Mena Hautau
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CONVERTING CROPLAND
AND
PASTURE IMPROVEMENT

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Goals

- Understand
  - preparation before seeding occurs
  - some soil fertility basics
  - different methodologies for pasture conversion

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Field Crop History

- Previous crop in the rotation
  - Use of atrazine in corn fields
  - Pot up oats in soil from the field
  - Talk to previous manager
- Perennial weeds controlled before seeding

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Soil Test

- Every 3-4 years per 10-20 acres
- pH
  ideal = 6.8
  alfalfa 6.5-7.0
  all other legumes 5.5-7.0

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Lime

- Apply ahead of seeding
- Split high rates
- Pay attention to quality

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Macronutrients - NPK

- Phosphorous (P)
- Potassium/potash (K)
  - Optimum to above optimum levels
- Nitrogen
  - N is a recommended nutrient

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Micronutrients

- **Ca or Mg: soil test results**
  - **Lime is the source**
- **All others:**
  - **no need unless disturbed land**

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Case Study

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Soil Test Results
Grazing Farm in Berks County

- Soil pH 6.5
- Phosphorous 13 ppm (low)
- Potash 48 ppm (low)
- Magnesium 321 ppm (above optimum)
- Calcium 2527 ppm (high, limestone)
- OM 3.4%

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What was the **Limiting Factor** in this soil?

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Organic Matter

- **The soil "glue"**
- **Media for minerals, enzymes**

- **Water holding capacity**
- **Soil oxygen=soil life**

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Getting the Most from Your Soil

- Ability to release minerals from the soil determined by its composition
  - Sand
  - Silt
  - Clay

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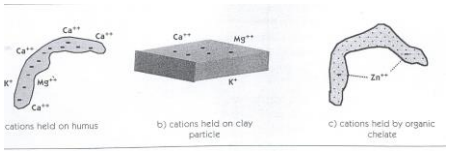
Getting the Most from Your Soil



Negative sites on soil, humus
From: *Building Soils for Better Crops*

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Micorrhizal Fungal Life

Found in:

- **Forested soils**
- **Permanent Pastures**
- **Long Term No-till**

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Getting the Most from Your Soil

- **Soils are enhanced by:**
  - **Plant root biodiversity**
  - **Eliminating tillage**
  - **Ideal pH**
  - **No "magic potion" or mineral supplement gives a higher yield, better soil!**

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Fertility Sources

- **Manure, compost, etc.**
- **Fertilizer**
  - **Soil test or 50#/T NPK annually**
- **Certified organic?**
- ***Penn State Agronomy Guide***
- ***Soil Fertility Management for Forage*** **fact sheets**
- ***Using Organic Nutrient Sources*** **fact sheet**

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Seeding

- **Inoculate legumes if no history**
- **Penn State Forage Trials**
  - **Grazing and Hay trials**
  - **Evaluates variety performance**

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Renovation OR Restoration

- **Evaluate forage cover (50-50)**
- **Pasture *restoration*:**
  - **animal power and fertility building**
  - **interseeding, frost seeding**
- **Pasture *renovation***
  - **Tillage VS. No-Till**

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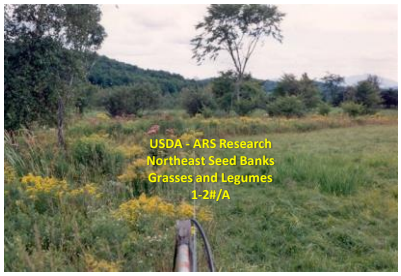
Animal Power Restoration
Vermont: Sheep renovate forest to pasture



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Doug Flack

- **Started grazing in 1978**
- **Emphasis on low input: Animals did the work over time**
- **Southeast PA? High land value**

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Flack Farm

- **Soils pH 4.8, 5.8 in 1994**
- **55 lambs plus ewes used for mob grazing**
- **No input in lime or seeding**
- **Pioneer in grazing- Sold fencing supplies**

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Pasture Renovation-Berks County "10 Acres Before"

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Pasture Renovation-Berks County "10 Acres After"

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Review-Steps to Successful Pasture Renovation

- **Plan** (6 steps)
- **Implement plan**
- **Most failures in pasture renovation are the result of inadequate preparation and/or not understanding the field conditions.**

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1. Soil Test

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☑ 1. Soil Test

2. Apply Soil Amendments

Apply lime at least 6 months prior to seeding.

Do not apply nitrogen before or immediately after seeding.

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- ☑ **1. Soil Test**
- ☑ **2. Apply Soil Amendments**
- **3. Select Appropriate Species/Variety**
  - **•Environmental constraints**
  - **•Management constraints**
  - **•Usually want a legume in pasture**

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- ☑ **1. Soil Test**
- ☑ **2. Apply Soil Amendments**
- ☑ **3. Select Appropriate Species**

4. Control weeds before seeding (perennials)

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- ☑ 1. Soil Test
- ☑ 2. Apply Soil Amendments
- ☑ 3. Select Appropriate Species
- ☑ 4. Control weeds before seeding

5. Destroy or suppress existing stand via herbicides or tillage OR use rotation management

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- ☑ 1. Soil Test
- ☑ 2. Apply Soil Amendments
- ☑ 3. Select Appropriate Species
- ☑ 4. Control weeds before seeding
- ☑ 5. Destroy or suppress stand

6. Use appropriate seeding method based on tillage

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Pasture Renovation

- Tillage
- No-Till

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Pasture Renovation with Tillage

- **Advantages**
  - Most widely used method due to equipment availability
  - Farming systems without herbicides
  - Best used where need to mix a lot of lime, fertilizers (low fertility)

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Pasture Renovation with Tillage

- **Disadvantages**
  - Soil erosion of steep slopes
  - Fuel use
  - Carbon loss

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No-Till Pasture Renovation

- **No-till farming:**
  - Farming method where soil is not disturbed

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No-Till Pasture Renovation

- **Advantages**
  - Soil is undisturbed
  - Soil structure maintained
  - No erosion on steep slopes
  - Fuel savings due to less tillage

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No-Till Pasture Renovation

- **Disadvantages**
  - Herbicide is the substitute for tillage
  - Specialized equipment-not every custom farmer has
  - Cannot mix lime and fertilizers into soil. Must surface apply

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Case Study Situation

- "Barcel" tall fescue in seeding mix became dominant specie in pasture
- Cattle selected for other pasture species,
- TF out-competed the other species

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No-Till Pasture Renovation

- Late summer-applied glyphosate by custom applicator
- Non-selective
- Killed sod

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No-Till Renovation

- **Late summer**
  - Seeded annual rye with a grain drill

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No-Till Renovation Planting and Emergence

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No-Till Renovation


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No-Till Renovation

- March-
  - –Annual rye coming out of dormancy

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No-Till Renovation

- –Were able to graze fall and spring
- –Skipped planting a summer annual-dry summer

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No-Till Renovation

- Fall: Seed permanent pasture mix


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No-Till Renovation

- **New pasture mix**
  - – Perennial ryegrass
  - – Orchardgrass
  - – Red clover
  - – White clover
  - – Puna chickory

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Pasture Renovation with modified Aerway (Gen-Till)

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Tillage-Pasture Renovation-Spring


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Tillage-Pasture Renovation-Summer

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Tillage-Pasture Renovation

Summer-
Brown mid-rib (BMR) sorghum sudangrass

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Tillage-Pasture Renovation-Autumn
Italian rye and red clover


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Tillage-Pasture Renovation

- Spring: New permanent seeding is planted

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Time to Seed

- **Fall is BEST time**
  - Mid August through mid September
- **Spring ???: April-May**
  - Adequate moisture
  - Weeds managed
  - Soil type

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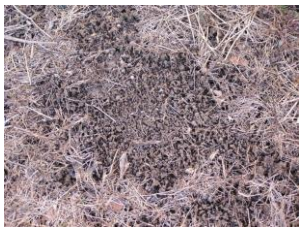
Frost Seeding

- "Honeycombed" soil
- Freeze/thaw works in seed
- Best done with clovers



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Tillage Systems

- **Soil to seed contact is VERY important!**
- **Custom seeded?**
- **Shown: cultipacker is used in tilled systems**

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Seeding Rates

- Check Agronomy Fact Sheets
- Seeding rates assume ideal planting conditions
- Seed company recommendations vary widely
- See handout on seeding rates

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Depth of Seeding

- Plant at .25 inches
- Do not bury seeds!
- Tillage: Should see footprint in ground before seeding. 10% of seeds on top of ground
- No-till: Get off the planter, check furrow to make sure seed is NOT in the residue, but in the soil

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Summary

- **Assess need for renovation**
  - **Pasture quality**
  - **Cost**
- **Preparation important to success**

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Thank you!

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