

Isozyme Genotyping of *Phytophthora ramorum* Reveals Fixed Heterozygosity at Three Loci Suggesting a Hybrid Origin¹

Willem A. Man in't Veld²

Abstract

Five enzyme stains, comprising seven loci, were used to characterize 37 strains of *Phytophthora ramorum* originating from Europe and America. All strains were monomorphic at all putative loci, except *Ldh-2*, which was polymorphic. At the dimeric *Gpi* and *Ldh-2* loci, three banded patterns, and sometimes five banded patterns (*Ldh-2*), were present indicating heterozygosity. The presence of four alleles at *Ldh-3* indicates polyploidy. I concluded that the American and European strains are conspecific. The heterozygosity at *Gpi*, *Ldh-2* and *Ldh-3* suggests that *P. ramorum* has been involved in hybridization events in its evolutionary past, because fixed heterozygosity is generally considered to be the hallmark of hybridization. This hybridization event may have triggered the problematic mating behavior as observed in laboratory experiments. When in the presumed common center of origin, outcrossing would have taken place regularly; gene flow between the two mating types should have resulted in homozygosity at the three heterozygous loci forementioned, at least in some strains. This, however, was not observed. In addition, sequence analysis of the Cox I gene and AFLP data showed consistent differences between the two mating types. This apparent lack of gene flow suggests that the two mating types have been reproductively isolated in their recent evolutionary past, and that they may represent two species *in statu nascendi*.

Key words: dimeric enzymes, fixed heterozygosity

¹An abstract of a poster presented at the Sudden Oak Death Second Science Symposium: The State of Our Knowledge, January 18 to 21, 2005, Monterey, California.

²Plant Protection Service, P.O. Box 9102, 6700 HC Wageningen, the Netherlands; w.a.man.in.'t.veld@minlnv.nl