Geneva®

AGROMILLORA

Geneva®

G.213

A new rootstock

FOR A SUSTAINABLE AND EFFICIENT APPLE ORCHARD

The Cornell University and the United States Department of Agriculture-Agricultural Research Service (USDA-ARS) together develop new rootstock cultivars with an emphasis on productivity, yield efficiency, easy nursery propagation, Fire blight, Woolly apple aphid and Crown rot resistances, tolerance to extreme temperatures, soil pathogens and apple replant disease. Among these, one of the new releases is the rootstock GENEVA®G.213.

Geneva® G.213*

Origin and characteristics

Origin: (New York, USA)
Plant Genetic Resources Unit, Cornell University
(*): Protected rootstock. Plant Patent Application Publication, No. US 2017/0094854 P1 (March 30, 2017).

In stool beds **produce some thorns**

Edition:
Agromillora in U.S.A, Europe and Brazil

Tree Vigor:
Similar to M.9 Pajam®2

Yield:
Good and very precocious

Reduces winter chilling requirements and induces an excellent branching

Yield Efficiency:
very high, 100-125% compared to M.9

Tolerance:
To waterlogging

Resistances:
Apple Replant Disease, Fire Blight, Crown Rot and Woolly Apple Aphid

Geneva® G.213*

Tree Vigor

The vigor induced to grafted trees is exposed in Figure 1, compared to the traditional rootstocks, in particular M.9 selections.

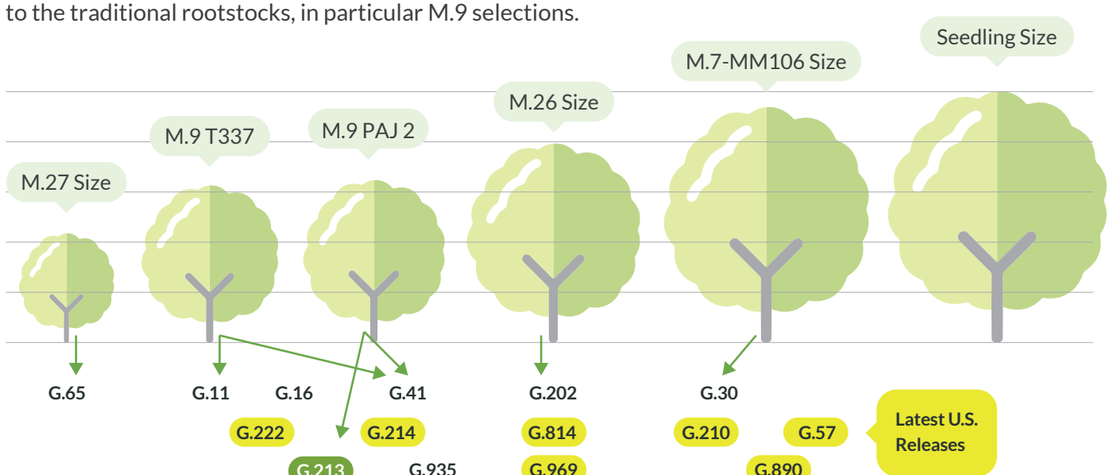

Figure 1: Tree size affected by traditional and new rootstocks, including different releases from Plant Genetic Resources Unit, Cornell University, Geneva & USDA Agricultural Research Unit (New York-U.S.A.). Source: G. Fazio. Personal com., FEM (San Michele - Italy), September 2018.

Geneva® G.213*

Agronomical performance

Different reports from Brazil in apple producing areas with limited availability of chilling hours, evidenced the good yield, high yield efficiency and precocity induced by G®213 on different apple cultivars. In Table 1 annual and cumulative yields of 'Maxi Gala' and 'Fuji Suprema' conducted in central axis are exposed. Figures 2 and 3 showed the effect of rootstock on branching capacity and budding uniformity on four years old trees of 'Maxi Gala' grafted on M.9 and G®213 rootstocks.

Variety	Rootstock	2018	2019	2020	2021	2022	CY (tons)	CY difference (tons)
Maxi Gala	G.213	67	40	85	102	82	**376**	**+181**
	M.9	38	28	24	61	44	**195**	**0**
Fuji Suprema	G.213	26	18	75	82	46	**247**	**+120**
	M.9	15	10	17	56	29	**127**	**0**

Table 1: Annual and cumulative yields of five years and differences on cumulative yield of the two rootstocks of 'Maxi Gala' and 'Fuji Suprema' cultivars grafted on G®G.213 and M.9 rootstocks and planted in 2015 in Vacaria, RS, Brazil.

Source: Commercial company (LMB Fruticultura).

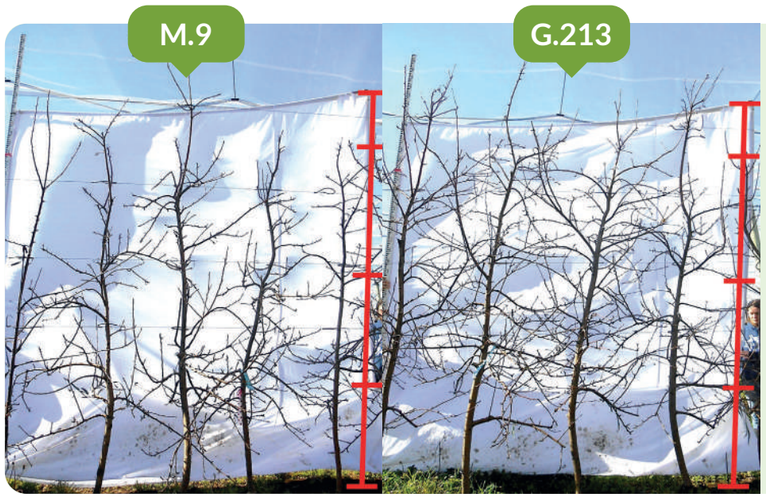

Figure 2: Effect of rootstock on branching of four years old trees of 'Maxi Gala' in Vacaria, RS, Brazil (Rufato, 2018)

Figure 3: Effect of rootstock on budding uniformity (%) of four years old trees of 'Maxi Gala' on spring 2015 in Vacaria, RS, Brazil. (Rufato, 2018)

REFERENCES: Rufato, L., 2018. Miglioramento dell'efficienza produttiva nei meleti con portinnesti della serie G in Brasile. Apple Rootstock Seminar-FEM (San Michele all 'Adige -Trento IT), 18th September 2018. Personal Com.

Geneva®

G.41

A new rootstock

FOR A SUSTAINABLE AND EFFICIENT APPLE ORCHARD

Among the rootstocks released by the Cornell University and the United States Department of Agriculture-Agricultural Research Service (USDA-ARS), G®41 is one of the most promising. Its origin, main characteristics and performance are reported below.

Geneva® G.41

Origin and characteristics

Origin: (New York, USA)
Plant Genetic Resources Unit, Cornell University
(*): Protected rootstock. Plant Patent Application Publication, No. US 2006/0174387 P1 (March 08, 2006).

Difficult to propagate in stool beds.

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Edition: In USA Agromillora (non-exclusive). In Europe under the sublicence of EFTR

Tree Vigor: Similar to or slightly higher than M.9 Pajam®2.

Yield: High and very precocious

Brittle graft union with some cultivars

Yield Efficiency: 105-115% compared to M.9

Tolerance: Very cold hardy

Resistances: Apple Replant Disease, Fire Blight, Crown Rot and Woolly Apple Aphid.

Geneva® G.41

Tree Vigor

The vigor induced to grafted trees is exposed in Figure 4, compared to the traditional rootstocks, in particular M.9 selections. °

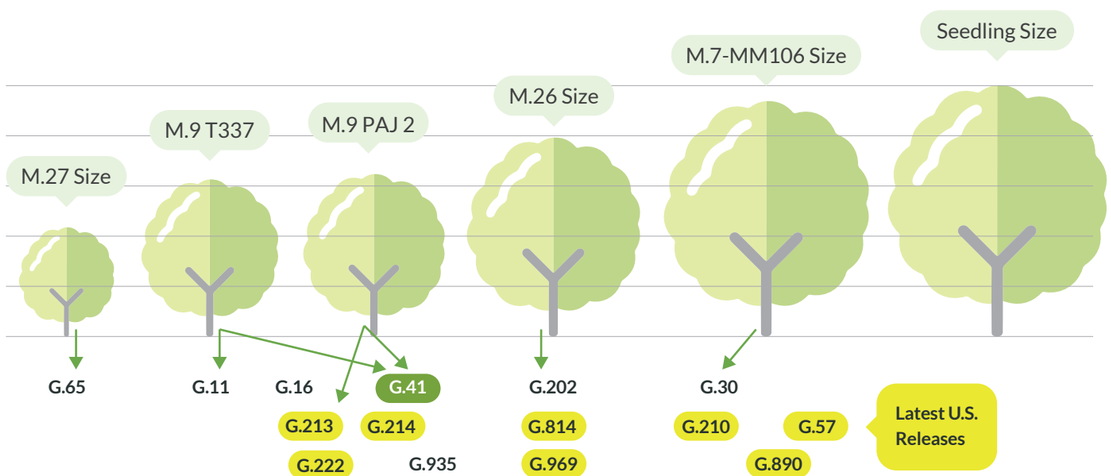

Figure 4: Tree size affected by traditional and new rootstocks, including different releases from Plant Genetic Resources Unit, Cornell University, Geneva & USDA Agricultural Research Unit (New York-U.S.A.). Source: G. Fazio. Personal com., FEM (San Michele - Italy), September 2018.

Geneva® G.41

Agronomical performance

Different reports from USA and Europe, in this case from the EUFRIN; evidenced the good performance of different rootstocks from “G” series, in particular the G®41 and G®11 grafted with the cultivars ‘Gala Brookfield® Baigent’, ‘Golden Delicious Reinders’ and ‘Story® Inored’ (Carbó et al., 2015).

Annual and cumulative yields of 8 years old trees of ‘Gala Brookfield® Baigent’ grafted on different rootstocks in a replanted situation are exposed in Figure 5 compared with reference rootstocks, corresponding the best results to G®41. Best fruit size, mean over the period 2015-2021 was obtained with G®41 (data not shown). I Class of fruit color (>90% fruit color) was increased by 28 and 26%, respectively, compared to M9 Pajam®2 (data not shown).

Geneva® G.41

Agronomical performance

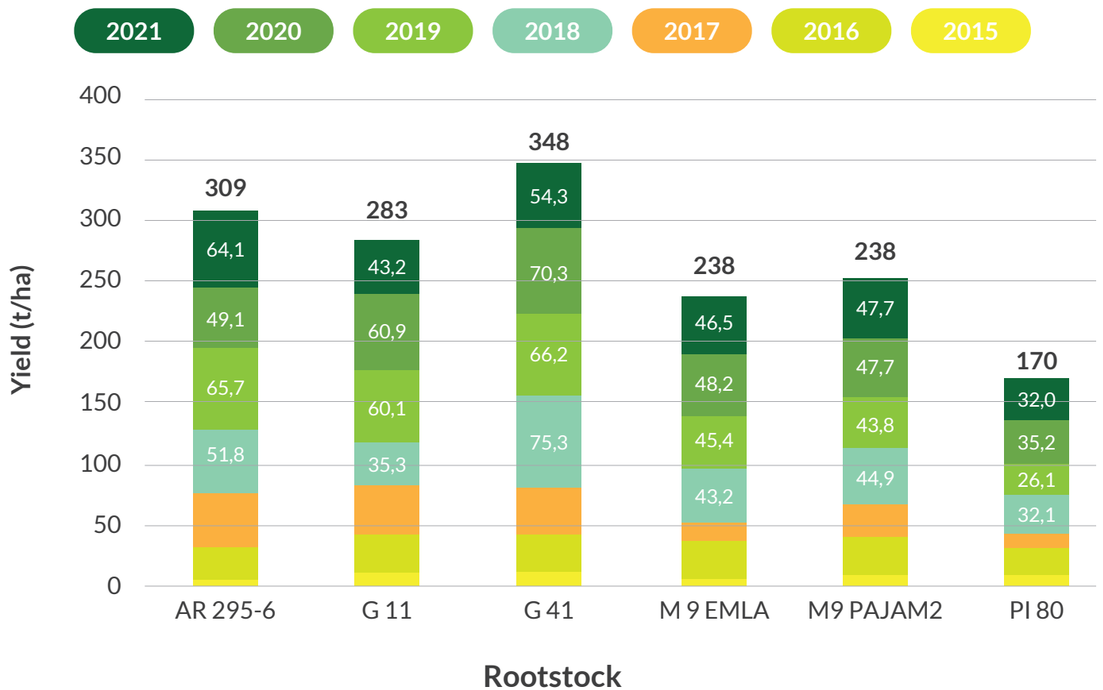

Figure 5: Effect of rootstock on annual and cumulative yields of eight old years tree of ‘Gala Brookfield® Baigent’ apple grafted on different rootstocks in the EEA IRTA-Mas Badia (Girona-Spain) planted in February 2014 in a replanted plot (Carbó et al., 2022).

REFERENCES: Carbó, J.; Iglesias, I.; Avila, G.; Bonany, J.; Alins, G., 2015. ¿Que nos aportan los nuevos portainjertos de manzano? IRTA- XX Jornada Frutícola, Mollerussa, 22 octubre 2015, 41-53pp. Carbó, J.; Aramburu, B.; Dahmani, A.; Llorca, A.; Lordán, J., 2022. Avaluació de diferents portaempelts en situacions de replantació. DemoPortaempelts de pomera – 2021 i 2022. Jornada Fructícola d’Estiu-IRTA. La Tallada d’Empordà (Girona), 4 agost 2022.

Geneva® G.41

In another trial with 'Galaval C.O.V.' planted in February 2017 on the basis of EUFRIN network, G®41 corresponding to a replanted situation showed a superior production to G®11 but similar to M9 Pajam®2, the reference rootstock, as illustrated in Figure 6. Mean fruit size for the period 2018-2021 was affected by the rootstock, obtaining with G®41 a superior size (data not shown).

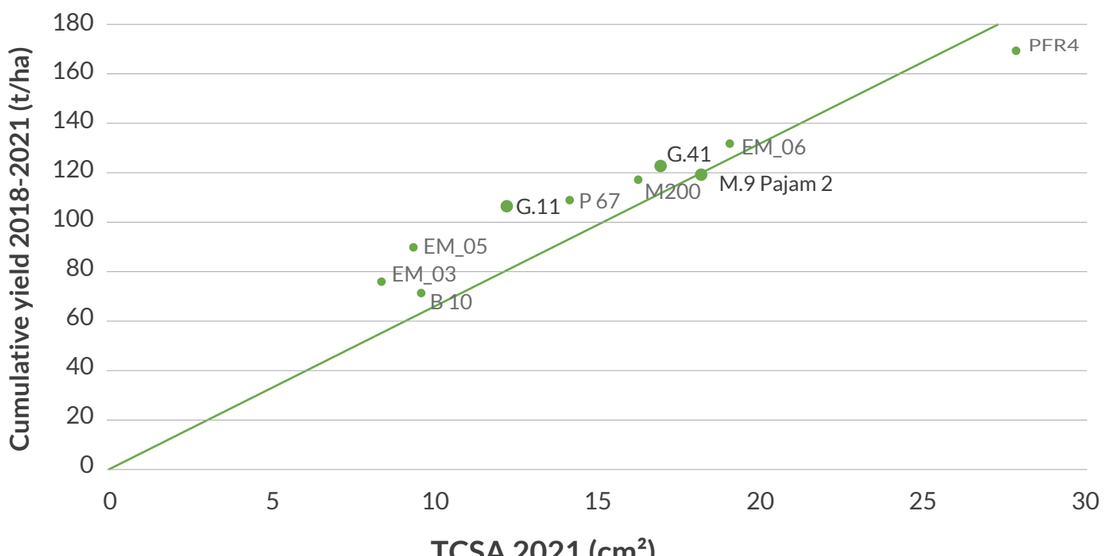

Figure 6: Effect of rootstock on vigor and cumulative yield efficiency of 'Galaval®' apple grafted on different rootstocks in the EEA IRTA-Mas Badia (Girona-Spain) planted in February 2017 in second generation of replanted plot (Carbó et al., 2022).

REFERENCES: Carbó, J.; Iglesias, I.; Avila, G.; Bonany, J.; Alins, G., 2015. ¿Que nos aportan los nuevos portainjertos de manzano? IRTA- XX Jornada Frutícola, Mollerussa, 22 octubre 2015, 41-53pp. Carbó, J.; Aramburu, B.; Dahmani, A.; Llorca, A.; Lordán, J., 2022. Avaluació de diferents portaempelts en situacions de replantació. DemoPortaempelts de pomera – 2021 i 2022. Jornada Fructícola d'Estiu-IRTA. La Tallada d'Empordà (Girona), 4 agost 2022.

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The Available Rootstocks

Vigor Range	Selection	High Productivity	Woolly Apple Aphids Resistance	Fire Blight Resistance	Replant Disease Resistance	Phyto-Phthora Tolerance	Cold Hardiness Resistance	Low Chilling Requirement	Low Suckering Burr Knots	Suscepitibilit Latent Viruses
M26 / M9	G213	Yes	+++	+++	++	++		Yes	Yes	No
	G41	Yes	+++	+++	++	+++	Yes		Yes	No
M26	G214	Yes	+++	+++	++	++	Yes		Yes	No
MM106 / M7	G969	Yes	+++	+++	++	++	Yes		Yes	No
M106	G210	Yes	+++	+++	++	++	Yes		Yes	No

+++ high ++ mid + low

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