

LaMotte

Soil Test Kit Garden Guide



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Visual Symptoms of Element Deficiencies

Mineral	Needle Color	Stem Appearance	Roots
Nitrogen deficiency	Light or pale green color	Slender, may be succulent	Small roots
Phosphorus deficiency	Yellow color	Short, slender stems	Small roots
Potassium Deficiency	Cotyledons red or chocolate brown	Shoot dieback; stunted growth	Small roots, poor growth



Nutrient Requirements of a Seedling:

The minimum quantity of nutrients the plant will absorb to attain the desired morphological size and physiological condition.



Soil Analysis:

The major tool for determining the range of critical and acceptable values of soil fertility, and for maintaining optimum levels of nutrients.

Four Tests: pH, Phosphorus, Nitrogen, Potassium



Recommended Nutrient Levels for Seedling Production

Soil Texture	Organic Matter (%)	N (%)	pH	P (kg/ha)	K (kg/ha)
Sandy	1.5	0.07%	5.5 - 7.5	50 - 100	75 - 125
Loamy	2.0	0.10%	5.5 - 7.5	75 - 100	125 - 175
Clay	>3	0.15%	5.5 - 7.5	75 - 125	150 - 250

Soil Sample:

1. Must be representative of nursery
2. Establish sampling areas
3. In one field, collect from 5 areas and mix all samples
4. Sample at the root zone
5. Keep samples free of foreign objects
6. Keep soil management records



Soil Preparation:

1. Spread out sample
2. Allow soil sample to dry overnight
3. Remove all twigs, etc.
4. Gently crush soil to remove lumps

Soil pH: Why It's Important

1. Numerical scale 1 – 14
2. Measures acidity – alkalinity
3. Conifers 5.5 – 6.5 pH
4. Deciduous 6.5 - 8 pH



Soil pH Test:

1. Fill test tube (0755) to line 4 with pH Indicator (5701). Squeeze bottle gently.



Soil pH Test:

2. Use .5 g spoon (0698) to add three measures of soil sample to test tube solution.



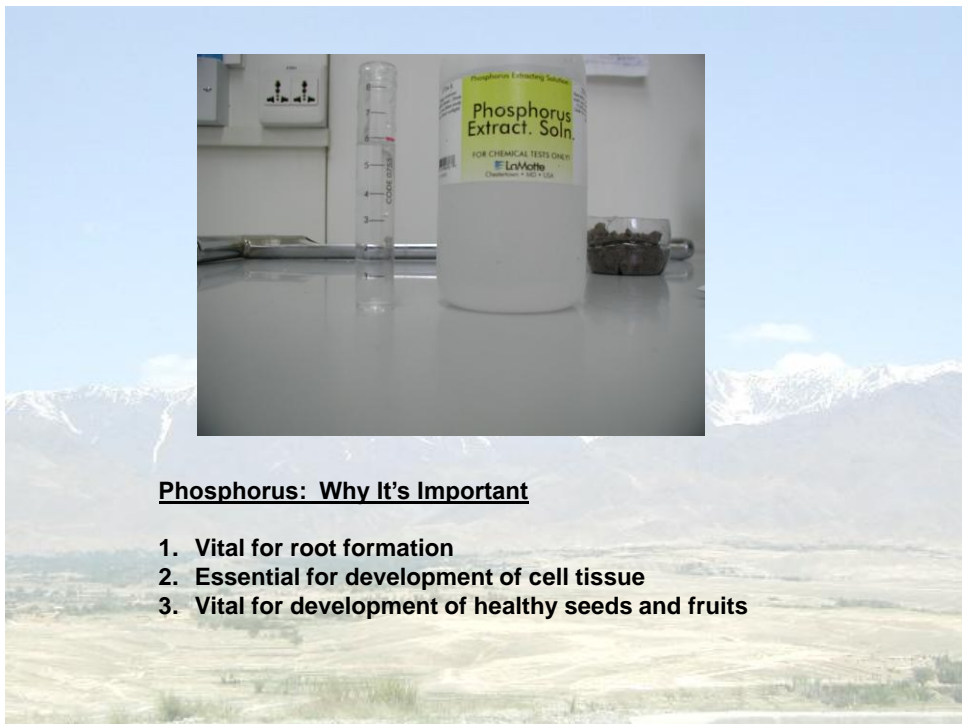
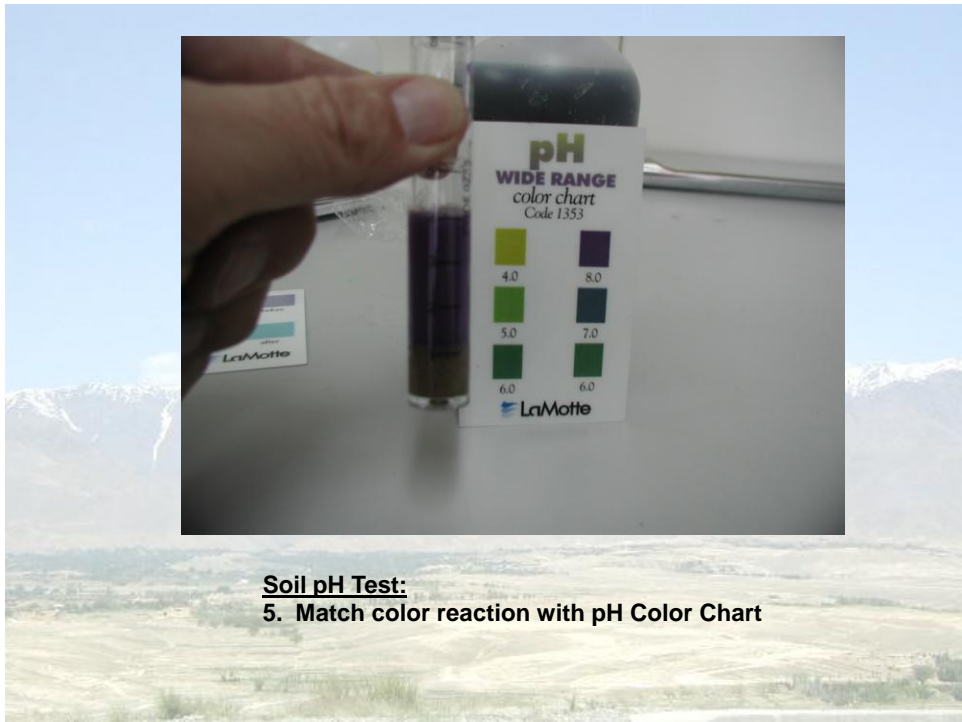
Soil pH Test:

3. Cap and mix gently for one minute.



Soil pH Test:

4. Allow test tube to stand for 10 minutes to let soil settle.





Soil Phosphorus Test:

1. Fill test tube (0755) to line 6 with Phosphorus Extracting Solution (5704)

Soil Phosphorus Test:

2. Use .5 g spoon (0698) to add three measures of soil sample to test tube solution.



Soil Phosphorus Test:

3. Cap and mix gently for one minute.



Soil Phosphorus Test:

4. Remove cap. Allow to stand, and soil to settle, until liquid above the soil is clear.



Soil Phosphorus Test:

5. Use one pipet (0364) to transfer the clear liquid to a second clean test tube. To avoid agitation of the soil, squeeze bulb of pipet before inserting into liquid. Release bulb slowly to draw clear liquid into pipet. Do not pull any soil. Fill second tube to line 3.



Soil Phosphorus Test:

6. Add six drops of Phosphorus Indicator Reagent (5705) to soil extract in the second tube.



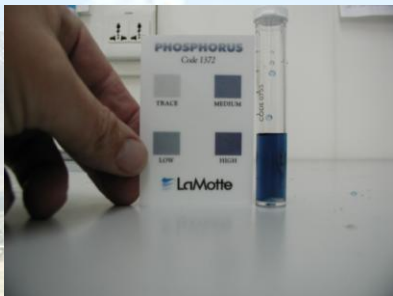
Soil Phosphorus Test:
7. Cap and mix thoroughly.



Soil Phosphorus Test:
8. Add one Phosphorus Test Tablet (5707).



Soil Phosphorus Test:
9. Cap and mix until tablet dissolves. A blue color will develop.




Soil Phosphorus Test:
10. Match color with Phosphorus Chart (1372).

- **Low:** 0 – 50 kg/ha
- **Medium:** 50 – 100 kg/ha
- **High:** >100 kg/ha



Nitrogen: Why It's Important

- 1. Part of every living cell (proteins)**
- 2. Directly involved in photosynthesis**
- 3. Stimulates above-ground growth**




Soil Nitrogen Test:

- 1. Fill test tube (0755) to line 7 with Nitrogen Extracting Solution (5702)**

Soil Nitrogen Test:

- 2. Use .5 g spoon (0698) to add two measures of soil samples.**





Soil Nitrogen Test:
3. Cap and mix gently for one minute.



Soil Nitrogen Test:
4. Remove Cap and allow soil to settle.



Soil Nitrogen Test:
5. Use a clean pipet (0364) to transfer the clear liquid to a second test tube. To avoid agitation of the soil, squeeze bulb of pipet before inserting tip into liquid. Release bulb slowly to draw clear liquid into pipet. Do not pull up any soil. Fill second tube to line 3 with liquid.

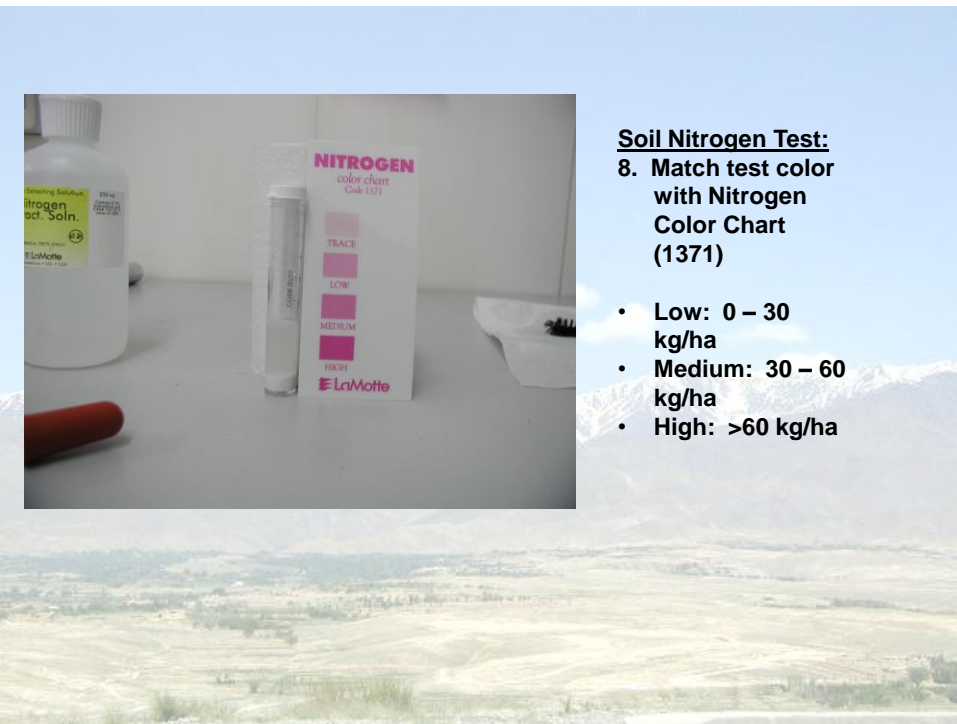


Soil Nitrogen Test:

6. Use .25 g spoon (0695) to add two measures of Nitrogen Indicator Powder (5703) to soil extract in second tube.

Soil Nitrogen Test:

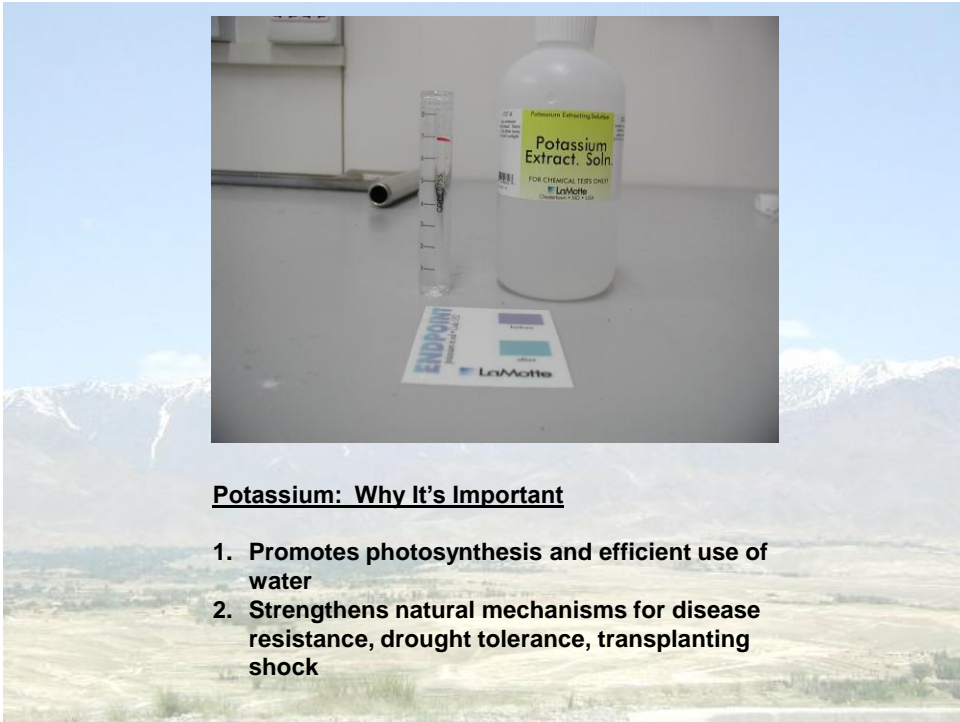
7. Cap and gently mix. Wait 5 minutes for pink color to develop above the powder.



Soil Nitrogen Test:

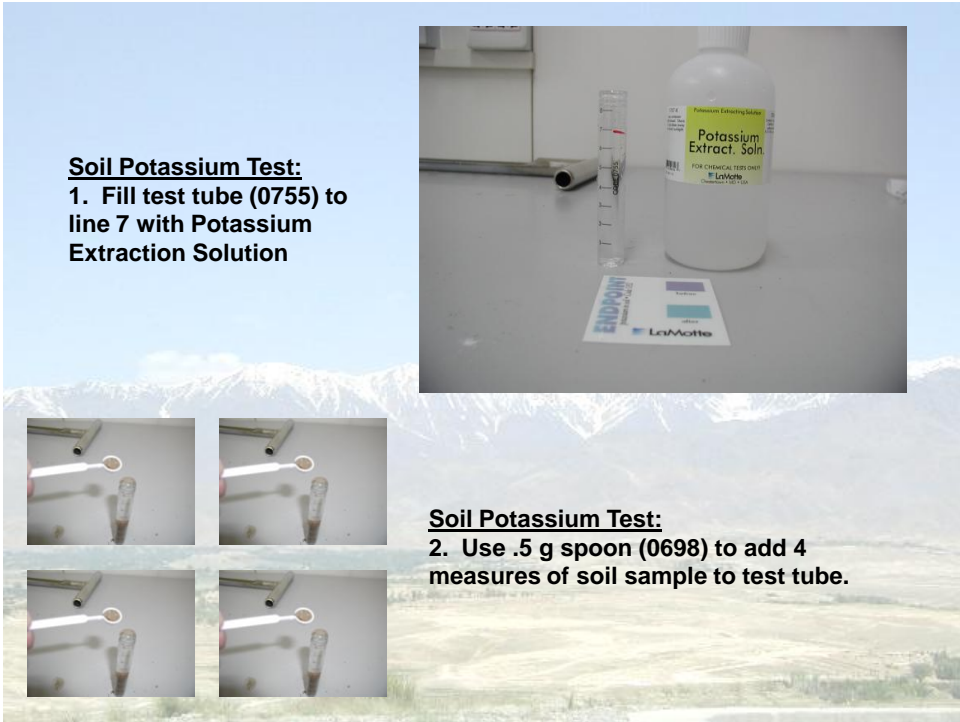
8. Match test color with Nitrogen Color Chart (1371)

- Low: 0 – 30 kg/ha
- Medium: 30 – 60 kg/ha
- High: >60 kg/ha

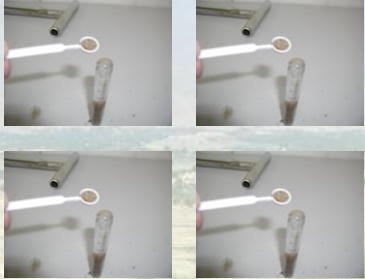


Potassium: Why It's Important

- 1. Promotes photosynthesis and efficient use of water
- 2. Strengthens natural mechanisms for disease resistance, drought tolerance, transplanting shock



Soil Potassium Test:
1. Fill test tube (0755) to line 7 with Potassium Extraction Solution



Soil Potassium Test:
2. Use .5 g spoon (0698) to add 4 measures of soil sample to test tube.



Soil Potassium Test:
3. Cap and shake vigorously
for one minute



Soil Potassium Test:
4. Remove cap and allow soil
to settle.



Soil Potassium Test:
5. Use a clean pipet
(0364) to transfer the
clear liquid to a
second clean test
tube. Be careful not
to pull up any soil
into pipet. Fill
second tube to line 5
with the liquid. Note:
If additional extract is
needed to fill the tube
to line 5, repeat steps
1 through 4.



Soil Potassium Test:

6. Add one Potassium Indicator Tablet (5708) to soil extract in second tube.



Soil Potassium Test:

7. Cap and mix until tablet dissolves. A purplish color will appear.



Soil Potassium Test:

8. Add Potassium Test Solution (5709), two drops at a time, keeping count. Mix contents after each addition. Stop adding drops when the color changes from purplish to blue.

Soil Potassium Test:

9. Use potassium End Color Chart (1352) as a guide in reading this color change. Keep an accurate count of the number of drops added. Read test results from table.

<u>Number of Drops</u>	<u>Potassium Level</u>
0-8	Very high
10	High
12	Medium High
14	Medium
16	Medium Low
18	Low
20 or more	Very low

- Low: 1 – 120 kg/ha
- Medium: 120 – 200 kg/ha
- High: >200 kg/ha



4 Drops



8 Drops



12 Drops

Sanitation:

1. Wash all equipment after each use.
2. Dirty equipment could influence results



Sources of Soil Enrichment:

1. Commercial Fertilizers
2. Organic Fertilizers



Compound	Formula	Nitrogen Content
Ammonium nitrate	$(\text{NH}_4)\text{NO}_3$	33.5%
Ammonium sulfate	$(\text{NH}_4)_2\text{SO}_4$	21%
Diammonium phosphate	$(\text{NH}_4)_2\text{HPO}_4$	21%
Anhydrous ammonium	Liquid NH_3	82%
Urea	$\text{CO}(\text{NH}_2)_2$	45%
Calcium Nitrate	$\text{Ca}(\text{NO}_3)_2$	15%
Mixed fertilizers, as	10-10-10	10%