Effects of elevated atmospheric CO_2 concentrations on phloem sap composition of spring crops and aphid performance.

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Abstract

The concentration and composition of free amino acids and carbohydrates in the phloem sap of wheat and oilseed rape (OSR) and the effects on the performance of aphids (*Rhopalosiphum padi* and *Myzus persicae*) were determined under atmospheric carbon dioxide (CO_2) enrichment. The analysis of phloem sap showed that carbohydrates and amino acid levels of the host plants were significantly affected by elevated CO_2 level. Among carbohydrate concentrations in the phloem sap, significant increases were observed in fructose and glucose in spring wheat under CO_2 enrichment, whereas no changes were observed in OSR. These changes in plant chemistry affected the performance of herbivorous insects (i.e. aphids) in varying ways, positively affecting the relative growth rate (RGR) of *R*. *padi* in spring wheat and negatively affecting the RGR of *M*. *persicae* on OSR.

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