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The role of sulfur metabolism in the pea response to drought

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Pea (*Pisum sativum* L.) produces seeds rich in proteins for human and animal nutrition and its cultivation enriches the soils in nitrogen, thus decreasing the need for nitrogen fertilization. Increasing pea cultivation and productivity is an agroecological challenge which requires to improve pea tolerance to environmental stresses. Drought and the lack of sulfur in soils are two abiotic stresses that interact in the current context of climate change and low-input practices. Products of sulfur metabolism, like glutathione, are known to play a protective role against many stresses but their interaction with the plant response to drought remains to be studied. A system biology approach will be used to study the influence of sulfur nutrition on the dynamics of gene and protein networks associated with the response of pea leaves to drought during the reproductive phase. This approach will provide metabolic regulation models connecting sulfur nutrition to the drought response. The integration of other data (e.g., physiological, yield components) will reveal regulatory factors potentially responsible for the physiological variations observed and/or for the modifications of agronomic traits under these environmental constraints. In addition to provide a better understanding of the role of sulfur in the plant's response to drought, the project will lead to the identification of gene and protein candidates for stabilizing or improving the productivity and seed quality of pea.

Key words: Pea; system biology; drought; sulfur nutrition; gene network; protein network; remobilization; seed filling