



**PhD Studentship in  
Molecular Biology of Plant-Endophyte Interactions  
at AgResearch, New Zealand**

**Fungal effectors required for *Epichloë*-wheat interactions**

This PhD studentship is based within the Plant-Fungal Interactions Team at AgResearch, New Zealand's agricultural crown research institute. The student will conduct research towards a PhD degree in a joint appointment with the Institute of Fundamental Sciences at Massey University (Palmerston North, New Zealand). The student will be based at AgResearch in Palmerston North and will be part of a large multidisciplinary team with extensive expertise in grass endophytes. The principal supervisors at AgResearch will be Linda Johnson and Christine Voisey, and at Massey University the main supervisor will be Rosie Bradshaw. Co-supervision will also be provided by Martijn Rep at the University of Amsterdam (The Netherlands).

**Description of project:**

Cool season grasses such as perennial ryegrass (*Lolium perenne*) have co-evolved with symbiotic fungal endophytes (genus *Epichloë*) that impart significant protection against biotic and abiotic stresses. These symbiotic associations have been extensively studied by the Plant-Fungal Interactions Team resulting in commercialization of protective endophytes such as AR1 and AR37 in perennial ryegrass. The research team has extended this expertise to identify biochemically useful endophytes in the wild grass relatives of modern cereals, with the intention of developing protective endophytes for use in cereals. Inoculation of *Epichloë* endophytes into wheat has been achieved; however the relationship between the endophyte and host is wholly or partly incompatible resulting in stunted plants or elimination of the endophyte. This PhD programme will study small secreted proteins (SSPs) termed "effectors" which we have previously identified through transcriptomic studies. Candidate genes encoding SSPs will be functionally analysed in a wheat-infecting *E. bromicola* strain by targeted gene deletion or through gene over-expression studies. The effects of gene manipulation will be assessed by inoculation of mutants into cereal hosts and analysis of endophyte infection on host phenotype.



Applicants should have a background in plant or fungal biology with relevant molecular biology experience. Applicants should hold, or expect to hold, a high grade Honours or Masters-level degree (or equivalent) in relevant life sciences.

The scholarship has a value of NZD\$30,000 tax free p/a plus PhD registration fees (currently approx. NZD\$7,000 for international and domestic students) for up to 3 years. The successful applicants will have to satisfy Massey University academic and English language requirements for postgraduate studies.

To apply, please send (i) a cover letter outlining your suitability and interest in the position, (ii) a current curriculum vitae and names of three referees, and (iii) your academic transcripts online via: <https://careers.sciencenewzealand.org>. This position closes on the 28<sup>th</sup> August 2015 or until an appropriate candidate is appointed.