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Poisoning by *Stryphnodendron sp.* in a bovine - Case report

Intoxicação por Stryphnodendron sp. em um bovino – Relato de caso

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ABSTRACT: Poisonous plants are notorious for causing serious problems and economic losses, directly affecting the livestock sector. The plants of the genus *Stryphnodendron* mainly affect the digestive, integumentary and reproductive systems. The objective of this work was to report the case of a bovine that was poisoned by *Stryphnodendro sp.* The owner reported the occurrence of apathy, hyporexia, sialorrhoea and diarrhoea, observed a day previously and that this was the only animal to show these clinical signs. The animal died a few hours after being attended. The necropsy revealed the presence of seeds of both genera in the digestive tract, multiple ulcers in the abomasum and renal and hepatic alterations that were also evidenced in the blood tests.

KEYWORDS: poisoning; Piauí; poisonous plants; ruminant.

RESUMO: As plantas tóxicas são conhecidas por causarem problemas graves e perdas econômicas, afetando de forma direta o setor pecuário. Plantas do gênero *Stryphnodendron*, afetam principalmente o sistema digestório, tegumentar e reprodutivo. Objetivou-se relatar o caso de um bovino, que se intoxicou com *Stryphnodendro* sp.. O proprietário relata a ocorrência de apatia, hiporexia, sialorreia e diarreia, observada há um dia e que esse foi o único animal a apresentar esses sinais clínicos. O animal veio a óbito poucas horas após o atendimento. Na necropsia destaca-se a presença de sementes dos dois gêneros no trato digestório, múltiplas úlceras no abomaso e alterações renais e hepáticas evidenciadas também nos exames de sangue.

PALAVRAS-CHAVE: envenenamento; Piauí; plantas tóxicas; ruminante.

INTRODUCTION

In Brazil, it is estimated that the annual losses caused by plant deaths are of approximately 1.3 million of cattle, 422,000 sheep and 58,000 goats. The number of poisonous plants known and reported in Brazil has been increasing year by year, showing a very substantial evolution. Over the last 40 years, recognised poisonous plants have gone from 90 known species and 52 genera in 1980 to 162 species and 96 genera in 2022 (Riet-Correa; Machado; Micheloud, 2023).

Toxic or poisonous plants are known to cause severe economic losses, directly affecting the livestock farming sector with animal losses resulting from death, reproductive losses, reduced production, subclinical diseases, reduced immunity, replacement of the dead animals, reduction in the value of the farms and costs of diagnosis, treatment and control measures (Bezerra; Silva, 2019; Riet-Correa; Machado; Micheloud, 2023).

According to Melo *et al.* (2021), the lack of knowledge about these plants on the part of farmers and professionals involved in livestock farming is one of the main causes for the occurrence of poisoning by plants in production animals. In extensive livestock farming, mainly because this system is the most frequently used on farms, the poisonous plants present in pastures pose an obstacle to the development of livestock farming (Sousa *et al.*, 2019).

In a study conducted in the Alto Gurguéia micro-region of Piauí, only 55% of producers characterised "Barbatimão" as a poisonous plant. Despite the vast number of studies carried out on the subject and the extensive literature on poisonous plants in the country, there is still a scarcity of information when it comes to the frequency of poisonings caused by plants in some regions of the country. Allied to the lack of technical knowledge on the subject and the absence of technical assistance (Sousa *et al.*, 2019).

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In a prospective study carried out in Pernambuco, a survey was conducted on the occurrence of the main poisonous plants and the occurrence of plant poisoning in ruminants, the *Stryphnodendrm coriaceum* was mentioned by 17.89 per cent of the farmers, but its toxicity was unknown and there were no accounts of poisoning (Melo *et al.*, 2021).

Prospective studies to discover or clarify the cause of poisoning remain valid and are an important tool in diagnosis of animal diseases. Studies to identify poisonous plants bring together farmers, field veterinarians, animal health authorities and scientists and also lead to the diagnosis of common livestock diseases as well as new ones (Melo *et al.*, 2021). Scientific dissemination on farms is essential to alert the producers about the poisonous plant species that can be found (Bezerra; Silva, 2019). With further research, reports, study and knowledge of epidemiology, clinical signs and pathology, it is expected that producers will become better informed and it is predicted that the number of poisonous species will continue to increase (Riet-Correa; Machado; Micheloud, 2023).

Popularly known as "barbatimão", *Stryphnodendron sp.* is a tree that can grow up to 20 metres tall, can produce brownish, twisted broad beans, popularly known as "rosquinhas", and its flowering occurs during the dry season (Sousa *et al.*, 2019; Santos *et al.*, 2020).

The plants of the genus *Stryphnodendron* are known to affect ruminants in the Central-West and Northeast regions of Brazil, mainly affecting the digestive, integumentary and reproductive systems. These plants are often found in pastures. The poisonings mainly occur from May to September, when the plants are fruiting and the fruits are more easily found on the ground, which coincides with the beginning of the dry season, when the availability of forage is lowest (Melo *et al.*, 2021; Riet-Correa; Machado; Micheloud, 2023).

The clinical signs and necropsy findings, both in spontaneous and experimental cases, are mainly found in the digestive system and the skin. Clinical signs such as apathy, dehydration, sialorrhoea, anorexia, rumen hypotonia, diarrhoea, rumen acidosis and photosensitisation are commonly found. As for the pathological findings, they include poor body condition, jaundice, the presence of ulcers, mostly in the abomasum, presence of plant parts in the digestive tract, liver with lobular pattern showing rounded edges and yellowish to orange appearance, distended gallbladder with dense walls (Braga *et al.*, 2018; Lazaro *et al.*, 2018; Santos *et al.*, 2020; Guizelini *et al.*,2021).

The diagnosis is made based on clinical signs, necropsy findings, histopathological lesions and epidemiological analysis. It must be differentiated mainly from other poisonous plants that cause similar symptoms and from other causes of photosensitisation (Lazaro *et al.*, 2018; Guizelini *et al.*, 2021).

As prevention and control measures, it is important to carry out the identification the plant in the pastures, pasture management during the fruiting season, with the removal of animals from the areas where these plants are present, mechanical control and eradication of some invasive plant species. These can be effective alternatives to reduce the occurrence of outbreaks and deaths (Santos *et al.,* 2020).

The aim of this study was to report the case of a bovine poisoned by *Stryphnodendron sp.* as well as to describe the clinical and pathological findings observed.

CASE REPORT

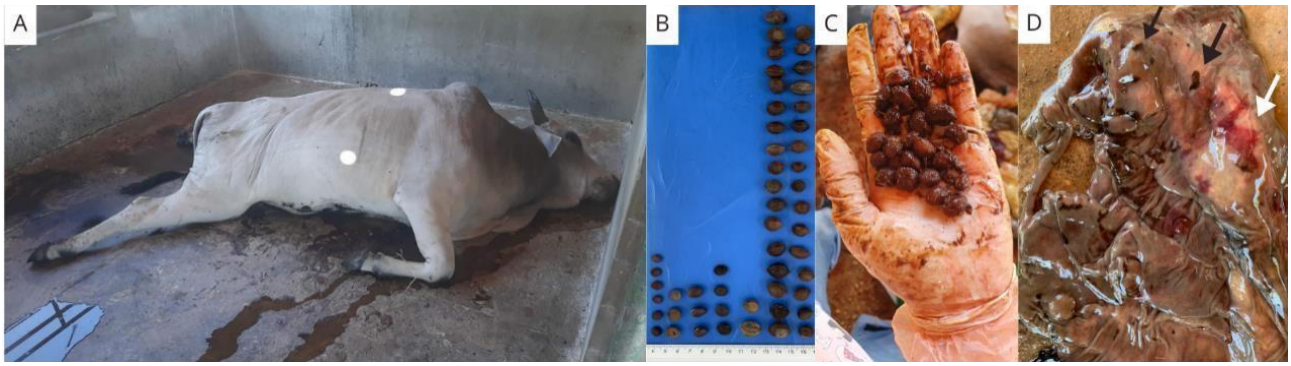
A 4-year-old male Nelore bovine with a body weight of approximately 400kg, from the municipality of Dermeval Lobão - PI, was attended at the Large Animal Clinic (CGA) of the University Veterinary Hospital of the Federal University of Piauí. During the anamnesis, the person responsible reported apathy, hyporexia, sialorrhoea and diarrhoea, which had been observed the day before. The animal was raised on native pasture, separated from the other animals and the females, and was given a complement of Elephant Grass (*Pennisetum purpureum*). He also informed that this was the only animal to present such clinical signs and that there had never been a similar case on the property.

On clinical examination, the animal was observed in standing position, apathetic, with a body score of 3.5, normothermic (RT: 38.6°C), hypocoloured mucous membranes, mild dehydration (5%), eupnoeic (RR: 28 rpm), normocardic (HR: 88 bpm), hyporexia, absent rumination, ruminal hypotonia, tenderness upon abdominal palpation, increased intestinal peristalsis and the presence of dark-coloured diarrhoeal feces, with blood.

Laboratory tests (haemogram and biochemistry) were requested, which revealed the presence of absolute neutropenia. In addition to elevated values for urea (1001.9 mg/dL, reference: 20-30 mg/dL), creatinine (33.7 mg/dL, reference: 1.0-2.0 mg/dL) and AST/TGO (220 U/L, reference: 78-132 U/L) and GGT (2.6 IU/L, reference: 6.1-17.4 U/L) and total proteins (6.1 g/dL, reference: 6.74-7.46 g/L) below the reference values (Kaneco; Harvey; Bruss, 2008). The ruminal fluid was examined using an orogastric tube and showed a pH between 7.0 and 7.5, a fetid odour and a dark brown colour. The ruminal lavage was then performed. The antibiotic Oxytetracycline (20mg/kg, IM, every 48 hours) and the analgesic/anti-inflammatory Flunixin meglumine (2.2 mg/kg, IM, SID) were administered. The animal died a few hours after being admitted.

During the necropsy examination were observed moderately cyanotic to reddened eye and oral mucous membranes, a large amount of blackened faeces in the perianal area and a strong ammoniacal odour. The pericardial sac was filled with translucent reddish fluid and hydropericardium. Upon the opening of the rumen, seeds with the morphology of *Stryphnodendron sp.* ("barbatimão") were observed. The abomasal content was red and the mucosa had multiple multifocal to coalescing ulcers, ranging from millimetres to 4 cm in diameter (Figure 1).

The small intestine presented multiple haemorrhagic areas in the submucosa and the opening of the caecum revealed a



Source: Personal archive, 2023.

Figure 1. A - Deceased animal. B - Quantity of seeds found after necropsy. C - Seeds found in the rumen. D - Necropsy findings: abomasal mucosa with multiple ulcers (black arrows) and haemorrhagic spots (white arrow).

large clot that filled the entire lumen, the intestinal walls were oedematous and the mucosa was discreetly necrotic. The rectum contained loose, blackish faeces. The liver was pale and orange and, on cutting, multiple pale areas with a soft consistency were observed. The gallbladder was intensely distended with viscous bile content. The kidneys were intensely pale. On opening of the urinary vesicle, moderate haematuria was observed. On opening of the urinary vesicle, moderate haematuria was observed. The encephalon was hyperemic with multifocal haemorrhages.

DISCUSSIONS

The diagnosis of plant poisoning was based on the clinical and anatomopathological findings and, above all, on the presence of seeds with the morphological characteristics of *Stryphnodendron sp*. in the digestive tract of the animal. Clinical and pathological findings similar to the present study have already been described in spontaneous and experimental outbreaks and in other species caused by plants of the genus *Stryphnodendron sp*.

A report of three spontaneous outbreaks caused by *Stryphnodendron fissuratum* in cattle and an experiment carried out in sheep were described by Guizelini *et al.* (2021) in the Brazilian Central-West. In these outbreaks, animals from Nelore breeding farms showed increased serum AST and creatinine values, and the necropsy findings were ulcers in the digestive tract in all the animals, mainly in the abomasum, liver with colour alteration and pale kidneys, as well as the presence of seeds morphologically compatible with *Stryphnodendron fissuratum*. On the other hand, in the experiment, the animals showed hyporexia, rumen hypotonia, diarrhoea, progressing to severe apathy, anorexia and sialorrhoea. At necropsy, ulcers were found in the digestive tract and the liver was orange.

In an outbreak caused by *Stryphnodendrm rotundifolium*, the farm where the outbreak occurred is used for extensive cattle breeding, However, poisoning has never been.

never previously been observed at the location. In this case, the abomasum was found to be congested, eroded and ulcerated; the liver was orange in colour; the gallbladder was distended with thick walls; and parts of the plant were found in the digestive tract (Santos *et al.*, 2020).

Lazaro *et al.* (2018) reported spontaneous poisoning by *Stryphnodendron fissuratum*, in a batch of 160 animals, 52 of them became sick, both cows and calves. Of these animals, 16 died and in three of the bovines that were necropsied, the findings were similar. These consisted of diffusely pale kidneys, the presence of the seeds of the plant found in the rumen and multifocal ulcers in the abomasum.

In two experiments conducted, the animals showed signs similar to those found in this report. In the first, reported by Lazaro *et al.* (2018), in an experimental poisoning by *Stryphnodendron fissuratum* in cattle, the animals became ill and one died. The similar clinical signs presented were apathy, diarrhoea, inappetence, dehydration, salivation and ruminal hypotonia.The necropsy showed pale kidneys and hydropericardium. Elevations in serum urea, creatinine and serum levels of urea, creatinine and AST were also observed; GGT levels differed from the findings in the present report.

As for the second experiment carried out by Braga *et al.* (2018), the *Stryphnodendron obovatum* plant was used, where the animals were divided into three groups consuming different doses of the plant. The group that consumed doses higher than 45 g/kg of the plant in a single dose died in less than 24 hours. They presented rumen hypomotility, apathy and diarrhoea. At necropsy, alterations were observed in the abomasal mucosa. The group that consumed a dose of 5 g/kg for 10 days presented anorexia, hypersalivation and diarrhoea, similar to the findings of the present study.

Lazaro *et al.* (2018) reported that hepatogenic photosensitisation is a late manifestation of poisoning by *Stryphnodendron fissuratum*. It is only observed in animals that recover from the acute phase.

CONCLUSIONS

It was concluded that the clinical signs and necropsy findings caused by the poisoning were determinant for the diagnosis. *Stryphnodendrom sp*. are plants that can cause economic damage to the livestock farming. Due to the lack of knowledge on the part of producers, it is extremely important to disseminate knowledge about the toxic potential of these plants.

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