

Electrophoretic distinction between the peach-potato aphid, *Myzus persicae*, and the tobacco aphid, *M. nicotianae* (Homoptera: Aphididae)

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Abstract

The electrophoretic mobility of the enzyme glutamate oxaloacetate transaminase (GOT) on cellulose acetate plates was compared among sibling species of the *Myzus persicae* (Sulzer) group (*M. persicae*, *M. nicotianae* Blackman, *M. antirrhinii* (Macchiati)). *M. persicae* itself is monomorphic for GOT-1 (genotype ff), whereas European populations of *M. nicotianae* are polymorphic for this enzyme, with two forms of slightly different mobility (alleles s, f). In the samples of *M. nicotianae* examined, *M. persicae*-like ff genotypes were rare and heterozygotes (sf) were in large excess, even in samples from Greece where *M. nicotianae* has a regular holocycle (i.e., annual sexual reproduction). In North America, where *M. nicotianae* is probably entirely anholocyclic, samples of both red and green colour morphs of this species were found to be heterozygous for GOT-1. The enzyme difference can thus provide a means of distinguishing most individual specimens, including trapped alatae, of *M. persicae* and *M. nicotianae*. The anholocyclic taxon *M. antirrhinii* appears to be a fixed heterozygote for GOT-1 and thus resembles most *M. nicotianae*, but can be distinguished electrophoretically from both *M. persicae* and *M. nicotianae* by its distinctive pattern of esterases.

Introduction

Morphometric studies of numerous samples of aphids of the *Myzus persicae* (Sulzer) group from four continents showed that samples from tobacco (*Nicotiana tabacum*) can be distinguished by canonical variate (CV) analysis. They have consistently different mean CV scores when compared with samples collected from other host plants, even after they have been reared in the laboratory on excised leaves of plants other than tobacco (Blackman, 1987). On the basis of this evidence the tobacco-feeding form was described as a distinct species, *M. nicotianae* Blackman. The two taxa were believed to be genetically isolated from one another because *M. nicotianae* was thought to be anholocyclic, therefore lacking the ability to produce sexual morphs and interbreed with *M. persicae*.

Aphids of the *M. persicae* group feeding on tobacco in some parts of the world (Japan, Central Asia) do

however produce sexual morphs, and the taxonomic status of such populations is unresolved (Blackman, 1987). It was found recently that a migration from peach (*Prunus persica*) to tobacco occurs in Greece (G. Michalopoulos, pers. comm.). Peach is the normal primary host of *M. persicae*; that is, the plant on which sexual reproduction occurs. If *M. nicotianae* can also have a sexual phase on peach, then interbreeding might occur which would be expected to reduce or eliminate the morphological distinction between the two taxa. Nevertheless, when included in CV analysis, samples of *M. nicotianae* originating from tobacco in Greece, and also samples that originated from spring populations on peach in tobacco-growing areas, consistently group with samples from anholocyclic populations of *M. nicotianae* in other parts of the world (Blackman & Spence, unpublished data, and discussion section of this paper).

The morphological differences between the two taxa are very slight, and can only be demonstrated reliably by CV analysis involving 11–14 characters. Discriminant functions involving 2–4 characters have been computed from a large data set and included in keys (Blackman,

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