

INFLUENCE OF DIFFERENT COVER CROPS ON NITROGEN RESPONSIVE GENES IN MELON

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The objective of this work was to evaluate, the existence of a specific interface between different cover crops (CC) and a melon commercial hybrid which results in a distinct expression profile of Nitrogen-responsive genes (N-genes) such as nitrate reductase (*NR*), nitrite reductase (*NiR*), glutamine synthase (*GS1* and *GS2* isoforms), glutamate synthase (*GOGAT*), ribulose-1,5-bisphosphate carboxylase/oxygenase (*rbcL* and *rbcS* isoform). The gene expression was evaluated on leaves and roots of melon plants grown in the presence of barley, wheat, spelled, rye and a mix of all CC, in comparison with melon grown under normal conditions (without CC), at three different time points (14, 28, and 42 days after melon transplantation). The 5 melon-CC combinations were grown in vases in a controlled growth chamber and each test was replicated three times. Furthermore, the N content was determined in leaves, roots and soil either in control (without melon or CC) in each melon-CC combination at T0, transplantation and at the three time points. The gene expression analysis on melon resulted to be different in the tissues and at all time points considered. The *NR* and *NiR* genes showed higher expression in the presence of rye, spelled and barley in leaves and roots respectively. The *GS/GOGAT* genes had higher levels of expression in melon leaves in combination with spelled while in roots the level were higher in combination with rye. The rubisco genes expression was greater for the plastidial isoform (*rbcL*), resulting in a higher photosynthetic activity in melon grown with spelled, rye and mix and was negatively correlated with the N content in melon leaves in combination with rye and mix but positively correlated in the melon-spelled system. Furthermore, the average N content in the soil was different during melon-CC cultivation; barley, rye and mix resulted to mostly deplete N from soil. Barley, mix and wheat, not making the N soil content available, can limit the activation of photosynthetic complex probably due to "interference" and "allelopathy" phenomenon that needs to be further investigated. In conclusion, spelled and rye are the most useful CC that positively influence melon plants growth. The data obtained confirm that the plant-CC combination represent a valid sustainable cultivation system that can help in enhancing nitrogen use efficiency (NUE) in crop plants.