Intercropping narrow-leafed lupins with cereals for whole crop harvest

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Why intercropping?

- Increased yields per unit area through better use of natural resources
- Improved yield stability
- Increased competitive ability against weeds
- Reduced attacks of diseases and insects
- Better foddervalue compared to cereals only
- *Whole crop harvest*: undersowing of a ley is possible, longer time for post harvest cultivations, establishment of green manure

Why weeding?

- Reduce yield loss due to weeds
- Eliminate weeds that contain substances noxious to livestock
- Reduce the addition of weed seeds to the soil seedbank
- Favours the lupins more than the cereals?

The experiment

Treatments

- Two experimental sites
- Three combinations of intercrops
- Weed harrowing or not
- Harvest time

Measurements

- Whole-crop yield
- Proportions of crop species and weeds
- Value as fodder (no replicates)

The three intercrops

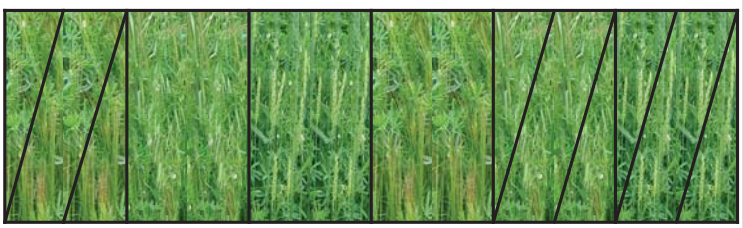
Lupins / barley | Lupins / wheat | Lupins / barley / oats

Barley: 60 kg ha^{-1} | Wheat: 70 kg ha^{-1} | Barley/oats: 30 kg ha^{-1} each

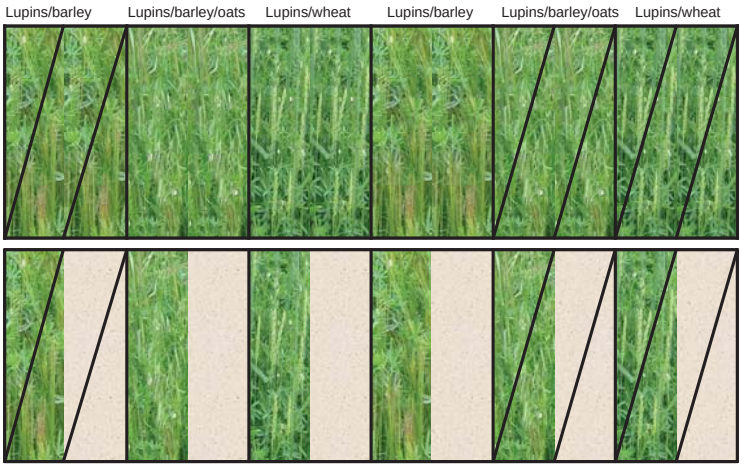
Lupins (cv. Bora): 115 kg ha^{-1}, *i.e.*, 75 germinable seeds m^{-2}

Experimental design

Lupins/barley | Lupins/barley/oats | Lupins/wheat | Lupins/barley | Lupins/barley/oats | Lupins/wheat



Design – harvest time



Implementation of treatments

- ✓ *Weed harrowing*
- ✓ Once before crop emergence
- ✓ Once after crop emergence

- ✓ *Early harvest*
- ✓ When 50% of the lupin pods had reached full size
- ✓ *Late harvest*
- ✓ Vinslöv: 2 weeks later
- ✓ Högåsa: 3 weeks later

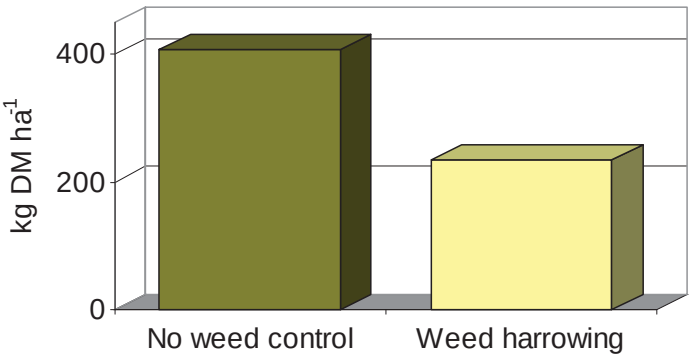
Site description

Site	Soil type	Precrop	Fertiliser	Dominating weeds
Vinslöv	Sand	Pea/oats	20 tons slurry ha^{-1}	*Chenopodium album*, *Stellaria media*, *Viola arvensis*
Högåsa	Heavy clay	Winter-wheat	Not applied	*Bilderdykia convolvulus*, *Chenopodium album*, *Viola arvensis*

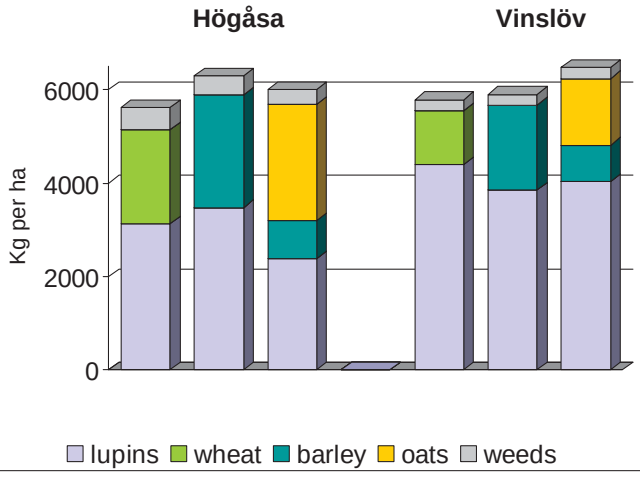
Högåsa: 58.5°N, 15.5°E

Vinslöv: 56.1°N, 13.9°E

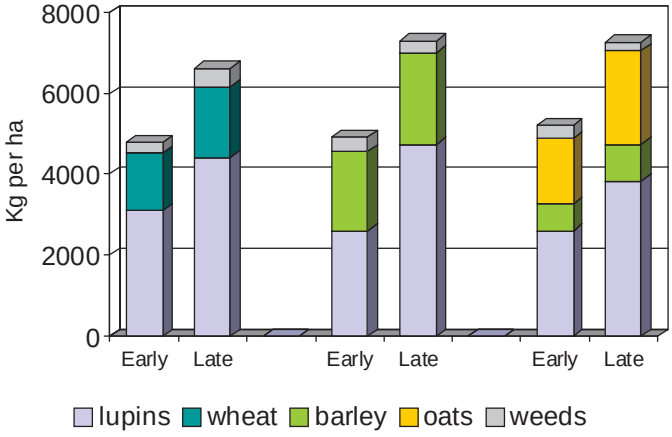
Weeds



Crop yields averaged over time of harvest



Crop yields averaged over sites



Conclusions - 2 experiments

- ✓Weed harrowing reduced weed biomass but not biomass or proportions of crop components.
- ✓Delayed harvest increased biomass of lupins by 1100 -2000 kg DM ha^{-1} .
- ✓At late harvest, the total yields were 600-900 kg ha^{-1} higher in mixtures with barley or oats than in mixtures with wheat.
- ✓The proportion of lupins in the crop yield increased in the order:

barley/oats < barley < wheat

Thank you for your attention!

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http://EkoForsk.slu.se/en