



## **Whole-plant C allocation priorities: do secondary metabolites and VOCs matter?**

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Whole-plant carbon (C) allocation is a critical issue for understanding plant functioning and has been studied for many decades. Plants fix CO<sub>2</sub> from the atmosphere and partition the resulting photosynthetic products (carbohydrates) among several functional pools including growth of structural and reproductive biomass, metabolic processes like respiration but also for the synthesis of secondary metabolites promoting defense and communication. Allocation to secondary metabolites is conceptually viewed as a trade-off between growth and defense. Plants either invest carbohydrates to produce biomass which may be lost – at least partially – to herbivory or they increase allocation to secondary metabolites to deter herbivores from consuming existing biomass. While conceptually intuitive, trade-off hypotheses all suffer from one important shortcoming: the whole-plant carbon balance, critical for determining trade-off relationships, is usually unknown.

In the research group on Plant Allocation, we manipulate and measure the whole-plant carbon balance in different species and use tracers to investigate carbon fluxes through the plant and into functional allocation pools. Inducing carbon limitation by reducing atmospheric [CO<sub>2</sub>] allows us to infer allocation priorities. In this presentation I will show several examples of studies on whole-plant carbon allocation patterns in different plant species. These investigations include assessments of different functional pools like growth, storage, secondary metabolites and volatile emissions as well as the underlying phytohormonal patterns and show that allocation to secondary metabolites and volatiles has a high priority in the whole-plant carbon balance.