

CP-101

Effects of biotic and abiotic stress on carotenoid content in carrot

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Synthesized by plants, carotenoids are key pigments as photoprotective compounds in chlorophyll organs and help attract pollinators and dispersers for non-chlorophyll organs such as flowers and fruits. However, in underground organs, such as roots or tubers, their role is not clearly determined. Carotenoids also represent an important class of human health metabolites as precursors of vitamin A. The carrot root, an important vegetable consumed worldwide, contains high concentrations of carotenoids, and therefore represents an interesting model to understand the accumulation in these pigments.

If some knowledge about genetic determinism exists, a few studies have highlighted the impact of environmental factors on the accumulation of carotenoids in carrots. This work thus aims to (i) determine whether environmental factors modulate the accumulation of carotenoids in carrot roots and leaves, and (ii) identify the regulation levels of the carotenoid accumulation.

In this work, two studies were conducted on a panel of genotypes with various root color. The first study was to highlight the impact of two contrasted growing periods for temperature and global radiation on the carotenoid accumulation and the expression level of biosynthetic pathway genes. The second study aimed to determine more precisely the impact of individual and combined stress (water restriction, *Alternaria dauci* inoculation) on the carotenoid accumulation.

CP-102

Cover crops effects on nitrogen and weeds in MI processing carrots

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Cover crops are gaining popularity as potentially valuable tools for managing soils and pests in processing carrot production in Michigan. We hypothesized that cover crops—sown in late summer the season before carrot production—would suppress weeds, improve N availability, and increase crop quality and yield. Four on-farm trials were conducted during the 2014-15 (sites 1 and 2) and 2015-16 (sites 3 and 4) growing seasons to evaluate the effects of a range of cover crops including: 1) oats 2) oilseed radish (OSR) “Defender”; 3) Dwarf Essex Rape (DER); and 4) an oats+OSR mix. A cover crop free control treatment was included for comparison. Cover crop biomass ranged from 2-9 T/ha, with greatest productivity occurring at site 3, likely due to an earlier planting date and higher soil fertility. Carrot yields were greater following cover crops compared to the no cover crop control in 4 out of 16 cases, and unaffected in the remaining 12 cases. At site 3, carrot marketable yields were increased by 14-30%, and the percentage of forked carrots reduced by 50% or more in treatments containing cover crops in the mustard family (OSR, DER, and oats+OSR); these treatments also had higher soil N and lower densities of winter annual weeds in early spring compared to the oats and no cover crop control. Ongoing research is aimed at evaluating the impact of these cover crops on nematode community as an indicator of soil health, and fungal pathogens that may influence carrot productivity.