ALFALFA NUTRIENT REQUIREMENTS, DEFICIENCY SYMPTOMS, AND FERTILIZER APPLICATION

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NUTRIENTS IN 8 T/A ALFALFA

Nutrients (lbs/acre)

- N: 450 lbs/acre
- P: 100 lbs/acre
- K: 300 lbs/acre
- Ca: 250 lbs/acre
- Mg: 200 lbs/acre
- S: 150 lbs/acre
- Fe: 50 lbs/acre
- Mn: 30 lbs/acre
- Cl: 20 lbs/acre
- B: 10 lbs/acre
- Zn: 5 lbs/acre
- Cu: 2 lbs/acre
- Mo: 1 lb/acre
NITROGEN DEFICIENCY

- **Conditions**
  - Poor nodulation

- **Diagnosis**
  - Few nodules on roots
  - Small yellow plants mixed with tall green plants
  - Tissue test (Mo or Co)
  - Symptoms similar to S or Mo def.

- **Correction**
  - Urea (46-0-0)
  - Max. = 50 lbs N/acre/cutting
  - pH > 6.3
  - Drill (3-5 lbs/a) 2-5x inoculated seed
N-FIXING NODULE
CONDITIONS FAVORING N DEFICIENCY

- Seedling alfalfa
- Cold soils
- Hot soils
- Waterlogged soils
- Shallow soils
- Sandy soils
- Spring cuttings
- Intensive harvesting
- High yield levels
- Alfalfa-grass mixtures
- Mo or Co deficiency
- Low pH soils
### N STUDIES

<table>
<thead>
<tr>
<th>Location</th>
<th>Yield increase (%)</th>
<th>Comments</th>
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<tbody>
<tr>
<td>Imperial Valley</td>
<td>2.3</td>
<td>Winter 7% Summer 1%</td>
</tr>
<tr>
<td>Yuma Mesa</td>
<td>32</td>
<td>Nodulation? Irrigation</td>
</tr>
<tr>
<td>Tucson</td>
<td>4.5</td>
<td>No increase at 21 d cycle</td>
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NITROGEN DEFICIENCY
PHOSPHORUS DEFICIENCY

- Conditions
  - Cold soils

- Diagnosis
  - Soil test
  - Tissue test
  - Symptoms similar to slight water stress

- Fertilizer
  - Mono-ammonium phosphate (11-52-0)
  - Max. = 100 lbs P$_2$O$_5$/acre/application
PHOSPHORUS DEFICIENCY
PHOSPHORUS DEFICIENCY

LOW P 400 PPM

Adequate P 900 PPM

Purple margins
P STUDY - MARICOPA

The diagram shows a comparison of Hay Yield (T/acre) across three treatments: Control, APP, and MAP. The MAP treatment has the highest hay yield, followed by APP and then Control.
POTASSIUM DEFICIENCY

- Conditions
  - Sandy soil

- Diagnosis
  - Soil test
  - Tissue test
  - Symptoms similar to blue alfalfa aphid

- Fertilizer
  - Muriate of potash (0-0-60)
  - Max. = 300 lbs K$_2$O/acre/application
POTASSIUM DEFICIENCY
SULFUR DEFICIENCY

- **Conditions**
  - Sandy, low OM soil

- **Diagnosis**
  - Tissue test
  - Symptoms similar to N or Mo def.

- **Fertilizer**
  - Gypsum (15-17% S)
  - Max. = 15 to 50 lbs S/acre/year
SULFUR DEFICIENCY
BORON DEFICIENCY

- Conditions
  - Low OM soil

- Diagnosis
  - Tissue test
  - Symptoms similar to 3-corner leafhopper

- Fertilizer
  - Borax (11% B)
  - Max. = 1 to 3 lbs B/acre/life of stand
BORON DEFICIENCY
MOLYBDENUM DEFICIENCY

- Conditions
  - Low pH soil
- Diagnosis
  - Tissue test
  - Symptoms N or S def.
- Fertilizer
  - Sodium molybdate (40% Mo)
  - Max. = 0.1 to 0.5 lbs Mo/acre/life of stand
MOLYBDENUM DEFICIENCY

Wheat

Cucurbit
ALFALFA FERTILIZER FAQs

- Should I apply N fertilizer?
- Are liquid or granular P fertilizers better?
- Can P fertilizer be top-dressed?
- Do I have a micro-nutrient deficiency?
- Should I keep nutrients in balance?
- Do bio-enhanced fertilizers work?
- How about manure?