

# *Narthecium ossifragum*-associated photosensitization in sheep in the Faroe Islands

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## Úrtak

Ljósviðkvæmi, sum veldur álvarsligar sjúkubroytingar í skinninum á seyði, ið etur kattarklógv, *Narthecium ossifragum*, er vanligt í Føroyum. Tað er serliga ein sjúka hjá lombum, og flestu tilburðirnir eru seinna partin í juni, í juli og fyrra partin í august. Nakrir fáir tilburðir hjá eldri seyði eru seinna helvt í apríl og fyrra helvt í mai, tá ið *N. ossifragum* sprettir. Samanlagt vera umleið 20 tilburðir stadfestir um árið, og sjúkan hevur lítlan týdning fyri føroyska seyðahaldið. Sjúkan er víða um, men ger mest um seg í ávísimum økjum í Eysturoy og Streymoy.

## Abstract

Photosensitization, causing serious skin defects, in sheep grazing *Narthecium ossifragum* occurs regularly in the Faroe Islands. It is a typical disease of lambs and most cases are seen in late June, July and early August. A few cases in adult sheep occur in late April and early May, when the *N. ossifragum* is sprouting. In total about 20 cases are diagnosed every year and the problem is of minor importance for the Faroese sheep industry. The disease is wide spread but is most prevalent in certain areas on Eysturoy and on Streymoy.

## Introduction

Photosensitization in sheep is an important problem in various parts of the world. Most photosensitization diseases are associated

with ingestion of plant or fungal toxins. In The Faroe Islands photosensitization occurs regularly, but the problem seems to be of minor economical importance (Fig. 1.). In some places in the Faroes the disease is known as *ormasjúka* (literally: worm disease) or *lambið harðnar upp í skorti* (Eng: desiccation of the skin of the face of the lamb).

The disease is also well known to occur in lambs in western Norway (Flåøyen, 1993) where the disease is called *alveld* (literally: elf-fire). Several thousand cases are known to occur in Norway every year. In the northern regions of the British Isles, the same disease is called *plochteach*, *saut* or *yellowses* (Ford, 1964).

## Aetiology (cause of the disease)

The disease occurs only in sheep grazing the lily *Narthecium ossifragum* (Fæ: Kattarklógv; Fig. 2). *N. ossifragum* is a loosely to densely clonal, perennial herb, 5-30(-40) cm tall with a creeping rhizome. The plant occurs on oligotrophic, mesotrophic and eutrophic peat deposits in Scandinavia to

69° 42' N, in the British Isles, in the Netherlands, Belgium, north-west Germany, west and central France, northern Spain and east Portugal (Summerfield, 1974). In the Faroe Islands, *N. ossifragum* is very common except on the islands Stóra Dímun, Lítla Dímun, Koltur and Mykines where it has not been found (Hansen, 1966). It is a lowland plant. This became clear from the botanical mapping which the University of Copenhagen performed in 1960-61 (Hansen, 1966). *N. ossifragum* was found in 92% of 135 investigated localities below 300 m above sea level (a.s.l.), in 56% of the localities at 300-600 m a.s.l., and in none the zone above 600 m a.s.l. (Hansen, 1966). Above 300 m a.s.l. its growth is scattered and does not cover extensive areas as it does in the lowland. It occurs on shallow, peaty soils and pools. It flowers in late July and fruits in September. Large areas are coloured yellow at the flowering time.

The aetiology of the disease is not fully known (Flåøyen, 1993). Steroidal saponins from the plant have been suggested to be the actual toxins (Ender, 1955), but results from dosing experiments in lambs suggest that the saponins alone may not be responsible (Flåøyen *et al.*, 1991b).

### Epidemiology

The condition is typically a disease of lambs. About 20 lambs, out of a total population of 70,000 sheep, are reported to become photosensitized every year. Most of these cases occur in the period between 25 June and 10 August.



Fig. 1. Lamb photosensitized after ingestion of *Nartheicum ossifragum* showing typical clinical signs.

Ordinarily a few cases (<5 cases) of photosensitization in adult sheep are reported to occur in late April and early May. At that time the *N. ossifragum* is sprouting and there are few other green plants available as feed.

Cases are widely spread, but mostly reported to occur on Eysturoy between Norðskála and Eiði and on Streymoy between Hvalvík and Tjørnuvík. The disease occurs mainly in sheep grazing lowland pastures. A daily surveillance of the grazing animals is normally not performed in the Faroe Islands, and unreported cases do probably occur.



Fig. 2.  
*Narthecium ossifragum* (Faroese: Kattarklógv) plant in flower.

### Pathogenesis

The saponins from *N. ossifragum* are either hydrolysed by rumen microorganisms to sapogenins, sarsasapogenin being the most important, before absorption or they may be absorbed as saponins and hydrolysed to sapogenins probably by the liver. In the liver the sapogenins are conjugated producing insoluble salts of episarsasapogenin  $\beta$ -D-glucuronide and epismilagenin  $\beta$ -D-glucuronide which precipitate in the hepatocytes, biliary epithelium and bile as calcium salts (Flåøyen *et al.*, 1991a; Miles *et al.*, 1993). Whether or not these crystals are the sole cause of the liver damage has yet to be ascertained. It is possible that a primary liv-

er injury caused by an unknown toxin is necessary for the crystal accumulation which then aggravates the liver lesions.

The liver injury or dysfunction results in retention of phylloerythrin, a photodynamic metabolic product of chlorophyll produced by rumen microorganisms (Rimington and Quin, 1933). In areas of skin scarcely protected by wool or pigment the effect of sunlight on phylloerythrin causes oxidative necrotizing changes in the cells of the skin and adjacent tissues.

The differences in susceptibility between lambs and adult sheep may be due to differences in the metabolism of saponins by the rumen or internal tissues. Differences in glutathione transferase activities or other cytosolic or microsomal enzyme activities in the liver have been suggested as the cause of differences in susceptibility to alveld (Flåøyen and Jensen, 1991).

### Clinical findings

Clinical signs are seen only in white sheep or on the white areas in sheep that are partly pigmented. The salient clinical signs in photosensitized sheep are increasing restlessness, head shaking, scratching of the face and ears with the hind feet, and rubbing of the irritated skin against the ground. The skin changes develop rapidly, with swelling and reddening. The eyelids, muzzle and lips become swollen and turgid. However, the most obvious signs are the thickened, oedematous, heavily drooping ears. Soon there is seepage of sticky honey-coloured serum from the thickened skin which gradually becomes more and more desiccated. After 1-2 days this forms exten-

sive scabs that mat the covering hair. Signs of jaundice are sometimes seen.

### Treatment

Photosensitized sheep must be kept in the dark to avoid further development of skin lesions. General supportive treatment and administration of antibiotics are given to control secondary infection. Glucocorticoids in early stages will reduce the inflammation.

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