

Introduction:

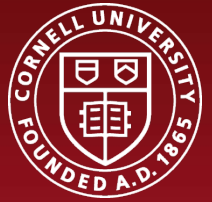
The joint Cornell University and United States Department of Agriculture-Agricultural Research Service (USDA-ARS) Apple Rootstock Breeding and Evaluation Program develops new rootstock cultivars with an emphasis on productivity, yield efficiency, ease of nursery propagation, fire blight resistance, tolerance to extreme temperatures, resistance to the soil pathogens of the sub-temperate regions of the US, and tolerance to apple replant disorder.

In many trials in North America and other worldwide locations all of the released GENEVA® rootstocks have demonstrated a “per acre productivity” and “tree yield efficiency” similar or higher than current commercial standards M.9 and M.26.

General Characteristics of GENEVA® Apple Rootstocks

- Disease resistance
 - Fire blight
 - Crown and root rots (*Phytophthora*)
 - Replant disease complex*
- Pest resistance
 - Woolly apple aphid*
- Other characteristics
 - All are dwarf types that differ within dwarf sizes
 - Cold hardiness*

*Applies to some GENEVA® Apple Rootstocks.

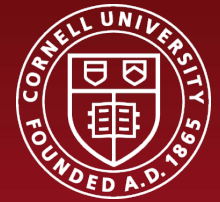


Contact:
Jessica Lyga,
Technology
Licensing Officer

Office:
607-255-0270

E-mail:
JML73@cornell.edu

GENEVA® APPLE ROOTSTOCKS COMPARISON CHART v.4



GENEVA® Apple Rootstocks													
Traits	D1148	D1147	D3610	D3539	D4950	D6263	D3609	D4190	D2737	D4951	D3785	D3540	D5107
	G.11	G.16	G.41 ^(a)	New! G.213	G.214	New! G.814	G.935	G.222	G.202	G.969	G.30	G.210	G.890
Arranged in order by size (smallest to largest)	M.9 T337	M.9 T337	M.9 T337	M.9 T337	M.9/M.26	M.9/M.26	M.26	M.26	M.26	M.7	M.7	M.7	M.7/ MM.106
Woolly Apple Aphid Resistance	No	No	High	High	High	No	No	High	High	High	No	High	High
Fire Blight Resistance	Resistant	Resistant	Very Resistant	Very Resistant	Very Resistant	Very Resistant	Very Resistant	Very Resistant	Very Resistant	Very Resistant	Very Resistant	Very Resistant	Very Resistant
Replant Disease Complex Resistance	Partial	Partial	Tolerant	Tolerant	Tolerant	Tolerant	Tolerant	No	Tolerant	Tolerant	Tolerant	Tolerant	Tolerant
Crown and Root Rots (Phytophthora)	Tolerant	Tolerant	Tolerant	Tolerant	Tolerant	Tolerant	Tolerant	Tolerant	Tolerant	Tolerant	Tolerant	Tolerant	Tolerant
Cold Hardiness	Yes	Partial: Good Mid-winter, Bad early-cold	Yes	TBD	Yes	Yes	Yes	Yes	Yes	Yes-Good, Mid-winter	Yes	Yes	Yes
Productivity/Yield Efficiency- as good or better than M.9	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Low suckering and burr knots	Yes	Yes	Yes	Yes	Yes	Medium	Yes	Medium	Yes	Yes	Yes	Yes	Yes
Susceptibility to latent viruses	No	Yes	No	No	No	Yes	Yes	No	No	No	No	No	No

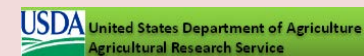
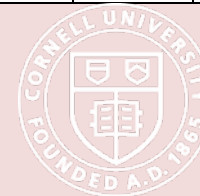
TBD: To Be Determined.

(a) Remarks: G.41 has presented weak graft unions with the following scions: Cripps Pink, Scilate, and Honeycrisp. The well feathered trees are prone to breakage in strong winds in the first 2-3 years and additional care needs to be taken to prevent breakage. Breakage risk decreases with time.

Recommendation: Use plant materials that have been tested and are "clean" of viruses.

Licensing for all varieties is available as exclusive or non-exclusive in selected Domestic and International Territories.

Chart data valid as of September 20, 2018, and supplied by Cornell University apple rootstock breeding team members, Gennaro Fazio, PhD., USDA Breeder, Terence Robinson, PhD, Cornell Breeder, and Herb Aldwinckle, PhD., Professor Emeritus.



Contact:
Jessica Lyga,
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Licensing Officer

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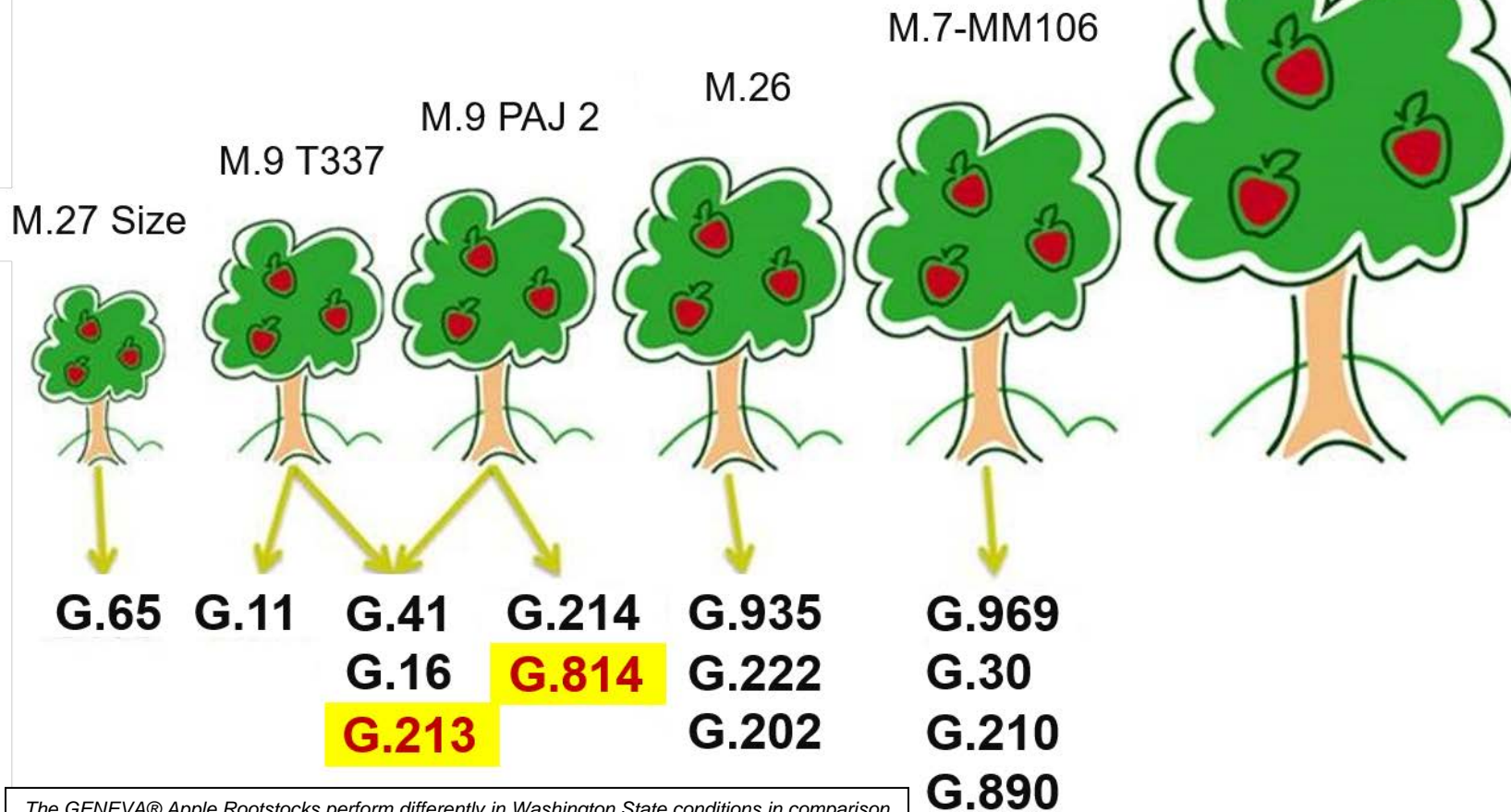
E-mail:
JML73@cornell.edu

Released GENEVA® Apple Rootstocks Arranged by Tree Size



Seedling Size

New Releases



The GENEVA® Apple Rootstocks perform differently in Washington State conditions in comparison to the data displayed here that was collected in New York State.

Please contact your local extension agent for growing predictions for these varieties in your region.

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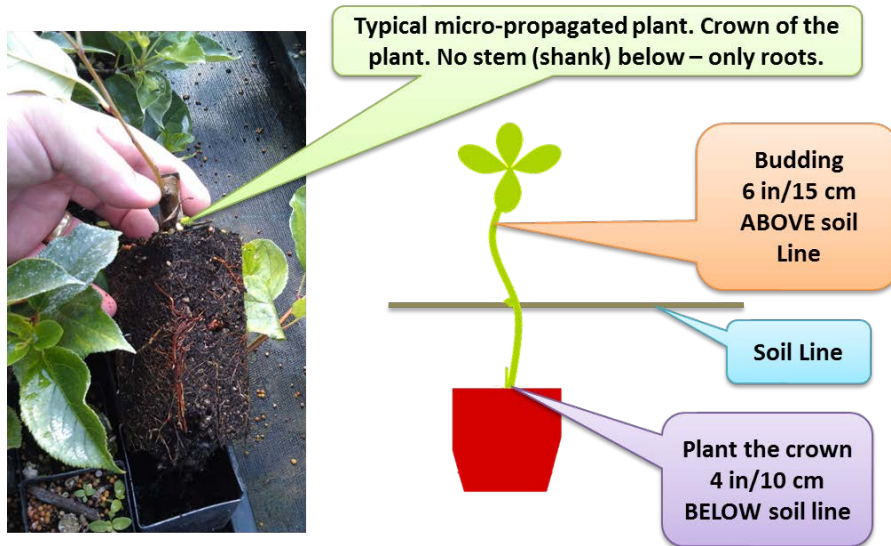
E-mail:
JML73@cornell.edu

Geneva® Apple Rootstock Technical Bulletin:

Plants derived from in-vitro culture (micropropagation) to be used directly as liners.

As the implementation of micropropagation of Geneva rootstocks is becoming widespread we have a few recommendations and suggestions about the nursery phase of such material:

1. Micropropagation nurseries need to stress the importance of the recommended planting method for the in-vitro plantlets when planting into the field. It is very important to have a rootstock stem (shank) on the tree that is planted a minimum of 4 in/10 cm below soil line and budded 6 in/15 cm above soil line. The problem arises because the in-vitro plants have root systems that are at the soil line of the pot (crown). Part of the traits of apple rootstocks is provided by the shank, and if there is no or little shank, then the properties of dwarfing and precocity are reduced – reducing potential yield.
2. The material is usually very delicate compared to normal liners, therefore planting in good weather conditions and providing moisture and other nursery care is very important to produce successful liners.



Scientific Contact:

Gennaro Fazio

315-787-2480

gennaro.fazio@ars.usda.gov

630 W. North St., Geneva, NY

www.ars.usda.gov/



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