UNIVERSITY of GUELPH

ONTARIO AGRICULTURAL COLLEGE

DEPARTMENT OF ANIMAL BIOSCIENCES

MSc Defence

Investigating the Genetic Potential of Feed Efficiency Traits in Canadian Holstein Calves

Avalon Phillips

Date: Thursday July 17, 2025 at 9:00am

The PhD Defence for Avalon Phillips has been scheduled for July 17, 2025 at 9:00am. The defence will be held online via Teams and in room 141: https://teams.microsoft.com/l/meetup-join/19%3ameeting_MDY1MWFmZjYtZDViOC00OWUzLTg0NWMtMTYyNDVhZmE3ZjJm%40thread.v2/0?context=%7b%22Tid%22%3a%22be62a12b-2cad-49a1-a5fa-85f4f3156a7d%22%2c%22Oid%22%3a%22dfbebf32-99ae-4022-a68f-422f93e11c7f%22%7d

<u>**Exam Committee:**</u>

Examining Chair: Dr. Vern Osborne

Advisor: Dr. Christine Baes

Advisory Committee Member: Dr. Flavio Schenkel

Additional Member: Dr. Luiz Brito

Abstract:

Genetic selection for dairy calf feed efficiency could reduce rearing costs and farming environmental impact. This thesis examined the genetic influence and relationships among calf feed efficiency traits. A univariate random regression model was used to estimate genetic parameters of daily metabolizable energy intake (MEI) over the first two months of life. Average heritability and repeatability for daily MEI was 0.20 (SE=0.04) and 0.46 (SE=0.03) respectively. Genetic correlations between daily MEI ranged from -0.31 to 0.99, reflecting calf gastrointestinal maturation. Genetic parameters for pre-weaning (PRW) and peri-weaning (PEW) residual metabolizable energy intake (RMEI) were estimated using multiple-trait estimates and recursive modelling of energy sinks. Heritability estimates for PRW-RMEI and PEW-RMEI were 0.07 and 0.31, respectively. Contrasting relationships with production, fertility, and efficiency traits, as well as selection indexes, were observed with PRW-RMEI and PEW-RMEI. Results further industry understanding of the genetic background of feed efficiency in dairy calves.