# Alternative Systems for Processing Vegetables

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# Alternative Thinking

- Improvement in soil quality
  - Organic matter
    - Nutrient mineralization
    - Water holding capacity
    - Soil structure – water infiltration
    - Biological activity of soils
- Alternative nutrient sources
  - Green manures or cover crops
  - Soil amendments

# Role in Vegetable Systems

- Opportunity
  - Shortened growing season
    - 65 – 80 d crops
    - Late planting, early harvest
- Cover crops
  - Annual covers
  - Perennial covers
- Organic production systems


Alfalfa Under-seeded in Snaps


Hairy Vetch Underseeded into Beans


No Intercrop


Sweetclover after Roundup

# No cover

# Alfalfa in the Corn Understory

2 applications of Roundup

Preplant disking

Bicep Lite

# Perennial Cover Crop Biomass

| | Fall Growth (10/18) | | Spring Growth (5/17) | |
|---|---|---|---|---|
| | biomass | N | biomass | N |
| | ton/a | lb/a | ton/a | lb/a |
| No cover crop | 0.00 | 0.00 | 1.08 | 29.25 |
| Hairy vetch | 1.58 | 127.08 | 0.48 | 45.19 |
| Alfalfa | 0.92 | 67.47 | 1.46 | 120.66 |
| Red Clover | 1.26 | 92.64 | 1.28 | 101.23 |
| Sweet/Yellow Clover | 0.94 | 68.37 | 1.39 | 120.05 |
| Alsike Clover | 0.84 | 59.51 | 0.95 | 79.80 |
| LSD (0.05) | 0.31 | 1.32 | 0.27 | 1.45 |

# Sweet Corn Yield

| | Yield (ton/a) | |
|---|---|---|
| Cover crop | 0 N | 150 lb N |
| No cover crop | 1.82 | 8.36 |
| Hairy vetch | 6.87 | 8.88 |
| Alfalfa | 6.45 | 8.08 |
| Red Clover | 7.31 | 8.81 |
| Sweet/Yellow Clover | 8.09 | 8.57 |
| Alsike Clover | 7.14 | 7.85 |

0.97

# Summary

- Yields of snap beans unacceptable
  - Growing cover crop in vegetable under story
  - Take advantage of crop resources
- Perennial cover survived snaps, tillage, glyphosate and in some cases corn
- Save cost of 100 to 140 lb N/a
  - 20 to 30 units N to optimize yield

# Cover crops

# Sweet Corn Yield Response to Fertilizer Source

| | N rate (lb/a) | | P rate | Corn Yield (ton/a) | | Cost ($/a) |
|---|---|---|---|---|---|---|
| N source | 1/2 x | 1 x | (lb/a) | 1/2 x | 1x | 1x rate |
| Commercial | 75 | 150 | 25 | 7.9 | 9.3 | $75 |
| OMRI Fert. | 80 | 152 | 25 | 8.8 | 9.9 | $450 |
| Manure | 80 | 155 | 205 | 7.3 | 7.3 | $250 |


O N, rye cover
150 N, NH4NO3
150 N, OMRI
150 N, Manure

# Sweet Corn Yield Response to Integrated Fertility Program

| Cover crop (lb N/A) | Fertilizer* Manure lb/a | Fertilizer* OMRI 11-0-0 lb/a | Total N lb/a | Total P lb/a | Corn Yield ton/a | Fertilizer Cost $/a |
|---|---|---|---|---|---|---|
| Rye | 1250 | 0 | 42 | 55 | 4.9 | 63 |
| Rye | 1250 | 950 | 147 | 55 | 10.1 | 368 |
| Pea (60) | 1250 | 0 | 102 | 55 | 6.4 | 63 |
| Pea (60) | 1250 | 600 | 168 | 55 | 9.5 | 263 |
| Alfalfa (100) | 1250 | 0 | 142 | 55 | 8.62 | 63 |

*all plots received OMRI approved 5-5-5 starter fertilizer

Pea cover,
P based manure

Pea Cover,
P based manure,
OMRI Fertilizers

# Summary

- OMRI approved fertilizer programs yielded similar to conventional fertilizers
- Manure alone resulted in reduced N yield
- Combinations of cover crops with manure maintained yield at reduced management costs

# Future

- Potential of cropping systems
- Optimize inputs to maximize crop yield
- Value of the system – long term benefits