Cover Crops, A Soil Health Approach

SASEV Virtual Table & Dried Grape Information day

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11 August 2021
What are Cover Crops?

- Any plant population grown with the main goal of protecting and enriching soil, that increases soil health over time.
Soil Health Benefits

1. Organic carbon
2. Microbial activity
3. Aeration and Infiltration
4. Nitrogen fixation
5. Weed suppression
6. Erosion prevention
7. Building structure
8. Combatting pathogens
Nitrogen Fixation

- Symbiosis
- Influencing factors
- Typically 15-40kg N/ton DM
- 7kg fixed N - covers inoculant cost*

<table>
<thead>
<tr>
<th>Species</th>
<th>Potential N (kg/ha)</th>
<th>Value (R/ha)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forage Peas</td>
<td>60 - 105</td>
<td>1 500 - 2 625</td>
</tr>
<tr>
<td>Vetch</td>
<td>55 - 170</td>
<td>1 375 - 4 250</td>
</tr>
<tr>
<td>Lupines</td>
<td>85 - 130</td>
<td>2 125 – 3 250</td>
</tr>
<tr>
<td>Perennial Clover</td>
<td>85 - 225</td>
<td>2 125 - 5 625</td>
</tr>
<tr>
<td>Annual Clover &amp; Medics</td>
<td>80 - 150</td>
<td>2 000 – 3 750</td>
</tr>
<tr>
<td>Faba Beans</td>
<td>110 - 170</td>
<td>2 750 - 4 250</td>
</tr>
</tbody>
</table>

* Based on R25/kg N (LAN)
Soil Health Benefits

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Photo source: Nemlab
Integrated weed management

Why?

- Herbicide resistance ↑
- Cost of chemicals ↑
- Availability ↓
- Environmentally conscious consumers ↑

Table: Integrated Weed Management Strategies

- Physical
- Chemical
- Biological
- Ecological

IWM

Table grapes, De Doorns
Soil Health Benefits

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Photo source: Nemlab
Combatting Pathogens

• Four management approaches:
  1. Bio-fumigation
  2. Non- and poor host cover crops
  3. Diversity and rotation
  4. Chemical (Biological?)
Soil Health Benefits

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Natural predators and beneficial insects
Cover Crop Selection

• Rainfall and irrigation
• Soil type
• Goals
  ▪ Weed suppression
  ▪ Forage production
  ▪ Biomass
  ▪ Nitrogen fixation
  ▪ Alleviating compaction
  ▪ Erosion prevention
  ▪ Decoration
• Challenges/Problems
  ▪ Very wet, low/high pH, saline, etc.
• Equipment
• Budget

<table>
<thead>
<tr>
<th>Sand</th>
<th>Loam</th>
<th>Clay</th>
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</thead>
<tbody>
<tr>
<td>Phacelia</td>
<td>Phacelia</td>
<td>Phacelia</td>
</tr>
<tr>
<td>Forage Rye</td>
<td>Forage Rye</td>
<td>Forage Rye</td>
</tr>
<tr>
<td>White Mustard</td>
<td>White Mustard</td>
<td>White Mustard</td>
</tr>
<tr>
<td>Radish</td>
<td>Radish</td>
<td>Radish</td>
</tr>
<tr>
<td>Vetch</td>
<td>Vetch</td>
<td>Vetch</td>
</tr>
<tr>
<td>Bitter Lupines</td>
<td>Bitter Lupines</td>
<td>Barley</td>
</tr>
<tr>
<td>Saia Oats</td>
<td>Oats</td>
<td>Oats</td>
</tr>
<tr>
<td>Serradella</td>
<td>Clover</td>
<td>Clover</td>
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<tr>
<td>Medics</td>
<td>Medics</td>
<td>Medics</td>
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<tr>
<td>Triticale</td>
<td>Triticale</td>
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<tr>
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Formulating Seed Mixtures

- Seed size and shape
- Equipment
- Compatibility
Annual Winter Options

Grasses and Cereals
- Forage Rye
- Forage Barley
- Saia Oats
- Triticale

Legumes
- Lupines
- Vetch
- Forage Peas
- Clovers

Brassicas and Forbes
- Radish
- Mustard
- Phacelia
Perennial Cover Crops

- ‘Mow and blow’ throughout the season
- Maximum material production
- High fibre content = cover that lasts longer
- The idea is to replace expensive mulch and to rather produce it in the work rows
- Nutrient mining/scavenging
Vine Rows
Vine Row Options

- Medics
- Sub Clover
- White Clover
- Grazing Vetch
- Turnips
- Radish
**Bankies**

- Grows low
- Fixes nitrogen in the rootzone
- Re-establishes via seed
- Weed suppression
- Produces a mulch

### Perennial option

<table>
<thead>
<tr>
<th>Seeding rate (kg/ha)</th>
<th>Species</th>
<th>Variety</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Medics</td>
<td>Santiago/Scimitar</td>
</tr>
<tr>
<td>3</td>
<td>Whiet Clover</td>
<td>Durana/Haifa</td>
</tr>
<tr>
<td>6</td>
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</tbody>
</table>

### Annual option

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<td>Medics</td>
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<tr>
<td>3</td>
<td>Sub. Clover</td>
<td>Dalkeith</td>
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</tbody>
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*Wine grapes, Stellenbosch*
Management of open fields

- Annual winter and/or summer cover crops
- Full surface
- 1 - 2 year breaks are ideal
The importance of quality seed

- Newest varieties and species
- Lab reports
  - Germination requirements
  - Purity requirements
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