Potential risk factors for BSE (reply to calavas and others)

Clauss, Marcus; Sauter-Louis, C

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Potential risk factors for BSE

SIR, – We read with great interest the paper by Clauss and others (2006) investigating the potential risk factors for BSE in Bavaria. Indeed, beyond the crude evidence of a link between the trend of the epidemic in cattle in the UK and other European countries and the control measures of the ban on meat-and-bone meal (MBM) in cattle feed, there has previously been only one published epidemiological case-control study evidencing the food risk factors for BSE (Wilesmith and others 1992). It is therefore of the utmost importance to verify if these factors are universal, or evolved over time and space,
since it appears that in some countries the MMB ban has not been 100 per cent effi-
cient. In this context, other contamination hypotheses have been raised, such as ani-
mal fats included in milk replacers, bical-
cic phosphates extracted from bones, or on-
farm cross-contamination with feed dedica-
ted to pigs or poultry in which MMB was
still authorised (Jarrige and others 2006).
Clauss and others (2006) evidenced univariate links (P<0.0001) between both use
of proprietary concentrates, milk replacers and status of the herds (BSE affected or controls). We would like to
draw attention to a crucial methodologi-
cal consideration. It is a fact that the association between two variables (for
example, a risk factor A and a disease) can be biased if another factor B, called con-
founder, is linked with both the disease and the factor A. That is the reason why epidemiologists use multivariate models,
such as multiple logistic regression, to
take into account complex relationships
between risk factor hypotheses and dis-
ease (Thrusfield 2005). It may happen that a strong univariate link between a
factor and a disease fades away when
adjusted on another factor, with which it
is itself heavily correlated.
In cattle, many farmers who purchase
proprietary concentrates for replacement
animals or adults also buy milk replac-
ers for their calves. This seems to be the
case in Bavaria, where 83.2 per cent of the
respondent BSE farms are used to buy
both concentrate feed and milk replacers. It is therefore important to
analyse if both factors have an effect on
BSE, or if one of the links is only due to a
confounding effect between these two
factors.
Therefore, we would be very keen to
read in a further paper the results of a
multivariate analysis on this set of data, in
order to definitely assess if all the poten-
tial factors that our colleagues have
evidenced are to be considered as risk factors or not.

D. Calavas, N. Jarrige, Agence Française de Sécurité Sanitaire des Aliments, 69003 Lyon, France
C. DUCROT, Institut National de la Rcherche Agronomique, 63122 Thieux, France

References

phy: case-control studies of calf feeding practices and meat and bonemeal inclusion in proprietary
concentrates. Research in Veterinary Science 52, 325-331

Dr M. Clauss and Dr C. Sauter-Louis comment: Thank you for providing us with the opportunity to reply to Dr Calavas and colleagues.
In our paper (Clauss and others 2006), we presented univariate compar-
isons of different potential risk factors
between BSE and non-BSE farms. In partic-
ular, with reference to the use of pro-
prietary milk replacer (MRP), proprietary
pelleted compound feed concentrates (CONC), or both, in calves, we showed in
Table 2 of our paper that a similar pro-
portion, approximately 18 per cent, of
non-BSE farms used either only CONC or
only MRP in their calves, which suggests
against an association of these two risk
factors.
If the use of MRP and CONC were cor-
related (tested by kappa test), then only
one of these factors would be allowed in
a logistic regression. As these factors are
not correlated (kappa=0.34), both can be
used in a multiple logistic regression as
requested by Calavas and colleagues,
which we provide here (SPSS 13.0; SPSS).
In addition to these two factors, we also
used cattle breed as a variable in the
logistic regression, because we had found
evidence for a breed predisposition to
BSE in the Bavarian cattle population
(Sauter-Louis and others 2006). The
results of the multiple logistic regression
using these three variables are sum-
marised in Table 1.

As in our paper, the odds ratios for MRP and CONC are similar in scope;
breed also represents a significant risk
factor with a lesser odds ratio. If, in a sec-
ond analysis, MRP and CONC are consid-
ered together as proprietary feeds (PROP), then a similar odds ratio for
breed and a very high odds ratio for PROP results (Table 2). In our paper,
we explained that the individual risk factors for MRP and CONC should not be used to
compare the relative risk of the one over
the other because, in the Bavarian
dataset, the ranking of these two factors
changed several times when data for a
few new cases were added. Therefore, we
consider it reasonable to regard propri-
etary feeds as such – be it MRP or CONC –
as a risk factor.
The experiences in the UK and
Switzerland, where a decline in the BSE epidemic was noted after feed bans and a
time lag corresponding to the incubation
period, and the fact that the ban of ani-
mal products from both CONC and MRP
at the end of 2000 in Bavaria (and
Germany in general) was followed not
only by an immediate decline in the rate
of cross-contamination of cattle feeds
with animal products (Clauss and
Kienzle 2003), but also by a marked
decline in new BSE cases in 2005, support
this view.

M. Clauss, Division of Zoo Animals,
Exotic Pets and Wildlife, Vetsuisse Faculty,
University of Zurich, Winterthurerstrasse
260, 8057 Zurich, Switzerland
C. Sauter-Louis, Clinic for Ruminants,
Sonnenstrasse 16, 85764 Oberschleissheim, Germany

References
CLAUSS, M. & KIENZLE, E. (2005) On the cross-
contamination of ruminant feedstuffs in Bavaria
after the comprehensive feed ban. Deutsche Tierärztliche Wochenschrift 110, 473-512
associated with cases of bovine spongiform encephalopathy in Bavaria, Germany. Veterinary Record 158, 509-513
logical evidence in Bavarian cattle. Schweizer Archiv für Tierheilkunde 148, 245-250

TABLE 1: Results of multiple logistic regression using the use of milk replacer (MRP), pelleted compound feed concentrates (CONC), and breed as variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Regression coefficient</th>
<th>se</th>
<th>df</th>
<th>P</th>
<th>Odds ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>MRP</td>
<td>1.900</td>
<td>0.310</td>
<td>1</td>
<td>&lt;0.0001</td>
<td>6.7</td>
</tr>
<tr>
<td>CONC</td>
<td>1.992</td>
<td>0.334</td>
<td>1</td>
<td>&lt;0.0001</td>
<td>7.3</td>
</tr>
<tr>
<td>Breed</td>
<td>0.997</td>
<td>0.242</td>
<td>1</td>
<td>&lt;0.0001</td>
<td>2.7</td>
</tr>
</tbody>
</table>

TABLE 2: Results of multiple logistic regression using the use of proprietary feeds (PROP) (milk replacer and/or pelleted compound feed concentrates) and breed as variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Regression coefficient</th>
<th>se</th>
<th>df</th>
<th>P</th>
<th>Odds ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>PROP</td>
<td>2.938</td>
<td>0.461</td>
<td>1</td>
<td>&lt;0.0001</td>
<td>18.9</td>
</tr>
<tr>
<td>Breed</td>
<td>1.118</td>
<td>0.225</td>
<td>1</td>
<td>&lt;0.0001</td>
<td>3.1</td>
</tr>
</tbody>
</table>

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