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Nitrogen nutrition of tomato plant alters leafminer dietary intake dynamics

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ABSTRACT

The leafminer *Tuta absoluta* (Meyrick) is a major pest of the tomato crop and its development rate is known to decline when nitrogen availability for crop growth is limited. Because N limitation reduces plant primary metabolism but enhances secondary metabolism, one can infer that the slow larval development arises from lower leaf nutritive value and/or higher plant defence. As an attempt to study the first alternative, we examined the tomato-*T. absoluta* interaction in terms of resource supply by leaves and intake by larvae. Tomato plants were raised under controlled conditions on N-sufficient vs. N-limited complete nutrient solutions. Plants were kept healthy or artificially inoculated with larvae for seven days. Serial harvests were taken and the N, C, dry mass and water contents were determined in roots, stems and leaves. Leaf and mine areas were also measured and the N, C, dry mass and water surface densities were calculated in order to characterize the diet of the larvae. The infestation of a specific leaf lessened its local biomass by 8-26%, but this effect was undetectable at the whole plant scale. Infestation markedly increased resource density per unit leaf area (water, dry mass, C and N) suggesting that the insect induced changes in leaf composition. Nitrogen limitation lessened

Abbreviations: C, carbon; dat, days after transplantation; DW, dry weight; EWT, equivalent water thickness; FW, fresh weight; HN, high nitrogen nutrition; LN, low nitrogen nutrition; N, nitrogen; SLC, specific leaf carbon content; SLN, specific leaf nitrogen content; SLW, specific leaf weight

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