



## **ABSTRACT**

*"The use of pea and physcomitrella patens to study the evolution of strigolactone functions in land plants"*

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Strigolactones are small carotenoid derived molecules known to be produced by plant roots and released into the rhizosphere to play the same role of signalling the proximity of a host root in both symbiotic and parasitic interactions. They have been recently recognised as a novel plant hormone controlling shoot branching.

For several years, we have been using garden pea (*Pisum sativum*) and a series of high branching mutants to study the control of axillary bud outgrowth and how strigolactones, auxin and cytokinin interact to regulate shoot branching.

To investigate the presence and the role of strigolactones in a non-vascular plant, we have used the moss *Physcomitrella patens*, an experimental system well adapted to study the evolution of developmental mechanisms in plants. Using homologous recombination, we have obtained a knock-out mutant in the homologue of the *CAROTENOID CLEAVAGE DIOXYGENASE 8 (CCD8)* gene, encoding a strigolactone biosynthesis enzyme. The mutant phenotype is rescued by exsudates from wild type colonies, by exogenous supply of synthetic strigolactones or by ectopic expression of seed plant CCD8. Our data demonstrate *P. patens* produces strigolactones which act as signalling factors controlling both developmental and ecophysiological processes.