

Table 1. Rootstock means for trunk cross-sectional area, root suckers, zonal chlorosis, yield per tree, yield efficiency, and fruit size of Honeycrisp apple trees in the 2010 NC-140 Honeycrisp Apple Rootstock Trial. Means are based on data from BC, MA, MI, MN, NS, NY, OH, and WI. All values are least-squares means, adjusted for missing subclasses.<sup>2</sup>

Rootstock	Survival (2010-17, %)	Trunk cross-sectional area (2017, cm <sup>2</sup> )	Tree height (2017, cm)	Canopy width (2017, cm)	Cumulative root suckers (2010-17, no./tree)	Average zonal chlorosis (2012-17, % canopy affected)	Yield per tree (2017, kg)	Cumulative yield per tree (2011-17, kg)	Yield efficiency (2017, kg/cm <sup>2</sup> TCA)	Cumulative yield efficiency (2011-17, kg/cm <sup>2</sup> TCA)	Fruit weight (2017, g)	Average Fruit weight (2012-17, g)
B.9	100	10.2	220	121	9.8	29	9.3	44.0	0.94	4.37	207	204
B.10	96	15.6	257	147	2.4	27	16.0	69.0	1.10	4.57	199	208
B.7-3-150	100	37.0	347	197	2.9	24	22.2	83.7	0.66	2.45	217	224
B.7-20-21	100	36.1	326	189	4.3	29	18.9	81.3	0.58	2.42	209	217
B.64-194	98	41.4	352	198	0.8	25	25.1	90.6	0.65	2.28	223	232
B.67-5-32	100	37.3	343	194	2.6	25	23.1	73.4	0.67	2.14	204	220
B.70-6-8	99	35.6	340	189	1.2	26	17.2	75.9	0.51	2.26	208	217
B.71-7-22	89	3.6	143	59	5.7	44	2.6	12.3	0.73	3.60	161	180
G.11	99	13.6	261	149	5.1	35	15.4	69.9	1.13	5.08	206	208
G.41N	91	17.1	277	162	1.8	30	15.8	75.5	0.99	4.51	220	215
G.41TC	91	14.6	276	159	5.0	39	17.3	69.4	1.15	4.86	200	208
G.202N	94	27.3	308	188	21.1	35	22.2	92.4	0.88	3.62	214	210
G.202TC	95	17.5	285	162	13.9	38	15.3	66.3	0.90	3.88	197	199
G.935N	89	18.7	277	166	16.7	44	13.7	82.5	0.76	4.47	210	204
G.935TC	96	16.9	267	164	21.4	45	14.9	71.2	1.02	4.42	207	202
CG.2034	96	9.4	233	121	3.8	46	8.7	41.0	0.95	4.33	183	195
CG.3001	88	22.5	298	170	2.5	41	20.2	90.6	0.98	4.24	224	213
CG.4003	94	11.5	235	123	2.2	30	10.8	50.1	1.04	4.63	170	180
CG.4004	97	28.9	326	198	11.7	32	21.4	105.7	0.81	3.81	209	215
CG.4013	100	22.4	311	181	19.8	46	15.8	69.6	0.84	3.57	194	205
CG.4214	98	17.7	298	172	32.0	48	18.5	82.0	1.12	4.85	198	202
CG.4814	81	19.5	275	164	17.4	54	16.7	79.4	0.89	4.13	183	185
CG.5087	100	19.3	277	169	7.4	49	15.4	84.2	0.86	4.44	181	185
CG.5222	93	22.9	298	182	23.4	41	17.8	76.5	0.87	3.60	199	207
Supp.3	93	14.1	265	149	5.4	56	9.0	51.3	0.71	3.76	184	192
PiAu 9-90	100	25.6	292	170	4.1	65	12.2	44.9	0.50	1.81	179	171
PiAu 51-11	99	24.9	298	178	4.0	39	17.3	66.4	0.77	2.80	211	222
M.9 NAKBT337	99	15.1	254	148	11.4	36	12.4	62.6	0.88	4.30	209	209
M.9 Pajam 2	99	16.7	259	147	21.3	39	12.5	62.1	0.78	3.81	206	204
M.26 EMLA	97	18.8	275	157	7.6	36	12.6	61.5	0.69	3.37	206	212
Estimated HSD	14	5.0	26	19	8.9	8	6.4	12.9	0.35	0.67	32	18

<sup>2</sup>Mean separation in columns by Tukey's HSD ( $P = 0.05$ ). HSD was calculated based on the average number of observations per mean.

Table 2. Site means for trunk cross-sectional area, root suckers, zonal chlorosis, yield per tree, yield efficiency, and fruit size of Honeycrisp apple trees in the 2010 NC-140 Honeycrisp Apple Rootstock Trial. Means are based on data from BC, MA, MI, MN, NS, NY, OH, and WI. All values are least-squares means, adjusted for missing subclasses.<sup>2</sup>

Rootstock	Survival (2010- 17, %)	Trunk cross- sectional area (2017, cm <sup>2</sup> )	Tree height (2017, cm)	Canopy width (2017, cm)	Cumulative root suckers (2010-17, no./tree)	Average zonal chlorosis (2012-17, % canopy affected)	Yield per tree (2017, kg)	Cumulative yield per tree (2011- 17, kg)	Yield efficiency (2017, kg/cm <sup>2</sup> TCA)	Cumulative yield efficiency (2011-17, kg/cm <sup>2</sup> TCA)	Fruit weight (2017, g)	Average Fruit weight (2012-17, g)
BC	99	14.4	302	163	23.5	47	20.2	55.4	1.43	4.07	232	252
MA	98	21.1	317	174	21.9	47	16.8	68.8	0.87	3.59	224	227
MI	97	20.5	155	150	3.6	49	23.3	76.0	1.23	4.24	190	212
MN	100	22.0	285	170	1.4	38	15.9	68.2	0.75	3.52	109	139
NS	86	18.7	268	138	0.8	33	12.4	61.6	0.62	3.35	187	158
NY	98	25.5	339	215	11.2	27	15.3	85.1	0.69	3.88	273	254
OH	88	25.6	271	96	3.9	45	6.2	47.4	0.33	2.23	216	193
WI	99	20.6	321	192	10.7	22	15.2	93.4	0.84	5.08	175	205
Estimated HSD	7	4.9	25	16	5.5	8	6.0	15.4	0.28	0.45	18	14

<sup>2</sup>Mean separation in columns by Tukey's HSD ( $P = 0.05$ ). HSD was calculated based on the average number of observations per mean.

Table 3. Survival (2010-17, %) of Honeycrisp apple trees at individual planting locations in the 2010 NC-140 Honeycrisp Rootstock Trial.<sup>2</sup>

Rootstock	BC	CH	CO	IA	IL	MA	MI	MN	NS	NY	OH	WI
B.9	100	100	100	100	92	100	100	100	100	100	100	100
B.10	100	89	100	100	100	100	100	100	88	89	89	100
B.7-3-150	100	100	100	90	100	100	100	100	100	100	100	100
B.7-20-21	100	83	100	100	100	100	100	100	100	100	100	100
B.64-194	100	29	100	100	100	100	100	100	100	100	83	100
B.67-5-32	100	70	100	100	100	100	100	100	100	100	100	100
B.70-6-8	100	92	100	100	100	92	100	100	100	100	100	100
B.71-7-22	100	100	100	100	83	100	83	100	83	100	67	83
G.11	100	50	100	100	50	100	100	100	90	100	100	100
G.41N	91	82	100	100	70	100	100	100	70	100	80	90
G.41TC	100	75	100	100	100	100	75	100	50	100	100	100
G.202N	100	0	100	33	67	100	100	100	83	100	67	100
G.202TC	100	50	100	100	83	100	100	100	100	80	83	100
G.935N	90	100	---	100	30	100	100	100	67	100	67	89
G.935TC	100	100	100	100	50	100	100	100	100	100	67	100
CG.2034	100	20	100	100	60	100	100	100	100	100	67	100
CG.3001	100	0	100	100	0	50	100	100	50	100	100	100
CG.4003	100	40	100	100	75	100	100	100	75	100	75	100
CG.4004	100	100	100	100	100	100	100	100	100	100	75	100
CG.4013	100	50	---	100	100	100	100	100	100	100	100	100
CG.4214	100	71	100	100	71	100	100	100	100	100	88	100
CG.4814	100	57	80	100	50	100	86	100	14	100	50	100
CG.5087	100	67	100	100	33	100	100	100	100	100	100	100
CG.5222	100	80	100	---	14	100	100	100	43	100	100	100
Supp.3	100	67	100	0	80	100	80	100	100	83	80	100
PiAu 9-90	100	83	100	100	83	100	100	100	100	100	100	100
PiAu 51-11	100	82	100	100	100	100	100	100	100	100	90	100
M.9 NAKBT337	100	83	100	100	75	100	100	100	100	100	92	100
M.9 Pajam 2	100	50	100	92	75	100	100	100	100	100	92	100
M.26 EMLA	100	33	100	100	63	100	100	100	88	88	100	100
Estimated HSD	18	98	13	26	83	20	34	0	65	34	73	24

<sup>2</sup>Mean separation in columns by Tukey's HSD ( $P = 0.05$ ). HSD was calculated based on the average number of observations per mean.

Table 4. Trunk cross-sectional area (2017, cm<sup>2</sup>) of Honeycrisp apple trees at individual planting locations in the 2010 NC-140 Honeycrisp Rootstock Trial. All values are least-squares means, adjusted for missing subclasses.<sup>z</sup>

Rootstock	BC	CH	CO	IA	IL	MA	MI	MN	NS	NY	OH	WI
B.9	7.7	7.3	8.8	8.0	12.4	9.6	10.1	11.4	10.8	9.4	11.1	11.6
B.10	11.6	12.6	18.9	13.4	26.0	15.7	13.7	15.6	15.9	17.6	19.0	15.5
B.7-3-150	20.7	19.1	43.1	46.1	112.7	38.7	36.0	46.7	23.9	44.9	50.7	34.4
B.7-20-21	22.7	14.2	46.8	38.7	92.2	31.2	31.6	36.0	37.5	41.0	49.3	39.9
B.64-194	21.7	18.4	59.6	38.4	104.3	40.3	46.4	43.5	38.0	48.4	48.1	45.1
B.67-5-32	21.9	16.7	51.2	38.0	84.4	37.9	48.6	43.6	28.7	36.4	46.7	34.4
B.70-6-8	19.5	18.0	44.9	48.5	112.3	39.2	30.1	40.7	27.0	45.5	48.2	34.7
B.71-7-22	2.2	3.9	5.1	4.3	4.2	2.5	4.0	6.6	2.3	4.0	3.4	3.7
G.11	9.6	12.0	19.7	14.1	27.5	13.0	14.2	14.5	12.2	15.0	14.4	15.6
G.41N	14.1	10.5	25.3	14.4	25.2	15.2	15.3	17.7	15.4	20.8	19.9	18.6
G.41TC	11.8	8.6	24.7	18.2	26.8	14.2	18.7	16.2	14.3	15.8	9.8	15.7
G.202N	21.3	---	27.6	36.9	50.7	29.4	21.0	32.0	24.0	29.0	32.2	29.5
G.202TC	10.8	9.5	20.3	20.7	45.1	19.7	14.5	19.4	14.0	26.1	19.1	16.5
G.935N	13.4	9.4	---	18.9	33.6	19.5	18.1	18.9	16.8	22.7	20.5	19.9
G.935TC	11.4	8.1	23.6	13.6	42.0	13.9	15.2	16.4	17.3	20.2	23.4	17.5
CG.2034	9.6	13.2	14.9	11.4	15.4	10.3	9.4	9.6	9.5	8.0	8.0	10.6
CG.3001	18.8	---	30.4	28.5	---	31.3	14.2	21.1	20.7	30.5	26.8	16.2
CG.4003	8.0	8.9	16.3	10.6	14.7	10.3	9.1	11.8	9.4	21.3	10.1	12.3
CG.4004	21.1	15.0	29.4	21.9	48.2	28.1	25.2	36.3	29.0	27.7	34.4	29.2
CG.4013	11.7	13.3	---	39.5	54.9	22.0	24.9	15.4	18.7	33.0	41.1	12.3
CG.4214	10.6	7.5	17.9	16.7	37.8	21.5	18.5	18.2	17.9	21.8	18.4	14.7
CG.4814	15.0	12.1	23.9	30.5	30.8	19.8	18.0	19.4	19.2	24.7	19.9	20.1
CG.5087	16.5	9.8	22.2	17.7	33.5	18.4	16.8	19.1	16.1	24.4	21.7	21.2
CG.5222	16.4	9.6	29.1	---	32.0	23.3	20.0	19.4	23.7	24.6	36.8	18.7
Supp.3	10.3	10.7	25.2	---	14.5	12.7	15.3	14.4	12.7	19.1	16.2	11.7
PiAu 9-90	25.0	18.0	41.6	17.9	44.1	27.5	23.6	19.3	17.5	41.5	27.1	22.9
PiAu 51-11	11.7	13.8	31.8	35.8	94.5	24.3	32.2	25.2	21.2	31.6	28.6	24.6
M.9 NAKBT337	10.0	9.0	20.9	13.0	30.4	14.6	14.2	15.6	12.8	19.6	20.5	13.7
M.9 Pajam 2	12.3	8.9	24.2	17.3	32.6	13.9	16.3	17.6	14.4	20.3	20.8	17.6
M.26 EMLA	15.0	15.5	24.6	21.3	44.1	14.8	21.3	19.3	19.5	20.6	21.6	18.2
Estimated HSD	8.9	6.2	27.7	21.2	34.1	12.5	14.4	16.3	13.1	16.7	16.4	16.3

<sup>z</sup>Mean separation in columns by Tukey's HSD ( $P = 0.05$ ). HSD was calculated based on the average number of observations per mean.

Table 5. Cumulative yield per tree (2011-17, kg) of Honeycrisp apple trees at individual planting locations in the 2010 NC-140 Honeycrisp Rootstock Trial. All values are least-squares means, adjusted for missing subclasses.<sup>z</sup>

Rootstock	BC	CH	CO	IA	IL	MA	MI	MN	NS	NY	OH	WI
B.9	32.5	6.8	12.3	26.0	22.8	41.3	56.7	37.2	38.3	54.8	31.9	59.4
B.10	52.9	12.9	17.3	34.8	46.7	70.6	74.2	57.3	60.6	93.0	49.2	94.3
B.7-3-150	61.4	17.9	24.3	48.0	39.1	78.3	90.8	107.6	58.2	103.5	47.0	123.0
B.7-20-21	61.9	9.7	24.6	44.4	37.3	76.9	86.1	80.8	94.8	94.3	52.2	103.5
B.64-194	60.2	16.0	18.0	43.8	34.3	71.3	97.4	105.6	106.1	100.1	49.4	134.7
B.67-5-32	61.2	11.6	15.8	39.7	26.4	66.8	96.7	76.5	70.1	71.2	44.1	100.4
B.70-6-8	51.6	13.9	16.5	41.2	39.5	85.7	65.7	94.6	61.1	98.2	42.0	108.6
B.71-7-22	9.8	2.5	2.1	13.5	13.0	8.4	17.5	17.2	5.6	15.1	8.2	16.5
G.11	44.9	18.5	18.2	55.6	48.0	69.9	91.0	76.4	39.2	88.6	51.9	97.4
G.41N	57.1	9.5	22.2	43.2	45.9	77.1	85.9	76.7	63.0	94.7	39.6	109.6
G.41TC	56.1	7.7	24.8	41.8	38.7	58.6	95.0	69.9	67.1	86.9	23.3	98.2
G.202N	82.8	---	20.4	31.3	68.5	110.8	90.6	87.2	98.2	96.8	67.1	105.7
G.202TC	42.2	19.8	20.9	45.6	42.9	82.4	67.7	73.3	43.9	91.0	48.2	81.2
G.935N	67.6	11.3	---	39.2	71.4	101.1	87.0	65.7	56.2	92.5	57.1	132.5
G.935TC	53.3	8.7	16.1	35.9	50.6	60.3	79.6	61.5	53.6	86.7	60.3	114.5
CG.2034	39.3	7.4	6.7	28.3	26.1	41.6	44.3	44.4	25.3	34.9	29.9	68.2
CG.3001	78.4	---	13.8	70.8	---	126.2	71.0	76.0	102.8	118.1	59.6	93.0
CG.4003	41.7	17.4	12.2	32.0	25.6	54.1	47.7	46.4	39.0	70.8	22.7	78.2
CG.4004	84.2	20.3	22.9	61.1	67.0	108.0	110.5	107.1	109.6	102.4	74.9	148.9
CG.4013	47.2	9.1	---	41.3	37.0	93.1	94.8	63.1	69.4	74.5	56.7	58.3
CG.4214	63.2	10.9	25.5	37.6	49.4	70.8	91.5	86.1	86.2	97.0	63.5	97.6
CG.4814	72.5	14.0	22.7	51.6	61.4	70.9	92.8	85.6	57.1	110.0	53.3	93.0
CG.5087	81.4	12.3	17.6	43.4	28.3	69.9	76.8	80.7	82.0	98.9	69.1	114.6
CG.5222	64.2	8.9	16.0	---	68.8	65.8	83.0	62.7	84.6	88.1	61.8	101.7
Supp.3	53.2	7.2	10.5	---	14.5	43.3	46.5	42.8	34.3	84.0	32.2	74.2
PiAu 9-90	57.2	11.6	11.9	18.4	15.6	31.2	31.0	28.1	32.7	75.2	46.2	57.7
PiAu 51-11	40.3	10.1	18.6	42.9	32.2	60.7	81.4	63.6	61.4	91.5	49.0	83.0
M.9 NAKBT337	46.4	11.3	25.9	39.6	58.4	67.6	78.9	61.9	39.9	87.8	47.3	71.1
M.9 Pajam 2	47.7	7.8	28.9	30.4	47.6	48.9	73.3	58.2	39.4	80.4	45.3	103.4
M.26 EMLA	50.5	3.6	20.1	50.6	67.3	52.7	74.8	52.4	69.5	71.9	40.3	80.2
Estimated HSD	26.9	9.0	14.3	20.3	37.8	35.0	41.6	36.5	48.3	37.4	27.8	44.4

<sup>z</sup>Mean separation in columns by Tukey's HSD ( $P = 0.05$ ). HSD was calculated based on the average number of observations per mean.

Table 6. Cumulative yield efficiency (2011-17, kg/cm<sup>2</sup> trunk cross-sectional area) of Honeycrisp apple trees at individual planting locations in the 2010 NC-140 Honeycrisp Rootstock Trial. All values are least-squares means, adjusted for missing subclasses.<sup>2</sup>

Rootstock	BC	CH	CO	IA	IL	MA	MI	MN	NS	NY	OH	WI
B.9	4.10	0.96	1.34	3.30	2.14	4.33	5.71	3.28	3.66	5.81	2.92	5.13
B.10	4.69	1.01	0.92	2.66	1.89	4.59	5.47	3.84	3.83	5.35	2.64	6.12
B.7-3-150	3.02	0.96	0.63	1.54	0.33	2.06	2.62	2.34	2.48	2.36	0.93	3.79
B.7-20-21	2.74	0.71	0.63	1.23	0.44	2.57	2.93	2.31	2.62	2.36	1.06	2.77
B.64-194	2.75	0.80	0.32	1.15	0.30	1.76	2.14	2.63	2.79	2.13	1.04	3.02
B.67-5-32	2.83	0.75	0.32	1.10	0.32	1.90	1.99	1.83	2.47	2.08	1.07	2.99
B.70-6-8	2.70	0.79	0.43	0.91	0.37	2.24	2.21	2.38	2.29	2.21	0.90	3.18
B.71-7-22	4.48	0.63	0.72	3.23	2.70	3.31	4.26	3.38	2.41	3.90	2.63	4.48
G.11	4.51	1.53	0.98	4.05	2.04	5.30	6.44	5.21	3.14	5.93	3.73	6.35
G.41N	4.04	0.90	0.89	3.10	1.98	4.95	5.87	4.35	4.09	4.62	2.02	6.10
G.41TC	4.65	0.91	1.08	2.24	1.56	4.13	5.22	5.79	4.87	5.49	2.41	6.34
G.202N	3.90	---	0.67	0.83	1.31	3.82	4.24	3.04	4.08	3.78	2.32	3.77
G.202TC	3.80	2.11	1.16	2.29	0.96	4.10	4.67	3.84	2.99	4.07	2.55	5.01
G.935N	4.98	1.24	---	2.17	2.46	5.15	4.82	3.61	3.28	4.22	2.84	6.86
G.935TC	4.98	1.11	0.68	2.79	1.08	4.14	5.21	3.78	3.14	4.43	2.68	6.99
CG.2034	4.01	0.50	0.54	2.60	1.72	3.85	4.71	4.57	2.65	4.61	3.79	6.48
CG.3001	4.15	---	0.39	2.58	---	4.02	4.80	3.60	5.09	3.94	2.24	6.12
CG.4003	5.35	1.81	0.92	2.89	1.64	5.12	5.25	4.09	4.08	4.54	2.25	6.36
CG.4004	3.98	1.37	0.80	2.81	1.51	3.85	4.39	3.13	3.89	3.74	2.20	5.26
CG.4013	4.02	0.66	---	1.17	0.70	4.03	4.03	4.17	3.74	2.36	1.37	4.82
CG.4214	5.96	1.42	1.45	2.32	1.37	3.30	5.05	4.78	4.79	4.49	3.69	6.73
CG.4814	4.79	1.17	0.96	1.79	2.18	3.64	5.20	4.49	2.93	4.51	2.75	4.69
CG.5087	4.96	1.29	0.73	2.57	1.03	3.77	4.65	4.26	5.04	4.20	3.10	5.52
CG.5222	3.89	0.92	0.59	---	2.18	2.90	4.21	3.35	3.51	3.76	1.66	5.56
Supp.3	5.04	0.73	0.45	---	1.40	3.37	3.26	3.27	2.52	4.45	1.97	6.23
PiAu 9-90	2.45	0.64	0.41	1.06	0.43	1.28	1.30	1.67	1.51	1.88	1.84	2.52
PiAu 51-11	3.44	0.74	0.62	1.41	0.39	2.54	2.58	2.55	2.93	2.97	1.79	3.59
M.9 NAKBT337	4.57	1.28	1.25	3.47	1.91	4.67	5.62	3.99	3.24	4.69	2.39	5.23
M.9 Pajam 2	3.81	0.88	1.20	1.77	1.55	3.53	4.57	3.44	2.77	4.07	2.29	5.99
M.26 EMLA	3.42	0.18	0.91	2.39	1.74	3.56	3.76	2.78	3.53	3.49	1.91	4.48
Estimated HSD	1.66	0.78	0.87	1.72	1.51	1.39	1.99	2.47	1.72	1.88	1.98	2.08

<sup>2</sup>Mean separation in columns by Tukey's HSD ( $P = 0.05$ ). HSD was calculated based on the average number of observations per mean.

Table 7. Average fruit size (2012-17, g) of Honeycrisp apple trees at individual planting locations in the 2010 NC-140 Honeycrisp Rootstock Trial. All values are least-squares means, adjusted for missing subclasses.<sup>2</sup>

Rootstock	BC	CH	CO	IA	IL	MA	MI	MN	NS	NY	OH	WI
B.9	260	194	159	152	174	227	201	146	156	224	211	207
B.10	250	238	204	165	212	240	205	138	162	249	202	216
B.7-3-150	250	177	218	207	215	262	241	175	152	284	200	230
B.7-20-21	234	180	239	188	229	237	220	145	169	276	206	245
B.64-194	239	167	230	191	247	249	249	170	202	283	218	247
B.67-5-32	234	181	237	196	221	252	240	149	183	258	208	236
B.70-6-8	263	192	220	189	234	248	204	155	158	274	198	234
B.71-7-22	224	286	145	125	208	158	220	114	142	193	204	187
G.11	254	188	211	152	194	240	213	115	155	255	221	209
G.41N	287	195	228	168	213	244	228	144	166	269	185	201
G.41TC	248	249	225	189	233	245	214	162	171	265	175	183
G.202N	267	---	225	141	206	244	206	135	161	249	215	200
G.202TC	212	176	192	189	197	225	209	149	140	251	194	212
G.935N	252	215	---	166	187	228	208	146	158	252	200	191
G.935TC	240	195	185	170	171	220	214	127	162	253	202	196
CG.2034	269	172	187	173	219	204	216	138	142	234	186	175
CG.3001	277	---	194	195	---	246	185	118	205	284	200	188
CG.4003	259	199	213	144	183	195	197	109	134	215	153	173
CG.4004	285	181	232	184	228	248	214	154	170	252	190	211
CG.4013	241	181	---	195	205	220	189	151	166	267	207	201
CG.4214	269	189	222	173	217	235	212	117	164	257	179	185
CG.4814	252	189	224	189	177	220	181	109	133	257	151	175
CG.5087	233	198	237	163	248	210	186	126	152	240	162	172
CG.5222	270	169	214	---	199	221	206	141	142	249	227	201
Supp.3	268	223	224	---	175	210	189	130	130	253	170	190
PiAu 9-90	200	178	193	121	144	171	181	93	114	243	167	199
PiAu 51-11	245	181	196	195	264	246	234	155	180	268	199	250
M.9 NAKBT337	267	244	225	178	220	230	214	146	161	263	187	205
M.9 Pajam 2	246	223	233	168	206	218	225	144	146	247	191	216
M.26 EMLA	265	176	211	182	222	224	248	158	149	249	198	209
Estimated HSD	75	206	92	39	81	44	63	49	54	40	54	38

<sup>2</sup>Mean separation in columns by Tukey's HSD ( $P = 0.05$ ). HSD was calculated based on the average number of observations per mean.

Table 8. Rootstocks were distributed among seven vigor classes. Distribution among categories were made relative to the trunk cross-sectional area of trees on M.9 NAKBT337: 0-40% sub-dwarf, 40-80% small dwarf, 80-110% moderate dwarf, 110-130% large dwarf, 130-150% small semi-dwarf, 150-200% moderate semidwarf, and 200+% large semidwarf. Within class, rootstocks are ordered highest to lowest based on cumulative (2011-17) yield efficiency. These 2010 NC-140 Honeycrisp Apple Rootstock Trial data are from BC, MA, MI, MN, NS, NY, OH, and WI. All values are least-squares means, adjusted for missing subclasses.<sup>2</sup>

Vigor class	Rootstock	Trunk cross-sectional area (2016, cm <sup>2</sup> )	Cumulative yield efficiency (2011-17, kg/cm <sup>2</sup> TCA)
Large semi-dwarf	B.7-3-150	37.0	2.45
	B.7-20-21	36.1	2.42
	B.64-194	41.4	2.28
	B.70-6-8	35.6	2.26
	B.67-5-32	37.3	2.14
Moderate semi-dwarf	CG.4004	28.9	3.81
	G.202N	27.3	3.62
	CG.5222	22.9	3.60
	PiAu 51-11	24.9	2.80
	PiAu 9-90	25.6	1.81
Small semi-dwarf	CG.3001	22.5	4.24
	CG.4013	22.4	3.57
Large dwarf	CG.4214	17.7	4.85
	G.41N	17.1	4.51
	G.935N	18.7	4.47
	CG.5087	19.3	4.44
	G.935TC	16.9	4.42
	CG.4814	19.5	4.13
	G.202TC	17.5	3.88
	M.9 Pajam 2	16.7	3.81
M.26 EMLA	18.8	3.37	
Moderate dwarf	G.11	13.6	5.08
	G.41TC	14.6	4.86
	B.10	15.6	4.57
	M.9 NAKBT337	15.1	4.30
	Supp.3	14.1	3.76
Small dwarf	CG.4003	11.5	4.63
	B.9	10.2	4.37
	CG.2034	9.4	4.33
Sub-dwarf	B.71-7-22	3.6	3.60
Estimated HSD		5.0	0.67

<sup>2</sup>Mean separation in columns by Tukey's HSD ( $P = 0.05$ ). HSD was calculated based on the average number of observations per mean.



