

D Leybourne: CV
April, 2024

Personal profile: I am an agricultural entomologist and ecologist. My main research aims are 1) To understand the biological and ecological processes that underpin the success of herbivorous insects and vector-borne disease in agricultural systems; 2) To develop more sustainable crop protection practices. I currently work as a Research Fellow at The University of Liverpool, and I previously held positions in academia (Leibniz University Hannover) and industry (RSK ADAS Ltd.)

Education

PhD: Life Science. Dundee University, UK. 2015-2019. Thesis title: Exploiting molecular plant-aphid interactions for improved pest control under climate change". Supervisors: Dr Jorunn Bos, Dr Alison Karley.

BSc (Hons) Biology (Cell & Molecular Biology). Newcastle University, UK. 2010-2013.

Employment

Research Fellow: The University of Liverpool, UK. 2022-present.

Position is funded by an external research fellowship awarded by The Royal Commission for the Exhibition of 1851. Role involves managing and delivering the proposed package of research, delivering knowledge exchange activities, and securing additional funds to further support research activities. From July 2023 role has involved line-management responsibilities of one research technician, and PhD student supervision from Sep 2023 (co-supervisor). Role has involved student teaching: 22/23 - academic tutor for a Y2 tutorial group; 23/24 -academic tutor for Y3 tutorial groups, contribution of lectures and seminars in the Animal Diversity module (Stage one Undergraduate module).

Postdoctoral Research Fellow: Leibniz University Hannover, Germany. 2021-2022.

Position was funded by an external postdoctoral research fellowship awarded by the Alexander von Humboldt Foundation. I was hosted by Professor Emily Martin (research group in Zoological Biodiversity), and my role involved managing and delivering the proposed package of research and delivering knowledge exchange. I also secured additional funding from the British Ecological Society. Role involved line-management duties (5 x student assistants) and supervision of student projects (several BSc students and one MSc student). I was also responsible for assessment of BSc and MSc project dissertations. The main fellowship research aim was to highlight ecological links between landscape diversity and endosymbiont communities in agricultural ecosystems.

Entomologist: RSK ADAS Ltd. (ADAS), UK. 2019-2022.

This was a research and consultancy role at the agricultural research and consultancy firm ADAS (Agricultural Development and Advisory Service). I primarily worked in the arable entomology team on research projects focussed on crop protection of cereal and oilseed crops. Role involved securing commercial bids for contract research projects (e.g., projects for agrichemical companies) and managing and delivering successful bids. Role also involved developing industry research activities, including development of research ideas and writing applications to appropriate funding bodies (e.g., Innovate UK, Agriculture and Horticulture Development Board); position included management of funded research projects and ensuring research projects achieved the aims and objectives. There was a significant emphasis on knowledge exchange of research activities with academic and industry audiences, including farmer stakeholder groups (e.g., agronomy conferences). Position was part-time (20% FTE) from Jan 2021.

Fellowships and Grants

Active:

- Research Fellowship (2022-2025): The Royal Commission for the Exhibition of 1851. Project lead. Total value c. £200k. "Elucidating the agro-ecological factors influencing virus success in cereal ecosystems".
- Faming Innovations Programme – Feasibility Study (2023-2025): Innovate UK. Project co-lead (lead for Liverpool University). Collaborators: Sheffield University, Mutus Tech Ltd., ADAS. Total value £530k; Liverpool value £80k. "Adaptive AI-enabled and context-enhanced mobile intelligence for climate-smart pest management to optimise sustainable and resilient farming".

Previous

- Alexander von Humboldt Postdoctoral Fellowship (2021-2022): The Alexander von Humboldt Foundation. Project lead. Total value c. £150k. "The Agricultural Landscape and Arthropod biodiversity Nexus: ALAN".
- Large Research Grant (2021-2023): British Ecological Society. Project lead. Total value £12k. "Landscape effects on endosymbionts of the cabbage stem flea beetle".
- Faming Innovations Programme – Feasibility Study (2021-2022): Innovate UK. Project co-lead (lead for ADAS). Collaborators: Sheffield University, Mutus Tech Ltd. Total value £300k; ADAS value: £100k. "Integrating Visual and Context Information into a Mobile Intelligence Solution for Sustainable Management of Wheat Pests and Soil Health".
- Pump-Prime Business-Academic Partnership Grant (2022): BBSRC. Project co-lead (lead for ADAS). Collaborators: Sheffield University. Total value £75k; ADAS value: £25k. "NemaRecognition: An AI- and molecular-driven pipeline for throughput plant parasitic nematode recognition". Note – I secured funding for this project but relinquished project involvement when I left ADAS.
- Research Grant (2019-2021): Agriculture and Horticulture Development Board. Project co-lead (lead for ADAS). Collaborators: Rothamsted Research. Total value £15k; ADAS value: £7.5k. "Provision of information on the pyrethroid sensitivity of *Rhopalosiphum padi* and *Sitobion avenae* in the UK".

Teaching and Supervision

- Contribution of lectures to Animal Biodiversity module (Stage One Undergraduate) on the topic of Invertebrates. The University of Liverpool, 2024
- Tutor for Key Skills in Life Science module. The University of Liverpool, 2023
- Academic advisor for undergraduate students. The University of Liverpool, 2023-present
- BSc and MSc project examiner. Leibniz University Hannover, The University of Liverpool, 2021-present
- PhD student supervisor: One student (co-supervisor), 2023-present
- MSc student supervisor: One previous student, 2021-2022
- BSc student supervisor: Five previous students, 2021-2022
- Statistic Tutor. Dundee University, 2019

Publications

Peer-reviewed publications

* = joint authorship; [§] = corresponding/senior author articles; [¥] = article based on student research

- Leybourne DJ [§], Whitehead MA, Will T. 2024. Genetic diversity in vector populations influences the transmission efficiency of an important plant virus. Accepted: *Biology Letters*. DOI: 10.1098/rsbl.2024.0095
- Leybourne DJ ^{* §}, Storer KE* et al.. 2024. Thresholds and prediction models to support the sustainable management of herbivorous insects in wheat. Accepted: *Agronomy for Sustainable Development*. DOI: 10.1007/s13593-024-00965-5
- Leybourne DJ [§]. How does vector diversity influence the transmission efficiency of barley yellow dwarf virus? Perspectives from a review. *Plant Pathology*. Early view: <https://doi.org/10.1111/ppa.13871>
- Manentzos AN,... & Leybourne DJ ^{§, ¥} (2024). Low prevalence of secondary endosymbionts in *Myzus persicae* (Hemiptera: Aphididae) and *Brevicoryne brassicae* (Hemiptera: Aphididae) sampled from rapeseed crops. *Bulletin of Entomological Research*. Early view: <https://doi.org/10.1017/S0007485324000063>
- Leybourne DJ ^{§, ¥}, et al., (2024). Sharing the burden: Cabbage stem flea beetle pest pressure and crop damage are lower in rapeseed fields surrounded by other rapeseed crops. *Agriculture, Ecosystem & Environment*, **366**, 108965
- Ramirez CC ... & Leybourne DJ. (2023). To tolerate drought or resist aphids? A new challenge to plant science is on the horizon. *Journal of Experimental Botany*, **74**, 1745-1750
- Leybourne DJ [§] et al., (2023). Common facultative endosymbionts do not influence sensitivity of cereal aphids to pyrethroids, *Agricultural and Forest Entomology*, **25**, 344-354
- Luke SH, et al., (2023). Grand challenges in entomology: Priorities for action in the coming decades. *Insect Conservation and Diversity*, **16**, 173-189

D Leybourne: CV
April, 2024

- [Leybourne DJ[§]](#) & Araottir GI., (2022). Common resistance mechanisms are deployed by plants against sap-feeding herbivorous insects: insights from a meta-analysis and systematic review. *Scientific Reports*, **12**, 17836
- [Leybourne DJ](#) et al., (2022). Drought stress increases the expression of barley defence genes with negative consequences for infesting cereal aphids. *Journal of Experimental Botany*, **73**, 2238-2250
- [Leybourne DJ[§]](#), Storer KE* et al., (2022). Development of a pest threshold decision support system for minimising damage to winter wheat from wheat bulb fly, *Delia coarctata*. *Annals of Applied Biology*, **180**, pp. 118-131
- [Leybourne DJ](#) et al., (2021).. Drought has negative consequences on aphid fitness and plant vigor: Insights from a meta-analysis. *Ecology and Evolution*, **11**, pp. 11915-11929
- Escudero-Martinez C*, [Leybourne DJ](#)* & Bos JIB (2021). Plant resistance in different cell layers affects aphid probing and feeding behaviour during non-host and poor-host interactions. *Bulletin of Entomological Research*, **111**, pp. 31-38
- Pickering et al., (2020). Integrated pest management of cabbage stem flea beetle in oilseed rape. *Outlooks on Pest management*, **31**, pp. 287-290
- [Leybourne DJ](#) et al., (2020). The price of protection: a defensive endosymbiont impairs nymph growth in the bird cherry-oat aphid, *Rhopalosiphum padi*. *Insect Science*, **27**, pp. 69-85
- [Leybourne DJ](#) et al., (2020). A fitness cost resulting from *Hamiltonella defensa* infection is associated with altered probing and feeding behaviour in *Rhopalosiphum padi*. *Journal of Experimental Biology*. jeb.207936
- Preedy KF, Chaplain MAJ, [Leybourne DJ](#), et al., (2020). Learning-induced switching costs in a parasitoid can maintain diversity of host aphid phenotypes although biocontrol is destabilised under abiotic stress. *Journal of Animal Ecology*, **89**, pp. 1216-1229
- [Leybourne DJ](#) et al., (2019). Defence gene expression and phloem quality contribute to mesophyll and phloem resistance to aphids in wild barley. *Journal of Experimental Botany*, **70**, pp. 4011-4026

Book Chapters

- [Leybourne DJ[§] et al.](#), (2023). Online decision support systems, remote sensing and artificial intelligence applications for wheat pest management. IN: Advances in understanding insect pests affecting wheat and other cereals. Eds: Eigenbrode S & Rashed A. *Invited contribution*.
- Ramsden et al., (2023). Advances in pest risk assessment techniques focusing on invertebrate pests of European outdoor crops. IN: Advances in monitoring of native and invasive insect pests of crops. Eds: Fountain M & Pope T.

Publications: Preprints & papers in-review

- [Leybourne DJ[§]](#), et al.. Can artificial intelligence be integrated into pest monitoring schemes to help achieve sustainable agriculture? An entomological, management, and computational perspective. *In Revision: Agricultural Entomology*

Invited and Plenary Talks

- Keynote speaker. International workshop "Pest control under drought – A new challenge to plant science on the horizon". Talca University, Chile. March 2024.
- Invited speaker. International Barley Away Days. The James Hutton Institute, UK. Feb 2024.
- Invited speaker. Seminar Series. The Julius Kuehn Institut, Germany. 2023.
- Invited speaker. Seminar Series. Giessen University, Germany. 2023.
- Plenary speaker. Monogram Conference. "Biotic Threats" session. Leeds, UK. 2022.
- Invited speaker. Seminar Series. NIAB, UK. 2021.

Academic Service

- Editor: *Annals of Applied Biology*, from 2022
- Associate Editor: *Ecological Entomology*, from 2022
- Grant review: Numerous national funding agencies (Chile, Sweden, Ireland), The British Ecological Society
- Peer-Review: Numerous international journals (e.g., *Functional Ecology*, *Journal of Applied Ecology*, *BMC Ecology*, *Insect Molecular Biology*, *The Plant Genome*). Average of one per month.