Can cover crops aid weed suppression in horticultural crops?

Angela Huckle

Field Vegetable Research Consultant

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Outline

- Cover crops in horticulture
  - Current situation
  - What growers feel are:
    - Benefits
    - Challenges
- Role in weed suppression
- Case study

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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

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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)

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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

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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

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Potential for weed suppression

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

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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

Angela Huckle

Field Vegetable Research Consultant

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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

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Cover crop treatments

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

* These treatments were created where the mixes were spun together by overlapping edges when broadcast, so seed rates may be lower than indicated

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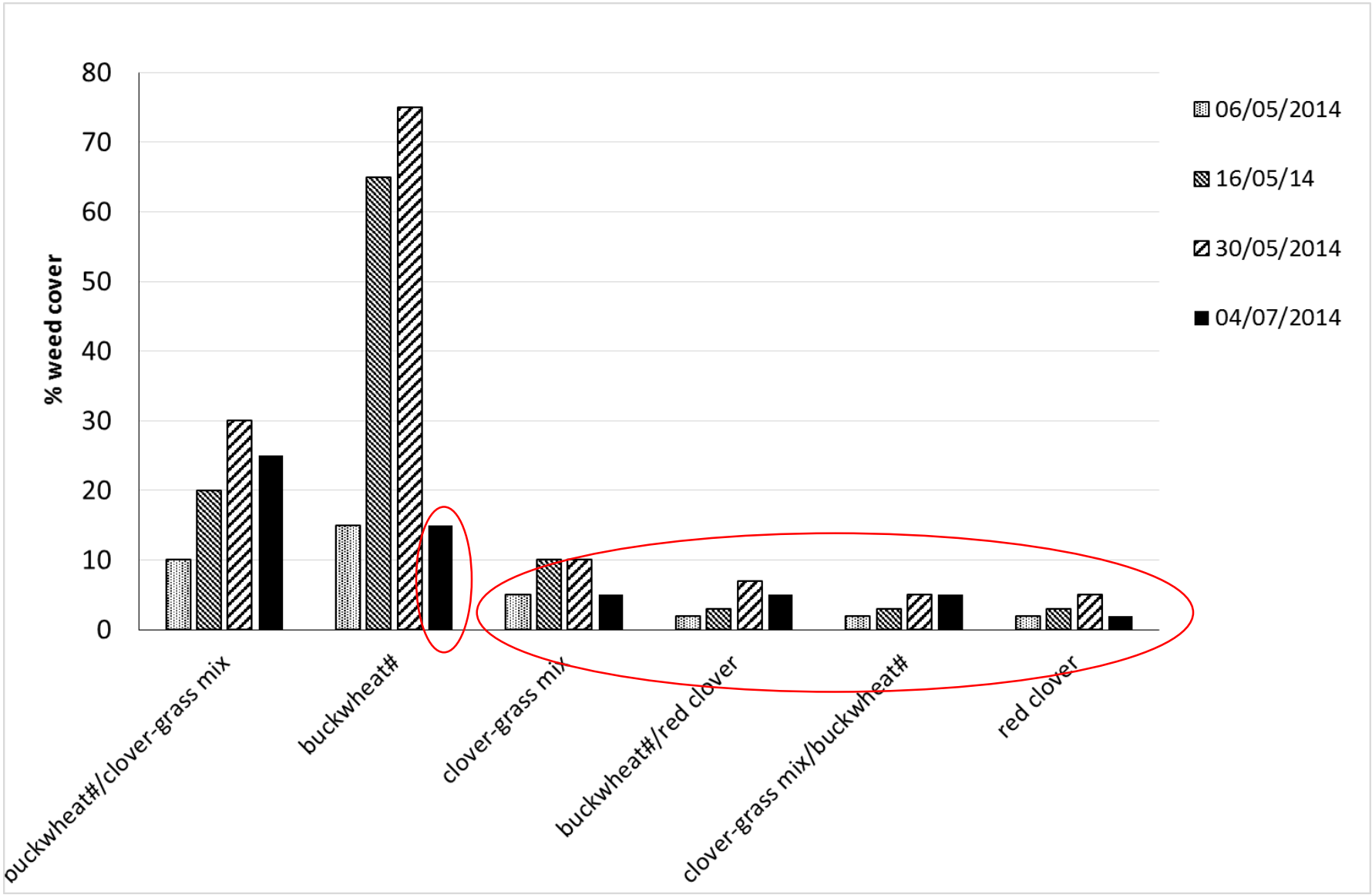
Weed control during cover cropping -2014



Variable levels of weed suppression

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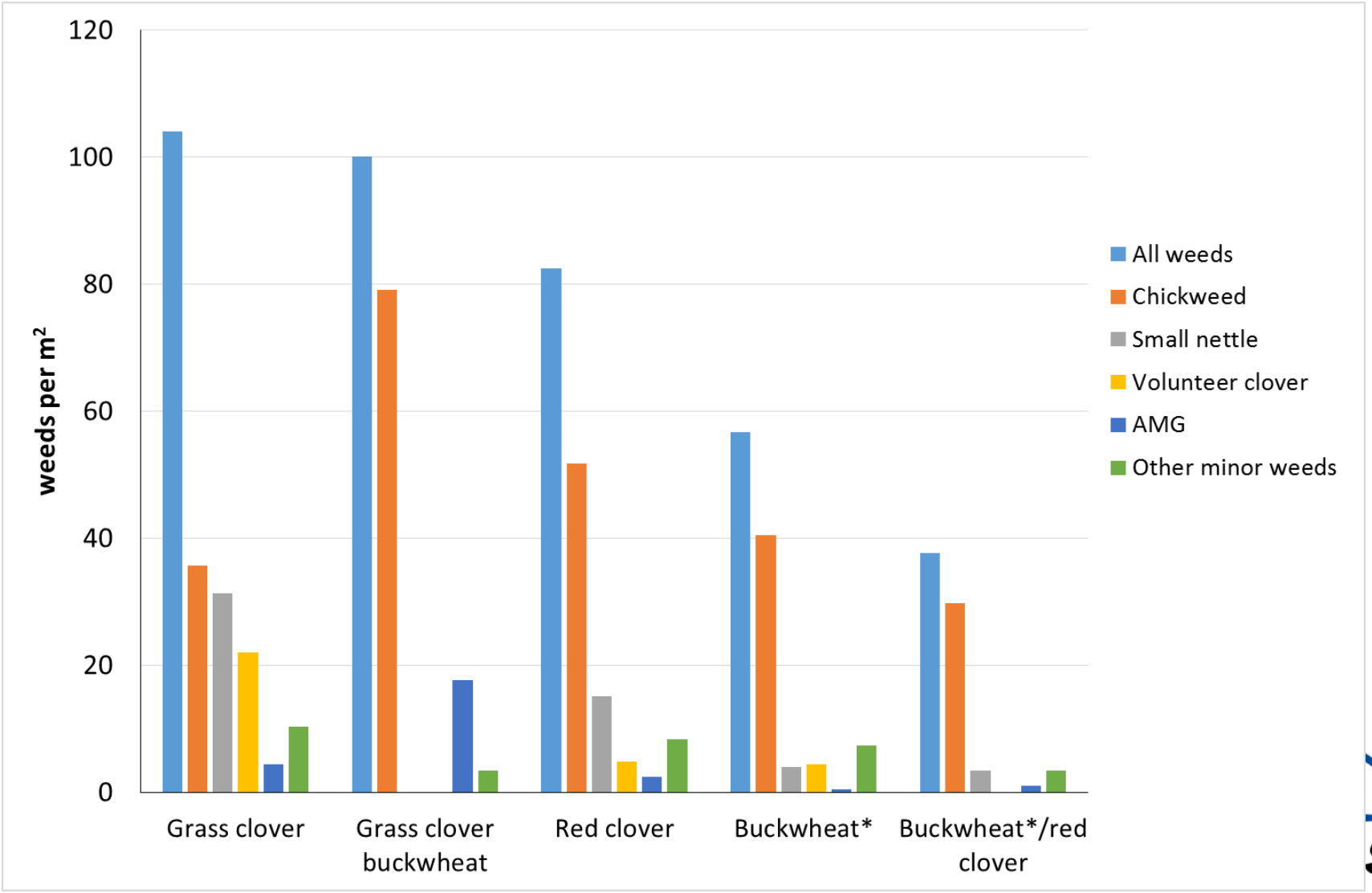
Mean weed per m^2 in spinach following cover cropping - 2015



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

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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

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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

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Contact for further info:

Angela Huckle angela.huckle@adas.co.uk

- Mobile 07785 278835