Copper Toxicity

Introduction
Copper: is an essential element required by a number of enzymes involved in specific oxidase type reactions.
- derived from plants (5-20 ppm)
- legumes are higher than plants
- absorbed in the intestinal tract and stored in the liver (40-70%)
- normal copper levels are from 0.7 to 2.0 ppm

Copper Poisoning
Copper poisoning in feeder lambs is often the result of feeding improperly formulated mixed diets.
- closely related to molybdenum toxicity
- sheep are 10 times more susceptible than cattle
- many outbreaks can be traced to feeding supplements that have been formulated for cattle and swine

Cause and Disease Process
- triggered by stress
- excessive copper stored in liver (>15 ppm)
- hemolytic crisis- destruction of red blood cells

Clinical Signs
- chronic copper poisoning appears as an acute homlytic crisis with death occurring in 24-48 hours.
- the animals suddenly go off feed and become weak
- mucous membranes and white skin are a yellowish brown
- hemoglobin in the urine is a dark red-brown color
- the number of animals in a group may be low (5-10%), the death of an infected animal may reach 75%

Postmortem Findings
- pale tan liver
- dark green/black kidney

Diagnosis
Very few conditions cause a severe hemolytic crisis. Phenothiazine and onion poisoning cause similar symptoms.
A definite diagnosis relies on copper serum or the copper tissue levels.
Feed samples should be analyzed for copper and molybdenum concentrations before feeding.

Treatment and Prevention
- Source should be identified and removed immediately
- Avoid stressful conditions
- Treatment is based on inactivating the copper with molybdate and sulfate.
  - Drench with electrolytes and sodium thiomolybdate to flush kidneys and bind copper 1 qt/hr