

[Go Back to Presentation](#)

T83

Does 500 ohms accurately describe the electrical resistance of Idaho dairy cows?

R. Norell<sup>1</sup>, M. de Haro Marti<sup>2</sup>, J. Wilson<sup>3</sup>, M. Chahine<sup>3</sup>, J. Packham<sup>4</sup>, K. Kruger<sup>3</sup>. <sup>1</sup>University of Idaho Idaho Falls, ID, <sup>2</sup>University of Idaho Gooding, ID, <sup>3</sup>University of Idaho Twin Falls, ID, <sup>4</sup>University of Idaho Burley, ID.

By Idaho statute, a 500-Ω shunt resistor is used when investigating stray voltage on dairies and represents the “worst case” body resistance value for adult dairy cows (USDA stray voltage handbook 696, 1992). In recent studies, we have shown that cow electrical resistance (ER) is lower with wet feet, standing in manure, and wet hair coats. Our objective was to compare ER between 3 cow pathways and 2 housing types on commercial dairies. Cow pathways were: muzzle to 4 feet (M4), shoulder to 4 feet (S4) and rear udder to 4 feet (R4). Electrical connections included: cow standing on electrically isolated concrete with 2.5 cm of manure plus a metal mesh on muzzle (M4), metal pipe on wet shoulders (S4), or a metal pipe on wet rear legs + rear udder (R4). These pathways mimic a cow touching a metal waterer with muzzle, touching a manger lockup with wet shoulders and touching parallel parlor pipework with wet rear udder+ legs. Six dairies were enrolled and each provided 15 cows from a freestall barn (FS) and 15 cows from an open lot (OL). Data were analyzed as a randomized complete block design using Proc GLMMIX in SAS. Mean ER (Ω) and % <500 Ω by pathway and by housing were: 254+17, 100; 236+17, 99; and 305+17, 91; 279+14, 96; 251+14, 98; for M4, S4, R4, FS, and OL, respectively. Mean ER was different between cow pathways with R4 being significantly higher ( $P < 0.01$ ) than S4 and M4. ER in FS tended to be higher than ER in OL ( $P < 0.06$ ) but the housing × pathway interaction was not significant ( $P < 0.9$ ). Minimum ER (Ω) by pathway within dairy ranged from 188 to 226; 141 to 183; and 170 to 221; for M4, S4 and R4, respectively. The risk of wet hair coats due to precipitation is greater for OL and motel style FS than gable roofed FS, thus, dairy housing should be considered in stray voltage investigations. All 3 cow pathways and body contact conditions commonly occur on Idaho dairies and measured ER are well below “worst case” from USDA 696. Using a lower value shunt resistor appears desirable to more accurately assess stray voltage risk on Idaho dairies.

Keywords: electrical resistance, stray voltage.

[Home](#)[Events List](#)[Calendar](#)[Search](#)[More ..](#)