

# **Bovine Spongiform Encephalopathy (BSE) In Sheep?**

New Zealand is free from both BSE and scrapie. MAF risk assessments, reviewed and endorsed by the government's independent BSE Expert Science Panel, concluded that the Scrapie Freedom Assurance Programmes (SFAPs), under which sheep have been imported to New Zealand since the mid-1980s, provide firm guarantees against the introduction of either of the TSEs. The SFAPs involve testing for infection by biosassay, embryos transfers, and prolonged quarantine.

## **Summary**

*The spectre of BSE in sheep is worrying. European sheep were probably exposed to rations containing meat and bone meal (MBM) several years ago. Experimentally it has been shown that sheep can be infected by mouth with BSE. There is no immediately obvious measure that could be taken, such as removal Specified Risk Materials (SRMs), to adequately protect public health should BSE be found to be in the European sheep population.*

## **Background**

The clinical signs of BSE in the sheep are indistinguishable from those of scrapie. The two diseases can only be distinguished on the basis of bioassay in mice and lesion profiling. The British have been looking for it by taking brains from scrapie cases, inoculating them into mice and then looking for the incubation period and so-called "lesion profile" indicative of BSE. There are, however, two problems with this approach. The first is cost. To profile a single isolate in mice costs around £20,000. They have about 200 isolates underway at present. The second difficulty is time; it takes up to two years to run a single lesion profile study.

Because of these fears about BSE possibly being present in sheep, the European Commission recently requested its Scientific Steering Committee (SSC) to:

1. pre-emptively carry out risk assessments corresponding to a range of circumstances (scenarios) should BSE be confirmed to occur in the sheep population under domestic conditions.
2. present an updated state of affairs regarding tissue infectivity distribution on the basis of the most recent results of the ongoing experiments on BSE in small ruminants,
3. identify and list the criteria to be fulfilled to conclude that the BSE/variant Creutzfeldt Jakob Disease (vCJD) strain has been isolated from sheep

The SSC reported back that its opinion on the situation remains unchanged from what it reported in 1998, namely that one "*has to assume that BSE could have been introduced into the sheep and goat population because it has clearly been demonstrated by experiments that BSE can be orally transmitted to certain genotypes of small ruminants and because it is likely that BSE-contaminated MBM has been fed to some sheep and*

goats". The SSC went on to say that although there is no evidence that BSE is present in small ruminants, the extent of observations to detect its presence is very limited.

The SSC considers that it cannot at this stage assess the risk to the human population from the possibility that BSE exists in small ruminants under normal conditions. There are too many variables and unknowns for which additional information is needed. For example, it is not known whether horizontal transmission between sheep is as important as transmission by infected feed. A first conclusion is that there is an urgent need in Europe to begin collecting the information required for an adequate assessment of the likely prevalence of BSE in small ruminants.

The SSC considers that a number of possible scenarios could be listed, ranging from the situation that the exposure to infected feed is considered to be unlikely, to the scenario that BSE in small ruminants has been confirmed under natural conditions and that there are related outbreak(s) of cases over a wide geographic area.

Another aspect to the problem is what can be done to protect the consumer if BSE is shown to be present in sheep? In cattle, BSE infectivity is largely confined to the central nervous system (CNS) which can be easily removed. CNS tissues, and a range of others which might be considered contaminated under certain circumstances, are known as SRMs.

In the case of BSE in sheep, there is sufficient evidence now that infectivity is distributed more widely, right through the peripheral lymph nodes. That is, trimming cannot render sheep meat safe to the same extent that it can with beef.

In April 2000 the SSC proposed a list of SRMs, the exclusion of which it proposed would protect consumers from exposure to BSE. In its most recent report, the SSC considered that its earlier list of SRMs is still appropriate but when more comprehensive data on BSE infectivity in sheep is available, the SSC will revisit this conclusion.

The SSC proposes that rapid tests should be developed for differential diagnosis of scrapie and BSE in sheep and goats. Preliminary research in the United Kingdom suggests that the issue could be clarified by what is known as "glycotyping" of "Transmissible Spongiform Encephalopathy" (TSE) isolates from sheep. However, to date, glycotyping in sheep has not been consistent or reproducible in the hands of different researchers.

In its most recent report on the subject the SSC stated that there is a further need to significantly improve surveillance and culling strategies and to accelerate the introduction of a system of individual identification of sheep and of criteria for the determination of the TSE-free status of flocks. A start must be made for the collection of data useful for the assessment of the risk of BSE in small ruminants at the national level, but also at the level of local management practices. The SSC further recommends EU-wide national programmes of breeding towards a genetically fully resistant sheep population.

The SSC pre-emptively lists a number of additional measures to be considered should there be strong indications or evidence of BSE actually being present in domestic flocks. These refer to specified risk materials, culling strategies and generalised testing of animals.

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The detection of BSE in European sheep would probably not benefit New Zealand's sheepmeat exports. Consumer fears would probably result in a decline in demand for all lamb, regardless of origin. New Zealand would probably be faced with a very expensive surveillance programme, going well beyond what is currently in place, to regain consumer confidence in European and other important markets. If BSE is found in European sheep, nobody will benefit.