



Animal Susceptibility, Toxicity and Comparative Pathology of Locoweed Poisoning in Livestock and Wildlife

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Locoweeds (*Astragalus* and *Oxytropis* spp.) contain swainsonine that inhibits key cellular enzymes resulting in a specific neurologic disease called locoism. To become poisoned animals must eat locoweed for several weeks. Some animals become accustomed to eating locoweed and long exposures produce more severe disease with little chance of recovery. All animals are susceptible to locoweed poisoning; however, there is variation in susceptibility, clinical signs and lesions. Horses are uniquely sensitive and develop clinical signs and neurologic lesions at relatively low doses of short duration. In comparison rodents and mule deer develop similar neurologic lesions as horses, but only at much higher doses and longer durations. Though less susceptible than horses, cattle and sheep are also easily poisoned. Most poisoned livestock species develop dull hair coat, neurologic disease, decreased libido, infertility, abortion, cardiovascular disease and death. Poisoned rodents and mule deer become emaciated with only subtle neurologic signs. As swainsonine inhibited enzymes are critical in cellular metabolism, affected cells become swollen and bloated with incompletely metabolized oligosaccharides and glycoproteins. This is seen microscopically as vacuolation of neurons and other cells. Poisoning also affects tissues and organs in a species specific manner. For example, poisoned livestock develop vacuolated neurons and neurologic disease while poisoned deer have extensive pancreatic and intestinal lesions with little neurologic change. Recent isolation of mannosidases with different swainsonine binding affinities suggests that differences in severity, distribution and progression of locoweed induced lesions are probably due to tissue and species specific mannosidase expression.

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