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TOWARDS A DEEP TRANSCRIPTOMIC ANALYSIS OF ZUCCHINI RESPONSE TO ZYMV ATTACK FOR RAPID DETECTION OF VIRUS RESISTANCE LOCI IN ZUCCHINO

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Cucurbita pepo, RNA-Seq, Zucchini yellow mosaic virus, HRM, Isogenic lines

Cucurbits species are economically important crops grown worldwide. In many regions, the most serious threat to their production is Zucchini yellow mosaic virus (ZYMV). The use of resistant cultivars could be the most cost-effective and reliable approach for limiting the spread of this dangerous virus. A monogenetic source of resistance to ZYMV was identified in *Cucurbita moschata* and introgressed in a *C. pepo.* However, in cultivated zucchini the major gene indicated as *Zym-1* interact with two modifier genes *Zym-2* and *Zym-3,* making difficult the breeding resistance transfer. Until now, not effective markers associated to this resistance have been found. The aims of our work was to perform both a study of zucchini resistance response to ZYMV using genomic resources and to discover and validate markers for rapid detection of ZYMV resistance loci in zucchini. To reach our goals, two *C. pepo* isogenic lines, susceptible and resistant to ZYMV, were inoculated and leaves samples were collected at 12 and 22 day post-inoculation (dpi). A RNA sequencing of three biological replicates for each post-inoculation time was performed. In parallel SNP unigene polymorphisms, previously discovered using a Golden Gate platform, were tested using two segregation populations for ZYMV resistance through a High Resolution Melt (HRM) genotyping. Analysis of Differential Expressed Genes (DEGs), performed between two resistant and susceptible genotypes at two post-inoculation times, revealed a total of 1302 unique expressed genes in resistant line. HRM analysis highlighted one SNP, significantly associated to resistance to ZYMV in both populations. Gene expression differences highlight in this work between the two isogenic lines could be used for a comprehensive study of gene expression and for discovering expressed SNPs in zucchini in response to ZYMV. Furthermore, this study supplies a unigene marker closely linked to the *Zym-1* gene that conferred resistance against ZYMV that might be employed in MAS.