



Short communication

Poisoning by *Indigofera lespedezioides* in horses

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ABSTRACT

Poisoning by *Indigofera lespedezioides* is reported in horses in the state of Roraima, northern Brazil. The main clinical signs are anorexia, sleepiness, unsteady gait, severe ataxia, weakness, stumbling, and progressive weight loss. To induce the disease experimentally, a 7-year-old horse was introduced in a small paddock invaded by the plant. The first nervous signs were observed 44 days from the start of grazing. The animal was euthanized on day 59. No significant gross lesions were observed upon necropsies of the experimental horse as well as one spontaneously affected horse. Upon histologic examination neuronal lipofuscinosis was observed in the brain, cerebellum, and spinal cord. Wallerian-type degeneration was observed on some mesencephalic tracts. Neuronal and axonal degeneration and lipofuscinosis were observed on electron microscopy examination. Indospicine was detected in four samples of *I. lespedezioides* with concentrations ranging from 63 to 1178 µg/g whereas nitro toxins could be detected in only one of the samples at a concentration of 2.5 mg/g. In conclusion, poisoning by *I. lespedezioides* is very similar to those poisonings by *Indigofera linnaei* and *Indigofera hendecaphylla*. Based on the preponderance of indospicine and lack of nitro toxins in the samples it is proposed that indospicine is the toxic compound responsible for the poisoning.

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The *Indigofera* genus from the Fabaceae family contains approximately 700 different species (Aylward et al., 1987). *Indigofera linnaei* (= *Indigofera dominii*, *Indigofera enneaphylla*) in Australia (Bell and Hall, 1952; Hooper et al., 1971; Carroll and Swain, 1983) and *Indigofera spicata* in Florida (Morton, 1989) have been reported as a cause of nervous signs in horses. In Florida, *I. spicata* is now regarded as an incorrect identification of the plant, which is now recognized as *Indigofera hendecaphylla* (Wilson and Rowe, 2008). *I. hendecaphylla* contains indospicine (Hegarty and Pound, 1968, 1970). There are no references on the indospicine

content in *I. linnaei*, but Hooper et al. (1971) cite a personal communication from Hegarty and Bolton that they detected indospicine in this plant, Hegarty et al. (1988) showed that horses fed *I. linnaei* accumulated indospicine in their muscle. It has not been fully demonstrated that indospicine is responsible for the clinical signs in horses; it is suspected that a nitro toxin maybe the cause of the disease (Majak et al., 1992). Indospicine is a liver toxin for dogs and has caused secondary poisoning in dogs ingesting meat from horses (Hegarty et al., 1988; Kelly et al., 1992) and camels (FitzGerald et al., 2011) poisoned by *I. linnaei*.

Indigofera lespedezioides has been associated with a neurologic disease in horses in Roraima (Braga, 1998). The plant is also found in wet-lands in Mato Grosso where it is

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suspected of being toxic for cattle (Pott and Pott, 1994) and fish (Braga, 1998).

The objective of this paper is to report the poisoning by *I. lespedezioides* (= *Indigofera pascuori*) (Fig. 1A and B) in horses in the state of Roraima, northern Brazil, and report on the analyses of indospicine and nitro toxins in the plant.

Data on the occurrence of the disease were collected during February 2010 during visits to farms in the affected region and in interviews with veterinary practitioners and farmers in the city of Boa Vista. The disease occurs in the northern region of the state of Roraima in at least five counties (Amajari, Alto Alegre, Normandia, Cantá, and Bom Fim) and has been recognized by the farmers for more than 20 years. The plant is mostly found in the native vegetation (savanna) known as *lavrado*, mainly in the borders of the forest. The amount of *I. lespedezioides* was significantly reduced after pastures were planted primarily with *Brachiaria* spp. and the disease has ceased to occur in those pastures. In this region of the state of Roraima the climate is tropical with yearly rainfalls of 1100 to 1400 mm. The rainy season with monthly rainfalls of 150–300 mm is from April/May to August/September. During the dry season, monthly rainfalls are of approximately 50 mm (Barbosa, 1997). Most cases of poisoning occur at the end of the dry season when *I. lespedezioides* is nearly the only green vegetation available. Typically, up to 10% of the horses can be affected, but in one case a farmer reported 100%

mortality in a herd of 30 horses. Cattle and sheep fed the plant were not affected.

The main clinical signs are anorexia, sleepiness, unsteady gait, severe ataxia (Fig. 1C and D), weakness, stumbling, and progressive weight loss. Gait alterations are more marked in the hind limbs with the hind hooves dragging and causing excessive wear of the toes. Eye discharge and blindness are also observed. Some farmers have reported corneal opacity in affected horses. Horses of all ages are affected. If the animals are disturbed or forced to move, nervous signs increase and the animals can fall. Abortion is commonly observed in mares. Death occurs 2–4 months after the observation of first clinical signs. If the plant consumption is interrupted, some animals may recover.

To induce the disease experimentally, a 7-year-old horse of the *Lavradeiro* breed was introduced into a small paddock invaded by the plant. First clinical signs were observed 44 days from the start of grazing. The animal was euthanized on day 59. Clinical signs were weight loss, general weakness, ataxia, hind limb dragging, and sleepiness.

One spontaneously affected 10-years-old horse and the experimental animal were necropsied. No significant gross lesions were observed. Fragments of liver, kidney, spleen, heart, mesenteric lymph nodes, lung, thyroid, and large and small intestine and the whole brain and spinal cord were collected and fixed in 10% buffered formalin. After fixation, 1 cm thick serial sections were made from the brain and

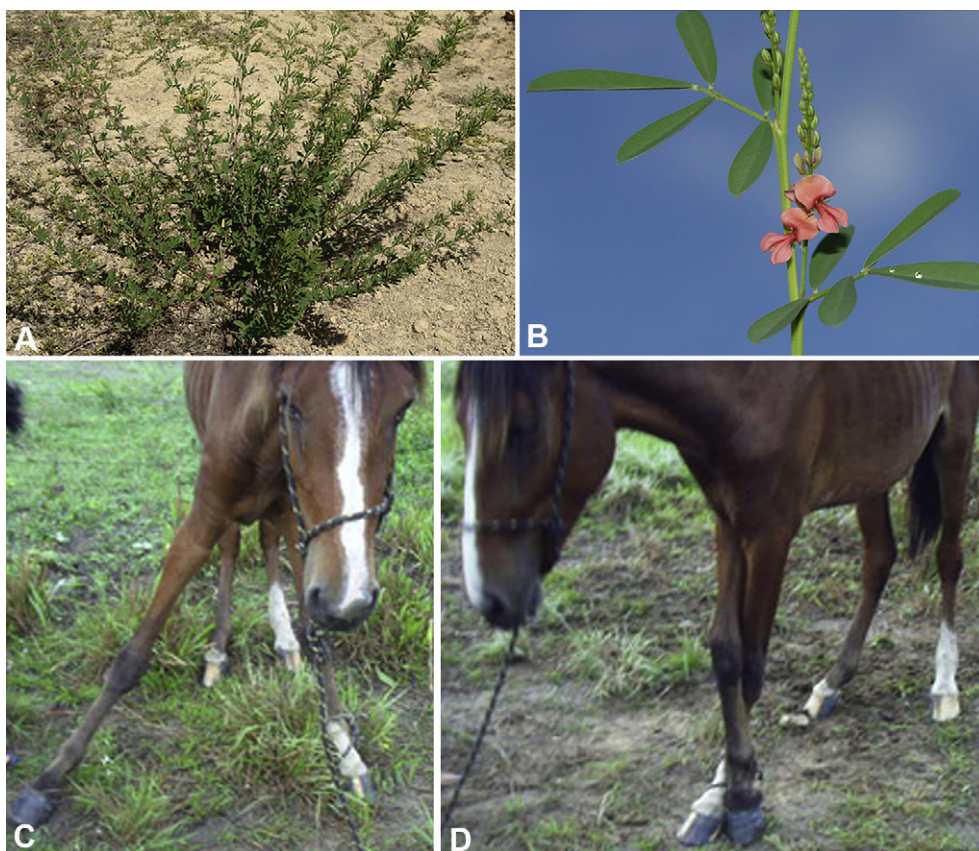


Fig. 1. A and B) *Indigofera lespedezioides*. C and D) Horse spontaneously poisoned by *I. lespedezioides* showing severe ataxia.

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