Fertility Management for Organic Production

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Start with a Soil Test

- Phosphorus (P)
- Potassium (K)
- pH
- CEC
- OM (organic matter)



Start with a Soil Test

- Critical Soil Test Levels Phosphorus (P)
  - Corn 15 ppm
  - Soybean 15 ppm
  - Wheat 25 ppm
  - Alfalfa 25 ppm

Start with a Soil Test

- Critical Soil Test Levels for Potassium (K)
  - CEC = 10 CEC = 20
  - 100 ppm 125 ppm
  - For all crops

Start with a Soil Test

- Critical Soil Test Levels for Soil pH
  - Alfalfa pH 6.5
  - Other Crops pH 6.0
  - Liming needed when pH falls 0.2 to 0.3 units below critical levels

Start with a Soil Test

- Calcium (Ca)
  - critical level > 200 ppm
- Magnesium (Mg)
  - Critical level > 50 ppm
  - Ratio Ca / Mg > 1:1

Nutrients Removed in Harvested Portions of Agronomic Crops.

Crop	Unit of yield	Nutrient removed per unit of yield	
		P_2O_5	K_2O
		lb/unit	
Corn			
Feed grain	bushel	0.37	0.27
Silage	ton	3.30	8.00
Soybeans	bushel	0.80	1.40
Wheat			
Grain	bushel	0.63	0.37
Straw	bushel	0.09	0.91
Alfalfa	ton	13.00	50.00

Total Nitrogen Recommendations for Wheat Based on Yield Potential.

Yield potential bu/acre	*Pounds N to apply lb N/acre*
50	40
70	75
90+	110

Nitrogen Recommendations for Corn Based on Yield Potential and Previous Crop.

Previous crop	*Corn yield potential (bu/acre)*					
	80	100	120	140	160	180+
	pounds N to apply per acre					
Corn and most other crops	80	110	140	160	190	220
Soybeans	50	80	114	130	160	190
Grass sod	40	70	100	120	150	180
Established forage legume Average stand (3 plants/sq ft)	0	10	40	60	90	120
Good stand (5 plants/sq ft)	0	0	0	20	50	80
Annual legume cover crop	50	80	110	130	160	190

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THE OHIO STATE UNIVERSITY Bulletin Extension

Tri-State Fertilizer Recommendations
Bulletin E-2567

Sampling, Handling and Testing Soils

Soil pH and Lime Recommendations

Nitrogen , Phosphorus, Potassium Recommendations

Nutrients Used by Crop

Sources of Nutrients for Organic Crop Production

- Manure
- Compost
- Cover Crop
- Previous Crop
- Other – Foliar or Soil Applied

Straw Pack Steer Manure



Manure Application



Nutrient Content

- Steer Manure
- 4 ton / acre
  - N 77 lb /ac
  - P2O5 40 lb /ac
  - K2O 62 lb/ac
- Poultry Compost
- 2 ton / acre
  - N 80 lb / ac
  - P2O5 230 lb /ac
  - K2O 123 lb /ac

Bulletin

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Ohio Livestock Manure Management Guide
Bulletin 604-06

Manure Characteristics

Animal Type, Size,
Weight & Volume of Manure,
Nutrient Content

Red clover



Nutrient Content

- Red Clover topgrowth
- 1.5 ton /ac
  - N 120 lb/ac
  - P 8 lb/ac
  - K 77 lb/ac



Austrian Winter Peas @ 30 lbs/acre

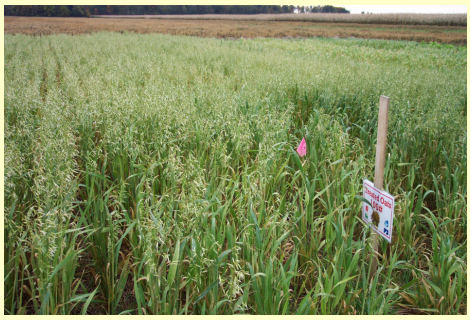
Cowpea



NW Ag Research Farm

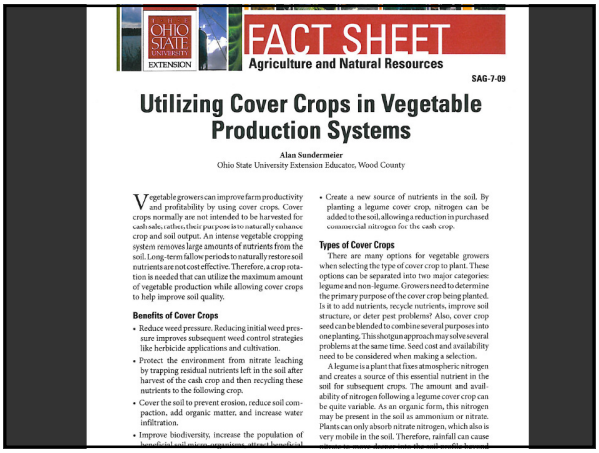


Oats planted Aug. 3
Shelby County



Nutrient Levels in Oats

Nutrient	Lbs / Ton Biomass	Lbs @ 4 Ton
Nitrogen	69.5	278
Elemental P	8.8	35
Elemental K	81.8	327



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FACT SHEET

Agriculture and Natural Resources

SAG-7-09

Utilizing Cover Crops in Vegetable Production Systems

Alan Sundermeier
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Vegetable growers can improve farm productivity and profitability by using cover crops. Cover crops normally are not intended to be harvested for cash sale, rather, their purpose is to naturally enhance crop and soil output. An intense vegetable cropping system removes large amounts of nutrients from the soil. Long-term fallow periods to naturally restore soil nutrients are not cost effective. Therefore, a crop rotation is needed that can utilize the maximum amount of vegetable production while allowing cover crops to help improve soil quality.

Benefits of Cover Crops

- Reduce weed pressure. Reducing initial weed pressure improves subsequent weed control strategies like herbicide applications and cultivation.
- Protect the environment from nitrate leaching by trapping residual nutrients left in the soil after harvest of the cash crop and then recycling these nutrients to the following crop.
- Cover the soil to prevent erosion, reduce soil compaction, add organic matter, and increase water infiltration.
- Improve biodiversity, increase the population of [illegible]
- Create a new source of nutrients in the soil. By planting a legume cover crop, nitrogen can be added to the soil, allowing a reduction in purchased commercial nitrogen for the cash crop.

Types of Cover Crops

There are many options for vegetable growers when selecting the type of cover crop to plant. These options can be separated into two major categories: legume and non-legume. Growers need to determine the primary purpose of the cover crop being planted. Is it to add nutrients, recycle nutrients, improve soil structure, or deter pest problems? Also, cover crop seed can be blended to combine several purposes into one planting. This shotgun approach may solve several problems at the same time. Seed cost and availability need to be considered when making a selection.

A legume is a plant that fixes atmospheric nitrogen and creates a source of this essential nutrient in the soil for subsequent crops. The amount and availability of nitrogen following a legume cover crop can be quite variable. As an organic form, this nitrogen may be present in the soil as ammonium or nitrate. Plants can only absorb nitrate nitrogen, which also is very mobile in the soil. Therefore, rainfall can cause



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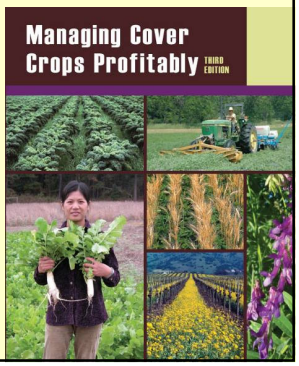

Foliar or Soil Applied Nutrients

- Seaweed, Fish emulsion,
- rock phosphate
- biological/ microbe activator

- Beware of non-approved OMRI ingredient
- % active ingredient
- Plant availability

Develop a Whole Farm Plan

- Track flow of nutrients produced & used on farm
- How can you generate/reuse more nutrients (cover crops, compost)
- Accept others waste (food scraps, leaves)
- Rotate legumes and grasses for N
- Match nutrient supply to crop needs

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