Evening One Agenda

Make the most of what you have

Improve or change what you have
Evening One Agenda

- What do I have?
  - Species
  - Soil type
  - Soil fertility
- What do I do with it?
  - Improve fertility
  - Improve cutting management
Would You keep it?
Why or why not?
Make the most of what you have

• Know what species you have
  – Look for the good stuff
  – Can you manage it to be more productive
  – Tailor your management to what you have

• Planting new takes resources and incurs a risk
  – If you aren’t managing what you have now what you plant new may become what you have
  – Can you establish and manage a new seeding?
Grass

- Includes grasses and grass-like plants, sedges, rushes and lilies
- 1 Cotyledon or seed leaf - monocot
- Growing point internal - whorl
- Parallel leaf veins
- No secondary growth – no branching
Orchardgrass
Orchardgrass
- Leaf sheaths and stems flattened
- Leaf crosssection is V shaped
Orchardgrass
- Bunch grass
- Scattered winterkill in NYS
Orchardgrass
- Early maturing grass
Reed canarygrass
- Can be difficult to establish?
- Very persistent
- Relatively high protein
Reed canarygrass
- Can be difficult to establish?
- Very persistent
- Relatively high protein
Reed Canarygrass

- Large ligule
Timothy
Timothy
Tall Fescue
Tall Fescue
Perennial Ryegrass
Kentucky Bluegrass
Smooth Bromegrass

• “M” constriction in middle of leaf
• Smooth seedhead that tends to flop to one side
Smooth bromegrass
- Has distinctive $M$ or $W$ constriction in leaf
- Rhizomes, forms a sod
Quackgrass
Quackgrass
Tall grasses

- Orchardgrass, timothy, tall fescue, smooth bromegrass, reed canarygrass
- Do not graze, mow or clip closer than 3 inches, reserves and new growth are in the stubble
- With the exception of orchardgrass will not tolerate frequent grazing below typical hay cutting height
Short grasses

- Bluegrass, perennial ryegrass
- Will tend to take shorter and more continuous grazing and mowing
- Bluegrass has basil tillers than seem to survive the closest clipping and grazing
Growth habit

• Bunch Type
  – orchardgrass, timothy, tall fescue, perennial ryegrass

• Sod Forming-Rizhomes
  – reed canarygrass, smooth bromegrass, bluegrass
Grass Regrowth

• Type of regrowth: culms = stems
  – Regrowth culmless: tall fescue, orchardgrass, bluegrass
  – Regrowth culmed: reed canarygrass, smooth bromegrass
  – Regrowth culmed reproductive: timothy, perennial ryegrass
Apical Dominance

Growth is dominated by growing point at the tip of stem or root. Removal allows new buds to form and grow.

- **Strong**
  - Timothy
  - Smooth Bromegrass

- **Intermediate**
  - Orchardgrass
  - Reed Canarygrass
  - Tall Fescue

- **Weak**
  - Perennial Ryegrass
  - Kentucky Bluegrass
Legume

- Dicot
  - Two leaf seedling
  - Leaf veins net like
  - New growth can come from new buds in above ground portion of plant
- Seed in pod
- Roots have nodules
  - Use an inoculant
Alfalfa
Red Clover

Red Flower

“V” watermark
White Clover
Alsike Clover
Evening One Agenda

✓ What do I have?
  ✓ Species
  ❏ Soil type
  ❏ Soil testing

❏ What do I do with it?
  ❏ Improve fertility
  ❏ Improve cutting management
Soil

- Typically half solid and half space
- Pores about equally contain air and water
- Nutrients held on solids
- Plant available nutrients are in soil solution (water)
Sand

- Coarse larger particle
- Little surface area
Silt

- Smaller smooth particle
- Silt “flows”
Clay

- Smaller plate like particle
- Lots of surface area.
• Good
  – water drains away
  – roots need air
  – warm up early in the spring

• Bad
  – water drains away
  – less organic matter
  – don’t hold nutrients

• Good
  – hold moisture
  – holds nutrients
  – higher organic matter

• Bad
  – hold moisture
  – slow to warm up in the spring
Know your soil types

• Soils have a specific soil name (soil series)
• Named based on the local it was found in
Know your soil types

• Will tell you drainage class
• Need for Cornell specific nutrient recommendations
RHINEBECK SERIES

- The Rhinebeck series consists of very deep, somewhat poorly drained soils formed in clayey lacustrine sediments. They are on glacial lake plains and uplands mantled with lake sediments. Slope ranges from 0 to 15 percent. Mean annual temperature is 48 degrees F, and mean annual precipitation is 39 inches.
Where you can obtain

- Local Soil and Water Conservation District office
- and
- Natural Resources Conservation Service office
- Soil Survey books
- http://websoilsurvey.nrcs.usda.gov/app/
Welcome to Web Soil Survey (WSS)

Web Soil Survey (WSS) provides soil data and information produced by the National Cooperative Soil Survey. It is operated by the USDA Natural Resources Conservation Service (NRCS) and provides access to the largest natural resource information system in the world. NRCS has soil maps and data available online for more than 95 percent of the nation’s counties and anticipates having 100 percent in the near future. The site is updated and maintained online as the single authoritative source of soil survey information.

Soil surveys can be used for general farm, local, and wider area planning. Onsite investigation is needed in some cases, such as soil quality assessments and certain conservation and engineering applications. For more detailed information, contact your local NRCS state office.
Herkimer County, New York, Southern Part (NY613)

<table>
<thead>
<tr>
<th>Map Unit Symbol</th>
<th>Map Unit Name</th>
<th>Acres in AOT</th>
<th>Percent of AOT</th>
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<tbody>
<tr>
<td>BOC</td>
<td>Bombay very fine sandy loam, 8 to 15 percent slopes</td>
<td>0.4</td>
<td>0.5%</td>
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<tr>
<td>CcB</td>
<td>Conesus silt loam, 2 to 8 percent slopes</td>
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<td>3.8%</td>
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<tr>
<td>FaC</td>
<td>Farmington silt loam, 0 to 8 percent slopes</td>
<td>16.2</td>
<td>21.4%</td>
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<tr>
<td>HcA</td>
<td>Hornell silt loam, 0 to 3 percent slopes</td>
<td>2.3</td>
<td>3.0%</td>
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<tr>
<td>HcC</td>
<td>Hudson silt loam, loamy substratum, 8 to 15 percent slopes</td>
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<td>4.2%</td>
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<tr>
<td>RbA</td>
<td>Rhinebeck silt loam, loamy substratum, 0 to 3 percent slopes</td>
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<tr>
<td>WaA</td>
<td>Wassaic silt loam, 0 to 3 percent slopes</td>
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<td>WaB</td>
<td>Wassaic silt loam, 3 to 8 percent slopes</td>
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<td>Wassaic silt loam, 8 to 15 percent slopes</td>
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<td>12.7%</td>
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<tr>
<td>WaD</td>
<td>Wassaic silt loam, 15 to 25 percent slopes</td>
<td>3.5</td>
<td>4.7%</td>
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Totals for Area of Interest: 75.8 100.0%
## Herkimer County, New York, Southern Part (NY615)

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**Totals for Area of Interest**

|                | 75.8 | 100.0% |


Herkimer County, New York, Southern Part

Wab—Wassaic silt loam, 3 to 8 percent slopes

Map Unit Setting
- Elevation: 600 to 1,750 feet
- Mean annual precipitation: 41 to 50 inches
- Mean annual air temperature: 45 to 49 degrees F
- Frost-free period: 125 to 165 days

Map Unit Composition
- Wassaic and similar soils: 80 percent
- Minor components: 20 percent

Description of Wassaic

Setting
- Landform: Ridges, hill plains, benches
- Landform position (two-dimensional): Summit
- Landform position (three-dimensional): Crest
- Down-slope shape: Convex
- Across-slope shape: Convex
- Parent material: Loamy till derived mainly from limestone, with varying amounts of sandstone, shale, and crystalline rock

Properties and qualities
- Slope: 3 to 8 percent
- Depth to restrictive feature: 20 to 40 inches to lithic bedrock
- Drainage class: Well drained
- Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.05 in/hr)
- Depth to water table: More than 80 inches
- Frequency of flooding: None
- Frequency of ponding: None
- Calcium carbonate, maximum content: 1 percent
- Available water capacity: Low (about 4.0 inches)

Interpretive groups
- Farmland classification: All areas are prime farmland
- Land capability (nonirrigated): 2e
- Hydrologic Soil Group: C

Typical profile
- 0 to 2 inches: Silt loam
- 2 to 7 inches: Loam
- 7 to 28 inches: Gravelly silt loam
- 28 to 32 inches: Unweathered bedrock

Minor Components

Honeoye
- Percent of map unit: 5 percent

Formerington
- Percent of map unit: 5 percent
Properties and qualities

- Slope: 3 to 8 percent
- Depth to restrictive feature: 20 to 40 inches to lithic bedrock
- Drainage class: Well drained
- Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.06 in/hr)
- Depth to water table: More than 80 inches
- Frequency of flooding: None
- Frequency of ponding: None
- Calcium carbonate, maximum content: 1 percent
- Available water capacity: Low (about 4.0 inches)

Interpretive groups

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<th>Suitabilities and Limitations Ratings</th>
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<tr>
<td>Open All</td>
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<tr>
<td>Building Site Development</td>
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<tr>
<td>Construction Materials</td>
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<td>Disaster Recovery Planning</td>
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<tr>
<td>Land Classifications</td>
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<tr>
<td>Land Management</td>
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<td>Military Operations</td>
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<td>Recreational Development</td>
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<td>Sanitary Facilities</td>
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<tr>
<td><strong>Vegetative Productivity</strong></td>
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<tr>
<td>Crop Productivity Index</td>
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<tr>
<td>Forest Productivity (Cubic Feet per Acre per Year)</td>
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<tr>
<td>Forest Productivity (Tree Site Index)</td>
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<td>Iowa Corn Suitability Rating</td>
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<td>Range Production (Favorable Year)</td>
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<td>Range Production (Normal Year)</td>
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<td>Range Production (Unfavorable Year)</td>
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<tr>
<td>Yields of Irrigated Crops (Component)</td>
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<tr>
<td>Yields of Irrigated Crops (Map Unit)</td>
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<td>Map unit symbol</td>
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<td>BuB</td>
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<tr>
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</tr>
<tr>
<td>DaB</td>
</tr>
<tr>
<td>Ha</td>
</tr>
<tr>
<td>NuC</td>
</tr>
</tbody>
</table>

Totals for Area of Interest  

|                  | 70.7 |

Description — Yields of Non-Irrigated Crops (Component)

These are the estimated average yields per acre that can be expected of selected nonirrigated crops under normal cultural practices.
Evening One Agenda

✓ What do I have?
  ✓ Species
  ✓ Soil type
  ❑ Soil testing

❑ What do I do with it?
  ❑ Improve fertility
  ❑ Improve cutting management
If you use no fertilizer or manure this year will your crops still grow?
How much from the soil?

• Don’t care!
• Experience
• Soil Testing
  – has its limitations
  – as good as info you provide
Take samples to plow depth or 5-6 inches

Take representative samples throughout the field

Take one composite sample for analysis
## Agro-One Soil Analysis

**with Cornell Nutrient Guidelines**

**Example 1**

### Lab Sample ID: Example 1

**Field/Location:**

**Date Sampled:**

**Date Tested:**

**Statement ID:**

**Description:**

### Nutrient Analysis

<table>
<thead>
<tr>
<th>Element</th>
<th>lbs/acre*</th>
<th>Very Low</th>
<th>Low</th>
<th>Medium</th>
<th>High</th>
<th>Very High</th>
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<tbody>
<tr>
<td>Phosphorus (P)</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Potassium (K)</td>
<td>138</td>
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<td>Calcium (Ca)</td>
<td>3,209</td>
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<tr>
<td>Magnesium (Mg)</td>
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<table>
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<tr>
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<tbody>
<tr>
<td>Soil pH</td>
<td>5.7</td>
<td>Manganese (Mn)</td>
<td>3.2</td>
<td>% OM</td>
<td>6.1</td>
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<tr>
<td>Buffer pH</td>
<td>5.6</td>
<td>Zircon (Zn)</td>
<td>1.2</td>
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<tr>
<td>Iron (Fe), lbs/acre</td>
<td>10.4</td>
<td>Aluminum (Al), lbs/acre</td>
<td>97.5</td>
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</table>

### Crop History

<table>
<thead>
<tr>
<th>Year</th>
<th>Crop</th>
<th>Grasses Maintenance</th>
<th>Grasses Maintenance</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td></td>
<td>1</td>
<td>2</td>
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### Soil Fertilizer Recommendations

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<tbody>
<tr>
<td>1</td>
<td></td>
<td>3.00 lb/acre</td>
<td>50 - 75 kg/ha</td>
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<tr>
<td>2</td>
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<td>0.00 lb/acre</td>
<td>50 - 75 kg/ha</td>
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### Comments

- Improve yield and plant quality as well as protect the environment with proper fertilization.

* Morgan analysis results reported in pounds per acre.

Nutrient recommendations provided by Cornell University. For assistance interpreting your report, contact your local Cooperative Extension office at 607-254-2544 or http://cwe.cornell.edu/Pages/Default.aspx for a complete list of Cornell Cooperative Extension offices.

Nutrient recommendations provided by Cornell University.

These are general guidelines. Always consult with your crop advisor for recommendations specific to your farm.

* T1 Lime rate is for 100% E&V. To calculate actual rate, rate to use = recommended rate/E&V (all lime sources) ≤ 1.00.
### Nutrient Recommendations

<table>
<thead>
<tr>
<th>Element</th>
<th>Lbs/acre*</th>
<th>Very Low</th>
<th>Low</th>
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### Lab Results

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<tr>
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<td>Manganese (Mn), lbs/acre</td>
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<td>% OM</td>
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</table>

### Sample Information Summary

- Soil Name: Valois
- Tillage Depth: 1 - 7 Inches
- Drainage: Not Specified
- % Legume: Not Specified
- Crop Code: GRT
- Type: Pre-Plant

### Soil Fertilizer Recommendations

<table>
<thead>
<tr>
<th>Year</th>
<th>Crop</th>
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<th>N Range</th>
<th>P2O5 Range</th>
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**Comments - Improve yield and plant quality as well as protect the environment with proper fertilization.**

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</thead>
<tbody>
<tr>
<td>3</td>
<td>Grasses Maintenance</td>
</tr>
<tr>
<td>2</td>
<td>Grasses Maintenance</td>
</tr>
<tr>
<td>1</td>
<td>Grasses Maintenance</td>
</tr>
</tbody>
</table>

### Sample Information Summary

- **Soil Name:** Valois
- **Tillage Depth:** 1 - 7 Inches
- **Drainage:** Not Specified
- **% Legume:** Not Specified
- **Crop Code:** GRT
- **Type:** Pre-Plant

### Soil Fertilizer Recommendations (1=current yr, 2=next yr, etc.)

<table>
<thead>
<tr>
<th>Year</th>
<th>Crop</th>
<th>Lime</th>
<th>N Range</th>
<th>P2O5 Range</th>
<th>K2O</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Grasses Maintenance</td>
<td>3.00</td>
<td>50 - 75</td>
<td>40</td>
<td>30.00</td>
</tr>
<tr>
<td>2</td>
<td>Grasses Maintenance</td>
<td>0.00</td>
<td>50 - 75</td>
<td>40</td>
<td>30.00</td>
</tr>
<tr>
<td>3</td>
<td>Grasses Maintenance</td>
<td>0.00</td>
<td>50 - 75</td>
<td>40</td>
<td>30.00</td>
</tr>
</tbody>
</table>

**Comments** - Improve yield and plant quality as well as protect the environment with proper fertilization.

* Morgan analysis results reported in pounds per acre.

Nutrient recommendations provided by Cornell University. For assistance interpreting your report, contact your local Cooperative Extension office at 607-334-5841 or http://cce.cornell.edu/Pages/Default.aspx for a complete list of Cornell Cooperative Extension offices.

Nutrient recommendations provided by Cornell University.

These are general comments. Always consult with your crop adviser for recommendations specific to your farm.

Yr1 Lime rate is for 100% ENV. To calculate actual rate: rate to use = recommended rate/ENV (of lime source) x 100.
Example 2

La5 Sample ID: Example 2
Field/Location:
Date Sampled:
Date Tested:
Statement ID:
Description:

<table>
<thead>
<tr>
<th>Element</th>
<th>lbs/acre*</th>
<th>Very Low</th>
<th>Low</th>
<th>Medium</th>
<th>High</th>
<th>Very High</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phosphorus (P)</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Potassium (K)</td>
<td>1.83</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Calcium (Ca)</td>
<td>3.216</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Magnesium (Mg)</td>
<td>200</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Element</th>
<th>Value</th>
<th>Element</th>
<th>Value</th>
<th>Element</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soil pH</td>
<td>5.9</td>
<td>Manganese (Mn)</td>
<td>28.7</td>
<td>% OM</td>
<td>5.5</td>
</tr>
<tr>
<td>Buffer pH</td>
<td>6.7</td>
<td>Zinc (Zn)</td>
<td>1.1</td>
<td>% Legume</td>
<td></td>
</tr>
<tr>
<td>Iron (Fe)</td>
<td>24.6</td>
<td>Aluminum (Al)</td>
<td>9.1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Crop History (1 = last year, etc.)

<table>
<thead>
<tr>
<th>Year</th>
<th>Crop</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.4</td>
<td>Corn-Silage</td>
</tr>
<tr>
<td>2.4</td>
<td>Corn-Silage</td>
</tr>
<tr>
<td>1.4</td>
<td>Clover-Grass Seeding</td>
</tr>
</tbody>
</table>

Sample Information Summary

- Soil Name: Red Hook
- Crop Code: CO7
- Tillage Depth: 1 - 7 inches
- Drainage: Not Specified
- Type: Maintenance
- % Legume: 50% - 100% Legume

Soil Fertilizer Recommendations (1 = current yr, 2 = next yr, etc.)

<table>
<thead>
<tr>
<th>Year</th>
<th>Crop</th>
<th>tons / acre</th>
<th>lbs / acre</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Clover-Grass Maintenance</td>
<td>2.00</td>
<td>40</td>
</tr>
<tr>
<td>2</td>
<td>Clover-Grass Maintenance</td>
<td>0.00</td>
<td>40</td>
</tr>
<tr>
<td>3</td>
<td>Clover-Grass Maintenance</td>
<td>0.00</td>
<td>40</td>
</tr>
</tbody>
</table>

Comments - Improve yield and plant quality as well as protect the environment with proper fertilization.

* Morgan analysis results reported in pounds per acre.
Nutrient recommendations provided by Cornell University. For assistance interpreting your report, contact your local Cooperative Extension office at 607-254-5041 or http://cwe.cornell.edu/Pages/Default.aspx for a complete list of Cornell Cooperative Extension offices.
Nutrient recommendations provided by Cornell University.
These are general comments. Always consult with your crop advisor for recommendations specific to your farm.

*1 Lime rate is for 100% EWV. To calculate actual rate, rate to use = recommended rate/EWV (all lime source) x 100.
| Year | Crop                  | 1  | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 |
Evening One Agenda

✓ What do I have?
  ✓ Species
  ✓ Soil type
  ✓ Soil testing

❌ What do I do with it?
  ❌ Improve fertility
  ❌ Improve cutting management
Improving pH - Lime

• Apply lime and nutrients to soil test recommendations

• Lime recommendations is based on lime with 100% ENV (Effective Neutralizing Power)

• Example:
  – If lime ENV is 75% and you need 3 ton of lime how many tons do you apply:
  – $3\text{ ton} \div 0.75 = 4\text{ tons}$ to be applied
Improving Fertility – Adding Plant Nutrients

• Use fertilizer and/or manure
• Example: If you need 75 lbs N, 40 lbs $\text{P}_2\text{O}_5$ and 1 lbs 30 $\text{K}_2\text{O}$ per acre, what fertilizer do you buy?
  – Go to fertilizer dealer and tell them to mix you the fertilizer you need
Or
  – Use a known analysis like 19-19-19 and apply the pounds that get you close
Improving Fertility – Adding Plant Nutrients (continued)

• Example
  – If you need 75 lbs N, 40 lbs P$_2$O$_5$ and lbs 30 K$_2$O per acre, what fertilizer do you buy?
  – Go to fertilizer dealer and tell them to mix you the fertilizer you need

Or

  – If you need 75 lbs N, 40 lbs P$_2$O$_5$ and lbs 30 K$_2$O per acre, what fertilizer do you buy?
• Soil Test
• For alfalfa apply any needed lime
• Phosphorous and Potassium
  – On dairy farms most P and K should come on the farm in feed truck and go to the field in a manure spreader
  – Should not need P or K on fields regularly receiving manure
  – Fields not receiving manure and selling hay crop will likely need manure.
Nitrogen

- For grasses you need 200-225 lbs of actual N in applications spread out over the summer.
- Unlikely you would apply enough manure to supply nitrogen.
- Typically need 50 lbs actual N for every ton of anticipated dry matter yield.
- Example (lbs actual N): 100 lbs at green up in the spring, 50 lbs after 1st cutting and 50 lbs after 2nd.
- Can be combo with manure to achieve desired N.
Thoughts on fertility...

• Lack of nitrogen fertilization is one reason why grasses still tend to be under appreciated
  – Reason for “I don’t get any second cutting”
  – Nitrogen can raise protein and lower fiber levels

• Is field grass or legume
  – Decide which it is, don’t view as a mix
  – Fertilize accordingly