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**Report**  
**on**  
**“Chronic Wasting in Cattle”**

**Scientific Committee on Animal Health and Animal Welfare**

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Chronic Wasting in Cattle  
Report of the  
Scientific Committee on Animal Health and Animal Welfare

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## **1. TERMS OF REFERENCE**

The Scientific Committee on Animal Health and Animal Welfare is requested to review and report to the Commission on investigations carried out in the Netherlands on "Chronic Wasting in Cattle".

The information from the Netherlands is provided in two translated documents, which have been provided to the Committee. The first document refers to "Farms auditing: wasting cattle", and the second one on "The problem of wasting Cattle: review of current knowledge and areas of uncertainty".

## **2. INTRODUCTION**

From May 1998 onward it was compulsory for Dutch cattle farmers to take control measures against bovine herpesvirus 1 (BHV-1). Cattle on farms that were not certified as infectious bovine rhinotracheitis (IBR)-free had to be vaccinated twice a year. Alternatively, farmers had to remove the (few) BHV-1 seropositive cattle from their herds.

In the course of the vaccination program, it turned out that the live-attenuated BHV-1 vaccine was contaminated with bovine viral diarrhoea virus (BVDV). In order to assess the possible damage caused by the vaccine contamination a questionnaire was sent out to farmers that were known to have vaccinated their cattle. Both farmers and veterinarians reported side effects of the vaccine described as "chronic wasting" of cattle. This term was then used to define animal health problems that were thought to be associated with the use of BHV-1 marker vaccine. Signs of "chronic wasting" included abortion, stillbirth, subfertility, abomasal displacement, lameness, mastitis, diarrhoea, and decreasing body condition in general. However, no criteria have been set by which an objectively independent inventory of the problems could be made. The incidence of "chronic wasting" was restricted to approximately 150 dairy farms at most. Currently, no farms with "chronic wasting" cows are known. Several studies were performed to ascertain whether the vaccination with the BHV-1 marker vaccine was related to the "chronic wasting" in cows. So far none of the studies substantiated this hypothesis. Research into other possible infectious and non-infectious causes has been limited and has not indicated any common cause of "chronic wasting" in cattle.

## **3. GENERAL FINDINGS**

The term "wasting cattle" was defined by members of the Dutch Animal Health Service (GD), the Faculty of Veterinary Medicine (FD) of the University of Utrecht and the Royal Dutch Veterinary Association (KNMvD). The following characteristics have been ascertained for wasting cattle:

- animals become lame (through infections, laminitis, tarsitis and secondary ailments)
- animals which have recently calved, often heifers and second calvers
- milk production lower than expected

- serious decline in physical condition with no improvement which can normally be expected at a later stage during lactation
- impaired fertility
- the sickness does not– or at best inadequately - respond to conventional therapies.
- (often signs existed prior to the IBR campaign)

A recent report from the GD defined a wasted cow as one that has become very thin (body condition score < 2) as a result of some kind of disease, which is not clearly identifiable.

A problem farm has been defined as one where 20% or more of the cattle are wasted. A retrospective study of the prevalence of problem farms in the Netherlands was performed. The actual number of problem farms known to the GD (n=72) and the IBR Support Association (SIS) (n=120) in 1999 represents less than 1 % of today's dairy industry. The identification of problem farms were all based on verbal notifications from farmers, which have not been verified using quantitative criteria. Since November 1999, the number of notifications has fallen drastically and to date no new cases have been reported.

#### **4. POSSIBLE ETIOLOGY**

The investigation of causes leading to the “wasting disease” complex seems to be difficult, because the term covers a potentially wide range of different veterinary areas. The following possible causes have been taken into account.

##### **4.1. Infectious agents**

###### *4.1.1. Viruses*

Following the initial reports of a health problem in 1999, it was found that the IBR vaccine had been contaminated with an infectious agent (BVDV). However, available research data do not support a link between an actual BVDV contamination of batches of IBR marker vaccine and “wasting cattle” syndrome. An experiment in which pregnant heifers vaccinated with a 50-fold dose of a mixed vaccine using BVDV 1 contaminated batches were compared to control animals did not lead to any significant clinical, pathological, serological or immunological results, except the expected reaction to BHV-1.

Moreover, virological and epidemiological research and animal experiments yielded no indication that the IBR vaccine could have been contaminated with an agent other than BVDV. The hypothesis that a virulent "overlay" BHV-1 strain in the vaccine causes the “wasting syndrome” was rejected on the basis of clinical, pathological, and epidemiological findings.

In order to rule out chronic viral infections or the involvement of viruses that induce immunosuppression with debilitating effects “wasting cattle” material was investigated for the presence of a number of viruses. The following viruses were searched for in this study: BVDV (genotypes 1 and 2), bovine

immunodeficiency virus (BIV), circovirus, BHV 4, bovine leucosis virus (BLV), bluetongue virus, Rinderpest virus, bovine calicivirus, rotavirus, Norwalk-like virus, and ovine herpesvirus 2. The investigations failed to reveal any indication of a single, common, infectious cause of “cattle wasting”.

In one animal from a problem farm, circovirus was found. In pigs, this virus infection is associated with emaciation and wasting. So far such a virus is unknown for cattle; therefore the significance of the finding is difficult to assess. Further investigation has revealed that antibodies were also found in the blood of this animal. All other samples from cows from problem farms that were investigated for the presence of circovirus were negative.

TSE was excluded as causes of Chronic wasting disease.

#### 4.1.2. *Bacteria*

Although various bacterial infections have been found in material from “wasting cattle”, the results did not support a clear cause of the wasting problem. The investigations concentrated especially on *Leptospira* spp., *Salmonella* spp., as well as on *Mycobacterium paratuberculosis*.

#### 4.1.3. *Parasites*

In any case, infestations with known parasites as a primary cause for the syndrome could be excluded.

In summary, no evidence of a common infectious cause could be identified in material from animals of problem farms.

## 4.2. **Housing and management related causes**

Other causes not linked to infectious agents were also analyzed, since the cause for wasting cattle syndrome could be related to the animal's environment or feed (exogenous cause) or the characteristics of the animal itself (endogenous cause). Therefore, a case-control study conducted by the GD and the ID-Lelystad was performed to investigate the conditions and management of farms with wasted cattle in 1998.

It was notable that the average productivity of problem farms was not higher than on control farms, i.e. high productivity alone was unlikely to be the cause of the syndrome. The average size of problem farms was considerably larger than the average size of unsuspected dairy farms. Moreover, the study looked at the possibility of disease being introduced onto farms. Before any problems were detected, problem farms had more contact with other farms in connection with the purchase of animals of all ages.

When rations and feed were compared, no difference was found in the method and kind of feeding (mixed feeding, potentially mouldy roughage, putting or not putting milk cows out to pasture etc.).

Research into the status parameters for minerals, trace elements and general values relating to nutrition status in material from animals from problem

farms did not produce any clear indications. Very little research into the quality of feed as a possible cause of wasting syndrome has been conducted, and no indications of a clear cause of the syndrome have been found. Moreover, there was no evidence for dioxin contamination or cobalt deficiency in animals of problem farms. Mycotoxin-related causes were not studied.

Significant differences in management between normal and problem farms could not be substantiated. However, it appears that vets paid fewer routine visits to problem farms. Certainly this does not tell anything about the cause of the problem, but it may represent a characteristic feature of the problem farms.

## 5. CONCLUSIONS

- There is no clear concept of the phenomenon "wasting cattle syndrome". The clinical picture is quite variable. The phenomenon is considered to exist where more than 20 % of cows on a particular farm are wasted.
- No reliable information on the exact number of problem farms is available. However, there is evidence that in 1999 less than 1% of all Dutch dairy farms were affected. Since the end of 1999 the number of notifications has fallen drastically, and no new cases have been reported so far.
- There is no link between vaccination with IBR marker vaccine and any measurable effect on production or animal health in cattle, apart from the normal primary reaction to vaccination.
- Investigations of possible infectious and non-infectious causes have been limited and have not led to indications of any common cause of the syndrome
- Problem farms tend to be larger than the average Dutch dairy farm and they had a higher rate of animal removal. However, no difference was found with respect to production level, farm intensity and the introduction of disease from outside, e.g. by trade or other animal contacts. The differences in farm management could not be linked to the problems on the farms.
- No research has been performed into possible endogenous causes (e. g. genetic background of the affected animals).

## 6. RECOMMENDATIONS

- Further research into a possible link to the BHV-1 marker vaccine seems not to be necessary. However, the Committee emphasizes the importance of prudent production of vaccines in order to keep them clear of contaminating microorganisms.
- The definition of the syndrome "chronic wasting" should be made more objective, using key indicators and pathophysiological parameters.

- The result of the farm audit (Bartels *et al.*, 2000) does not suggest that further investigations in management and housing are necessary. No significant differences were noted between problem farms and control farms in terms of how the animals were housed, hygiene protocols, and feeding.

#### **6.1. In case the problem re-emerges**

- A systemic research into nutrition status, housing, and management conditions, compared to properly defined control animals should be performed.
- Systematic research should be performed into the feed status and possible toxic substances in existing material from properly defined wasting cattle and control animals.
- Systemic research should be carried out into the genetic background of properly defined wasting cattle compared to control animals.
- In case new problem farms are found, it is recommended that extensive research be carried out on these farms into possible infectious and non-infectious causes of the problem.
- Systemic studies are then needed to look into the pathophysiology of wasting cattle.

#### **6.2. General recommendations**

- Aforementioned recommendations should be integrated into EU legislation to ensure that unexplained emerging health problems are thoroughly investigated.
- Standardization of the recording of animal health details at farm level.
- Reasons for removal of animals and removal value should be recorded.
- Central storage of these records.
- Central notification of animal health problems of unknown origin.

## 7. ANNEX

### **The recommendations refer to:**

Bartels, C.J.M., Barkema, H.W., Stegeman, J.A., Bouma, A., 2000: Farms audit: wasting cattle; a case-control study to investigate the conditions on and management of farms with wasted cattle in 1998.

Meijer, G.A.L., Bouma, A., Verhoeff, J., 2000: The Problem of Wasting Cattle. Review of Current Knowledge and Areas of Uncertainty. ID-Lelystad Report No 002059.

Verhoeff, J., 2000: An investigation into the prevalence of chronic wasting in Dutch dairy herds. Animal Health Inspectorate (GD), May 2000.

### **Several abstracts of articles of the Tijdschrift voor Diergeneeskunde, 126, 2001:**

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Barkema, H. W., Bartels, C.J.M., van Wuijckhuise, L., Hesselink, J.W., Holzhauer, M., Weber, M.F., Franken, P., Kock, P.A., Brusckke, C.J.M., Zimmer, G.M., 2001: "Outbreak of bovine virus diarrhoea on Dutch dairy farms induced by a bovine herpesvirus 1 marker vaccine contaminated with bovine virus diarrhoea virus type 2". Tijdschrift voor Diergeneeskunde, 126, 158.

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Bartels, C.J.M., Barkema, H.W., Beiboer, M.L., Bouma, A., Stegeman, J.A., 2001 b: Management and herd performance of dairy herds with and without "chronic wasting" disease. Tijdschrift voor Diergeneeskunde, 126, 198.

Brusckke, C.J.M., Paal, H.A., Weerdmeester, K., 2001: Detection of bovine virus diarrhoea virus in a live bovine herpes virus 1 marker vaccine. Tijdschrift voor Diergeneeskunde, 126, 189.

de Kruif, A., 2001: Did vaccination with an infectious bovine rhinotracheitis (IBR) marker vaccine on thirteen cattle farms give rise to "chronic wasting" among dairy cattle? Tijdschrift voor Diergeneeskunde, 126, 166.

Meijer, G.A.L., Bouma, A., Verhoeff, J., 2001: Chronic wasting of dairy cows; a review of research. Tijdschrift voor Diergeneeskunde, 126, 223.

Müller, K.E., 2001: Clinical findings at cows originating from dairy herds with "chronical wasting disease". Tijdschrift voor Diergeneeskunde, 126, 184.



Weber, M.F., Verhoeff, J., 2001: Prevalence of chronic wasting in Dutch dairy herds with a history of chronic health problems. Tijdschrift voor Diergeneeskunde, 126, 180.

Weber, M.F., Verhoeff, J., Holzhauer, M., Bartels, C.J.M., van Wuijckhuise, L., Vellema, P., 2001: Vitamin B<sub>12</sub> supplementation and milk production on farms with "chronic wasting" cattle. Tijdschrift voor Diergeneeskunde, 126, 218.

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