Plant Agriculture

WINTER 2015 SEMINAR SERIES

TITLE: Leveraging genomic resources to breed a difficult perennial crop: apple rootstocks

SPEAKER: **Dr. Gennaro Fazio,** USDA-ARS Plant Genetics Resources Unit, Geneva, NY, and School of Integrative Plant Sciences, Cornell University

LOCATION: **Thornbrough 1307**

TIME: **3:35-4:35 pm**
DATE: **Wednesday, March 18, 2015**

ABSTRACT:
Rootstocks are the foundation of a healthy and productive orchard. As such, the choice of a rootstock can influence the productivity and profitability of an orchard in a very significant way. Rootstock performance is highly correlated with the genetic potential of such rootstock to provide anchorage, explore the soil profile, absorb and transfer nutrients to the scion, adapt to pedo-climatic conditions, tolerate extreme weather events, resist or cope with pathogens, propagate efficiently and impart positive architectural properties to the scion – like vigor control and precocity. The inheritance and control of all these desirable characters is quite complex making breeding of rootstocks quite challenging. Recent advances in genomic technologies are allowing more efficient and informed ways of selecting new rootstocks during the breeding process. Furthermore, breaking down complex traits like tree vigor into component traits (hormonal transport, nutrient uptake and transport, root architecture, water use efficiency) and further characterization of the inheritance of these component traits can simplify the understanding of complex traits and improve the breeding process and outcome. In the Geneva® breeding program we have been studying root architecture, nutrient uptake and translocation, and inheritance of gene expression to better characterize breeding populations and select parents and seedlings for the next generation of apple rootstocks. We present data relating to these traits and how they are associated to performance of released and elite stage apple rootstocks.

Biography:

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Gennaro Fazio is a plant breeder and research geneticist with the USDA-ARS Plant Genetic Resources Unit in Geneva, NY and Adjunct Associate Professor in the Horticulture Section of the School of Integrative Plant Sciences at Cornell University. The focus of his research is to develop new apple rootstocks that are more productive than current commercially available varieties, and that are resistant to devastating diseases like fire blight caused by *Erwinia amylovora* and replant disease. Part of the research focus is directed toward developing marker-assisted breeding protocols for the breeding program, and therefore basic and applied research is conducted on apple genetics/genomics, particularly in the area of disease resistance, root and tree architecture, rootstock-mediated plant nutrition and dwarfing mechanisms of apple rootstocks. He also aims to expand use of genetic resources within the National Malus Collection for apple rootstock improvement. Dr. Fazio has authored or co-authored 50+ papers in peer reviewed journals relevant to his field of research, and he has produced 18 issued plant patents or plant breeder's rights and authored or co-authored 14 publications in trade journals.