

Identifying and describing ultrasonic noise on dairy farms

Sarah Purcell, Emily Pope, Paul Bernard, and Kathryn Proudfoot

Department of Health Management (Purcell, Proudfoot) and Department of Biomedical Sciences (Pope, Bernard), Atlantic Veterinary College, University of Prince Edward Island, Charlottetown, PEI

Mentor: Dr. Kathryn Proudfoot, PhD, University of Prince Edward Island, kproudfoot@upei.ca

When investigating the impacts of noise on dairy farms, it is important to recognize that cattle can hear sound frequencies much higher than humans. While the human hearing range does not exceed 20 kHz, cattle can hear sounds up to 37 kHz. While it is understood that excess noise can negatively impact the health and productivity of farm animals, ultrasonic noise has not been assessed on dairy farms. The objectives of this study were to 1) investigate whether there is ultrasonic noise present on dairy farms and 2) describe the peak frequency emitted during milking procedures. We surveyed 6 dairy farms (n = 4 with automated milking systems and n = 2 with traditional milking parlors) using an ultrasound recording system. To detect ultrasonic noise throughout the farms, farm spaces were mapped out and recorded at 3 m intervals. Automatic milking systems and milking parlors were also recorded throughout their milking cycles. Frequencies and intensities were determined from the recordings by analyzing the spectrograms produced. We identified broadband noises with frequency components >20 kHz at all 6 farms, therefore ambient ultrasound is common on dairy farms. We did not identify any sources of single frequency ultrasonic noise that would appear inaudible to humans. Milking parlors and automatic milking systems emitted variable peak frequencies; for example, one automatic milking robot emitted peak frequencies between 20.5 to 82 kHz across 6 phases of the milking procedure. Cattle are likely more attuned to higher frequencies emitted within our hearing range, and although these sounds often have components audible to us, it provides a broader perspective on how dairy cows perceive these common sounds in their environment.

Research Grant: NSERC Discovery

Student Support: Boehringer Ingelheim Veterinary Scholars Award