



Swedish University of
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Intercropping narrow-leaved 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 fodder value 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



Barley: 60 kg ha⁻¹

Lupins / wheat



Wheat: 70 kg ha⁻¹

Lupins / barley / oats



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

Lupins/barley

Lupins/barley/oats

Lupins/wheat

Lupins/barley

Lupins/barley/oats

Lupins/wheat



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

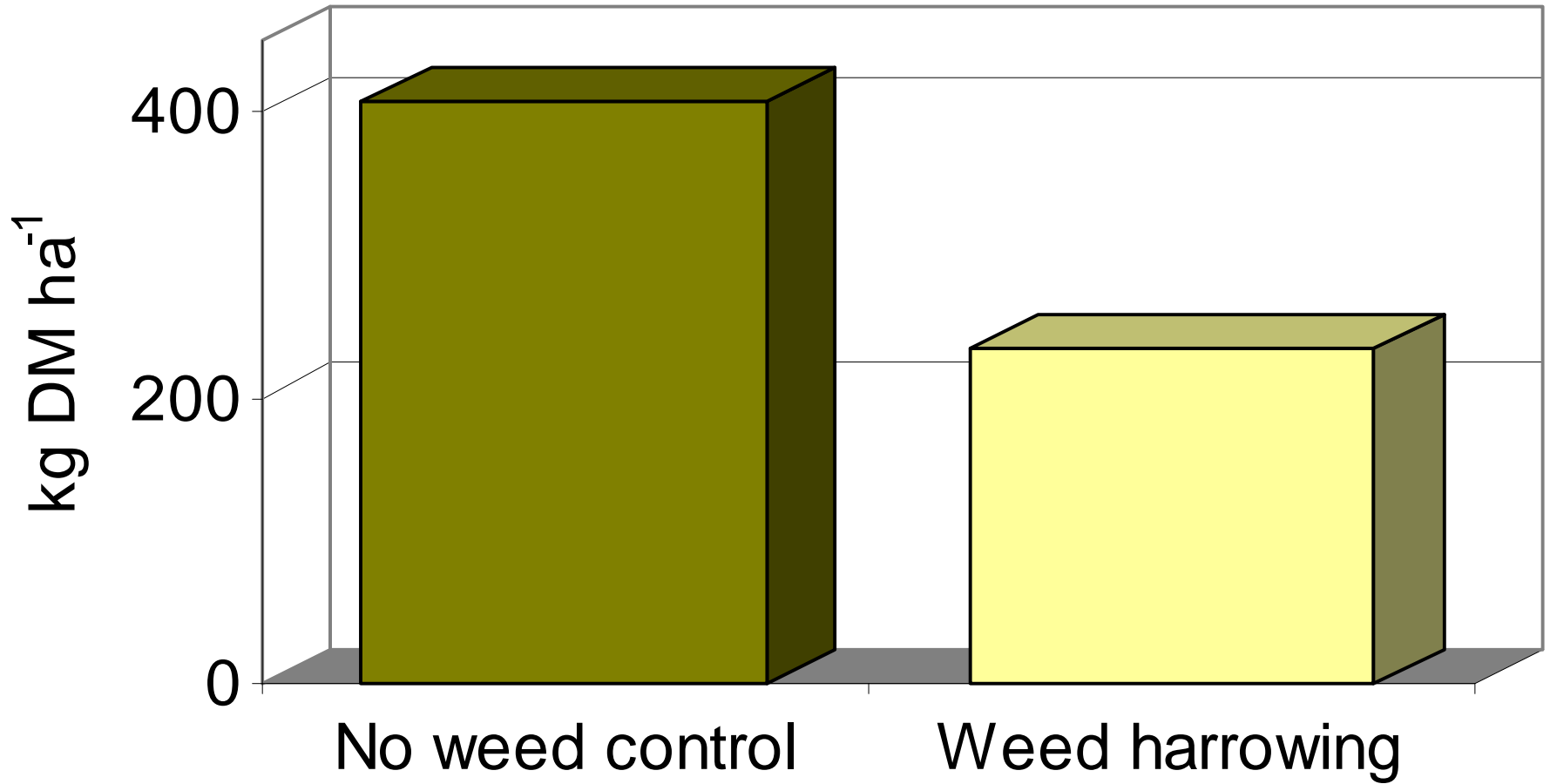
Site	Soil type	Precrop	Fertiliser	Dominating weeds
Vinslöv	Sand	Pea/oats	20 tons slurry ha ⁻¹	<i>Chenopodium album</i> , <i>Stellaria media</i> , <i>Viola arvensis</i>
Högåsa	Heavy clay	Winter- wheat	Not applied	<i>Bilderdykia convolvulus</i> , <i>Chenopodium album</i> , <i>Viola arvensis</i>



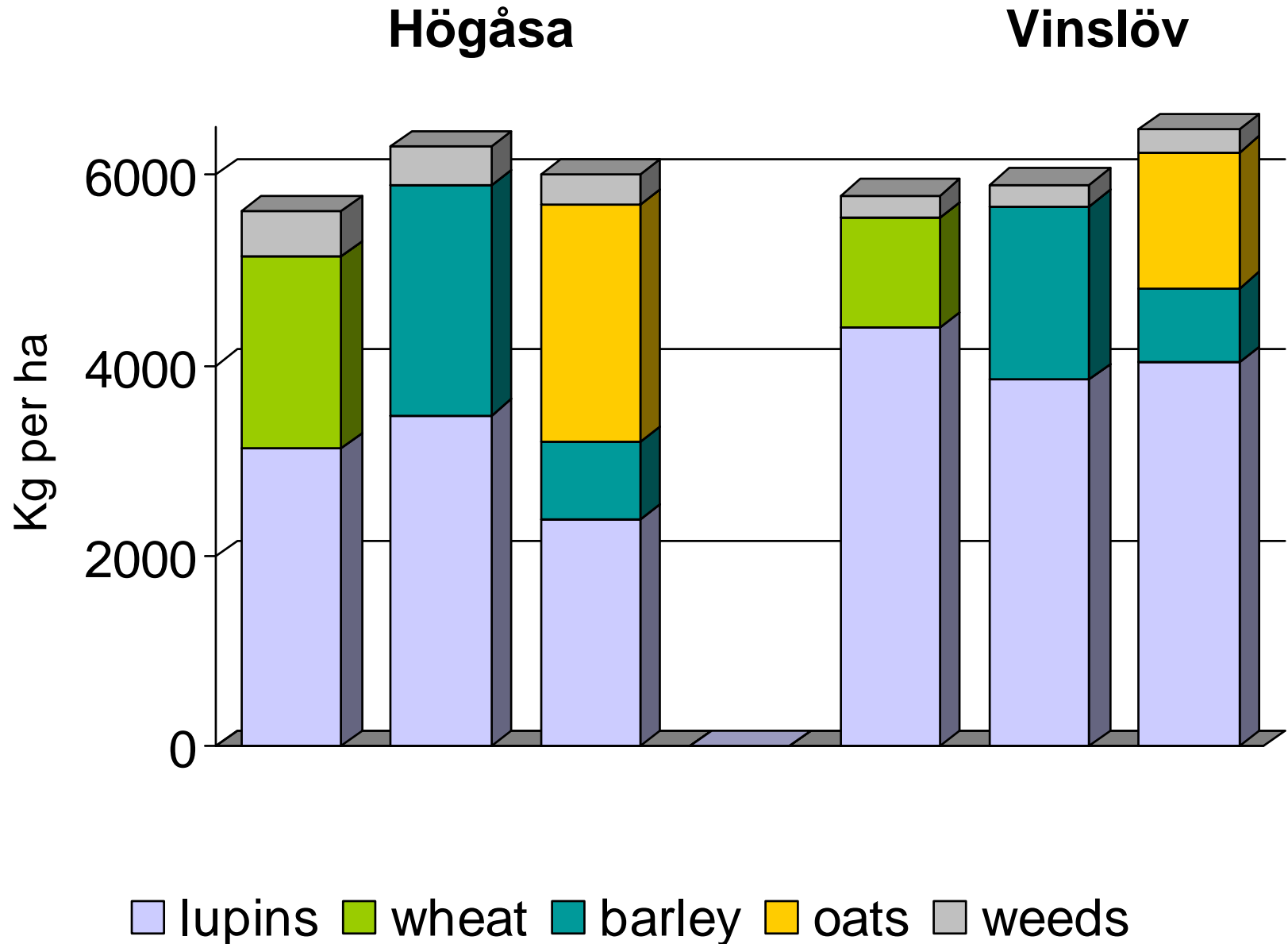
Högåsa: 58.5°N, 15.5°E

Vinslöv: 56.1°N, 13.9°E

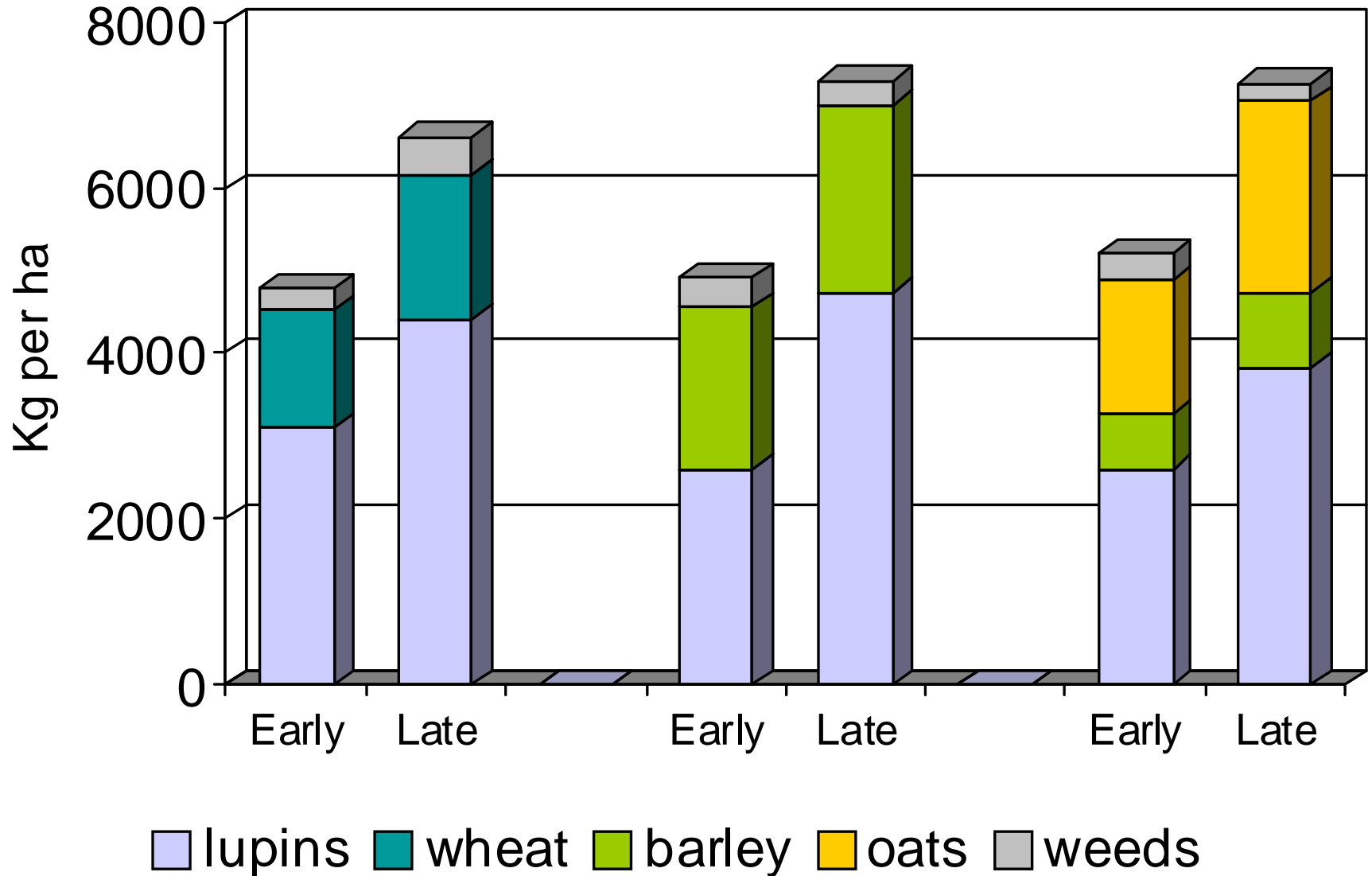
Weeds



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>