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# CYANOBACTERIA RELATED TOXICITY IN LIVESTOCK





# HISTORY

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- × Historically, reports of acute death and hepatotoxicity since 19<sup>th</sup> century
  - + Some evidence of prehistoric mass die offs
    - × *Microcystis* sp.
- × Primarily anecdotal reports and circumstantial evidence
- × Often, large scale mortality/morbidity
  - + Multiple species, including birds
- × Experimental dosing resulted in clinical signs and post mortem lesions identical to naturally occurring cases



# LIVESTOCK PRESENTATION

- × Multiple acute deaths
  - + May be more than one species
  - + May be hours to days post exposure
- × Variable symptoms
  - + Predominately liver and neurologic
- × Chronic illness
- × Correct conditions
  - + 50-85° F
  - + High nitrogen & phosphorus

# CLINICAL SIGNS

- × Acute fulminant hepatic failure
  - + Death
  - + Hemoperitoneum
  - + Hepatomegaly
  - + Hemorrhage in intestinal tract
- × Subacute and chronic
  - + Photosensitization
  - + Ascites
  - + Icterus, etc



# CLINICAL SIGNS

- × Neurotoxicity
  - + Muscle fasciculation
  - + Weakness
    - × Prolapse
    - × Dystocia (abortion)
  - + Paralysis
  - + Cyanosis
  - + Respiratory paralysis
    - × DDX - botulism





# DIAGNOSIS

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## × Complicated

- + Each cyanotoxin has different pathology
  - × More than one toxin can be produced in a bloom event
- + Frequently not confirmed
  - × Bloom often unobserved
  - × Odorless, Tasteless
- + Toxin may not be present when clinical disease is observed
- + Sample handling may impact ability to detect



# ANALYSIS

- × Liquid chromatography/mass spectrometry
  - + May take weeks
- × ELISA – rapid screening
- × Samples should be –
  - + Chilled
  - + Protected from light
  - + Shipped promptly
    - × Degradation within 24 hours
- × Testing includes:
  - + Gastric contents, intestinal contents - fixed in formalin
  - + Water sources – 1 quart
  - + Tissue
- × <http://limnology.eeob.iastate.edu/>



# CHRONIC LOW DOSE EXPOSURE

- × Tumor promotion
- × Chronic hepatic changes
- × ? – chronic hepatic fibrosis
- × ? – decreased productivity
- × ? – reproductive failure



# TREATMENT

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- × Supportive Care
  - + Fluids – electrolyte balance
  - + Oxygen and respiratory support
- × No Antidote
- × Anti-convulsants, Atropine