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New Honeycrisp Rootstocks for Nova Scotia

FactSheet

Field Services

No other factor influences the potential success or failure of an orchard planting as much as rootstock selection. After the orchard is established, cultivars can be changed by grafting, however, a poor performing rootstock must either be tolerated or the orchard removed. Rootstock selection influences everything from mature tree size, productivity, fruit size, to fruit colour and quality while also having varying levels of susceptibility to diseases and pests, cold hardiness, and compatibility with the scion cultivar. A suitable rootstock is one that is well matched to the orchard system spacing, soil type, cultivar, and intensity of management. There is no one perfect combination for all orchards, the orchard manager must select a rootstock which is best suited to the individual site. Fortunately, apples have the largest range in size-controlling rootstocks available of all tree fruit crops. This leaves an orchard manager with a lot of choices in selecting a rootstock, however, it also makes the rootstock selection process for apple orchards more complex than for other tree fruit plantings.

To support growers with rootstock selection, a group has been established to evaluate the performance of tree fruit rootstocks across North America. The NC 140 group is a collaborative research project involving a number of researchers and extension personnel to improve tree fruit production through rootstock development. Dr. Suzanne Blatt of Agriculture and Agri-Food Canada (AAFC) is currently a member of NC-140 for Nova Scotia. For more information on the NC-140 group, see http://www.nc140.org/.

One of the more recent trials of the NC-140 is a Honeycrisp rootstock planting established in 2010 which includes a site at the Kentville Agriculture Centre in Kentville, Nova Scotia and 9 other replicate locations across North America. The trial consists of 30 rootstock selections from various breeding programs around the world compared to commercial standards of M.26 EMLA, M.9 Pajam 2, M.9 NAKBT337, and B.9. Not all of the rootstocks in testing have been commercially released to date. The trial is planted at 4' x 12' spacing with all trees managed to the tall spindle production system. Data is recorded on cumulative yield, cumulative yield efficiency, fruit size, rootstock suckers, and zonal chlorosis of the leaf. In addition, further data has been collected by AAFC on pest and disease pressure as well as storage quality and disorders such as bitter pit.

The Kentville site of the Honeycrisp rootstock trial was established on moderately well-drained, sandy-loam soil. It is expected this soil type would provide about a medium vigour response compared with higher vigour clay-loam and loam soils and lower

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vigour sandy and/or gravelly soils. The site was previously planted with apple orchard and fumigated prior to establishment of the trial to minimize effects of apple replant disease. All trees are managed for diseases and pests according to standard conventional practices. Fruit are hand-thinned in late June/ early July to a crop load of 6-7 fruits cm^2 trunk cross-sectional area. No foliar calcium sprays are used on the trial and a sample of harvested fruit are placed immediately into refrigerated air storage at 4°C without delayed cooling or additional treatments in order to evaluate storage quality and disorders.

Summary data are now available through the 2015 season, or the 6th leaf of production, which gives a reasonable indication of the mature potential for each rootstock with Honeycrisp in Nova Scotia. Based on the 2010 trial performance to date, the following tables provide some recommendations and analysis for rootstock selection for Honeycrisp. A brief summary of rootstock recommendations for Honeycrisp is provided below (Table 1). The relative performance of each rootstock in Nova Scotia is also compared with the NC-140 trial average for key indicators (Table 2) and additional comments are provided in the final table (Table 3).

Table 1: Rootstock recommendations for Honeycrisp based on comparable size class.

Comparable Size Class	Recommended	Consider	Avoid
M.7		CG.4004	
M.26 --> M.7		G.202, CG.5222	
M.26	CG.4214	CG.3001 (note not G.30)	CG.4814, G.935
M.9 Pajam 2	B.10	G.41, M.9 NAKBT337	Supporter 3
B.9	B.9, M.9 NAKBT337	G.11	

Please note the analysis and recommendations provided in this factsheet are based on data from the 2010 NC-140 Honeycrisp rootstock trial and indicate performance to date. It may not accurately reflect performance of these rootstocks in all situations, such as when grown in other locations, under different management systems, and/or when grown with other apple cultivars.

Update posted July 2020: G.202 is no longer recommended.
G.202 is no longer recommended due to poor local performance such as weak and spindly growth in commercial plantings. Please contact Perennia's Tree Fruit Specialist for more information.

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Table 2. Performance (actual data and rank) of the 2010 Honeycrisp rootstock trial in Nova Scotia and averaged across the 10 NC-140 trial sites.

2010 NC 140 Honeycrisp Trial Data	Trunk cross-sectional area (TCSA 2015, cm2)				Cumulative yield per tree (2011-15, kg)				Cumulative yield efficiency (2011-15, kg/cm2 TCSA)				Average fruit size (2012-15, g)				Average bitter pit (%) per 25 fruit sample (2012-2015, NS only)	
	Data		Rank		Data		Rank		Data		Rank		Data		Rank		Data	Rank
Rootstock	NC140	NS	NS	NC140	NC140	NS	NS	NC140	NC140	NS	NS	NC140	NC140	NS	NS	NC140	NS	NS
B.64-194	26.0	30.7	1	1	40.3	62.1	4	8	1.5	2.0	24	28	238.9	196.3	3	3	5.9	11
B.7-20-21	24.0	29.6	2	2	39.6	56.1	6	9	1.7	1.9	25	25	227.1	177.8	7	8	9.6	18
CG.4004	20.8	26.3	3	7	54.3	77.2	1	1	2.8	3.1	9	16	237.3	253.0	2	4	9.0	17
B.67-5-32	23.1	21.9	4	4	31.5	37.9	13	24	1.4	1.7	29	29	234.8	190.5	4	6	8.7	16
G.202N	21.0	21.2	5	6	45.3	60.3	5	4	2.3	2.8	10	22	215.8	154.2	22	19	0.8	2
B.70-6-8	21.5	20.8	6	5	37.1	35.5	16	13	1.6	1.7	28	27	226.0	177.5	8	10	0.7	1
CG.5222	17.8	19.8	7	11	38.7	54.3	7	10	2.3	2.8	11	21	214.1	141.8	26	20	5.1	6
B.7-3-150	22.5	17.8	8	3	38.2	32.9	18	11	1.7	1.9	26	26	240.7	170.4	10	2	5.8	9
CG.3001	18.4	17.8	9	10	53.5	63.1	3	2	3.1	3.7	3	8	230.9	180.2	6	7	8.0	13
CG.4814	16.2	16.4	10	12	42.2	37.5	14	6	2.6	2.2	21	17	213.0	123.2	29	22	10.0	20
M.26 EMLA	14.0	15.5	11	16	32.2	41.3	10	23	2.4	2.7	12	20	225.4	148.3	23	12	14.4	24
PiAu 9-90	17.8	15.4	12	8	22.1	22.9	27	27	1.2	1.2	30	30	176.1	120.8	30	30	8.5	14
CG.4214	13.8	15.0	13	17	41.9	51.2	9	7	3.2	3.4	6	5	217.3	164.4	15	15	4.3	5
PiAu 51-11	17.9	14.8	14	9	32.6	34.2	17	20	1.9	2.5	14	24	234.9	180.4	5	5	12.2	21
CG.4013	16.0	14.6	15	13	32.2	36.6	15	22	2.2	2.5	15	23	217.2	167.0	14	16	27.1	30
G.935TC	11.8	14.5	16	20	36.4	32.1	19	14	3.1	2.3	18	9	209.0	157.0	19	24	15.7	26
CG.5087	14.7	13.9	17	14	45.7	52.8	8	3	2.9	3.8	2	12	209.1	155.0	21	23	17.5	27
G.935N	14.4	13.5	18	15	42.4	31.7	20	5	3.0	2.3	17	10	213.4	162.6	16	21	14.0	23
G.41TC	12.2	12.0	19	21	36.3	71.1	2	16	3.1	6.4	1	7	240.9	305.6	1	1	20.1	28
M.9 Pajam 2	12.0	11.8	20	19	32.3	23.3	26	21	2.6	2.0	23	18	216.0	147.5	24	18	5.8	10
G.41N	11.2	11.6	21	22	37.7	41.2	11	12	3.2	3.5	5	4	226.4	169.3	12	9	13.9	22
B.10	11.2	11.4	22	24	34.9	38.3	12	18	3.2	3.5	4	3	216.5	170.0	11	17	3.3	4
G.202TC	12.0	11.1	23	18	35.9	27.0	21	17	2.8	2.3	19	14	201.4	138.0	27	27	6.3	12
M.9 NAKBT337	11.0	10.3	24	23	33.0	24.4	24	19	3.0	2.5	13	11	225.9	170.6	9	11	2.8	3
Supp.3	10.7	10.2	25	26	26.5	21.4	28	26	2.5	1.9	27	19	208.2	145.2	25	25	23.0	29
G.11	10.7	9.7	26	25	36.4	24.0	25	15	3.4	2.4	16	1	217.5	161.1	18	14	9.6	19
CG.4003	8.9	8.0	27	27	29.2	26.8	22	25	3.4	3.3	8	2	198.6	136.6	28	28	5.5	8
B.9	7.1	8.0	28	29	21.9	24.5	23	28	3.1	3.3	7	6	203.5	168.0	13	26	8.6	15
CG.2034	7.5	7.1	29	28	21.3	15.7	29	29	2.8	2.3	20	13	218.4	161.5	17	13	15.2	25
B.71-7-22	2.7	1.7	30	30	7.1	3.7	30	30	2.8	2.0	22	15	189.7	156.8	20	29	5.4	7

Biggest --->

<--- Smallest

Colour Code: Non-Commercial | Industry Standard | Recommended | Consider | Avoid

Table 3. Rootstock size, commercial status, recommendations, and strength(s) and weakness(es) for Honeycrisp based on NC-140 performance.

Biggest --->

<--- Smallest

Rootstock	Size	Status	Recommended?	Strength(s) Rating Based on NS Ranking 1-6=Excellent (Bitter Pit=Very Low) 7-12=Good (Bitter Pit=Low) 13-15=Moderate			Weakness(es) Rating Based on NS Ranking 25-30=Poor (Bitter Pit=Very High) 19-24=Low (Bitter Pit=High) 16-18=Moderate		
				Yield Efficiency	Fruit Size	Bitter Pit	Yield Efficiency	Fruit Size	Bitter Pit
B.64-194	M.7	Non-Commercial	Avoid		Excellent	Low	Low		
B.7-20-21	M.7	Non-Commercial	Avoid		Good		Poor		Moderate
CG.4004	M.7	Non-Commercial	Consider	Good	Excellent				Moderate
B.67-5-32	M.26 ---> M.7	Non-Commercial	Avoid		Excellent		Poor		Moderate
G.202N	M.26 ---> M.7	Commercial	Consider	Good		Very Low		Low	
B.70-6-8	M.26 ---> M.7	Non-Commercial	Avoid		Good	Very Low	Poor		
CG.5222	M.26 ---> M.7	Commercial	Consider	Good		Very Low		Poor	
B.7-3-150	M.26	Non-Commercial	Avoid		Good	Low	Poor		
CG.3001	M.26	Non-Commercial	Consider	Excellent	Excellent	Moderate			
CG.4814[1]	M.26	Commercial	Avoid				Low	Poor	High
M.26 EMLA	-	Industry Standard		Good				Low	High
PiAu 9-90	M.26	Non-Commercial	Avoid			Moderate	Poor	Poor	
CG.4214	M.26	Commercial	Recommended	Excellent	Moderate	Very Low			
PiAu 51-11	M.9--->M.26	Non-Commercial	Avoid	Moderate	Excellent				High
CG.4013	M.9--->M.26	Non-Commercial	Avoid	Moderate	Moderate				Very High
G.935TC	M.9--->M.26	Commercial	Avoid				Moderate	Low	Very High
CG.5087	M.9--->M.26	Non-Commercial	Avoid	Excellent				Low	Very High
G.935N	M.9--->M.26	Commercial	Avoid				Moderate	Moderate	High
G.41TC	M.9 Pajam 2	Commercial	Consider	Excellent	Excellent				Very High
M.9 Pajam 2	-	Industry Standard				Low	Low	Low	
G.41N	M.9 Pajam 2	Commercial	Consider	Excellent	Good				High
B.10	M.9 Pajam 2	Commercial	Recommended	Excellent	Good	Very Low			
G.202TC	M.9 Pajam 2	Commercial	Consider			Low	Low	Poor	
M.9 NAKBT337	-	Industry Standard		Moderate	Good	Very Low			
Supp.3	M.9 T337	Commercial	Avoid				Poor	Poor	Very High
G.11	B.9	Commercial	Consider				Moderate	Moderate	High
CG.4003	B.9	Non-Commercial	Avoid	Good		Low		Poor	
B.9[2]	-	Industry Standard		Good	Moderate	Moderate			
CG.2034	B.9	Non-Commercial	Avoid				Low	Moderate	Very High
B.71-7-22	Sub Dwarf	Non-Commercial	Avoid			Low	Low	Low	

Notes: [1]CG.4814 has had significant graft union failure with Honeycrisp in Nova Scotia; [2]Can be difficult to adequately fill space which might also occur for similar-sized rootstocks.