



COMPARISON CHART v.5

Rooted in Innovation, Harvesting Success

The apple rootstock breeding program is a decades-long partnership between Cornell University and USDA.

This program develops disease and pest-resistant rootstocks to boost orchard productivity, allowing orchardists to tailor apple cultivation with precision by matching the strengths and weaknesses of complex environments.

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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*



GENEVA® APPLE ROOTSTOCKS COMPARISON CHART v.5

	D1148	D1147	D3539	D3610	D4950	D6263	D4190	D3609	D7656	D4951	D2737	D7877	D9997	D3785	D3540	D5107
	G.11	G.16	G.213	G.41	G.214	G.814	G.222	G.935	G.484	G.969	G.202	G.66	G.257	G.30	G.210	G.890
Size (small to large)	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.26	M.26- M.7	M.7	M.7	M.7	M.7/ MM.106
Wolly Apple Aphid Resistance																
Fire Blight Resistance	R	R	VR	VR	VR	VR	VR	VR	VR	VR	VR	VR	VR	VR	VR	VR
Replant Disease Complex Tolerance																
Crown and Root Rots (Phytophthora)																
Cold Hardiness			TBD													
Productivity/ Yield Efficiency																
Low suckering and burr knots																
Sensitivity to latent viruses**																

* Good mid-winter

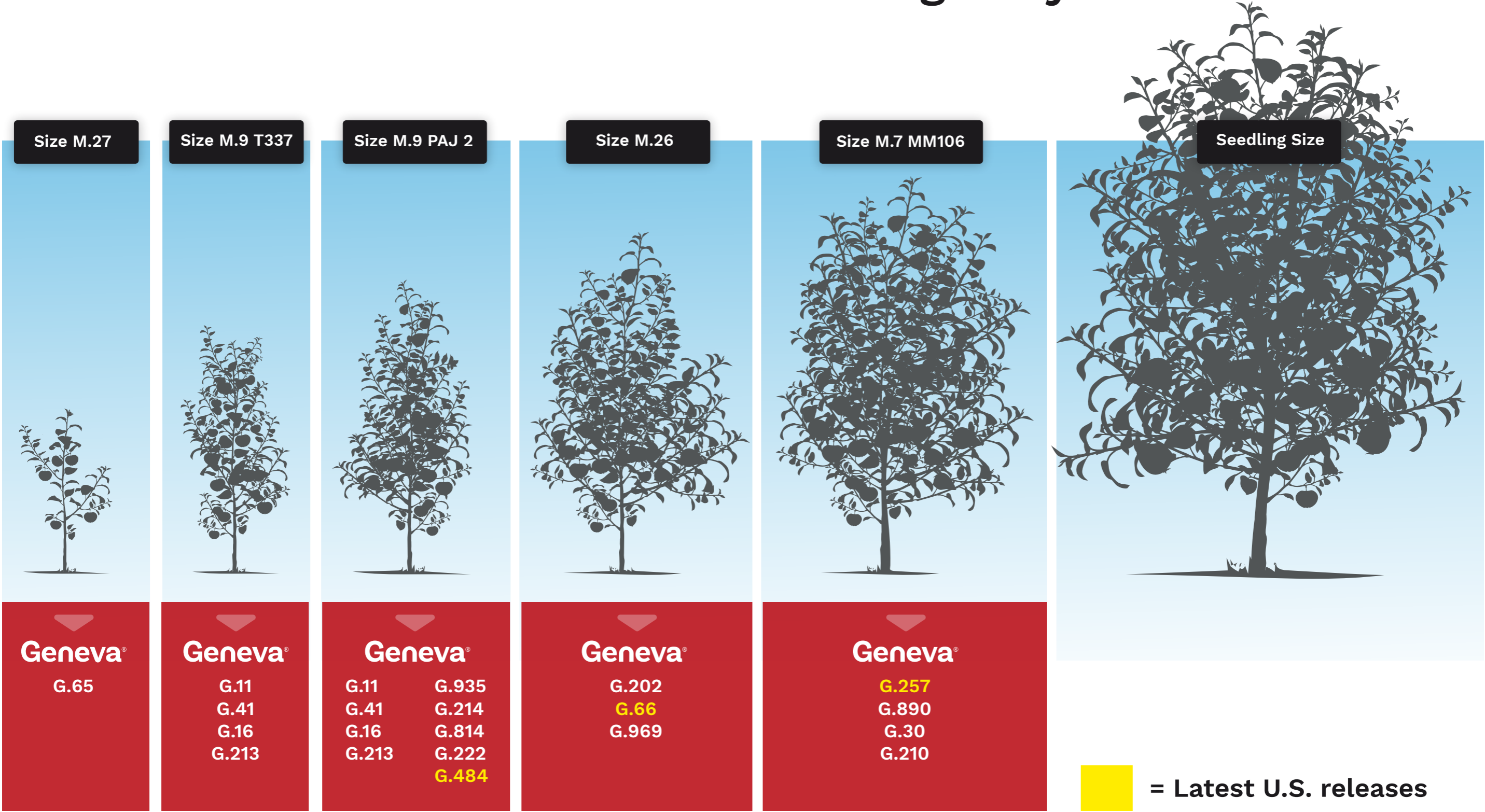
** This is a work in progress. Description is based on observations within breeding program and feedback from nurseries. There may be additional interactions with apple viruses that have not been characterized yet.



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	No		High		Tolerant		Non-sensitive	R	Resistant
	Yes		Medium		Partially Tolerant		Sensitive	VR	Very Resistant
	Partial		Low					TBD	To Be Determined

Released Geneva® Rootstocks arranged by tree size



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.

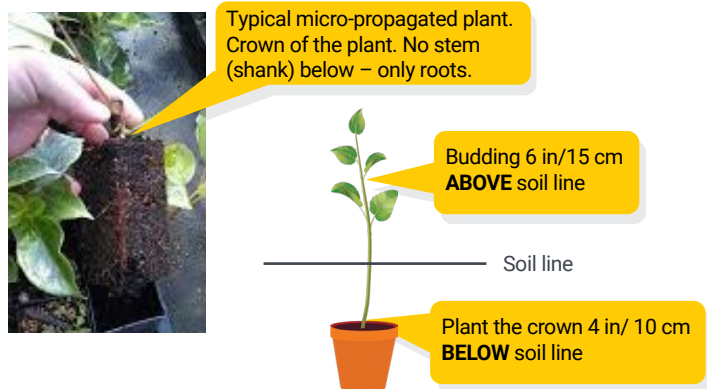
TECHNICAL BULLETIN

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.



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