

PhD School on Agriculture, Environment and Bioenergy

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(XXXIX cycle, 2023-26)

Project draft

1. Field of interest

AGR/19 - Animal husbandry

2. Project title

Development of innovative welfare indicators in farmed ruminants

3. Tutor (membro del Collegio dei Docenti) Prof. Silvana Mattiello

- **Eventually: co-tutor/s** Dott. Monica Battini

4. Relevance of the topic and state of the art: **mezza pagina**

The European Union's new Farm to Fork strategy aims towards more sustainable agriculture practices through an integrated food policy that covers the full supply chain, including animal welfare. This reflects the growing public concern around animal welfare (European Commission, 2022).

The factors that affect animal welfare include both the available physical resources (e.g. stocking density, food and water availability...), and the management practices (e.g. handling, transport...). These individual responses to these factors can be assessed using animal-based measures, and may vary among individuals depending on several characteristics, such as age, sex or breed (EFSA, 2012). Animal-based measures can be collected by direct observation or inspection of the animals, or they can be retrieved using automated methods (Precision Livestock Farming). These methods are becoming increasingly popular, as they are much less time consuming and allow a continuous and non invasive monitoring of animal welfare and health (Schillings et al., 2021), and are promising tools also for the evaluation of animal emotions, for example by means of facial expressions (Descovich et al., 2017) or vocalisations (Laurijs et al., 2021), which are important in enhancing positive welfare and provide a better life on farm (Mattiello et al., 2019).

Although many valid and reliable indicators are already available for the most widely farmed species, there are still many gaps that need to be addressed, especially in the field of positive welfare (Mattiello et al., 2019) and in extensive and pasture-based farming systems (Spigarelli et al., 2020).

The aim of the project is to fill these gaps by identifying valid and reliable animal-based indicators for the assessment of animal welfare in ruminants in different farming systems, with special attention to positive welfare, using traditional (e.g. observations, individual inspection) or innovative methods (PLF).

5. Layout of the project (draft)

5.1. Materials & Methods: **da mezza pagina ad una pagina massimo**

5.2. Schedule and major steps (3 years): mezza pagina max

Months 1-2: literature update and identification of gaps to be filled

Months 3-4: set up experiments to fill gaps

Months 5-30: data collection;

Months 8-33: data analysis;

Months 33-36: thesis writing.

Dissemination of results will take place as soon as the first results will be available (probably around month 18) and will last until the end of the project.

6. Available funds (source and amount)

PNRR - SPOKE 5 - Tasks 5.1.2 (Integrated sensor system for monitoring behavior, welfare and production performances in dairy cattle and goats) and Task 5.2.3 (Use of smart technologies to optimize the welfare of grazing dairy cattle and goats and to enhance environmental sustainability of their production): 304.000,00 €

40959 - F_UEALTRI22SMATT_01 - Dissemination of animal welfare practices in farmed ruminants: 78.040,00 €

41167 - CTE_NAZPU22SMATT_01 - Studio delle vocalizzazioni nell'allevamento bovino da latte presso l'azienda agraria sperimentale Baroncina di Lodi del CREA-ZA: 13.317,50 €

7. Literature: max 10 citazioni

Descovich K. A., Wathan J., Leach M. C., Buchanan-Smith H. M., Flecknell P., Farningham D., Vick S.-J., 2017. Facial expression: An under-utilized tool for the assessment of welfare in mammals. *ALTEX - Alternatives to animal experimentation*, 34(3): 409–429.

EFSA, 2012. Statement on the use of animal-based measures to assess the welfare of animals. *EFSA J.*, 10: 1–29.

European Commission, 2022. Farm to Fork Strategy. https://food.ec.europa.eu/horizontal-topics/farm-fork-strategy_en.

Laurijs K.A., Briefer E.F., Reimert I., Webb L.E., 2021. Vocalisations in farm animals: A step towards positive welfare assessment. *Appl. Anim. Behav. Sci.* 236, 105264.

Mattiello S., Battini M., De Rosa G., Napolitano F., Dwyer C., 2019. How can we assess positive welfare in ruminants? *Animals*, 9, 758.

Schillings J., Bennett R. Rose D.C., 2021. Exploring the Potential of Precision Livestock Farming Technologies to Help Address Farm Animal Welfare. *Frontiers in Animal Science*, 2: 639678.

Spigarelli C., Zuliani A., Battini M., Mattiello S., Bovolenta S., 2020. Welfare assessment on pasture: a review on animal-based measures for ruminants. *Animals*, 10: 609.