

Which rootstock should you GROW WITH?

SOURCES FOR CHART AND GUIDE: TOM AUJIL AND DR. GENNARO FAZIO

Rootstock attributes

Special rootstock guide from our Feb. 1, 2016 issue.

CULTIVAR

Listed by size, small to large

MARK	PROPAGATIBILITY:		COLD HARDY:	RESISTANCE TO:			
	LINER	TREE		REPLANT DISEASE	FIRE BLIGHT	CROWN/ROOT ROTS	WOOLLY APPLE APHID
	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 Nic29	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

For apple growers, choosing a rootstock type can be a bit overwhelming. There are many to choose from, yet no perfect choice. Soil, climate, trellis system, irrigation type, tree spacing and scion all play a role. Factor in the grower's expectations, and the spectrum of interaction between all of those considerations makes rootstock selection all the more difficult. The best option for one grower may not be best for everyone.

Apple growers have a lot of options when it comes to selecting the best rootstock for their orchards.

by Shannon Dininny

— is essential to a successful operation. So, here's a rundown of the latest news on rootstock choices for Washington from a couple of experts: Tom Auvil, research horticulturist with the Washington Tree Fruit Research Commission in Wenatchee, Washington, and Dr. Gennaro Fazio, plant geneticist with the U.S. Department of Agriculture in Geneva, New York.

Mark: The Mark rootstock starts growth uniformly and shows excellent horticultural traits in propagation, and growers who have their own nurseries have found it to be a very high-performing rootstock, Auvil said. Like other dwarf rootstocks, Mark is not drought tolerant, especially in the arid West, and tends to have more problems when planted as a finished tree when compared to bench grafts or sleeping eyes.

Budagovsky 9: In recent years, Bud 9 or B.9 has grown in popularity, largely due to its winter hardiness and compatibility with most cultivars. It's shown to be more dwarfing than M.9 varieties. B.9 doesn't like sandy soils and has not been a very reliable replant partner, but that can be overcome if more trees are planted, "as close as 18 inches," Auvil said. B.9 is an excellent choice for scions that grow large fruit or have high vigor, but be warned: If you graft them, they will sucker.

Geneva 65: A cold-hardy rootstock that is very resistant to fire blight and tolerant of crown and root rot, G.65 remains under review for its susceptibility to latent viruses and replant disorders. Fazio compares G.65

to a Malling 27 as a super-dwarfing rootstock suitable largely for vigorous varieties or a pedestrian orchard, though G.65 has some disease benefits over M.27. It's not generally available in volume.

More efficient rootstocks may yield two to three times more than less efficient rootstocks when planted at appropriate densities, and most growers want early yields, followed by consistent high yields — points that highlight the role rootstock selection plays in a grower's bottom line. Then, there's the pesky question of availability.

Staying abreast of the latest information on rootstocks — what's best where and why, what's available when — is essential to a successful operation. So, here's a rundown of the latest news on rootstock choices for Washington from a couple of experts: Tom Auvil, research horticulturist with the Washington Tree Fruit Research Commission in Wenatchee, Washington, and Dr. Gennaro Fazio, plant geneticist with the U.S. Department of Agriculture in Geneva, New York.

Malling 27: M.27 is another rootstock that doesn't have large volumes of commercial availability, and it hasn't been used much in Washington. It's less advantageous for commercial production and more likely to be utilized for very special uses, Fazio said, such as a pedestrian orchard or containerized trees.

Geneva 41: G.41 tends to be associated with very large-caliber finished trees — it's one of the high-performing Geneva rootstocks — but half-inch trees seem to have fewer problems than 5/8-inch or larger. Why? Because G.41 has had challenges with union breakage and needs to be handled with care, more so than other cultivars. Fazio said G.41 has this problem only with certain varieties, but researchers are working to improve graft-union development. "The smaller you graft or bud the tree, the better the chance at getting homeostatic communication between the two," he said.

Malling 9 T-337: M9.337 is the global standard for rootstock and is the most widely planted cultivar in Washington. M9.337 shows tremendous compatibility with most scions, but its susceptibility to fire blight makes it a rootstock to avoid in areas where fire blight is a concern, Auvil said. Also worth avoiding: pairing M9.337 with fire blight susceptible scions that bloom early and for a long time, such as Cripps Pink and Jazz.

Geneva 11: G.11 can be disappointing in its vigor, particularly in sandy or light soils. In good soils, G.11 grows very vigorously on nonbearing trees and grows large fruit. The rootstock seems to do well in nurseries, and some plantings back East have reached 25 years old and are still going strong, Fazio said. G.11 is not resistant to all the strains of fire blight, but compared to M.9, it's resistant. "You'll lose maybe a tree as opposed to a whole orchard," he said.

Geneva 16: Two words: virus sensitive. Even with certified wood. "We've had blocks that have had sustained tree losses over time. It's relatively slow, but even a half a percent adds up over time," Auvil said. "It can take three to four years from first symptom to final end," he said. Fazio called G.16 one of the wonders that made beautiful, productive trees in the nursery. It's still being used in the Southeast U.S. and in Minnesota's breeding program, he said, but clean wood is essential.

Malling 9 Nic29: This is the largest M.9 used in the West, but some nurseries have removed it from production due to its susceptibility to fire blight and replant disease. The rootstock tends to remain very vigorous, but works well with slow-growing scions. However, that vigor can create a late bloom, adding to those fire blight concerns.

Malling 9 Pajam2: More vigorous than M.9, Pajam2 is productive with large fruit. Replant may be a bit of a

problem, and fire blight is also an issue. A clone of the original M.9, this rootstock has similar characteristics of M.9 Nic29.

Malling 9 EMLA: EMLA 9 tolerates most soil types, except dry, light soils in low rainfall areas. Its root systems tend to be a little more fragile, so take care when digging up or planting this cultivar, and it's susceptible to fire blight. It also has similar characteristics to M.9 Nic29, but it's been cleared of viruses.

Geneva 935: Another high-performing Geneva rootstock, G.935 is a good rootstock for weaker varieties, such as Honeycrisp, with good fruit production. It's tolerant of replant disease, but not woolly aphid resistant, and is commercially available.

Geneva 969: G.969 has not been evaluated in the Northwest, though it's the easiest to grow in a nursery of the entire Geneva family. In the East, it's rated a very large tree and a high-performing tree. G.969 is the only cultivar in the Geneva family that stands up when it grows, rather than bend over like a raspberry bush. Fazio said G.969 will make weaker varieties shine. It is commercially available in limited quantities.

Geneva 214: One of the high-performing Geneva rootstocks, G.214 is the first of the Genevas known for being very replant tolerant. There have been a number of issues getting it into production — specifically, identity mistakes in propagation — but G.214 is finally headed to the stool beds. Washington trials have shown great stands with good transplant. The first group of 214 is available at some nurseries this year in limited quantity. Fazio said the new Washington variety WA 38, known as Cosmic Crisp, would do well on G.214.

Geneva 210: Another high-performing Geneva clone, G.210 has done the best at an unfumigated research replant site in Wapato, Washington. "It's been an excellent performer," Auvil said. "It's coming

out of tissue culture, stool beds are starting to show some production, and availability will dramatically increase over the next two to three years." Some limited availability now.

Geneva 222: A good M.9-type cultivar that is somewhat commercially available, G.222 is a good choice in areas where fire blight is a concern. However, it's not very replant tolerant. Fresh ground is good. There are limited quantities available.

Geneva 814: G.814 has been shown to be virus sensitive and must be paired with clean scion wood. In a couple of trials with Gala in Washington, the rootstock has grown a box-size bigger fruit than G.214. It's a rootstock that has a good balance of calcium, potassium and phosphorous, Fazio said, but the causal effects of large fruit size on bitter pit with this rootstock is not yet known.

Budagovsky 10: A very cold hardy rootstock that is resistant to fire blight and easy to propagate with few side shoots, Bud 10 has not yet been widely used in Washington. Bud 10 is highly susceptible to replant disease, which means it doesn't provide much improvement over bigger M.9 clones, Fazio said. It's a rootstock researchers are still learning about in the Northwest.

Malling 26: M.26 produces a significantly lower crop than M.9. In some locations, M.26 has shown very high susceptibility to crown rot, has relatively high susceptibility to fire blight and is among the worst rootstocks in terms of susceptibility to replant disease. "Don't use it," Fazio said. "It's been a productive stock for certain things, but it's done its job."

Geneva 30: A very hard cultivar to propagate, G.30 production is declining. Only one or two liner nurseries are producing G.30, Auvil said, and the rootstock has not proven itself horticulturally to be an extremely productive, large fruit rootstock. "But if you were a Gala grower, you'd love to grow Gala

on G.30," he said. "It's just very hard to get." Watch the graft unions in the first two years.

Geneva 890: A commercially available rootstock that has wider distribution, G.890 will probably be competitive with G.41 in terms of tree availability and volume, Auvil said. Bitter pit is a concern, due to its high vigor, but G.890 seems to be an excellent replacement tree in difficult soils. Fazio also noted that the rootstock has shined in extremely harsh replant areas.

Geneva 202: G.202 is a rootstock Auvil has removed from his lists because it produces one of the biggest trees, failing to "calm down" over time, yet is among the least productive rootstocks. The cultivar has been widely planted in New Zealand and is being sold in Mexico, but is not as well adapted to the Northwest.

Malling 7 EMLA: This rootstock offers significant crop density issues, Auvil said, and blind wood is made much more severe. Fazio noted the rootstock is easy to propagate, but suckers a lot, is not fire blight resistant and not particularly productive.

Malling 106 EMLA: A very difficult combination with vigorous scions like Granny Smith or Fuji, M.106 EMLA can show a lack of productivity. In addition, it's the "canary in the mine" for crown rot, Auvil said, meaning it's highly susceptible.

Budagovsky 118: A very vigorous rootstock that values dry, sandy orchard sites but is adaptable to various soil types, Bud 118 is extremely winter hardy but is not replant tolerant. Productivity is an issue, as it tends to grow smaller fruit every other year and suffers annual bearing challenges, Auvil said. There also has been some bitter pit in fruit in Washington. ●

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