Forage-fed ruminants on top for energy efficiency

Pigs & poultry fare poorly due to high grain & housing inputs

by Hugh Maynard

What an animal takes in and puts out as energy has long been a popular item of discussion. Economically, the input/output ratio determines the profitability of the farm. Environmentally, the use of non-renewable resources and demands on the sustainability of farmland are increasingly more important.

Alan Fredeen and Peter Havard of the Nova Scotia Agricultural College presented their findings regarding this question to the NSAC symposium on sustainable agriculture entitled "Reducing the Non-renewables", last April in Truro. Respectively members of the Departments of Animal Science and Engineering, their research has been aimed at examining the relationship between the input of non-renewable energy and the output of useful energy with the goal of identifying areas for improvement.

They defined the non-renewable energy inputs to animal production as the energy equivalent of fuels for operating machinery and ventilation, drying crops, production of inorganic fertilizers, and production of machinery and buildings.

Energy outputs were defined as the energy equivalent of human edible products of animal production and animal wastes used as fertilizer.

"Utilization of non-renewable inputs is currently not governed by efficiently. Their use is based on supply and price"the authors noted, adding that there has become the necessity for conservation, both for sustaining development and limiting damage to the environment.

They identified two approaches for improving the efficiency of animal production: the traditional approach is to increase inputs, taking advantage of the essentially fixed requirements for maintenance in animal production; the alternative approach is to lower energy inputs, such as switching from warm to cold housing or using natural ventilation systems.

Using work done by Southweil and Rothwell in Ontario in 1977, the authors presented production efficiencies from non-renewable energy inputs. They ranged from a low of 0.23 (output over input) for poultry (meat) to a high of 1.65 for heavy lamb.

'Efficiency seems to be affected most by housing design and by cereal grain input. Beef and sheep production systems, with potentially lowest housing and grain inputs, are most efficient" they stated. Beef energy output/input was 1.15, dairy was 0.64 (cheese) to 0.94 (milk) and swine was 0.62.

They also compared the effects of different animal feed inputs for provision of dry matter. Using Nova Scotia yields, barley corn, corn silage, soybeans, hay, haylage and pasture were stacked up against a purchased and delivered feed concentrate.

No surprise that the energy inputs for pasture were lowest, at 14-26 Mcal per tonne (range is based on yield variations), and that the feed concentrate were highest at 1,343 Mcal per tonne.

In the middle were corn at 10382478, barley at 699-1004, soybeans at 489-1096, corn silage at 401 -512, haylage at 232-363 and hay at 190297.