

**Biochemical Separation of Geographical Strains of Plum
Curculio, *Conotrachelus nenuphar* (Herbst) (Coleoptera:
Curculionidae), and Evaluation of Olfactory Attractants in
Virginia Orchards.**

Abstract

Plum curculio, *Conotrachelus nenuphar* (Herbst), is an endemic pest of stone and pome crops of the eastern United States. Two morphologically identical strains of plum curculio have been described and documented in Virginia: a univoltine strain and a multivoltine strain. Because of the cryptic coloring and behaviours of the plum curculio adults, monitoring in orchards is difficult and often ineffective.

RAPD-PCR assay was effective for separation of the geographical strains. Of the tested primers four, OPE 01, OPE 03, OPE 04, and OPE 07, yielded 21 amplimers that are useful for distinguishing individuals from the univoltine and multivoltine populations.

Gene targeted PCR revealed the presence of *Wolbachia* in both populations. Analysis of the *wsp* gene sequence showed the univoltine population of plum curculio is associated with a strain of *Wolbachia* in supergroup B, most closely related to a strain identified from *Perithemis tenera* (Say) (Odonata). The multivoltine populations of plum curculio are associated with strains of *Wolbachia* which are in supergroup A, and most closely related to *Wolbachia* strains associated with *Dacus destillatoria*, *Bactrocera* sp., and *Callosobruchus chinensis* Linn.

Three different trap designs baited with grandisoic acid, plant volatiles (limonene, ethyl isovalerate, benzaldehyde, trans-2-hexenal, and proprietary blends of plum essence and sour cherry essence), and a combination of pheromone and plant volatiles were tested. In 1999, significantly more plum curculios were captured with Tedders traps baited with grandisoic acid and unbaited control in traps baited with limonene, plum essence or ethyl isovalerate. In 2000, Circle traps baited with plum essence, sour cherry essence and grandisoic acid yielded no results. In 2001, branch mimic traps yielded no significant differences among three release rates of a blend of benzaldehyde, ethyl isovalerate, trans-2-hexenal, and limonene nor between presence or absence of grandisoic acid; although, there was a significant interaction between the pheromone and the host plant volatiles. Overall however, all three of the traps were not effective.