Application for Short Term Scientific Mission

Matthias Mair, BSc

University of Natural Resources and Life Sciences (BOKU)

Livestock Sciences

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Workplan

Title: Welfare assessment in small-scale alpine dairy farms: identification of potential risks

The Short Term Scientific Mission (STSM) aims at fostering the collaboration between the University of Padova (IT) Department of animal medicine, production and health and the University of Natural Resources and Life Sciences (BOKU) of Vienna, Department of Sustainable Agricultural Systems, Division of Livestock Sciences.

Goal: Statistical analysis of the effect of alpine pasture on animal welfare and to define risk factors

The aim mission will be to clean and organize the dataset, so that I am able to make the statistical analysis. I use the dataset which I collected during summer at the on-farm assessment.

Background

It is important to maintain the tradition of keeping the dairy cows on alpine pasture during summertime (vertical transhumance), both for animal welfare and cultural/economic issues.

This traditional farming system includes a lot of knowledge, for example on how to manage a herd of cows on alpine pasture or how to make local dairy products. It is the most natural function of ruminants to process pasture-grass into food. The consumers perceive "natural food and natural environment" as the best option for animal welfare (EUROBAROMETER, 2007; MIELE ET AL., 2009), it would be interesting, therefore, to find out how the conditions during the alp-period affect health and welfare of dairy cows. Many mountain farms keep their livestock in tie stall in winter, but in the summertime they let their cows on pasture so. I want to research how this 4 month alpine pasture effects animal welfare. For example, can improve alpine pasture open shoulders?

Action 1

During the STSM to the Department of Animal Medicine, Production and Health (MAPS) - University of Padova, I will first prepare a strategic plan for the statistical analysis of a large data-set concerning welfare of dairy cows in small scale alpine farms gathered during the on farm visits within the collaboration between the Department of Animal Science - University of Ljubljana, Slovenia; Division of Livestock Sciences, Department of Sustainable Agricultural Systems – University of BOKU Austria; Department of Agricultural and Environmental Sciences - University of Udine, Italy; and Department of Animal Medicine, Production and Health - University of Padova, Italy.

Data will be processed and statistically analysed in collaboration with the statistician of MAPS and with other collaborators. A stepwise approach will be applied: study the distribution of the raw data, set the experimental unit(s) according to the type of data gathered, assess the prevalence of the animal based measures and of the resource and management based measures before, during and after the summer grazing, run appropriate statistical analysis.

The response variables will be the outcomes of the animal based measures gathered through the direct observation of the animals (e.g. cleanliness, body condition score, integument alterations, etc.) whereas the explanatory variables will be the resource and management based measures gathered by interviewing the farmer (e.g. herd size, feeding management, seasonal calving, facilities on pasture, means of transport to the pasture and back, etc.). Descriptive analyses will be carried out on both response and explanatory variables. Explanatory variables with a continuous distribution (e.g. hours of allowance outdoors) will be considered either as covariates or as factors if their distribution in the dataset allows their grouping into different classes. These variables will be considered as the potential risk factors or preventive measures depending on how they will affect the response variable.

First, a univariate analysis will be performed to study the effect on the dependent variable (Y) of each single factor separately using a generalized linear model. A 2-way ANOVA will be then carried out to test for each pair of risk factors the significance of main effects and their interaction as well as to evaluate potential multicollinearity between risk factors through the inspection of the distribution of

farms across combinations of risk factors, and the calculation of the variance inflation factor. Following univariate analyses, only potential risk factors associated with the dependent variable ($P < 0.10$) will be offered to bi- or multivariate models. For the analysis of prevalence (i.e., percentages per farm, or batch), logistic regression models will be used, specifying a binomial variance function with a multiplicative dispersion parameter. For each risk factor retained in a final model, odds ratios (OR) as well as 95% confidence intervals will be obtained.

Once, the results will be achieved and the analysis will be over, I will need to study the existing literature to identify the weak and the strength points of my outcomes in order to build a discussion of the results.

During the last part of the mission I will contribute to prepare a strategic plan for the future publication(s).

Date	Aim
25 - 26 January 2016	To get to know the people from the Department of Animal Medicine, Production and Hhealth
27 – 28 January 2016	Finalize data entering
29 January – 1 February 2016	Correct, clean and control data
2 - 5 February 2016	To join data together
6 - 9 February 2016	Do the statistical analysis
10 - 12 February 2016	Discuss results