# Interpreting Plant Tissue and Soil Sample Analysis

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# Fertilization Philosophies

- **Due to variations in soil properties from one geographic region to another, soil testing labs may use different extraction methods.**
- **Rapid buildup/maintenance versus sufficiency level**
- **Crop rotations**
- **Soil texture**
- **Yield goal**

# Calibrations for the Bray-1, Mehlich III, and Olsen soil tests.

| Sufficiency level | Bray-1 | Mehlich-3 | Olsen | P recommendations |
|---|---|---|---|---|
| | ppm | | | Lbs P2O5/a |
| Very low | <5 | <7 | <3 | 50-90 |
| Low | 6-12 | 8-14 | 4-7 | 30-50 |
| Medium | 13-25 | 15-28 | 8-11 | 10-30 |
| High | 26-40 | 29-50 | 12-20 | 0 (starter P if needed) |
| Very high | >40 | >50 | >20 | 0 |

***P sufficiency levels and recommendations represent general values and will vary greatly between region and crop.**

# Soil Sample Analysis

- **Exact measurements**
  - **ppm**
- **Classify the degree of nutrient sufficiency**
  - **Very low**
  - **Low**
  - **Medium**
  - **High**
  - **Very high**
- **Recommendations**
  - **Based on broadcast rates**

# General guidelines from a land grant university in the mid-south

| Soil test level | Expected yield potential[1] | Mehlich-3 Nutrient Concentrations | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | P | K Most crops | Ca[2] | Mg[2] | SO4-S[2] | Mn[2] | Cu[2] | Zn |
| | | mg/kg or ppm | | | | | | | |
| V. low[3] | <65% | <16 | <61 | | | | | | <1.6 |
| Low[3] | 65-85% | 16-25 | 61-90 | <400 | <30 | <10 | <40 | <1.0 | 1.6-3.0 |
| Medium[3] | 85-95% | 26-35 | 91-130 | | | | | | 3.1-4.0 |
| Optimum | 100% | 36-50 | 131-175 | | | | | | 4.0-8.0 |
| High | 100% | >50 | >175 | | | | | | >8.0 |

[1] Expected yield potential without fertilization.
[2] Recommendations are not provided for these nutrients. This listed values represent general guidelines for interpretation.
[3] The soil test levels of “very low” and “medium” are considered “sub-optimum” levels.

| Soil test ratings for immobile nutrients (based on 8-inch sample)* | | | | | | |
|---|---|---|---|---|---|---|
| **Category-immobile nutrients** | Very low | low | medium | optimum | high | v. high |
| Probability of yield response to applied fertilizer | Very likely | likely | Somewhat likely | unlikely | Not expected | |
| **Phosphorus** | | | | | | |
| Mehlich-3,ppm colorometric P | <6 | 6-14 | 15-24 | 25-35 | 36-50 | >50 |
| Olsen bicarbonate, ppm P | <3 | 3-6 | 7-10 | 11-15 | 16-20 | >20 |
| Mehlich-3, ppm ICP-P | <7 | 8-15 | 16-26 | 27-35 | 36-50 | >50 |
| Bray-1, ppm P | <5 | 5-12 | 12-22 | 23-30 | 31-40 | >40 |
| Potassium, ppm K | <60 | 60-120 | 121-160 | 161-220 | 221-280 | >280 |
| Calcium, ppm Ca | <100 | 100-200 | 201-300 | 301-2500 | >2500 | >5000 |
| Magnesium, ppm Mg | <25 | 25-50 | 51-75 | 76-100 | 100-200 | >200 |
| Zinc, ppm Zn | <.03 | 0.3-0.5 | 0.6-0.8 | 0.9-1.2 | 1.3-2.0 | >2.0 |
| Iron, ppm Fe | <1.0 | 1.0-2.5 | 2.6-5.0 | 5.1-15.0 | 15-30 | .30 |
| Copper, ppm Mn | <.01 | 0.1-0.2 | 0.3-0.4 | 0.5-0.8 | 0.9-1.5 | >1.5 |
| Manganese, ppm Mn | <0.5 | 0.5-1.0 | 1.1-3.0 | 3.1-6.0 | 6.0-10 | >10 |
| Boron, ppm B | <0.2 | 0.3-0.5 | 0.6-0.8 | 0.9-1.5 | 1.6-2.5 | >2.5 |

*These ranges are provided for general crop production situations. The ranges may be different for individual crops or specific soil situations.
Source private lab.

# Private lab

| Soil test ratings for immobile nutrients (based on 8-inch sample)* | | | | | | |
|---|---|---|---|---|---|---|
| **Category-mobile nutrients**** | Very low | low | medium | optimum | high | v. high |
| Probability of yield response to applied fertilizer | Very likely | likely | Somewhat likely | unlikely | Not expected | |
| Nitrate-nitrogen, ppm NO3-N | <5 | 6-10 | 11-25 | *** | 26-50 | >50 |
| Sulfur, ppm S | <2 | 2-5 | 6-10 | *** | 11-15 | >15 |

*These ranges are provided for general crop production situations. The ranges may be different for individual crops or specific soil situations.
**Ranges for mobile nutrients are based on survey results. They are not based on sufficiency or probability of yield response.
*** The optimum range for mobile nutrients depends on the projected yield goal and other factors which are very specific to the crop and field conditions.

# P & K

- **Yield response to P fertilization is not likely when the soil P is ≥36 ppm for row crops.**
- **Response to potassium fertilization are not likely when the soil tests above 175 ppm for row crops.**

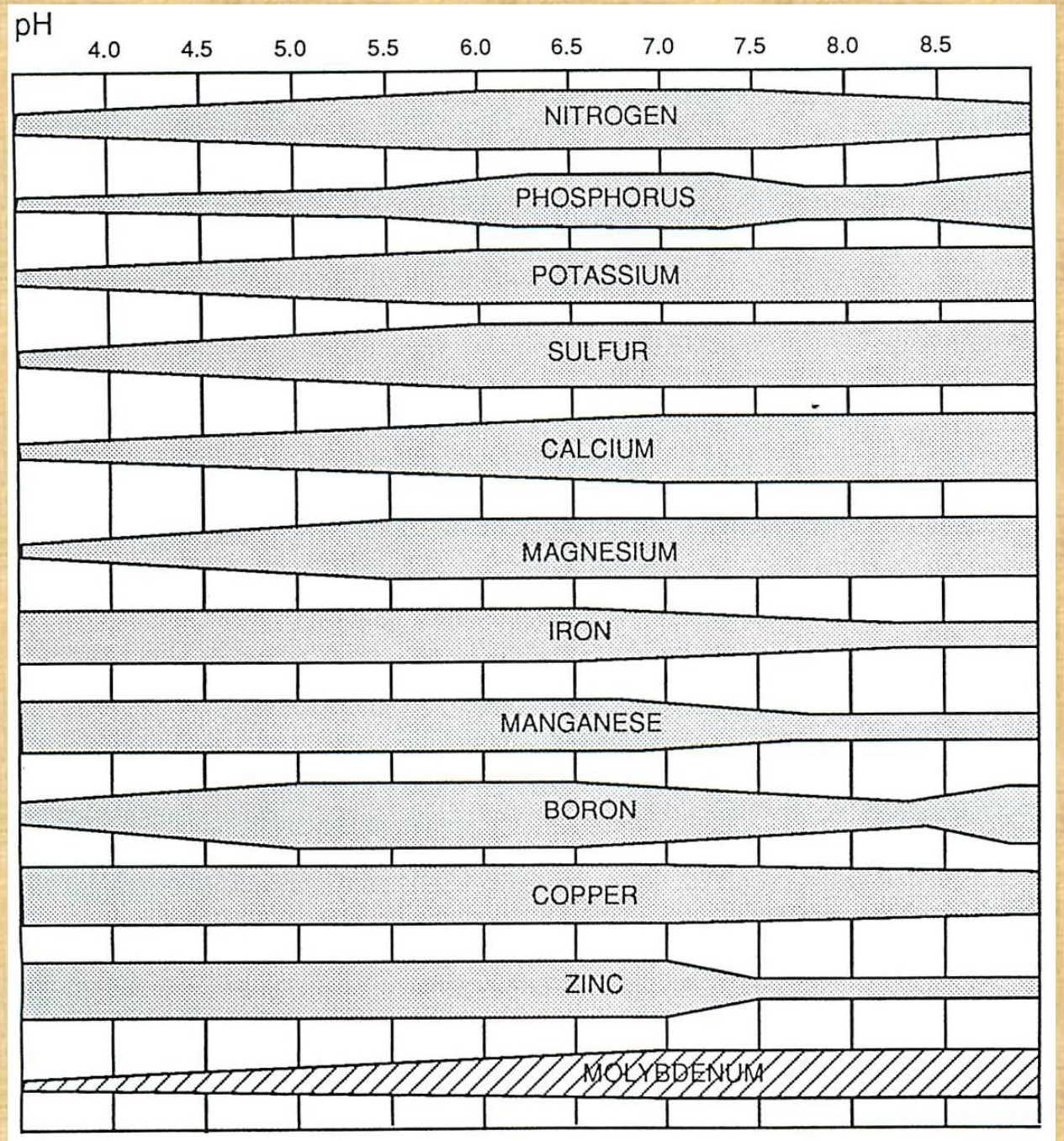
# Buildup

- **When the soil test is below the critical level (CL), it may be desirable to apply P or K at rates that increase soil test above the CL.**
- **Generally, applications of 10 to 30 lbs $P_2O_5$ /acre are required to increase soil test P level 1 ppm, depending on soil properties influencing P fixation capacity.**
- **Similarly, 5 to 15 lbs $K_2O$/acre are needed to increase soil K level 1 ppm.**
- **From an economic standpoint this may take several years,**
- **Put the amount that you can afford each year.**

# Soil pH

| Soil pH | General rating |
|---|---|
| <5.4 | Strongly acid |
| 5.4-5.7 | Moderateley acid |
| 5.8-6.4 | Slightly acid |
| 6.5-7.2 | Nuetral |
| 7.3-7.6 | Slightly alkaline |
| 7.7-7.9 | Moderately alkaline |
| >7.9 | Strongly alkaline |

**Is the measure of the acidity or alkalinity of the soil.**
**In general, soil pH values, P levels and K levels are highest in the cool, wet winter months and lowest during the hot, dry summer months and the fall of the year.**
**Clay soils require more lime to neutralize than a sandy or silty texture.**


pH
4.0
4.5
5.0
5.5
6.0
6.5
7.0
7.5
8.0
8.5
NITROGEN
PHOSPHORUS
POTASSIUM
SULFUR
CALCIUM
MAGNESIUM
IRON
MANGANESE
BORON
COPPER
ZINC
MOLYBDENUM

# Buffer pH

- **Second pH measurement for liming requirements.**

# CEC

- **Ability of negatively charged soil particles to attract and retain positively charged ions.**
- **Also an indication of soil texture and organic matter.**

# CEC

| CEC, meq/100g | Typical textue |
|---|---|
| <6 | Very sandy soils |
| 5-12 | Sandy soils |
| 10-25 | Loamey soils |
| 20-40 | Clayey soils |
| 35-50 | Clay soils |

# Cotton

Soil Texture: very fine sandy loam

Area: Alluvial

Irrigated: No

# Soil Test Results

| Element (Mehlich3) | Value | Cotton |
|---|---|---|
| pH (1:1 Water) | 4.73 | **Low** |
| Phosphorus, ppm | 60.74 | **Very High** |
| Potassium, ppm | 118.11 | **Medium** |
| Calcium, ppm | 887.07 | **Very High** |
| Magnesium, ppm | 195.06 | **Very High** |
| Sodium, ppm | 16.60 | **Optimum** |
| Sulfur, ppm | 7.84 | **Low** |
| Copper, ppm | 0.99 | **High** |
| Zinc, ppm | 0.63 | **Low** |

**RECOMMENDATION**

| Crop | Form | *Units: lb/Acre* | Nitrogen | Phosphate | Potash | Expected pH / Acre with adding Lime 1 Ton | 2 Ton |
|---|---|---|---|---|---|---|---|
| cotton | | | 60-90 | 0 | 40 | 6.21 Optimum | 7.45 High |

# Nitrogen

| Soil Type | Irrigation or Dryland | Lbs/Acre |
|---|---|---|
| Clay | Irrigation | 100-120 |
| Clay | Dryland | 90-120 |
| Silt Loam | Irrigation | 60-90 |
| Silt Loam | Dryland | 60-90 |

# Phosporus

| | | V. Low | Low | Medium | High | V. High |
|---|---|---|---|---|---|---|
| Soil Type | Irr. or Dryland | <10 ppm | <20 ppm | <35 ppm | <60 ppm | >60 ppm |
| clay | irrigation | 90 | 70 | 50 | 0 | 0 |
| clay | dryland | 80 | 60 | 40 | 0 | 0 |
| Silt loam | irrigation | 100 | 80 | 60 | 0 | 0 |
| Silt loam | dryland | 80 | 60 | 40 | 0 | 0 |

# Potassium

| | | V. Low | Low | Medium | High | V. High |
|---|---|---|---|---|---|---|
| Soil Type | Irr. or Dryland | <141 ppm | <211 ppm | <317 ppm | <334 ppm | >334 ppm |
| clay | irrigation | 100 | 80 | 60 | 0 | 0 |
| clay | dryland | 80 | 60 | 40 | 0 | 0 |

# Potassium

| | | V. Low | Low | Medium | High | V. High |
|---|---|---|---|---|---|---|
| Soil Type | Irr. or Dryland | <70 ppm | <106 ppm | <141 ppm | <158 ppm | >158 ppm |
| Silt loam | irrigation | 120 | 90 | 60 | 0 | 0 |
| Silt loam | dryland | 100 | 80 | 40 | 0 | 0 |

# Other nutrients

**Sulfur**

| S-ppm | S-recommendations |
|---|---|
| <12 | 20 lbs per acre |

**Zinc**

| Zn-ppm | Zn-recommendations |
|---|---|
| <1 | 10 |
| 1-2.25 | 5 |
| >2.25 | 0 |

# Corn

Alexandria, LA 71302

Soil Texture: very fine sandy loam

Area: Alluvial

Irrigated: No

# Soil Test Results

| Element (Mehlich3) | Value | Corn (field) |
|---|---|---|
| pH (1:1 Water) | 4.56 | **Low** |
| Phosphorus, ppm | 33.96 | **Medium** |
| Potassium, ppm | 105.75 | **Medium** |
| Calcium, ppm | 1,069.46 | **Very High** |
| Magnesium, ppm | 173.83 | **Very High** |
| Sodium, ppm | 50.89 | **Optimum** |
| Sulfur, ppm | 109.21 | **High** |
| Copper, ppm | 1.00 | **High** |
| Zinc, ppm | 1.59 | **Medium** |

**RECOMMENDATION**

| Crop | Form *Units: lb/Acre* | Nitrogen | Phosphate | Potash | Expected pH / Acre with adding Lime 1 Ton | 2 Ton |
|---|---|---|---|---|---|---|
| corn (field) | corn grain | 140-180 | 60 | 60 | 5.93 Optimum | 7.20 High |
| corn (field) | corn silage | 140-180 | 60 | 90 | 5.93 Optimum | 7.20 High |

# Nitrogen

| Soil Type | Irrigation or Dryland | Lbs/Acre |
|---|---|---|
| Clay | Irrigation | 180-240 |
| Clay | Dryland | 140-180 |
| Silt Loam | Irrigation | 180-240 |
| Silt Loam | Dryland | 140-180 |

# Phosphorus

| | | V. Low | Low | Medium | High | V. High |
|---|---|---|---|---|---|---|
| Soil Type | Irr. or Dryland | <10 ppm | <20 ppm | <35 ppm | <60 ppm | >60 ppm |
| clay | irrigation | 120 | 90 | 60 | 0 | 0 |
| clay | dryland | 100 | 80 | 60 | 0 | 0 |
| Silt loam | irrigation | 120 | 90 | 60 | 0 | 0 |
| Silt loam | dryland | 100 | 80 | 60 | 0 | 0 |

# Potassium

| | | V. Low | Low | Medium | High | V. High |
|---|---|---|---|---|---|---|
| Soil Type | Irr. or Dryland | <141 ppm | <211 ppm | <317 ppm | <334 ppm | >334 ppm |
| clay | irrigation | 120 | 90 | 60 | 0 | 0 |
| clay | dryland | 100 | 80 | 60 | 0 | 0 |

# Potassium

| | | V. Low | Low | Medium | High | V. High |
|---|---|---|---|---|---|---|
| Soil Type | Irr. or Dryland | <70 ppm | <106 ppm | <141 ppm | <158 ppm | >158 ppm |
| Silt loam | irrigation | 120 | 90 | 60 | 0 | 0 |
| Silt loam | dryland | 100 | 80 | 60 | 0 | 0 |

# Other nutrients

**Sulfur**

| S-ppm | S-recommendations |
|---|---|
| <12 | 20 lbs per acre |

**Zinc**

| Zn-ppm | Zn-recommendations |
|---|---|
| <1 | 10 |
| 1-2.25 | 5 |
| >2.25 | 0 |

# Plant Analysis

# Plant Analysis

- Based on the scientific principle that healthy plants contain predictable concentrations of essential elements.

# Interpretation methods used in plant analysis

- Critical values
- Sufficiency ranges
- Ratios
  - DRIS

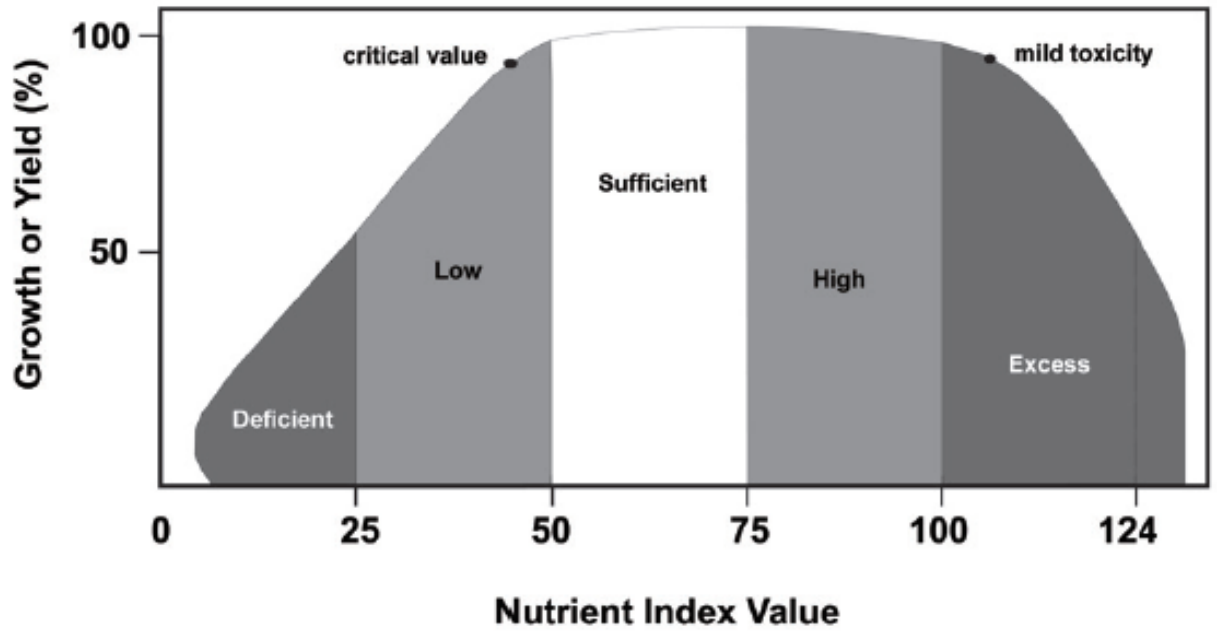



Figure 2. Schematic of yield or growth in response to increasing nutrient concentration and interpretation.

# Sampling procedures that enhance accuracy and effectiveness

- Seedlings
  - Entire plant (from about 1 inch above the soil)
- Larger plants
  - Most recent fully expanded  or mature leaf
- Flowering or fruiting stage
  - Corn-ear leaf

# Reasons for plant analysis

- **Problem solving**
  - **Good and bad plants**
- **Monitoring**
  - **Fine tuning nutrient applications**
  - **Taken the same time of day from the same area in the on each sampling date.**
  - **Corn**
    - **Just prior to sidedressing**
    - **Just prior to flowering**

# Environmental conditions

- **Caution**
  - **Drought**
  - **Saturated soils**
  - **Insects**
  - **Disease**
  - **Compaction**

# Corn-Sampling Procedure

| Stage of growth | Procedure |
|---|---|
| Seedling (<4 inches in height) | Whole plant-1 inch above the soil, 15-20 plants |
| Early growth (> 4 inches in height to tasseling) | Most recent mature leaf (MRML), 15-20 leaves |
| Tassel/Bloom | Earleaf, 15-20 leaves |
| Maturity | Earleaf, 15-20 leaves |

Note: ship in paper containers

# Corn-Critical values

| Macronutrients | | | | | |
|---|---|---|---|---|---|
| N | P | K | Ca | Mg | S |
| 3.0% | 0.25% | 2.0% | 0.40% | 0.25% | 0.12% |

| Micronutrients | | | | | |
|---|---|---|---|---|---|
| Fe | Mn | Zn | Cu | B | Mo |
| 15 ppm | 15 ppm | 15 ppm | 5 ppm | 10 ppm | 0.1 ppm |

**At Tasseling**

# Corn-sufficiency ranges for seedling(< 4”)

| Macronutrients (%) | | | | | |
|---|---|---|---|---|---|
| N | P | K | Ca | Mg | S |
| 4-5 | .4-.6 | 3-4 | .3-.8 | .2-.6 | .18-.50 |

| Micronutrients (ppm) | | | | | |
|---|---|---|---|---|---|
| Fe | Mn | Zn | Cu | B | Mo |
| 40-250 | 25-160 | 20-60 | 6-20 | 5-25 | .1-2.0 |

**The N:S ratio should be between 10 and 15 at all growth stages for optimum yields. Sulfur is limiting at N:S ratios greater than or equal to 18.**

# Corn-sufficiency ranges for seedling(> 4” to tasseling)

| Macronutrients (%) | | | | | |
|---|---|---|---|---|---|
| N | P | K | Ca | Mg | S |
| 3-4 | .3-.5 | 2-3 | .25-.80 | .15-.60 | .15-.40 |

| Micronutrients (ppm) | | | | | |
|---|---|---|---|---|---|
| Fe | Mn | Zn | Cu | B | Mo |
| 30-250 | 20-150 | 20-70 | 5-25 | 5-25 | .1-2.0 |

**The N:S ratio should be between 10 and 15 at all growth stages for optimum yields. Sulfur is limiting at N:S ratios greater than or equal to 18.**

# Corn-sufficiency ranges for tassel/bloom

| Macronutrients (%) | | | | | |
|---|---|---|---|---|---|
| N | P | K | Ca | Mg | S |
| 2.8-4.0 | .25-.50 | 1.8-3.0 | .25-.80 | .15-.60 | .15-.60 |

| Micronutrients (ppm) | | | | | |
|---|---|---|---|---|---|
| Fe | Mn | Zn | Cu | B | Mo |
| 30-250 | 15-150 | 20-70 | 5-25 | 5-25 | .1-2.0 |

**The N:S ratio should be between 10 and 15 at all growth stages for optimum yields. Sulfur is limiting at N:S ratios greater than or equal to 18.**

# Corn-sufficiency ranges (maturity)

| Macronutrients (%) | | | | | |
|---|---|---|---|---|---|
| N | P | K | Ca | Mg | S |
| 2.5-3.5 | .25-.40 | 1.6-2.5 | .2-.8 | .12-.50 | .12-.40 |

| Micronutrients (ppm) | | | | | |
|---|---|---|---|---|---|
| Fe | Mn | Zn | Cu | B | Mo |
| 30-250 | 15-150 | 16-50 | 4-20 | 3-20 | .1-2.0 |

**The N:S ratio should be between 10 and 15 at all growth stages for optimum yields. Sulfur is limiting at N:S ratios greater than or equal to 18.**

# Grain Sorghum-sampling procedure

| Stage of growth | Procedure |
|---|---|
| Seedling (< 4 cm tall) | Sample whole above ground portion of plant. |
| Vegetative or prior to heading | Sample entire fully developed leaf below the whorl |
| Flower or at heading | Sample second leaf from the top of the plant |
| Grain filling | Sample second leaf from the top of the plant. |

# Grain Sorghum-sufficiency ranges (seedling)

| Macronutrients (%) | | | | | |
|---|---|---|---|---|---|
| N | P | K | Ca | Mg | S |
| 3.9-? | .2-.5 | 2.0-? | .3-.6 | .25-.6 | .24+ |

| Micronutrients (ppm) | | | | |
|---|---|---|---|---|
| Fe | Mn | Zn | Cu | B |
| 75-400 | 13-200 | 12-150 | 4-20 | 3-30 |

# Grain Sorghum-sufficiency ranges (Vegetative)

| Macronutrients (%) | | | | | |
|---|---|---|---|---|---|
| N | P | K | Ca | Mg | S |
| 3-4 | .2-.4 | 2.0-? | .3-.6 | .2-.5 | ? |

| Micronutrients (ppm) | | | | |
|---|---|---|---|---|
| Fe | Mn | Zn | Cu | B |
| 75-200 | 8-100 | 12-100 | 2-15 | 1-10 |

# Grain Sorghum-sufficiency ranges (flowering)

| Macronutrients (%) | | | | | |
|---|---|---|---|---|---|
| N | P | K | Ca | Mg | S |
| 2.5-4.0 | .20-.35 | 1.4-? | .3-.6 | .2-.5 | ? |

| Micronutrients (ppm) | | | | |
|---|---|---|---|---|
| Fe | Mn | Zn | Cu | B |
| 65-100 | 8-100 | 12-100 | 2-7 | 1-10 |

# Grain Sorghum-sufficiency ranges (grain filling)

| Macronutrients (%) | | | | | |
|---|---|---|---|---|---|
| N | P | K | Ca | Mg | S |
| 2.4-4.0 | .2-.3 | 1.4-? | .3-.6 | .1-.5 | ? |

| Micronutrients (ppm) | | | | |
|---|---|---|---|---|
| Fe | Mn | Zn | Cu | B |
| 40-80 | 8-100 | 12-100 | 1-5 | 1-6 |

# Soybeans-critical values

- Critical values for the R2 stage are 0.30% for P, 1.50% for K, 17 ppm for MN, and 21 ppm for Zn.
- Sampling procedures
  - The most recently mature leaf blades are collected.

# Soybeans-sufficiency ranges (early growth)

| Macronutrients (%) | | | | | |
|---|---|---|---|---|---|
| N | P | K | Ca | Mg | S |
| 3.5-5.5 | .30-.60 | 1.7-2.5 | 1.1-2.2 | .30-.60 | ? |

# Soybeans-sufficiency ranges (flowering)

| Macronutrients (%) | | | | | |
|---|---|---|---|---|---|
| N | P | K | Ca | Mg | S |
| 3.25-5.0 | .30-.60 | 1.5-2.25 | .8-1.4 | .25-.70 | .25-.60 |

| Micronutrients (ppm) | | | | |
|---|---|---|---|---|
| Fe | Mn | Zn | Cu | B |
| 25-300 | 17-100 | 21-80 | 4-30 | 20-60 |

# Cotton

- **Sufficiency levels and critical values**
  - **Sufficiency ranges for cotton have often been used based upon observations and ranges of analyses of plant tissue from healthy or normal cotton crops. For this reason, ranges may be broad and too inclusive. Therefore, use of a sufficiency range for cotton and the implied critical concentration (lower end of sufficiency range) of a nutrient for deficiencies or toxicities are not absolute.**

# Cotton

- **Sampling procedures**
  - **Petiole analysis**
    - **Sample petioles from the most recently matured leaf on the vegetative stem at intervals beginning the week before first bloom and continuing for 7 or 8 weeks after bloom. Samples should be taken at weekly intervals and compared for the results to be meaningful. Interpret petiole analysis for NO3-N, total P, and total K only. Nitrate analysis is the most meaningful and the primary reason for sampling.**
  - **Leaf blade at early bloom**
    - **Sample the uppermost, mature cotton leaf blade on the vegetative stem. Discard the petiole. This is usually the 3$^{rd}$ to 5$^{th}$ leaf from the terminal. Sample during the period of one week before to one week after first bloom.**

# Cotton-petiole-sufficiency ranges (Arkansas)

| Time of sampling | Nitrate nitrogen (ppm) | Phosphorus (ppm) |
|---|---|---|
| Week of bloom | 10,000-35,000 | >800 |
| Bloom + 1 week | 9,000-30,000 | * |
| Bloom + 2 week | 7,000-25,000 | * |
| Bloom + 3 week | 5,000-20,000 | * |
| Bloom + 4 week | 3,000-13,000 | * |
| Bloom + 5 week | 2,000-8,000 | |
| Bloom + 6 week | 1,000-5,000 | |
| Bloom + 7 week | 0-5,000 | |
| Bloom + 8 week | 0-5,000 | |

***A decrease in P concentration of more than 300 ppm from the previous week usually indicates moisture stress.**

# Cotton-youngest mature leaf blade

| Sufficiency ranges-Macronutrients (%) | | | | | | |
|---|---|---|---|---|---|---|
| | N | P | K | Ca | Mg | S |
| Early bloom | 3.0-4.5 | .2-.65 | 1.5-3.0 | 2.0-3.5 | .3-.9 | .25-.80 |
| Late bloom/maturity | 3.0-4.5 | .15-.6 | .75-2.5 | 2.0-4.0 | .3-.9 | .3-.9 |

# Cotton-youngest mature leaf blade

| Sufficiency ranges-Micronutrients (ppm) | | | | | |
|---|---|---|---|---|---|
| | Fe | Mn | Zn | Cu | B |
| Early bloom | 50-250 | 25-350 | 20-200 | 5-25 | 20-80 |
| Late bloom/maturity | 50-300 | 10-400 | 50-300 | | 15-200 |

# Nutrient Corrective Measures

| Nutrient | Pounds per acre | Method |
|---|---|---|
| N | 30-50 | Side dress or top dress |
| P | 30-40 | Incorporate during early growth |
| K | 30-50 | Incorporate during early growth |
| Mg | 1-2 | foliar |
| Ca | 1-2 | foliar |
| S | 10-20 | Side dress or top dress |
| B | .2-.5 | foliar |
| Zn | .5-1 | foliar |
| Mn | 1-2 | foliar |
| Fe | 1-2 | foliar |
| Cu | .5-1 | foliar |

# Corn stalk nitrate sampling procedure

- Collect in three week period beginning at or just prior to black layer.
- 15 stalks per sample
- Cut an 8-inch sample of stalk beginning 6 inches above the ground and terminating at 14 inches above the ground.
- Place the samples in a paper sack, rather than plastic, to avoid mold growth
- Immediately send samples to the laboratory for nitrate analysis.

# Corn stalk testing to evaluate nitrogen management-interpretation of corn stalk nitrate analysis

| Plant N Status | Stalk nitrate (ppm as NO3) | Interpretation |
|---|---|---|
| Low | 0-250 | High probability that nitrogen was deficient. Visual signs of N deficiency are usually present. |
| Marginal | 250-700 | N availability was close to “optimal,” but it was too close to economic penalties for good N management. |
| Optimal | 700-2000 | High probability that yields were not limited by N availability. Visual signs of N deficiency on lower leaves are often observed in this range. |
| Excess | >2000 | High probability that N was greater than needed for maximum yields. |

Thank You

# Questions