

Selection for feed efficiency in Holstein cows based on data from the Efficient Cow projectA. Köck¹, M. Ledinek², L. Gruber³, F. Steininger¹, B. Fuerst-Waltl² and C. Egger-Danner¹¹ZuchtData EDV-Dienstleistungen GmbH, Dresdner Str. 89, 1200 Vienna, Austria, ²University of Natural Resources and Life Sciences, Department of Sustainable Agricultural Systems, Gregor-Mendel-Str. 33, 1180 Vienna, Austria,³Agricultural Research and Education Centre, Raumberg 38, 8952 Irdning-Donnersbachtal, Austria; koeck@zuchtdata.at

This study was part of the project 'Efficient Cow' whose overall objective was to evaluate the possibilities for genetic improvement of efficiency in Austrian dairy cattle. In the year 2014 a one-year data collection was carried out. Data of approximately 5,400 cows, i.e. 3,100 Fleckvieh (dual purpose Simmental), 1,300 Brown Swiss, 1,000 Holstein kept on 167 farms were recorded. In addition to routinely recorded data (e.g. milk yield), data on novel phenotypes like body weight, body condition score, lameness, claw health, subclinical ketosis and data about feed quality and feed intake was collected. The specific objective of this study was to estimate genetic parameters for feed efficiency traits and to investigate their relationships with fertility and health in Holstein cows. The following feed efficiency traits were considered: ratio of milk output to metabolic body weight (ECM/BW^{0.75}), ratio of milk output to dry matter intake (ECM/DMI) and ratio of milk output to total energy intake (ECM/INEL). Heritabilities of feed efficiency traits were moderate and ranged from 0.11 for ECM/INEL to 0.14 for ECM/BW^{0.75}. More efficient cows were found to have a higher milk yield, lower body weight, slightly higher dry matter intake and lower body condition score. Cows with a higher efficiency had a higher fat-protein-ratio, a longer calving interval and a higher frequency of fertility disorders. Higher efficiency was, however, associated with a lower somatic cell count, less lameness and a lower culling rate. Overall, cows with a medium efficiency combine both, a high milk yield with good fertility and health.

Feed from the sea: a move towards sustainable ruminant livestock production using brown seaweedM. Campbell¹, A. Foskolos² and K. Theodoridou¹¹Institute for Global Food Security, Queen's University Belfast, 13 Stranmillis Road, BT9 5AF Northern Ireland, United Kingdom, ²Institute of Biological, Environmental and Rural Sciences, Aberystwyth University, Penglais, Ceredigion, SY23 3DA Aberystwyth, United Kingdom; mcampbell1105@qub.ac.uk

Seaweed could provide an alternative, locally available, animal feedstock that is currently underexploited in the UK. According to FAO, livestock are accountable for 14.5% of global anthropogenic greenhouse gas emissions; methane accounts for approximately 44% of this. It was shown previously that adding seaweed to the ruminant diet could reduce methane emissions associated with rumen fermentation. Brown seaweeds contain valuable bioactive compounds known as phlorotannins (PT) which are linked to the methane abating behaviour of seaweed in the rumen. The current study aims to investigate the nutritional value of brown seaweeds and their effect on methane production. Two brown seaweed species, *Fucus vesiculosus* (FVS) and *Saccharina latissimi* (SAC), were collected in spring 2017 from Bangor, Co. Down, N. Ireland. Nitrogen (N) content was analysed by Dumas method and crude protein (CP) was estimated using Nx4.17. The Folin Ciocalteu method was used for PT content determination. Gas production was assessed using the *in vitro* gas production technique at 3, 6, 12, 24, 48, 72, 96 and 120 h for the determination of cumulative gas production; Lucerne, a non-PT containing plant, was used as a control. Statistical analyses were performed using JMP[®], Version 13.2.1. FVS and SAC had a CP content of 8.1 and 11.0% DM, respectively. The *in vitro* gas production results showed significant differences in total methane production between FVS and SAC (P<0.0001); compared to Lucerne, FVS and SAC reduced methane by 95 and 60%, respectively. The PT analysis revealed that FVS had a significantly higher PT content (3.17%DM) compared to SAC (0.368%DM). Although brown seaweeds are lower in CP compared to conventional feeds (40-50% CP in soybean), the environmental benefits should be considered. SAC is a species with high potential as a sustainable feed in ruminant nutrition. Further work is required to establish optimum inclusion rates in the diet.