



Morpho 3D: a new device to register and analyze 3D shapes of animals

Anaïs Caillot, Clément Allain, Philippe Faverdin, J M Delouard, L. Delattre, Yannick Le Cozler

► To cite this version:

Anaïs Caillot, Clément Allain, Philippe Faverdin, J M Delouard, L. Delattre, et al.. Morpho 3D: a new device to register and analyze 3D shapes of animals. 8. European Conference on Precision Livestock Farming (ECPLF), Sep 2017, Nantes, France. hal-01595576

HAL Id: hal-01595576

<https://hal.science/hal-01595576>

Submitted on 5 Jun 2020

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.



Distributed under a Creative Commons Attribution - ShareAlike 4.0 International License



Morpho 3D: a new device to register and analyze 3D shapes of animals

ECPLF 2017

12 – 14 September 2017

Nantes - France

A. Caillot ¹, C Allain ², P Faverdin ^{1,2}, JM Delouard ³, L Delattre ³, Y Le Cozler^{1,2}

UMR PEGASE, INRA / AGROCAMPUS-OUEST, F 35 590 St-Gilles
IDELE, F 35 650 Le Rheu
3D Ouest, F 22 300 Lannion

General: Monitoring growth and body condition is essential in modern farms for optimal management. Because of difficulties of implementation and use in commercial farms, it is not very common.

Hypothesis: 3 dimensions image analysis is a solution: designing Morpho 3D tool.

Questions: does Morpho 3D device is suitable for precise morphological measurements ?

Material & Methods

On-animal manual measurements of Heart Girth (HG), Withers Height (WH) and Hip Width (HW):

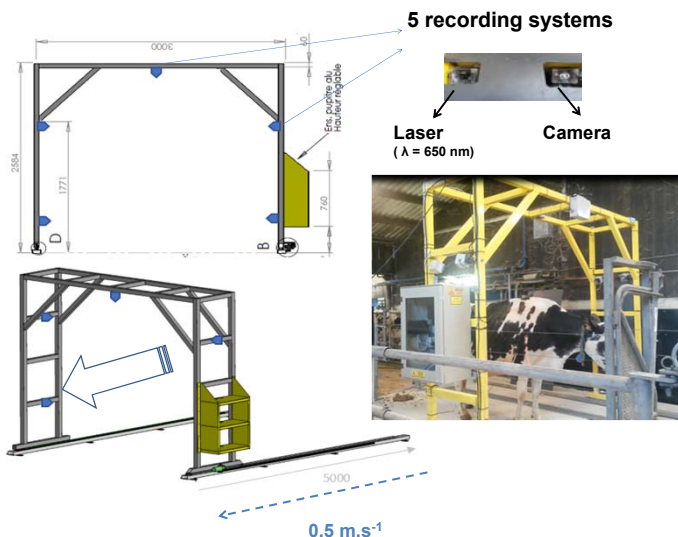
- 6 different cows (4 successive measurements)

→ Reproducibility

- 1 model plastic cow (6 times):

→ Repeatability

Indirect measurements on 3D images from 3D device
(Video available at : <https://vimeo.com/219370900>)



Heart Girth (HG)



Withers Height (WHG)



Hip Width (HW)

« Cleaning »

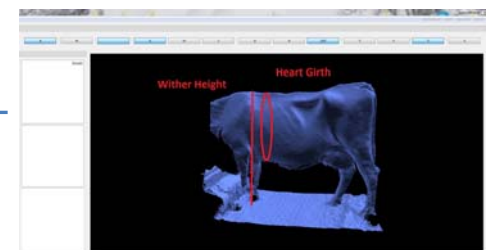


« Recontruction »
(Meshlab®)



« Measurements »
(Metrux2α®)

HG, WHG, HW



Results / Discussion

		Repeatability			Reproducibility	
		μ_r (cm)	σ_r	CV_r (%)	σ_R	CV_R (%)
HG	Manual	129.1	1.04	0.80	1.07	0.72
	Morpho3D	131.1	0.34	0.26	2.12	1.42
WHG	Manual	39.8	0.35	0.88	1.01	1.82
	Morpho3D	39.9	0.67	1.68	0.55	0.94
HW	Manual	194.2	0.21	0.11	0.49	0.62
	Morpho3D	195.8	1.89	0.97	0.92	1.09

μ : average value; σ : standard deviation;

$CV_r = \mu_r / \sigma_r * 100$; $CV_R = \mu_R / \sigma_R * 100$ (μ_R is the average value of the cow model, not presented)

- 2 min/cow to get an image
- High correlations between **Manual** and **Morpho3D** values
- CV_r & CV_R values < 3 %: repetatability and reproducibility are (very) good
- Reliable technology for on-farm uses

Conclusion / perspectives

- Needs for automation of measurements on 3D images (currently need 15 min for 5 items, only 3 presented here)
- Possibility to determine and use new indicators
- New opportunities for animal management and genetic evaluation, other than dairy cows, thanks to the possible determination of new indicators (surfaces, volumes...)