

DIRECT AND INDIRECT DEFENCE TO APHIDS IN TOMATO LANDRACES

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Landraces and local accessions have important traits for crop improvement and should play a major role in sustainable agricultural systems. Additionally, the suitability of some accessions for low input cultivation systems makes them good candidates for organic agriculture. Although some traits (e.g.: flavour, fruit shape and colour) are currently exploited for niche markets, the potential and the possible importance for low-pesticide farming of pest resistance is mostly unexplored. Here we report the genetic and the entomological characterisation of two landraces of the cherry-like tomato Corbarino, collected in the Sarno valley of the Campania district. The genotypes AN5 and AN7 both have a higher level of resistance towards the *Macrosiphum euphorbiae* aphid, compared with the M82 cultivar. The two genotypes differ in the mechanism controlling indirect defence mechanisms. No-choice wind-tunnel bioassays indicated that AN5 has a higher level of constitutive attractiveness toward the aphid parasitoid *Aphidius ervi*, not significantly increased after aphid infestation, while AN7 displays a very high level of attractiveness after *M. euphorbiae* infestation. The transcriptional analysis of these genotypes, carried out by real-time PCR, indicated interesting differences in the expression level of genes involved in both direct and indirect defence. For instance, *P4* (a defence gene encoding a PR-protein specifically activated following aphid feeding) and *Pti4* (an ethylene-response transcription factor that activates the expression of many pathogenesis-related proteins) are expressed at higher level in uninfested AN5 e AN7 plants compared to the cultivar M82. Moreover, overexpression of hydroperoxide lyase (*HPL*) and lipoxygenase C (*TomLoxC*), both encoding key enzymes for jasmonic acid and VOCs (Volatile Organic Compound) production, was also detected in the AN5 e AN7 genotypes. In conclusion, our data indicated that the AN5 and AN7 genotypes are very interesting genetic material as they combine high level of both direct and indirect defence against aphids and over-expression of some resistance genes.