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Abstract Submission Form

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Preferred presentation Oral

Preferred session Session 1: WG Animal Data Exchange – Decision Support Tools of the Future – Promoting Sustainability Farm Management

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Title of your paper New algorithm to plan easier and faster weighing for French breeders and technicians

Insert ABSTRACT text

Beef cattle breeding represents 3.7 million cows in France in 2022, including 1 million with certified pedigree (CPB), and 435,000 in Beef Cattle Recording (BCR). Each year (2022), more than 1 million calves are weighed up to weaning, giving 331,000 Adjusted Weights at 210 days (AW210). In 2021, the CALPAT project provided new flexible rules for calculating AW and a reliability indicator was developed. These recent developments have increased the number of AWs but have heightened the already existing difficulties for technicians and breeders to plan weighing sessions. To solve these problems and facilitate weighing planning, the PATApi project was adopted by « France Genetique Elevage », to provide a high-performance tool for planning weighings up to weaning.
At beginning, we initially focused on the needs of network advisors with regard to weighing planning. The main features expected from the algorithm are: 1°) a forecasting tool, able to provide theoretical weight dates based on the previous year's births. 2°) regular updated based on actual births and weighings. 3°) a list of animals with dates of birth and parameters 4°) provide at the output optimal passage dates, decision-support elements such as the ratio of animals with AWs, their average reliability, and graphical

representations enabling dynamic adjustment by the user.
At the same time, an exploratory analysis of available methods identified the exhaustive search for dates as a solution, particularly for providing dynamic graphical representations. However, this method would involve considering more than 4 billion possible combinations for a 4-month distribution of births and require 4 different passage dates to estimate AWs. An initial optimisation phase enabled us to detect the optimum periods (represented by their median date) rather than the exact dates, and to considerably reduce the number of combinations tested. Finally, the stochastic 'simulated annealing' method completely adapted to this problem, provided the optimum number of weighings and the corresponding weighing dates, with a very significant improvement in calculation times. On the downside, this method does not allow dynamic adjustment by the user. In practice, the performances obtained are satisfaying: between 3 and 5s for a farm of 60 animals with 3 weighing dates.
Once improved, this algorithm, developed in R language, was packaged and encapsulated in an API. This will interact with any software able to transmit a list of animals and the expected input parameters. Commissioning is expected as from 2024 and it will facilitate the work of technicians and breeders alike from the start of the next birth campaign.

Enter keywords beef, recording, weight planning, algorithm