



Event	Montreal (CA), ICAR 2022 Annual Conference	Title of the presentation
Subject	Abstract presented manuscript as ORAL presentation	Large scale phenotyping of methane for genetic evaluation is possible with Sniffers.

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Session: Sustainability in the context of animal recording

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ABSTRACT

Our objective was to demonstrate that the ongoing recording of methane of individual cows on 100 dairy farms in the Netherlands will provide meaningful breeding values for methane mitigation. Previously we conducted a power calculation that used the available literature, which predicted that recording on 100 dairy farms, 15,000 cows, and two years of recording, would provide a high enough reliability of prediction, to allow for practical direct selection for lower methane intensity. To determine what reduction in methane could be achieved by 2050, a methane trait with genomic prediction was included in an industry representative selection index, showing that methane intensity could be reduced by between 14% and 23% (depending on the strategy). To be able to achieve these gains a large scale phenotyping strategy needed to be implemented. We have commissioned 100 infrared spectrometry methane sensors, or 'sniffers', to be used to fulfill the data need. To date, 15 sensors have been installed, and at the time of writing installation of the remaining sensors is ongoing and will be completed in the first half of 2022. The benefit of using sniffers is that it allows for a high throughput of cows and continuous recording for extended periods of time. With the data already available we have calculated a trait referred to as weekly methane concentration (ppm). This methane concentration trait is moderately heritable and repeatable (0.32 and 0.68, respectively). The downside of using sniffers is that it records the methane concentration and not the methane production. We have also temporarily installed GreenFeeds on 16 farms (four overlapping with sniffers). Therefore, there are 1,809 cows with sniffer recorded weekly methane concentration, and 797 cows with GreenFeed recorded weekly methane production (g/day) (73 cows with both). All of the cows are linked via the pedigree and there are 1,655 which are also genotyped. A preliminary genetic correlation between Sniffer methane concentration and GreenFeed methane production is high at 0.77, indicating that selection for methane concentration as recorded with sniffers will in fact reduce methane production and intensity. We have learned a number of valuable lessons in the large scale rollout of methane sniffers which will be useful for future industry application. Most importantly, is that suitably reliable genomic breeding values for methane are closer to being a reality than ever before. :



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