

## The genetic control of pea growth and yield under environmental stress

### Supervisory team:

**Main supervisor:** Dr Beatriz Gonçalves (University of Bristol)

**Second supervisor:** Dr Smita Kurup (Rothamsted Research)

Dr Martin De Kauwe (University of Bristol)

**Collaborators:** Dr Francisca Segers (University of Bristol), Prof Claire Domoney (John Innes Centre)

**Host institution:** University of Bristol

### Project description:

Legumes are important crops that play a key role in the UK economy and food production. Globally, demand for legumes such as peas is on the rise and is likely to increase as we change food production and eating habits to meet global carbon emission targets. As cold-season crops, peas are particularly sensitive to changes in environmental conditions which can have major effects on yield. Stresses like drought and excess heat, for example, impact pea yield by reducing total seed number, a trait that is underpinned by various developmental processes such as the plant growth rate, branching pattern, and number of reproductive organs initiated and carried to maturity. For peas and other legumes to play a key role in our changing world it is vital we understand how these increasingly important crops will respond to global environmental change.

This project aims to decipher the genetic and developmental processes that control growth and lead to yield loss in response to environmental stress in peas. Under a collaborative supervision team, the student on this project will employ a multidisciplinary approach, combining developmental genetics, and molecular and physiological studies, to investigate the mechanisms controlling growth and yield in response to heat stress and drought.

Across four aims, the student will quantify the impact of heat and drought stress on growth, reproductive organ formation, and yield; determine the impact of carbon availability on growth and reproductive organ formation; study candidate gene response to heat and drought stress; and investigate the role of candidate genes in the control of growth and stress response. Through collaborations across the School of Biological Sciences at the University of Bristol, Rothamsted Research, and the John Innes Centre, this multidisciplinary work will provide comprehensive training in classic molecular and genetic biology, plant physiology and plant development, and bioinformatics approaches. This studentship will generate valuable new insights into the genetic control of developmental and physiological responses to heat stress and drought that will help us to better predict and mitigate pea yield losses under changing environmental pressures.

**Our aim as the SWBio DTP is to support students from a range of backgrounds and circumstances. Where needed, we will work with you to take into consideration reasonable project adaptations (for example to support caring responsibilities, disabilities, other significant personal circumstances) as well as flexible working and part-time study requests, to enable greater access to a PhD. All our supervisors support us with this aim, so please feel comfortable in discussing further with the listed PhD project supervisor to see what is feasible.**