



Event	Montreal (CA), ICAR 2022 Annual Conference	Title of the presentation
Subject	Abstract presented manuscript as ORAL presentation	PHENO3D : phenotyping and weighing beef cattle by 3D imagery

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Session: Artificial intelligence for adding value (to be confirmed)

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ABSTRACT

The Pheno3D project aims to bring the selection of cattle into high-throughput phenotyping by relying on the non-invasive technology of three-dimensional (3D) imaging. Thanks to artificial intelligence, the automation of 3D image analysis is now possible. The potential uses are numerous both for morphological evaluation and for monitoring livestock management indicators (particularly weight), but also in the long term to develop new phenotypes linked to the efficiency or robustness of animals. Thus, from an existing 3D "device", the PHENO3D project aims to develop an automated and real-time processing device for 3D images to extract phenotypes used in the beef cattle industry (weight and morphological scores).

The PHENO3D device will allow to phenotype more complex traits and can help select animals according to the major challenges of the livestock sector (animal welfare, sustainable animal, etc.). The device will also make it possible to increase the performance of the selection system (more data, data reliability, etc.) and offer breeders more solid selection programs. The latter will also benefit from an improved quality of advice on sorting and herd management thanks to more repeatable and reliable



results.

Thanks to this new device, the ease of collection will contribute to the sustainability of a solid selection scheme for the 9 french beefs cattle breeds which represent an important part of the genetic diversity of our breeds. As breed training of operators will no longer be necessary with this device, generalized scoring could be extended to breeds with small numbers.

On the TRL scale (Technological Readiness Level – levels 1 to 9), our device aims to develop phenotyping by 3D imaging from level TRL 5, simple taking of a 3D image, up to level TRL 9, with a 3D image and an image analysis and phenotype prediction demonstrator that works in a real environment.

The development of our high-throughput phenotyping device is also intended to support work for future developments of complex phenotypes from 3D images. :



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