

QUESTIONS FOR BIRGIT GREGLER-GRANDL, WP LEADER, WP 3

WP3 – Re-Breeding livestock for resilience

-Introduce yourself, your professional background and your role within the Re-Livestock project

My name is Birgit Gredler-Grandl, I hold a position as senior researcher at Wageningen University & Research at the Animal Breeding and Genomics Centre in the Netherlands. I work in the area of genetics of feed efficiency and methane emission of dairy cows. In Re-Livestock I'm the leader of work package 3, where it is all about investigating the potential of animal breeding as tool for climate change mitigation and adaptation.

-Describe Re-livestock in 1 sentence

Re-Livestock is a great project following a holistic approach by combining animal breeding, animal nutrition, animal management strategies and more to tackle climate change mitigation and adaptation to climate change.

-A background explaining why breeding is important for increasing resilience

Animal Breeding is one piece of the puzzle when it comes to climate change mitigation and adaptation or increasing resilience of the animal as a whole. Genetic improvement by identifying animals with genetic predispositions for lower methane emissions or increased heat tolerance is a cost-effective, reliable, permanent and cumulative strategy to increase resilience. In the last few years, studies have shown that genetic variation, i.e. genetic differences between animals exist for methane emission. In combination with other strategies, animal breeding will help to accelerate climate change mitigation and increase resilience of farm animals.

-You are testing animal breeding innovations for resilience. Could you describe them?

In WP3 of Re-Livestock, we demonstrate the potential of animal breeding as tool for climate change mitigation and adaptation. We investigate to what level animal breeding can reduce the impact of livestock on climate change and to the adaptation of livestock to climate change. We define traits for this and estimate their genetic parameters, i.e. evaluate whether genetic variation exists among

animals for different trait definitions. We estimate breeding values for methane mitigation and heat adaptation traits based on new as well as state of the art methods. We design breeding objectives to reduce greenhouse gas emissions while keeping animals healthy, which are best suited for future conditions.

-What activities you have already carried out / you will carry out in your WP (very summarized and in a plain language, not excessively technical if possible; in case there are many things, you can select and say, for example...)

In animal breeding, ideally thousands of individual cattle are measured for the trait of interest, here methane emission and traits related to heat tolerance, to estimate genetic parameters and breeding values. Recording of individual methane emission in cattle is costly and labour intensive. Therefore, in WP3 we combine measurements from several countries (Australia, Poland, Spain and The Netherlands) to increase the accuracy of genetic analysis. Within the course of the project, we will have a data pool of more than 15,000 individual methane emission records, which currently represents the single largest data pool available globally. It is known, that specific rumen microbes play an important role in either low or high methane emission. We combine the rumen metagenomic information with the genomic information of the cow itself to selectively breed for lower methane emission.

One other important topic is the genetic analysis of traits related to heat tolerance and heat stress in cattle. Heat tolerance itself is difficult to measure directly. Therefore, we aim to define innovative traits based on indicative existing data routinely collected by recording organisations (e.g. milk yield, health traits) and new recorded traits like respiration rates during heat waves and estimate genetic parameters for those.

-What will be the outcomes and results you expect to obtain from your WP? (these can be technical or other type of innovations, advance in methods and knowledge, recommendations for practices or policies, insights to what may happen in the future so as to guide policies...).

The goal of animal breeding is to provide farmers with reliable tools to select animals to be parents of the next generation. By combining data across countries we aim to increase the accuracy of breeding values for methane emission in cattle. One main outcome will be more reliable breeding values based on an international data set and using information from related traits.

An important outcome will be new breeding strategies for mitigation and adaptation to climate change for various future climatic conditions livestock may face in different production systems and countries. It will be extremely important to investigate the effects of breeding for lower methane emission on other traits like production and health. A major outcome of WP3 will be different breeding strategies in cattle to reduce emissions and improve adaptation while keeping animals healthy and maintain production efficiency.

-What do you think may be the main benefits of Re-Livestock for the sector and for society in general (linking to the WP challenge/s)

The beauty of Re-Livestock is the holistic approach to reduce the impact of livestock on climate change and increase resilience by bridging disciplines like animal breeding, animal nutrition and management and combine results of those in guiding future circular systems. Specifically related to animal breeding, Re-Livestock helps to join forces across countries working towards a common goal to provide farmers with reliable tools to reduce their environmental footprint on farm and to breed animals well adapted for future climatic conditions.