IMPLEMENTATION OF THE CANADIAN RETAIL CUT BEEF YIELD GRADES

J. Segura[1], J. L. Aalhus[1], I. L. Larsen[1], N. Prieto[1], M. E. Dugan[1], and O. Lopez-Campos[1*],

[1]*Lacombe Research and Development Centre, Agriculture and Agri-Food Canada, Lacombe, Canada*,

*oscar.lopezcampos@canada.ca

I. OBJECTIVES

As a means to facilitate North American cross-border beef trade, Canada is adapting its grading system from a 3-class total lean yield (TLY) to a 5-class retail cut yield (RCY). The relationships and implications of this transition from total lean meat yield to a harmonized RCY provide important historical grading benchmarks. The aim of this study was to interpret the relationships and implications of the transition from TLY to RCY estimations and to adapt the traditional Canadian grading system of 3 TLY classes to a new system of 5 RCY classes.

II. MATERIALS AND METHODS

A total of 720 beef carcasses were used first to determine the relationship between the United States Department of Agriculture (USDA) and Canada TLY systems and then develop a modified grade ruler, harmonizing the Canadian grades into 5 classes similar to the USDA RCY grades. Additionally, the developed RCY matrix was validated with a population of 750 carcasses from 3 Canadian beef plants with capabilities for Camera Vision Systems RCY evaluations. The predictive ability (R2, root mean squared error) was evaluated using SAS version 9.4 (SAS Institute Inc., Cary, NC).

III. RESULTS

Carcass weight (192.2–536.4 kg), grade fat (2.0–32.0 mm), ribeye area (52–124 cm^2), estimated lean yield (42.5–65.6%), USDA RCY (45.1%–55.3%), and marbling score (220–710) values of the carcass population used in the present study were within the actual range of the Canadian beef carcass market. The prior 3-class TLY grade system in Canada was based on the percentage estimation of the total carcass lean. Harmonization with the USDA RCY resulted in the classification of carcasses into 5 retail yield classes defined by the percentage of closely trimmed (0.5-inch fat, or less) and boneless retail cuts from the 4 major primal cuts (chuck, rib, loin, and round) derived from a carcass. The relationship between the Canada TLY and the USDA RCY fit a linear regression model with a considerably high regression coefficient ($R2 = 0.80$; root mean squared error $= 0.8472$; $P < 0.0001$). By considering both the regression model and the breakpoints for the 5 classes of the USDA RCY, a matrix of the estimated RCY percentage was developed and implemented into the Canadian grading ruler, characterized by 4 muscle scores and 15 fat classes (Jones et al., 1991) (Figure 1). The validation of the adapted Canadian Grade Ruler, including the RCY grade matrix against the Camera Vision Systems RCY estimations, showed R^2 values between 0.60 and 0.75.

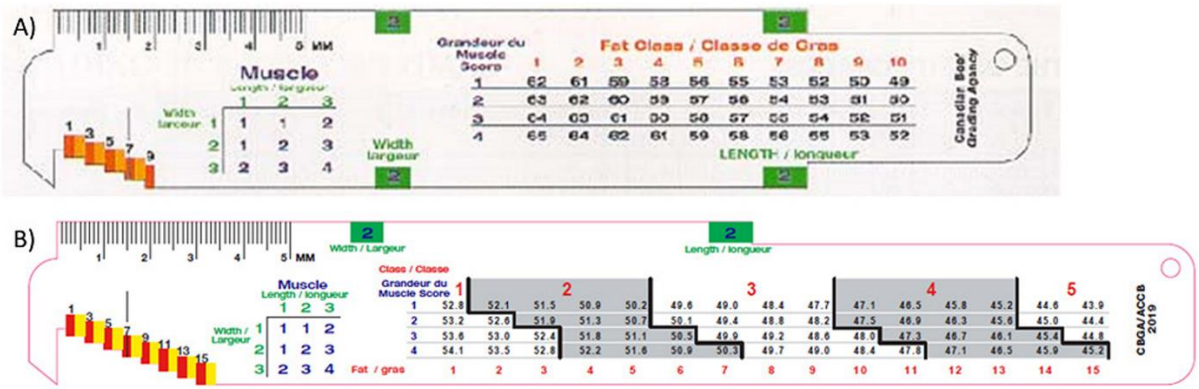

Figure 1.
(A) Traditional Canadian grade ruler defined by 3 total lean yield classes and 4 muscle scores and 10 fat classes. (B) Updated Canadian grade ruler defined by 5 retail cut yield classes and 4 muscle scores and 15 fat classes.

IV. CONCLUSION

Yield grade evaluations using the Grade Ruler are still required in beef plants where camera technology has not been implemented, or only partially introduced. Regression analyses of the Canada TLY and USDA RCY showed a strong relationship ($R^2 = 0.80$) in a research population. A successful adaptation of the Canadian grade ruler to a Canada RCY percentage matrix with 5 yield class breakpoints (Canada 1–Canada 5) was carried out. The adapted Canadian grade ruler is an accurate and reliable grading tool and can be implemented where camera technology is absent to provide harmonization between Canadian and USDA yield estimations, facilitating cross-border beef trading.

Keywords: grade ruler, grading, saleable yield, total lean