**FOR IMMEDIATE RELEASE**

**Global solutions to reduce methane emissions from ruminant animals are feasible, because the microbes causing the emissions are similar around the world.**

The New Zealand-led "Global Rumen Census" project analysed the microbes responsible for methane emissions from a wide range of ruminant animals around the world. The project found similar bacteria and methanogens dominate in nearly all rumens across a wide variety of species and animal diets. This means that new technologies that seek to reduce methane emissions by influencing rumen microbes should have global applications.

The results of the Global Rumen Census were released on 9 October 2015 in the open-access journal *Scientific Reports*.

The project was led by Gemma Henderson and Peter Janssen of AgResearch, New Zealand's largest Crown Research Institute. Globally, 140 scientists from 73 organisations contributed to the rumen census, with microbial samples collected over two years.

"We initially thought it would attract about 200 samples but the international interest was immediate and quite large. The sample pool grew to over 900 and we selected 742 of those samples to include in the project," says Henderson.

"It was an honour to be involved with such a successful global collaboration. One of the most exciting things for me was the enthusiasm generated internationally with so many people being interested in what we were doing and wanting to contribute. That was very rewarding."

The strength of the study lies in the diversity of samples collected, with animals from the Slovenian mountains to remote islands off the Chilean coast. As well as the expected samples from sheep, cattle, deer and goats, there were also some from buffalo and giraffes.

The rumen is the modified foregut of these animals. Microbes ferment food in the rumen, allowing the animal to extract energy from feed such as grasses that otherwise could not be digested. These microbes are therefore essential for ruminant productivity. Unfortunately, one of the by-products of this fermentation is the greenhouse gas, methane. This is produced by microbes called methanogens. The microbial survey extracted DNA from all samples and sequenced diagnostic marker genes that allowed the identification of different bacteria and methanogens. Once the data had been explored, the findings were checked back with census collaborators around the world.

The initial hypothesis was that rumen microbes would be similar to some extent across the world, but that diets or other factors would make a difference. Peter Janssen, who leads part of AgResearch's methane mitigation research, says the rumen microbes ended up being more similar than they had expected. Mostly they were the same in all samples, but some microbes were more strongly associated with certain hosts and some with certain diets.

"The rumen methanogens turned out to be highly similar species in all rumens across the world. Only a few species appear to be responsible for the methane produced by ruminants everywhere. This means mitigation strategies can be developed to target the few dominant methanogens, and a technology that's developed in one place should be applicable everywhere," says Janssen.

The main part of the study was funded by the New Zealand Government's Ministry for Primary Industries as part of its support for the Global Research Alliance on Agricultural Greenhouse Gases, a voluntary collaboration of 46 countries to support global food supply while reducing greenhouse gas emissions per unit of food produced.

Harry Clark, Director of the New Zealand Agricultural Greenhouse Gas Research Centre and co-chair of the Livestock Research Group of the Global Research Alliance on Agricultural Greenhouse Gases, says this study shows the real power of international research collaboration.

"This study has provided knowledge that no country could have delivered on its own, and the benefits are also global.

"The Global Rumen Census shows that new mitigation technologies that tackle the microbes responsible for methane production in ruminants can make a real difference at the global scale. Modifying the rumen is an enormous challenge, but collectively we have a chance to get there."

The Global Rumen Census complements New Zealand's large domestic research programme focused on methane-mitigation technology, particularly vaccines or inhibitors to suppress methanogens.

**For more information please contact:**


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**## Ends**

Examples of species that were sampled in the Global Rumen Census. The central image shows rumen contents, with methanogen cells showing in blue. © AgResearch and Wikimedia Commons.