

Effect of oat variety and oat type (feed-type vs milling-type) with multi-year samples on nutrient supply from rumen degradable and undegradable protein and carbohydrate fractions in western Canada

Ganqi Deng, María E. Rodríguez Espinosa, David A. Christensen, H. (Bart) Lardner, Peiqiang Yu*

Department of Animal and Poultry Science, College of Agriculture and Bioresources, University of Saskatchewan, 51 Campus Drive, Saskatoon, SK, S7N 5A8, Canada. *Corresponding author: Professor & Ministry of Agriculture Strategic Research Chair; Tel: +1 (306)-966-4132; peiqiang.yu@usask.ca

The objectives of this study were to investigate the effects of oat variety and oat type (feed-type vs milling type) on nutrient supply from rumen degradable and undegradable protein and carbohydrate fractions. The recent oat varieties in this study were provided by Crop Development Center, including Arborg (Milling), Haymaker (Forage type), Nasser (Feed-type), and Summit (Milling type) which were grown and harvested at the university crop research fields for three consecutive years. The nutrient supply from rumen degradable and undegradable protein and carbohydrate fractions were evaluated with the Cornell Net Carbohydrate and Protein System. The experiment design was a RCBD. The data was analyzed using mixed model procedure of SAS with the oat varieties as a fixed effect and the years as a random block effect. Multi-treatments comparison was used Tukey methods. The comparison between milling-type oat and feed-type oat was used orthogonal contrast of SAS. The results showed that the oat varieties had significant differences ($P < 0.05$) in total rumen degradable protein supply (TRDP, range from 9.2 to 11.1 %DM), total rumen undegradable protein supply (TRUP, range from 5.5 to 6.5%DM), but no significant differences in total rumen degradable carbohydrate supply (TRDC, average 46.9%DM), total rumen undegradable carbohydrate supply (TRUC, average 31.4%DM). Compared between the milling-type oat and feed-type oat, there was no significant difference in TRDP, TRUP, TRDC and TRUC.

Anogenital distance as a novel trait for enhancing fertility in Canadian Holsteins

Gabriella Dodd¹, Filippo Miglior^{1,2}, Flavio S. Schenkel¹, Tony C. Bruinje³, Mohanathas Gobikrushanth⁴, Jennifer Carrelli⁵, Masahito Oba⁵, Divakar J. Ambrose⁵, Christine F. Baes^{1,6}

¹Centre for Genetic Improvement of Livestock, Department of Animal Biosciences, University of Guelph, Guelph, ON, Canada; ²Lactanet, Guelph, ON, Canada; ³Department of Population Medicine, University of Guelph, ON, Canada; ⁴School of Veterinary Science, University of Queensland, Gatton, Australia; ⁵Department of Agricultural, Food and Nutritional Science, University of Alberta, Edmonton, AB, Canada; ⁶Institute of Genetics, Vetsuisse Faculty, University of Bern, Bern, Switzerland. Email: gdodd@uoguelph.ca

Fertility poses challenges in global dairy programs but is crucial for industry sustainability. Slow improvement of reproductive performance shifted industry focus to cow fertility, but current fertility indicator traits have low heritability estimates and are highly susceptible to environmental influences. Anogenital distance (AGD), a morphological trait reflecting prenatal androgen exposure, has shown promise as a fertility indicator in various species. Physiological studies have demonstrated a favorable relationship between short AGD and positive reproductive outcomes in females. This study assessed the feasibility and efficacy of incorporating AGD into genetic selection programs for dairy cattle. We investigated the genetic basis of AGD using a dataset of 4,985 Holstein cows and heifers across 20 farms in Canada. AGD records were normally distributed, with a mean value of 126.57 ± 13.79 mm. Our analysis using a single-trait animal model estimated a heritability of 0.40 ± 0.04 . The reliability of estimated breeding values (EBV) was 0.82 for proven sires (≥ 30 daughters). Results suggest that AGD is a moderately heritable trait in Canadian Holsteins and sire EBV can be reliably predicted. This study represents an initial exploration of AGD as a fertility indicator trait for dairy cows, but results are promising and encourage further research into its application in breeding programs. Incorporating AGD into genetic selection could significantly contribute to enhancing overall herd efficiency.

Take home message: This study suggests that anogenital distance can be genetically selected for the improvement of female fertility in dairy cattle.