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Humane euthanasia of neonates II: field study of the effectiveness of the Zephyr EXL non-penetrating captive-bolt system for euthanasia of newborn piglets

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Abstract

A previous study demonstrated the effectiveness of the Bock Industries Zephyr EXL non-penetrating captive bolt, using the abolition of visual-evoked potentials as a determination of brain death, in piglets in a laboratory. A second trial, reported here, involved the field-testing of this device, on-farm, in a commercial setting. Two hundred and seven piglets (mean [\pm SEM] dead weight: 1.86 [\pm 0.74] kg) requiring dispatch under the farm's protocols were euthanased with the device and demonstrated immediate loss of consciousness, subjectively assessed by behavioural signs and no recovery. Post mortem examination of the heads was undertaken confirming massive traumatic damage to the cerebrum with associated haemorrhage and bone plate shards forced down to the level of the corpus callosum in the majority of cases. A further trial of 106 piglets demonstrated that under commercial production conditions it took less than 7 s to select, place and euthanase a piglet using the device. One hundred percent of animals in the study were immediately killed. Given this complete kill rate and the sample size of the study, a statistical 95% confidence interval provides a maximum percentage of animals that would not immediately be stunned/killed, by this mechanical non-penetrating captive-bolt system, to be at most 1.2% and at least 0%. The results here, combined with the previous study, allow recommendation of the Bock Industries Zephyr EXL as being suitable as a single application euthanasia device for piglets up to 10.9 kg liveweight.

Keywords: animal welfare, captive bolt, euthanasia, mechanical stunning, piglet, Zephyr EXL