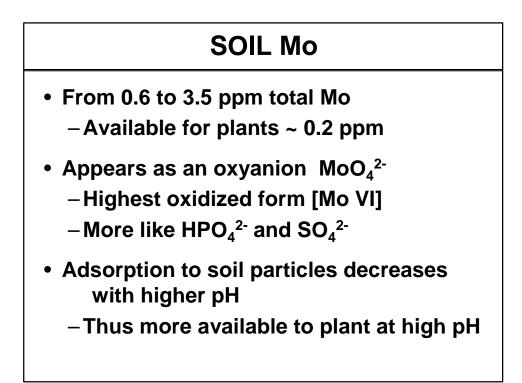
# **BIOL 695**

## MOLYBDENUM

# Chapter 17 MENGEL et al, 5th Ed



#### REQUIREMENT

- Less than for any other essential ion
- Function related to valency changes
- Cofactor to enzymes
  - -Nitrate reductase
  - -Nitrogenase
  - -Xanthine oxidase/dehydrogenase
  - -Sulfite reductase

### **CLOSELY RELATED TO**

- Nitrogen metabolism
- Mo requirement depends on N form

#### NITROGENASE

- All biological systems fixing N<sub>2</sub>
  - -Require nitrogenase
    - Each nitrogenase molecule
      - -Contains 2 Mo atoms
- N<sub>2</sub> is bound to Mo & electrons fed stepwise, degrading Mo-nitrogenase

#### NITROGENASE

- N<u>==</u>N by protonation – Until 2 molecules of NH<sub>3</sub> are released
- Mo content in nodules higher than leaves when external Mo supply low
- Mo content in leaves gen exceeds that of nodules when Mo sufficient

### NITRATE REDUCTASE

- Contains
  - -Heme Fe
  - -2 Mo atoms
- NRA low in Mo-deficient plants
   Induced in few hrs with ad'n of Mo
- NO<sub>3</sub> accumulates in Mo defic plants

#### NITRATE REDUCTASE

- Mo uptake greater in presence of
  - NO<sub>3</sub>-N than in NH<sub>4</sub>-N
  - -Plants grown with NH<sub>4</sub>-N
    - May not require Mo
- Under sterile cond grown with NH<sub>4</sub>
   Did NOT develop Mo def symptoms
- Non-sterile cond Mo def symptoms developed. WHY?

#### **DEFICIENCY SYMPTOMS**

- Resembles N deficiency
- Old leaves chlorotic first
- Necrotic leaf margins

   Caused by NO<sub>3</sub><sup>-</sup> accumulation
- Citrus Yellow spots
- Cruciferae grey-green limp apper.
  - -Extreme cases Only mid rib
    - "Whiptail"