	2	2	4	3	Jamaica		White	12 months	July 1955
289	1	3	1	1	2	2	3	5	1	4	2	3	2	4	3	Jamaica		Pink	12 months	July 1955
296	1	3	1	1	1	3	3	5	1	4	3	2	2	1	1	Jamaica		Light Tan	12 months	July 1955
298	1	3	1	1	2	4	3	5	1	4	3	2	2	4	3	Jamaica		Light Pink	12 months	July 1955
299	1	3	1	1	2	1	3	5	1	4	3	3	2	4	3	Jamaica		White	12 months	July 1955
318‡	1	3	1	1	1	3	3	5	1	4	3	1	1	4	3	Jamaica		Light Tan	15 months	June 1960
327‡	1	3	3	1	1	3	3	5	1	4	2	2	1	4	3	Brazil[5]	Xingu	Pale Orange-Yellow	10 months	June 1960
332	1	3	1	1	1	3	3	5	1	4	3	1	2	4	2	Brazil[5]	Mata Negra	White	10 months	June 1960
366	1	3	0	1	1	3	2	5	1	4	3	2	2	1	3	Brazil[4]	Manteiga		24 months	Feb. 1961
378	1	3	1	1	2	3	3	5	1	4	3	3	3	4	3	Brazil[6]	Mandkoca-Vira Barco	Light Tan	24 months	Feb. 1961
406	1	3	1	1	1	3	3	5	1	4	3	2	3	1	2	Brazil[7]	Manipeba Branca	Light Pink	36 months	Mar. 1961
443	1	3	3	1	1	4	3	5	1	4	3	2	2	1	1	Bolivia[24]	Blanca	Light Tan	13 months	Jan. 1962
445	1	3	3	1	1	2	1	5	1	4	3	1	2	1	3	Bolivia[25]	Blanca	Light Tan	12 months	Jan. 1962
493	1	1	1	1	2	2	3	5	1	4	3	3	3	4	3	Brazil[3]	Mamacheira	White	?	Feb. 1962

*Population and D. J. Rogers collection number.
†See Appendix for exact localities.
‡Amino acid analysis follows.

TABLE XXXI

MORPHOLOGICAL AND OTHER DESCRIPTIVE INFORMATION FOR GROUP 19

Population Number*	Character Number / Character State															Country†	Common Name	Color of Root Sub-epidermis	Age at Collection	Date of Collection
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15					
116	1	5	1	1	2	2	3	3	1	4	3	2	2	1	3	Jamaica[1]	Damsel	Pink	12 months	June 1954
119	1	3	1	1	2	4	3	5	1	4	3	1	2	1	2	Jamaica	Westmoreland		12 months	June 1954
125	1	3	1	1	2	4	3	3	1	4	3	1	2	1	1	Jamaica	White Joe	Light Tan	12 months	June 1954
229	1	3	1	1	2	2	2	3	1	4	3	2	2	1	3	Costa Rica[2]				June 1955
293	1	3	1	1	2	3	3	3	1	4	3	2	2	2	3	Jamaica[1]		Light Pink	12 months	July 1955
301	1	3	1	1	2	3	2	5	1	4	3	2	2	4	2	Jamaica		Cream White	12 months	July 1955
302	1	3	1	1	2	2	3	3	1	4	3	2	2	4	2	Jamaica		White	12 months	July 1955
316‡	1	3	1	1	1	4	1	6	1	4	2	1	1	1	2	Jamaica		White	15 months	June 1960
329‡	1	3	3	1	2	2	3	3	1	4	2	1	1	3	1	Brazil[5]	Niple	Light Tan	10 months	June 1960
365	1	3	0	1	2	1	3	3	1	4	3	1	2	1	3	Brazil[4]	Pitangue		12 months	Feb. 1961
405	1	3	1	1	1	4	3	3	1	4	3	1	3	4	1	Brazil[7]	Cravo	White	12 months	Mar. 1961
458	1	3	1	1	2	3	3	3	1	4	3	2	2	4	2	Peru[15]	Blanco	Yellowish Pink	9 months	Feb. 1962

*Population and D. J. Rogers collection number.
†See Appendix for exact localities.
‡Amino acid analysis follows.

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TABLE V
PROTEIN AND AMINO ACID ANALYSES*

Population 320

Proximate Analysis of Leaves
Percent per 100 gm

	As Received	Dry
Moisture	76.72	
Protein	4.81	20.66
Ether Extract†	1.38	5.93
Ash	2.03	8.72
Crude Fiber	1.92	8.25
Carbohydrates	13.77	59.15
Calories	86.7	372.6

Amino Acid Determination
Percent (16 mg Nitrogen Basis)

Alanine	5.77	Lysine	7.86
Arginine	4.00	Methionine	1.74
Aspartic Acid	10.12	Phenylalanine	5.25
Cystine	1.04	Proline	4.12
Glutamic Acid	10.07	Serine	5.52
Glycine	5.28	Threonine	4.80
Histidine	3.05	Tryptoph	1.62
Isoleucine	4.91	Tyrosine	3.74
Leucine	8.82	Valine	6.22
ppm Cyanide in leaf	33		

Population 322

Proximate Analysis of Leaves
Percent per 100 gm

	As Received	Dry
Moisture	69.83	
Protein	5.37	17.80
Ether Extract†	3.36	11.14
Ash	1.57	5.20
Crude Fiber	1.37	4.54
Carbohydrates	18.50	61.32
Calories	125.7	416.7

Amino Acid Determination
Percent (16 gm Nitrogen Basis)

Alanine	6.66	Lysine	6.29
Arginine	5.69	Methionine	2.00
Aspartic Acid	10.53	Phenylalanine	5.48
Cystine	1.47	Proline	5.44
Glutamic Acid	11.02	Serine	5.56
Glycine	4.94	Threonine	4.74
Histidine	2.87	Tryptophane	1.56
Isoleucine	5.06	Tyrosine	4.08
Leucine	9.47	Valine	6.09
ppm Cyanide in leaf	47		

Population 330

Proximate Analysis of Leaves
Percent per 100 gm

	As Received	Dry
Moisture	70.57	
Protein	9.31	31.63
Ether Extract†	3.68	12.50
Ash	2.01	6.83
Crude Fiber	1.28	4.35
Carbohydrates	13.15	44.68
Calories	123.00	417.70

Amino Acid Determination
Percent (16 gm Nitrogen Basis)

Alanine	5.22	Lysine	5.71
Arginine	5.30	Methionine	1.86
Aspartic Acid	9.44	Phenylalanine	5.29
Cystine	0.98	Proline	5.43
Glutamic Acid	9.42	Serine	4.51
Glycine	5.58	Threonine	4.49
Histidine	2.02	Tryptophane	2.19
Isoleucine	4.64	Tyrosine	3.71
Leucine	8.57	Valine	5.46
ppm Cyanide in leaf	42		

*Analysis made by Food and Drug Research Labs., Inc. Maspeth, Queens, Long Island, N.Y.
†Considered as fat for the calculation of caloric values.

Ap. I.
Tab. 34

111 14	450 .87 14	300 .81 14	244 .80 14	288 .80 14	225 .78 14	319 .78 14	456 .75 14	132 .74 14	454 .71 14	224 .68 14
112 17	123 .83 17	289 .83 18	124 .80 17	432 .80 17	128 .80 18	122 .76 16	448 .76 16	441 .74 16	131 .73 14	301 .73 19
114 14	132 .87 14	319 .83 14	131 .80 14	303 .80 14	124 .73 17	242 .68 14	300 .67 14	225 .63 14	416 .63 14	454 .63 14
116 19	293 .88 19	229 .87 19	365 .81 19	302 .80 19	121 .76 18	453 .76 17	458 .76 19	120 .73 15	125 .73 19	122 .73 16
119 19	125 .87 19	332 .83 18	298 .80 18	127 .80 18	365 .79 19	301 .76 19	406 .76 18	432 .76 16	128 .76 17	121 .76 18
120 15	122 .93 16	129 .89 15	134 .87 15	461 .84 15	121 .83 17	287 .83 15	299 .83 17	294 .83 15	128 .83 17	237 .83 15
121 18	128 .87 18	120 .83 15	122 .83 16	299 .80 18	378 .80 18	129 .80 15	293 .78 19	116 .76 19	289 .76 18	119 .76 19
122 16	120 .93 15	448 .87 16	229 .87 19	441 .85 16	432 .83 16	129 .83 15	128 .83 18	299 .83 18	121 .83 18	366 .81 18
123 17	112 .83 17	298 .80 18	127 .80 18	453 .76 17	301 .76 19	128 .76 18	119 .73 19	122 .73 16	271 .73 18	299 .73 18
124 17	112 .80 17	114 .73 14	301 .73 19	453 .73 17	229 .69 19	123 .69 17	298 .69 18	289 .69 18	293 .68 19	121 .67 18
125 19	119 .87 19	365 .86 19	293 .81 19	405 .80 19	458 .76 19	296 .76 18	116 .73 19	229 .73 19	127 .73 18	298 .73 18
126 18	127 .89 18	332 .87 18	271 .83 18	327 .80 18	378 .80 18	128 .80 18	298 .76 18	405 .76 19	299 .73 18	406 .73 18
127 18	271 .93 18	126 .89 18	332 .89 .5	298 .87 18	128 .83 18	299 .80 18	405 .80 19	123 .80 17	119 .80 19	296 .76 18
128 18	378 .93 18	299 .93 18	298 .89 18	289 .89 18	121 .87 18	461 .85 15	127 .83 18	134 .83 15	122 .83 16	271 .83 18
129 15	287 .93 15	294 .93 15	120 .89 15	291 .87 15	415 .83 15	122 .83 16	461 .82 15	128 .80 18	121 .80 18	293 .78 19
130 14	300 .83 14	131 .76 14	416 .73 14	224 .73 14	288 .72 14	244 .72 14	303 .69 14	134 .67 15	454 .67 14	111 .65 14
131 14	416 .83 14	303 .80 14	114 .80 14	130 .76 14	112 .73 17	132 .73 14	319 .69 14	288 .68 14	124 .67 17	300 .67 14
132 14	303 .93 14	114 .87 14	319 .83 14	300 .80 14	111 .74 14	450 .74 14	242 .74 14	131 .73 14	225 .69 14	244 .68 14
134 15	291 .89 15	120 .87 15	235 .87 15	128 .83 17	301 .83 18	299 .83 17	461 .81 15	448 .80 16	289 .80 17	302 .80 19
224 14	456 .87 14	300 .76 14	244 .75 14	288 .75 14	450 .75 14	120 .73 15	130 .73 14	441 .72 16	237 .69 15	303 .69 14
225 14	244 .85 14	319 .80 14	111 .78 14	242 .78 14	300 .76 14	454 .73 14	132 .69 14	302 .67 14	450 .65 14	288 .65 14
229 19	293 .88 19	122 .87 16	116 .87 19	365 .81 19	366 .81 18	120 .80 15	302 .80 19	301 .76 19	453 .76 17	129 .76 15
232 15	254 .92 15	237 .81 15	122 .78 16	415 .78 15	441 .77 16	120 .72 15	448 .72 16	240 .72 15	378 .71 17	134 .68 15
235 15	134 .87 15	301 .83 18	298 .80 17	120 .80 15	240 .80 15	302 .80 19	237 .76 15	458 .76 18	128 .76 17	299 .76 17
237 15	240 .83 15	120 .83 15	232 .81 15	287 .80 15	122 .76 16	235 .76 15	134 .76 15	415 .76 15	441 .74 16	129 .73 15
240 15	237 .83 15	406 .83 17	120 .80 15	134 .80 15	235 .80 15	301 .76 18	287 .76 15	254 .75 15	122 .73 16	229 .73 18
242 14	303 .81 14	244 .80 14	225 .78 14	132 .74 14	450 .73 14	319 .72 14	114 .68 14	300 .68 14	131 .68 14	289 .65 18
244 14	300 .88 14	225 .85 14	242 .80 14	450 .80 14	111 .80 14	454 .78 14	224 .75 14	456 .75 14	303 .74 14	288 .73 14
254 15	232 .92 15	134 .78 15	240 .75 15	415 .75 15	122 .75 16	448 .75 16	301 .74 18	378 .74 17	493 .72 17	237 .71 15
271 18	298 .93 18	127 .93 18	332 .83 18	126 .83 18	128 .83 18	296 .83 18	366 .81 18	443 .80 18	299 .80 18	293 .78 19

15

xmxmxmxmxmxmxmxmxxmm

286 15	461 .82 15	294 .80 15	366 .79 17	120 .76 15	445 .76 17	129 .73 15	444 .73 15	293 .72 18	298 .69 17	122 .69 16
287 15	129 .93 15	415 .89 15	294 .87 15	466 .84 15	120 .83 15	378 .80 17	444 .80 15	237 .80 15	291 .80 15	240 .76 15
288 14	459 .80 14	111 .80 14	416 .78 14	454 .78 14	224 .75 14	300 .74 14	244 .73 14	319 .72 14	130 .72 14	448 .68 16
289 18	123 .89 18	299 .89 18	378 .83 18	112 .83 17	298 .80 18	448 .80 16	134 .80 15	122 .80 16	120 .80 15	493 .80 18
291 15	134 .89 15	129 .87 15	294 .80 15	287 .80 15	128 .80 17	301 .80 18	458 .80 16	461 .78 15	302 .76 19	235 .76 15
293 19	458 .88 19	116 .88 19	229 .88 19	298 .84 18	302 .84 19	365 .84 19	128 .82 18	125 .81 19	129 .78 15	296 .78 18
294 15	129 .93 15	287 .87 15	120 .83 15	291 .80 15	286 .80 15	415 .76 15	122 .76 16	461 .75 15	128 .73 18	121 .73 18
296 18	443 .89 18	406 .87 18	366 .86 18	271 .83 18	332 .80 18	293 .78 19	298 .76 18	119 .76 18	127 .76 18	125 .76 19
298 18	271 .93 18	128 .89 18	127 .87 18	299 .87 18	293 .84 19	378 .83 18	301 .83 19	458 .83 19	289 .80 18	235 .80 15
299 18	128 .93 18	289 .89 18	378 .87 18	298 .87 18	134 .83 15	122 .83 16	120 .83 15	493 .83 18	127 .80 18	121 .80 18
300 14	244 .88 14	303 .87 14	130 .83 14	454 .83 14	111 .81 14	450 .81 14	132 .80 14	225 .76 14	319 .76 14	224 .76 14
301 19	458 .87 19	298 .83 18	235 .83 15	302 .83 19	134 .83 15	432 .80 16	332 .80 18	291 .80 15	128 .80 18	366 .79 18
302 19	458 .96 19	293 .84 19	301 .83 19	116 .80 19	235 .80 15	298 .80 18	229 .80 19	134 .80 15	299 .76 18	291 .76 15
303 14	132 .93 14	300 .87 14	450 .81 14	242 .81 14	114 .80 14	131 .80 14	319 .76 14	244 .74 14	224 .69 14	130 .69 14
316 19	119 .67 19	126 .63 18	129 .63 15	287 .63 15	291 .63 15	332 .63 18	406 .63 18	432 .63 16	240 .60 15	125 .60 19
319 14	114 .83 14	132 .83 14	225 .80 14	454 .80 14	450 .78 14	111 .78 14	300 .76 14	303 .76 14	416 .73 14	244 .72 14
327 18	126 .80 18	271 .76 18	366 .71 18	127 .69 18	289 .69 18	298 .69 18	443 .69 18	329 .68 19	378 .67 18	406 .67 18
329 19	365 .69 19	125 .68 19	327 .68 18	405 .65 19	289 .65 18	302 .65 19	441 .62 16	126 .61 18	293 .61 19	458 .61 19
332 18	127 .89 18	126 .87 18	271 .83 18	119 .83 19	406 .80 18	296 .80 18	301 .80 19	128 .80 18	458 .80 19	405 .76 19
365 19	125 .86 19	293 .84 19	116 .81 19	229 .81 19	119 .79 19	299 .79 18	120 .74 15	302 .74 19	445 .74 18	122 .74 16
366 18	296 .86 18	229 .81 19	443 .81 18	445 .81 18	271 .81 18	122 .81 16	301 .79 19	286 .79 15	406 .79 18	293 .77 19
378 18	128 .93 18	493 .89 18	299 .87 18	444 .87 15	289 .83 18	298 .83 18	287 .80 15	126 .80 18	121 .80 18	461 .78 15
405 19	125 .80 19	127 .80 18	126 .76 18	332 .76 18	271 .73 18	296 .69 18	378 .69 18	406 .69 18	458 .69 19	119 .67 19
406 18	296 .87 18	240 .83 15	332 .80 18	366 .79 18	119 .76 19	271 .76 18	443 .76 18	126 .73 18	378 .73 18	301 .73 19
415 15	287 .89 15	129 .83 15	466 .82 15	120 .80 15	232 .78 15	294 .76 15	237 .76 15	254 .75 15	122 .73 16	240 .73 15
416 14	131 .83 14	288 .78 14	130 .73 14	319 .73 14	450 .72 14	112 .69 17	224 .67 14	454 .67 14	456 .67 14	300 .63 14
432 16	448 .96 16	441 .88 16	122 .83 16	112 .80 17	301 .80 19	134 .76 15	120 .76 15	289 .76 18	119 .76 19	121 .73 18
441 16	448 .92 16	432 .88 16	122 .85 16	120 .78 15	289 .78 18	232 .77 15	237 .74 15	112 .74 17	235 .72 15	134 .72 15
443 18	296 .89 18	366 .81 18	271 .80 18	406 .76 18	119 .73 19	127 .73 18	125 .73 19	298 .73 18	445 .73 18	286 .69 15

444 15	461 .92 15	466 .88 15	378 .87 17	128 .80 17	287 .80 15	120 .76 15	134 .76 15	493 .76 17	129 .73 15	237 .73 15
445 18	366 .81 18	120 .80 15	461 .78 15	286 .76 15	365 .74 19	127 .73 18	122 .73 16	443 .73 18	129 .69 15	126 .69 18
448 16	432 .96 16	441 .92 16	122 .87 16	134 .80 15	289 .80 17	120 .80 15	112 .76 17	301 .76 18	254 .75 15	119 .73 19
450 14	111 .87 14	456 .82 14	303 .81 14	300 .81 14	244 .80 14	288 .80 14	319 .78 14	224 .75 14	132 .74 14	242 .73 14
453 17	116 .76 17	123 .76 17	229 .76 19	293 .75 19	124 .73 17	112 .73 17	301 .73 19	458 .73 19	366 .71 18	271 .69 18
454 14	300 .83 14	319 .80 14	244 .78 14	288 .78 14	225 .73 14	111 .72 14	450 .72 14	303 .69 14	130 .67 14	416 .67 14
456 14	224 .87 14	450 .82 14	300 .76 14	111 .75 14	244 .75 14	303 .69 14	288 .68 14	454 .67 14	416 .67 14	319 .67 14
458 19	302 .96 19	293 .88 19	301 .87 19	298 .83 18	128 .80 18	332 .80 18	291 .80 15	119 .76 19	116 .76 19	271 .76 18
461 15	444 .92 15	128 .85 18	120 .84 15	466 .83 15	286 .82 15	129 .82 15	134 .81 15	291 .78 15	299 .78 18	378 .78 18
466 15	444 .88 15	287 .84 15	461 .83 15	415 .82 15	129 .78 15	120 .75 15	378 .74 17	291 .74 15	134 .72 15	493 .72 18
493 18	378 .89 18	128 .83 18	299 .83 18	289 .80 18	444 .76 15	121 .76 18	120 .73 15	134 .73 15	122 .73 16	298 .73 18

Appendix II

TABLE OF COLLECTING LOCALITIES

Specimen #	Country	State, locality, soils	Origin of specimens
73 to 136	Jamaica	Parish of St. Catherine, Bodles Expt. Sta., 6 mi. W. of Old Harbor. Soils heavy, plastic, high pH. Irrigated land.	Cultivars from farms and other expt. stations throughout the island.
221 to 254	Costa Rica	Turrialba, grounds of Inter-American Inst. of Agric. Sci. Soils of volcanic origin.	Cultivars from Costa Rica and neighboring countries.
256 to 303	Jamaica	Same locality as above.	Cultivars represent replanting of collections made previous year.
312 to 321	Jamaica	Same locality.	Plants sampled 3 years later to test stability.
323 to 333	Brazil	Pará, Belem, Inst. Agron. do Norte. Soils sandy.	Cultivars from various localities in the Amazon Basin.
365 to 370	Brazil	Minas Geraes, Sete Lagoas, Fed. Expt. Sta. Soils red laterite.	Local cultivars.
376 to 380	Brazil	Pernambuco, Vitoria, Cedro Expt. Sta. Soils sandy to clay, red and yellow.	Local cultivars.
387 to 393	Brazil	Pernambuco, També, State Expt. Sta. Coastal-zone sandy-loam.	General collection of NE Brazilian cultivars.
405 to 406	Brazil	Pernambuco, Araripina Expt. Sta. Deep, dry, sand. Area called "chapada."	Cultivars represent area of extreme dryness, near desert conditions.
415 to 424	Bolivia	Dept. La Paz, Nor Yungas, Caranavi. River terraces, soils deep, rich.	General cultivars of area.
432 to 434	Bolivia	Dept. Santa Cruz, Quatro Ojitos, 90 km. N. of Santa Cruz, Colonial settlement.	Local cultivars.
436	Bolivia	Dept. Santa Cruz, Paichanetu, 40 km. N. of Santa Cruz. Soils sandy.	Single, local cultivar.

Appendix II

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TABLE OF COLLECTING LOCALITIES

Specimen #	Country	State, locality, soils	Origin of specimens
438 to 442	Bolivia	Dept. Santa Cruz, LaGuardia, 15 km. S. of Santa Cruz. Flat land, sandy soil.	Local cultivars.
443 to 451	Bolivia	Dept. Beni, Riberalta, Expt. Sta. of the Tropics. Soils plastic, lateritic, sand or clay.	Locally occurring cultivars.
452 to 466	Peru	Dept. Huanuco, Tingo Maria, Expt. Sta. and surrounding farms. Soils various.	Imported and local cultivars.
469 to 472	Peru	Dept. Loreto, Pucallpa. Low flatland. Soils red lateritic.	Locally occurring cultivars.
475 to 478 d/	Peru	Dept. Loreto, Caco (Conibo Indian village) ca. 75 mi. S. of Pucallpa, on Ucayali River. Soils on river terrace with annual innundation.	Locally occurring cultivars.
480 to 482 d/	Peru	Dept. Loreto, Chicosa (Campa Indian mission, Summer Inst. of Linguistics) ca. 175 mi. S. of Pucallpa on Ucayali River.	Locally occurring cultivars.
483 to 488	Peru	Dept. Loreto, Iquitos and vicinity, along the Amazon River.	Locally occurring cultivars.
490 to 493	Brazil	Amazonas, 8 km. NE of Manaus, Colonia Santa Antonio. Soils sandy.	Locally occurring cultivars.

Legends for Tables

1. List of characters and character states of M. esculenta used in this study.
2. Tabulation of relationship between surface condition of root and external root color.
3. Tabulation of relationship between surface condition of root and mature stem color.
4. Specimen descriptions for Group 1.
5. Proximate and amino acid analysis for populations (specimens) 320, 322 and 330, Group 1.
6. Specimen descriptions for Group 2.
7. Specimen descriptions for Group 3.
8. Proximate and amino acid analysis for populations (specimens) 312, Group 3.
9. Specimen descriptions for Group 4.
10. Specimen descriptions for Group 5.
11. Specimen descriptions for Group 6.
12. Specimen descriptions for Group 7.
13. Proximate and amino acid analysis for population (specimen) 315, Group 7.
14. Specimen descriptions for Group 8.
15. Specimen descriptions for Group 9.
16. Proximate and amino acid analysis for populations (specimens) 313, Group 9.
17. Specimen descriptions for Group 10.
18. Proximate and amino acid analysis for populations (specimens) 323, Group 10.
19. Specimen descriptions for Group 11.
20. Broximate and amino acid analysis for populations (specimens) 321, Group 11.
21. Specimen descriptions for Group 12.
22. Specimen descriptions for Group 13.
23. Proximate and amino acid analysis for populations (specimens) 326, 328, and 331, Group 13.

Legends for Tables (cont)

24. Specimen descriptions for Group 14.

25. Proximate and amino acid analysis for population (specimen) 319, Group 14.

26. Specimen descriptions for Group 15.

27. Specimen descriptions for Group 16.

28. Specimen descriptions for Group 17,

29. Specimen descriptions for Group 18.

30. Proximate and amino acid analysis for populations (specimens) 318 and 327, Group 18.

31. Specimen description for group 19.

32. Proximate and amino acid analysis for populations (specimens) 316 and 329, Group 19.

33. Appendix I. Sequence of specimen similarities for nearest ten specimens. Specimens of rough rooted cultivars are listed sequentially in the first column in this table. Smooth rooted cultivars are together in Table 34. In this table, one may discover the nearest ten most closely related cultivars, the similarity for each, and the group assignment of each of the related specimens.

34. Appendix I. Sequence of specimen similarities for nearest ten specimens. Specimens of smooth rooted cultivars are listed sequentially in the first column in this table. Rough rooted cultivars are together in Table 33. In this tabde, one may discover the nearest ten most closely related cultivars, the similarity for each, and the group assignment of each of the related specimens.

35. Appendix II. Collecting localities of specimens employed in this study.

APPENDIX I

TABLE 33

ROUGH-ROOTED CULTIVARS GROUPS 1 TO 13 INC.

SEQUENCE OF OBJECT SIMILARITIES FOR NEAREST TEN OBJECTS

Object compared	Group Assgnmt.	Object	Similarity	Group Assgnmt.	Object	Similarity	Group Assgnmt.	Object	Similarity	Group Assgnmt.	Object	Similarity	Group Assgnmt.	Object	Similarity	Group Assgnmt.	Object	Similarity	Group Assgnmt.	Object	Similarity	Group Assgnmt.	Object	Similarity	Group Assgnmt.
73	9	76	.93	9	256	.93	9	77	.88	9	74	.87	9	272	.87	8	266	.83	9	313	.83	9	472	.81	11
74	9	76	.93	9	77	.88	9	73	.87	9	256	.87	9	272	.87	8	266	.83	9	313	.83	9	236	.80	7
76	9	77	.94	9	73	.93	9	74	.93	9	272	.93	8	313	.89	9	256	.87	9	490	.87	8	314	.87	9
77	9	76	.94	9	313	.92	9	73	.88	9	74	.88	9	490	.88	8	272	.88	8	472	.87	11	78	.85	9
78	9	77	.85	9	76	.83	9	279	.80	9	313	.80	9	73	.76	9	81	.76	11	74	.76	9	105	.76	6
79	11	258	.88	11	264	.88	11	420	.88	11	472	.87	11	102	.85	11	266	.85	9	260	.85	1	312	.85	3
80	10	323	.89	10	98	.87	10	257	.87	11	109	.87	10	325	.87	10	420	.87	11	89	.83	10	266	.83	9
81	11	102	.89	11	320	.89	1	105	.87	6	108	.87	1	282	.87	6	93	.83	1	284	.83	1	313	.83	9
82	5	101	.98	5	83	.95	5	277	.94	5	97	.93	3	103	.92	3	91	.88	5	268	.88	1	282	.88	6
83	5	82	.95	5	101	.93	5	91	.93	5	268	.93	1	282	.93	6	260	.89	1	277	.89	5	97	.88	3
84	13	273	.81	13	261	.80	13	462	.75	13	276	.73	13	247	.72	13	246	.72	13	419	.72	13	451	.72	13
88	6	226	.87	6	91	.80	5	135	.80	6	263	.80	6	269	.80	6	330	.80	1	282	.80	6	388	.80	4
89	10	265	.87	10	376	.87	2	442	.87	11	80	.83	10	98	.83	10	109	.83	10	94	.83	2	325	.83	10
90	1	264	.87	1	377	.87	1	393	.85	3	260	.83	1	312	.83	3	487	.83	1	79	.81	11	91	.80	5
91	5	83	.93	5	264	.93	1	312	.89	3	82	.88	5	243	.88	3	101	.87	5	268	.87	1	282	.87	6

Object	Similarity	Group Assgnmt.
83	.80	5
314	.80	9
78	.83	9
106	.85	7
272	.76	8
377	.84	1
321	.83	11
321	.83	11
270	.85	6
264	.87	1
331	.68	13
270	.78	6
323	.80	10
109	.80	10
260	.83	1

APPENDIX I

TABLE 33

ROUGH-ROOTED CULTIVARS GROUPS 1 TO 13 INC.

SEQUENCE OF OBJECT SIMILARITIES FOR NEAREST TEN OBJECTS

Object compared	Group Assgnmnt.	Object	Similarity	Group Assgnmnt.	Object	Similarity	Group Assgnmnt.	Object	Similarity	Group Assgnmnt.	Object	Similarity	Group Assgnmnt.	Object	Similarity	Group Assgnmnt.	Object	Similarity	Group Assgnmnt.	Object	Similarity	Group Assgnmnt.	Object	Similarity	Group Assgnmnt.
92	7	106	.98	7	379	.96	7	103	.89	3	295	.89	7	97	.88	3	118	.87	11	284	.87	1	464	.87	5	483	.87	3	234	.83	7
93	1	260	.93	1	320	.93	1	268	.89	1	282	.89	6	279	.87	9	284	.87	1	487	.87	1	108	.83	1	264	.83	1	98	.83	10
94	2	376	.96	2	136	.87	5	278	.87	2	260	.83	1	89	.83	10	438	.83	10	452	.82	5	472	.81	11	98	.80	10	490	.80	8
95	6	269	.94	6	270	.89	6	263	.88	6	96	.81	6	105	.81	6	222	.81	2	226	.81	6	267	.81	2	135	.81	6	136	.81	5
96	6	105	.87	6	274	.87	7	477	.87	6	312	.83	3	320	.83	1	95	.81	6	226	.80	6	108	.80	1	136	.80	5	263	.80	6
97	3	103	.98	3	82	.93	5	101	.92	5	106	.89	7	83	.88	5	268	.88	1	315	.88	7	295	.88	7	92	.88	7	243	.88	7
98	10	260	.89	1	80	.87	10	109	.87	10	490	.87	8	268	.87	1	420	.87	11	89	.83	10	93	.83	1	313	.83	9	279	.83	7
99	13	276	.96	13	247	.88	13	270	.76	13	263	.74	13	95	.73	13	273	.72	13	380	.72	13	84	.69	13	246	.68	13	136	.68	
100	8	480	.87	8	490	.83	8	272	.83	8	274	.83	7	457	.83	7	477	.83	6	241	.81	7	266	.80	9	312	.80	3	77	.78	
101	5	82	.98	5	277	.96	5	103	.93	3	83	.93	5	97	.92	3	91	.87	5	249	.87	5	282	.87	6	268	.87	6	387	.87	
102	11	321	.93	11	313	.93	9	115	.92	11	81	.89	11	420	.89	11	260	.87	1	118	.87	11	312	.87	3	320	.87	1	77	.85	
103	3	97	.98	3	101	.93	5	82	.92	5	92	.89	7	284	.89	1	277	.89	5	483	.89	3	106	.88	7	83	.87	5	268	.87	
104	7	295	.93	7	234	.87	7	105	.87	6	272	.87	8	315	.87	7	278	.87	2	274	.87	7	106	.84	7	118	.83	11	92	.83	
105	6	263	.93	6	295	.93	7	270	.92	6	320	.89	1	81	.87	11	96	.87	6	104	.87	7	135	.87	6	269	.87	6	274	.87	
106	7	92	.98	7	379	.94	7	295	.91	7	97	.89	3	118	.88	11	103	.88	3	77	.85	9	115	.85	11	284	.85	1	464	.85	

APPENDIX I

TABLE 33

ROUGH-ROOTED CULTIVARS GROUPS 1 TO 13 INC.

SEQUENCE OF OBJECT SIMILARITIES FOR NEAREST TEN OBJECTS

Object Compared	Group Assgnmt.	Object	Similarity	Group Assgnmt.	Object	Similarity	Group Assgnmt.	Object	Similarity	Group Assgnmt.	Object	Similarity	Group Assgnmt.	Object	Similarity	Group Assgnmt.	Object	Similarity	Group Assgnmt.	Object	Similarity	Group Assgnmt.	Object	Similarity	Group Assgnmt.
108	1	320	.89	1	115	.88	11	81	.87	11	102	.83	11	118	.83	11	93	.83	1	284	.83	1	96	.80	6	105	.80	6	282	.80	6
109	10	80	.87	10	98	.87	10	89	.83	10	266	.83	9	442	.83	11	258	.80	11	90	.80	1	265	.80	10	264	.80	1	490	.80	8
110	6	270	.78	6	387	.78	5	263	.75	6	135	.68	6	105	.68	6	269	.68	6	282	.68	6	95	.68	6	280	.67	2	82	.67	5
115	11	102	.92	11	118	.92	11	108	.88	1	97	.88	3	260	.85	1	106	.85	7	312	.85	3	313	.85	9	320	.85	1	321	.85	11
118	11	115	.92	11	295	.89	7	106	.88	6	92	.87	7	102	.87	11	321	.87	11	77	.85	9	472	.85	11	108	.83	1	105	.83	6
135	6	226	.93	6	263	.93	6	270	.92	6	105	.87	6	269	.87	6	282	.87	6	477	.87	6	95	.81	6	88	.80	6	136	.80	5
136	5	263	.87	6	94	.87	2	83	.87	5	490	.87	8	295	.87	7	278	.87	2	379	.87	7	270	.85	6	106	.84	7	118	.83	11
221	3	470	.76	3	97	.75	3	393	.74	3	83	.73	5	103	.73	3	268	.73	1	315	.73	7	295	.73	7	312	.69	3	320	.69	1
222	2	278	.88	2	267	.87	2	227	.84	7	436	.84	10	106	.83	7	264	.82	1	236	.82	7	268	.82	1	274	.82	7	269	.82	6
226	6	135	.93	6	477	.93	6	88	.87	7	263	.87	6	269	.87	6	270	.85	6	95	.81	6	96	.80	6	91	.80	5	105	.80	6
227	7	236	.89	7	222	.84	2	267	.84	2	239	.83	7	278	.83	2	452	.82	5	464	.80	5	470	.80	3	280	.78	2	249	.76	5
231	5	277	.87	5	249	.83	5	101	.83	5	82	.81	5	470	.80	3	83	.76	5	103	.76	3	115	.75	11	97	.74	3	488	.73	9
233	3	393	.85	3	274	.83	7	243	.78	3	104	.76	7	239	.76	7	295	.76	7	90	.73	5	96	.73	6	312	.73	3	492	.72	9
234	7	104	.87	7	92	.83	7	106	.81	7	103	.80	3	295	.80	7	379	.80	7	387	.80	5	465	.80	7	97	.78	3	118	.76	11
236	7	227	.89	7	295	.87	7	274	.87	7	469	.87	7	241	.85	7	470	.83	3	267	.82	2	222	.82	2	74	.80	6	105	.80	6

TABLE 33

ROUGH-ROOTED CULTIVARS GROUPS 1 TO 13 INC.

SEQUENCE OF OBJECT SIMILARITIES FOR NEAREST TEN OBJECTS

Object compared	Group Assgnmnt.	Object	Similarity	Group Assgnmnt.	Object	Similarity	Group Assgnmnt.	Object	Similarity	Group Assgnmnt.	Object	Similarity	Group Assgnmnt.	Object	Similarity	Group Assgnmnt.	Object	Similarity	Group Assgnmnt.	Object	Similarity	Group Assgnmnt.	Object	Similarity	Group Assgnmnt.
238	7	457	.75	7	469	.75	7	241	.73	7	477	.72	6	236	.72	7	239	.72	7	104	.72	7	274	.72	7	465	.68	7	234	.68	7
239	7	447	.88	7	227	.83	7	236	.80	7	264	.80	1	274	.80	7	278	.80	2	469	.80	7	465	.80	7	241	.78	7	233	.76	3
241	7	469	.88	7	236	.85	7	272	.85	11	274	.85	7	100	.81	8	256	.78	9	74	.78	6	76	.78	9	239	.78	7	490	.78	8
243	3	393	.93	3	312	.92	3	483	.88	3	97	.88	3	91	.88	5	264	.88	1	274	.88	7	470	.85	3	103	.84	3	389	.84	4
246	13	261	.78	13	83	.73	5	331	.73	13	419	.73	13	460	.73	13	84	.72	13	276	.72	13	478	.69	13	273	.69	13	380	.69	13
247	13	276	.92	13	99	.88	13	269	.80	6	95	.74	6	263	.73	6	84	.72	13	261	.72	13	270	.72	6	282	.67	6	105	.67	6
249	5	464	.89	5	101	.87	5	387	.87	5	465	.87	7	469	.87	7	82	.85	5	280	.85	2	452	.85	5	92	.83	7	231	.83	5
250	4	389	.76	4	388	.76	4	483	.73	3	234	.69	7	252	.69	4	486	.67	1	312	.67	3	284	.67	1	438	.67	11	368	.65	12
252	4	389	.93	4	469	.87	7	483	.83	3	103	.80	3	388	.80	4	392	.80	4	97	.78	3	243	.78	3	368	.77	12	284	.76	1
256	9	73	.93	9	266	.89	9	76	.87	9	74	.87	9	77	.81	9	492	.81	9	258	.80	11	91	.80	5	274	.80	7	272	.80	8
257	11	258	.93	11	321	.89	11	472	.87	11	80	.87	10	268	.87	11	278	.87	2	315	.87	7	420	.87	11	260	.83	1	102	.83	11
258	11	257	.93	11	79	.88	11	264	.87	11	266	.83	9	321	.83	11	472	.81	11	80	.80	10	91	.80	5	109	.80	10	256	.80	9
260	1	268	.96	1	93	.93	1	98	.89	10	83	.89	5	264	.89	1	278	.89	2	420	.89	11	102	.87	11	312	.87	3	320	.87	1
261	13	331	.82	13	84	.80	13	246	.78	13	419	.78	13	451	.78	13	380	.74	13	247	.72	13	328	.71	13	273	.68	13	276	.67	12
263	6	270	.98	6	135	.93	6	105	.93	6	269	.93	6	282	.93	6	95	.88	6	226	.87	6	136	.87	5	83	.87	5	278	.87	2

APPENDIX I

TABLE 33

ROUGH-ROOTED CULTIVARS GROUPS 1 TO 13 INC.

SEQUENCE OF OBJECT SIMILARITIES FOR NEAREST TEN OBJECTS

Object compared	Group Assgnmnt.	Object	Similarity	Group Assgnmnt.	Object	Similarity	Group Assgnmnt.	Object	Similarity	Group Assgnmnt.	Object	Similarity	Group Assgnmnt.	Object	Similarity	Group Assgnmnt.	Object	Similarity	Group Assgnmnt.	Object	Similarity	Group Assgnmnt.	Object	Similarity	Group Assgnmnt.
264	1	268	.93	1	91	.93	5	260	.89	1	312	.89	3	487	.89	1	243	.88	3	79	.88	11	258	.87	11	90	.87	1	83	.87	5
265	10	89	.87	10	476	.82	12	80	.80	10	98	.80	10	109	.80	10	442	.80	11	390	.78	12	257	.76	11	272	.76	8	315	.76	7
266	9	256	.89	9	79	.85	11	77	.85	9	472	.85	11	80	.83	10	258	.83	11	109	.83	10	76	.83	9	74	.83	9	73	.83	9
267	2	280	.93	2	222	.87	2	227	.84	7	236	.82	7	269	.82	6	95	.81	6	447	.81	7	464	.81	5	452	.80	5	249	.78	5
268	1	260	.96	1	83	.93	5	264	.93	11	278	.93	2	93	.89	1	82	.88	5	97	.88	3	91	.87	5	103	.87	3	257	.87	11
269	6	95	.94	6	263	.93	6	270	.92	6	105	.87	6	135	.87	6	226	.87	6	282	.87	6	267	.82	2	222	.82	2	83	.80	5
270	6	263	.98	6	105	.92	6	269	.92	6	282	.92	6	135	.92	6	95	.89	6	82	.85	5	280	.85	2	226	.85	7	278	.85	2
272	8	490	.93	8	76	.93	9	295	.93	7	77	.88	9	104	.87	7	274	.87	7	278	.87	2	315	.87	7	105	.87	6	74	.87	9
273	13	84	.81	13	380	.80	13	419	.76	13	99	.72	13	246	.69	13	261	.68	13	276	.68	13	320	.67	1	328	.67	13	451	.63	13
274	7	295	.93	7	312	.89	3	243	.88	3	96	.87	6	105	.87	6	272	.87	8	264	.87	1	278	.87	2	315	.87	7	236	.87	7
276	13	99	.96	13	247	.92	13	270	.80	6	263	.78	6	84	.73	13	282	.72	6	135	.72	6	105	.72	6	246	.72	13	269	.72	6
277	5	101	.96	5	82	.94	5	103	.89	3	83	.89	5	97	.88	3	231	.87	5	282	.83	6	249	.83	5	268	.83	1	91	.83	5
278	2	268	.93	1	295	.93	7	260	.89	1	376	.89	2	222	.88	2	472	.88	11	94	.87	2	274	.87	7	272	.87	8	264	.87	1
279	9	313	.87	9	93	.87	1	81	.82	11	98	.83	10	80	.83	10	420	.83	11	433	.83	10	434	.81	12	102	.80	11	78	.80	11
280	2	267	.93	2	464	.88	5	452	.87	5	249	.85	5	270	.85	6	105	.82	6	278	.82	2	263	.82	6	447	.81	7	222	.80	2

APPENDIX I

TABLE 33

ROUGH-ROOTED CULTIVARS GROUPS 1 TO 13 INC.

SEQUENCE OF OBJECT SIMILARITIES FOR NEAREST TEN OBJECTS

Object Compared	Group Assgnmt.	Object	Similarity	Group Assgnmt.	Object	Similarity	Group Assgnmt.	Object	Similarity	Group Assgnmt.	Object	Similarity	Group Assgnmt.	Object	Similarity	Group Assgnmt.	Object	Similarity	Group Assgnmt.	Object	Similarity	Group Assgnmt.	Object	Similarity	Group Assgnmt.
282	6	263	.93	6	83	.93	5	270	.92	6	93	.89	7	320	.89	1	82	.88	5	135	.87	6	269	.87	6	268	.87	1	105	.87	11
284	1	320	.93	1	103	.89	3	97	.88	3	93	.87	1	92	.87	7	483	.87	3	106	.85	7	105	.83	6	101	.83	5	282	.83	6
295	7	274	.93	7	105	.93	6	278	.93	2	272	.93	8	104	.93	7	315	.93	7	106	.91	7	92	.89	7	118	.89	11	97	.88	3
312	3	483	.93	3	243	.92	2	91	.89	5	274	.89	7	264	.89	1	102	.87	11	260	.87	1	320	.87	1	487	.87	1	115	.85	11
313	9	102	.93	11	77	.92	9	76	.89	9	488	.87	9	279	.87	9	321	.87	11	115	.85	11	490	.83	8	81	.83	11	98	.83	10
314	9	76	.87	9	321	.83	11	313	.83	9	77	.81	9	80	.80	10	74	.80	9	73	.80	9	315	.80	7	257	.80	11	272	.80	8
315	7	295	.93	7	321	.89	11	97	.88	3	105	.87	6	104	.87	7	274	.87	7	278	.87	2	272	.87	8	268	.87	1	257	.87	11
320	1	93	.93	1	284	.93	1	108	.89	1	282	.89	6	105	.89	6	81	.89	11	322	.87	3	260	.87	1	102	.87	11	115	.85	11
321	11	102	.93	11	257	.89	11	315	.89	7	118	.87	11	313	.87	9	77	.85	9	115	.85	11	472	.85	11	81	.82	11	80	.83	10
323	10	442	.93	10	482	.92	10	80	.89	10	433	.89	10	257	.83	11	77	.82	9	472	.82	11	436	.81	10	434	.81	12	488	.80	9
325	10	80	.87	10	89	.83	10	434	.78	12	279	.76	9	323	.76	10	78	.76	11	482	.74	10	94	.73	2	98	.73	10	109	.73	10
326	13	451	.80	13	475	.73	13	446	.72	13	328	.69	3	380	.69	13	478	.67	13	419	.67	13	261	.65	13	273	.63	13	94	.60	2
328	13	331	.83	13	380	.73	13	261	.71	13	326	.69	13	451	.69	13	273	.67	13	84	.64	13	419	.63	13	438	.60	10	462	.56	13
330	1	486	.83	1	476	.81	12	88	.80	6	436	.79	10	370	.77	12	438	.76	10	487	.76	1	482	.74	10	258	.73	11	264	.73	1
331	13	328	.83	13	261	.82	13	246	.73	13	419	.73	13	380	.69	13	84	.68	13	475	.67	13	451	.67	13	433	.67	10	442	.63	10

APPENDIX I

TABLE 33

ROUGH-ROOTED CULTIVARS GROUPS 1 TO 13 INC.

SEQUENCE OF OBJECT SIMILARITIES FOR NEAREST TEN OBJECTS

Group Assgnmt.	Object	Similarity	Group Assgnmt.	Object	Similarity	Group Assgnmt.	Object	Similarity	Group Assgnmt.	Object	Similarity	Group Assgnmt.	Object	Similarity	Group Assgnmt.	Object	Similarity	Group Assgnmt.	Object	Similarity	Group Assgnmt.	Object	Similarity	Group Assgnmt.
33 4	424	.76	4	268	.76	1	388	.76	4	93	.73	1	376	.73	2	94	.73	2	260	.73	1	455	.73	4	438	.73	10	368	.72	12
68 12	370	.92	12	421	.92	12	101	.85	5	389	.85	4	103	.85	3	268	.85	1	433	.85	10	434	.85	12	82	.83	5	97	.83	3
69 12	476	.75	12	484	.72	12	392	.72	4	370	.72	12	265	.69	10	465	.65	7	103	.65	3	252	.65	4	221	.65	3	314	.65	9
70 12	368	.92	12	442	.88	10	421	.85	12	436	.85	10	390	.82	12	323	.80	10	482	.80	10	476	.78	12	315	.77	7	101	.77	5
76 2	94	.96	2	278	.89	2	89	.87	10	260	.87	1	438	.87	10	472	.85	11	136	.83	5	295	.83	7	268	.83	1	106	.82	7
77 1	486	.89	1	483	.89	3	264	.87	1	90	.87	1	79	.84	11	312	.83	3	260	.83	1	438	.83	10	487	.83	1	243	.82	3
79 7	92	.96	7	106	.94	7	490	.87	8	103	.87	3	295	.87	7	136	.87	5	97	.85	3	452	.85	5	284	.83	1	118	.83	11
80 13	273	.80	13	419	.76	13	261	.74	13	260	.73	1	328	.73	13	376	.73	2	438	.73	10	99	.72	13	94	.69	2	246	.69	13
87 5	249	.87	5	101	.87	5	82	.85	5	277	.83	5	92	.83	7	270	.82	6	106	.81	7	295	.80	7	278	.80	2	379	.80	7
88 4	424	.87	4	389	.87	4	312	.83	3	243	.81	3	88	.80	6	91	.80	5	252	.80	4	274	.80	7	264	.80	1	477	.80	6
89 4	252	.93	4	483	.89	3	103	.87	3	388	.87	4	97	.85	3	368	.85	12	243	.84	3	312	.83	3	284	.83	1	486	.83	1
90 12	476	.85	12	370	.82	12	268	.81	1	315	.81	7	278	.81	2	257	.81	11	391	.80	12	93	.78	1	260	.78	1	265	.78	10
91 12	390	.80	12	376	.78	2	89	.78	10	484	.78	12	438	.75	10	94	.74	2	476	.72	12	93	.72	1	260	.72	1	455	.72	6
92 4	252	.80	4	389	.80	4	469	.80	7	483	.76	3	103	.73	3	274	.73	7	315	.73	7	330	.73	1	457	.73	7	484	.73	12
93 3	243	.93	3	90	.85	1	312	.85	3	233	.85	3	483	.82	3	91	.81	5	274	.81	7	264	.81	1	97	.81	3	470	.78	3

APPENDIX I

TABLE 33

ROUGH-ROOTED CULTIVARS GROUPS 1 TO 13 INC.

SEQUENCE OF OBJECT SIMILARITIES FOR NEAREST TEN OBJECTS

compared	Group Assgnmnt.	Object	Similarity	Group Assgnmnt.	Object	Similarity	Group Assgnmnt.	Object	Similarity	Group Assgnmnt.	Object	Similarity	Group Assgnmnt.	Object	Similarity	Group Assgnmnt.	Object	Similarity	Group Assgnmnt.	Object	Similarity	Group Assgnmnt.	Object	Similarity	Group Assgnmnt.
417	7	457	.73	7	256	.72	9	480	.68	8	100	.68	5	387	.67	5	226	.67	6	73	.65	9	492	.63	9	238	.62	7	266	.61	9
419	13	451	.80	13	261	.78	13	273	.76	13	380	.76	13	246	.73	13	331	.73	13	84	.72	13	99	.68	13	475	.67	13	326	.67	13
420	11	102	.89	11	260	.89	11	79	.88	11	472	.88	11	268	.87	1	257	.87	11	98	.87	10	80	.87	10	279	.83	1	93	.83	9
421	12	368	.92	12	370	.85	12	103	.73	3	101	.73	5	268	.73	1	389	.73	4	433	.73	10	434	.73	2	82	.72	5	97	.72	3
424	4	388	.87	4	264	.87	1	487	.82	1	91	.80	5	268	.80	1	226	.80	6	389	.80	4	477	.80	6	368	.77	12	93	.76	1
433	10	323	.89	10	434	.85	12	368	.85	12	488	.83	9	279	.83	9	442	.83	10	313	.83	9	482	.81	10	76	.80	9	73	.80	9
434	12	368	.85	12	433	.85	10	482	.81	10	279	.81	9	323	.81	10	420	.80	11	80	.87	10	98	.78	10	325	.78	10	370	.77	12
436	10	442	.89	10	370	.85	12	222	.84	2	323	.81	10	101	.79	5	433	.79	10	330	.79	1	315	.79	7	278	.79	2	109	.79	10
438	10	260	.87	1	376	.87	2	94	.83	2	103	.83	3	101	.83	5	377	.83	1	268	.83	1	82	.81	5	97	.81	3	89	.80	10
439	6	263	.80	6	490	.80	8	136	.80	5	270	.78	6	280	.75	2	452	.75	5	95	.74	6	98	.73	10	105	.73	6	96	.73	6
440	2	94	.71	2	78	.67	11	438	.67	10	376	.67	2	325	.64	10	333	.64	4	379	.64	7	434	.64	12	108	.64	1	110	.63	6
442	10	323	.93	10	436	.89	10	370	.88	12	89	.87	10	482	.86	10	433	.83	10	109	.83	10	98	.83	10	80	.83	10	464	.80	5
446	13	326	.72	13	475	.68	13	380	.68	13	94	.65	2	472	.63	11	460	.62	13	376	.61	12	420	.58	11	478	.58	3	99	.56	13
447	7	239	.88	7	267	.81	2	280	.81	2	464	.75	5	96	.74	6	452	.74	5	95	.73	6	487	.72	93	93	.72	7	227	.72	7
451	13	326	.80	13	419	.80	13	261	.78	13	84	.72	13	328	.69	13	380	.69	13	475	.67	13	109	.67	10	246	.67	13	331	.67	13

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APPENDIX I

TABLE 33

ROUGH-ROOTED CULTIVARS GROUPS 1 TO 13 INC.

SEQUENCE OF OBJECT SIMILARITIES FOR NEAREST TEN OBJECTS

Compared	Group Assgnmnt.	Object	Similarity	Group Assgnmnt.	Object	Similarity	Group Assgnmnt.	Object	Similarity	Group Assgnmnt.	Object	Similarity	Group Assgnmnt.	Object	Similarity	Group Assgnmnt.	Object	Similarity	Group Assgnmnt.	Object	Similarity	Group Assgnmnt.	Object	Similarity	Group Assgnmnt.
452	5	464	.94	5	280	.87	2	249	.85	5	379	.85	7	106	.83	7	94	.82	2	136	.82	5	227	.82	7	278	.82	2	92	.81	7
455	6	282	.83	6	83	.83	5	93	.80	1	320	.80	1	438	.80	10	376	.80	2	260	.80	1	487	.80	1	82	.78	5	94	.76	2
457	7	274	.87	7	469	.87	7	477	.87	6	100	.83	8	92	.83	7	483	.83	3	106	.81	7	226	.80	6	295	.80	7	389	.80	4
460	13	475	.80	13	246	.73	13	478	.69	13	462	.67	13	446	.62	13	276	.62	13	331	.60	13	387	.60	5	249	.60	5	465	.60	7
462	13	84	.75	13	246	.67	13	460	.67	13	261	.62	13	252	.60	4	331	.60	13	389	.60	4	392	.60	4	328	.56	13	273	.56	13
463	8	480	.78	8	243	.73	3	313	.72	9	100	.72	8	477	.78	6	76	.68	9	81	.68	11	74	.68	9	256	.68	9	388	.68	4
464	5	452	.94	5	249	.89	5	280	.88	2	92	.87	7	106	.85	7	379	.83	7	278	.83	2	469	.83	7	465	.83	7	472	.82	11
465	7	469	.87	7	249	.87	5	92	.83	7	464	.83	5	106	.81	7	103	.80	3	295	.80	7	234	.80	7	387	.80	5	379	.80	7
469	7	241	.88	7	252	.87	4	457	.87	7	465	.87	7	274	.87	7	249	.87	5	236	.87	7	92	.83	7	464	.83	5	483	.83	7
470	3	243	.85	3	97	.84	3	103	.83	3	236	.83	7	315	.83	7	295	.83	7	268	.83	1	83	.83	5	231	.80	5	227	.80	7
472	11	257	.88	11	278	.88	2	420	.88	11	79	.87	11	77	.87	9	102	.85	11	321	.85	11	376	.85	2	260	.85	1	266	.85	9
475	13	460	.80	13	326	.73	12	478	.73	13	446	.68	13	331	.67	13	419	.67	13	451	.67	13	246	.67	13	452	.65	5	472	.64	11
476	12	390	.85	12	265	.82	10	330	.81	1	370	.78	12	482	.77	10	369	.75	12	484	.74	12	436	.73	10	486	.72	1	277	.72	5
477	6	226	.93	6	274	.87	7	457	.87	7	135	.87	6	105	.87	6	96	.87	6	100	.83	8	269	.80	6	295	.80	7	388	.80	4
478	13	475	.73	13	246	.69	13	460	.69	13	326	.67	13	221	.63	3	273	.60	13	446	.58	13	295	.56	7	314	.56	9	76	.56	9

APPENDIX I

TABLE 33

ROUGH-ROOTED CULTIVARS GROUPS 1 TO 13 INC.

SEQUENCE OF OBJECT SIMILARITIES FOR NEAREST TEN OBJECTS

Group Assgnmnt.	Object	Similarity	Group Assgnmnt.	Object	Similarity	Group Assgnmnt.	Object	Similarity	Group Assgnmnt.	Object	Similarity	Group Assgnmnt.	Object	Similarity	Group Assgnmnt.	Object	Similarity	Group Assgnmnt.	Object	Similarity	Group Assgnmnt.	Object	Similarity	Group Assgnmnt.
80 8	100	.87	8	313	.80	9	321	.80	3	463	.78	8	115	.78	11	102	.73	11	118	.73	11	266	.73	9	483	.73	3	243	.72	5
81 7	379	.80	7	452	.78	5	488	.76	9	92	.76	7	464	.76	5	106	.74	7	482	.74	10	469	.73	7	465	.73	7	249	.73	5
82 10	323	.93	10	442	.86	10	80	.81	10	433	.81	3	257	.81	11	434	.81	12	472	.80	11	370	.80	12	279	.79	9	321	.79	11
83 3	312	.93	3	103	.89	3	389	.89	4	377	.89	1	243	.88	3	97	.88	3	92	.87	7	284	.87	1	486	.87	1	106	.85	7
84 12	391	.78	12	476	.74	12	482	.74	10	257	.73	11	392	.73	4	369	.72	4	390	.71	12	323	.69	10	370	.69	12	258	.67	11
86 1	487	.93	1	377	.89	1	483	.87	3	264	.83	1	389	.83	4	330	.83	1	79	.81	11	93	.80	1	438	.80	10	368	.80	12
87 1	486	.93	1	264	.89	1	312	.87	3	93	.87	1	260	.87	1	79	.85	11	424	.83	4	377	.83	1	268	.83	1	91	.83	5
88 9	313	.87	9	433	.83	10	77	.82	9	323	.80	10	102	.80	11	76	.76	9	314	.76	9	481	.76	7	103	.76	3	115	.75	11
90 8	272	.93	8	77	.88	9	98	.97	10	76	.87	9	136	.87	5	379	.87	7	295	.87	7	106	.85	7	313	.83	9	100	.83	8
92 9	256	.81	9	266	.78	11	100	.78	8	241	.76	7	136	.74	5	490	.74	8	109	.74	10	274	.74	7	272	.74	8	73	.74	9

APPENDIX I

TABLE 34

SMOOTH-ROOTED CULTIVARS GROUPS 14 to 19 INC.

SEQUENCE OF OBJECT SIMILARITIES FOR NEAREST TEN OBJECTS

Object compared	Group Assgnmt.	Object	Similarity	Group Assgnmt.	Object	Similarity	Group Assgnmt.	Object	Similarity	Group Assgnmt.	Object	Similarity	Group Assgnmt.	Object	Similarity	Group Assgnmt.	Object	Similarity	Group Assgnmt.	Object	Similarity	Group Assgnmt.	Object	Similarity	Group Assgnmt.	Object	Similarity	Group Assgnmt.
111	14	450	.87	14	300	.81	14	244	.80	14	288	.80	14	225	.78	14	319	.78	14	456	.75	14	132	.74	14	454	.71	14	224	.68	14
112	17	123	.83	17	289	.83	18	124	.80	17	432	.80	17	128	.80	18	122	.76	16	448	.76	16	441	.74	16	131	.73	14	301	.73	19
114	14	132	.87	14	319	.83	14	131	.80	14	303	.80	14	124	.73	17	242	.68	14	300	.67	14	225	.63	14	416	.63	14	454	.63	14
116	19	293	.88	19	229	.87	19	365	.81	19	302	.80	19	121	.76	18	453	.76	17	458	.76	19	120	.73	15	125	.73	19	122	.73	16
119	19	125	.87	19	332	.83	18	298	.80	18	127	.80	18	365	.79	19	301	.76	19	406	.76	18	432	.76	16	128	.76	17	121	.76	18
120	15	122	.93	16	129	.89	15	134	.87	15	461	.84	15	121	.83	17	287	.83	15	299	.83	17	294	.83	15	128	.83	17	237	.83	15
121	18	128	.87	18	120	.83	15	122	.83	16	299	.80	18	378	.80	18	129	.80	15	293	.78	19	116	.76	19	289	.76	18	119	.76	19
122	16	120	.93	15	448	.87	16	229	.87	19	441	.85	16	432	.83	16	129	.83	15	128	.83	18	299	.83	18	121	.83	18	366	.81	18
123	17	112	.83	17	298	.80	18	127	.80	18	453	.76	17	301	.76	19	128	.76	18	119	.73	19	122	.73	16	271	.73	18	299	.73	18
124	17	112	.80	17	114	.73	14	301	.73	19	453	.73	17	229	.69	19	123	.69	17	298	.69	18	289	.69	18	293	.68	19	121	.67	18
125	19	119	.87	19	365	.86	19	293	.81	19	405	.80	19	458	.76	19	296	.76	18	116	.73	19	229	.73	19	127	.73	18	298	.73	18
126	18	127	.89	18	332	.87	18	271	.83	18	327	.80	18	378	.80	18	128	.80	18	298	.76	18	405	.76	19	299	.73	18	406	.73	18
127	18	271	.93	18	126	.89	18	332	.89	18	298	.87	18	128	.83	18	299	.80	18	405	.80	19	123	.80	17	119	.80	19	296	.76	18
128	18	378	.93	18	299	.93	18	298	.89	18	289	.89	18	121	.87	18	461	.85	15	127	.83	18	134	.83	15	122	.83	16	271	.83	18
129	15	287	.93	15	294	.93	15	120	.89	15	291	.87	15	415	.83	15	122	.83	16	461	.82	15	128	.80	18	121	.80	18	293	.78	19

APPENDIX I

TABLE 34

SMOOTH-ROOTED CULTIVARS GROUPS 14 to 19 INC.

SEQUENCE OF OBJECT SIMILARITIES FOR NEAREST TEN OBJECTS

Object compared	Group Assgnmnt.	Object	Similarity	Group Assgnmnt.	Object	Similarity	Group Assgnmnt.	Object	Similarity	Group Assgnmnt.	Object	Similarity	Group Assgnmnt.	Object	Similarity	Group Assgnmnt.	Object	Similarity	Group Assgnmnt.	Object	Similarity	Group Assgnmnt.	Object	Similarity	Group Assgnmnt.
130	14	300	.83	14	131	.76	14	416	.73	14	224	.73	14	288	.72	14	244	.72	14	303	.69	14	134	.67	15	454	.67	14	111	.65	14
131	14	416	.83	14	303	.80	14	114	.80	14	130	.76	14	112	.73	17	132	.73	14	319	.69	14	288	.68	14	124	.67	17	300	.67	14
132	14	303	.93	14	114	.87	14	319	.83	14	300	.80	14	111	.74	14	450	.74	14	242	.74	14	131	.73	14	225	.69	14	244	.68	14
134	15	291	.89	15	120	.87	15	235	.87	15	128	.83	17	301	.83	18	299	.83	17	461	.81	15	448	.80	16	289	.80	17	302	.80	19
224	14	456	.87	14	300	.76	14	244	.75	14	288	.75	14	450	.75	14	120	.73	15	130	.73	14	441	.72	16	237	.69	15	303	.69	14
225	14	244	.85	14	319	.80	14	111	.78	14	242	.78	14	300	.76	14	454	.73	14	132	.69	14	302	.67	14	450	.65	14	288	.65	14
229	19	293	.88	19	122	.87	16	116	.87	19	365	.81	19	366	.81	18	120	.80	15	302	.80	19	301	.76	19	453	.76	17	129	.76	15
232	15	254	.92	15	237	.81	15	122	.78	16	415	.78	15	441	.77	16	120	.72	15	448	.72	16	240	.72	15	378	.71	17	134	.68	15
235	15	134	.87	15	301	.83	18	298	.80	17	120	.80	15	240	.80	15	302	.80	19	237	.76	15	458	.76	18	128	.76	17	299	.76	17
237	15	240	.83	15	120	.83	15	232	.81	15	287	.80	15	122	.76	16	235	.76	15	134	.76	15	415	.76	15	441	.74	16	129	.73	15
240	15	237	.83	15	406	.83	17	120	.80	15	134	.80	15	235	.80	15	301	.76	18	287	.76	15	254	.75	15	122	.73	16	229	.73	18
242	14	303	.81	14	244	.80	14	225	.78	14	132	.74	14	450	.73	14	319	.72	14	114	.68	14	300	.68	14	131	.68	14	289	.65	18
244	14	300	.88	14	225	.85	14	242	.80	14	450	.80	14	111	.80	14	454	.78	14	224	.75	14	456	.75	14	303	.74	14	288	.73	14
254	15	232	.92	15	134	.78	15	240	.75	15	415	.75	15	122	.75	16	448	.75	16	301	.74	18	378	.74	17	493	.72	17	237	.71	15
271	18	298	.93	18	127	.93	18	332	.83	18	126	.83	18	128	.83	18	296	.83	18	366	.81	18	443	.80	18	299	.80	18	293	.78	19

APPENDIX I

TABLE 34

SMOOTH-ROOTED CULTIVARS GROUPS 14 to 19 INC.

SEQUENCE OF OBJECT SIMILARITIES FOR NEAREST TEN OBJECTS

Object Compared	Group Assgnmnt.	Object	Similarity	Group Assgnmnt.	Object	Similarity	Group Assgnmnt.	Object	Similarity	Group Assgnmnt.	Object	Similarity	Group Assgnmnt.	Object	Similarity	Group Assgnmnt.	Object	Similarity	Group Assgnmnt.	Object	Similarity	Group Assgnmnt.	Object	Similarity	Group Assgnmnt.
286	15	461	.82	15	294	.80	15	366	.79	17	120	.76	15	445	.76	17	129	.73	15	444	.73	15	293	.72	18	298	.69	17	122	.69	16
287	15	129	.93	15	415	.89	15	294	.87	15	466	.84	15	120	.83	15	378	.80	17	444	.80	15	237	.80	15	291	.80	15	240	.76	15
288	14	450	.80	14	111	.80	14	416	.78	14	454	.78	14	224	.75	14	300	.74	14	244	.73	14	319	.72	14	130	.72	14	448	.68	16
289	18	128	.89	18	299	.89	18	378	.83	18	112	.83	17	298	.80	18	448	.80	16	134	.80	15	122	.80	16	120	.80	15	493	.80	18
291	15	134	.89	15	129	.87	15	294	.80	15	287	.80	15	128	.80	17	301	.80	18	458	.80	16	461	.78	15	302	.76	19	235	.76	15
293	19	458	.88	19	116	.88	19	229	.88	19	298	.84	18	302	.84	19	365	.84	19	128	.82	18	125	.81	19	129	.78	15	296	.78	18
294	15	129	.93	15	287	.87	15	120	.83	15	291	.80	15	286	.80	15	415	.76	15	122	.76	16	461	.75	15	128	.73	18	121	.73	18
296	18	443	.89	18	406	.87	18	366	.86	18	271	.83	18	332	.80	18	293	.78	19	298	.76	18	119	.76	18	127	.76	18	125	.76	19
298	18	271	.93	18	128	.89	18	127	.87	18	299	.87	18	293	.84	19	378	.83	18	301	.83	19	458	.83	19	289	.80	18	235	.80	15
299	18	128	.93	18	289	.89	18	378	.87	18	298	.87	18	134	.83	15	122	.83	16	120	.83	15	493	.83	18	127	.80	18	121	.80	18
300	14	244	.88	14	303	.87	14	130	.83	14	454	.83	14	111	.81	14	450	.81	14	132	.80	14	225	.76	14	319	.76	14	224	.76	14
301	19	458	.87	19	298	.83	18	235	.83	15	302	.83	19	134	.83	15	432	.80	16	332	.80	18	291	.80	15	128	.80	18	366	.79	18
302	19	458	.96	19	293	.84	19	301	.83	19	116	.80	19	235	.80	15	298	.80	18	229	.80	19	134	.80	15	299	.76	18	291	.76	15
303	14	132	.93	14	300	.87	14	450	.81	14	242	.81	14	114	.80	14	131	.80	14	319	.76	14	244	.74	14	224	.69	14	130	.69	14

APPENDIX I

TABLE 34

SMOOTH-ROOTED CULTIVARS GROUPS 14 to 19 INC.

SEQUENCE OF OBJECT SIMILARITIES FOR NEAREST TEN OBJECTS

Object compared	Group Assgnmt.	Object	Similarity	Group Assgnmt.	Object	Similarity	Group Assgnmt.	Object	Similarity	Group Assgnmt.	Object	Similarity	Group Assgnmt.	Object	Similarity	Group Assgnmt.	Object	Similarity	Group Assgnmt.	Object	Similarity	Group Assgnmt.	Object	Similarity	Group Assgnmt.	Object	Similarity	Group Assgnmt.
316	19	119	.67	19	126	.63	18	129	.63	15	287	.63	15	291	.63	15	332	.63	18	406	.63	18	432	.63	16	240	.60	15	125	.60	19
319	14	114	.83	14	132	.83	14	225	.80	14	454	.80	14	450	.78	14	111	.78	14	300	.76	14	303	.76	14	416	.73	14	244	.72	14
327	18	126	.80	18	271	.76	18	366	.71	18	127	.69	18	289	.69	18	298	.69	18	443	.69	18	329	.68	19	378	.67	18	406	.67	18
329	19	365	.69	19	125	.68	19	327	.68	18	405	.65	19	289	.65	18	302	.65	19	441	.62	16	126	.61	18	293	.61	19	458	.61	19
332	18	127	.89	18	126	.87	18	271	.83	18	119	.83	19	406	.80	18	296	.80	18	301	.80	19	128	.80	18	458	.80	19	405	.76	19
365	19	125	.86	19	293	.84	19	116	.81	19	229	.81	19	119	.79	19	299	.79	18	120	.74	15	302	.74	19	445	.74	18	122	.74	16
366	18	296	.86	18	229	.81	19	443	.81	18	445	.81	18	271	.81	18	122	.81	16	301	.79	19	286	.79	15	406	.79	18	293	.77	19
378	18	128	.93	18	493	.89	18	299	.87	18	444	.87	15	289	.83	18	298	.83	18	287	.80	15	126	.80	18	121	.80	18	461	.78	15
405	19	125	.80	19	127	.80	18	126	.76	18	332	.76	18	271	.73	18	296	.69	18	378	.69	18	406	.69	18	458	.69	19	119	.67	19
406	18	296	.87	18	240	.83	15	332	.80	18	366	.79	18	119	.76	19	271	.76	18	443	.76	18	126	.73	18	378	.73	18	301	.73	19
415	15	287	.89	15	129	.83	15	466	.82	15	120	.80	15	232	.78	15	294	.76	15	237	.76	15	254	.75	15	122	.73	16	240	.73	15
416	14	131	.83	14	288	.78	14	130	.73	14	319	.73	14	450	.72	14	112	.69	17	224	.67	14	454	.67	14	456	.67	14	300	.63	14
432	16	448	.96	16	441	.88	16	122	.83	16	112	.80	17	301	.80	19	134	.76	15	120	.76	15	289	.76	18	119	.76	19	121	.73	18
441	16	448	.92	16	432	.88	16	122	.85	16	120	.78	15	289	.78	18	232	.77	15	237	.74	15	112	.74	17	235	.72	15	134	.72	15
443	18	296	.89	18	366	.81	18	271	.80	18	406	.76	18	119	.73	19	127	.73	18	125	.73	19	298	.73	18	445	.73	18	286	.69	15

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TABLE 34

SMOOTH-ROOTED CULTIVARS GROUPS 14 to 19 INC.

SEQUENCE OF OBJECT SIMILARITIES FOR NEAREST TEN OBJECTS

Object Compared	Group Assgnmnt.	Object	Similarity	Group Assgnmnt.	Object	Similarity	Group Assgnmnt.	Object	Similarity	Group Assgnmnt.	Object	Similarity	Group Assgnmnt.	Object	Similarity	Group Assgnmnt.	Object	Similarity	Group Assgnmnt.	Object	Similarity	Group Assgnmnt.	Object	Similarity	Group Assgnmnt.
444	15	461	.92	15	466	.88	15	378	.87	17	128	.80	17	287	.80	15	120	.76	15	134	.76	15	493	.76	17	129	.73	15	237	.73	15
445	18	366	.81	18	120	.80	15	461	.78	15	286	.76	15	365	.74	19	127	.73	18	122	.73	16	443	.73	18	129	.69	15	126	.69	18
448	16	432	.96	16	441	.92	16	122	.87	16	134	.80	15	289	.80	17	120	.80	15	112	.76	17	301	.76	18	254	.75	15	119	.73	19
450	14	111	.87	14	456	.82	14	303	.81	14	300	.81	14	244	.80	14	288	.80	14	319	.78	14	224	.75	14	132	.74	14	242	.73	14
453	17	116	.76	17	123	.76	17	229	.76	19	293	.75	19	124	.73	17	112	.73	17	301	.73	19	458	.73	19	366	.71	18	271	.69	18
454	14	300	.83	14	319	.80	14	244	.78	14	288	.78	14	225	.73	14	111	.72	14	450	.72	14	303	.69	14	130	.67	14	416	.67	14
456	14	224	.87	14	450	.82	14	300	.76	14	111	.75	14	244	.75	14	303	.69	14	288	.68	14	454	.67	14	416	.67	14	319	.67	14
458	19	302	.96	19	293	.88	19	301	.87	19	298	.83	18	128	.80	18	332	.80	18	291	.80	15	119	.76	19	116	.76	19	271	.76	18
461	15	444	.92	15	128	.85	18	120	.84	15	466	.83	15	286	.82	15	129	.82	15	134	.81	15	291	.78	15	299	.78	18	378	.78	18
466	15	444	.88	15	287	.84	15	461	.83	15	415	.82	15	129	.78	15	120	.75	15	378	.74	17	291	.74	15	134	.72	15	493	.72	18
493	18	378	.89	18	128	.83	18	299	.83	18	289	.80	18	444	.76	15	121	.76	18	120	.73	15	134	.73	15	122	.73	16	298	.73	18