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PHENO3D : VALIDATION OF A HIGH-THROUGHPUT MOVABLE 3D DEVICE FOR THE ACQUISITION OF THE WHOLE CATTLE BODY

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Over the past decade, proofs of concept have flourished around the use of three-dimensional imaging to assess cattle morphology, but the devices were not suitable for on-farm phenotyping. To follow up on the presentation of the year 2022, we wanted to present to you the progress in terms of pictures and results on the PHENO3D project. Our objective was to scale up by developing a 3D scanner suitable to on-farm phenotyping and portable from one commercial farm to another. The 3D scanner is a dismountable gantry (3 x 2.5 x 0.7 m) carrying 10 depth sensors which combine their data acquisition to provide a 3D image of the whole body. Animals walk under the device and are scanned in motion allowing high throughput phenotyping. Proprietary algorithms automatically clean the image allowing direct image processing. The scanner has been tested in different situations: inside and outside, indicated at the end of a ladder or between 2 pens in a fattening barn. To validate the accuracy of 3D image acquisition, we used the method proposed by Le Cozler et al. (2019) comparing the values measured on live animals (REF) with those extracted from 3D images manually (method A) and automatically by image processing (method B). Traits used in the validation process were hip width (HW), heart circumference (HG), chest depth (CD), height at withers (WH) and height of the sacrum (SH). The REF measurements were recorded in 2 sessions on 33 animals (crossbred calves 6 to 12 months old) and the animals were scanned under the different conditions described above. Correlations with REF for methods A and B were greater than 0.9 on WH and SH measurements, higher than 0.8 for CD and HW measurements, and greater than 0.7 on HG. The accuracy of this new device allows on farm phenotyping. Automatic processing of the image is already promising and will be further developed into the PHENO3D project that aims to predict body weight and morphological trait scores used in the beef cattle genetic indexes.