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Plant Virus Ecology Network

Workshop 4

Montpellier May 30/31- June 1 2011

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Rapid population shifts in watermelon mosaic virus in France may be related to differential fitness in non-cucurbit hosts

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Watermelon mosaic virus (WMV, *Potyvirus*) is widespread in cucurbit crops in France since its first description 40 years ago. WMV has a relatively wide host range, including several weeds that can constitute winter reservoirs for the virus. Since 2000, new “emerging” (EM) isolates of WMV inducing more severe symptoms, particularly on zucchini squash, were introduced, probably from Asia. Within a few years, they have almost completely replaced in south-eastern France the “classic” (CL) isolates present before. In order to understand the causes for this rapid population shift, we studied the biological properties of CL and EM isolates. There was no evidence for a general better fitness of EM isolates regarding their host range, accumulation and aphid transmission in cucurbit hosts. A modeling approach based on epidemiological data from experimental plots suggested a dissymmetry in favor of EM vs. CL strains regarding their relative capacity of over-infections of plants already infected by the other type of strains, albeit this was not confirmed in greenhouse experimental tests. However, EM isolates appeared to present better aphid transmission rates from some non-cucurbit hosts than CL isolates in conditions of mixed infections, suggesting that non-cucurbit reservoirs could be an important driver of the evolution of viral populations.