



March 27th, 2023

Module 1 - Traits and methods to compute phenotypes

Course description:

The module will cover basic principles for definition of traits related to resistance and resilience (RR) and traits related to feed efficiency (FE) in small ruminant, recording systems for these traits, together with relevant examples in different SMARTER's countries:

- Definition of resistance and resilience in small ruminant and for feed efficiency (theoretical and concepts)
- Traits and measures related to RR & FE traits (practical examples and genetic basis)
- Recording systems: examples in different countries and breeds.
- Statistical treatment of raw input data (R/R): transformation/normalization, repeated measures vs multi-trait, etc.

In addition to theoretical lecture, a large part of the module will use SMARTER partner data (INRAE, SRUC, UNILEON, INIA-UY) for a hands-on approach. For RR traits, the practical session will address gastrointestinal parasite resistance. For feed efficiency, participants will use several sheep data (ASSAF dairy sheep, Romane lambs, and cross bred lambs) to compute a comprehensive set of feed efficiency related traits.

Upon module completion, participants can expect to have a fundamental understanding of the purpose, have the basic knowledge to clean, manipulate and analyze RR & FE traits. They will be able to understand the assumptions and limitations of different types of traits, models and recording systems models, and will be able to interpret literature data.

Requisites:

Bring your own laptop. either Linux, Windows or Mac. The hands-on will use R. Data files and scripts will be provided.

Course teachers:

Rachel Rupp, Flavie Tortereau (INRAE), Elly Navajas (INIA-UY), Nicola Lambe (SRUC), Juan José Arranz (UNILEON).

Agenda

Session 1: General introduction to Resistance/Resilience and Feed Efficiency in small ruminants (theoretical and genetic basis)	
09:30 - 10:00	“Welcome, General presentation of the Course and of SMARTER” - Riccardo Bica (INRAE)
10:00 – 10:45	“Definition of resistance and resilience in small ruminant: concepts, traits and recording, and genetic basis” – Rachel Rupp (INRAE)
10:45 – 11:00	Coffee Break
11:00 – 12:00	“Definition of feed efficiency in small ruminant: concepts, traits and recording, and genetic basis” - Elly Navajas (INIA-UY)
12:00 – 13:00	Lunch
Session 2: Lecture & Tutorial: Presentation of SMARTER cases studies and manipulating traits and models for FE traits	
13:00 – 14:45	“Handling feed efficiency data in sheep: three examples in meat sheep lambs (cross bred lambs from SRUC and Romane lambs from INRAE) and adult dairy sheep (ASSAF from UNILEON) will be presented (recording and protocols), and datasets provided to handle trait construction, models and concepts with R” – Juan-José Arranz (UNILEON); Nicola Lambe (SRUC); Elly Navajas (INIA-UY); Flavie Tortereau (INRAE)
14:45 – 15:15	Coffee Break
Session 3: Lecture & Tutorial: Presentation of SMARTER cases studies and manipulating traits and models for RR traits	
15:15 – 17:00	“Handling gastrointestinal parasites RR data in sheep: one example from meat sheep (INIA-UY) will be used to analyze and interpret the “gold standard” FEC (fecal egg counts) at different ages, in farm or experimental stations, natural vs artificial infestation and other phenotypes such as FAMACHA and body condition score” - Elly Navajas, Gabriel Ciappesoni, Ignacio De Barbieri (INIA-UY)