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Background Oilseed rape (*Brassica napus* L.) is facing an increasing demand to meet worldwide needs for food and biofuel industries. Its high sulfur (S) requirements have led to consider S limitation before the onset of pod formation as a major concern to maintain high yield and to reach good oil quality (Postma et al., 1999). Therefore, the prediction of S contents in leaves which undergo sequential senescence during the vegetative phase might be of help to a better management of S fertilization by real time adjustments (Schnug and Evans, 1992).

Methods In this study we developed a predictive model of plant growth before the onset of pod formation in relation to S availability (SuMoToRI, Sulfur Model Towards Rapeseed Improvement). Effective organ growth is calculated by taking into account daily S availability, air temperature and photosynthetically active radiation. Our work aimed (i) to predict plant growth and leaf S contents and (ii) to highlight the most important carbon- (C) and S-related processes that drive growth according to S supply.

Results Simulation results showed that the output variables i.e. Leaf Area Index, Total Dry Weight, Leaf Dry Weight, Leaf S content were correctly predicted. When comparing contrasting S supplies, differences in formalisms were necessary to consider for C assimilation as a side effect of different Radiation Use Efficiency and for plant S uptake and leaf S demand as a direct consequence in S availability.

Discussion/ Conclusion The model allows S amounts in photosynthetic leaves and in fallen leaves to be estimated which can be a useful tool to correct S fertilization inputs throughout the vegetative phase by correlating threshold levels in leaves with final performances.

References

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