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Session 2: The Holstein Cow - all set for tomorrow: feed efficiency, sustainability, low methane emissions

Title: Methane emissions

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Lowering methane emission of Dutch dairy cows by animal breeding

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Mitigation of enteric methane emissions helps to lower the environmental impact of dairy farming. Methane has a significant global warming potential, that is 27 times greater than CO_2 over a 100 year lifespan, however, it also has a relatively short halftime of 8.5 years. This means that the mitigation of methane emissions can have a short-term cooling effect, contrary to CO_2 which remains in the atmosphere for thousands of years. There is potential for reducing ruminant enteric emissions by animal breeding, as the effect is cumulative, permanent, and cost-effective. For breeding value estimations, collecting phenotypes of thousands of animals is essential. However, recording methane emissions of individual animals is challenging. To achieve large-scale phenotyping for methane emissions in the Netherlands, phenotyping is performed with nondispersive infrared sensors called 'sniffers', which sample air from the feed bin of milking robots. The current dataset contains 561,903 records on 6,628 cows from 52 farms, and is currently being scaled up to recording on 15,000 cows from 100 farms. The first analyses on a smaller dataset recorded on 1,800 cows from 15 farms showed that weekly mean methane concentrations are heritable (0.32 ± 0.03) and repeatable (0.68 ± 0.01). Furthermore, the genetic correlation with methane production, measured with GreenFeed units on 822 cows from 16 farms, was high (0.76 ± 0.15). Future stages of the research project will focus on estimating genetic correlations with all breeding goal traits in the Netherlands, and implementing methane in current or new selection indexes.