ANNUAL REPORT TO NC-140

2010 Apple Rootstock Trials

November, 2014 -- Clemson, SC

Wesley R. Autio

This year was the fifth season of the 2010 NC-140 Apple Rootstock Trials. Data submitted in 2014, however, were for the fourth growing season (2013). All submitted data were received in an easily read format, but there were a few problems with cooperators following the protocol. **Everyone is encouraged to review their data and make sure that all measurements are the unit requested. Further, include only those data requested in the protocol, with the same columns in the spreadsheet, and in the same order**. A problem with the 2013 (and previous years as well) data was the lack of submission by some co-operators -- this situation is completely unacceptable. All data should be submitted in the format and units requested and by the submission deadline (January 15).

The data to be submitted and the format of the data submission are presented in the Data Submission Protocol on Page 3. Submit these data in Excel spreadsheet format, using the rootstock codes described in the protocol, by **January 15, 2015**. If data are not recieved by February 15, they will not be included in the published 5-year summary.

In 2015, follow the Pruning and Training Plan (Page 2) and the Trial Protocol for 2015 (Page 2).

To avoid problems during the compilation of the data, please pay paticular attention to the following points:

1. **Submit only the data requested.**
2. **Use the correct units.**
3. **Columns must be consistent with the protocol.**
3. **Make sure that all data make sense -- proofread your data set.**
4. **For rootstock and replication designations, follow the protocol exactly -- rootstock names should appear as they are listed in the Data Submission Protocol (Page 3) -- please note that there are no spaces in any of these names.**

Rootstocks, cultivars, and locations involved in the 2010 NC-140 Apple Rootstock Trial. Honeycrisp plantings are spaced 4'x12', and Fuji plantings are spaced 6'x14'. All trees are trained to the Tall Spindle System.

Rootstocks	Honeycrisp sites	Aztec Fuji sites
B.9	BC	**CH***
B.10	**CH***	ID
B.7-3-150	CO	KY
B.7-20-21	**IL***	NC
B.64-194	IA	**NY***
B.67-5-32	MA	PA
B.70-6-8	**MN***	UT
B.70-20-20	MI	
B.71-7-22	**NJ***	
G.11	NS	
G.41 N	**NY***	
G.41 TC	**OH***	
G.202 N	UT	
G.202 TC	WI	
G.935 N		
G.935 TC		
CG.2034		
CG.3001		
CG.4003		
CG.4004		
CG.4013		
CG.4214		
CG.4814		
CG.5087		
CG.5222		
PiAu 9-90		
PiAu 51-11		
Supp.3		
M.26 EMLA		
M.9 Pajam2		
M.9 NAKBT337		

*No data were submitted for 2013.

Send 2010 data via email to Wes Autio (autio@umass.edu) by

January 15, 2015

Trial Protocol for 2015

Tree management.

A. Trees must be supported and trained as Tall Spindles (see Pruning & Training Plan, Mature Tree).
B. Adjust crop load as described in the Pruning & Training Plan, Mature Tree.
C. Manage pests, nutrients, and water per local recommendations. Pay attention to weed control in this trial.

Collect the follow data for each tree in 2015.

A. Root suckers: the number removed and counted, August.
B. Yield: count all fruit per tree and weigh (to the nearest 0.1 kg).
C. Zonal leaf chlorosis: after Honeycrisp harvest, visually estimate the portion (%) of the canopy exhibiting symptoms.
D. Trunk size: trunk circumference 30 cm above the graft union (mm), October.
E. Status: 0=dead, 1=alive, and 2=missing data, October.

Pruning and Training Plan for the Tall Spindle System

Mature Tree	Dormant	1. Limit tree height to 11.5' (3.6m) by annually cutting leader back to a weak fruitful side branch. 2. Annually, remove at least 2 limbs, including lower tier scaffolds, that are more than ¾" in diameter using a bevel cut. 3. Simplify each remaining branch on the tree so that it is columnar with no major side branches. 4. Shorten branches that extend into the row to facilitate movement of equipment and preserve fruit quality on the lower limbs.
	Late May	Chemically thin, and then follow up with hand thinning to appropriate levels to ensure regular annual cropping and adequate fruit size. (Target = 120-150 fruits/tree)
	August	Lightly summer prune to encourage light penetration and maintain pyramidal tree shape.

Data Submission Protocol

Submit data via email (autio@umass.edu) by January 15, 2015.

If data are not received by February 15, 2015, they will not be included in the published 5-year summary.

STATE 2010 Apple Rootstock Trial DATA FOR 2014

Cultivar	Rootstock	Rep	Sub-rep	2010 Status (see below)	Trunk circ. (spring, 2010, mm)	Side branches (spring, 2010, no.> 10cm)	Height of the graft union (spring, 2010, mm)	Trunk circ. (fall, 2010, mm)	Comments regarding trees which died during 2010 (those with status = 0)	**2011 Status (0=dead, 1=alive, 2=missing data)**	Flower clusters (no.)	Root sucker (Aug, 2011, no.)	Yield per tree (2011) (kg)	Yield per tree (2011) (no)	Trunk circ. (fall, 2011, mm)	**Comments regarding trees which died during 2011 (those with status = 0)**	**2012 Status (0=dead, 1=alive, 2=missing data)**	Root sucker (Aug, 2012, no.)	Yield per tree (2012, kg)	Yield per tree (2012, no.)	Zonal chlorosis (Honeycrisp only, 2012, %)	Trunk circ. (fall, 2012, mm)	**Comments regarding trees which died during 2012 (those with status = 0)**	**2013 Status (0=dead, 1=alive, 2=missing data)**	Root sucker (Aug, 2013, no.)	Yield per tree (2013, kg)	Yield per tree (2013, no.)	Zonal chlorosis (Honeycrisp only, 2013, %)	Trunk circ. (fall, 2013, mm)	**Comments regarding trees which died during 2013 (those with status = 0)**	**2014 Status (0=dead, 1=alive, 2=missing data)**	Root sucker (Aug, 2014, no.)	Yield per tree (2014, kg)	Yield per tree (2014, no.)	Zonal chlorosis (Honeycrisp only, 2014, %)	Trunk circ. (fall, 2014, mm)	Tree height (cm)	Canopy width (cm, average of in-row and across-row)	Comments regarding trees which died during 2014 (those with status = 0)
Honeycrisp	B.9	1	1	1	X	X	X	X		**1**	X	X	X	X	X		**1**	X	X	X	X	X		**1**	X	X	X	X	X		**1**	X	X	X	X	X	X	X	
Honeycrisp	B.9	1	2	0	X	X	X	.	fireblight	**0**	.	.	.	.	.		**0**	.	.	.	.	.		**0**	.	.	.	.	.		**0**	.	.	.	.	.	.	.	
Honeycrisp	B.9	1	3	1	X	X	X	X		**1**	X	X	X	X	X		**1**	X	X	X	X	X		**1**	X	X	X	X	X		**1**	X	X	X	X	X	X	X	
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Honeycrisp	M.26EMLA	4	1	1	X	X	X	X		**0**	X	X	X	X	X	**Voles**	**0**	X	X	X	X	X		**0**	X	X	X	X	X		**0**	X	X	X	X	X	X	X	
Honeycrisp	M.26EMLA	4	2	3	.	.	.	.		**2**	.	.	.	.	.		**2**	.	.	.	.	.		**2**	.	.	.	.	.		**2**	.	.	.	.	.	.	.	
Honeycrisp	M.26EMLA	4	3	4	.	.	.	.		**2**	.	.	.	.	.		**2**	.	.	.	.	.		**2**	.	.	.	.	.		**2**	.	.	.	.	.	.	.	

Status 2010:

0 = died after it was clearly growing well
1 = alive
2 = considered to be a non-data tree because of human error (like tractor blight)
3 = planted but broke at the union before it was fully supported
4 = leafed out but quickly shut down
5 = never leafed out and began to grow

When a data point is missing, insert a period in that cell, but do not replace zeros with periods.

DATA FORMAT: Excel

Rootstock Codes: (do not include spaces in the rootstock name)

B.9	B.67-5-32	G.41N	G.935TC	CG.4013	PiAu9-90	M.26EMLA
B.10	B.70-6-8	G.41TC	CG.2034	CG.4214	PiAu51-11	M.9Pajam2
B.7-3-150	B.70-20-20	G.202N	CG.3001	CG.4814	Supp.3	M.9T337
B.7-20-21	B.71-7-22	G.202TC	CG.4003	CG.5087		
B.64-194	G.11	G.935N	CG.4004	CG.5222		

Table 1. Trunk cross-sectional area, root suckers, Honeycrisp zonal chlorosis, yield per tree, yield efficiency, and fruit size of Honeycrisp apple trees in the 2010 NC-140 Honeycrisp Apple Rootstock Trial. Includes data from BC, IA, MA, MI, NS, UT, and WI, except UT data were not included for zonal chlorosis, and MI data were not included for fruit weight.

Rootstock	Trunk cross-sectional area (2013, cm^2)	Cumulative root suckers (2010-13, no./tree)	Zonal chlorosis (%)	Yield per tree (2013, kg)	Cumulative yield per tree (2011-13, kg)	Yield efficiency (2013, kg/cm^2 TCA)	Cumulative yield efficiency (2011-13, kg/cm^2 TCA)	Average Fruit weight (2012-13, g)
B.9	5.0	1.5	28	5.8	8.5	1.16	1.68	198
B.10	7.3	0.3	26	9.6	13.0	1.30	1.76	214
B.7-3-150	11.2	0.5	22	7.3	10.7	0.69	1.03	240
B.7-20-21	13.6	0.4	30	9.6	13.3	0.74	1.00	218
B.64-194	13.8	0.1	21	10.4	14.1	0.67	0.97	217
B.67-5-32	12.4	0.4	27	7.8	10.5	0.63	0.88	230
B.70-6-8	11.2	0.3	24	8.4	12.2	0.74	1.10	223
B.70-20-20	21.8	1.5	22	9.4	12.5	0.44	0.58	254
B.71-7-22	2.0	1.6	46	1.7	2.7	0.87	1.42	203
G.11	7.0	1.4	41	9.2	13.1	1.34	1.90	223
G.41N	7.2	0.2	33	9.7	13.8	1.35	1.86	231
G.41TC	6.9	1.3	37	7.8	9.9	1.19	1.51	239
G.202N	13.0	6.3	32	15.2	18.2	1.14	1.40	240
G.202TC	8.0	2.9	47	8.9	11.8	1.09	1.50	195
G.935N	9.3	3.2	54	12.7	17.3	1.30	1.79	218
G.935TC	7.2	3.2	61	9.5	13.3	1.26	1.79	212
CG.2034	5.4	1.1	52	5.9	9.2	1.07	1.65	226
CG.3001	11.6	0.2	35	13.6	19.7	1.16	1.76	243
CG.4003	6.1	0.9	38	7.6	11.2	1.22	1.83	197
CG.4004	12.0	2.1	27	14.5	19.6	1.21	1.61	229
CG.4013	7.7	3.3	42	6.1	8.4	0.73	1.11	223
CG.4214	8.2	6.1	48	10.7	14.5	1.25	1.80	226
CG.4814	10.3	5.3	52	10.6	15.4	1.05	1.53	244
CG.5087	9.6	1.4	43	13.8	18.0	1.37	1.75	225
Supp.3	6.7	1.1	57	5.2	9.3	0.85	1.46	228
PA9-90	11.5	0.4	70	5.7	7.8	0.49	0.66	168
PA51-11	10.4	0.6	35	7.9	10.5	0.77	1.08	231
M.9T337	6.9	1.8	37	7.0	10.4	1.00	1.51	225
M.9Pajam2	8.0	3.8	39	7.6	11.6	0.97	1.44	208
M.26EMLA	8.5	1.5	30	9.1	12.3	1.09	1.47	221
LSD (*P* =0.05)	1.1	1.5	8.9	1.9	2.1	0.19	0.20	16
HSD (*P* =0.05)	2.0	2.7	16.3	3.5	3.8	0.34	0.37	29

Table 2. Trunk cross-sectional area (2013, cm^2) of Honeycrisp apple trees at individual planting locations in the 2010 NC-140 Honeycrisp Rootstock Trial.

Rootstock	BC	CO	IA	MA	MI	NS	UT	WI
B.9	4.5	5.5	4.4	4.9	4.7	5.2	5.5	5.8
B.10	6.6	11.2	7.1	7.5	6.3	8.4	8.1	7.5
B.7-3-150	8.9	17.0	14.7	11.4	7.8	10.0	14.0	11.8
B.7-20-21	12.6	21.8	13.6	12.3	10.7	16.2	14.0	15.8
B.64-194	9.1	24.2	13.5	14.9	12.5	15.2	14.0	18.1
B.67-5-32	11.2	19.0	14.6	13.7	12.0	10.2	12.9	12.4
B.70-6-8	9.1	16.9	12.9	12.6	7.8	11.2	12.8	12.0
B.70-20-20	21.0	35.4	18.2	24.3	16.7	21.9	24.9	26.0
B.71-7-22	1.8	3.7	2.5	2.0	1.9	1.6	2.3	2.0
G.11	5.8	10.8	7.2	7.0	5.8	6.8	8.9	7.8
G.41N	8.0	13.1	7.2	6.7	5.9	7.2	6.9	8.7
G.41TC	6.8	12.0	7.7	6.6	6.1	5.5	8.5	7.3
G.202N	11.9	10.8	12.5	14.9	9.2	13.8	12.6	14.9
G.202TC	7.4	15.6	8.4	10.2	7.1	6.7	9.7	6.5
G.935N	9.2	---	8.9	10.3	7.9	9.4	8.7	11.3
G.935TC	6.2	13.7	6.0	9.3	6.9	8.4	6.6	8.4
CG.2034	6.1	6.3	5.9	5.0	4.7	4.8	5.9	5.7
CG.3001	10.6	17.0	13.4	15.0	6.9	14.4	13.6	8.2
CG.4003	5.0	7.3	6.8	6.7	5.2	6.3	6.2	6.6
CG.4004	11.3	14.3	11.2	12.4	8.8	14.8	10.9	14.2
CG.4013	6.5	---	10.8	10.5	7.7	7.7	8.0	4.8
CG.4214	6.1	11.8	9.0	10.4	7.9	9.4	6.8	7.8
CG.4814	9.5	11.4	14.3	9.9	8.8	11.6	8.5	11.0
CG.5087	10.9	11.8	9.8	9.7	8.5	9.1	6.0	12.1
CG.5222	10.3	15.1	---	11.6	8.4	13.1	10.7	9.1
Supp.3	6.3	15.2	7.5	6.4	4.3	7.6	8.0	6.5
PiAu 9-90	12.1	23.6	9.8	13.0	8.8	9.2	16.2	11.0
PiAu 51-11	7.1	16.1	13.8	12.0	9.4	8.9	11.1	10.4
M.9 NAKBT337	5.9	10.8	7.6	7.7	5.3	6.9	7.3	7.6
M.9 Pajam 2	7.7	18.6	8.2	6.7	6.6	7.6	8.9	10.2
M.26 EMLA	8.1	12.2	9.5	8.0	6.8	9.5	9.6	8.4
LSD (*P* =0.05)	2.0	9.4	2.7	2.9	1.8	3.2	4.5	2.9
HSD (*P* =0.05)	3.8	17.8	5.0	5.3	3.4	5.8	8.4	5.4

Table 3. Cumulative root suckers (2010-13, no. per tree) of Honeycrisp apple trees at individual planting locations in the 2010 NC-140 Honeycrisp Rootstock Trial.

Rootstock	BC	CO	IA	MA	MI	NS	UT	WI
B.9	4.2	---	1.2	3.2	0.3	0.0	0.9	1.1
B.10	0.3	---	0.0	0.0	0.3	0.0	1.5	0.2
B.7-3-150	1.9	---	0.0	0.7	0.4	0.0	0.4	0.2
B.7-20-21	0.4	---	0.1	1.1	0.2	0.0	0.4	0.3
B.64-194	0.0	---	0.3	0.0	0.2	0.0	0.3	0.0
B.67-5-32	1.5	---	0.2	0.7	0.0	0.0	0.3	0.1
B.70-6-8	0.7	---	0.0	0.3	0.7	0.0	0.4	0.1
B.70-20-20	1.8	---	1.8	4.2	1.2	1.0	0.8	0.4
B.71-7-22	3.3	---	1.0	2.2	1.2	0.0	1.3	1.5
G.11	0.8	---	0.1	6.7	0.5	0.0	0.8	0.8
G.41N	0.4	---	0.0	0.2	0.0	0.0	0.4	0.3
G.41TC	1.3	---	0.0	5.3	0.0	0.0	0.3	0.8
G.202N	11.2	---	1.7	20.5	0.2	0.0	0.5	3.4
G.202TC	1.8	---	0.8	10.3	1.7	0.0	0.5	4.6
G.935N	3.6	---	3.1	5.1	1.3	1.4	2.0	5.4
G.935TC	5.7	---	4.0	8.5	1.7	0.0	1.0	1.0
CG.2034	2.8	---	0.4	0.7	2.3	0.0	1.5	0.0
CG.3001	0.0	---	0.0	0.5	0.0	0.0	1.0	0.0
CG.4003	1.4	---	0.3	2.0	0.5	0.0	1.0	0.8
CG.4004	4.3	---	0.5	7.5	0.8	0.0	0.3	1.8
CG.4013	4.8	---	8.0	7.0	3.0	0.7	1.8	0.7
CG.4214	13.1	---	7.5	9.4	0.7	0.5	4.3	6.7
CG.4814	9.1	---	1.3	11.9	1.0	5.0	2.0	3.3
CG.5087	5.0	---	0.3	4.3	0.7	0.0	0.0	0.0
CG.5222	18.0	---	---	10.9	0.8	0.0	0.3	2.0
Supp.3	1.5	---	0.5	1.6	0.0	0.0	0.5	3.0
PiAu 9-90	0.1	---	1.2	0.0	0.2	0.0	1.0	0.3
PiAu 51-11	0.0	---	0.5	2.1	0.2	0.0	0.8	1.0
M.9 NAKBT337	2.2	---	1.4	5.7	0.3	0.0	1.5	1.5
M.9 Pajam 2	5.8	---	3.0	8.8	0.7	0.3	1.3	6.8
M.26 EMLA	3.3	---	0.3	5.5	0.8	0.0	1.0	0.3
LSD (*P* =0.05)	5.3	---	2.5	7.5	1.4	1.2	1.9	3.1
HSD (*P* =0.05)	9.7	---	4.5	13.9	2.6	2.2	3.6	5.7

Table 4. Zonal leaf chlorosis (2013, %) of Honeycrisp apple trees at individual planting locations in the 2010 NC-140 Honeycrisp Rootstock Trial.

Rootstock	BC	CO	IA	MA	MI	NS	UT	WI
B.9	46	---	2	47	18	37	---	18
B.10	31	---	8	50	26	23	---	21
B.7-3-150	28	---	4	42	21	25	---	15
B.7-20-21	40	---	15	59	29	17	---	21
B.64-194	19	---	22	40	20	9	---	18
B.67-5-32	34	---	17	42	26	26	---	18
B.70-6-8	23	---	8	50	20	24	---	23
B.70-20-20	15	---	33	31	28	7	---	19
B.71-7-22	100	---	3	90	13	44	---	15
G.11	78	---	11	39	19	70	---	26
G.41N	66	---	12	31	19	43	---	20
G.41TC	60	---	22	65	28	20	---	23
G.202N	30	---	34	27	30	48	---	24
G.202TC	63	---	33	57	27	70	---	27
G.935N	66	---	60	43	60	59	---	31
G.935TC	90	---	73	65	37	65	---	30
CG.2034	94	---	27	80	15	83	---	19
CG.3001	50	---	10	65	50	10	---	20
CG.4003	68	---	8	40	25	63	---	11
CG.4004	18	---	26	33	35	19	---	33
CG.4013	73	---	13	50	43	30	---	37
CG.4214	83	---	48	53	27	44	---	32
CG.4814	70	---	45	66	37	55	---	35
CG.5087	55	---	53	53	37	35	---	28
CG.5222	55	---	---	67	28	34	---	25
Supp.3	88	---	86	52	38	52	---	32
PiAu 9-90	76	---	80	70	75	85	---	36
PiAu 51-11	49	---	22	60	43	18	---	21
M.9 NAKBT337	58	---	21	55	29	38	---	20
M.9 Pajam 2	53	---	36	53	28	44	---	22
M.26 EMLA	30	---	7	55	23	42	---	17
LSD (*P* =0.05)	24	---	25	24	18	28	---	10
HSD (*P* =0.05)	45	---	45	44	33	51	---	19

Table 5. Yield (2013, kg per tree) of Honeycrisp apple trees at individual planting locations in the 2010 NC-140 Honeycrisp Rootstock Trial.

Rootstock	BC	CO	IA	MA	MI	NS	UT	WI
B.9	0.1	0.7	7.5	7.1	8.1	8.0	0.9	8.9
B.10	0.2	1.7	7.4	15.8	11.8	14.6	0.4	15.4
B.7-3-150	0.0	3.6	12.4	10.9	8.9	5.9	0.0	14.4
B.7-20-21	0.0	4.4	11.2	17.2	11.7	11.5	0.1	15.6
B.64-194	0.3	5.3	8.2	17.1	14.1	11.0	0.0	25.9
B.67-5-32	0.4	1.3	9.0	12.8	11.9	7.7	0.0	14.3
B.70-6-8	0.1	0.7	11.4	17.1	9.3	6.2	0.0	15.1
B.70-20-20	0.8	2.5	2.5	17.2	18.1	10.5	0.2	16.5
B.71-7-22	0.2	0.1	3.5	2.0	2.2	0.8	0.8	2.6
G.11	0.1	1.4	13.3	14.5	11.5	6.4	0.8	17.5
G.41N	0.0	0.9	9.7	14.6	9.8	13.3	2.3	19.4
G.41TC	0.1	0.9	9.1	8.1	10.4	13.8	0.0	12.3
G.202N	0.0	0.6	5.9	30.1	13.2	19.1	0.0	21.6
G.202TC	1.3	0.9	13.5	21.2	11.9	7.5	0.0	7.9
G.935N	0.1	---	12.7	24.6	13.3	8.2	1.5	29.2
G.935TC	0.3	0.0	10.0	17.1	11.5	8.4	0.0	22.3
CG.2034	0.2	2.5	8.6	6.7	7.1	2.1	2.8	13.1
CG.3001	0.3	0.0	17.4	42.5	7.1	15.5	0.0	19.2
CG.4003	0.1	1.1	10.7	13.6	7.4	9.3	0.1	13.4
CG.4004	1.0	5.8	13.5	26.6	13.7	20.2	0.0	26.6
CG.4013	0.2	---	9.3	25.9	9.4	9.5	2.2	2.9
CG.4214	0.0	1.5	8.5	15.8	13.5	15.8	2.9	18.6
CG.4814	1.1	0.0	8.6	20.5	11.9	18.7	1.3	12.3
CG.5087	0.4	0.1	13.6	22.9	12.7	21.4	0.0	16.6
CG.5222	0.1	2.1	---	15.8	11.0	19.7	0.0	13.1
Supp.3	0.0	0.7	2.1	12.4	7.2	3.4	0.4	11.5
PiAu 9-90	2.5	3.6	5.7	10.1	7.4	4.6	0.0	11.1
PiAu 51-11	0.0	2.8	7.1	14.3	11.6	11.4	0.1	12.5
M.9 NAKBT337	0.0	1.3	10.8	10.7	8.8	5.3	1.7	11.9
M.9 Pajam 2	0.2	2.3	9.5	11.7	10.7	3.9	0.1	16.9
M.26 EMLA	0.6	0.1	13.4	9.6	10.4	16.2	0.0	13.5
LSD (*P* =0.05)	0.9	3.6	3.9	7.7	3.3	6.5	1.8	6.8
HSD (*P* =0.05)	1.7	6.8	7.2	14.2	6.0	11.9	3.3	12.5

Table 6. Cumulative yield (2012-13, kg per tree) of Honeycrisp apple trees at individual planting locations in the 2010 NC-140 Honeycrisp Rootstock Trial.

Rootstock	BC	CO	IA	MA	MI	NS	UT	WI
B.9	4.8	1.4	7.5	7.1	8.1	12.2	2.5	17.2
B.10	8.2	3.3	7.4	15.8	11.8	18.8	1.6	24.4
B.7-3-150	8.8	7.1	12.4	10.9	8.9	10.8	2.7	21.5
B.7-20-21	10.3	8.9	11.2	17.2	11.7	17.6	2.8	22.1
B.64-194	8.7	10.6	8.2	17.1	14.1	15.1	4.3	35.2
B.67-5-32	9.8	2.7	9.0	12.8	11.9	10.7	2.0	19.6
B.70-6-8	8.7	1.3	11.4	17.1	9.3	12.6	2.9	22.8
B.70-20-20	12.5	5.0	2.5	17.2	18.1	11.2	4.2	21.7
B.71-7-22	1.8	0.2	3.5	2.0	2.2	2.3	1.4	5.6
G.11	8.4	2.8	13.3	14.5	11.5	12.2	3.5	27.6
G.41N	10.8	1.8	9.7	14.6	9.8	18.2	3.3	29.9
G.41TC	9.3	1.8	9.1	8.1	10.4	14.1	2.0	16.3
G.202N	12.9	1.2	5.9	30.1	13.2	21.2	2.3	24.5
G.202TC	8.8	1.8	13.5	21.2	11.9	14.0	3.7	10.3
G.935N	13.7	---	12.7	24.6	13.3	13.4	3.0	40.4
G.935TC	10.6	0.0	10.0	17.1	11.5	15.5	1.5	30.6
CG.2034	8.4	5.0	8.6	6.7	7.1	6.8	3.8	20.4
CG.3001	15.0	0.0	17.4	42.5	7.1	22.5	2.4	33.8
CG.4003	7.3	2.1	10.7	13.6	7.4	15.3	1.3	23.0
CG.4004	16.1	11.6	13.5	26.6	13.7	27.7	1.3	38.4
CG.4013	7.5	---	9.3	25.9	9.4	10.6	3.0	7.2
CG.4214	10.4	3.1	8.5	15.8	13.5	19.7	4.2	28.9
CG.4814	15.1	0.0	8.6	20.5	11.9	23.8	2.2	21.7
CG.5087	14.1	0.1	13.6	22.9	12.7	25.3	1.0	29.4
CG.5222	10.4	4.2	---	15.8	11.0	24.5	3.6	19.8
Supp.3	9.5	1.3	2.1	12.4	7.2	7.9	3.7	18.5
PiAu 9-90	9.4	7.2	5.7	10.1	7.4	6.0	4.0	12.1
PiAu 51-11	6.8	5.7	7.1	14.3	11.6	14.9	2.3	18.0
M.9 NAKBT337	7.7	2.7	10.8	10.7	8.8	10.4	3.3	22.0
M.9 Pajam 2	9.3	4.5	9.5	11.7	10.7	9.4	2.3	28.2
M.26 EMLA	9.6	0.2	13.4	9.6	10.4	19.4	2.0	21.3
LSD (*P* =0.05)	2.8	7.2	3.9	7.7	3.3	7.3	2.0	7.9
HSD (*P* =0.05)	5.2	13.6	7.2	14.2	6.0	13.5	3.7	14.5

Table 7. Yield efficiency (2013, kg/cm^2 TCA) of Honeycrisp apple trees at individual planting locations in the 2010 NC-140 Honeycrisp Rootstock Trial.

Rootstock	BC	CO	IA	MA	MI	NS	UT	WI
B.9	0.01	0.15	1.72	1.33	1.75	1.66	0.15	1.52
B.10	0.02	0.13	1.05	2.08	1.84	1.70	0.05	2.07
B.7-3-150	0.00	0.19	0.86	0.99	1.15	0.60	0.00	1.31
B.7-20-21	0.00	0.19	0.84	1.44	1.10	0.71	0.01	1.04
B.64-194	0.04	0.22	0.59	1.08	1.11	0.67	0.00	1.44
B.67-5-32	0.03	0.07	0.65	0.97	0.99	0.75	0.00	1.16
B.70-6-8	0.01	0.04	0.90	1.37	1.19	0.50	0.00	1.25
B.70-20-20	0.04	0.07	0.15	0.71	1.08	0.48	0.01	0.62
B.71-7-22	0.10	0.02	1.39	1.18	1.12	0.49	0.40	1.30
G.11	0.02	0.15	1.79	2.13	2.01	1.08	0.10	2.24
G.41N	0.00	0.06	1.36	2.12	1.66	1.86	0.34	2.28
G.41TC	0.01	0.07	1.19	1.27	1.71	2.48	0.00	1.73
G.202N	0.00	0.06	0.56	2.00	1.44	1.37	0.00	1.49
G.202TC	0.19	0.05	1.59	2.10	1.68	1.04	0.00	1.21
G.935N	0.01	---	1.47	2.37	1.67	0.88	0.17	2.61
G.935TC	0.05	0.00	1.69	1.95	1.67	0.97	0.00	2.64
CG.2034	0.04	0.39	1.50	1.13	1.52	0.44	0.38	2.29
CG.3001	0.04	0.00	1.30	2.85	1.12	1.08	0.00	2.35
CG.4003	0.02	0.14	1.56	2.08	1.41	1.59	0.03	2.02
CG.4004	0.07	0.41	1.20	2.15	1.56	1.55	0.00	1.95
CG.4013	0.03	---	0.88	2.46	1.25	1.17	0.24	0.61
CG.4214	0.01	0.17	0.95	1.56	1.73	1.69	0.44	2.44
CG.4814	0.11	0.00	0.64	2.03	1.44	1.72	0.13	1.14
CG.5087	0.04	0.00	1.33	2.03	1.50	2.44	0.00	1.37
CG.5222	0.01	0.13	---	1.34	1.32	1.49	0.00	1.46
Supp.3	0.00	0.05	0.27	1.95	1.72	0.39	0.06	1.69
PiAu 9-90	0.30	0.22	0.57	0.67	0.76	0.23	0.00	1.01
PiAu 51-11	0.00	0.18	0.55	1.22	1.23	1.31	0.01	1.24
M.9 NAKBT337	0.00	0.12	1.42	1.39	1.66	0.82	0.23	1.57
M.9 Pajam 2	0.02	0.18	1.13	1.79	1.60	0.55	0.01	1.71
M.26 EMLA	0.07	0.01	1.41	1.20	1.57	1.74	0.00	1.61
LSD (*P* =0.05)	0.10	0.27	0.39	0.71	0.33	0.69	0.25	0.66
HSD (*P* =0.05)	0.19	0.52	0.72	1.31	0.60	1.26	0.46	1.21

Table 8. Cumulative yield efficiency (2012-13, kg/cm^2 TCA) of Honeycrisp apple trees at individual planting locations in the 2010 NC-140 Honeycrisp Rootstock Trial.

Rootstock	BC	CO	IA	MA	MI	NS	UT	WI
B.9	1.0	0.3	1.7	1.3	1.7	2.5	0.4	3.0
B.10	1.2	0.3	1.1	2.1	1.8	2.2	0.2	3.3
B.7-3-150	1.0	0.4	0.9	1.0	1.1	1.1	0.2	2.0
B.7-20-21	0.8	0.4	0.8	1.4	1.1	1.1	0.2	1.5
B.64-194	1.0	0.4	0.6	1.1	1.1	0.9	0.3	2.0
B.67-5-32	0.9	0.1	0.6	1.0	1.0	1.1	0.2	1.6
B.70-6-8	0.9	0.1	0.9	1.4	1.2	1.1	0.2	1.9
B.70-20-20	0.6	0.1	0.1	0.7	1.1	0.5	0.2	0.8
B.71-7-22	1.0	0.0	1.4	1.2	1.1	1.4	0.6	2.8
G.11	1.4	0.3	1.8	2.1	2.0	1.9	0.4	3.6
G.41N	1.3	0.1	1.4	2.1	1.7	2.6	0.5	3.5
G.41TC	1.4	0.1	1.2	1.3	1.7	2.5	0.3	2.4
G.202N	1.1	0.1	0.6	2.0	1.4	1.6	0.2	1.7
G.202TC	1.2	0.1	1.6	2.1	1.7	2.0	0.4	1.7
G.935N	1.5	---	1.5	2.4	1.7	1.4	0.3	3.7
G.935TC	1.7	0.0	1.7	1.9	1.7	1.9	0.2	3.6
CG.2034	1.4	0.8	1.5	1.1	1.5	1.4	0.5	3.6
CG.3001	1.4	0.0	1.3	2.9	1.1	1.6	0.2	4.1
CG.4003	1.5	0.3	1.6	2.1	1.4	2.5	0.2	3.5
CG.4004	1.4	0.8	1.2	2.2	1.6	2.0	0.2	2.8
CG.4013	1.1	---	0.9	2.5	1.2	1.3	0.3	1.5
CG.4214	1.7	0.3	1.0	1.6	1.7	2.1	0.6	3.8
CG.4814	1.6	0.0	0.6	2.0	1.4	2.2	0.2	2.0
CG.5087	1.3	0.0	1.3	2.0	1.5	2.8	0.2	2.4
CG.5222	1.0	0.3	---	1.3	1.3	1.9	0.3	2.2
Supp.3	1.5	0.1	0.3	2.0	1.7	0.9	0.5	2.9
PiAu 9-90	0.8	0.4	0.6	0.7	0.8	0.4	0.3	1.1
PiAu 51-11	1.0	0.4	0.6	1.2	1.2	1.7	0.2	1.8
M.9 NAKBT337	1.3	0.2	1.4	1.4	1.7	1.5	0.4	2.9
M.9 Pajam 2	1.2	0.4	1.1	1.8	1.6	1.3	0.3	2.9
M.26 EMLA	1.2	0.0	1.4	1.2	1.6	2.0	0.2	2.6
LSD (*P* =0.05)	0.2	0.5	0.4	0.7	0.3	0.7	0.2	0.8
HSD (*P* =0.05)	0.4	1.0	0.7	1.3	0.6	1.2	0.4	1.5

Table 9. Fruit size (2013, g) of Honeycrisp apple trees at individual planting locations in the 2010 NC-140 Honeycrisp Rootstock Trial.

Rootstock	BC	CO	IA	MA	MI	NS	UT	WI
B.9	340	187	161	221	---	141	206	265
B.10	288	166	174	204	---	155	253	242
B.7-3-150	---	176	211	238	---	148	---	316
B.7-20-21	370	163	180	222	---	177	210	278
B.64-194	300	180	192	225	---	203	---	292
B.67-5-32	292	182	205	229	---	174	---	284
B.70-6-8	297	156	186	226	---	134	---	307
B.70-20-20	346	195	200	234	---	205	280	318
B.71-7-22	330	200	132	185	---	105	230	240
G.11	275	96	180	237	---	138	267	310
G.41N	---	152	192	230	---	154	264	256
G.41TC	280	194	217	227	---	197	---	284
G.202N	---	144	190	254	---	171	---	263
G.202TC	266	159	189	205	---	101	---	256
G.935N	300	---	160	220	---	187	240	223
G.935TC	307	---	142	207	---	195	---	255
CG.2034	257	168	191	213	---	166	220	242
CG.3001	445	---	215	215	---	186	---	292
CG.4003	245	150	159	235	---	111	180	223
CG.4004	325	165	222	229	---	150	---	304
CG.4013	340	---	200	222	---	193	235	266
CG.4214	310	166	214	234	---	176	203	254
CG.4814	309	---	220	214	---	157	235	287
CG.5087	395	---	207	225	---	149	---	332
CG.5222	310	113	---	208	---	159	---	280
Supp.3	160	163	214	219	---	123	210	242
PiAu 9-90	189	154	132	144	---	107	---	193
PiAu 51-11	---	175	238	235	---	154	275	298
M.9 NAKBT337	---	158	197	224	---	171	229	271
M.9 Pajam 2	300	179	172	204	---	135	250	257
M.26 EMLA	329	150	198	219	---	172	---	312
LSD (*P* =0.05)	113	59	28	29	---	37	68	51
HSD (*P* =0.05)	224	116	52	54	---	68	138	94

Table 10. Average fruit size (2012-13, g) of Honeycrisp apple trees at individual planting locations in the 2010 NC-140 Honeycrisp Rootstock Trial.

Rootstock	BC	CO	IA	MA	MI	NS	UT	WI
B.9	220	107	161	221	---	172	154	261
B.10	261	173	174	209	---	179	191	262
B.7-3-150	266	182	211	238	---	182	222	321
B.7-20-21	261	164	180	222	---	195	153	292
B.64-194	255	179	192	225	---	203	140	293
B.67-5-32	291	188	205	229	---	191	181	292
B.70-6-8	243	182	186	226	---	196	171	312
B.70-20-20	345	195	200	234	---	206	211	322
B.71-7-22	273	243	132	185	---	174	184	228
G.11	234	148	180	237	---	181	186	316
G.41N	291	179	192	230	---	175	214	264
G.41TC	322	176	217	227	---	199	154	289
G.202N	320	187	190	254	---	175	211	265
G.202TC	235	189	189	205	---	145	147	247
G.935N	292	---	160	219	---	212	177	237
G.935TC	267	167	142	207	---	214	196	251
CG.2034	275	173	191	213	---	194	191	266
CG.3001	296	160	215	215	---	208	206	294
CG.4003	254	166	159	235	---	145	122	236
CG.4004	289	174	222	229	---	168	153	313
CG.4013	252	---	200	222	---	201	195	267
CG.4214	272	176	214	234	---	185	175	269
CG.4814	289	151	220	214	---	170	198	290
CG.5087	327	---	207	225	---	159	140	297
CG.5222	298	186	---	208	---	165	164	290
Supp.3	288	177	214	219	---	175	207	259
PiAu 9-90	224	152	132	144	---	132	155	196
PiAu 51-11	225	171	237	234	---	178	206	310
M.9 NAKBT337	253	165	197	224	---	212	163	298
M.9 Pajam 2	254	140	172	204	---	190	143	285
M.26 EMLA	260	195	198	219	---	179	161	306
LSD (*P* =0.05)	36	63	28	29	---	41	54	39
HSD (*P* =0.05)	67	118	52	54	---	75	99	73

Table 11. Trunk cross-sectional area, root suckers, yield, yield efficiency, and fruit size of Aztec Fuji apple trees in the 2010 NC-140 Fuji Apple Rootstock Trial (including ID, KY, NC, and UT data only).

Rootstock	Trunk cross-sectional area (2013, cm^2)	Cumulative root suckers (2010-13, no./tree)	Yield per tree (2013, kg)	Cumulative yield per tree (2011-13, kg)	Yield efficiency (2013, kg/cm^2 TCA)	Cumulative yield efficiency (2011-13, kg/cm^2 TCA)	Average Fruit weight (2012-13, g)
B.9	10.8	1.9	5.4	11.8	0.42	1.02	186
B.10	20.2	0.3	5.8	13.7	0.31	0.70	194
B.7-3-150	31.3	0.2	8.9	16.5	0.30	0.57	188
B.7-20-21	6.0	0.4	1.0	2.3	0.15	0.47	124
B.64-194	31.9	1.4	0.9	14.5	0.33	0.48	188
B.67-5-32	37.1	0.6	9.0	12.7	0.25	0.34	191
B.70-6-8	34.8	0.0	9.9	18.2	0.32	0.57	195
B.70-20-20	56.3	2.2	7.3	11.9	0.14	0.22	186
B.71-7-22	5.8	1.0	2.1	4.7	0.38	0.91	174
G.11	20.6	0.3	8.4	19.0	0.44	0.98	216
G.41N	20.7	0.5	9.2	15.5	0.38	0.63	212
G.41TC	20.4	1.0	7.6	12.7	0.36	0.60	211
G.202N	26.5	1.6	11.0	19.5	0.50	0.82	195
G.202TC	19.6	1.2	7.3	17.5	0.42	0.93	176
G.935N	24.8	1.0	14.2	26.4	0.61	1.12	195
G.935TC	23.5	3.6	9.2	21.2	0.40	0.99	202
CG.2034	11.7	0.7	5.2	10.4	0.42	0.86	187
CG.3001	31.4	0.8	8.9	20.5	0.27	0.60	218
CG.4003	12.3	0.2	6.1	14.1	0.55	1.28	168
CG.4004	28.3	1.3	13.1	23.3	0.45	0.78	216
CG.4214	15.3	1.0	7.3	14.4	0.48	0.94	205
CG.4814	23.7	4.1	7.0	13.9	0.30	0.58	191
CG.5087	15.8	1.2	8.8	11.7	0.69	0.91	188
CG.5222	29.7	2.9	10.0	18.7	0.36	0.64	208
Supp.3	19.7	0.2	6.1	14.7	0.35	0.86	213
PA9-90	44.3	1.9	6.4	9.6	0.20	0.30	174
PA51-11	40.0	0.2	6.3	12.8	0.17	0.34	202
M.9T337	19.3	2.5	9.0	18.2	0.50	1.01	198
M.9Pajam2	24.1	4.8	11.0	19.6	0.49	0.88	207
M.26EMLA	30.3	0.2	9.6	18.8	0.33	0.64	208
LSD (*P* =0.05)	3.9	1.9	2.8	3.3	0.15	0.19	16
HSD (*P* =0.05)	7.1	3.5	5.2	6.1	0.27	0.35	29

Table 12. Trunk cross-sectional area (2013, cm^2) of Aztec Fuji apple trees at individual planting locations in the 2010 NC-140 Fuji Apple Rootstock Trial.

Rootstock	ID	KY	NC	PA	UT
B.9	14.4	9.8	6.2	10.6	12.3
B.10	20.9	23.0	15.1	18.3	19.7
B.7-3-150	26.9	42.6	24.1	25.9	31.7
B.7-20-21	4.9	8.6	3.2	---	6.0
B.64-194	31.0	36.0	27.5	---	32.9
B.67-5-32	39.0	41.7	30.4	29.5	37.3
B.70-6-8	31.5	44.0	30.7	29.6	33.1
B.70-20-20	57.6	60.7	54.6	34.3	52.1
B.71-7-22	5.9	5.2	3.9	---	7.4
G.11	18.6	27.2	15.8	13.0	22.4
G.41N	32.4	15.8	17.1	---	21.4
G.41TC	22.2	23.0	15.0	---	21.4
G.202N	25.7	38.3	17.8	---	21.5
G.202TC	21.9	27.0	14.2	15.7	15.5
G.935N	23.1	33.1	15.6	18.5	26.7
G.935TC	19.9	31.1	15.8	---	30.9
CG.2034	11.2	12.1	8.5	---	15.2
CG.3001	36.7	32.1	24.9	---	32.3
CG.4003	9.4	15.6	10.3	---	13.9
CG.4004	34.0	29.3	19.8	---	32.3
CG.4013	---	21.8	10.2	---	14.5
CG.4214	16.8	23.1	9.0	---	13.7
CG.4814	24.7	32.0	19.5	---	21.8
CG.5087	10.9	23.1	7.3	---	15.1
CG.5222	34.1	34.0	23.1	19.6	28.0
Supp.3	15.0	27.0	16.5	---	20.4
PiAu 9-90	25.0	62.3	34.8	---	52.8
PiAu 51-11	35.1	47.3	32.3	31.8	43.7
M.9 NAKBT337	17.3	26.1	15.3	16.2	17.4
M.9 Pajam 2	23.5	28.9	16.2	17.9	24.8
M.26 EMLA	31.6	35.1	25.2	24.3	28.9
LSD (*P* =0.05)	7.6	8.7	6.6	6.4	8.3
HSD (*P* =0.05)	14.0	16.0	12.2	12.1	15.3

Table 13. Cumulative root suckers (2010-13, no. per tree) of Aztec Fuji apple trees at individual planting locations in the 2010 NC-140 Fuji Apple Rootstock Trial.

Rootstock	ID	KY	NC	PA	UT
B.9	0.2	3.7	0.1	3.6	3.2
B.10	0.0	0.0	0.0	0.3	1.1
B.7-3-150	0.0	0.2	0.3	2.4	0.3
B.7-20-21	0.0	0.9	0.0	---	0.3
B.64-194	0.3	2.7	0.0	---	2.8
B.67-5-32	0.0	1.8	0.0	0.4	0.7
B.70-6-8	0.0	0.0	0.0	2.0	0.2
B.70-20-20	0.1	6.2	0.3	2.0	2.2
B.71-7-22	0.0	2.0	0.2	---	1.6
G.11	0.0	0.7	0.0	0.0	0.8
G.41N	0.0	0.7	0.3	---	0.7
G.41TC	0.0	2.0	0.0	---	2.0
G.202N	0.0	3.4	0.0	---	2.5
G.202TC	0.3	2.5	0.6	4.4	1.4
G.935N	0.0	0.8	0.0	1.1	3.1
G.935TC	0.0	1.0	0.2	---	15.8
CG.2034	0.0	1.0	2.0	---	0.0
CG.3001	0.0	2.0	0.0	---	1.7
CG.4003	0.0	0.3	0.0	---	0.4
CG.4004	0.0	3.3	0.3	---	1.8
CG.4013	---	1.0	0.0	---	0.0
CG.4214	0.0	1.3	0.2	---	2.8
CG.4814	0.3	14.8	0.0	---	3.7
CG.5087	0.0	2.5	0.0	---	1.0
CG.5222	0.2	7.1	1.1	9.3	3.9
Supp.3	0.0	0.4	0.3	---	0.2
PiAu 9-90	0.0	5.3	0.0	---	2.0
PiAu 51-11	0.0	0.6	0.3	0.4	0.1
M.9 NAKBT337	0.0	3.1	2.2	2.6	4.3
M.9 Pajam 2	0.1	15.9	0.4	0.6	2.7
M.26 EMLA	0.0	0.3	0.2	0.2	0.5
LSD (*P* =0.05)	0.3	6.2	0.9	3.9	4.2
HSD (*P* =0.05)	0.6	11.5	1.7	7.3	7.7

Table 14. Yield (2013, kg per tree) of Aztec Fuji apple trees at individual planting locations in the 2010 NC-140 Fuji Apple Rootstock Trial.

Rootstock	ID	KY	NC	PA	UT
B.9	15.0	1.4	2.0	1.8	2.7
B.10	4.3	3.8	7.8	1.2	8.4
B.7-3-150	16.3	6.7	1.8	1.7	10.9
B.7-20-21	0.8	0.5	0.8		1.9
B.64-194	14.0	3.9	9.3		11.7
B.67-5-32	14.2	6.0	5.1	1.6	10.7
B.70-6-8	18.0	4.1	8.6	1.6	9.0
B.70-20-20	12.5	4.8	5.6	0.4	6.8
B.71-7-22	5.2	0.1	1.3	---	1.1
G.11	10.9	7.7	5.8	4.5	9.2
G.41N	25.5	2.7	6.4	---	7.7
G.41TC	15.3	6.0	2.8	---	6.2
G.202N	12.8	9.2	11.0	---	11.6
G.202TC	13.3	6.0	5.1	8.0	5.0
G.935N	17.4	9.3	13.5	3.2	17.1
G.935TC	9.2	5.8	5.4	---	17.3
CG.2034	7.2	3.2	1.4	---	8.9
CG.3001	16.3	5.1	4.7	---	8.6
CG.4003	9.8	4.6	3.7	---	6.2
CG.4004	20.9	9.4	9.3	---	13.0
CG.4013	---	2.0	4.8	---	8.1
CG.4214	14.6	4.0	3.8	---	4.9
CG.4814	4.6	7.4	6.0	---	9.4
CG.5087	14.8	5.6	4.3	---	11.1
CG.5222	10.9	9.0	6.1	3.8	14.3
Supp.3	9.8	8.2	4.6	---	1.7
PiAu 9-90	8.9	3.6	4.1	---	8.7
PiAu 51-11	6.4	5.1	6.7	0.8	7.3
M.9 NAKBT337	14.2	6.1	10.0	2.0	6.1
M.9 Pajam 2	12.9	7.3	11.4	2.9	11.8
M.26 EMLA	7.9	7.0	12.4	2.0	11.2
LSD (*P* =0.05)	7.4	3.3	5.7	2.0	5.7
HSD (*P* =0.05)	13.7	6.1	10.5	3.8	10.6

Table 15. Cumulative yield (2011-13, kg per tree) of Aztec Fuji apple trees at individual planting locations in the 2010 NC-140 Fuji Apple Rootstock Trial.

Rootstock	ID	KY	NC	PA	UT
B.9	28.3	2.6	5.9	1.8	9.3
B.10	23.0	7.7	10.4	1.2	11.9
B.7-3-150	32.2	12.0	5.7	1.7	15.9
B.7-20-21	3.3	0.8	2.5	---	2.8
B.64-194	23.8	8.3	11.6	---	13.1
B.67-5-32	23.4	9.1	6.6	1.6	11.6
B.70-6-8	36.7	10.2	11.0	1.6	14.9
B.70-20-20	25.2	7.6	6.9	0.4	8.6
B.71-7-22	9.0	0.1	4.3	---	4.6
G.11	31.6	14.2	11.3	4.5	17.7
G.41N	46.8	4.9	9.8	---	11.1
G.41TC	26.6	6.4	4.5	---	13.2
G.202N	34.0	17.0	14.5	---	14.2
G.202TC	33.3	12.2	11.6	8.0	12.6
G.935N	42.5	18.6	19.5	3.2	25.8
G.935TC	30.9	10.6	16.3	---	23.6
CG.2034	20.0	4.7	1.7	---	11.3
CG.3001	42.0	11.8	8.0	---	17.3
CG.4003	23.0	8.8	12.4	---	12.0
CG.4004	49.6	12.5	15.8	---	15.2
CG.4013	---	3.8	6.8	---	9.9
CG.4214	30.8	6.7	6.6	---	8.6
CG.4814	23.1	14.1	7.9	---	13.8
CG.5087	20.9	9.8	5.1	---	12.2
CG.5222	29.6	18.0	10.6	3.8	16.3
Supp.3	22.2	13.9	8.9	---	11.9
PiAu 9-90	13.9	7.5	4.8	---	10.8
PiAu 51-11	20.3	10.8	9.3	0.8	9.1
M.9 NAKBT337	32.4	12.8	14.9	2.0	11.5
M.9 Pajam 2	30.2	10.8	16.5	2.9	17.5
M.26 EMLA	30.4	13.0	15.8	2.0	15.3
LSD (*P* =0.05)	9.3	5.1	6.1	2.0	5.4
HSD (*P* =0.05)	17.2	9.3	11.2	3.8	10.0

Table 16. Yield efficiency (2013, kg/cm^2 TCA) of Aztec Fuji apple trees at individual planting locations in the 2010 NC-140 Fuji Apple Rootstock Trial.

Rootstock	ID	KY	NC	PA	UT
B.9	1.04	0.14	0.28	0.16	0.19
B.10	0.22	0.18	0.49	0.07	0.45
B.7-3-150	0.63	0.16	0.09	0.07	0.34
B.7-20-21	0.18	0.05	0.19	---	0.19
B.64-194	0.47	0.11	0.35	---	0.36
B.67-5-32	0.39	0.13	0.17	0.05	0.30
B.70-6-8	0.58	0.09	0.31	0.05	0.28
B.70-20-20	0.24	0.08	0.10	0.01	0.13
B.71-7-22	0.92	0.02	0.45	---	0.14
G.11	0.63	0.30	0.37	0.34	0.41
G.41N	0.79	0.17	0.36	---	0.34
G.41TC	0.69	0.26	0.18	---	0.29
G.202N	0.50	0.26	0.69	---	0.61
G.202TC	0.68	0.24	0.43	0.51	0.32
G.935N	0.72	0.29	0.82	0.17	0.65
G.935TC	0.48	0.19	0.36	---	0.56
CG.2034	0.62	0.26	0.16	---	0.59
CG.3001	0.46	0.15	0.17	---	0.29
CG.4003	1.05	0.30	0.35	---	0.47
CG.4004	0.60	0.33	0.48	---	0.38
CG.4013	---	0.08	0.48	---	0.56
CG.4214	0.89	0.20	0.35	---	0.34
CG.4814	0.18	0.23	0.28	---	0.47
CG.5087	1.36	0.27	0.58	---	0.84
CG.5222	0.36	0.28	0.27	0.19	0.54
Supp.3	0.66	0.33	0.34	---	0.08
PiAu 9-90	0.38	0.07	0.15	---	0.18
PiAu 51-11	0.18	0.12	0.21	0.02	0.17
M.9 NAKBT337	0.85	0.24	0.67	0.12	0.30
M.9 Pajam 2	0.56	0.24	0.76	0.15	0.49
M.26 EMLA	0.24	0.20	0.52	0.08	0.39
LSD (*P* =0.05)	0.35	0.12	0.39	0.11	0.26
HSD (*P* =0.05)	0.64	0.22	0.73	0.20	0.48

Table 17. Cumulative yield efficiency (2011-13, kg/cm^2 TCA)of Aztec Fuji apple trees at individual planting locations in the 2010 NC-140 Fuji Apple Rootstock Trial.

Rootstock	ID	KY	NC	PA	UT
B.9	1.97	0.26	1.03	0.16	0.74
B.10	1.14	0.34	0.67	0.07	0.63
B.7-3-150	1.23	0.29	0.25	0.07	0.51
B.7-20-21	0.71	0.09	1.04	---	0.35
B.64-194	0.79	0.23	0.44	---	0.40
B.67-5-32	0.63	0.20	0.21	0.05	0.32
B.70-6-8	1.18	0.23	0.41	0.05	0.46
B.70-20-20	0.47	0.13	0.12	0.01	0.17
B.71-7-22	1.58	0.02	1.60	---	0.63
G.11	1.76	0.53	0.73	0.33	0.79
G.41N	1.43	0.31	0.53	---	0.52
G.41TC	1.20	0.28	0.30	---	0.62
G.202N	1.33	0.45	0.89	---	0.74
G.202TC	1.60	0.46	0.88	0.50	0.80
G.935N	1.80	0.56	1.20	0.17	0.97
G.935TC	1.54	0.35	1.03	---	0.77
CG.2034	1.77	0.36	0.19	---	0.74
CG.3001	1.16	0.34	0.29	---	0.55
CG.4003	2.44	0.58	1.20	---	0.89
CG.4004	1.45	0.43	0.80	---	0.45
CG.4013	---	0.16	0.67	---	0.68
CG.4214	1.84	0.33	0.61	---	0.68
CG.4814	0.93	0.43	0.37	---	0.67
CG.5087	1.91	0.45	0.69	---	0.97
CG.5222	0.93	0.55	0.46	0.19	0.61
Supp.3	1.56	0.53	0.65	---	0.59
PiAu 9-90	0.64	0.15	0.17	---	0.22
PiAu 51-11	0.59	0.23	0.28	0.02	0.21
M.9 NAKBT337	1.92	0.47	1.02	0.12	0.62
M.9 Pajam 2	1.36	0.36	1.07	0.15	0.72
M.26 EMLA	0.97	0.37	0.64	0.08	0.55
LSD (*P* =0.05)	0.41	0.16	0.63	0.11	0.23
HSD (*P* =0.05)	0.76	0.29	1.17	0.20	0.43

Table 18. Fruit size (2013, g) of Aztec Fuji apple trees at individual planting locations in the 2010 NC-140 Fuji Apple Rootstock Trial.

Rootstock	ID	KY	NC	PA	UT
B.9	201	162	175	159	178
B.10	243	165	194	158	172
B.7-3-150	230	145	180	172	178
B.7-20-21	95	146	129	---	125
B.64-194	243	142	180	---	187
B.67-5-32	245	133	208	155	164
B.70-6-8	245	152	209	153	180
B.70-20-20	265	145	183	157	182
B.71-7-22	167	138	205	---	189
G.11	252	191	237	174	204
G.41N	281	139	223	---	180
G.41TC	289	171	212	---	201
G.202N	235	171	221	---	163
G.202TC	213	163	170	139	159
G.935N	262	170	199	154	181
G.935TC	242	168	251	---	188
CG.2034	210	165	225	---	186
CG.3001	284	162	223	---	177
CG.4003	131	162	211	---	154
CG.4004	302	148	220	---	204
CG.4013	---	115	186	---	184
CG.4214	237	154	237	---	192
CG.4814	254	146	213	---	173
CG.5087	247	140	266	---	164
CG.5222	287	147	196	161	177
Supp.3	211	211	189	---	186
PiAu 9-90	179	136	197	---	187
PiAu 51-11	251	153	206	186	191
M.9 NAKBT337	229	174	191	168	176
M.9 Pajam 2	251	163	221	162	189
M.26 EMLA	274	171	214	156	190
LSD (*P* =0.05)	37	47	50	26	27
HSD (*P* =0.05)	68	86	92	49	50

Table 19. Average fruit size (2012-13, g) of Aztec Fuji apple trees at individual planting locations in the 2010 NC-140 Fuji Apple Rootstock Trial.

Rootstock	ID	KY	NC	PA	UT
B.9	205	175	182	159	179
B.10	223	176	194	158	181
B.7-3-150	229	150	183	172	190
B.7-20-21	121	127	121	---	128
B.64-194	242	134	184	---	186
B.67-5-32	254	146	201	155	165
B.70-6-8	245	150	192	153	193
B.70-20-20	270	142	156	157	183
B.71-7-22	176	125	169	---	196
G.11	237	179	228	174	211
G.41N	305	150	231	---	192
G.41TC	261	173	205	---	203
G.202N	245	162	209	---	174
G.202TC	200	159	176	139	1070
G.935N	252	157	183	154	191
G.935TC	227	161	216	---	190
CG.2034	224	176	127	---	195
CG.3001	285	170	199	---	204
CG.4003	151	164	195	---	161
CG.4004	301	151	212	---	199
CG.4013	---	121	177	---	187
CG.4214	247	174	197	---	187
CG.4814	236	146	199	---	183
CG.5087	264	147	240	---	164
CG.5222	298	151	196	161	176
Supp.3	222	205	193	---	222
PiAu 9-90	193	143	179	---	184
PiAu 51-11	261	153	200	186	188
M.9 NAKBT337	224	173	211	168	187
M.9 Pajam 2	248	160	218	162	196
M.26 EMLA	255	166	216	156	193
LSD (*P* =0.05)	33	38	33	26	22
HSD (*P* =0.05)	61	69	61	49	40