

### ***What is happening in the Rumen?***

What happens in the rumen is very important to the productivity of your stock and there are several ways we can modify what happens to try and improve productivity. When feeding ruminants the process is to feed both the beast and the rumen which in turn feeds the beast. The ruminant's digestive system consists of four stomachs the rumen, the reticulum, the omasum and the abomasum. The rumen and reticulum are basically large fermentation vats which are full of all sorts of micro-organisms. The important micro-organisms are bacteria, protozoa and fungi that digest the feed and turn it into something that the beast can utilize. Bacteria are the dominant organisms in the rumo-reticulum and carry out the bulk of digestion. There are many different species of bacteria in the rumo-reticulum and by altering the conditions in the rumen we can alter the populations in desirable ways.

Fungi are present in smaller quantities but are important in breaking up fibre so that the bacteria can penetrate and digest the fibre. Adequate sulphur is essential for fungi. Protozoa are single celled animals that are present in smaller numbers. They prey on the bacteria and as they are actively moving do not cycle out of the rumen as quickly and so tend to lower the efficiency of use of dietary protein. They do however have a role in energy metabolism utilising energy sources that would otherwise be wasted. There have been varying results from trials involving removing protozoa from the rumen.

The population of rumen microbes works in a symbiotic way with one group of bacteria living on the waste product of another group. In this way the energy from fibrous plant material is turned into volatile fatty acids that the beast can absorb and use as its energy source. Bovatec works by altering the population so more of this energy is in a form easily used by the beast and so we get more weight gain from the same amount of feed. Many bacteria release enzymes onto the fibre which digests the feed and then the bacteria utilize the sugars that are released by these enzymes for their growth and reproduction. Bacteria can utilise ammonia to produce proteins. When the bacteria are swept out of the rumen and pass on to the fourth stomach where this protein is digested and available to the beast. Some bacteria can also create the necessary water soluble vitamins (B group, C and K) given the correct trace minerals in the diet.

Feeding urea or other ammonia sources enhances the activity and number of cellulolytic (cellulose digesting) bacteria and so increase the rate and extent of fibre digestion. By increasing the rate of fibre digestion we allow the rumen to empty earlier and so increase the beast's intake of forage. This entire extra intake is available as extra gain if there is initially enough intake for maintenance.

When additives are used in the rumen to modify the population of microbes it is necessary to get as even an intake as possible. After 3 or 4 days without supplement the population in the rumen has returned to unsupplemented levels. For this reason a high intake lick or water dosing that ensures daily intake is the preferred method of supplementation.

By modifying the rumen environment and the population of microbes in it we can increase the productivity of stock.

Rob Sands (Nutritionist)