



NC-140 Dwarf Apple Rootstock Evaluation and Trial–2021

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Selection of apple rootstocks adapted to Iowa's climatic conditions is critical for sustainable orchard management. The project's aim is to evaluate current and new dwarfing rootstock selections and their effects on the fruiting cultivar, Buckeye Gala. Beneficial effects of growth and productivity of dwarfing rootstocks can be a key component of sustainable apple production. Evaluation of new rootstock selections along with established rootstocks will determine their suitability for Iowa climatic and soil conditions.

Materials and Methods

The field experiment was established in 2019 with a randomized complete block design and five replications. Rootstock treatments included seven cultivars grafted with Buckeye Gala fruiting cultivar. Two rootstock selections developed by Cornell University (G969 and G4814); one selection by International Fruit Obtention (IFO #2); and four rootstocks established in the industry (Bud10, M26, M9-T337, and G41) were used. One-year-old trees were planted in 2019 and set 3 ft. apart within a row, and rows were spaced 14 ft. apart, on center. Treatment plots consisted of three trees of the same rootstock. Fruiting cultivars, Ambrosia, grafted on Bud 10 rootstock, and Ludacrisp, grafted on Bud 9 rootstock, were included for pollination of Buckeye Gala. Trunk diameter of trees was measured 30 cm above the graft union. Height at the highest point of the trees and spread of the widest limbs were measured. Data were analyzed using SAS (PROC GLM), and mean separation within a variable was completed using Tukey HSD ($P \geq 0.05$).

Results and Discussion

Buckeye Gala grown on M26 and G969 rootstocks had a larger diameter of tree trunk compared to M9-T337 (Table 1). Trees grown on M9-T337 rootstock had a shorter tree height than all other rootstocks, except Bud 10. There was no difference in tree limb spread between the rootstock selections after the 2021 season. Trees grown on G4814 rootstock had a higher number of suckers than all other rootstocks. Additional years of research will provide reliable information about the apple rootstocks' adaptability to soil, climate, and pests, and characteristics of tree anchorage, size, precocity, winter hardiness, and fruit yield.

Table 1. Tree trunk diameter, height, limb spread, and sucker growth of Buckeye Gala apple grown on seven rootstocks.

Rootstock	Tree trunk diameter (mm) ^z	Tree height (m)	Tree limb spread (m)	Tree sucker growth ^y (number)
M26	35.3 a ^x	2.5 a	1.8 a	0.9 b
G969	35.0 a	2.4 a	1.7 a	0.4 b
Bud 10	33.8 ab	2.3 ab	1.6 a	0.6 b
IFO #2	31.8 ab	2.5 a	1.8 a	1.3 b
G4814	31.3 ab	2.5 a	1.7 a	4.6 a
G41	31.2 ab	2.4 a	1.8 a	1.6 b
M9-T337	21.5 b	2.1 b	1.6 a	1.5 b

^zTree trunk diameter measured 30 cm above graft union; tree height measured at the highest point of trees; and tree spread determined from the widest limbs.

^yTree sucker growth indicates number of new shoots coming from below the graft union and from the soil directly around the base of the tree.

^xMean separation within a column by Tukey HSD; means followed by the same letter within a column are not different from one another, P < 0.05.

Acknowledgements

Appreciation is extended to staff of the Iowa State University Horticulture Research Station for their assistance and maintenance of the orchard. This project is part of the USDA, NIFA, NC140, Multistate Project, Improving Economic and Environmental Sustainability in Tree Fruit Production through Changes in Rootstock Use.