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Abstract: Incidence of Hoof Lesions in Dairy Cattle Classified as High, Average or Low Antibody and Cell-Mediated Immune Responders.

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A number of studies have shown cattle classified as high immune responders have lower incidence of disease, however the incidence of hoof lesions has yet to be evaluated in dairy cattle classified for immune response. Therefore the objective of this study was to compare the incidence of hoof lesions in dairy cattle classified as high, average or low antibody (AMIR) and cell-mediated immune responders (CMIR). Cattle (n = 190) from a commercial dairy farm in Ontario were evaluated for immune response (IR) using a patented protocol that captures both (AMIR) and (CMIR) and classified as high, average or low responders based on estimated breeding values. Hoof health data was collected by the farm's hoof trimmer using Hoof Supervisor software (part of the Ontario Dairy Hoof Health Project performed by the Ontario Hoof Trimmers Guild). Only the first trim date for each animal was included in this data set, and multiple lesions per cow were considered. All lesions were analyzed both as individual lesion types and grouped into infectious (foot rot and digital dermatitis) and horn (sole hemorrhage, sole ulcer, toe ulcer and white line). In accordance with the Hoof Health Project, the hoof trimmer scored each lesion for severity as: 1 = least, 2 = middle, 3 = most. Data were analyzed using a SAS mixed model which included the effects of parity and AMIR or CMIR category (high, average or low). Data are presented as the total number of lesions per cows within an IR category, and significance is reported at $P < 0.05$, with trends at $P < 0.10$. Results showed that high antibody responders had a trend towards lower incidence of infectious lesions (30%) compared to average (69%), and less but non-significant difference compared to low responders. Specifically, High responders had significantly less digital dermatitis (23%) compared to average (60%) and similarly significantly less severe digital dermatitis (3%) compared to low responders (24%). Conversely, high antibody responders (73%) had significantly more non-infectious horn lesions compared to average (43%) and low cows (24%). High cell-mediated responders had a trend towards less inter-digital hyperplasia (0%) compared to average responders (11%). Therefore, not only have cows classified as high immune responders been reported to have lower disease incidence, but this study suggests they also have a lower occurrence of infectious hoof lesions, a critical problem facing dairy producers.

Keywords: hoof health, Immune response, dairy cattle