Application of digital image equipment (DIE) for distance morphological evaluation of horses

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INTRODUCTION

Morphological evaluation of animals is important for management and research purposes.

However, obtaining morphological traits can be time-consuming and requires trained labor.

In addition, manipulation procedures can be stressful and difficult to perform especially for free ranging and feral animals.

Santos et al., 2010

INTRODUCTION

To overcome these difficulties, in recent years, studies with different species have involved the application of digital imaging for biometric examinations (Negretti et al., 2008, Stanjko et al., 2008, Mollah et al., 2010).

These techniques lower animal manipulation

Measuring animals becomes a simple and fast procedure

Possibility of measuring body surface area and angular measures

Santos et al., 2010

INTRODUCTION

Capture of images has been made both with digital image cameras, and with thermal image cameras (Stajnko et al., 2008)

One problem with distance digital image analysis is the need to have a scale.

This can be overcome using laser projection directly into the animal that is being measured

Biometrical measures based on digital image analysis have been shown to be accurate and have high reproducibility (Negretti et al., 2004, 2008)

Santos et al., 2010

OBJECTIVES

the aim of the present study was the development of an equipment to allow morphological measurements of horses at a distance by analysis of digital images.

Santos et al., 2010

MATERIALS AND METHODS

Equipment

* Two parallel red laser with a 650nm wavelength
* Digital video camera (Sony DCR-SX31).

The distance between the two lasers was 32 cm, and it was used as marker for image analysis.

The equipment was calibrated by filming fixed and previously measured objects.

Santos et al., 2010

MATERIALS AND METHODS

Animals

* The study involved 11 horses
* Different breeds, body weight and size

In order to evaluate the equipment reliability three morphological measurements (H) were obtained with both hypometer (H) and with digital image equipment (DIE):

* Withers height – WH
* Rump height – RH
* Body length- BL

Santos et al., 2010

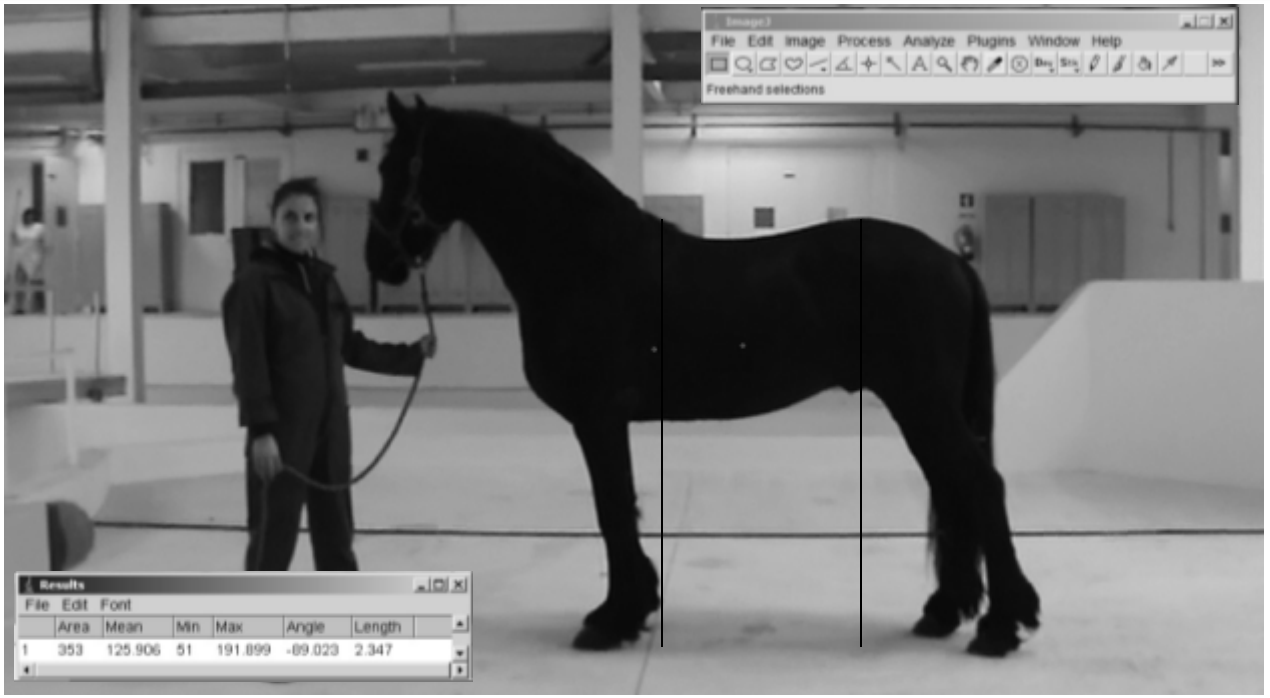
MATERIALS AND METHODS

Image analysis

* video imagery was divided into frames and the best frame from each horse was selected.

*From this frame a 1200 × 720 pixels JPEG image was generated.

*This image was analyzed using the NIH ImageJ software and WH, RH and BL were determined.



Santos et al., 2010

RESULTS AND DISCUSSION

	Hypometer				DIE		
	Av ± sd	Min	Max		Av ± sd	Min	Max
WH	143.9±11.8	125.5	161.0		142.6±11.6	127.3	158.6
RH	146.3±10.7	132.0	163.3		144.8±11.5	127.9	161.7
BL	146.1±10.0	134.0	164.0		145.5±10.8	132.1	163.5

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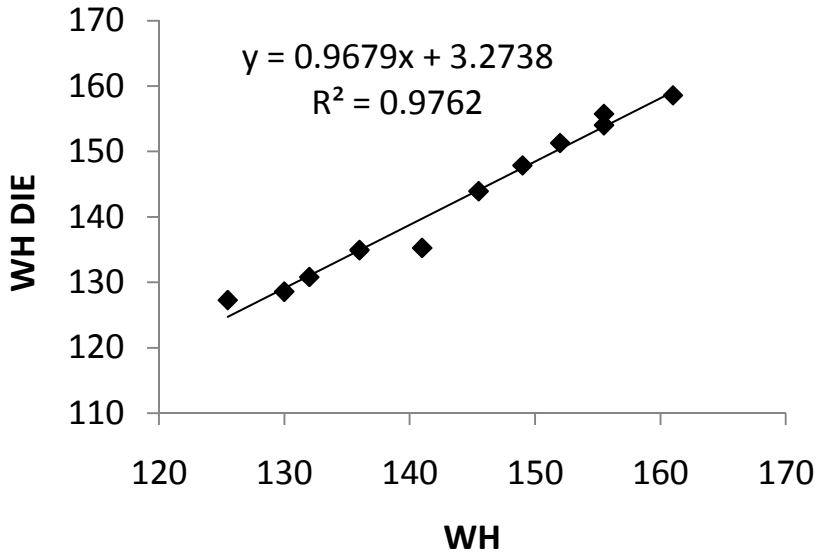
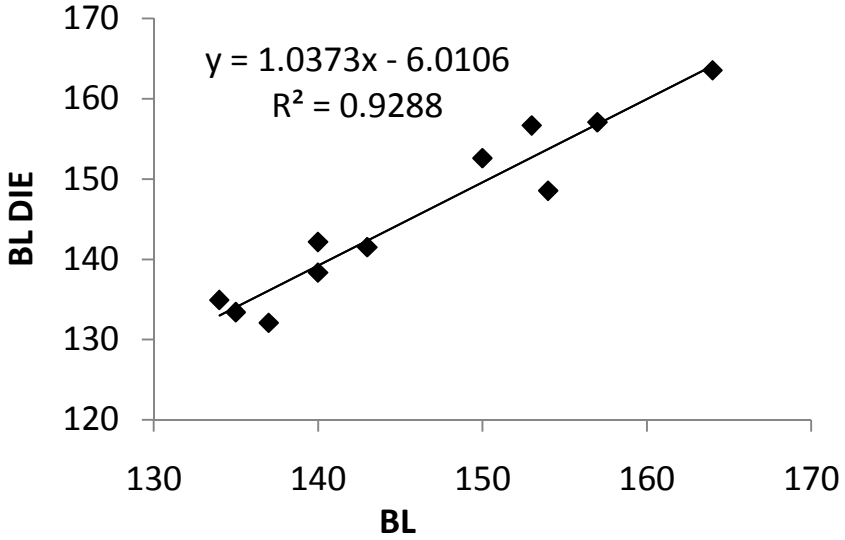
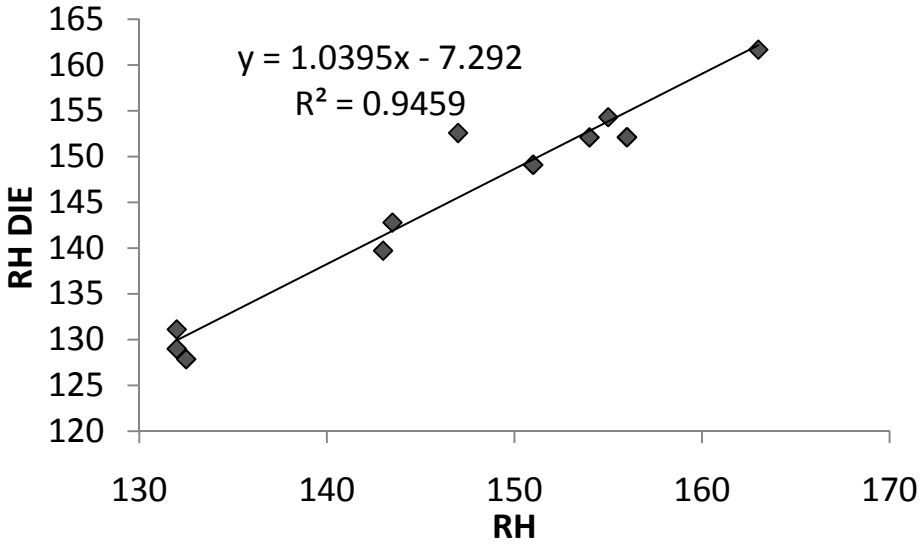
RESULTS AND DISCUSSION







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CONCLUSIONS

*All DIE measurements explained a large amount of the variation of the equivalent H measurements ($R^2 > 0.93$; $P < 0.001$).

*Accuracies of predictions (in terms of R^2) were high for all measurements (R^2=0.98; 0.95 and 0.93 for WH, RH and BL, respectively).

*Findings of the current study show that DIE is able to accurately obtain morphological measurements in horses.

*This equipment may present interesting features for use when working with free ranging and wild/semi-wild animals.

Santos et al., 2010