

# URUGUAYAN BEEF QUALITY AUDIT-2022: A SURVEY OF CARCASS TRAITS RELATED TO QUALITY AND VALUE OF CATTLE

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## I. INTRODUCTION

The first Uruguayan Beef Quality Audit (UBQA) was conducted in 2002, in a joint project among Colorado State University, INAC e INIA and was an important benchmark to identify what the beef industry was producing, measuring and reporting on cattle and carcass traits. Seven National Beef Quality Audits (NBQA) were conducted in the U.S. (1991, 1995, 2000, 2005, 2011, 2016 and 2022), and four in Uruguay (UBQA 2002, 2007, 2013 and 2022). Many of the UBQA findings were used as training practices for producer and packers related to animal handling. But also some marketing demands have occurred, not only in Animal Welfare but also in meat quality attributes (marbling) explained by improvements in genetics and efficiency of the production systems. This UBQA-2022 was done to quantify if these mentioned changes could improve the quality and consistency of the Uruguayan cattle and identify current issues for the beef industry.

## II. MATERIALS AND METHODS

Seven packing plants were visited one day in two seasons, Spring (October to December 2022) and Fall (April to June 2023). It was sampled 33% percent of the cattle from each production lot (n=3207). *Harvest Floor Assessments. Before Hide Removal.* Breed-type and crosses were classified based on visual characteristics (hide color, breed traits). Horns were evaluated visually for approximate length (none,  $\leq 10$  cm, and  $> 10$  cm). *After Hide Removal.* Liver was evaluated recording the reasons for condemnation. Carcass bruises were assessed based on location (round, loin, rib, chuck, flank, brisket, and neck), and severity (1: no tissue removal or 2: tissue removal affecting final product). *Carcass Assessments.* Beef carcasses were evaluated by Uruguayan grading system (dentition, sex, hot carcass weight HCW) [1] and by USDA Quality Grade (QG) factors (skeletal maturity and marbling) [2]. Most of these measurements were done by INAC and INIA trained personnel. *Statistical Analysis.* All analyses were performed using SAS (SAS Inst., Inc., Cary, NC). Means were generated using Proc Means and frequency distributions using Proc Freq.

## III. RESULTS AND DISCUSSION

The major breed was Angus (34%) followed by Hereford (32.2%) and their crosses (26.4%), representing British breeds 92.6% of the slaughtered cattle (data not shown). Angus increased to 34% versus 17.8 % in UBQA 2013. This assessment is different to US NBQA, where hide color provides an indication of predominant breed and because it is used in branded beef programs that emphasize Angus genetics and/or black-hided cattle [3]. Black-hided cattle increased 4 % in the NBQA 2022 related to 2016 [4]. Cattle with horns can potentially cause injury or muscle bruising to other animals. UBQA showed that 82% of the cattle had not horn (71% in 2013), and 14.7% had horns  $> 10$  cm in length (20.1% in 2013). Schwartz et al. [4] reported that most cattle evaluated in NBQA 2022 had not horns (84.1%).

Inspectors from Veterinary Services determined that 25.8% of the livers were condemned. This result showed improvements in the incidence of flukes in our production systems from 2013. Schwartz et al. [4] reported an incidence rate of 28.5% for liver condemnation in NBQA 2022.

It was found that 76.4% of carcasses were bruised, being similar to UBQA 2013 (73%) . From the total carcass evaluation, 23% of them were in the round and 22.1% were in the flank. According to the severity of the bruises 74% of carcasses presented severity 1 and 26% severity 2 (within this 76.4%). In NBQA 2022, bruises were found in the loin (30%), rib (23.7%), chuck (19.7%), round (19.3%), and brisket/plate/flank (7.3%) [4].

The Official Grading System [1] classifies the carcasses by sex-classes and dentition by the number of teeth, among others. Related to sex-classes, 58.1% was steer, 11.2% was heifer and 30.7% was cow. Considering only steers, dentition distribution in UBQA 2022 were zero (6.6%), two (41%), four (22.4%), six (15.5%) and eight teeth (14.5%). It was observed a 26% decrease in the proportion of 8 teeth steers from 2013, increasing the incidence rate of 2 and 4 teeth (28%). The average HCW was 264,2 kg, being 290 kg for steers, 247 kg for heifers, and 234 kg for cows. These values are 14 kg and 10 kg heavier than 2013, for steers and cows, respectively. Lovell et al. [5] in reported an average HCW of 400.6 kg in NBQA 2022.

Frequencies of marbling scores, carcass maturity and USDA QG are shown in Table 1. An improvement was observed in score of marbling from 2013, where carcass reaching Small o higher levels increased 20%. Over 81% of the steer carcasses were A in skeletal maturity and 19% of them were B. Applying USDA QG system, most of the Uruguayan cattle was in Choice (42%), followed by Standard (22%) and Select (18.5%) grades. This data showed an increase of 24% in Choice and a decrease of 13% in Standard grade comparing with UBQA 2013. Distributions of USDA QG in NBQA 2022 were Prime (8.2%), Choice (74.7%), Select (15.8%), and other (1.4%) [5].

Table 1 - Frequencies (%) of marbling scores, skeletal maturity and USDA Quality Grade for all carcasses. UBQA 2022.

Marbling	Freq.	Skel. Mat.	Freq.	USDA QG	Freq.
Pd	1.3	A	61.4	Prime	1.2
Tr	10.9	B	21.9	Choice	42.3
Sl	30.8	C	10.9	Select	18.5
Sm	30.6	D	5.6	Standard	22.0
Mt	17.7	E	0.2	Commercial	4.0
Md	6.8			Utility	11.5
SIA/MdA	1.9			Cutter	0.5

#### IV. CONCLUSION

Uruguayan Beef Quality Audits are a mean to identify the main problems for the beef industry and how they affect the value of live cattle, carcasses, or by-products. Carcass bruising resulted in economic loss to the beef industry and an animal-welfare concern. UBQA 2022 produced higher average hot carcass weight and marbling scores, increasing the contribution of young animals related to 2013. Also, it was observed an increase in the percentage of USDA Choice carcasses from 2013. This information will help the Uruguayan beef industry to evaluate the beef quality progress and provide a benchmark for future educational and research programs.

#### ACKNOWLEDGEMENTS

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