March 29ᵗʰ, 2023

Module 3 - Detecting Stress and evaluating ability to cope with stress

Course description:

Animals are exposed to stresses such as heat or management problems that may be measured or not. These stresses can be quantified and used in a norm reaction model to evaluate animal's ability to cope with stress. In addition, using frequent (e.g. daily) longitudinal data on traits, it is possible to infer the occurrence of unrecorded stresses based on deviations from the trajectory - either individual or group based.

The objectives of the module are:

- to present the norm reaction model to evaluate how animals deal with stresses when stresses are directly measured

- when stresses are not measured, how to infer and quantify their existence using deviation from trajectories, either of a group or of an individual

- how to include these inferred stresses into the norm reaction model for resistance to stress

In addition to some lecture, we will use INRAE data and UEDIN simulation for a hands-on approach.

Requisites:

Bring your own laptop. either Linux, Windows or Mac. The hands-on will use R, the blupf90 suite, text editors, and command line ("Terminal" in the Linux & Mac jargon and "Command shell" or "PowerShell" in Windows). Another option for Windows users is Ubuntu's "Windows Subsystem for Linux". Data files and scripts will be provided.

Course teachers:

Andres Legarra (CDCB), Carolina Garcia-Baccino (NUCLEUS), Masoud Ghaderi-Zefreh, Oswald Matika, Ricardo Pong-Wong (UEDIN)

Agenda

Session 1: Theory	
09:30 - 11:00	"Measures of stresses (THI, bacterial load, farm effect...)" - TBD "Norm reaction model, and how can be used to model reaction at the genetic level to stresses" - Andres Legarra (CDCB); Ricardo Pong-Wong (UEDIN)
11:00 – 11:15	**Coffee Break**
Session 2: Hands-on with blupf90 and R	
11:15 – 12:30	"A norm reaction model with observed covariates (e.g.THI)" - Andres Legarra (CDCB); Oswald Matika (UEDIN) "Writing the model" - TBD "Estimating genetic parameters" - TBD "Interpreting EBVs" - TBD
12:30 – 14:00	**Lunch**
Session 3: Theory	
14:00 – 15:30	"Inferring stresses from farm effects" - Masoud Ghaderi-Zefreh (UEDIN) "Inferring stresses from perturbation of group data" - Carolina Garcia-Baccino (NUCLEUS)
15:30 – 15:45	**Coffee Break**
Session 4: Hands-on	
15:45 – 17:00	"Inferring herd effects" - Masoud Ghaderi-Zefreh (UEDIN) "Inferring stresses from daily data" - Carolina Garcia-Baccino (NUCLEUS)
Session 5: Challenge session	
17:00 – 18:00	"Analysis on non-yet analysed SMARTER datasets (e.g ruminal temperatures)" – Riccardo Bica (INRAE) "Test the model and assess its outcome" – Riccardo Bica (INRAE)