

NORTH WEST DEPARTMENT OF AGRICULTURE
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AGRICULTURAL SUPPORT SERVICES

Poisonous plants and livestock
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Introduction

- Poisonous plants are among the important causes of economic loss to the livestock industry and must be considered when evaluating illness and decreased productivity in livestock.
- The presentation aims to make the farmers and public in general aware of the dangers of poisonous plants and be able to deal with them. It will be very important for the public to learn and be able to identify these plants. This will curb the incidents of poisoning and its unfortunate consequences.
- In case of suspected poisoning, the actual locality must be inspected for indications of recent browsing in order to link the plant and the clinical signs.
- It should be noted that there is less knowledge about specific antidotes at the moment, however if there is any drug that has to be administered, it should be undertaken by professional animal health practitioners.

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The basis for plant poisoning (ADME) of a toxicant

- Absorption (alimentary canal, lungs and skin) solubility is a function of absorption. Mostly drinking water after ingestion is a problem
- Distribution or translocation of poison is via bloodstream to reactive organs like liver and bile. Knowledge of translocation characteristics of toxicant help in selection of organs for analysis.
- Metabolism: the body attempt to detoxify, previous exposure increase tolerance
- Excretion: via milk, digestive tract and urinary system. The metabolic reaction may determine the rate of elimination in the body (reabsorption in other organs is a possibility)

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Economic impact of plant poisoning in livestock industry

- Stock loss and loss of money
- Medical expenses, photosynthesisization, chronic illness and debilitation
- Reduced growth rate of animals or decreased growth gain
- Reduced productivity
- Reduced reproduction, birth defects, increased calving interval
- Loss in underutilisation of infested land or grazing
- Reduced value of infested land
- Additional fencing or infrastructure
- Increased labor and management costs

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Factors influencing toxicity of the plants

1. Growth stage of the plant.
 - in most of the plants young leaves are more toxic than older leaves.
2. Amount ingested.
 - Certain plant species are only harmful to stock if an individual animal have ingested them in a large quantity.
3. Secondary effects.
 - The toxicity of other species is activated by certain factors like drinking water immediately after ingestion of the plant.
4. Climatic factors.
 - The toxicity of certain plants diminish after receiving rain, although the effect of rain might be the promotion of grass growth and therefore there will be no need to graze poisonous plants.

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Factors affecting the activity of toxicants

It is difficult to differentiate between the symptoms of plant poisoning and those of other diseases, therefore diagnosis should be done with due consideration of the following, the circumstances under which the symptoms shown or mortality occur, history of the cattle, their familiarity with feed source, seasonal or weather conditions.

The effect of poisoning is determined by multitudes of factors rather than by the toxicity of the plant itself

- Exposure of animals to the poisoning
- Biological
- Chemical

These factors regulate the absorption, metabolism and elimination or excretion and thus influence the observed clinical signs or consequences

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Exposure of livestock to poisonous plants.

- Dose or amount ingested is the major concern, however frequency and duration are important
- The route of exposure affects absorption, translocation and metabolic pathways
- Exposure of toxicant during stress periods or feed shortages
- Environmental factors like temperature, humidity atmospheric pressure affect rate of consumption
- Many poisonous plants incidents are correlated with seasonal changes
- The toxicity of certain plants diminish after receiving rain, although the effect of rain might be the promotion of grass growth and therefore there will be no need to graze poisonous plants.

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Biological factors contributing to plant poisoning

- Various livestock species react differently to plant poisoning because of absorption, metabolism and elimination
- Functional differences in species and animal strains like vomiting and regurgitation
- Age and size of animals are primary factors in plant poisoning (young are more susceptible, body weight, body surface area)
- Nutritional and dietary factors
- Hormonal and health status
- Sex
- Stress

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Biological factors contributing to plant poisoning

- Various plant species have different inherent toxic agents at various levels
- Functional differences in species like reaction of plants to browsing, production of toxic substances
- Age and size of plants are primary factors in plant poisoning (young plant are more poisonous than older ones)
- Hormonal and health status
- Season of the year: during winter some plants are dormant so potent level is low

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Chemical factors contributing to plant poisoning

- The chemical nature of the plant is determines solubility which in turn influences the absorption
- The carrier of the toxic compound affects its ability to be readily available

Categories of poisonous plants:

- Those that are indigenous to the veld and increase with overgrazing
- Those that invade after overgrazing or soil disturbance

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Diagnosis and pertinent information

- Number of animals sick dead or exposed, their age, weight and chronology of morbidity or mortality
- Clinical signs and course of illness
- Any prior illness or disease conditions
- Lesions observed and observations of ingesta
- Response to treatment
- Description of facilities
- Recent past locations and when moved
- Clinical signs and post-mortem examinations

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Diagnosis of plant poisoning

- Be familiar with plant growing in the area (plant identification)
- Know conditions under which poisoning can occur
- Know soil deficiencies or excesses which may complicate plant toxicities
- Syndromes associated with each plant in the area
- Season of the year in which poisoning can be anticipated
- History of animals and their movements
- Change of management or environmental condition
- Change of diet or grazing habits
- Determine metabolic profiles like lesions, etc.
- Laboratory examinations and analytical procedures

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Leading killers in livestock

Toxicosis	Cattle	Sheep
Cardiac glycosides poisoning	33%	30%
Seneciosis (liver poisoning)	1%	5%
Decapetulum cymosum	8%	8%
Gousiekte	4%	2%
Lantana camara (liver poisoning)	3%	
Diplodiosis (Fungus)	2%	2%
Gigeria africana (Vee-meer siekte bos)		1%
Gnidia (January bos)		13%
Geeldikkop and dikoor		25%
Clever		

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Toxicosis	Symptoms and signs
Cardiac glycosides poisoning	Affects the heart, nervous system and is fatal. Tulo (Morsea & Homeria), slangkop (Drimia & Urgela), Milkweed krimpsekte, witslorm (Thesium lineatum), krimpsekte (Tyfocodon wallichii, T. grandiflorus & Cotyledon orbiculata)
Nervous system	Albitla versicolor, Datura ferox, Cynodon dactylon, chrysocoma tenuifolia
Decapetulum cymosum (Poison leaf)	Sudden heart failure and death. Dichapetalum cymosum/ gifblaar
Gousiekte	Sudden heart failure and death. Pachystigma pygmaeum, P. thamuis, P. latifolium, Pavett harborii
Gastrointestinal disorder	The main symptoms are staggering and shivering, uncoordinated movement and inability to walk, lesions occur in different organs of animals, regurgitation, stiff sickness, hair loss and paralysis. Pennisetum glandestinum, Gnidia burchellii (January bos), Solanum spp, Sesbania punicea and Ornithogalum spp

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Type of livestock poisoning	Symptoms and signs
Geeldikkop and dikoor	Tribulus terrestris and Panicum coloratum
Kidney, Bladder and Reproductive system	Anagallis arvensis, Trifolium spp, Salsola tuberculatiformis, Opuntia spp, Salsola oleacea
Hydrogen cyanide poisoning	Prussic acid respiratory distress (difficult breathing and rapid breathing), blue discoloration of skin (de-oxygenated blood) Varchelle spp, C. dactylon, Sorghum bicolor, Eucalyptus cladocalyx Laboured breathing, trembling and staggering. The animal soon goes down and froth in the mouth and dies rapidly.
Vermeersiekte bos	Gigeria africana (G. ornativa & G. aspera) affects the gastrointestinal tract with symptoms like regurgitation, stiff sickness, hair loss and paralysis.
Diplodiosis	Fungus (Diplodia maydis) decaying cobs of harvested maize
Liver poisoning	Senecio latifolius & retrosus, Lantana camara
Type of livestock poisoning	Symptoms and culprits
Geeldikkop and dikoor	Tribulus terrestris and Panicum coloratum

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Treatment of plant poisoning

- Every attempt should be made to prevent stock losses due to plant poisoning because the treatment of affected stock is in most cases of little help.
- Treatment include:
 - Prevention of further absorption> Gastric lavage by flushing the stomach with fluid, use of laxatives or gastrotony may come handy, oral administration of certain agents like activated charcoal, Activated charcoal can assist in binding the toxin and prevent more absorption. Drenching with Epsom salt will hasten the removal of poisonous material from the digestive tract of the animal.
 - Symptomatic treatment> control of convulsive seizures, maintenance of respiration, treatment for shock, alleviation of pain, control of cardiac dysfunction, correction of electrolyte imbalance and fluid loss, For small or young animal pectolyte can be used for diarrhea.
 - Specific antidotes> are listed for each toxicant
- Drenching with strong black coffee can counteract many poisons.
- Use of sunflower oil and vinegar can be handy.

Remove animals from the source and protect them from direct sunlight
animals must be observed. The animals should be rested frequently and be observed for any clinical signs.

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Control methods of poisonous plants

- The long term solution to plant poisoning problem may be in the use of herbicides, although a research in this aspect need to be intensified. Poison leaf plant or gifblaar can be controlled by Access mixed in water with Actipron. This is the only herbicide registered to control it.
- In the mean time good animal husbandry and veld management should be attended to. It is evident that livestock poisoning by plants can be traced to problems of management and condition of the veld
- Every attempt should be made to prevent stock losses due to plant poisoning because the treatment of affected stock is in most cases of little help.
- The most effective method to avoid stock loss is through correct grazing or veld management.

NB: Livestock poisoning by plants can be traced to problems of management and condition of the veld

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Biosecurity

- This is a management practice that prevents the spread of toxins from infected animals to susceptible animals and prevents the introduction of pathogens into a herd or place where the problem is not prevalent.
- An effective biosecurity program can minimize the risk toxic exposure and its impact on livestock health and farm profitability.
- Benefits of biosecurity program: optimum animal health and welfare, improved animal productivity, reduced production and inputs costs and enhanced value of herd free from toxins and diseases.
- Economic returns on time and effort invested in maintaining healthy herd
- Maintaining healthy herd requires a comprehensive biosecurity plan and adherence to biosecurity protocols.
- This calls for risk assessment and incorporation of measures that will promote health and safety in the farm and minimize potential threats to animal health

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