



Relationship between grading scores and image analysis traits for marbling in Angus, Hereford and Japanese Black x Angus in Australia

Maeda Sakura¹, Polkinghorne Rod², Kato Keisuke¹, Kuchida Keigo¹

¹ Obihiro University of Agriculture and Veterinary Medicine ² Marrinya Agricultural Enterprises



Introduction

Beef carcass grading systems

Two major standards in Australia

Aus-meat

Australian Meat Industry Classification System

All carcasses are assigned based on Aus-meat

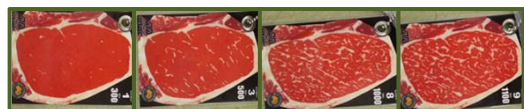
MSA Meat Standard Australia

MSA has been developed from consumer testing to suit consumer needs

Marbling Score (MB)

Assigned by the grader's visual judgment

Aus-meat 0-9 | MSA 100-1100



Examples of MB standard image

MB is important for **EATING QUALITY** but difficult to grade precisely

Visual judgment is RIGHT ?

Purpose

To investigate the accuracy of the MB

We tried to

- measure meat quality of 3 cattle breeds
- compare the relationship between grading scores and image analysis traits for marbling

Materials

High-resolution carcass images

10 head x 3 breeds x 3 sessions

→ 90 beef carcass images

Breed

Hereford

Angus

JBA^{*1}



^{*1} Japanese Black (JB) sire x Angus (A) dam



Sex

All Steer

Age in months

9-29

(EStimated age)

Methods

Mirror type Camera

Took images using mirror type camera



Image analysis

Calculated image analysis traits using the software (BeefAnalyzerII)

Image analysis traits

- Marbling percent (%)**
Ratio of the marbling area in the rib eye area
- Coarseness index (%)**
Degree of coarseness of marbling particles
- Fineness index (n/cm²)**
The number of marbling particles per unit area

Shooting data

Session

1 30th Jan. 2010

2 15th May

3 16th Oct.

Results 1 : MEAT QUALITY (MQ)

High-resolution digital images

The 12-13th rib images by mirror type camera



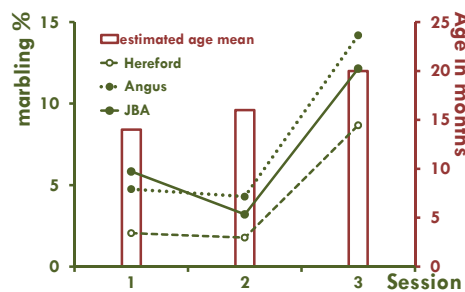
Hereford

Angus

JBA

Least Square means of image analysis traits

SAS GLM procedure / Fixed effect : Breed Covariate effect : ossification (Estimated age)



Hereford

Significantly-low

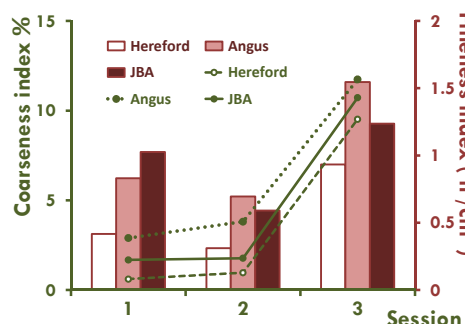
Too little marbling to assess all traits for marbling

Angus & JBA



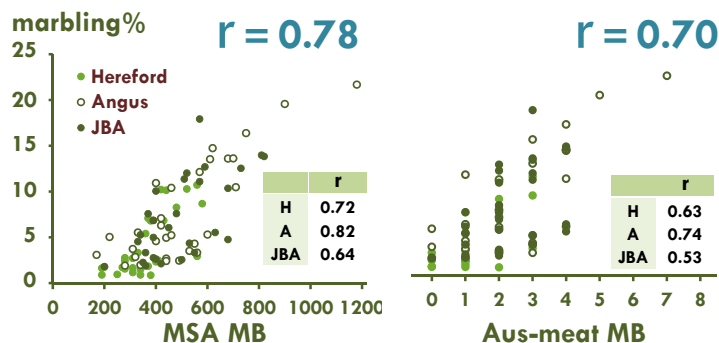
No Significant difference

Marbling much the same but Angus tended to have finer marbling



Results 2 : MB CORRELATION

Graph relating marbling% to each MB



- MSA's correlation was higher than Aus-meat's
- MB's correlation varied with MB's strictness

Discussion

- JB's marbling increase after 20 mo's old ^{*2}
JBA may have the highest marbling among three breeds if we use an older population
- Similar MQ Angus & JBA showed a strong maternal effect for cattle 20 months
- MSA's high-accuracy grading was due to the difference in grade scales
- On the whole, correlation was high

Conclusion

- ⇒ Grading was accurate for low marbling meat
- ⇒ Need more research for high marbling