

Tailoring Apple Cultivation With Precision - A Global Economic Safeguard

Cornell



As consumers stroll through the aisles of their local grocery store, plucking their favorite fresh apples from the shelves, they may not realize the profound innovation that underpins the root system for the apple trees that bear these fruits. The Geneva® Apple Rootstock, born from a decades-long collaboration between Cornell University and the U.S. Department of Agriculture’s Agricultural Research Services (ARS), has revolutionized the apple industry.

Over the last decade, thanks to the USDA’s federal funding and technical guidance, six additional varieties were released and licensed, resulting in a portfolio of 33 commercially released and licensed Geneva® Apple Rootstock varieties. These remarkable varieties have extended their reach far beyond the domestic apple market and are being integrated as the rootstock in apple-growing regions worldwide.

In 1968, in the small city of Geneva, New York, breeders at Cornell University embarked on a bold mission: to initiate the apple rootstock breeding program focused on creating disease-resistant apple trees and increasing orchard productivity in roots.

In recent years, Dr. Gennaro Fazio, a plant breeder and research geneticist of USDA-ARS in Geneva, NY, and Dr. Terence

Robinson, an applied fruit crop physiologist from Cornell University, have successfully fine-tuned nutrient profiles and tailored rootstocks to scion cultivars, ushering in a new era of precision horticulture. The program saw its first patented apple rootstock released in the 2000s, followed by more than 14 other plant patents covering new apple rootstock varieties over the past 20 years. Their work not only benefited apple growers but has also solidified the Geneva® Apple Rootstock's position in the market.

“We have heard orchardists say 'Our business could not survive without Geneva® Apple Rootstocks',” Dr. Fazio proudly acknowledges. However, without the support and collaboration of the Center for Technology Licensing (CTL) at Cornell University, navigating this journey would be far more challenging.

The journey begins with breeders sending new apple rootstock varieties to trusted evaluation partners in locations across the US and the world for several years of testing. After the evaluation proves successful when grafted and paired with other apple varieties, CTL secures patent rights and trademark rights to the varieties. Large farm operations in the Pacific Northwest and Northeastern US have implemented the Cornell-USDA apple rootstocks in their high-density apple orchards as well as smaller local “Pick-Your-Own” family-owned farming operations. “The high field performance of the Geneva® Apple Rootstocks has generated increasing demand in the U.S. markets, possibly trending toward replacing current commercial rootstocks in the next two decades,” Dr. Fazio said. “Just the impact on fire blight is worth tens of millions of dollars every year.”

The ripple effect of Geneva® Apple Rootstocks extends to vital regions like Washington state, where one major nursery anticipates the sale of 1.5 million apple trees in 2024. Remarkably, over 70% of these apple trees are grafted onto Geneva rootstocks, underscoring their role in bolstering the state's apple industry.

In India, Seven Star Pvt Ltd, a leading agribusiness venture, has an exclusive license to propagate and commercialize Geneva® Apple Rootstocks in India. Field trials of the rootstocks in India have delivered promising results in terms of plant growth and yields, and Seven Star anticipates grafting 400,000 new trees by 2026. The majority of these will be planted in the state of Jammu and Kashmir, which currently produces 77% of the country's apples—an industry that provides jobs for nearly 3.5 million people.

Agromillora Group, a global nursery leader in Spain has commercially propagated and sold a broad spectrum of Geneva® rootstocks varieties in to apple growers in Morocco, Brazil, and countries in the European Union. In New Zealand, Cornell and Waimea Nurseries have a multi-decade licensing arrangement to introduce the rootstocks to New Zealand apple growers.

Apple growers worldwide now have disease and pest-resistant apple rootstocks tailored to fit specific environments, allowing them to maximize their yields. Thanks to the blight resistance, planting apples in international markets is now a feasible endeavor.

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