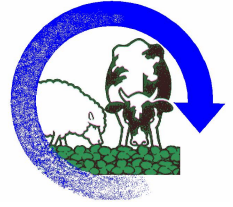


# GPEP II International Grazing Behaviour Workshop

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## “The meal dynamics of grazing herbivores: patterns and processes”

26th to 28th November 2013 – Faculty of Agronomy (Auditorium)

Universidade Federal do Rio Grande do Sul

Porto Alegre – Brazil

### Context & Matter

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The foraging behaviour of mammalian herbivores consists in a succession of “feeding bouts” (according to the terminology used by Bailey et al., 1996) spaced by periods of other activities. The term “feeding bout”, or “grazing bout”, refers to a period of concentrated grazing only defined by the temporal extent of the non-feeding periods. We think current knowledge allows a more functional definition of this fundamental level of organisation of foraging behaviour.

The question is: are all foraging decisions taken by the grazing animal following a single rule throughout the day (e.g. maximization of instantaneous intake, selection of preferred species), or are they evolving as a function of short-term internal and external circumstances, with a succession of short-term decision rules leading to daily (or longer) strategies (e.g. balancing nutrient intake, maximizing daily energy intake, limiting satiety)? In the first case, all temporal partitions of the intake are functionally equivalents and the process is not dynamic. Possible interactions between present foraging decisions and future ones are not considered. In the second case, feeding bouts are structured and dynamics, with foraging decisions evolving with time. Present intake behaviours will affect future ones. Intake components probably interact with each other to qualify overall diet quality, and short-term objectives are not necessarily the same as daily ones. Here, the question of satiety and duration of the feeding bouts is more complex, as animals can stop feeding when they conclude a foraging sequence; reach a balanced physiological state... Under this second hypothesis, we propose to use the term “meal” rather than “feeding bout”, as we think it is functionally more meaningful.

**This workshop aims to question, based on experimental and/or observational results, the significance of dynamical foraging processes at the “meal” scale.** By dynamical foraging processes, we refer to variations with time in variables such as dry matter and/or nutrient intake rate, pattern of plant selection, intake of secondary metabolites, properties of the foraging paths, etc... induced by adaptive short-term evolutions of the foraging decisions. Adaptive foraging decisions can be based on post-ingestive feedbacks, physiological signals, modification of the forage offer, hedonic factors, time of the day, herd behaviour, learned behaviours, etc. In simple words, our objective is to question if the concept of “meal” is more relevant than “feeding bout”. More important, we would like to have a discussion on the implications of these dynamical processes at larger scales, such as daily to weekly foraging strategies. The last afternoon of the event will be devoted to discuss a conceptual model on this issue.

Format of the event will be organized around 5 thematic sessions (see program hereafter), each with two main speakers and one or two student interventions. Main speakers will be allowed one hour, with approximately half time for the presentation and half time for the discussion. At the end of each day, we will have one additional hour of general discussion on the main topics of the day. The idea is to get time to discuss and think together. So if a discussion is going well, time for that discussion will be extended. For interested speakers, we will prolong the event by a day trip in the field on the 29<sup>th</sup> of November to practice behavioural dynamical observation with cattle and sheep and discuss more methodological issues.

## Provisional Program

### Day 1 – Nov 26<sup>th</sup>

#### Opening session

09:00

#### Paulo César de Faccio Carvalho (UFRGS/Brazil)

Present research projects on grazing herbivores and foraging behaviour at GPEP/UFRGS

#### Session I

#### The dynamic of short-term to daily foraging processes: I - Patterns

10:00

Are short-term intake rate of dry matter and/or nutrients constant or dynamical along feeding bouts/meals? If dynamical, how forage offer properties (e.g. resource availability, structure and heterogeneity) affect this dynamic? Can we highlight common patterns, and what are the bases of these pattern?

Plenary speaker: **Pablo Chilibroste, Universidade da República, Uruguay**

#### Session II

#### The dynamic of short-term to daily foraging processes: II – Influence on diet quality

14:00

Is the dynamic of dry matter and/or nutrients short-term intake rate influencing grazing herbivores' diet quality? How relevant is the dynamic of secondary compounds intake for overall diet quality?

Plenary speaker: **Juan Villalba, Utah State University, USA**

#### General discussion: Why are foraging processes dynamical?

17:00

### Day 2 – Nov 27<sup>th</sup>

#### Session III

#### The “meal” dynamics: intake kinetic and sequential order of the meal components

09:00

Are temporal partitions of a feeding bout functionally equivalent or not? If not, we can now use “meal” rather than “feeding bout”.

How the sequence order of diet components can influence diet quality? Is there common pattern of meal sequencing between different species? How meal sequencing responds to different levels of resource heterogeneity? And can we use meal sequencing to improve grazing land utilisation?

Plenary speaker: **Michel Meuret, INRA Montpellier, France**

## Session IV

### Physiological and hedonic factors influencing short-term herbivore's foraging choices

13:30

Are short-term (i.e. intra-meal/feeding bout) changes in herbivores foraging choices mediated by physiological feedback or hedonic factors? What is the nature of involved physiological feedback? What factors influence duration of the meals? Is herbivores' ability to successfully structure their intake based on learned behaviours?

**Plenary speakers:** Pablo Gregorini, DairyNZ, New Zealand

William Foley, The Australian National University, Australia

### General discussion: "feeding bout" or "meal"? The functional organisation of daily intake

17:00

## Day 3 – Nov 28<sup>th</sup>

## Session V

### Daily to weekly foraging strategies emerging from complementary short-term decisions rules

09:00

How dynamical foraging processes at the meal scale impact daily to weekly foraging strategies? How complementary short-term decision rules can lead to coherent larger scale strategies? How to integrate dynamical foraging processes in daily to weekly foraging strategy models?

**Plenary speaker:** Daniel Fortin, Université Laval, Quebec, Canada

### Closing session:

15:00

Review of the main conceptual advances. Thinking on conceptual models of herbivore foraging strategy explicitly integrating the dynamic of foraging process at the meals scale

### Sharing opportunities

17:00

Common protocols and future projects/opportunities. Identification of working groups for international collaborations to work on the different aspects emerging from this discussion with clear objectives about joined publications.

## Optional field day – Nov 29<sup>th</sup>

### Field day at the UFRGS Experimental Station

Practical field school on measurements of dynamical foraging process: challenge local trained observers and let see at what scale you are able to monitor foraging processes!

*In situ* discussion on methodological issues raised by dynamical foraging processes.