

## Aspergillosis in reindeer (*Rangifer tarandus tarandus* L). A case report

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At meat inspection of reindeer, the lungs of a young male reindeer, which had been kept on supplementary feed through the winter until it was slaughtered February 1994, were found to have numerous 1–3 mm round, dark «dots» dispersed on the surface and cut surface. The ethiology was suspected to be of parasitic origin and small pieces of the lungs were fixed in 10 % formalin, and submitted to the National Veterinary Institute for histopathological investigation.

The material was trimmed, embedded in paraffin, cut 5 µm sections and stained with haematoxyline-eosin. The «dots» were found to be fungal granulomas characterized by a necrotic centre of cellular debris with branching hyphae surrounded by mainly mononuclear cells, some macrophages, few neutrophils and occasional multinucleated cells. No capsule was formed but the surrounding consisted of compressed alveoli with dilated capillaries and frequent areas of haemorrhages.

The material was further investigated using the peroxidase-antiperoxidase (PAP)-technique. Embedded sections were deparaffinized and rinsed in 0.5 mol/l Tris-HCl buffer, pH 7.6 containing 0.15 mol/l NaCl (TBS). Endogenous peroxidase was inactivated by incubating the sections for 20 min. in TBS containing 1.0 % (v/v) hydrogen peroxide. The

sections were then rinsed thoroughly in TBS and incubated for further 15 min. with 2 % BSA in TBS.

Specific antisera to *Aspergillus*, *Zygomycetes* and *Candida*, raised in rabbits according to Smith *et al.* (1992), were used as primary antibodies. The lung sections were incubated for 45 min. with a 1:1200 dilution of the specific antisera directed to the different fungal species, followed by a 30 min. incubation with swine antirabbit IgG and rabbit PAP-complex (Dakopatts, Glostrup, Denmark) diluted 1:20 and 1:100 respectively. All dilutions were made in TBS containing 1 % BSA. The sections were thoroughly rinsed in TBS between each incubation. Peroxidase activity was visualized by incubating the sections for 8 min. in TBS containing 0.06 % (w/v) diaminobenzidine (DAB, Sigma, St. Louis, USA) and 0.034 % (v/v) hydrogen peroxide. Finally, the sections were rinsed in tap water, counterstained in Mayer's haematoxylin and mounted with Entellan (Merck, Darmstadt, Germany).

Investigations on *Candida*, *Zygomycetes* and *Aspergillus* revealed *Aspergillus* to be the invading fungus (Fig. 1). The lesions were of an acute progressive type and matched earlier descriptions of mycotic pneumonia in lamb caused by *Aspergillus* sp. (Austwick *et al.* 1960; Rehbinder, 1977). The

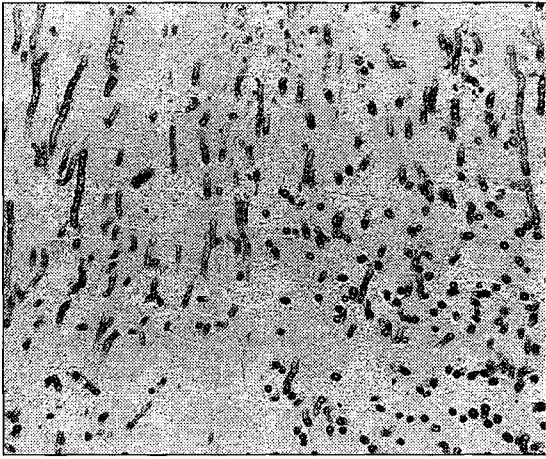


Fig. 1. *Aspergillus* hyphae in the centre of a granuloma stained by means of PAP-technique x 480.

absence of eosinophils and giant cells seems to be a general feature in this kind of infection (Rehbinder, 1977).

The absence of pathological alteration in organs other than the lungs indicates an airborne infection and aspiration of airborne fungal spores. Because of the ubiquitous nature of *Aspergillus* sp. the chances of exposure to infection are high. The animal's general state of health, age and other factors seem to determine its susceptibility (Austwick *et al.*, 1960; Rehbinder, 1977).

Supplementary fed reindeer probably have a much higher exposure to *Aspergillus* spores than is

ever likely among animals grazing under natural conditions. If, in addition, corralled animals are exposed to prolonged stress affecting the immune system (Rehbinder, 1990), the risk of contracting a fungal infection resulting in overt disease is increased.

This is apparently the first report of *aspergillosis* in reindeer. It is, nevertheless, evident that the hygienic conditions in reindeer corrals and the quality of the fodder must always be considered in order to avoid outbreaks of disease.

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### References

- Austwick, P. K. C. 1972. The pathogenicity of fungi. – *In: Microbial pathogenicity in man and animals*. Cambridge University Press. London, pp. 251–268.
- Austwick, P. K. C., Gitter, M. & Watkins, C. V. 1960. Pulmonary aspergillosis in lambs. – *Vet. Rec.* 72: 19–21.
- Rehbinder, C. 1977. Mycotic granulomatous pneumonia in a lamb (case report). – *Nord. Vet.-Med.* 29: 343–346.
- Rehbinder, C. 1990. Management stress in reindeer. – *Rangifer*, Special Issue No 3: 267–288.
- Smith, J. M. B., Aho, R., Mattsson, R. & Pier, A. C. 1992. Progress in veterinary mycology. – *J. Med. Vet. Mycol.*, 30 (suppl. 1): 307–316.

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