UMR Herbivores

Team Feed, Digestion, Microbes, Metabolism, and Nutrition (Dinamic)

INRAtion®V5: a field tool for a new approach to Ruminant rationing

The new integrated ruminant feeding system designed by INRA 2018 has made it possible to envisage new functionalities for rationing ruminants, in terms of scope (very diverse rations and types of animals) and diversity of animal responses (economic, environmental, nutritional and animal health benefits). These innovations have been integrated into the INRAtion®V5 software developed in partnership with livestock consultancy firms (SIEL association). This tool makes it possible to optimise rations for production objectives that may differ from the animals' potential production trajectory, to integrate the search for a compromise between different responses, and to evaluate the rations calculated on the basis of all predicted animal responses. A first version of the software will be available at the end of 2019 with modules for rationing dairy cows, growing and fattening cattle, and predicting feed value. The rationing modules for suckler cows and small ruminants will be integrated in 2020.

The feeding system proposed by INRA for rationing ruminants has been regularly updated for 40 years. It is widely used in France and in several European, African and South American countries, and thanks in particular to its support software, INRAtion®. The recent revision of the system aimed at developing new approaches to rationing. In addition to the traditional objective of calculating rations to cover the needs at the animals' potential, it was also necessary to calculate rations for an objective that could be different from these needs, and thus to predict the multiple responses of the animals in terms of production, product quality, animal health and environmental emissions. It was also important, with a view to optimizing the use of resources, to broaden the contexts of application of the system to a wider variety of feeding situations. The system has been thoroughly revised with this objective in mind, leading to the publication of the new 'red book' (INRA 2018). What remained to be done was to integrate these new concepts into an operational tool for rationing.

The construction of the INRAtion®V5 rationing system was the subject of a close partnership with the SIEL Association, which brings together 24 livestock consultancy firms (ECEL), representing more than 50% of the dairy herd in France. This partnership has resulted in a co-owned tool whose calculation engines are fully validated by INRA, and whose interfaces and ergonomics correspond to the expectations of the field user to define his objectives over the production cycle, feed his animals in batches or individually, and manage his feed stocks. In addition to integrating the models described in the Red Book to calculate feed values from their laboratory analysis, predict feed intake (including on pasture), nutritional intakes, and the multiple needs and responses of the animals, the INRAtion®V5 engine is based on an algorithm that optimizes the rations calculated according to various objectives. This generic and modular 'objective function' integrates production objectives, management of body reserves, and efficiency of protein use. Other predicted animal responses allow the user to evaluate the calculated rations on several technical and economic dimensions, in order to make informed decisions. An 'augmented' version of the software (called Rumin'Al) integrates ECEL-specific functionalities, in particular the connection with ECEL information systems. A first version of the software, available at the end of 2019 in French and English, will integrate the feed value prediction module (PrevAlim), the rationing modules for dairy cows, and growing and fattening cattle. The software is available under license (https://www.inration-ruminal.fr/), and made available to academic and research institutions.

Training in the software and underlying concepts will be provided in late 2019-early 2020 by INRA (through AgroParisTech and AFZ) and SIEL, and with support from the DGER for agricultural education. Rationing modules for suckler cows, ewes and dairy goats are being developed for integration in 2020. The connection to the ECEL information systems will allow a massive feedback of results from the field, which can be interpreted to develop the system and the tool.

Publication

Dépôt à l'APP du logiciel INRAtion®V5

Reference:

INRA, 2018. INRA Feeding System for Ruminants. Wageningen Academic Publishers, Wageningen, The Netherlands, 640 pp.

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Legend: Four categories of animal responses were considered for the multicriteria evaluation of ruminant diets: animal production, animal health, wastes and products quality. Within each category, different dimensions were defined, then detailed in criteria assessing using indicators measured or estimated at feedstuffs scale.