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Assessment of key parameters for gunshot used on cattle: a pilot study on shot placement and effects of diverse ammunition on isolated cattle heads

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Abstract

There have been many improvements regarding transport conditions, pre-slaughter handling, and captive-bolt stunning of cattle at commercial abattoirs, but many challenges still exist. Animals unaccustomed to human-animal contact, such as free-range beef cattle, may be especially difficult to handle on the day of slaughter. Shifting of the slaughter process from the abattoir to the animals' familiar environment could improve animal welfare at slaughter. In 2011, the German government passed an amendment allowing farmers to slaughter free-range cattle, on-farm, using a rifle. A proper stun is vital when employing this method but neither sufficient practical experience nor scientific knowledge are in place to allow this. Thus, this study aimed to examine shot placement and the effect of diverse ammunition by means of shooting at cattle heads, post mortem, with a rifle. Impact was assessed using brain tissue damage observed from skull dissections. Placing the shot frontally at the forehead resulted in severe brain damage significantly more frequently than targeting laterally. A precise frontal shot, utilising both large and small bore calibres, caused severe brain damage that would almost certainly have led to immediate unconsciousness and death. One of the small bore calibres caused minimal brain damage apart from the trajectory. However, this was the only calibre not passing straight through. Due to the fact that the bullet remains within the skull, thus transferring all of its energy to the skull and brain, the impact of this calibre on the brain would also be expected to be rapidly fatal. A projectile that does not exit the skull would also be advantageous as regards safety.

Keywords: *animal welfare, brain damage, cattle, gunshot, slaughter, stunning*