Defend

Working together to tackle emerging livestock diseases

DEFEND NEWSLETTER #6 **September 2021**

DEFEND is a consortium of 30 scientific partners from academia, industry and government working together to halt the emergence of two viral pathogens of livestock into Europe and neighbouring countries – **African Swine Fever Virus (ASFV) and Lumpy Skin Disease virus (LSDV).**

The aim of DEFEND is to control ASFV and LSDV by understanding the drivers behind their emergence, and by generating research outputs which underpin novel diagnostic tools, vaccines and authenticate appropriate and rapid responses by decision-makers.

DEFEND Key Facts

Start date: June 2018

Duration: 5.5 years

Budget: 5.6 million EUR

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Welcome to our sixth DEFEND newsletter!

DEFEND has reached its 36-month time point which is the end of the official “reporting period 2”. Excellent progress continues to be made with data gathering and analysis underway in all work packages.

In this newsletter we highlight the environmental risk factors for African Swine Fever in wild boar, from Hannes Bergman of the Friedrich-Loeffler-Institut, describe a Knowledge Exchange activity with field veterinarians carried out by the Azerbaijan Food Safety Agency, and spotlight two of our DEFEND partners - University Ss. Cyril and Methodius from North Macedonia, and the Friedrich-Loeffler-Institut from Germany.

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Defend

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NEWS

DEFEND Integrated Knowledge Transfer Awards 2020

In our last edition we announced that **Azerbaijan Food Safety Agency** (RVL) were the winners of our Integrated Knowledge Transfer (IKT) award. They received €500 to spend on their choice of IKT activity, an ASF and LSD awareness training course for field veterinarians, and we are pleased to have received an update from them.

Workshop

Our IKT workshop took place across different regions of the country, including Baku, Oquz, Gandja and Barda. The main goal of the workshop was to explain and demonstrate to field veterinarians the procedures for collecting, storing, and shipping biological samples. We also covered biosafety rules and the importance of using personal protective equipment and highlighted the importance of controlled temperature storage during sample transport. These are all areas that field veterinarians in Azerbaijan have little understanding of and therefore addressing this is crucial to improve field practices. The workshop started with a presentation on nodular dermatitis and highlighted how the correct collection of samples can play an important role in the diagnosis and prevention of the disease. A discussion regarding the impact to the economy and issues affecting humans were also took place.

Discussion

The second half of the workshop was a round table discussion session on the problems in veterinary practice and an exchange of knowledge and ideas. The participants all agreed that further cooperation between laboratory and veterinary organisations is essential to continue to facilitate the exchange of knowledge and new information on animal diseases.

Beyond the workshop

The workshop participants were provided with training materials, including booklets and training manuals, to assist with ongoing implementation of the themes discussed at the workshop. The participants were all very grateful for the documents and stated they would be well used in the field. Certificates of attendance were also provided.

Participants views

The participants commented on the negative effect that Coronavirus has had on the interactions and emotional state of people. Comments were made on the positive impact of the workshop and how happy everyone was to be able to discuss problems, exchange knowledge and ideas, and to collaborate in person.

Professor Teresa Lambe receives OBE

We would like to congratulate a consortium member and member of the DEFEND Enabling Impact Team, Professor Teresa Lambe, on the award of her OBE in the Queen's Honours list announced in June.

Professor Lambe, of the Jenner Institute at Oxford University, was named for her services to science and public health, for recognition of her work on the development of the COVID AstraZeneca vaccine. As one of the Principal Investigators overseeing the University's Covid-19 vaccine programme, Tessa received Officer of the Most Excellent Order of the British Empire (OBE), the second highest ranking order that can be given.

Professor Lambe said, “It is a privilege to receive this recognition and I would like to thank the global team, whose imagination, hard work, and determination allowed us to turn the impossible into reality, making a vaccine in record time. Going forward, we need to remember what we can achieve when we work together, so we can make sure that future generations don't need to make the same sacrifices that we have.”

23% of recipients were recognised for COVID related services and Professor Lambe was one of 206 people receiving an OBE and amongst 567 women who were named on the Queen’s Birthday Honours list.

The Enabling Impact Team at Defend leads the work package on guaranteeing impact (WP13) and consists of work package leads with experience in exploitation of research.

ARTICLES

Our second partner article comes from Dr. Hannes Bergmann, Prof. Franz J. Conraths and Dr. Carola Sauter-Louis of the Friedrich-Loeffler-Institut (FLI) entitled –

Environmental risk factors for African Swine Fever in wild boar

FRIEDRICH-LOEFFLER-INSTITUT
FLI
Bundesforschungsinstitut für Tiergesundheit
Federal Research Institute for Animal Health

Could African swine fever occur near you?

ASF continues to expand its grip on Europe. This animal disease is a major challenge for the pig production sector. It is therefore extremely important for pig producers and related stakeholders to know about potential environmental risk factors that associate with ASF occurrence in wild boar, which spread ASF virus in Europe. Knowledge about such risk factors provides a perspective to adjust disease awareness, pig management and biosecurity practices. As part of the EU Horizon 2020 DEFEND project, the German Federal Research Institute for Animal Health (Friedrich-Loeffler-Institut) leads work package 1 (WP1) to develop risk assessment frameworks for ASF and Lumpy Skin Disease. One of the scientific outputs from DEFEND WP1 provides this perspective on ASF risks for pig producers and related stakeholders.

ASF Prevention

ASF is an internationally spreading viral pig disease. As a pig species, European wild boar are highly susceptible to infection with the virus, whilst it is harmless for humans. In pigs, ASF virus causes severe generalised illness, leading to fever, bleedings and rapid death of most infected animals. The presence of ASF in a region severely damages pig production, trade economy, and social welfare. Therefore, immediate actions are needed to control ASF in affected regions, but also to protect disease-free regions from introduction of the virus. No sufficiently protective ASF vaccine currently exists, thus making risk factor identification and risk mitigation paramount.

Focus on environmental factors

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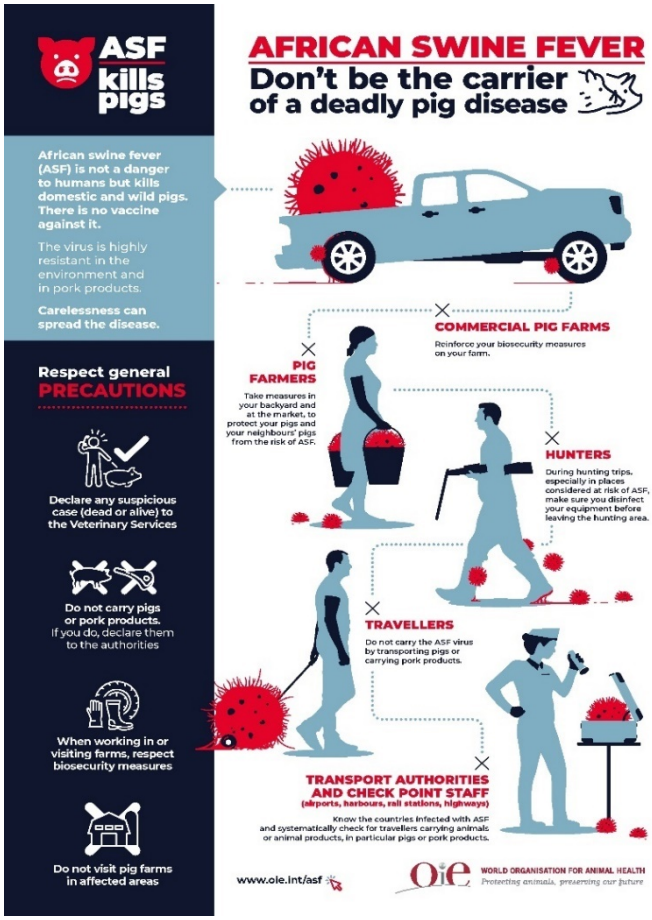
On the European continent, ASF has been spreading from east to west since its most recent incursion in 2007. Disease events in domestic pigs are typically distinguished from ASF cases reported in wild boar, indicating clear differences in disease transmission characteristics among these two pig types. Interestingly, ASF persistence and its gradual spread in most of Europe appears to be linked with wild boar infections, but not necessarily with disease outbreaks in domestic pigs. Management of ASF in wild boar populations is complicated, emphasising the importance of focussing on wild boar related and thus environmental ASF risk factors.

Risk factor candidates

Scientists of the DEFEND WP1 collected and classified a range of factors that have been examined for their association with ASF occurrence in European wild boar. These factors include proximity to ASF cases, the overall habitat suitability for wild boar, and factors related to human presence and activity. It is likely that many of the factors interact and presuppose one another, but how this practically manifests, remains unknown. Adequate levels and types of forest coverage, access to surface water and climate factors determine wild boar habitat suitability, potentially resulting in higher or lower wild boar numbers, which may indirectly modulate the risk of ASF occurrence. Furthermore, these environmental factors are likely to influence the persistence of ASF virus in the environment itself and modify the resulting level of virus exposure in the area.

The human "touch"

Detection of ASF cases in wild boar that occurred far away from previously known outbreak areas highlight the importance of human activity as a factor associated with ASF spread. Many human activities, such as farming, hiking, hunting or traffic can disturb wild boar and may thus lead to increased wild boar movement, which in turn could contribute to ASF spread. Alternatively, human outdoor activities could also result in "picking up" ASF virus and carrying it to regions not yet affected by ASF, even over hundreds of kilometres away. Therefore, environmental factors may influence ASF relevant wild boar biology or directly contribute to ASF spread.



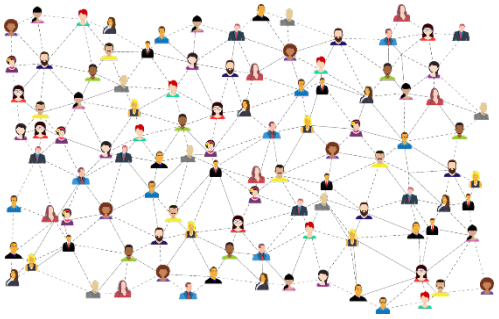
Take home message: Biosecurity!

In summary, the presence of ASF in European wild boar has a devastating impact on the European pig industry and causes significant hardship for people that work with or are dependent on pigs and pig production. The awareness of potential environmental ASF risk factors is critical in this situation, as ASF in wild boar is very difficult to control. Due to their inherent nature, the association of many environmental factors with ASF is challenging to study. As a result, evidence is scarce. Nevertheless, ASF occurrence in wild boar is far from random and environmental risk factors conducive to the observed disease pattern remain to be determined. In the meantime, it would be fair to exercise caution in relation to human activities that directly or indirectly interact with wild boar in the widest sense and to implement adequate biosecurity measures. After all, if you see signs of wild boar around you, ASF could indeed occur, where you are.

Look out for further partner articles in the next edition of the DEFEND newsletter!

OUTPUTS

As the DEFEND project moves through its term, we will be producing numerous outputs. Our outputs will focus on the scientific work being carried out on the project and will showcase our results and findings.



Below are the recent outputs from the project, we are proud to share these with you and hope that you find them both interesting and informative.

Publications

Type of publication	Title	Authors	Link to the publication
Article in journal	**Mathematical Approach to Estimating the Main Epidemiological Parameters of African Swine Fever in Wild Boar**	Federica Loi , Stefano Cappai, Alberto Laddomada , Francesco Feliziani, Annalisa Oggiano , Giulia Franzoni , Sandro Rolesu, Vittorio Guberti	https://www.mdpi.com/2076-393X/8/3/521
Article in journal	**A review of risk factors of ASF incursion in pig farming within the European Union scenario**	Silvia Bellini, Gabriele Casadei, Giorgia De Lorenzi, Marco Tamba	https://www.mdpi.com/2076-0817/10/1/84
Article in journal	**Potential link of single nucleotide polymorphisms to virulence of vaccine-associated field strains of lumpy skin disease virus in South Africa**	Antoinette van Schalkwyk Pravesh Kara Karen Ebersohn Arshad Mather Cornelius Henry Annandale Estelle Hildegard Venter David Brian Wallace	https://doi.org/10.1111/tbed.13670
Article in journal	**A Review of Environmental Risk Factors for African Swine Fever in European Wild Boar**	Hannes Bergmann, Katja Schulz, Franz J. Conraths and Carola Sauter-Louis	https://www.mdpi.com/2076-2615/11/9/2692

Activities

Activity	Description
Seminar	**Talk on ASF vaccines at the VIV Virtual Summit -Asia Edition** VIV Virtual Summit 21-23 April 2021 - VIV Asia
Seminar	**SVEPM 2021 (The Society for Veterinary Epidemiology and Preventive Medicine)** Welcome | SVEPM 2021 - March 24-26 2021
Seminar	**Modelling the spread of African Swine Fever in Europe by integrating Participatory Risk Mapping Networks for Animal Diseases** https://www.youtube.com/watch?v=BGgFqtlRvm4

PARTNER FOCUS

In each newsletter we ask a partner to describe their organisation, research and role in DEFEND.
In this edition we have focused on our partners from **North Macedonia & Germany.**

Partner: University Ss. Cyril and Methodius in Skopje (USCM)

Country: North Macedonia

Description of Organisation

The Faculty of Veterinary Medicine in Skopje (FVMS) is a member of the biggest and the oldest University in the country, The University Ss. Cyril and Methodius in Skopje.

The internal organisation of the faculty consists of three institutes, of which the Veterinary Institute (established in 1927) represents a national laboratory and main research centre for the diagnosis of animal and zoonotic diseases.

Description of research / area of expertise

FVMS has a broad scope of research activities, covering the epidemiology and diagnostics of the major transboundary animal and zoonotic diseases, animal diseases of economic importance, vector-borne diseases, foodborne pathogens, AMR, etc.

As the main adviser and partner to the national Veterinary Authority (FVA), we provide expert and scientific opinions on the key issues related to the development and implementation of the national surveillance, control, and eradication programs.

In collaboration with various international organizations and European research centres, we have provided our expertise in the transfer of knowledge for implementation, validation, and verification of classical microbiological, serological and advanced molecular diagnostic methods to a number of scientists and researchers, especially from Asia and Africa.

Role in DEFEND

- **WP-2: Phylogenetics of ASFV and LSDV**
- **WP-3: Conflict, migrations and virus spread**
- **WP-9: Optimising LSD Vaccine strategies**
- **WP-10: Host determinants of LSD resistance**

Key people working on DEFEND

- **Dr. Igor Djadjovski**
- **Dr. Kiril Krstevski**
- **Zagorka Popova, MSc**

Partner: **Friedrich-Loeffler-Institut (FLI)**

Country: **Germany**

Description of Organisation

Federal Research Institute for Animal Health

Description of research / area of expertise

The work of the Friedrich-Loeffler-Institut (FLI) focusses on farm animal health and welfare and on the protection of humans from zoonoses, i.e., infections that can be transmitted from animals to humans. The FLI does basic and applied research in different scientific fields.

Role in DEFEND

- **WP-1: Risk analysis framework for ASF and LSD**

Key people working on DEFEND

- **Prof. Franz J. Conraths**
- **Dr. Carola Sauter-Louis**
- **Dr. Hannes Bergmann**

Keep up to date

*If you would like to keep up to date with our work on DEFEND, you can register as a **DEFEND Stakeholder**, by emailing the DEFEND mailbox (defend@pirbright.ac.uk).*

*You can also follow us on **Twitter and Facebook @defend2020***