HARMFUL ALGAL BLOOMS - ECOLOGIC IMPACTS

Challenges to Providing Safe Drinking Water in the Midwest: A Symposium
September 21-22, 2017
Drake University

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VETERINARY DIAGNOSTIC LAB
BLUE GREEN ALGAE

- Are increasing concern in the Midwest
- The only supply of water for many grazing animals is surface water
- HAB's cause death in animals
BLUE GREEN ALGAE BLOOM

When the bloom is wind driven and concentrates on the windward side of a body of water the risk increases.
CYANOBACTERIA

Species of cyanobacteria

**Neurotoxins**
- Anabaena flos-aquae
- Anabaena circinalis
- Aphanizomenon flos-aquae
- Cylindrospermopsis raciborskii

**Hepatotoxins**
- Microcystis aeruginosa
- Cylindrospermopsis raciborskii
- Nodularia spumigena
BLUE GREEN ALGAE

Produce cyanotoxins

- These toxins will cause nervous signs including acute death
- Hepatic damage
Many producers confuse plant growth with algal blooms.
Neurotoxins

- Anatoxin-a
- Anatoxin-a(s)
Aphanizomenon flos-aquae is known to produce two of the same toxins as paralytic shellfish poison (PSP): saxitoxin and neosaxitoxin. A. flos-aquae is also known to produce anatoxin-a.
DIAGNOSIS

- Collect water sample, at least 100 ml
- Refrigerate until the lab receives the sample
- Stomach content on a dead animal
7 cows and 1 bull died from this exposure
SEPTEMBER IN IOWA

CYANOBACTERIA
CLINICAL SIGNS

- Numbness
- Tingling
- Dizziness
- Difficulty breathing
- Skin irritation
- Weakness
- Diarrhea, nausea, cramps
- Fainting

TREATMENT

- Supportive
- Wash the animal if possible
- Activated charcoal 2 to 5 grams/kg bd wt in a slurry

CYANOBCACTERIA
Microcystin potency in livestock has not been established.

LD50 values in laboratory animals range from 50 to 11,000 ppb.

Acute effects = 20 ppb.
LD50 values following IP ingestion in mice vary between 200 and 250 ppb.
- LD50 following IP injection = 20-50 ppb

ANATOXIN-A (S)
LD50 following IP injection = 0.2-2.1 ppb
- PCR method for rapid and specific detection of freshwater toxigenic Microcystis spp. based on microcystin synthetase C (mcyC) gene
- LC/MS/MS method for cyanotoxin analysis