

# Abstract Submission Form

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**Preferred presentation**

Oral

**Preferred session**

Session 6: SC Dairy Cattle Milk Recording – Presentation and evaluation of new analytical parameters in herd management for dairy farms

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**Title of your paper**

Evolution of mature size, mature production and the relative maturity and performance during the first two lactations of DHI registered Holsteins in Canada

**Insert ABSTRACT text**

Size and milk production of dairy cows have increased over time. However, the magnitude of this increase and its relationship with productivity across lactations has been little studied. The objective of this analysis was to describe the evolution over the last two decades of the mature BW (MBW), mature production and the relative maturity (RMAT) and performance (RPER) during the first two lactations of Holstein cows. Data from first (L1), second (L2) and third and more lactations (L3+) from 2002 to 2021 were extracted from the Quebec DHI data base. Records of age at first calving (AFC, 1,413,772), BW (565,710; 713,668 and 1,152,530) and 305 d-adjusted milk and components yields (1,334,433; 1,0310,24 and 1,538,492) from L1, L2 and L3+ cows, respectively, were averaged per year. The L3+ cows were considered as mature and the reference to evaluate RMAT and RPER of L1 and L2 cows. Data from L3+ cows and AFC were regressed against time while RMAT and RPER were analyzed using a fixed effect model including year, parity and their interaction. The BW and milk (MY), fat (FY) and protein yields (PY) of

L3+ cows increased since 2002 ( $P<0.01$ ) at rates of  $3.7\pm 0.1$ ,  $109\pm 5$ ,  $5.7\pm 0.2$  and  $4.0\pm 0.2$  kg per yr, respectively. In 2021 L3+ cows weighed  $738\pm 1.2$  kg and produced  $11,184\pm 56$ ,  $447\pm 2.6$  and  $364\pm 2.8$  kg of milk, fat and protein, respectively. The AFC decreased ( $P<0.01$ ) at a rate of  $0.15\pm 0.01$  mo per year, averaging  $24.8\pm 0.13$  mo in 2021. L1 cows' RMAF decreased ( $P<0.01$ ) at  $0.09\pm 0.01\%$  per year and was  $87.4\pm 0.1\%$  of MBW in 2021. Overall, L2 cows' RMAF was  $94.46\pm 0.05\%$  of MBW and did not change over time ( $P=0.61$ ). The RPER decreased over time ( $P<0.01$ ) but at a faster rate in L1 than in L2 cows ( $P<0.01$ ) for MY ( $0.22\pm 0.2$  vs  $0.06\pm 0.2\%$  per yr), FY ( $0.17\pm 0.2$  vs  $0.04\pm 0.02\%$  per yr) and PY ( $0.24\pm 0.01$  vs  $0.07\pm 0.02\%$  per yr). In 2021 MY, FT and PY relative to L3+ cows were 80.3, 81.5 and 81.5% for L1 and 95.0, 95.2 and 96.6 % for L2 cows, respectively. Despite the significant progress in mature lactational performance and AFC, there has been a decline in the RPER of L1 and L2 cows that deserves to be addressed.

**Enter keywords**

Maturity, lactation