Nitrogen management strategies for perennial ryegrass/white clover swards to improve grazing dairy systems productivity

Walsh Scholars Reference Number: 2026001
University: Munster Technological University (MTU)
Funding: Teagasc

Research Institutution: Teagasc
Location: Teagasc Moorepark, Co. Cork, Ireland
Proposed Start Date: 1st of January 2027

Project Summary

Ireland's pasture-based dairy production systems are built on an extended grazing season and rely on high levels of home-grown grass to support milk production. However, increasing environmental regulations have resulted in progressive reductions in permitted chemical nitrogen (N) fertiliser application rates, creating a need for alternative strategies that maintain productivity while improving nitrogen use efficiency and reducing environmental impacts.

The incorporation of white clover into perennial ryegrass swards has emerged as a promising approach to reducing reliance on chemical nitrogen fertiliser through biological nitrogen fixation. Previous Teagasc research has demonstrated that grass–white clover swards receiving 150 kg N/ha can achieve similar herbage production to grass-only swards receiving 250 kg N/ha. However, further research is required to optimise nitrogen management strategies within grass–white clover systems and to quantify their impacts on farm productivity and environmental performance.

This PhD project will provide the student with expertise in grassland management, dairy production systems, nutrient management, and environmental assessment. The student will evaluate milk and herbage production from a precision nitrogen management strategy compared with a conventional grass-only system receiving 200 kg N/ha and a grass–white clover system receiving 150 kg N/ha. The research will quantify nitrogen inputs and outputs across the different systems and assess their environmental impacts through a detailed nitrogen balance.

The project will also develop evidence-based guidelines for nitrogen application in grass–white clover swards based on clover content. Findings will contribute to the development of more productive, resource-efficient, and environmentally sustainable grazing dairy systems. The student will be based at both Teagasc Moorepark and Clonakilty Agricultural College and will have opportunities to collaborate with researchers across Europe and present their findings at international scientific conferences.

Supervision

The project will be supervised by Dr Aine Murray, Teagasc, whose research expertise focuses on grassland management, grazing dairy systems, nutrient management, and the integration of white clover into pasture-based production systems. Her research aims to improve the productivity, efficiency, and environmental sustainability of Irish dairy farming systems.

Co-supervision will be provided by Dr Brendan O'Neill, Munster Technological University (MTU), contributing complementary academic expertise in agricultural and environmental sciences. Together, the supervisory team combines applied research experience in grassland-based dairy production with university-based expertise, providing the student with a strong research environment and comprehensive support throughout the project.

Research Environment

You will be registered at Munster Technological University and based at the Teagasc Animal and Grassland Research and INNOVATION Centre, Moorepark, a centre of excellence for grassland science, dairy production, and sustainable farming systems, for the duration of your studies. The project offers access to

state-of-the-art experimental facilities, long-term grassland trials, and a strong interdisciplinary research community.

Career and Training Opportunities
The Teagasc Walsh Scholars Programme provides a structured four-year training and development framework designed to support both academic excellence and long-term career readiness. Scholars develop advanced scientific and analytical expertise alongside transferable skills in communication, project management, and stakeholder engagement through expert-led training, workshops, and tailored professional development.

Opportunities are provided to present research at national and international conferences, supporting professional networking and active engagement with the wider research community. Dedicated final-year career supports focus on preparing scholars for impactful roles across research, industry, advisory services, and policy, in Ireland and internationally.

Through the Teagasc International Training Awards, scholars may undertake an international research placement of up to 12 weeks aligned with their PhD project. Outstanding achievement may also be recognised through the Walsh Scholars of the Year and Gold Medal Awards.

Candidate Profile and Eligibility
Applicants should ideally:

- Hold a minimum Second Class Honours (2.1) degree in Agricultural Science or a related discipline
- Have a good understanding of pasture-based dairy production systems and practical grazing management experience
- Demonstrate strong organisational, analytical, and problem-solving skills, with an interest in applied agricultural research
- Be willing to undertake field-based research, data collection, statistical analysis, and the communication of research findings through scientific publications, conferences, and industry engagement activities
- Possess excellent written and verbal communication skills, with the ability to work effectively both independently and as part of a team
- Be highly self-motivated and prepared to undertake both field and laboratory-based research activities
- Hold a full, clean driving licence valid in Ireland
- Meet the English language requirements for postgraduate study where applicable

Funding Details
This is a fully funded four-year PhD funded by Teagasc, including:

- €25,000 annual stipend
- University fees covered up to €6,000 per annum

How to Apply
Applicants should submit the following to Dr Áine Murray – aine.murray@teagasc.ie - with the subject line: **"PhD Application – Walsh Scholars Reference: 2026001"** by **5 pm, Wednesday 28th October 2026**
Required documents:

- CV (including two referees)
- 1–2 page personal statement outlining:
    - Why you are interested in this project
    - Why you are a strong candidate for this PhD

Interviews
Shortlisted candidates will be invited to interview in early November 2026. Online interviews can be accommodated.

Further Information
Informal enquiries are welcome and may be directed to Dr Áine Murray: aine.murray@teagasc.ie

Further information on the Walsh Scholars Programme is available at:
https://www.teagasc.ie/about/research-innovation/the-walsh-scholars-programme/about-the-programme/