

## RESEARCH UPDATE

### Breeding more sustainable beef cattle



Paul Smith, Sinéad Waters and David Kenny of Teagasc Grange and Alan Kelly (UCD) report on RumenPredict and MASTER, international research consortia aiming to link the rumen microbiome with animal performance and GHG emissions.

A microbial community residing in the rumen provides ruminant livestock with the unique ability to convert plant matter into high-quality sources of dairy and meat protein. However, members of this microbial ecosystem are responsible for an estimated 60% of Irish agriculture's greenhouse gas (GHG) emissions through the production of methane.

As a result, decreasing the volume of methane produced by the Irish livestock industry will be key to adhering to the 2030 EU targets of a 30% reduction in Irish GHGs. The potential exists to breed low methane-emitting cattle. However, the effectiveness of selecting more sustainable livestock will be dependent on an increased understanding of the microbiological mechanisms underpinning methane production.

As part of the EU-funded projects RumenPredict and MASTER, Teagasc, UCD and the Irish Cattle Breeding Federation (ICBF) are partnered in an effort to better understand the biological mechanisms associated with methane output.

Both projects aim to better understand the link between the composition of the rumen microbial ecosystem (rumen microbiome) and methane output. To achieve the objectives of both projects, GreenFeed systems, the first of their kind in Ireland, have been installed at the ICBF progeny test centre in Tully, Co. Kildare

to estimate methane output from individual animals. A sample of rumen fluid is obtained from each animal to define the relationship between the composition of the rumen microbiome and methane output. Data on methane output and samples of rumen fluid have been obtained from over 320 cattle thus far.

Based on preliminary results to date, a promising relationship between methane output and the Eurostar breeding index is materialising.

A subtle trend for cattle with a reduced level of methane output to rank higher on the replacement index is emerging. This association is likely to be further confirmed as more animals are added to the study. In addition, cattle at Tully are producing on average 236 grams of methane per day. Microbial analysis is currently underway in Teagasc Grange, with a link between the composition of the rumen microbiome and methane output likely to be available by the end of 2020 or early 2021.

This work has the potential to identify animals with a greater genetic propensity to efficiently utilise feed, while minimising their impact on the environment. Furthermore, findings from these projects will provide the knowledge required for future targeted mitigation strategies to the benefit to Irish agriculture and national GHG reduction policy.