TAA
Trade Adjustment Assistance for Farmers
Technical Assistance

Wild Blueberry Best Management Practices for Fertilizers
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?
Where are the nutrients?

<table>
<thead>
<tr>
<th>Location</th>
<th>Nutrients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organic pad</td>
<td>N, P, K, Ca, Mg, B</td>
</tr>
<tr>
<td>Sandy Soil</td>
<td></td>
</tr>
</tbody>
</table>
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
4. Fertilizer choices
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
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

![pH Diagram]

![Nutrient Availability Diagram]
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
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
- 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.
Plant health reflected in leaf nutrient concentrations

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

0.135%

0.136%
Sample many clones in a field

AVE = .124 %

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

Tip dieback

June 23 6 14 27 4 11 24 31 7 15

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 particles 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 04469-05722

COST per sample:
$18.00 with leaves stripped from stems
$21.00 with leaves on stems

(make check payable to Analytical Lab)

Name: ______________________________
Farm Name: _________________________
Address: ____________________________
Town: __________ State: __________ Zip: ___
Phone: __________
Best Management Practices for Fertility Management

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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

Yield (lb/acre) (Thousands) Stem Height at Fertilization Time (in)

Fertilizer Application Date

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

Does fertilizing based on leaf tissue analysis work?
Leaf Nitrogen

Mean separation by Duncan's Multiple range test, 1% level, DAP at 80 lbP/acre.

Leaf Phosphorus

Mean separation by Duncan's Multiple range test, 1% level. DAP at 80 lbP/acre.
Mean separation by Duncan’s Multiple range test, .01% level. DAP at 80 lb/acre.

Figure
Stem Characteristics

Mean separation by Duncan's Multiple range test, 0.1% level. DAP at 80 lbP/acre.

Yield

Mean separation by Duncan's Multiple range test, 0.03% level. DAP at 80 lbP/acre.
Potential Profitability

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

*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 % P₂O₅ (which is only 44% P)
    • So 46 lbs of P₂O₅ 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

LOWBUSH BLUEBERRY FOLIAR ANALYSIS REPORT

COASTAL BLUEBERRY SERVICES, INC
PO BOX 522
UNION ME 04862

FIELD NAME: growers field

<table>
<thead>
<tr>
<th>NUTRIENT</th>
<th>LEVEL FOUND</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nitrogen %</td>
<td>1.55</td>
</tr>
<tr>
<td>Calcium %</td>
<td>0.496</td>
</tr>
<tr>
<td>Potassium %</td>
<td>0.475</td>
</tr>
<tr>
<td>Magnesium %</td>
<td>0.251</td>
</tr>
<tr>
<td>Phosphorus %</td>
<td>0.118</td>
</tr>
<tr>
<td>Aluminum (ppm)</td>
<td>81.9</td>
</tr>
<tr>
<td>Boron (ppm)</td>
<td>22.7</td>
</tr>
<tr>
<td>Copper (ppm)</td>
<td>5.20</td>
</tr>
<tr>
<td>Iron (ppm)</td>
<td>45.0</td>
</tr>
<tr>
<td>Manganese (ppm)</td>
<td>756</td>
</tr>
<tr>
<td>Zinc (ppm)</td>
<td>10.6</td>
</tr>
</tbody>
</table>

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
How many prune-year applications are needed?

Phosphorus Study

Thank You

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- University of Maine in Orono
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- smagula@maine.edu