

Information on Postgraduate Research Scholarship - Ref: VC 2022-FES-NRI-4

Faculty: Engineering and Science

Department: Agriculture, Health and Environment, NRI

Lead Supervisor: Lucie Büchi

Project Title: Elucidating the ecological niche and the current and future distribution of *Vulpia myuros*, a new weed in reduced tillage agriculture

Project Description:

Vulpia myuros (rattail fescue) is an annual grass species with almost worldwide presence. In recent years, *V. myuros* has been increasingly observed as a weed in arable crops in Europe and northern America, in particular in crops under reduced tillage practices. These reduced tillage practices are increasingly followed worldwide to conserve soil and reduce labour, practices that may favour further infestation by *V. myuros*. In addition, as a species adapted to dry conditions, *V. myuros* could be favoured in Europe in the future as most climate change scenarios predict increasing occurrences of drought. However, little is known about the real ecological requirements of this species. In addition, there has been limited evaluation of the change in the distribution of the species across the globe. It is thus crucial to better understand the factors favouring the presence of *V. myuros* to evaluate the potential agricultural and economic impact it could have for British and European agriculture. Such evaluation requires analysing existing data using an advanced analytical and modelling framework.

The current PhD proposal aims to address some of these knowledge gaps in order to elucidate the climatic and environmental factors that contribute to the distribution and expansion of *V. myuros* and the role of agronomic factors in altering the species' distribution. We propose undertaking a thorough advanced modelling of the distribution of *V. myuros* worldwide, first using publicly available databases (GBIF contains for example more than 90,000 records for *V. myuros*) using the climate-environmental approach. In a second step, we will use data from an online farm survey, that gives information about the cropping practices and conditions favouring its presence as a weed in arable fields, to improve the model predictions for impact in agriculture. The impact of different scenarios of climate change and change in cropping practices will be explored. If time permits, additional information about the species will be collected through simple greenhouse experiments and interviews of farmers dealing with *V. myuros* infestation.

This project is mainly desk based. The PhD student will gain experience in the following techniques: habitat distribution modelling (also called ecological niche modelling) methodologies, advanced spatial statistics and R programming, database management, and scientific writing towards informing evidence-based policy and decision making. The project will be at the interface between quantitative spatial ecology, environmental science, and agronomy and the student would acquire key knowledge in these three disciplines. Insights gained from this project will increase our understanding of weed evolution and distribution and how this can potentially be mitigated to reduce their impact on agriculture.

Duration:

3 years, Full-Time Study or 6 years, Part-Time Study

Bursary available (subject to satisfactory performance):

Year 1: £16,062 (FT) or pro-rata (PT) Year 2: In line with UKRI rate Year 3: In line with UKRI rate

In addition, the successful candidate will receive a contribution to tuition fees equivalent to the university's UK Home rate, currently £4,596 (FT) or pro-rata (PT), for the duration of their scholarship. International applicants will need to pay the difference between the UK and international fee rate (currently £15,100) for the duration of their scholarship.

Students may be liable for tuition fees after this period.

Person Specification of Essential (E) or Desirable (D) requirements:	
Criteria:	E or D
Education and Training:	
<ul style="list-style-type: none"> 1st Class or 2nd class, First Division (Upper Second Class) Honours Degree or a taught Master's degree with a minimum average of 60% in all areas of assessment (UK or UK equivalent) in a relevant area to the proposed research project 	E
<ul style="list-style-type: none"> For those whose first language is not English and/or if from a country where English is not the majority spoken language (as recognised by the UKBA), a language proficiency score of in an IELTS certificate demonstrating that you have achieved at least 6.5 overall and a minimum of 6.0 in any of the elements or an acceptable, demonstrable equivalent to this UK VISA and Immigration secure English Language Test is required, unless the degree above was taught in English and obtained in a majority English speaking country, e.g. UK, USA, Australia, New Zealand, etc, as recognised by the UKBA. 	E
Experience & Skills:	
<ul style="list-style-type: none"> Previous experience of undertaking research (e.g. undergraduate or taught masters dissertation) 	E
<ul style="list-style-type: none"> Background/experience in ecology, agronomy, environmental science or related field 	E
<ul style="list-style-type: none"> Data analysis and quantitative skills 	E
<ul style="list-style-type: none"> Previous experience in spatial analysis or habitat distribution modelling 	D
<ul style="list-style-type: none"> Knowledge of R or other programming languages (e.g. Python, C++) 	D
Personal Attributes:	
<ul style="list-style-type: none"> Understands the fundamental differences between a taught degree and a research degree in terms of approach and personal discipline/motivation 	E
<ul style="list-style-type: none"> Able to, under guidance, complete independent work successfully 	E
<ul style="list-style-type: none"> Curiosity, proactive and motivation for research 	E
<ul style="list-style-type: none"> Keen on working mostly with data to uncover patterns 	E
<ul style="list-style-type: none"> Interest in learning modelling and data analysis approaches 	E
<ul style="list-style-type: none"> Keen on doing almost exclusively desk-based work 	E
Other Requirements:	
<ul style="list-style-type: none"> The scholarship must commence by January 2023 	E

Making an application:

Please read this information before making an application. Information on the application process is available at: <https://www.gre.ac.uk/research/study/apply/application-process>. Applications need to be made online via this link. **No other form of application will be considered.**

All applications **must include** the following information. **Applications not containing these documents will not be considered.**

- In the first part of the application select the following: **Agriculture, Health and Environment**
- **Scholarship Reference Number (VC 2022-FES-NRI-4)**– included in the personal statement section together with your personal statement as to why you are applying
- **a CV including 2 referees ***
- **a short proposal on how you would address the research topic**
- **academic qualification certificates/transcripts and IELTS/English Language certificate if you are an international applicant or if English is not your first language or you are from a country where English is not the majority spoken language as defined by the UK Border Agency ***

**upload to the qualification section of the application form. Attachments must be a PDF format.*

Before submitting your application, you are encouraged to liaise with the Lead Supervisor on the details above.

Closing date for applications: *midnight UTC on 30 September 2022*

For further information contact: *E-mail: L.A.Buchi@gre.ac.uk*