Plant protection in organic crop rotation experiments

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Weed control: prevention

- Cultivars which are competitive
- Late sowing of winter cereals
- Placing fertiliser close to crops
Optimal mechanical weed control

- Spring sown cereals and pulses without catch crops:
  - pre-emergence harrowing
  - post-emergence harrowing
  - supplementary harrowing later if needed
Optimal mechanical weed control

- Winter cereal with and without catch crops:
  - pre-emergence harrowing if possible
  - post-emergence harrowing if possible
  - harrowing early spring

- without catch crops:
  - supplementary harrowing later if needed
Optimal mechanical weed control

Winter wheat at Jyndevad and winter cereals in rotation 4 at Foulum, without catch crops, since 1998:
- sown at larger than normal row distance
- mechanical hoeing between rows
- supplementary harrowing

Winter cereals in rotation 4 with catch crops:
- brush hoeing between rows 2-3 times
Optimal mechanical weed control

Sugar beets:
- pre-emergence flame weeding
- hand hoeing in the rows
- mechanical hoeing between rows
- hand weeding
Weed control - perennials

- Couch grass:
  - without catch crops - stubble cultivation at more than 5 shoots m\(^{-2}\)
  - with catch crops - stubble cultivation at more than 50 shoots m\(^{-2}\)
  - cutting the grass-clover more often at more than 5 shoots m\(^{-2}\) in the preceding crop
Weed control - perennials

- Creeping thistles:
  - cut below ground and pulled at the anthesis of the cereals
- Others (mugwort, curled dock etc.):
  - pulled up at sight
- Stubble cultivation in systems without catch crops
Prevention of diseases

- Cultivars which are resistant
- Testing of seed material
- Least susceptible crops
Prevention of insect pests

- Double final plant density sown in sugar beets
- Grass clover sward left uncut in August-September

Direct control of insect pests:
- flaming larvae of leather jackets
Weeds at 4 locations 2 years

- Jyndevad: 167 g/m² (1998), 0 g/m² (1997)
- Foulum: 121 g/m² (1998), 62 g/m² (1997)
- Flakkebjerg: 64 g/m² (1998), 43 g/m² (1997)
- Holeby: 61 g/m² (1998), 48 g/m² (1997)

Number m²
Weeds in different crops at Foulum

- Pea:barley
- Spring barley
- Oats
- Winter wheat

1997
1998

0 5 10 15 20 25 30 35 g/m²
Effect of fertiliser on weeds in winter wheat

![Graph showing the effect of fertiliser on weeds in winter wheat](image-url)
Effect of weed control in winter wheat 1998

![Bar chart showing the effect of different weed control methods on weed growth in winter wheat at Foulum, Flakkebjerg, and Jyndevad. The chart compares weed harrowing, weed harrowing + supplementary, row hoeing, and brush weeding.]
Effect of weed harrowing in oats

![Graph showing the effect of weed harrowing in oats.

The graph compares the biomass of weeds in different locations:
- Foulum 97
- Foulum 98
- Flakkebjerg 97
- Flakkebjerg 98

The x-axis represents the locations, and the y-axis shows the biomass in g/m².

The bars indicate the biomass with and without weed harrowing.

Legend:
- Green bar: weed harrowing
- Pink bar: no weed harrowing]
Effect of catch crop on creeping thistle

![Bar chart showing the number of plots with thistles at Anthesis and Harvest with and without catch crop.](chart.png)
Effect of fertiliser on mildew in oats at Foulium
Effect of catch crop and fertiliser on take-all in second year winter wheat in rotation 4 1998
Insect pests

- no serious attacks
  - except leather jacket larvae
  - some attacks of aphids in cereals
- no differences between treatments
Conclusions

- Differences between treatments - fertiliser & catch crop
  - weeds
  - diseases
- Differences between crop rotations remain to be seen