Using real-time ultrasound measurements to monitor small variations in body condition of horses

E. Verhees[1], A. S. Santos[2], W.F. Pellikaan[1], A.F.B. van der Poel[1], S. R. Silva[2]

[1] Animal Nutrition Group, Wageningen University, Netherlands
[2] CECAV-UTAD, PO Box 1013, 5001 – 801 Vila Real, Portugal

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INTRODUCTION

Body reserves are decisive for nutritional, reproductive and health management.

Body Condition Score Systems have been developed

BCS Systems:

***Subjective**

***Dependent on individual human perspectives and opinions**

Use of more objective, yet easily obtained measurements of fat reserves may therefore be helpful in the monitoring of body condition.

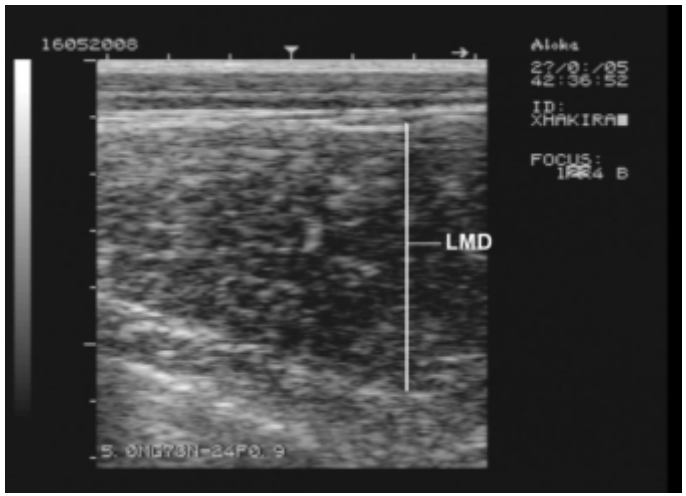
Santos et al., 2009

INTRODUCTION

A current way to predict body condition is to measure subcutaneous fat under the skin with an ultrasound scanner.

To make accurate measurements the real-time ultrasound (RTU) technique must be able to identify small variations in tissue depth (Hopkins et al., 1993; Silva et al., 2005).

This ability is mainly dependent of the probe frequency and image resolution (Young et al., 1992, Williams, 2002).



Santos et al., 2009

OBJECTIVES

The aim of this study was to evaluate two ultrasonic frequency probes (5 and 7.5 MHz) and image analysis for monitoring small variations in fat thickness of horses.

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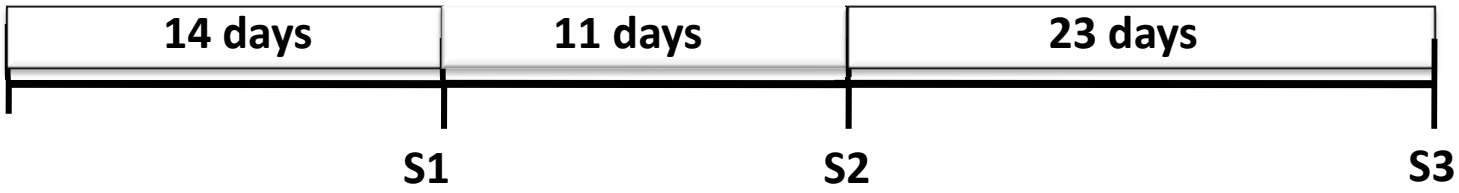
MATERIALS AND METHODS

Animals and diets

* 5 horses (347 ± 19 kg BW)
* 3 experimental periods
* 3 measurement sessions (S1, S2, S3)



Bellow maintenance level (CVB, 2007)
Meadow hay restricted 2x/d (4.5 kg)

Above maintenance level (CVB, 2007)
Meadow hay *ad lib*. (15–20% refusals)
Commercial concentrate feed (2kg)

Maintenance level (CVB, 2007)
Meadow hay *ad lib*. (no refusals)
Commercial concentrate feed (1.5 kg)

small variations in body reserves

Santos et al., 2009

MATERIALS AND METHODS

Measurements (S1, S2, S3)

*Body Condition Score (Henneke et al., 1983)

*Cresty Neck Score (Carter et al., 2007, 2008)

Real Time Ultrasound (RTU)

Aloka SSD 500V real time scanner (Tokyo, Japan) using 2 linear probes:

*7.5 MHz (UST-5512U-7.5, 38 mm, Tokyo, Japan)

*5.0 MHz (UST-588U-5, 64 mm, Tokyo, Japan)

- For subcutaneous fat measurements (SF): Back and rump
- For tissue depth measurements (TD): Thoracic cage

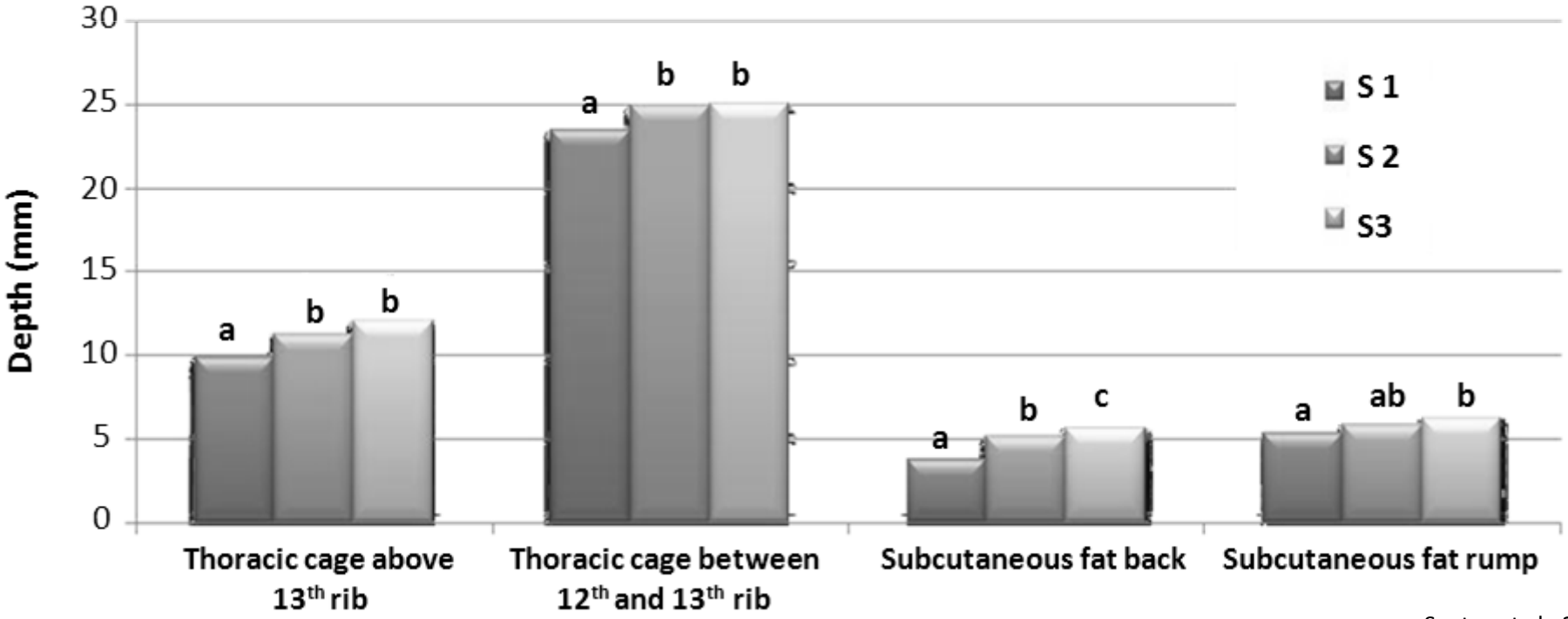
Santos et al., 2009

RESULTS AND DISCUSSION

BCS and CNS

	S1	S2	S3	Effect
BCS	5.1±0.65	5.6±0.86	5.3±0.87	NS
CNS	3.7±0.74	3.8±0.58	3.2±0.92	NS

RTU



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RESULTS AND DISCUSSION

correlation coefficients (r) between BCS and CNS and RTU measurements

	TDaR	TDbR	SFBack	SFRump	TDaR	TDbR	SFBack	SFRump
	5 MHz probe				*7.5 MHz probe*			
BCS Total	**0.793 ****	**0.758 ****	**0.613 ***	**0.845 ****	**0.816 ****	**0.799 ****	**0.608 ***	**0.804 ****
CNS	**0.746 ****	**0.699 ****	**0.596 ***	**0.794 ****	**0.772 ****	**0.739 ****	**0.531 ***	**0.755 ****

n = 15.

* correlation is significant at *P<.05 (r>.50)*

*** correlation is significant at P<.01 (r>.62).*

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CONCLUSIONS

*The data of the present research show that the RTU technique was able to measure small variations in SF and tissue depth and they resulted in significant differences, that were not detectable with BCS appraisal;

*RTU is not only a more objective method to determine the body condition; it is also more accurate and more detailed;

*A good correlation between BCS and RTU measurements was observed;

* Since RTU measurements are more objective and less dependent on the experience of the researcher compared to researcher-dependent determinations of BCS, they are a good way to monitor body condition.

Santos et al., 2009

THANK YOU FOR YOUR ATTENTION!

Santos et al., 2009