

## **Abstract**

During last 200 years, the concentration of carbon dioxide (CO<sub>2</sub>), one of the most important greenhouse gasses, has significantly increased. It is assumed, that by the end of this century, the concentration of CO<sub>2</sub> will be as much as two times higher than nowadays. The changes in atmospheric concentration of CO<sub>2</sub> are largely caused by human activity. Both direct and indirect effects of CO<sub>2</sub> lead to changes on every level of plant body, from changes in gene expression, through changes in physiology and anatomy, to whole-plant morphology changes. Understanding of these changes and relationships between them is necessary for our conception of future 'greenhouse' world and preparation for the life in it.

Growth under elevated CO<sub>2</sub> conditions generally leads to increase of the assimilation rate. The increase in the amount of fixed carbon then usually causes an increase in carbon to nitrogen ratio and changes in carbohydrate levels in plants. A common phenomenon related to growth at elevated CO<sub>2</sub> concentration is an excessive accumulation of nonstructural carbohydrates in leaves. This accumulation can be associated with down-regulation of photosynthesis. However, changes in carbohydrate levels can occur in other plant parts.

This Bachelor thesis is focused mostly on woody species. As perennials with secondary tissues, they often react in different ways than other functional groups of plants investigated. The aim of this thesis is to summarize available knowledge on the impact of elevated CO<sub>2</sub> on plant carbohydrate levels. Very important parts of the thesis are the tables in the appendix with summary of the changes in photosynthesis, respiration and carbohydrate content. The text alone discusses the diversity of research outcomes and the possible influence of other factors, mainly nitrogen availability.

Keywords:

elevated CO<sub>2</sub>, carbohydrates, Rubisco, respiration, down-regulation of photosynthesis, trees, nitrogen availability