

Effects of floret removal on the dynamics, during flowering and grain-filling, of cytokinins in xylem sap and leaves of sunflower hybrids of contrasting post-anthesis canopy senescence patterns.

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Modifications in the source-sink relationships during grain filling can modify live root length density (LRLD) and affect crop canopy senescence. Here we report results of a study, conducted under field conditions during the flowering and grain-filling phases, of xylem-sap and leaf-level cytokinins dynamics. The experiments were carried out during two consecutive seasons using two sunflower hybrids with contrasting post-anthesis canopy senescence patterns (Paraiso75, stay-green [SG]; and Paraiso65, fast dry down [FDD]). Crop carbon partitioning patterns were also altered by removing all florets (-F treatment) before anthesis. At crop level, dynamics of live root length density (LRLD), xylem sap flow rate, of cytokinins in the xylem sap, and of green leaf area index (GLAI) were followed, while at leaf level, dynamics of total chlorophyll content, of trans-Zeatin content, and of net photosynthesis, were recorded for leaf positions 17, 20, 22, 24 and 27. The -F treatment exhibited higher values of LRLD, cytokinins in the xylem sap, and of leaf trans-Zeatin concentration than control—at anthesis and during the grain filling in both hybrids. All measured variables decreased earlier, for both hybrids, in the control treatment with respect to the -F treatments, and in the FDD hybrid with respect to the SG hybrid. The results of this study indicate that the dynamics of the cytokinins in the xylem sap is the link between the dynamics of LRLD and that of leaf trans-Zeatin levels, contributing to the contrasting canopy senescence patterns in the two hybrids.