ROCK SPRINGS NC-140 APPLE ROOTSTOCK TRIALS

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Current Plantings @ Rock Springs

- 2007 Crimson Gala (just finished)
- 2010 Aztec Fuji
- 2014 Aztec Fuji & Honeycrisp
- 2016 Royal Red HC & Scifresh

2007 Crimson Gala

- G.65
- G.41
- G.935
- G.210
- CG.4210
- B.9
- M.9 NAKB T337
- Ottawa 3
- Bud. 491

Summary

			2007 - 2015		
Rootstock	15 TCSA, cm^2	# Rootsuckers	Yield/tree, kg	Eff., kg/cm^2	Avg. Fruit wt., g
B.491	37.0bc	0.2a	70.1b	1.88abc	135b
CG.4210	24.9ab	0.2a	58.6b	2.32c	117a
G.210	81.6f	18.0 b	115.5c	1.44ab	138b
G.41	46.3cd	0.0a	136.9c	2.94d	146bc
G.65	15.6a	0.6a	21.8a	1.40a	121a
G.935	74.3f	5.0ab	139.3c	1.88bc	139b
M.9T337	59.3de	5.8ab	130.9c	2.37cd	156c
O.3	67.6ef	0.7a	134.8c	2.03c	141b
P-Value	0.0001	0.0018	0.0001	0.0001	0.0001

Letters refer to Tukey-Kramer mean separation, P=0.05

Highest

Lowest

Missing G.210 (6210)

B.9

O.3

B.491

M9 337

Take Home:

- Crimson Gala trained as a spindle
  - G.41 & G.935 did well as did M.9 337 and Ottawa 3
  - G.210 ~35% larger than M.9 337
  - G.935 ~ 25% larger than M.9 337
  - G.41 ~ 20% smaller than M.9 337
- Yields
  - G.935 = G.41 = O.3 = M.9 337
- B.9, CG.4210, B.491, G.65 less successful in this production system

2010 Uniform Trial

- 28 rootstocks
- Aztec Fuji or Honeycrisp
  - ID, KY, NC, NY-HV, PA, UT, MX
  - BC, CO, IL, IN, IA, MA, MN, MI, NJ, NS, NY-G, OH, UT, WI, MX
- CG, G., Bud., PiAu, Controls
- Planted 6’ x 14’ (518 trees/A)

Size Diversity !

2010 Fuji Uniform Trial

Rtstk.	TCSA	%M9	#Trees
B.10	40.9	(109)	12
B.64-194	77.9	(207)	4
B.67-5-32	72.1	(192)	8
B.70-6-8	89.9	(239)	10
B.71-7-22	7.4	(20)	5
B.7-20-21	5.7	(15)	2
B.7-3-150	77.9	(207)	12
B.9	19.0	(50)	11
CG.2034	17.4	(46)	1
CG.3001	34.8	(92)	2
CG.4003	18.0	(48)	5
CG.4013	27.6	(73)	2
CG.4214	18.4	(49)	3
CG.4814	37.0	(98)	2

Rtsk.	TCSA	(%M9)	#Trees
CG.5222	42.8	(114)	8
G.11	27.0	(72)	6
G.202N	52.0	(138)	2
G.202TC	29.7	(79)	12
G.41N	82.5	(219)	1
G.41TC	42.8	(114)	1
G.935N	38.4	(102)	7
G.935TC	36.7	(98)	2
M.26EMLA	61.9	(164)	12
M.9Pajam2	41.0	(109)	8
M.9T337	37.6	(100)	9
PiAu51-11	84.3	(224)	9
PiAu9-90	37.9	(101)	3
Supp.3	35.0	(93)	4

Advanced "CG" Selections

Rootstock	16 TCSA, cm^2 (%M.9T337)	# Trees
B.7-20-21	5.7(15)	2
B.71-7-22	7.4(20)	5
CG.2034	17.4(46)	1
CG.4003	18.0(48)	5
CG.4214	18.4(49)	3
B.9	19.0(50)	11
G.11	27.0(72)	6
CG.4013	27.6(73)	2
G.202TC	29.7(79)	12
CG.3001	34.8(92)	2
Supp.3	35.0(93)	4
G.935TC	36.7(98)	2
CG.4814	37.0(98)	2
M.9T337	**37.6(100)**	**9**
PiAu9-90	37.9(101)	3
G.935N	38.4(102)	7
B.10	40.9(109)	12
M.9Pajam2	41.0(109)	8
CG.5222	42.8(114)	8
G.41TC	42.8(114)	1
G.202N	52.0(138)	2
M.26EMLA	**61.9(164)**	**12**
B.67-5-32	72.1(192)	8
B.7-3-150	77.9(207)	12
B.64-194	77.9(207)	4
G.41N	82.5(219)	1
PiAu51-11	84.3(224)	9
B.70-6-8	89.9(239)	10

2010 Aztec Fuji 7th Leaf

2010-2016			
Rootstock	16 TCSA, cm^2	Yield/ Tree, kg	Eff., Kg/cm^2
B.10	40.9 b	49.38 ab	1.22 bcd
B.67-5-32	72.1 cd	63.55 bc	0.89 ab
B.70-6-8	89.9 d	66.64 cd	0.75 a
B.7-3-150	77.9 cd	55.34 bc	0.74 a
B.9	19.0 a	36.57 a	1.93 f
CG.5222	42.8 b	65.14 bcd	1.49 cde
G.11	27.0 ab	65.79 bcd	2.45 g
G.202TC	29.7 ab	62.06 bc	2.08 fg
G.935N	38.4 b	83.51 d	2.27 fg
M.26EMLA	61.9 c	70.22 cd	1.13 bc
M.9Pajam2	41.0 b	63.89 bc	1.54 de
M.9T337	37.6 b	69.11 cd	1.89 ef
PiAu51-11	84.3 d	48.44 ab	0.58 a
P-Value	0.0001	0.0001	0.0001

Letters refer to Tukey Kramer mean separation, P=0.05

Highest

Lowest

Size Comparison of Tissue Cultured Rootstocks

Rootstock	16 TCSA, cm^2 (%M.9T337)	# Trees
B.7-20-21	5.7(15)	2
B.71-7-22	7.4(20)	5
CG.2034	17.4(46)	1
CG.4003	18.0(48)	5
CG.4214	18.4(49)	3
B.9	19.0(50)	11
G.11	27.0(72)	6
CG.4013	27.6(73)	2
G.202TC	29.7(79)	12
CG.3001	34.8(92)	2
Supp.3	35.0(93)	4
G.935TC	36.7(98)	2
CG.4814	37.0(98)	2
M.9T337	37.6(100)	9
PiAu9-90	37.9(101)	3
G.935N	38.4(102)	7
B.10	40.9(109)	12
M.9Pajam2	41.0(109)	8
CG.5222	42.8(114)	8
G.41TC	42.8(114)	1
G.202N	52.0(138)	2
M.26EMLA	61.9(164)	12
B.67-5-32	72.1(192)	8
B.7-3-150	77.9(207)	12
B.64-194	77.9(207)	4
G.41N	82.5(219)	**1**
PiAu51-11	84.3(224)	9
B.70-6-8	89.9(239)	10

Take Home:

- B.10 continues to look promising and is suggested for trial (≤ M.26)
- None of the other replicated Budagovsky stocks are promising
- G.11 and G.935* best performing stocks
- Tissue cultured trees in this study are all smaller than traditionally budded stocks

*Recent report in Good Fruit Grower on G.935 and certain cultivars

2014 Uniform Trial

- Vineland Rootstocks
  - cold hardy, resistant to fire blight, easy to propagate, size control (?)
- Spacing
  - HC: 4’ x 12’ = 908 trees/A
  - Fuji: 5 x 12’ = 726 trees/A
- Honeycrisp & Aztec Fuji
  - HC: V.1, V.5, V.6, V.7, G.(6)969, G.(5)890
  - Fuji: V.1, V.5, V.6, V.7, G.214, (G.11)
  - Standards: M.9T.337, M.26EMLA

2014 Rootstock Trial

Rootstock	TCSA Fall '16, cm^2	Growth '16, cm^2	Yield, Kg	Efficiency g/cm^2	Crop Load, $\#/cm^2$
Aztec Fuji					
G.214	12.9ab	6.3abc	4.30ab	331a	1.5a
M.26 EMLA	11.7ab	5.1ab	4.06a	366a	1.6a
M.9 T337	10.8a	4.7a	4.46ab	458a	2.1a
V.1	15.2bc	7.1bcd	4.32ab	305a	1.7a
V.5	17.5cd	8.0cde	7.57b	469a	2.3a
V.6	20.1d	9.4e	7.24ab	424a	2.1a
V.7	18.6cd	8.6de	6.38ab	386a	1.9a
P-Value	0.0001	0.0001	0.0032	0.2759	0.5298

Highest

Lowest

Aztec Fuji

2014 Rootstock Trial

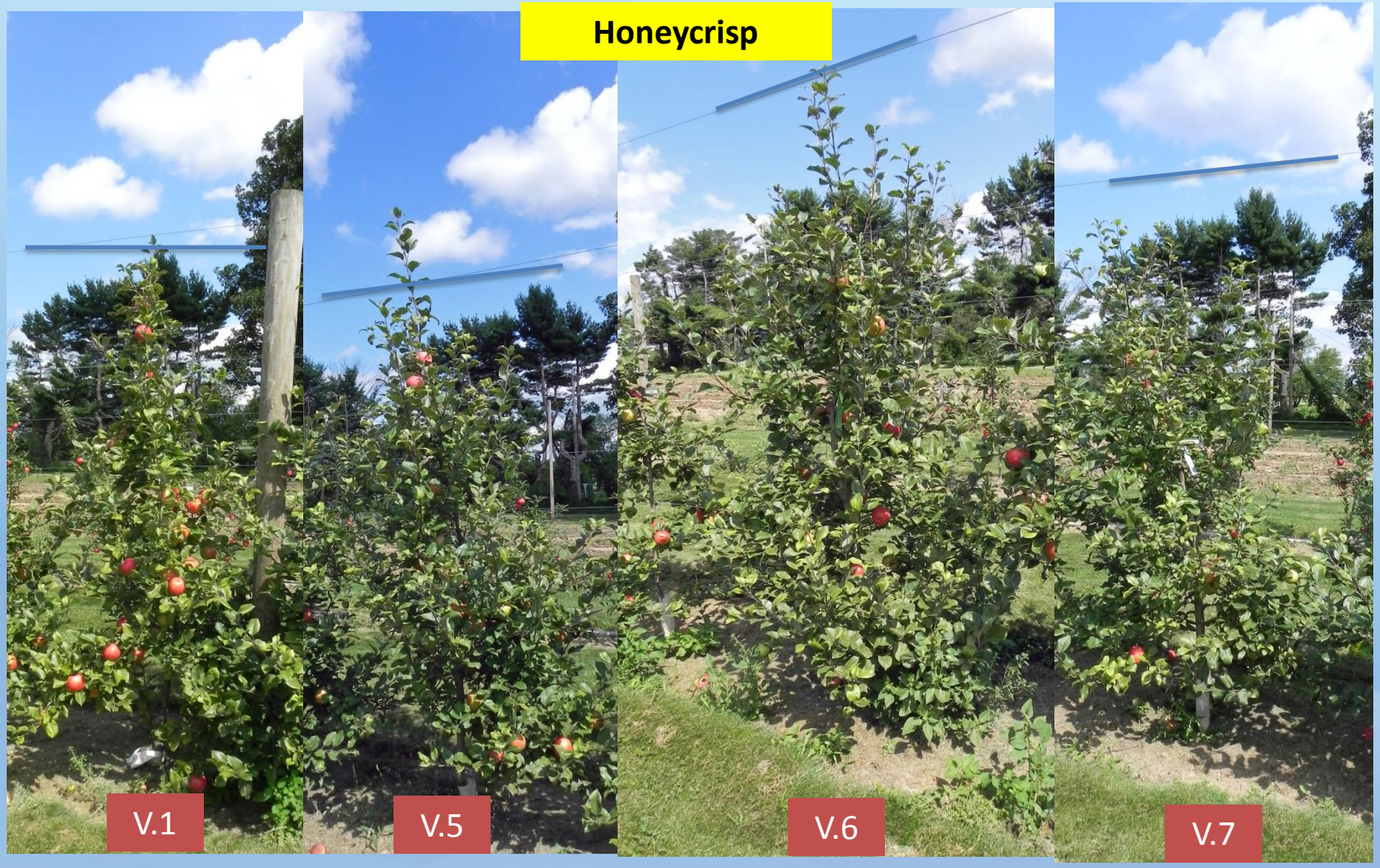
Rootstock	TCSA Fall '16, cm^2	Growth '16, cm^2	Yield, kg	Efficiency, g/cm^2	Crop Load, $\#/cm^2$
Honeycrisp					
G.890	15.3cd	6.1c	14.74c	965cd	3.6bc
G.969	10.1a	3.6ab	10.76bc	1117d	4.3c
M.26 EMLA	9.7a	3.6ab	6.92ab	725abcd	2.8abc
M.9 T337	8.0a	2.7a	6.86ab	861bcd	3.5bc
V.1	12.9b	5.0bc	9.40ab	774abcd	3.2abc
V.5	13.5bc	6.1c	6.43a	492ab	1.8a
V.6	17.3d	7.6d	7.52ab	444a	1.8a
V.7	13.2bc	5.8c	7.05ab	546abc	2.1ab
P-Value	0.0001	0.0001	0.0001	0.0001	0.0001

Letters refer to Tukey-Kramer mean separation, P = 0.05

Highest

Lowest

Honeycrisp



= top wire 9.5 ft.

Take Home:

- Large trees at planting did not grow well the first year
- Aztec Fuji
  - **V.7**, V.6 & V.5 largest trees
  - V.5 best yield but similar to other Vineland
- Honeycrisp
  - M.9, M.26 & G.969 similar size
  - V.6 >G.890 >V.5=V.7 >V.1
  - G.890 highest yield
  - **G.969** most efficient, best crop load
  - Consider planting weak cultivars on G.969

2016 Rootstock Trial

- Royal Red Honeycrisp
  - G.41, G.935, M.9 Nic29
  - 3’ x 12’ = 1210 trees/A

Honeycrisp G41

Cultivar	Propagatibility:			Resistance to:			
	Liner	Tree	Cold Hardy:	Replant Disease	Fire Blight	Crown/ Root Rots	Wooly Apple Aphid
MARK	Very good	Excellent	Moderate	Low	Low	Moderate	None
B.9	Very good	Very good	Moderate	None	High	High	None
G.65	Fair	Fair	High	TBD	High	High	None
M.27	Fair	Fair	TBD	TBD	TBD	TBD	TBD
G.41	Fair	Very good	High	High	High	High	High
M.9 T-337	Good	Good	Low	Low	None	High	None
G.11	Good	Good	Moderate	Moderate	High	High	None
G.16	Good	Good	Moderate	Partial	Mod-High	High	None
M.9 NIC 29	Good	Good	Low	Low	None	High	None
M.9 PAJAM2	Good	Good	Low	Low	None	High	None
M.9 EMLA	Good	Good	Low	Low	None	High	None
G.935	Good	Very good	High	High	High	High	None
G.969	Excellent	Excellent	TBD	Tolerant	High	High	High
G.214	Good	Very good	High	High	High	High	High
G.210	Very good	Very good	TBD	High	High	High	High
G.222	Very good	Very good	Low	Low	High	High	High
G.814	Very good	Very good	High	Tolerant	High	High	None
B.10	Good	Good	High	TBD	High	TBD	None
M.26	Very good	Very good	Low	None	None	None	None
G.30	Fair	Fair	High	High	High	High	None
G.890	Very good	Very good	High	High	High	High	High
G.202	Very good	Very good	High	Tolerant	High	High	High
M.7 EMLA	Very good	Very good	Moderate	Moderate	Low	Moderate	None
M.106 EMLA	Very good	Very good	Moderate	Low	Low	None	None
B.118	Very good	Very good	High	Low	Moderate	Moderate	None

from: http://treefruit.wsu.edu/varieties-breeding/rootstocks/

Peach Rootstocks