The Old School, Brewhouse Hill, Wheathampstead,
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# *The relative effectiveness of two expanding bullet designs in young harp seals (*Pagophilus groenlandicus*): A randomised controlled field study in the Norwegian harp seal hunt*

*KA Ryeng*[*†] *and SE Larsen*[‡]

[†] Institute of Marine Research, Fram Centre, PO Box 6606, Langnes, NO-9296 Tromsø, Norway
[‡] Norwegian University of Life Sciences, Faculty of Veterinary Medicine, Department of Production Animal Clinical Sciences, Oslo, Norway
* Contact for correspondence: kathrine.ryeng@hi.no

## Abstract

*The aim of this study was to investigate the relative effectiveness of a rapidly expanding Bonded hunting bullet and an explosively expanding Varmint bullet in young harp seals (*Pagophilus groenlandicus*). The study was conducted as an open, controlled and randomised parallel-group designed field trial. The animals were pre-randomised (1:1) into one explosively expanding (Varmint) and one expanding (Bonded) bullet type group, with 75 animals in each. The study sample consisted of young, weaned harp seals, 2–7 weeks of age, of both sexes, from the Greenland Sea harp seal population. The study was conducted during the regular hunt. Instantaneous death rate (IDR) and time to death (TTD) were the main variables. The observed IDR was 84% in both bullet groups. Correcting for Weather Condition Index, the IDR for the Varmint bullet was significantly higher compared to the Bonded. The mean TTD was shortest in the Varmint group, but the difference did not reach significance. Compared to the Bonded, a significantly higher total cranial damage score and bleeding intensity, and significantly lower frequencies of bullet exit wounds were detected in the Varmint group. The post mortem reflex movements caused by the Varmint bullet were significantly more powerful with longer duration and higher frequencies of clonic contractions. In conclusion, the results indicate a higher effectiveness of the Varmint bullet relative to the Bonded. The Varmint bullet may thus improve animal welfare in the hunt of young harp seals.*

**Keywords**: *animal welfare, harp seal, hunt, instantaneous death rate, rifle bullet design, time to death*