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**Adaptation of Pea to contrasted French regions:
simulation of pea varieties with the AZODYN-Pea crop**

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Pea (*Pisum sativum* L.) is a particularly sensitive crop regarding abiotic stress throughout its cycle (Schneider and Huyghe 2015). Climate change results in the increase of the unpredictability of both the frequency and the intensity of these stresses (Stocker et al. 2013). To avoid abiotic stress, breeders have been developing, for the last fifteen years, winter pea varieties sown during autumn, more resistant to frost with an earlier flowering date than spring pea, as well as varieties called "Hr", photoperiod-sensitive, that can be sown even earlier than regular winter types. However, despite the progress of winter type breeding, winter pea surfaces seldom reached more than 25000ha since 2000. Our aim was to study the performances of the different types of pea in contrasted French regions, for various climates, in order to adapt the choice of the pea type to the frequency and intensity of abiotic stress. For this purpose, the crop model Azodyn-Pea (Jeuffroy et al. 2012) was adapted to simulate various types of pea. The model was then used for the evaluation of the three types over the past ten years in different French regions in order to identify which type is most suited to each environment (climate, region). Here we show the potential of winter pea for various French climates. Azodyn-Pea will also allow, in a second phase, the exploration of novel combinations of plant traits in order to design ideotypes and contribute to the development of new varieties within each type.