TAA

Trade Adjustment Assistance for Farmers

Technical Assistance

Wild Blueberry Best Management Practices for Fertilizers





USDA

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Dept. Plant, Soil, and Environmental Sciences

Best Management Practices for Fertility Management

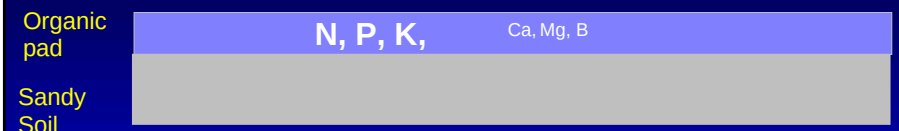
1. Basics of wild blueberry plant nutrition
2. Evaluating wild blueberry health
3 Nutrient management strategies
4. Fertilizer choices

Basics of wild blueberry nutrition

- **Where are the nutrients in a blueberry soil?**

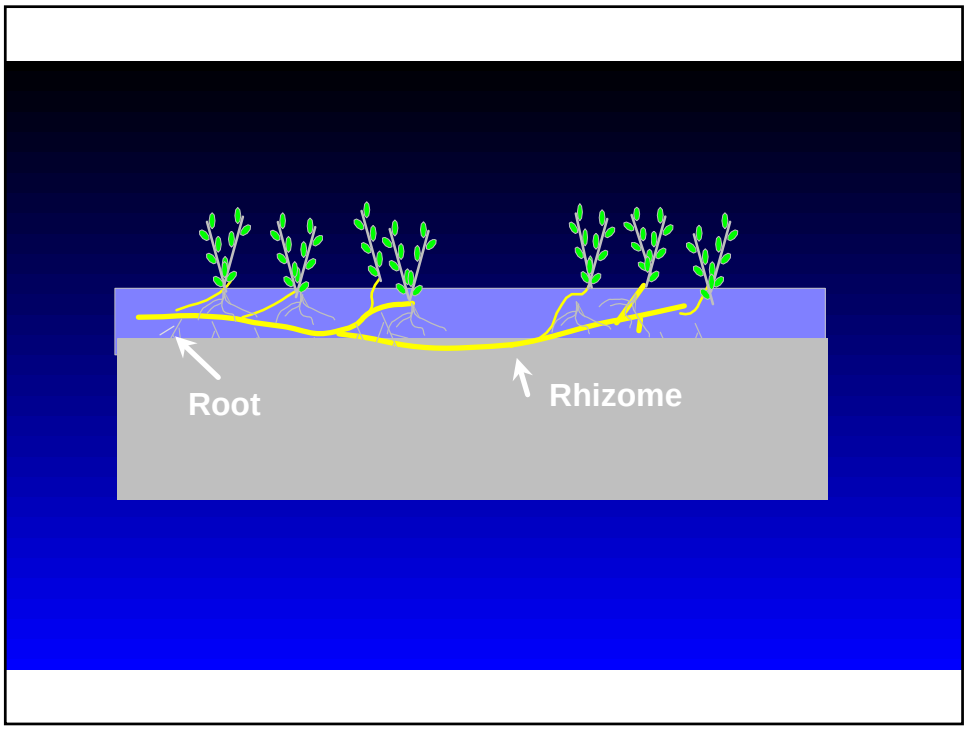
Lowbush Blueberry Soil Profile

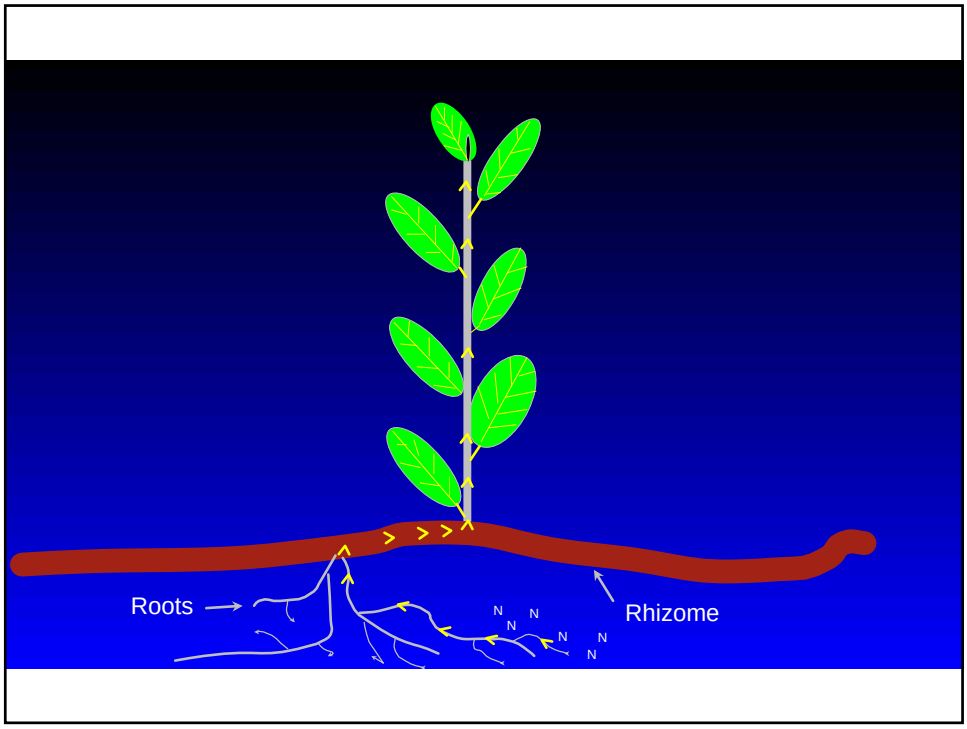
Where are the nutrients?



Basics of wild blueberry nutrition

- **How does the plant get the nutrients?**





Best Management Practices for Fertility Management

1. Basics of wild blueberry plant nutrition
✓ Evaluating wild blueberry health
3 Nutrient management strategies
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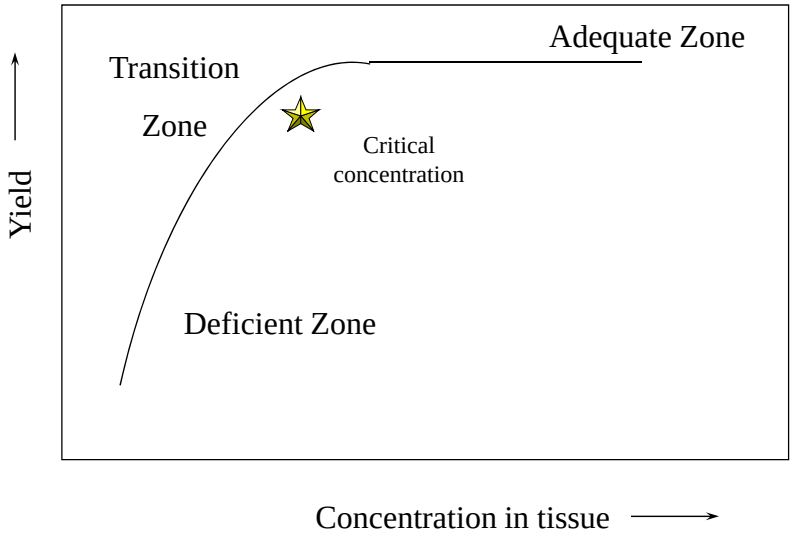
Evaluating wild blueberry health

- **How can we assess nutrient status?**

Assessing Plant Health

- Symptoms:
  - Abnormal leaf color
  - Poor stem growth
  - Poor fruit set, low yield

Plant Yield and Nutrient Content



Assessing Plant Health

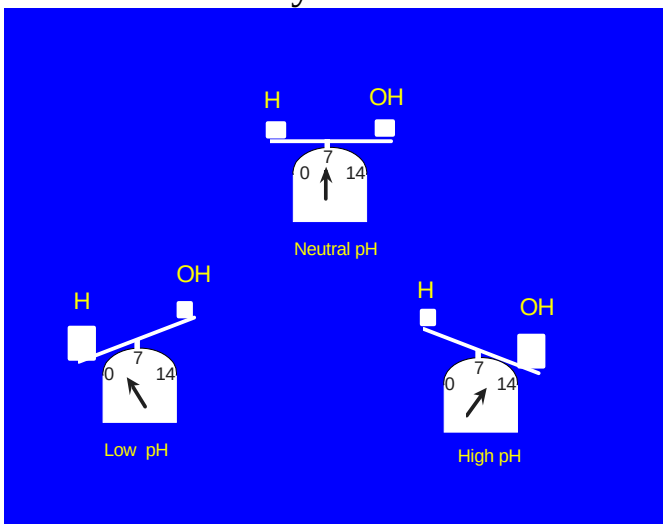
- Symptoms:
  - Abnormal leaf color
  - Poor stem growth
  - Poor fruit set, low yield
- Test Soil and Leaves

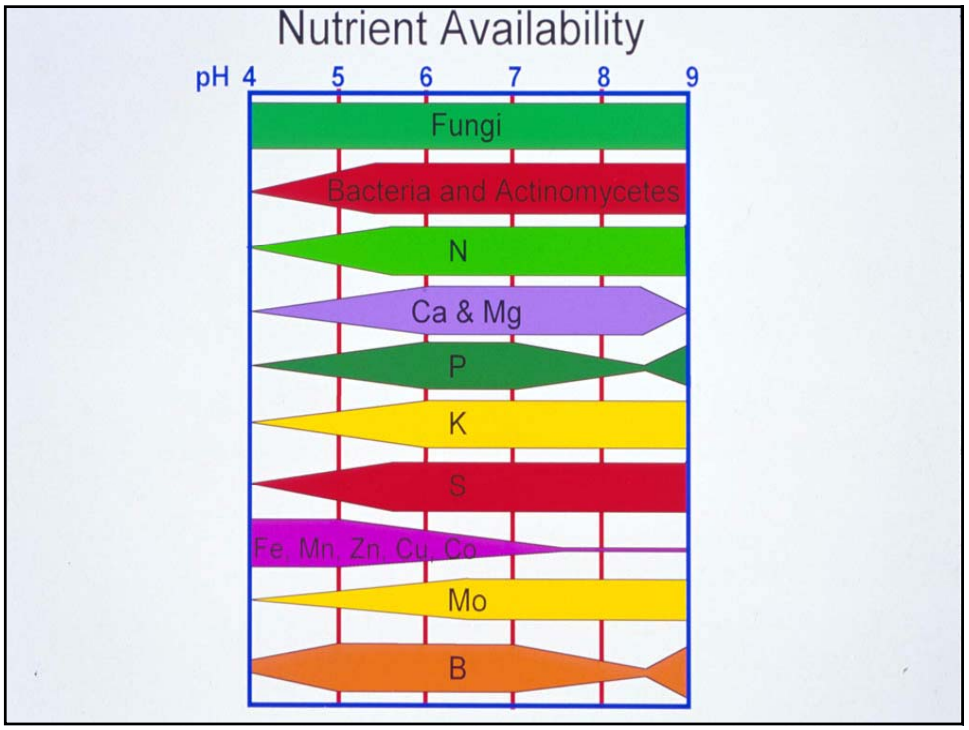
Correct pH

Low N and P

What is soil pH?

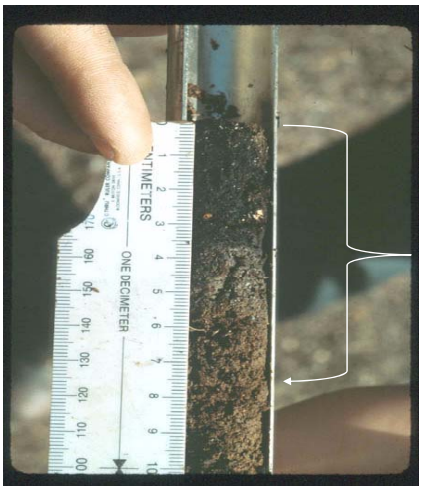
- Measure of acidity





What is soil pH?

- Measure of acidity
- Sample soil
  - determine soil pH
  - Depth – 3 inches



How to sample blueberry soil?

- Soil sampling methods
  - Random sample to represent entire field
  - Send to the Maine Soil Testing Service for analysis

1865 THE UNIVERSITY OF MAINE
Analytical Laboratory and
Maine Soil Testing Service
5722 Deering Hall
Orono, ME 04469-5722

What is soil pH?

- Measure of acidity
- Sample soil to determine soil pH
- How to lower soil pH?

Lowering Soil pH to 4.0 using Sulfur

- Original pH — Pounds Sulfur/acre

Original pH	Pounds Sulfur/acre
5.00	1,000
5.10	1,100
5.20	1,200
5.30	1,300

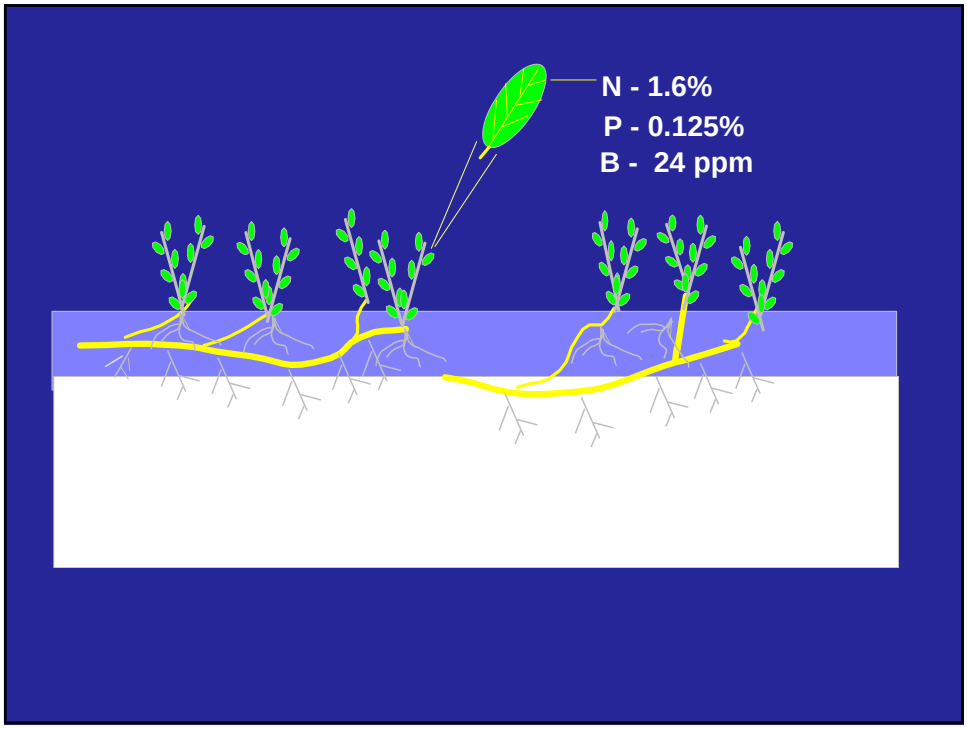
Cultural Management fact sheet - 254-Cultural Management pH

Lowering Soil pH to 4.0 using Sulfur

- Precautions to avoid **injury to blueberries**
  - **Apply before blueberry shoots emerge**
  - **Do not apply more than 1000 lbs/a of sulfur in any given year**
  - **Do not apply when ground is saturated**

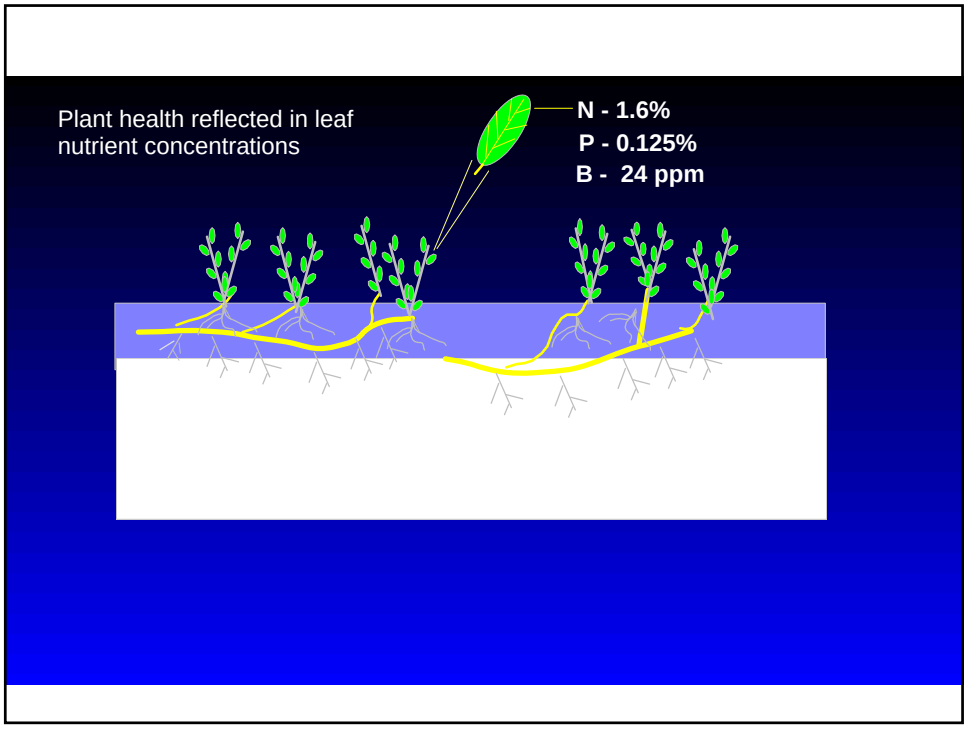
Leaf Samples better than Soil Samples

- Some nutrients are “tied up” on soil particles and not available to plant



Assessing Plant Health

- Proper leaf sampling methods
  - Sample all leaves on a stem
  - Random sampling across the field
  - Taking leaf samples at the correct stage of development.



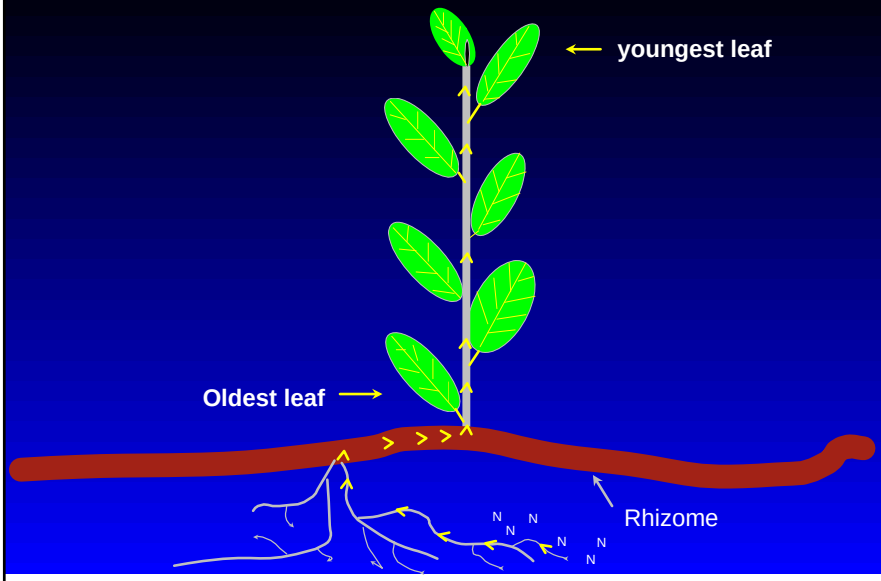
Nutrients

1. Major - needed in large quantities
   - N - nitrogen Ca -calcium Fe - iron
   - P - phosphorus Mg -magnesium
   - K - potassium S - sulphur

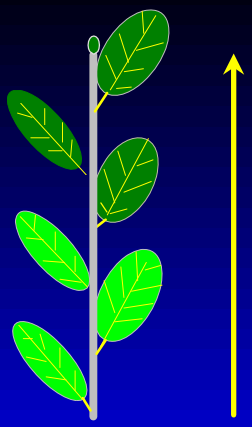
2. Minor - important, but needed in small quantities
   - B - boron
   - Cu - copper
   - Mn - manganese

Nutrient Movement in the Plant

1. Some nutrients move more easily throughout the plant.
2. Mobile vs Immobile Nutrients

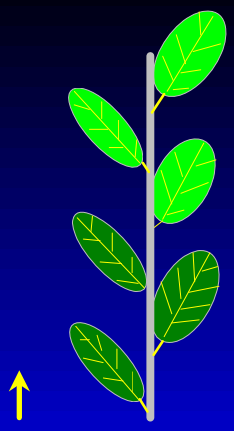


Mobile Element
- N
- P
- K
- Mg



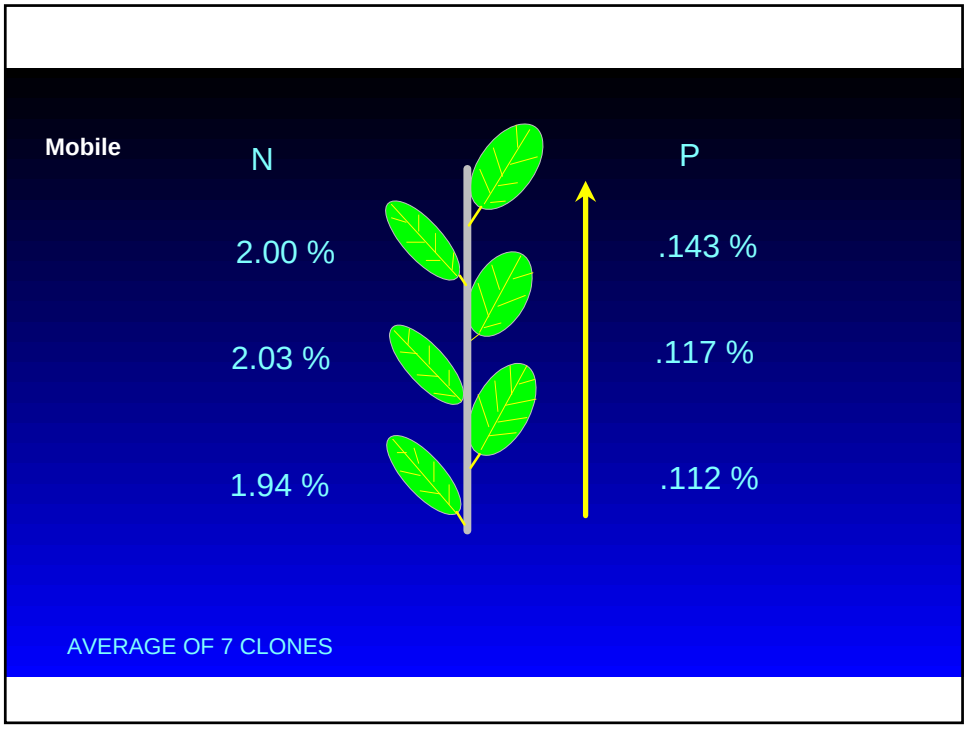
Deficiency appears in lower leaves

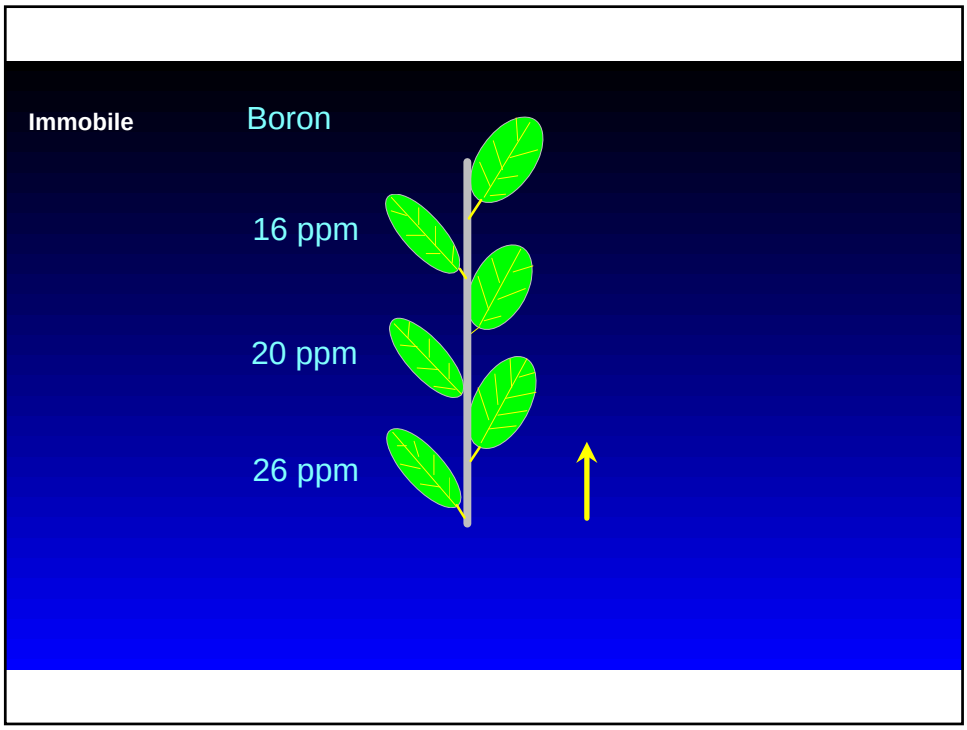
Immobile Element
- B
- Ca



Deficiency appears in upper leaves

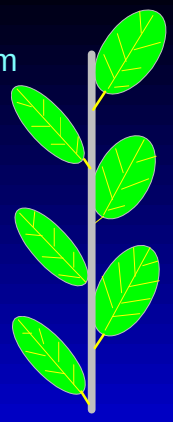
*movement affected by moisture availability


Mobile
N
2.00 %
2.03 %
1.94 %
P
.143 %
.117 %
.112 %
AVERAGE OF 7 CLONES


Immobile
Boron
16 ppm
20 ppm
26 ppm

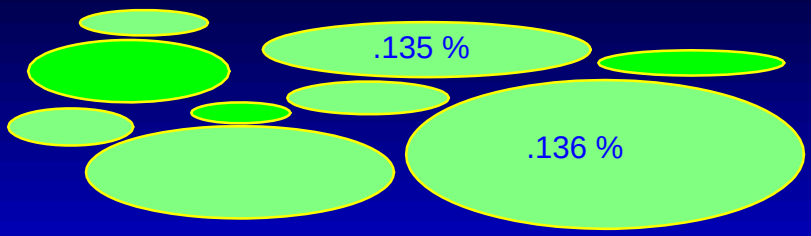
Trevett's Standard =

Sample all leaves on stem

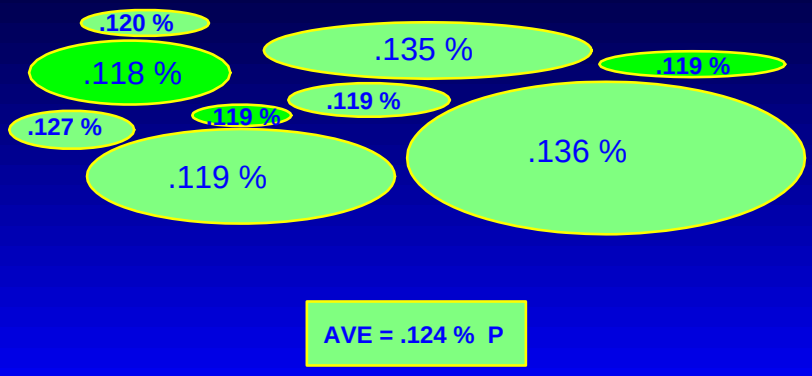


Sample many clones in a field

Phosphorus

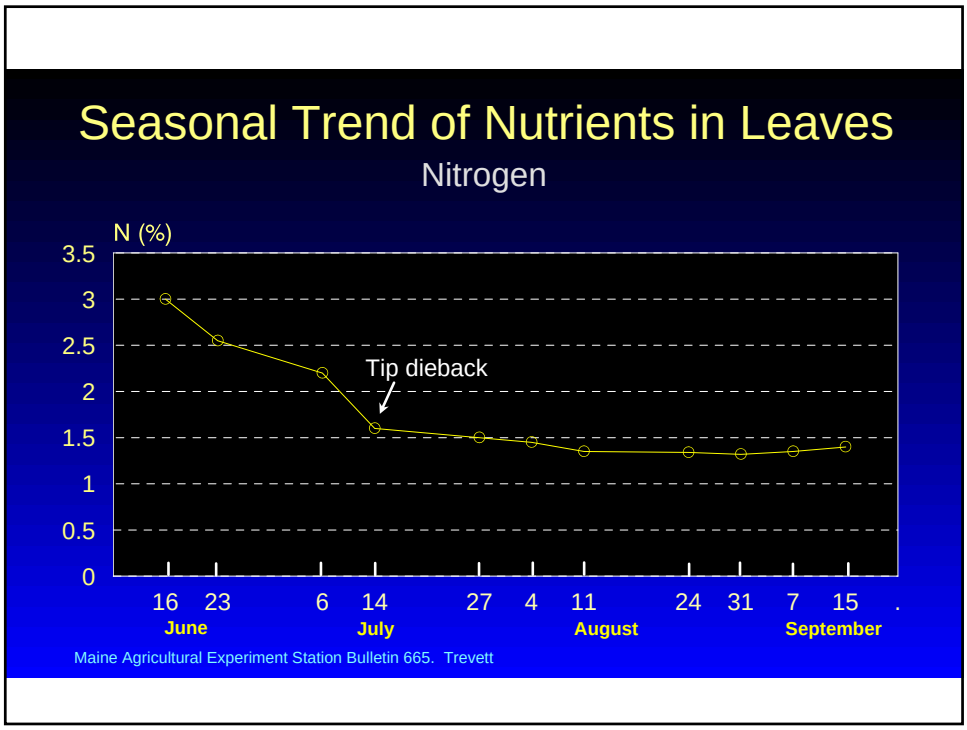


Sample many clones in a field



Correct Leaf Sampling Time

- Take leaf tissue samples at the “tip-dieback” stage
  - What is the tip dieback stage and why is this important?


Seasonal Trend of Nutrients in Leaves
Nitrogen
N (%)
3.5
3
2.5
2
1.5
1
0.5
0
Tip dieback
16
23
6
14
27
4
11
24
31
7
15
June
July
August
September
Maine Agricultural Experiment Station Bulletin 665. Trevett

Accurate Leaf Sampling

- Sample only sweet low not sourtop
- Samples at 90% tip dieback
- Sample 30 or more clones

Wild Blueberry Plant Tissue Bag

INSTRUCTIONS

See Wild Blueberry Fact Sheet #222 for complete instructions

One Sample Per Bag
Cut 3 stems from 30 clones throughout the field

* *Do not* include any soil particle on plants

* *Do not-mix* in other vegetation

*
If samples have pesticide, dust residue or soil on them, they must be rinsed

*
Hold samples in dry, clean area free from contamination

SEND sample to: Analytical Lab Room 407
University of Maine
5722 **Deering Hall**
Orono, ME 0446905722

COST per sample: $18.00 **w/leaves stripped from** stems
$21.00 **w/leaves on stems**
(make check payable to Analytical Lab)

*Name:*_____

*Farm Name:*_____

*Address:*_____

*Town:*_____*State:*_____*Zip:*____

*Phone:*_____

Best Management Practices for Fertility Management

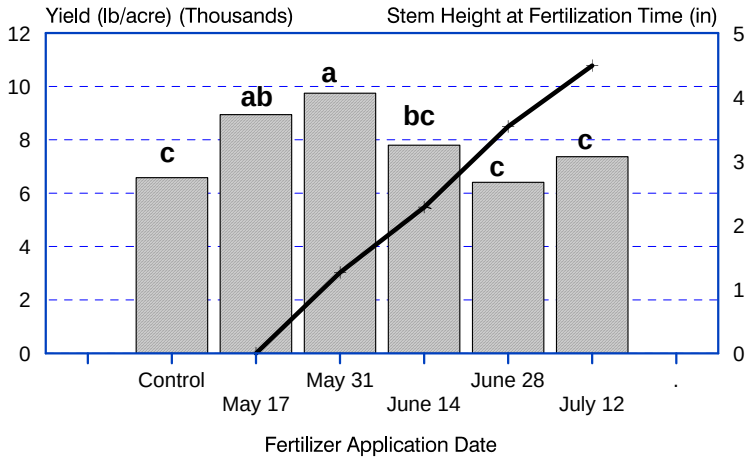
1. Basics of wild blueberry plant nutrition
2. Evaluating wild blueberry health
✓ Nutrient management strategies
4. Fertilizer choices

Current Fertility Management Practices

- Take leaf tissue samples at tip-dieback stage.
- Cut stems at ground level (sample all leaves)
- Follow recommendations for Urea (N), MAP (N + P), or DAP (2 x N + P)

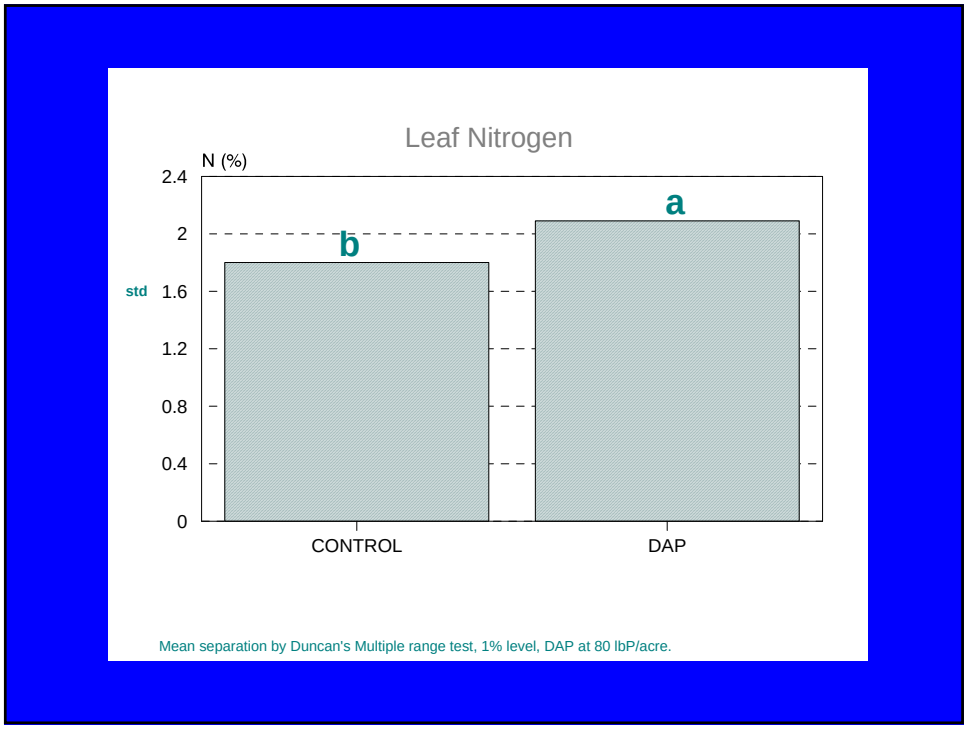
Effect of Fertilizer Timing on Yield

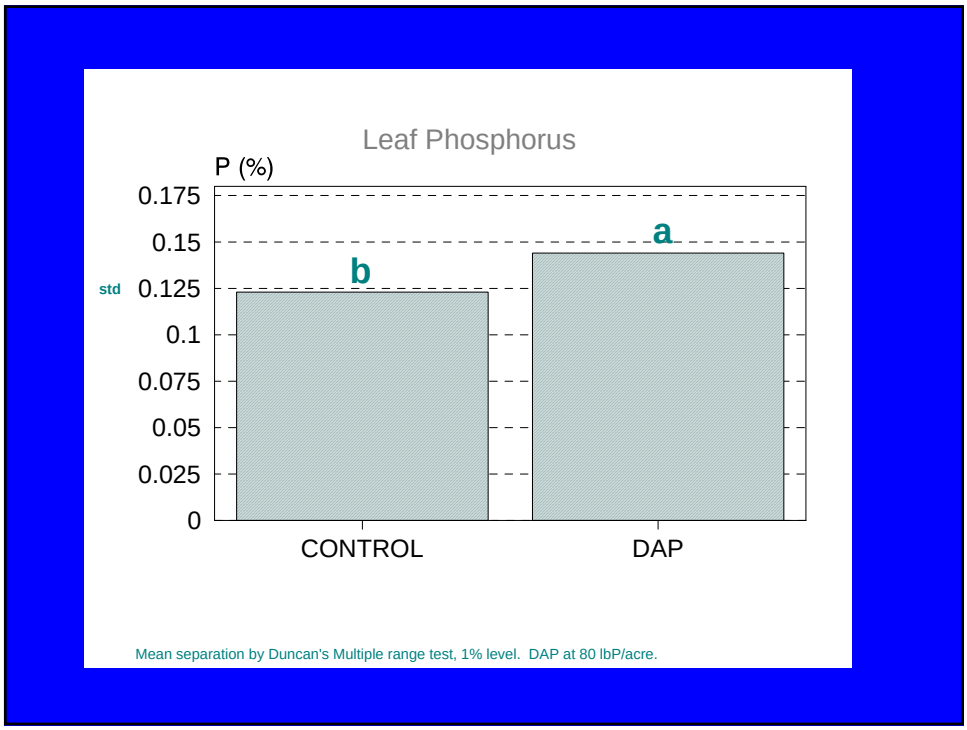
2000 Study

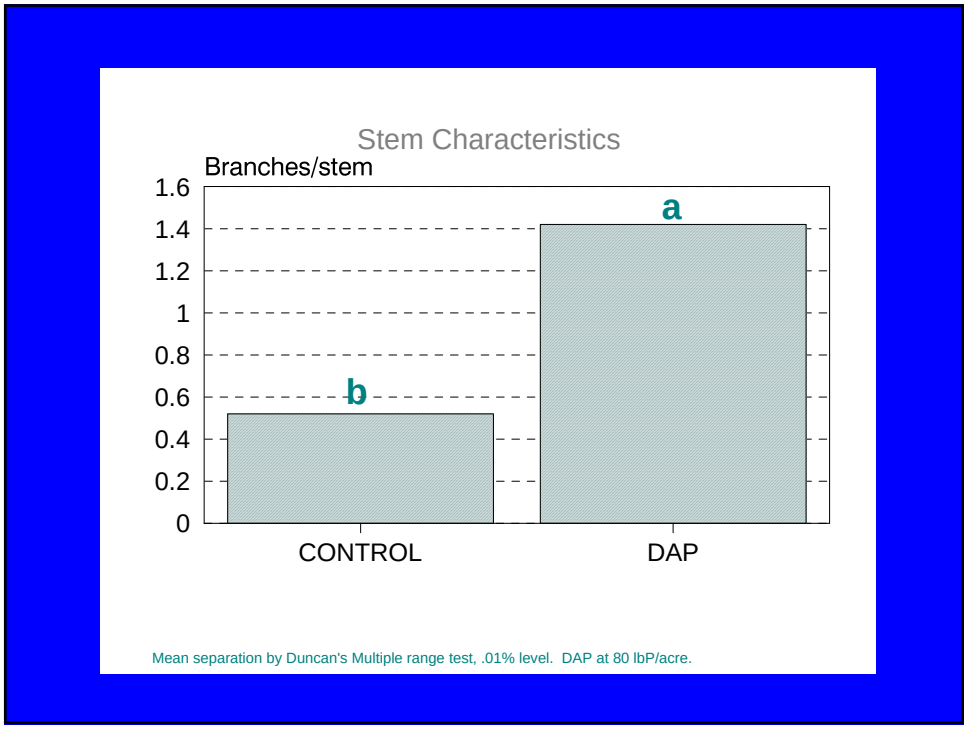


400lbs DAP/acre applied on indicated dates. , Significance level = 0.01%.

Does fertilizing based on leaf tissue analysis work?


Leaf Nitrogen
N (%)
2.4
2
1.6
1.2
0.8
0.4
0
std
b
a
CONTROL
DAP
Mean separation by Duncan's Multiple range test, 1% level, DAP at 80 lbP/acre.

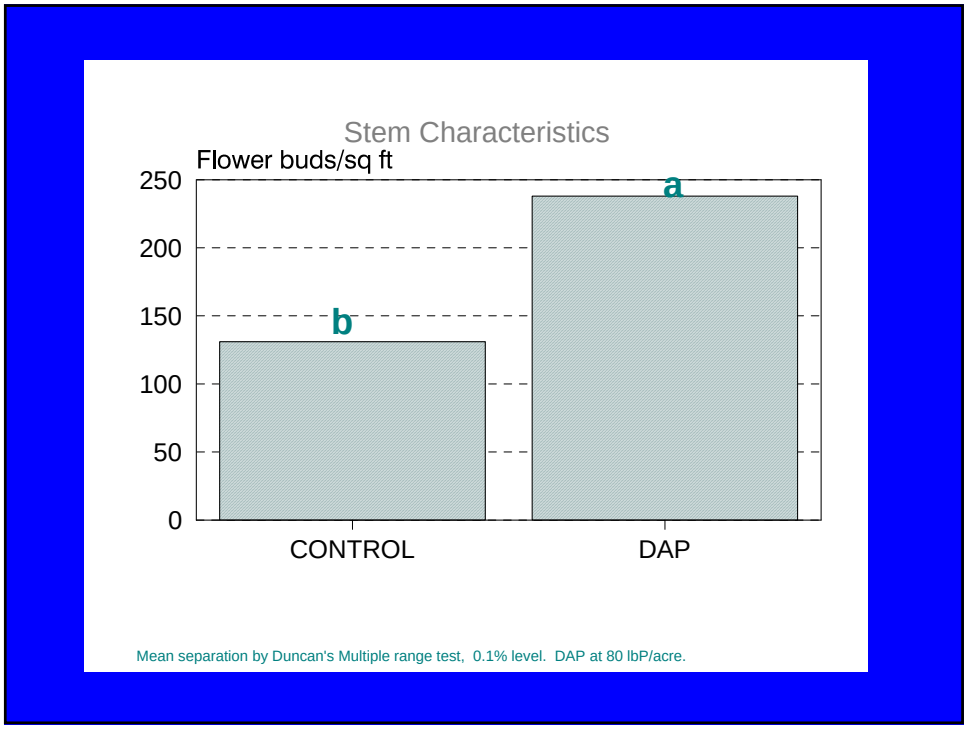

Leaf Phosphorus
P (%)
0.175
0.15
0.125
0.1
0.075
0.05
0.025
0
std
b
a
CONTROL
DAP
Mean separation by Duncan's Multiple range test, 1% level. DAP at 80 lbP/acre.

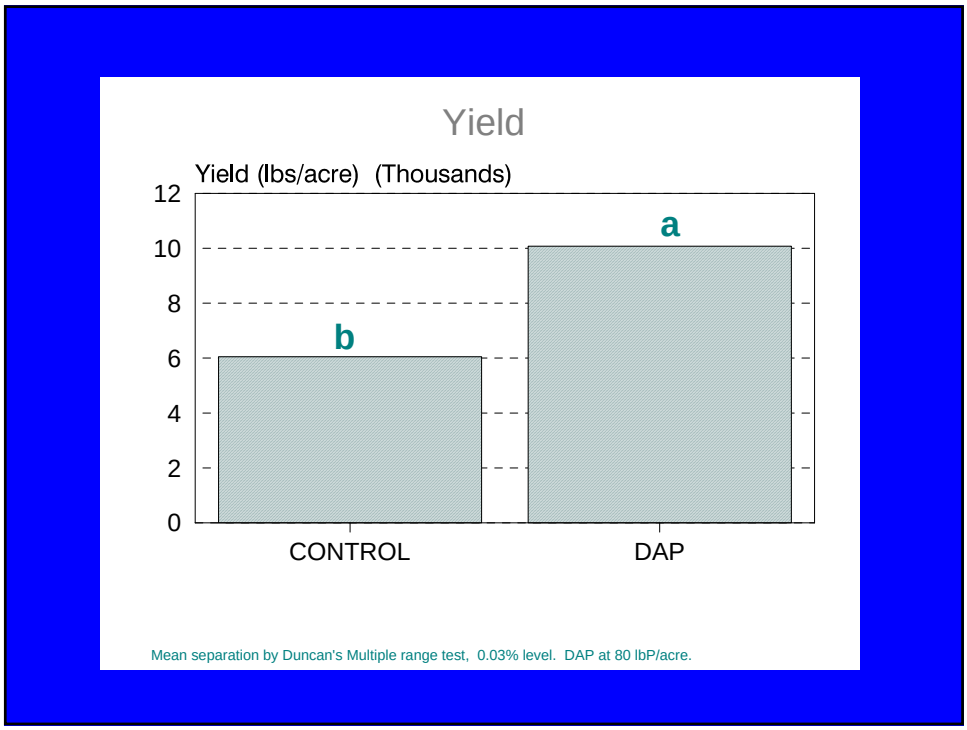

Stem Characteristics
Branches/stem
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
a
b
CONTROL
DAP
Mean separation by Duncan's Multiple range test, .01% level. DAP at 80 lbP/acre.

Figure


Control


DAP


Stem Characteristics
Flower buds/sq ft
250
200
150
100
50
0
a
b
CONTROL
DAP
Mean separation by Duncan's Multiple range test, 0.1% level. DAP at 80 lbP/acre.


Yield
Yield (lbs/acre) (Thousands)
12
10
8
6
4
2
0
a
b
CONTROL
DAP
Mean separation by Duncan's Multiple range test, 0.03% level. DAP at 80 lbP/acre.

Potential Profitability

Fertilizer cost*	Blueberry Yield (lbs/acre)	Crop Value** ($)	Profit due to fertilization ($)
0	1000	540	
158	1,500	652	112
158	2,000	922	382
158	3,000	1462	922
158	4,000	2002	1,462

*Application of 400 lbs of DAP per acre, assuming $33.25/100 lbs DAP and $25/acre application cost.
**Crop value based on the ten year average price of $0.54/lb minus the fertilizer and application costs.

Best Management Practices for Fertility Management

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✓ Fertilizer choices

DAP

- 100 lb bag of DAP (18 – 46- 0)
  - 18 % N or 18 lb actual N
  - 46 % P_2O_5 (which is only 44% P)
    - So 46 lbs of P_2O_5 x .44 = 20.2 lbs of actual P
    - For each 100 lbs of DAP you apply almost equal amounts of N and P, about 20.

University of Maine
Analytical Lab

09/14/95

LOWBUSH BLUEBERRY FOLIAR ANALYSIS REPORT

COASTAL BLUEBERRY SERVICES, INC

Job #: 1703

PO BOX 522

Lab no.:232

UNION ME 04862

FIELD NAME: growers field

NUTRIENT	LEVEL FOUND
Nitrogen %	**1.55**
Calcium %	0.496
Potassium %	0.475
Magnesium %	0.251
Phosphorus %	**0.118**
Aluminum (ppm)	81.9
Boron (ppm)	22.7
Copper (ppm)	5.20
Iron (ppm)	45.0
Manganese (ppm)	756
Zinc (ppm)	10.6

RECOMMENDED NUTRIENT AMENDMENTS

Apply 70 lb/A nitrogen and 180 lb/A phosphate.

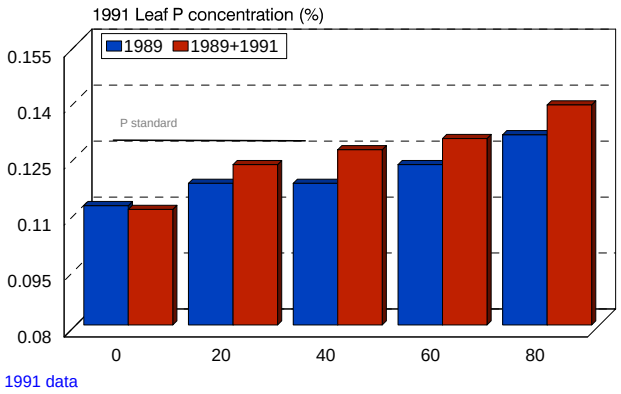
Suggested source: 400 lb diammonium phosphate (18-46-0) per acre.

Fertilizer Choices

– How can we best supplement nutrients?

How many prune-year applications are needed?

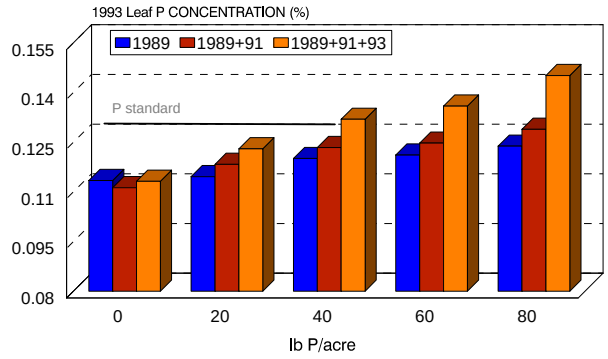
Phosphorus Study



1991 data

How many prune-year applications are needed?

Phosphorus Study



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Thank You

- Jack Smagula
- Professor of Horticulture
- University of Maine in Orono
- (207) 581-2925
- smagula@maine.edu