

A Laboratory outbreak investigation of Post-Monsoon Endemic Moist Eczematous Syndrome in cattle in Jhapa District of Nepal

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Abstract

An endemic hyperemic moist eczematous syndrome was reported in Cattle and Buffaloes in Jhapa district of Nepal during month of September after prolong spell of drought followed by heavy rainfall causing water logging total 56 cattle and buffalo were affected and out of which 12 animal died. Rest of ill animals were treated with 5% of Antidegnala liquor and Penta-sulphate. Straw and Skin samples revealed *Penicillium* sp. Fungus. After long spell of drought period followed by repeated flooding in lowland area in tropical and subtropical there is likely increase risk of fungal infestation in forage fed to cattle buffaloes seems to be risky for occurrence of Endemic Moist Eczamztous syndrome, either preventive measure for its prevention or early treatment with either with anti Degnala liquor or Use of pentasulphate seem to prevent loss from this condition.

Key words: Endemic hyperemic moist eczematous syndrome, Cattle and Buffaloes, Jhapa district, Nepal, Antidegnala liquor and Penta-sulphate, *Penicillium* sp. Fungus, postmonsoon.

Introduction

District livestock Service Jhapa reported the incidence of syndrome similar to be as described as Degnala disease. A total 56 cattle were affected out of which 12 of them died during treatment with antibiotic and other supportive medicine. On field observation in outbreak area all sick animals were having hypermic moist eczematous lesion all over the body, and on the tail, thigh, legs, udder, testicle with normal temperature and appetite. All the animals showing the symptoms were diagnosed as suffering from Endemic Moist Eczematous syndrome and were provided treatment with antidegnala liquor and penta sulphate.

Review of Literatures

Facial eczema is a disease of sheep and cattle which occurs in warmer districts of the North Island during late summer and autumn and is responsible for serious production losses in some years. It is caused by a fungus, *Pithomyces chartarum*, which proliferates on dead plant material in pasture under warm, humid conditions. The minute spores of this fungus contain a substance, sporidesmin, which produces severe toxic effects in the liver. The appearance of livers of affected animals varies, according to the severity of the damage, from slight

mottling with light patches to gross discoloration, distortion, and atrophy of large areas (Dr Marjorie). Frequently, the severely damaged portions are surrounded with new liver tissue. As a result of this damage the functions of the liver are impaired. Blockage of bile ducts may prevent the excretion of waste substances in the bile; for example, accumulation in the fat and skin of bile pigments, derived from the normal breakdown of old red corpuscles, produces the jaundice or yellow staining commonly seen in the carcasses of affected sheep. Of particular importance is the loss of ability to excrete the substance phylloerythrin. This is formed in the digestive tract of ruminants through the degradation of chlorophyll and is absorbed from the intestine and carried to the liver, where it is normally excreted in the bile. If this excretory mechanism is upset, phylloerythrin passes into the bloodstream which supplies the whole of the body (Norman Trevor). Phylloerythrin belongs to a class of fluorescent pigments which are capable of making the skin sensitive to sunlight, causing reddening, intense itching, swelling, and scab formation. It is these effects, generally showing on the face of affected animals but also on other unpigmented skin exposed to light, such as the teats and udders of cows, which give rise to the popular name "facial

eczema". These skin effects are, however, secondary to the much more serious impairment of liver function. The fungus, *Pithomyces chartarum*, grows only on dead or dying plant tissues, not on the living leaf. Hence the amount of the fungus in a pasture is related to some extent to the amount of this dead material, or litter, present. Growth of the fungus, and its production of spores, is strongly influenced by climate and environmental factors. Temperature, humidity, and the time during which the litter remains wet appear to be particularly important. This explains the typical, although not invariable, association of the disease with a period of warm, wet weather, often following a dry spell during which grass growth has ceased and litter has accumulated in the herbage. The toxic substance, sporidesmin, has been isolated from cultures of the fungus and its chemical structure determined. A single dose of one-thousandth of an ounce is sufficient to kill a lamb of about 60 lb live weight. Sporidesmin itself does not appear to accumulate in the liver, but its effects are cumulative, so that repeated small doses are as effective as a single large dose. Even with a single dose, the full sequence of changes takes some time to develop. Hence photosensitisation usually does not occur until 10 to 14 days after the animal received the toxin, and it may be even further delayed. Both the chemical nature of sporidesmin and its effects on tissues present unusual features which have not yet been fully studied. Facial eczema (FE) is a type of sunburn (sometimes called photosensitisation) affecting exposed areas of pale skin of cattle. It is caused by a poisonous substance called "sporidesmin" that causes liver damage. Sporidesmin is produced on pasture plants, including rye grass, by a fungus called *Pithomyces chartarum*. This fungus is widely distributed and occurs naturally within dead plant material at the base of standing pasture.

FE has been recorded in sheep and cattle on mainland south eastern Australia. Deg Nala disease, which causes necrosis and gangrene of the dependent parts in cattle and buffaloes (*Bubalus bubalis*) is known to exist in Indo-Pakistan, as a number of cases were recorded stemming from a monsoon rainwater stream in the area of Murdike (Sheikhpura District), near Nala Deg in Pakistan (Shirlaw 1939). A widespread occurrence of the disease has been reported from rice growing areas of Indo-Pakistan (Irfan, 1971; Kalra et al., 1972; Irfan and Maqbool, 1986) which caused considerable

economic losses. Signs of disease may be seen in stock between several days and several weeks following pick-up of sporidesmin from the pasture. The toxin is absorbed from the intestine and reaches the liver, where it causes severe damage to bile ducts and liver cells. All the outward signs of FE result from the liver damage caused by sporidesmin.

The signs of FE range from mild photosensitization (sunburn) to severe jaundice and death, depending on the amount of sporidesmin consumed. Sunburn is the most consistent sign, and usually affects the exposed areas of the skin of the face, ears, teats, and vulva, and areas of skin lacking dark pigmentation, ie. areas covered by white hair. The skin over these areas becomes reddened, and then goes crusty and dark. It eventually peels off leaving large raw areas, which are susceptible to infections. The sunburn is often accompanied by watery swelling of the underlying tissues. Jaundice (yellowing of mucous membranes) is often seen at this stage. Affected animals lose weight rapidly. Most animals recover from the acute phase, but tend to be unthrifty, often taking many months to regain condition. Some never recover, and either die or are culled. In dairy cattle, the udder and teats are often severely affected, and milk production drops sharply. Loss of weight and general illness are often severe, and death, although uncommon, can occur up to months after the initial liver damage occurs. Clinical Symptoms observed are initial dullness, lethargy and anorexia, Variable onset of jaundice and photosensitization. Some animals may die without either being observed, photosensitization: sheep - non wool skin including muzzle, ears, face, escutcheon cattle - non black pigmented areas including teats, deer - generalized, some animals develop chronic ill-thrift, some progress to a hepatic encephalopathy dullness, depression tremor, recumbency (Norman Trevor). Animal factors. sheep, cattle, deer susceptible, horses resistant, evidence for genetic resistance in sheep <http://www.angis.org.au/bin/Databases/BIRX/birx_doc?omia+848> Plant/environmental factors, fungus grows on the dead leaf litter of pasture, most frequent pasture is perennial rye grass, but can occur on other species, requires warmth and humidity to promote rapid fungal growth and sporulation, typical weather conditions involve autumn break rains after dry summer, several days of consistent warmth ($T^{\circ}C > 15.5^{\circ}C$) and high humidity (>80%), fungus

concentrates toxin in spores which may be distributed throughout whole pasture sward most toxic part of pasture is base of sward (<http://vein.library.usyd.edu.au/links/pact/facialeczema.html>).

Occurrence

Outbreaks typically occur when weather conditions suitable for rapid fungus growth and spore production are combined with abundant dead, recently killed plant material, which favours fungal growth. The fungus requires warm, humid weather and light rain (or irrigation) for growth. This is most likely to be a problem in autumn when the summer has been hot and dry, the pasture well eaten back, and rains fall when the ground is still warm. In such conditions both pasture and grass grow rapidly. The fungus producing sporidesmin is normally not visible to the naked eye. It multiplies by producing millions of spores which are coated with the toxin sporidesmin. Freshly produced spores are the most toxic; if fungal growth stops after a change in the weather, the residual spores on the pasture lose their toxicity within one or two weeks. The fungus will grow on most pasture plants, but it grows best on perennial ryegrass. It grows in the dead pasture litter at the base of the plants. When the fungus reaches toxic levels, animals grazing short pasture at high stocking rates are at greatest risk (<http://vein.library.usyd.edu.au/links/pact/facialeczema.html>).

Objective of Investigation

- (A) Ascertain the exact cause of the Syndrome.
- (B) Evaluation of Mycobiota of rice straw fed to cattle in the area.
- (C) Evaluation of Hematological parameters of clinical and post-treated animal.
- (D) Evaluation of the treatment with Antidegnala liquor/penta sulphate for systemic mycoses.

Clinical Pathology

Dry skin with moist lesion in thigh region of cattle. Generalized hyperemic moist eczema. Hyperemic moist eczematous lesion on face and neck.

Hematological findings of samples from clinical case pre-treatment:

Animal	RBC	WBC	PCV%	HB
OX	4x10mm	7.2x10mm ³	23	7.6
C.calf	4.6x10mm	8.2x10mm ³	28	9.3
C.calf	4x10mm	7.8x10mm ³	24	8
C.calf	4.5x10mm	8.2x10mm ³	27	9
Normal	5x10mm	4-12x10mm ³	28-42	8.5-13.5

Hematological findings of samples from clinical case post treatment:

Animal	RBC	WBC	PCV%	HB
Ox	7.2x10mm	4.6x10mm ³	28	9.3
Ox	8.5x10mm	5x10mm ³	30	10
Calf	9x10mm	5.5x10mm ³	33	11
Calf	8.6x10mm	5x10mm ³	30	10
Ox	7.9x10mm	4.8x10mm ³	29	9.6
B.bull	9.5x10mm	6x10mm ³	36	12
Normal	5x10mm	4-12x10mm ³	28-42	8.5-13.5

Mycobiota of Straw and fodder forage: Revealed the growth of fungus *Penicillium* spp in mycological medium on laboratory culture.

Treatment provided

Use of 5% of Anti-Degnala liquor 5-19ml s/c or i/m alternate day 4 times a week has been found to be successful. Alternately orally Penta-sulphate was given.

Result and Discussion

All animal which were treated with above preparation the eczematous lesion were disappeared within week and animal returned to normal health. Low land marshy landscape of area, moist hot humid tropical climatic condition traditional husbandry practice of feeding rice straw seems to be the source of opportunistic fungal invasion which was evident from the fungal growth in laboratory mycomedia. The increase of total WBC count and decrease in PCV, Hb in blood of clinically ill animal and treatment response indicates that in any incriminated change in weather condition new disease condition is likely too occur in livestock need to be assessed.

Conclusion

The disease is strongly associated with the feeding of rice straw containing multiple dark specks. This observation is concurs with the findings of earlier researchers (Irfan and Maqbool 1986) who reported that fungal infested straw and fungal mats of various species in different combinations, when mixed with fresh non-infested rice straw, produced the disease. Saprophytic fungi infesting rice straw produce mycotoxin possessing vasoconstriction, which produces the lesions of the disease (Irfan et al., 1984). The greater severity of the disease in buffaloes as compared to that in cows may partly be due to the high susceptibility of this species. Therapeutic trials with an antidote (a penta-sulphate mixture) given orally, and a vasodilator (nitroglycerin ointment) applied locally on the lesions effected the highest percentage (90%) cure rate. This cure rate

was in a broad agreement with the findings of Schontal (1980) who reported a cure rate of 80% with a penta-sulphate mixture. Same way in this observation it was observed the entire animal which was treated with injection of anti Degnala liquor followed by penta sulphate recovered completely. Same way there was marked increase in total WBC count ,and decrease in PCV and Hb during clinical phase of syndrome on treatment there was marked increase of both PCV and Hb and increase in RBC count and normal WBC count also support that this syndrome was attributed by infestation of fungus on rice straw which was fed to these animals. If proper management of dry forage during rainy season carried out it can minimize the loss due to endemic moist eczematous syndrome. Further more if timely treatment of animal is if initiated with use of anti Degnala liquor or with penta sulphate will minimize the losses need to be looked into.

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Avian Influenza - Vietnam

Bird flu has occurred in Tra Vinh province, announced the Veterinary Department. The department said that ducks died in Phuong Thach commune, Cang Long district, Tra Vinh province, from 24 Jun 2008 . By 4 Jul 2008 , around 1000 unvaccinated ducks had died. Their samples were tested positive to H5N1 virus.

The local veterinary service culled the ducks so far. Contrary to the previous statement of 12 Mar 2008 on the epizootic being resolved, according to follow-up report 19, "The event is continuing. Weekly follow-up reports will be submitted."

<http://www.oie.int/wahid-prod/public.php>