

Contrasts In Temporal Genetic Variation Of *Ceratitis Capitata* In Europe

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ABSTRACT

The Mediterranean fruit fly (*Ceratitis capitata*) is a pest species of major concern in the fruit trade which has exhibited a large range expansion from Africa into Europe and other continents worldwide. Its phylogeography has been studied intensely and historical invasion pathways have been pin-pointed. Less is known about genetic variation on a temporal level. In European populations, we report changes in genetic composition over time linked to different demographic histories. Using whole genome sequencing and samples over four seasons within two years, we assess changes in genetic variation in populations that represent core (Italy), marginal (Croatia) or transient satellite populations (Austria). We present evidence of annual variation in genetic structure of natural populations in multiple locations including core and, more strongly, in marginal populations. For some there may be historically documented events being the cause of the observed spatial patterns of variation such as the Sterile Insect Technique (SIT) application in the Neretva valley (Opuzen, Croatia) starting in 2011, possibly resulting in a suppression of local population followed by shifts in the dominant genotype. In other cases, the cause of this annual variation is less obvious. The strong annual fluctuations in genetic composition of the studied satellite population could possibly be related to accidental, recurrent import of medflies through infested fruit. Conversely, results suggest the presence of a relatively homogeneous genotype in the whole of the Mediterranean basin with a moderate level of spatial genetic structuring. A better understanding of variation present in the surrounding matrix of focal populations could shed more light on local scale gene exchange and source-sink dynamics over time, ultimately providing us with a better insight of local population dynamics.

KEYWORDS: medfly, population genetics, WGS, demographic history