Transnational Projects funded by RSF

DAFM Reference	Project Title	Lead(Collaborating)Institution	Award
11/RD/EMIDA/1	Development of Novel Diagnostic strategies for the anti-mortem immunodiagnosis of bovine tuberculosis and Johne's disease:	UCD	281,905

Transnational Call Type: Emerging and Major Infectious Diseases of Livestock European Research Area Network Call 2011

Project Coordinator: Dr. Stephen Gordon

Project Abstract

Mycobacterial infections of livestock such as bovine tuberculosis (bTB) or Johne's disease (JD) exact a high cost on European agriculture. bTB and JD are chronic inflammatory diseases caused by Mycobacterium bovis (M. bovis) and M. avium paratuberculosis (MAP), respectively. Detection and slaughter of M. bovis infected animals is required under EU law but JD control relies on voluntary cooperation. Both diseases can affect multiple domestic animal and wildlife species. The mainstay of bTB control is the skin test often combined with blood based interferon-γ (IFNG) release assays (IGRA); and serology. Detection of JD relies on serology (ELISAs). The diagnostics based on cellular immunity (CMI) measure responses to bovine, avian and johnin tuberculin (aka PPD), or similar crude cell or antigen extracts which have severe specificity and sensitivity limitations. These preparations share common antigens between different species of mycobacteria and their efficacy in the various tests can vary. With respect to bTB diagnosis, sensitivity and specificity of the comparative tuberculin skin test or the IGRA is severely compromised in animals that are dually infected with M. bovis and MAP as MAP infection results in high avian PPD responses masking bovine tuberculin responses. Vaccination of animals with current commercially available JD vaccines similarly produces immune responses that confound the diagnostic tests. Further, due to cross reactivity, PPD-based reagents in M. bovis skin testing elicits immune responses that may confound subsequent immunological detection of both diseases when complex antigen reagents such as whole bacterial extracts are being applied. Clearly there is an urgent need for specific diagnostic reagents for these important diseases and a requirement to validate diagnostic tests multi-nationally against a background of common mycobacterial infections. The overall project aim was to improve the diagnosis of BTB and JD by generating more specific tools not compromised for sensitivity or specificity by co-infection and to increase the knowledge base of these two important livestock disease. The underlying philosophy of our consortium was based on a multi-pronged translational research approach combined with a fundamental and basic research arm. To deliver this goal, a consortium was formed of 11 partners from 7 countries (Czech Republic, France, Germany, Italy, Netherlands, United Kingdom, Republic of Ireland) through this 'MycobactDiagnosis' ERA-NET, with funding from individual national governments. This report will focus on the research work of UCD funded by DAFM.

Final Report: Final Report Emida 1 (pdf 517Kb)

Transnational Projects funded by RSF

DAFM Reference	Project Title	Lead(Collaborating)Institution	Award
11/RD/EMIDA/2	Coping with Anthelmintic Resistance in Ruminants Coping with Anthelmintic Resistance in Ruminants	Teagasc	149,666

Transnational Call Type: Emerging and Major Infectious Diseases of Livestock European Research Area Network Call 2011

Project Coordinator: Dr. Orla Keane

Project Abstract

Infections with gastrointestinal nematodes (GIN) are a major threat to ruminant health, welfare and production and thus to the viability of the ruminant livestock industries in the EU and worldwide. Anthelmintic resistance (AR) is the single-most important problem facing EU ruminant farmers today in relation to sustainable GIN control. AR is a constantly expanding process, from small ruminants to cattle; from the first commercialised anthelmintics (AH) to the modern ones and from single drug AR to multi-resistant cases. CARES believes that within the foreseeable future the most sustainable strategy is a combination of approaches, namely i) early detection of AR, ii) use of bioactive crops with documented AH properties, iii) improved farm management, feeding and selective use of AH. This applied approach needs support by basic research and a better understanding of mechanisms of development and reversion of AR. The project CARES will address these key issues through 3 complementary aims: 1) Improving the detection of AR in GINs (WP1). The aims are to improve the usability and reliability of current phenotypic tools but also to develop and validate molecular markers for the early detection of AR development and spread, particularly against macrocyclic lactones (ML).2) Assessing the role of plant resources to replace (WP2) or improve (WP3) the activity of synthetic AHs against AR GINs. The aims are to test the hypothesis of either direct AH effects of plant secondary metabolites (PSMs) against resistant (and susceptible) GINs (WP2); or indirect effects because some PSMs can potentially act as reversing agent for AR against ML (WP3). *In vitro* studies will provide basic data on the efficacy of active plants against AR GINs, either directly or in combination with AH drugs. *In vivo* studies will provide results for future exploitation of bioactive plants on-farm. 3) Exploring options for on-farm intervention (WP4). Integration is a key word for the sustainable control of GINs. The aims are to explore how combinations of solutions, adapting herd management systems, the use of natural AH or a selective use of AH can contribute to effective GIN control and slow down the spread of AR. The consortium is built on cross-linking criteria to address the objectives. Indeed, CARES brings together 8 partners from 5 EU countries plus a world leading research partner from Canada. Coping with Anthelmintic RESistance (CARES) is pivotal to all existing and up-coming means of nematode control. This project directly addresses the topic of parasite control/anthelmintic resistance named in the Stimulating Sustainable Agricultural Production through Research and Innovation (SSAPRI) document as a research priority area required to underpin the targets of the Food Harvest 2020 report. This research area aims “to mitigate against the risks of anthelmintic resistance and of new and emerging parasitic diseases - provide for sustainable use of anthelmintics and develop alternative parasite control strategies, with particular emphasis on the sheep sector.” The CARES project directly addresses these aims.

Final report: Final Report Emida 2 (pdf 356Kb)

Transnational Projects funded by RSF

DAFM Reference	Project Title	Lead(Collaborating)Institution	Award
13/RD/ICT-AGRI/1	SMART INTEGRATED LIVESTOCK FARMING	UCD	€225,000

Transnational Call Type: Coordination of ICT and Robotics in Agriculture and Related Environmental Issues (ICT AGRI) European Research Area Network Second Call (2012)

Project Coordinator: Prof. Nick Holden

Project Abstract

In this project we will develop an evaluation platform that demonstrates through research the potential for an Internet of Things (IoT) enabled FMIS with animal-centric ICT, production databases & best practice standards to assist farmers optimize sustainable livestock production. In this respect SILF will take an integrated approach to solving issues with environmental impact and animal welfare during livestock production. Previously developed smart farming sensing systems for lameness detection in dairy production will be "robustified", validated and evaluated against other available systems in different member states. The commercial/environmental benefit of these systems along with 'object-connected ICT' will be realized through specific business-models and lifecycle costing for farming systems. To entice innovation adoption these benefits will be disseminated through different means, e.g. through the use of a virtual farm simulator. To meet the growing appetite for meat and livestock derived products livestock farms across Europe are increasing in size. Therefore farmers must find greater integration of ICT into their production processes so that their farming knowledge can be exploited to better effect. SILF will demonstrate the benefits of integrating different information streams for supporting efficient dairy production. It will also develop know-how on user requirements for practical lameness detection system development through real-farm application, validation and "rubustification" and evaluation of these systems in Belgium, Denmark, Finland and Ireland. It will ease the entry into technology adoption by using virtual farm simulator as a means of dissemination. The impact of the project will be a significant step towards realistic possibility for livestock farmers to integrate object-connected ICT for improvement of sustainable production with improved animal welfare and commercial throughput. As Irish agriculture is so dependent on livestock production systems and products, this project is of great significance. Current national policy, found in Food Harvest 2020 specifies a requirement for Ireland to build on its green credentials through "SMART GREEN GROWTH" based technologies. This project directly focuses on this objective through the demonstration of the technical basis of IoT for sensor based data acquisition on farm (SMART), improved efficiency of farm management (GREEN) needed to increase productivity (GROWTH) in line with the target (50% increase in milk production) with minimal environmental consequences.

Final report: Final Report SILF (pdf 382 KB)

Transnational Projects funded by RSF

DAFM Reference	Project Title	Lead(Collaborating)Institution	Award
13/Ruragri/1	Towards RUral Synergies and Trade-offs between Economic development and Ecosystem services	UCD	€99,759
Transnational Call Type: Facing sustainability: new relationships between rural areas and agriculture in Europe(RURAGRI) European Research Area Network Call (2012)			
Project Coordinator: Dr. James Breen			
Project Abstract			
The main research objective of TRUSTEE is to disentangle the complex relationships between economic development and ecosystem services at different spatial scales. We will use an interdisciplinary approach that will involve economists, geographers, agronomists, and ecologists. At every step of the research process, we will involve scientists, experts, and stakeholders. In doing so, this research will also strengthen the capacity of a range of stakeholders to design sustainable strategies for rural areas. The sub-objectives are: 1 Analyse the multi-scaled determinants of economic development and ecosystem services on a large European gradient of rural and rural/urban areas; 2. Increase our understanding of how to achieve mutual benefits for economic development in rural areas and ecosystem services; 3. Identify and assess the governance mechanisms and policy instruments that enhance sustainable rural vitality in very diverse contexts, 4. Produce synergies among international researchers of varied disciplines and between researchers and various stakeholders at different governance scales.			
Final report: Not available yet			

Transnational Projects funded by RSF

DAFM Reference	Project Title	Lead(Collaborating)Institution	Award
14 Aniwha 1	Prevalence and optimised detection of resistance to antibiotics vital for animal and human health	NUIM	€246,937

Transnational Call Type: Animal Health and Welfare (Anihwa) European Research Area Network Third Call (2014)

Project Coordinator: Dr. Fiona Walsh

Project Abstract

The arsenal of antibiotics for use in medicine is ever decreasing, while the rates of resistance are ever increasing. There is a great need to identify and control all sources of antibiotic resistance, and minimise the transfer of resistance genes and/or bacteria within animals and between animals and humans. The aims of this collaborative project are to address resistance to three critically important classes of antibiotic classes; polymyxins (colistin), aminoglycosides and carbapenems among gut microflora from pigs and cattle. Colistin is an important antibiotic in the treatment of animals with intestinal infections i.e. Escherichia coli and Salmonella species. Carbapenemases were thought to be restricted to human pathogens, since carbapenems are not used in veterinary medicine. However, they have recently been identified in food animals. This project will evaluate the rates of resistance (or reduced susceptibility) to colistin, aminoglycosides and carbapenems and among Gram-negative enteric bacteria from pigs and cattle, and compare these with the levels of prescribing in the different countries. We will identify the mechanisms leading to the resistance or reduced susceptibility to those antibiotics, and decipher their genetic environment. In cases where no known resistance mechanism can be identified we will utilise whole genome sequencing and functional metagenomics to decipher the novel resistance mechanism. Using this data we can then evaluate the relationship between mobile resistance elements within and between countries. Recently developed rapid diagnostic techniques for cheap identification of carbapenemase-producing isolates will be applied to investigate carbapenem resistance. We will also develop further diagnostic tools for the identification of colistin and aminoglycoside resistances. The use of antibiotics in veterinary medicine, the emergence of antibiotic resistance and the potential transfer of resistance through the food chain to humans are topics of high priority at both the national and EU policy levels. Comprehensive EU-wide scientific data is required to guide future policy in this area and to ensure the maintenance of both animal and human health and welfare. Traceability and transparency within the food industry are required in order to build on the reputation that Ireland has built up over many years as an island of safe food production, with high standards in animal health and welfare. Through this research Ireland will be at the forefront of antibiotic resistance traceability in the pig industry, enabling measures to be instigated to ensure that the pigs of Ireland have the lowest levels of resistance possible while maintaining the high health and welfare standards.

Final report: Not available yet

Transnational Projects funded by RSF

DAFM Reference	Project Title	Lead(Collaborating)Institution	Award
15/RD/ICT Agri Era Net/GrassQ	Development of ground based and Remote Sensing, automated 'real-time' grass quality measurement techniques to enhancegrassland management information platforms	Teagasc (NUIM, CIT)	€242,683
Transnational Call Type: Coordination of ICT and Robotics in Agriculture and Related Environmental Issues (ICT AGRI) European Research Area Network Third Call (2015)			
Project Coordinator: Dr. Bernadette O'Brien			
Project Abstract			
The focus of this project is to develop and enable an intelligent system that will apply precision management to whole farm grassland and grazing systems. The goal is to optimize grass quality, utilization efficiency, and ultimately profitability, with minimal labour requirement and maximum objectivity. To precisely allocate to the cow herd the absolutely correct area of grass, it is necessary to have an accurate 'real-time' measure of grass quality (as well as quantity). The research proposed here is new and innovative, in that two very different techniques will be used to derive this grass quality measure, either by automated grass quality data capture by a near infrared spectroscopy (NIRS) sensor at ground level or by Remote Sensing image data captured using satellite or unmanned aerial vehicles (UAVs) and subsequent predictive modeling. This project provides a unique opportunity for these two techniques to be operated in parallel. The output or product of this research will be the provision of high quality, 'real-time', geo-tagged information in the form of herbage mass, and specifically grass quality, through a user friendly software package on a Smartphone App or web-based decision support system (DSS). The grass quality measure will be defined as % dry matter (DM), % organic matter digestibility (OMD) and % crude protein (CP). This latter parameter information (CP) together with the location specific nature of the data will also hold potential for targeted fertilizer application procedures for the future. This proposed work is central to one of the two fundamental priorities for SHARP, that being sustainable food production, with competitiveness and sustainability being two of the guiding principles focusing on the pillars of animal production, grass and sustainable management of those. Furthermore, this proposed work is aligned with the FoodWise 2025 vision for the Irish agrifood industry, which recognizes as a key fundamental principal, the grass-fed livestock production system which provides a significant comparative advantage in terms of cost competitiveness and environmental efficiency. The proposed work will enhance both grass utilization efficiency and targeted fertilizer application.			
Final report: Not available yet			

DAFM Reference	Project Title	Lead(Collaborating)Institution	Award
15/RD/ICT Agri Era	Mainstreaming controlled traffic techniques and optimization of	Teagasc (UCD, NUIG)	€259,196

Net/CTF-Optimove	movements		

Transnational Call Type: Coordination of ICT and Robotics in Agriculture and Related Environmental Issues (ICT AGRI) European Research Area Network Third Call (2015)

Project Coordinator: Dr. Dermot Forristal

Project Abstract

CTF-Optimove will focus on yield potential, avoiding production loss on headlands, improving machine performance, optimising CTF configuration and vehicle routing, and dealing with region specific constraints in countries like Denmark, Ireland, and Belgium. The guidelines will be presented at transnational workshops and a transnational advisory network will be put in place. Besides this, the uptake by farmers will be promoted by working with innovative farmers, industry and advisory groups. The specific objectives of this project are: • To develop an operational tool in a form of a Decision Support System (DSS) to minimize soil disturbance and compaction involving specific operational tools. The developed DSS will optimize the planning and control of operations (e.g. soil-sensitive route planning, logistics and scheduling under workability constraints - field readiness) including the configuration and execution of minimal soil compaction practices (e.g. CTF, field traffic planning) • To focus particularly on field headlands by quantifying the levels of crop losses on arable field headlands and identify the factors which contribute to such that losses such as soil structure damage, crop damage, inaccurate input application, etc. as well as determine the role of optimising traffic patterns and input application precision in reducing production losses and optimising costs on headlands areas. • To determine the role of innovative newer sensors in assessing headland position effects. • To effectively quantify quality and demonstrate the benefits of CTF in terms of work rates, fuel consumption and costs. To this end, a tractor will be instrumented with a set of sensors (i.e. fuel meter, speed radar) and data from the tractor operational data will be acquiredgained through the tractor ECU (Electronic Control Unit). • To carry out an adoption study for different farming systems in Denmark, Ireland and Belgium (incl. compatibility with existing systems, social factors influencing farmer uptake, economic viability). • To exploit the results of the demonstration sites. • To promote the uptake by farmers by developing an innovative dissemination package closely working with farmers, industry and advisory groups.

Final report: Not available yet