Biology/Phenology

A Search for Molecular Markers to Discriminate *Rhagoletis pomonella* from *R. zephyria*

Nina Barcenas, Tom Unruh, Wee Yee, Edward Lisowski, Kelly Archer and Pablo Palmandez
USDA-ARS, Wapato, WA

*Keywords:* *Rhagoletis pomonella, Rhagoletis zephyria*, DNA diagnostics, elongation factor alpha intron, mitochondrial CO1, geographic variation

*Abstract:* The apple maggot, *Rhagoletis pomonella*, is a primary pest of cultivated apples, especially in the northeastern United States and southeastern Canada. However, in the last 25 years it has spread and infested apples in many parts of the Pacific Northwest. To prevent apple maggot from spreading to the main apple producing areas, local authorities rely on early detection and immediate eradication programs. Monitoring is mainly based on captures of adults in sticky traps. Unfortunately, the morphology of *R. pomonella* overlaps with its sister species *R. zephyria*, the snowberry maggot, especially in females. Here we describe a combination of two molecular markers (PCR-RFLP of nuclear intron elongation factor alpha and mitochondrial cytochrome oxidase 1) that lead to 90 to 99% diagnosis, depending on the collection area. This work failed to pinpoint 100% diagnostic markers due to the similarity of the species and possibly due to incomplete reproductive isolation. Further research to find markers with better resolution is ongoing and preliminary data are presented.