

**PATHOLOGICAL STUDIES IN DOMESTIC
RUMINANTS
EXPERIMENTALLY INTOXICATED WITH
CRUDE
EXTRACT OF *CAPPARIS TOMENTOSA*
LEAVES**

A.M. Shommein, O.F Idris & Y.M. Salih

The plant *Capparis tomentosa* which is a member of the family Capparidaceae is widespread in the Blue Nile Province of the Democratic Republic of the Sudan.

The plant is eaten by camels and goats and by other ruminants when there is drought or insufficient pastures. In the recent years a lot of heresay reports and complaints from stock owners were recieved concerning the toxic effects of the plant. Many animals said to have died and many others suffered various degrees of paralysis and other nervous manifestations after feeding on *Capparis tomentosa* leaves. Series of experiments were designed in the Biochemistry department at Soba Labortories to investigate the biochemical changes in the intoxicated animals and to determine the toxic ingredients of the plant.

The present work was carried with an endeavour to study the gross anatomy and histopathological changes in experimentilly intoxicated domestic ruminats

Materials and Methods

During investigations on the biochemical effects of *Capparis tomentosa* in domestic ruminants experimentally intoxicated, the gross anatomy and histopathology of 4 calves, 8 sheep 9 goats and 3 camels were studied. Pieces of livers, Kidney, spleen, intestine, abomasi, lungs, hearts and brains were collected and fixed in 10% neutral formalin. Paraffin sections were prepared and stained with haematoxylin and eosin. Fresh livers were sectioned using a cryostat and stained with Sudan III.

Results

Macroscopically the carcasses of all the species examined revealed similar changes. Froth came out of the mouths and the tongues, in majority of cases, were protruded 4-6 inches from the lips. The eyes were sunken and the mucous membrans were pale. Hydrothorax, hydropericardium and ascitis were predominant findings in all species. The hind limbs in camels were stiffened and abducted towards the

abdomin. The trechea and the bronchi were filled with froth and the mucous membranes showed haemorrhagic patches. The lungs were congested, oedematous and some places showed diffuse blood infiltration resembling aspiration pneumonia. The hearts were flaby and hydropericardium was evident in all species but more pronounced in goats. There were petechial haemorrhages in the endocardium. The abomasi showed impaction and the ingesta was coated with mucous secretion. The entire intestines were haemorrhagic and faeces contain mucous. The gall bladders in calves, sheep and goats were distended with bile. The livers were dark in colour and enlarged. The kidneys were congested and petechial haemorrhages were seen on the renal cortical surfaces when the capsules were removed. The brains were severely congested and fluid was formed in the ventricles of the brain suggesting of internal hydrocephalus.

Histologically the livers showed evidence of focal necrosis with infiltration of lymphoid cells in the hepatic lobules and sometimes in the interlobular septa (Fig 1). Some livers showed fatty changes. The capillary walls were swollen with their lumena filled with erythrocytes. The stomach and intestines were characterised by the degeneration of the glandular epithelium and infiltration of lymphoid cells in the serous and muscular layers. The blood vessels of the liver intestines and abomasi were generally congested and their endothelia swollen (Fig 2). The kidneys showed epithelial necrosis and desquamation of renal tubules. The interstitial tissues were infiltrated with oedema, leucocytes and erythrocytes (Fig 3). The lungs showed pulmonary oedema with lymphocytic infiltration and capillary congestion (Fig 4). The myocardium underwent degeneration with lymphocytic infiltration between the cardiac muscle fibers (Fig 5). The brain, revealed oedema, liquifactive necrosis and congestion of blood capillaries. In some cases erythrocytes were found extravasted in the brain tissues.

Discussion

Reviewing the literature about toxicity with *capparis tomentosa* we could not find any study of the pathology of the toxic plants. However, Ferreira 1952 cited by Watt 1962 reported that the plant is toxically fatal to camels and horned domestic stock with the exception of the goat. Idris et al 1979 proved that the plant is toxic to all domestic ruminants and perhaps the camels and goats are the most affected.

Cortesi 1936 found in Abyssinia that the camels eat the fruit willingly without showing any ill effects. Hopkins in 1950 reported sickness and death among Africans in Southern Rhodesia from drinking an infusion of the root. From this study it seems that the main effects of the plant toxins are on the circulatory system causing dilatation of the capillaries, increasing their permeability and producing extravasation.

Injuries to the capillary walls caused leakage of plasma protein into the tissues spaces, thus increasing the hydrostatic and osmotic pressures there which in turn caused retention of fluid thereby inducing oedema. Histopathologically the plant toxin is shown to cause regressive disturbances of the cell metabolism, principally in the liver, kidneys and the heart. The livers showed focal necrosis, the kidneys showed tubular nephrosis and the heart myocardial degeneration. The brain was severely congested.

Summary

The gross anatomy and histopathological changes in ruminants experimentally intoxicated with crude extract of *Capparis tomentosa* leaves were described. The main effects of the toxin were in the vascular system which resulted in hydrothorax hydropericardium and ascitis. Focal necrosis of the livers, renal tubular nephrosis and brain congestion were common findings.

Acknowledgement

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Fig. 1: Liver showing focal necrosis and infiltration of lymphoid cells.





Fig. 2: Liver blood vessels showing congestion and swelling of endothelia.

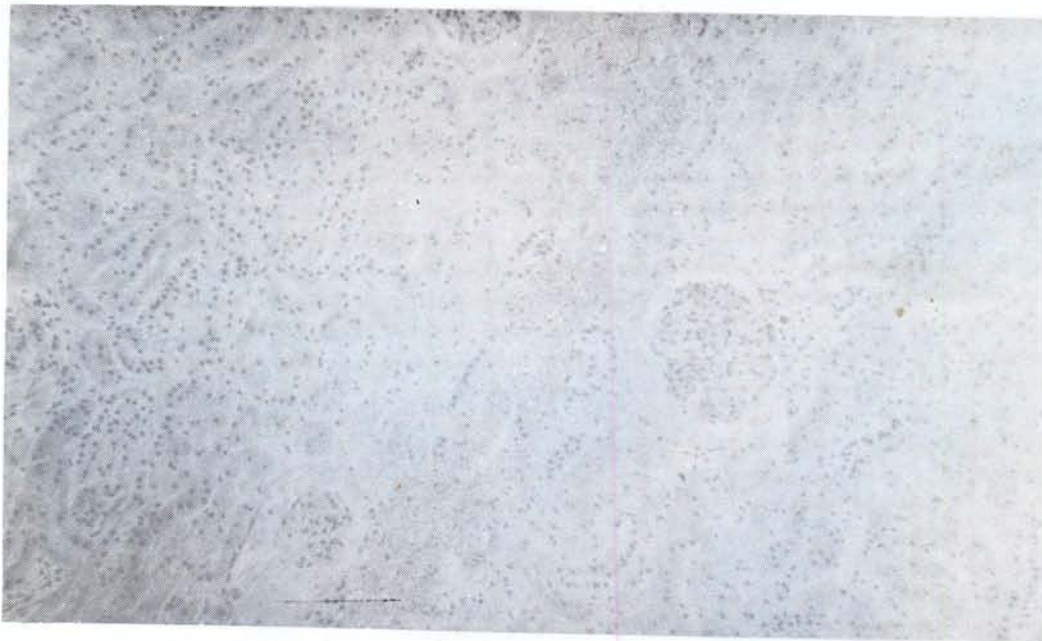


Fig. 3: Kidney showing tubular necrosis and desquamation of renal tubules.

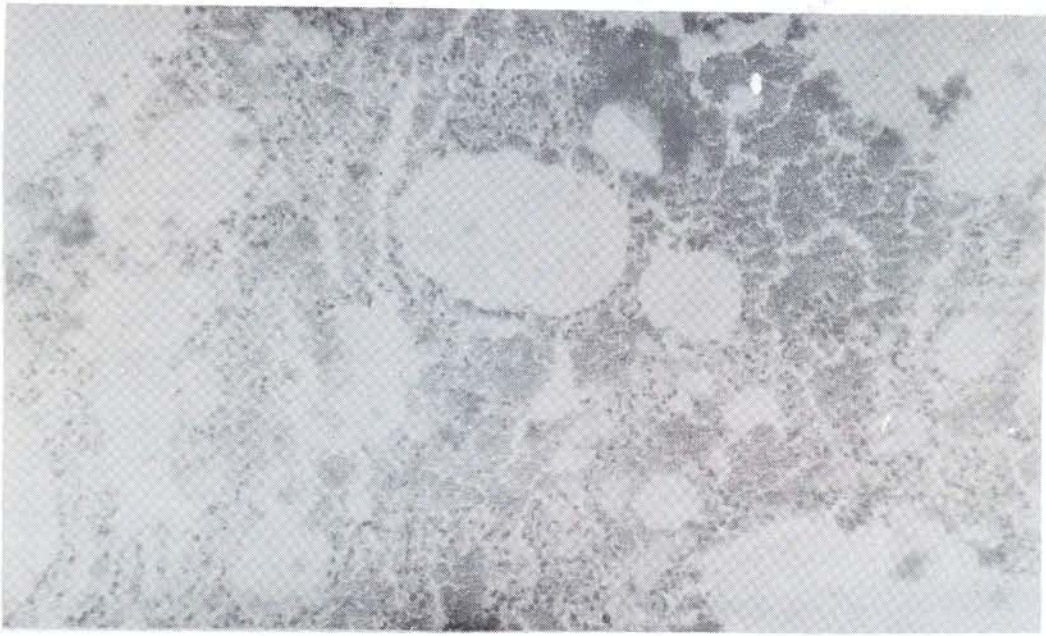


Fig. 4: Lung section showing oedema and lymphocytic infiltration.

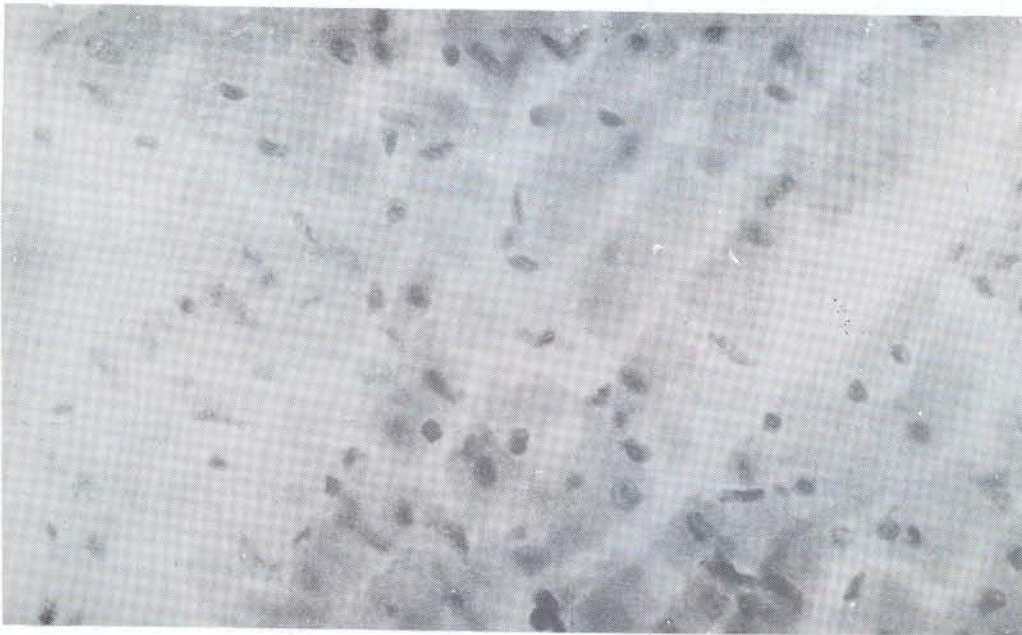


Fig. 5: Cardiac muscle showing degeneration with lymphocytic infiltration.