Can cover crops aid weed suppression in horticultural crops?

Angela Huckle
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Outline

• Cover crops in horticulture
  • Current situation
  • What growers feel are:
    • Benefits
    • Challenges

• Role in weed suppression

• Case study
Cover crop use in horticulture

- Existing plus increasing use and awareness
  - Major growers
    - Vitacress and Emmetts, 10 yrs +
    - 2012 – wet year
    - AHDB GREAT soils project

- Vegetables
  - Overwinter catch crops
  - Fertility building/structure
  - Less very short term use

- Fruit
  - Grass alleyways
  - Bare strips around trees and vines common
Why do horticultural growers use them?

- Fertility + OM building
  - Green manures
- Improving soil structure
- Reduce N leaching
- Reduce soil erosion and runoff

- Weeds – additional benefit (not primary reason)
What benefits are growers seeing? Any weed effects?

- Improved drainage
  - Less standing water

- Improved soil structure
  - Easier to work
  - Better crops

- Weeds
  - Vitacress sow at higher rates in known problem fields

= Increased yield potential
What are the challenges in horticulture?

- Justifying extra cost
- The right species/mix
  - Rotation
  - Soil type
  - Competition
- Manageability
- Fitting into production schedules
  - Sowing dates and establishment
- Machinery
  - Drilling fine seed
Popular species/mixes at present

- Variable depending on grower, soil type and crop rotation
- Grass/cereal + legume
  - N capture + fertility building
- Cereals – N capture and cross compliance
  - Rye/oats/barley
- Phacelia – increasing interest
Potential for weed suppression

- AHDB Hort - GAP analysis
  - Weeds high priority across sectors
  - BLW and grasses
  - Reducing herbicide armoury
  - Integrated approaches
Potential for weed suppression

• Direct competition
  • Fast establishing cover
    • Cereal rye
    • Ryegrass
    • Vetches
  • Mat after mowing
• Allelopathy
  • Rye
  • Buckwheat
  • Mustards

• AHDB Hort/ADAS studies included buckwheat
Cover crops as an alternative to Basamid in salad production

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Methods

• Cover crops sown April 2014

• Assessments at:
  • Initial emergence
  • During establishment
  • Once established
  • One month post establishment

• Weed levels assessed in subsequent spinach crops – 2015

• Soil mineral nitrogen, pH, P, K, Mg and organic matter measured – Oct/Nov 2014 and Feb 2015
  • Additional benefits
# Cover crop treatments

<table>
<thead>
<tr>
<th>Treatment no.</th>
<th>Common name</th>
<th>Seed rates</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Grass and red clover ley - Italian Ryegrass cvs. Danergo, Dracar, Fox, Red clover cv, Milvus (grower standard)</td>
<td>22.5 kg/ha</td>
</tr>
<tr>
<td>2</td>
<td>Clover and grass/ Buckwheat cv. KORA</td>
<td>22.5 kg/ha *</td>
</tr>
<tr>
<td></td>
<td></td>
<td>100 kg/ha *</td>
</tr>
<tr>
<td>3</td>
<td>Buckwheat cv. KORA/ grass and clover</td>
<td>100 kg/ha *</td>
</tr>
<tr>
<td></td>
<td></td>
<td>22.5 kg/ha *</td>
</tr>
<tr>
<td>4</td>
<td>Buckwheat cv. KORA</td>
<td>100 kg/ha</td>
</tr>
<tr>
<td>5</td>
<td>Red clover cv. FORMICA/ Buckwheat cv. KORA</td>
<td>25 kg/ha</td>
</tr>
<tr>
<td></td>
<td></td>
<td>100 kg/ha</td>
</tr>
<tr>
<td>6</td>
<td>Red clover cv. FORMICA</td>
<td>25 kg/ha</td>
</tr>
</tbody>
</table>

* These treatments were created where the mixes were spun together by overlapping edges when broadcast, so seed rates may be lower than indicated.
Weed control during cover cropping -2014
Variable levels of weed suppression
Mean weed per m² in spinach following cover cropping - 2015
Effects on soil mineral nitrogen & N uptake by cover crops

• There were no significant differences in N uptake
  • Where clover was present – N in cover crop was higher (N fixing)

• Soil mineral nitrogen (SMN) measured in November was lowest in mixes containing buckwheat
  • Benefit for N capture

• In Spring – where clover or volunteer clover formed the predominant species
  • SMN gave soil nitrogen supply (SNS) indices of 3-4
  • N capture and N fixing
  • 2014/15 – dry winter
Cover crop trial summary

- Showers following cover crop sowing aided establishment
- Clover/grass ley, clover/grass/buckwheat, red clover/buckwheat & red clover established at >80% cover
- Clover/grass ley & red clover/buckwheat, just red clover provided the best weed suppression
- Buckwheat did not re-establish after flailing
- In 2015 spinach crops – buckwheat (white clover) and red clover + buckwheat (white clover) = best weed suppression
  - Chickweed suppression - equivalent to current grower standard.
  - Suppression of small nettle appears better
  - Additional benefits, N capture, soil structure
Cover crops provide potential weed suppression in horticulture

• From initial UK trials – early stages
• Main reason for use likely to be soil and nutrient benefits
  • Weed suppression effects useful
    • Especially with a declining herbicide armoury
    • Increasing resistance
    • Integrated approach
  • Further information needed

• Horticulture growers are trialling
  • Which species best for which systems and soils
Acknowledgements

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