Title: Updating the Phylogeny of *Rhagoletis*: Relationships of the North American Species Groups

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Flies in the genus *Rhagoletis* (Diptera: Tephritidae) are of importance economically, and also serve as models for studying modes of speciation and coevolutionary relationships with their braconid (egg, larval) and diapriid (pupal) parasitoids. Bush’s (1966) seminal taxonomic work placed the North American *Rhagoletis* species into five species groups (*pomonella, tabellaria, cingulata, suavis, and ribicola*). Despite several subsequent analyses based on morphology, allozymes, and mitochondrial DNA, the phylogenetic relationships of these five species groups remain unresolved. In addition, it remains unclear whether the North American *Rhagoletis* taxa represent a monophyletic group. Thus, the main goals of this project were to determine phylogenetic relationships of North American *Rhagoletis* species groups and to test the monophyly of the North American *Rhagoletis* taxa. Our approach was to incorporate additional mitochondrial DNA data (COI & COII) into an updated mtDNA phylogeny of North American *Rhagoletis*, and to expand the phylogenetic analysis to incorporate sequences of alleles at a single copy nuclear locus (CAD) that has been used successfully to study species relationships in other tephritids. Initial phylogenies based on mtDNA are largely congruent with previous work, yet provide additional resolution of some species relationships. For example, contrary to previous mtDNA phylogenies, *R. cornivora* is now well-supported as a member of the *pomonella* species group. In addition, phylogenetic analyses of a combination of mitochondrial COI/COII and CAD provide resolution of some species group relationships, with the new data providing support for the *tabellaria* species group and the *pomonella* species group as sisters.