Food Animal Initiative

*ENVIRONMENTS FIT FOR **ANIMALS** FIT FOR THEIR ENVIRONMENT*

FAI Technical Datasheet – Disease reduction through immune competence G5 – Update August 2005

In recent years there has been a focus on disease reduction through improved biosecurity i.e. reduction in the disease challenge to animals. There is another approach to disease reduction which is to enhance the ability of animals to fight disease. This has been carried out well in terms of vaccine development and application. However, the value of the potential contribution of the animal's own immune system to resist challenges and the link between stress reduction and immune competence are currently underestimated in many livestock systems.

'the facts…….'

Disease occurs when the challenge from a pathogen overwhelms the ability of an animal's immune system to deal with it.

Science shows a link between stress and immune competence[1] and indeed this can be used as one measure of animals' welfare in research. This fact has been well understood in human medicine for a number of years.

Disease is only one stressor for an animal. Stress can be caused in many other ways such as lack of adequate feed/water, cold or heat stress, injury, fear or bullying.

The link between stress and immune competence can be demonstrated by considering two well known animal production systems;

1. *Levels of respiratory and enteric disease in dairy calves are high compared to suckler calves*[2] - this is due to the stresses of the dairy calf system such as; a greater risk of inadequate colostrum levels, early weaning, mixing at a vulnerable stage, and a higher risk of disease challenges as they are moved between farms and are generally housed rather than being kept outside. Although there are some vaccines available these have a limited effect as the primary problem is the animal's inability to fight the disease.
2. *Levels of E.coli enteritis (watery mouth) can be controlled in lambs by a combination of cleanliness in the lambing pen and supplying adequate colostrum*[3] – many shepherds routinely give lambs a single dose of antibiotic at birth. This is not necessary where pens are kept meticulously clean by strawing up daily and ensuring adequate colostrum levels. Watery mouth signs can be used as an early indicator that management practices need to be stepped up. Early watery mouth is easily treated by administering additional colostrum.

Blackface ewe with twin ewe lambs for future breeding

'….the FAI response!'

As farmers we have found it useful to categorise diseases according to how we deal with them:

1. Where commercial vaccines are available; vaccination for those animals which are high risk and against diseases which are highly pathogenic e.g. clostridial disease in young sheep
2. Quarantine and treatment for incoming animals for those diseases which can be kept out e.g. mange mites in pigs
3. All others are protected against by a combination of good immune competence and an environment giving maximum opportunity for immunity to develop against those diseases most likely to be a challenge.

Point 3 above has been achieved by:

1. Operating birth to death systems for both parent and offspring, allowing maximum opportunity for the development of immunity against those diseases currently on the farm. This immunity is then passed to the offspring.
2. Allowing access of animals as they grow to other diseases on the farm at low levels thus enabling them to develop immunity without disease.

Although not foolproof this is the sensible strategy for free range systems and a more robust alternative for these systems than trying to mimic the more intensive systems where the strategy for type 3 disease is to keep the animals separate from any challenge as far as is possible.

1. Zanella, Broom & Mendl 1991 Responses to housing conditions and immunological state in sows. *Animal Production* **52** 579.
2. Roger Hancock VLA personal communication
3. Eales A & Boden E 1991 Sheep and Goat Practice p91-100