

**Zeitschrift:** Schweizer Archiv für Tierheilkunde SAT : die Fachzeitschrift für Tierärztinnen und Tierärzte = Archives Suisses de Médecine Vétérinaire ASMV : la revue professionnelle des vétérinaires

**Herausgeber:** Gesellschaft Schweizer Tierärztinnen und Tierärzte

**Band:** 132 (1990)

**Heft:** 8

**Artikel:** Incidence of pathological changes in sheep seropositive to maedi-visna

**Autor:** Badiola, J.J. / Luján, L. / García Marín, J.F.

**DOI:** <https://doi.org/10.5169/seals-592691>

### **Nutzungsbedingungen**

Die ETH-Bibliothek ist die Anbieterin der digitalisierten Zeitschriften auf E-Periodica. Sie besitzt keine Urheberrechte an den Zeitschriften und ist nicht verantwortlich für deren Inhalte. Die Rechte liegen in der Regel bei den Herausgebern beziehungsweise den externen Rechteinhabern. Das Veröffentlichen von Bildern in Print- und Online-Publikationen sowie auf Social Media-Kanälen oder Webseiten ist nur mit vorheriger Genehmigung der Rechteinhaber erlaubt. [Mehr erfahren](#)

### **Conditions d'utilisation**

L'ETH Library est le fournisseur des revues numérisées. Elle ne détient aucun droit d'auteur sur les revues et n'est pas responsable de leur contenu. En règle générale, les droits sont détenus par les éditeurs ou les détenteurs de droits externes. La reproduction d'images dans des publications imprimées ou en ligne ainsi que sur des canaux de médias sociaux ou des sites web n'est autorisée qu'avec l'accord préalable des détenteurs des droits. [En savoir plus](#)

### **Terms of use**

The ETH Library is the provider of the digitised journals. It does not own any copyrights to the journals and is not responsible for their content. The rights usually lie with the publishers or the external rights holders. Publishing images in print and online publications, as well as on social media channels or websites, is only permitted with the prior consent of the rights holders. [Find out more](#)

**Download PDF:** 03.04.2026

**ETH-Bibliothek Zürich, E-Periodica, <https://www.e-periodica.ch>**

Dep. Patologia Animal. Facultad de Veterinaria. Zaragoza (Spain)

**INCIDENCE OF PATHOLOGICAL CHANGES IN SHEEP SEROPOSITIVE TO MAEDI-VISNA**

J. J. Badiola, L. Luján, J. F. García Marín and M. C. Simón

Maedi is a multisystemic disease of adult sheep caused by a lentivirus from the retrovirus family. The disease produces affections in lung, brain, joints and mammary glands (1). In Spain the disease was described in 1984 (2). Epidemiological surveys in some parts of Spain demonstrate that Maedi has a high prevalence and is the most important respiratory disease in adult sheep. There are no data on the percentage of infected sheep that develop lesions and clinical disease. The aim of this work is to get an estimation of the relationship between the seropositivity to Maedi Visna Virus (MVV) and the presence of lesions in the lungs and mammary glands.

**Material and methods**

124 randomly selected Rasa breed sheep killed in a slaughterhouse in Zaragoza, were studied between 1988 and 1989. Their age ranged from 2 to 7 years. Blood samples were taken and both, mammary glands and lungs were removed for pathological and microbiological studies. With the purpose of serological studies an AGID test, using a WLC-1 antigen was carried out. The lungs and mammary glands were macroscopically studied and samples for microscopical studies were taken and processed by applying routine techniques. In order to estimate the severity of the lesions, we carried out the following methods:  
*Lungs:* The two histological changes, Hyperplasia of Lymphoid Follicles (H.L.F.) and Interstitial Pneumonia (I.P.), which are considered to be the most characteristic lesions of Maedi, were evaluated. These lesions were classified as follows: Number of lymphoid follicles found in the whole section, +: 2 to 5, ++: 6 to 15, +++: above 15. I.P.: +: slight, ++: moderate, +++: severe.  
*Mammary gland:* Similar changes, Hyperplasia of Lymphoid Follicles (H.L.F.) and Interstitial Infiltrate (I.I.) of the parenchyma, were also evaluated. These lesions were classified as follows. Number of lymphoid follicles: As in lungs. I.I.: (slight inflammatory infiltration was not considered pathological), +: moderate infiltration, ++: severe infiltration. Samples from the mammary glands were taken for bacteriological examination by standard methods in order to isolate and identify Mycoplasma and other bacteria.

**Results**

74 animals were seropositive to MVV and the other 50 were seronegative. Pathological findings in lungs (table 1): 21 seropositive animals showed typical gross lesions of Maedi. The microscopic lesions were seen in 40 seropositive sheep, amongst which were the 21 with gross lesions. H.L.F. was detected in 38 animals and I.P. was seen in 28. The number of follicles in these seropositive animals was variable, ranging from only a few in some animals to a large number in others. Likewise, the intensity of the interstitial pneumonia was variable. There was no relationship between the number of follicles and the intensity of the interstitial pneumonia. 12 animals had H.L.F. (from + to +++), without I.P. and 2 had I.P. (++) without H.L.F. Finally, 26 sheep presented a mixed form with H.L.F. and I.P., but all the combinations of these two lesions could be found. Thus some

animals with +++ of H.L.F. had only a + of I.P. and sheep with +++ of I.P. had only + of H.L.F. Pathological findings in mammary gland: Microscopic lesions were detected in 43 seropositive sheep, 30 of these with H.L.F. and 27 with I.I. Most of the animals showed a middle-low number of follicles. The I.I. was generally mild. No relationship was found between the number of follicles and the intensity of I.I.: 16 animals had H.L.F. only; 13 had I.I. only, and 14 H.L.F. and I.I. In these 14 sheep, all the combinations of lesions could be found. Pathological findings in seronegative animals: There were 50 sheep seronegative to Maedi. We observed maedi-like lesions in 8 animals. Two sheep with a few lymphoid follicles in the lungs were detected. Lesions in the mammary glands were found in 6 animals. These lesions showed several degrees of H.L.F. General Results: 19 sheep amongst the 74 seropositive animals had none of the lesions described above. 55 showed lesions related to Maedi; 12 had them in the lungs only, and 15 exclusively in mammary gland. 28 sheep had lesions in both organs.

| Lung                | sheep | Mammary gland       | sheep |
|---------------------|-------|---------------------|-------|
| Gross pathology:    | 21    | Gross pathology:    | none  |
| Microscopically     | 40    | Microscopically     | 43    |
| H.L.F.:             | 38    | H.L.F.:             | 30    |
| +                   | 7     | +                   | 20    |
| ++                  | 17    | ++                  | 8     |
| +++                 | 14    | +++                 | 2     |
| I.P.:               | 28    | I.I.:               | 27    |
| +                   | 13    | +                   | 22    |
| ++                  | 8     | ++                  | 5     |
| +++                 | 7     |                     |       |
| Presentation        |       |                     |       |
| H.L.F. only: 12     |       | H.L.F. only: 16     |       |
| H.L.F. and I.P.: 26 |       | H.L.F. and I.I.: 14 |       |
| I.P. only: 2        |       | I.I. only: 13       |       |

Table 1: Gross and microscopic results of the 74 seropositive animals

**Discussion**

The high seropositive rate (60%) against Maedi-Visna virus found in this study, carried out with randomly selected sheep, must be pointed out. This fact shows that Maedi is a very common disease in our geographical area.

With respect to the occurrence of lesions in seropositive sheep, the simultaneous involvement of both lungs and mammary glands (38%) is an outstanding feature of this study, when compared with the lower percentage of animals showing only one of the two organs affected

(lungs 16%, mammary glands 20%). This results seems to agree with other studies (3, 4). A relatively high number of seropositive animals (25%) did not show lesions in either organ.

With respect to the type and severity of the lesions, the predominance of the H.L.F. over the I.P. was observed in lungs, whereas in the mammary glands this relationship was not noted.

On the other hand, even when occurring in both organs, the lesions did not show the expected proportion in terms of either type or importance.

*Institut für Veterinär-Pathologie, Justus-Liebig-Universität, Giessen, FRG*

### **OCCURRENCE OF CANINE DISTEMPER VIRUS INFECTION IN NON-DOMESTIC CARNIVORES AND DISTRIBUTION OF VIRAL ANTIGEN IN BRAIN TISSUES**

*W. Baumgärtner, M. Adami*

Canine distemper virus (CDV) belongs to the genus Morbillivirus in the Paramyxoviridae family and causes an acute to subacute systemic and/or neurologic disease in dogs and other carnivores throughout the world (1,4,5). Within the order Carnivora are a number of families including Canidae and Mustelidae that have been shown to be susceptible to CDV. As a result of the widespread use of modified-live CDV vaccines the incidence of CDV infection in domestic dogs has dramatically declined. However, isolated epidemic recurrence of CDV infection in dogs and the recent epizootic among harbor seals due to infection with a CDV-like virus raise the question of the importance of wildlife species as a reservoir source for infection (3,6). Surprisingly, little is known about occurrence and details of histological and immunohistological findings in noncanid species (5,7).

Therefore, the purpose of the present study was twofold, (i) to record the seasonal incidence of CDV infection among mustelids originating from the same geographical area and, (ii) to characterize histologically and immunohistologically CDV-associated brain lesions in these animals.

Brain tissues from 41 beech martens (*Martes foina*), 2 pine martens (*Martes martes*) and 3 european polecats (*Mustela putorius*), which were submitted for rabies diagnosis to the Staatliche Institut für Gesundheit und Umwelt, Abteilung Veterinärmedizin, in Saarbrücken over a 12 months period (April 1989–March 1990), were collected. Impression smear preparations were taken from brain tissues for rabies diagnosis and half of each brain was fixed in 10% non-buffered formalin. For histological examination, tissues were embedded in paraffin wax, stained with hematoxylin and eosin (HE) and selected sections with luxol fast blue and cresyl violet. Immunohistological demonstration of CDV antigen was performed as described (2).

Clinically, the mustelids showed abnormal behavior including aggressiveness and lack of fear or they were found dead with no premonitory signs. CDV antigen was demonstrated immunohistolo-

### **References**

1. *Cutlip, R. C. et al.* (1988): *Vet. Micro.* 17, 237–250. — 2. *Gonzalez, L. et al.* (1984): *Med. Vet.* 1, 277–284. — 3. *Van der Molen and Houwers* (1987): *Vet. Quaterly.* 9, 3, 193–202. — 4. *Deng, P. et al.* (1986): *Vet. Pathol.* 23, 184–189.

gically in 18 (39.1%) and rabies virus infection was diagnosed in 5 animals (10.9%). CDV infection in mustelids had a peak incidence in the winter months. Histological lesions in mustelids with CDV infection varied but were in general mild to minimal. Intranuclear and intracytoplasmic inclusion bodies were not observed. Minimal to mild perivascular and/or meningeal mononuclear cell infiltrates were observed in 12 cases. Two animals exhibited single foci of demyelination with or without reactive astrogliosis in the cerebellar white matter or the medulla oblongata. Four cases were without significant microscopic brain lesions. Concurrent brain lesions were caused by toxoplasmosis or cerebral nematodiasis in two cases. Immunohistochemically, CDV antigen was present predominantly in the cerebellar and cerebral grey matter, to a lesser extent in meningeal cells and rarely in the white matter.

Summarized, the present findings show a high incidence of naturally occurring CDV infection in wild mustelids with minimal to mild histological brain lesions. In addition, CDV antigen was prominent in the grey matter and white matter involvement was rarely observed.

### **References**

1. *Appel M. J. G., Gillespie J. H.* (1972): In: S. Gard, C. Hallauer and K. F. Meyer (Eds.), *Virology Monographs.* Springer Verlag, NY, Vol. 11, 1–96. — 2. *Baumgärtner W. et al.* (1989): *Acta Neuropathol.* 78, 504–512. — 3. *Glardon O., Stöckli R.* (1985): *Schweiz. Arch. Tierheilk.* 127, 707–716. — 4. *Krakovka S. et al.* (1985): In: R. G. Olsen, S., Krakowka, J. R., Blakeslee, Jr.: *Comparative pathobiology of viral diseases,* CRC Press, Boca Raton, Florida, Vol II, 137–164. — 5. *Montali R. J. et al.* (1987): In: M.C.M. Horzinek (series Ed.), *Virus infections of vertebrates. Vol. I: M.J.G. Appel (Ed.), Virus infections of carnivores.* Elsevier Science Publishers B.V., Amsterdam, Oxford, New York, Tokyo, 437–443. — 6. *Osterhaus A. D. M. E. et al.* (1988): *Nature* 335, 403–404. — 7. *Steinhagen P., Nebel W.* (1985): *Dtsch. tierärztl. Wschr.* 92, 178–181.