

**Recent changes in the occurrence of perennial weeds in Finnish spring cereal fields**  
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**NAJF** Nordic Association of Agricultural Scientists Working Group Perennial Weeds



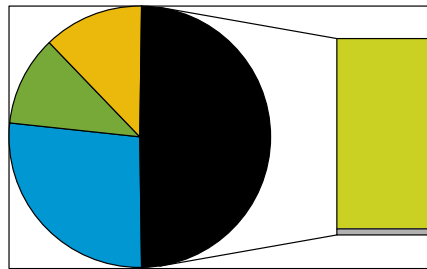
## Outline of the talk

Weed surveys in Finland

- **History of weed surveys**
- **Recent changes in spring cereals, 1997-1999 vs. 2007-2009**
- **Weed shift and obvious driving forces**



## Use of agricultural land in Finland



	In 2010, ha
Grassland	659 000
Other crops	275 000
Fallow	307 000
Spring cereals	1 175 000
Winter cereals	37 000
<b>TOTAL</b>	<b>2 253 000</b>

Source: Data and Information Centre (TIKE) of the Ministry of Agriculture and Forestry

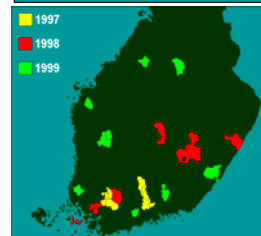
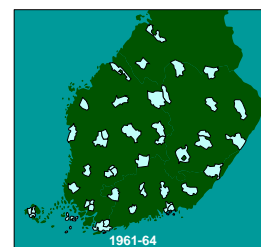
## Weed surveys of spring cereals

**1961-1964** (2710 fields)  
 - the beginning of chemical weed control  
 - weed biomass 1000 kg/ha

**1982-1984** (267 fields)  
 - twenty years of intensive agriculture  
 - weed biomass 320 kg/ha (sprayed: **133**)

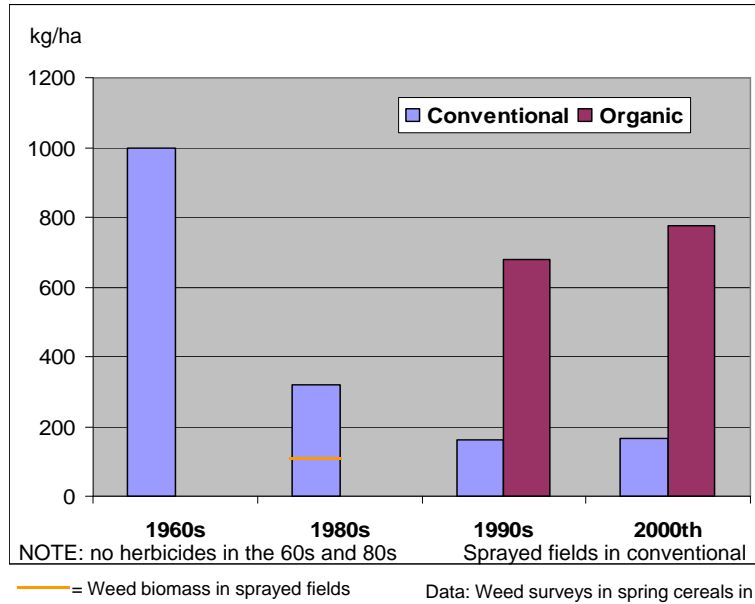
**1997-1999** (690 fields)  
 - EU subsidies; **organic farming**  
 - use of sulfonylureas  
 - weed biomass 329 kg/ha (s: **163**, o: **678**)

**2007-2009** (595 fields)  
 - reduced tillage...direct drilling  
 - weed biomass 251 kg/ha (s: **167**, o: **775**)



• 16 regions, about 300 farms

### CHANGES in weed biomass production over the decades



### The major weeds in spring cereals in Finland

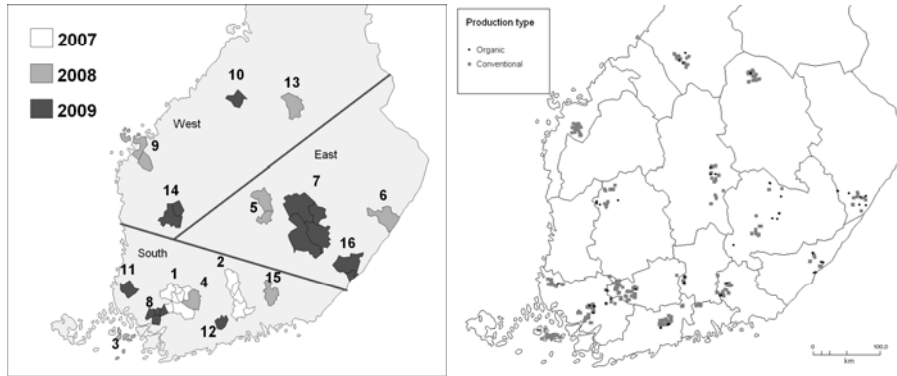
- Annuals**

- *Viola arvensis* MOST FREQUENT
- *Chenopodium album* MOST ABUNDANT DICOT (biomass)
- *Galeopsis* spp. (bifida and speciosa)
- *Stellaria media*
- *Spergula arvensis*
- *Polygonum aviculare*
- *Lapsana communis*
- *Fallopia convolvulus*
- *Tripleurospermum inodorum*
- *Galium spurium* MOST SUCCESSFUL in the 2000s

- Perennials**

- *Elymus repens* Kvickrot, kveke
- *Sonchus arvensis* Åkermolke
- *Cirsium arvense* Åkertistel

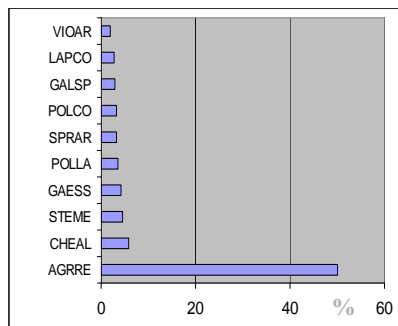
## Survey regions in 1997-1999 and 2007-2009



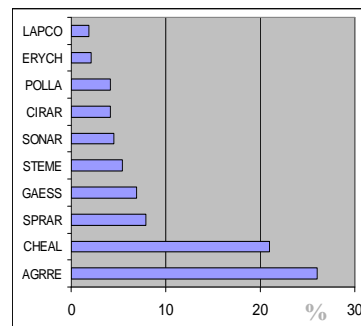
**Survey data:** Frequency, Density and Biomass of weed species. Cropping facts.

## Weed biomass production in spring cereals in Finland PROPORTION of DIFFERENT SPECIES in the 1990s

**Conventional, sprayed (N=457)**



**Organic (N=165)**



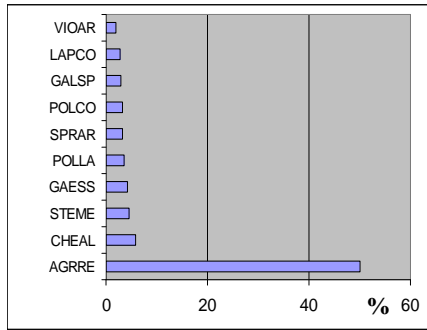
### TOTAL INFESTATION

**Median = 63 kg/ha**  
**Mean = 163 kg/ha**

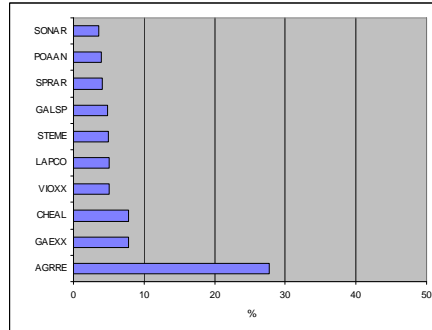
**Median = 567 kg/ha**  
**Mean = 678 kg/ha**

**Proportion of WEED BIOMASS production by species  
CHANGES between the 1990s and 2000th**

**Conventional 1990s (N=457)**



**Conventional 2000th (N=503)**

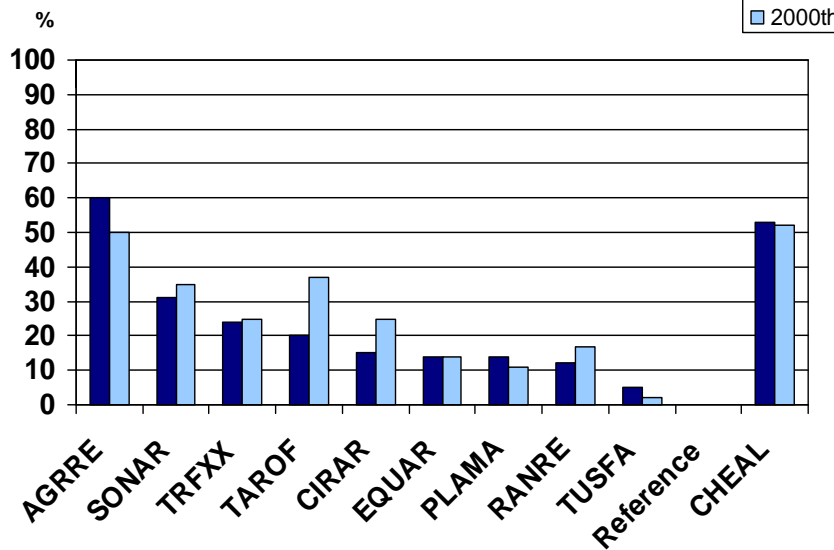


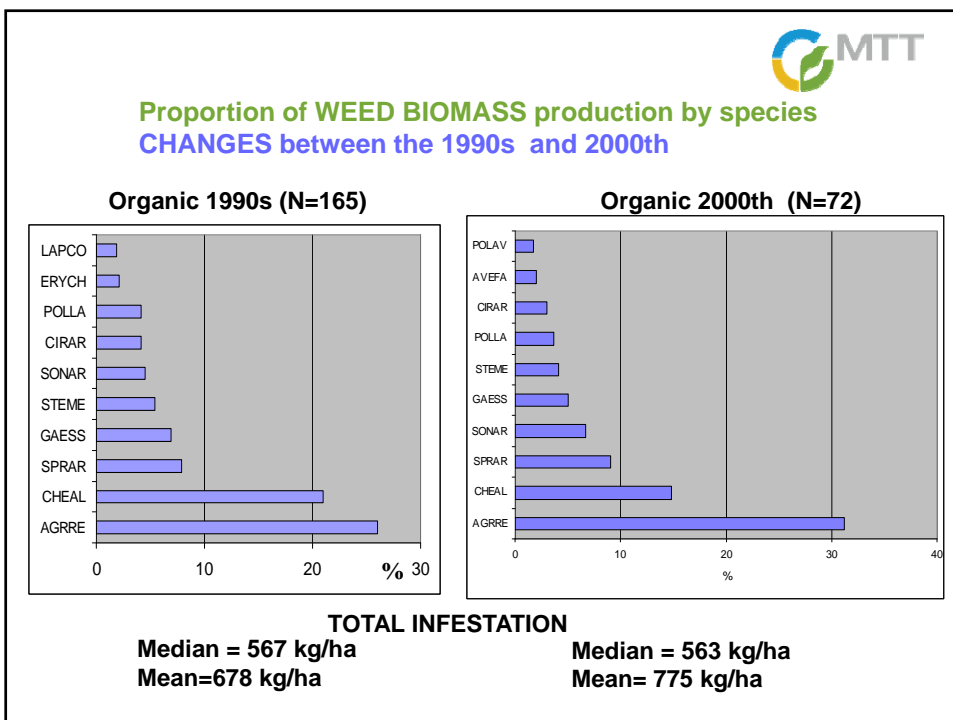
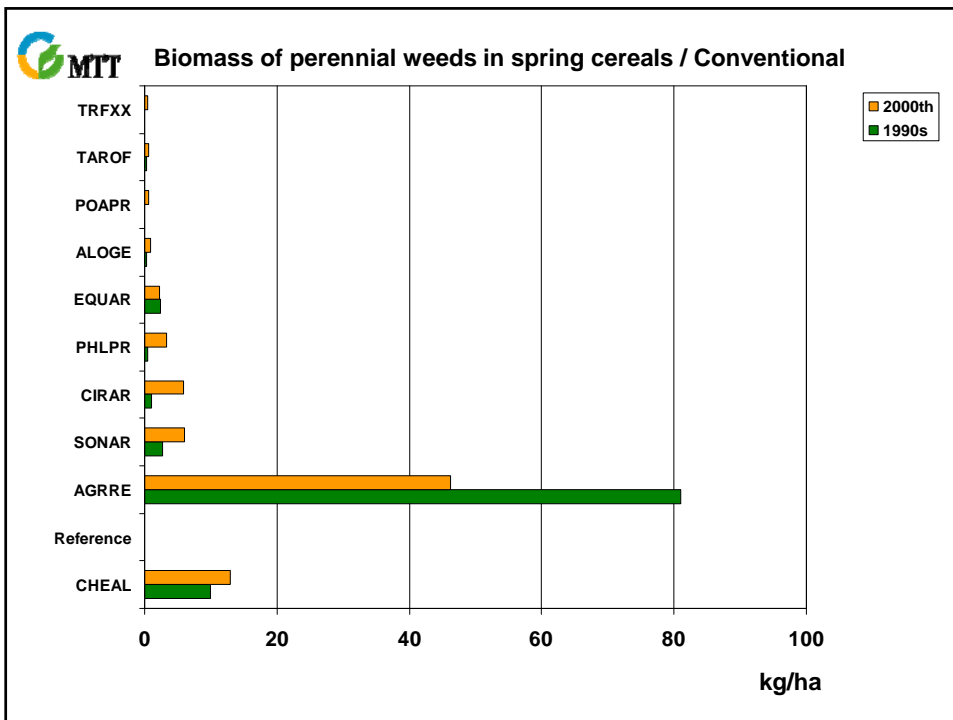
**TOTAL INFESTATION**

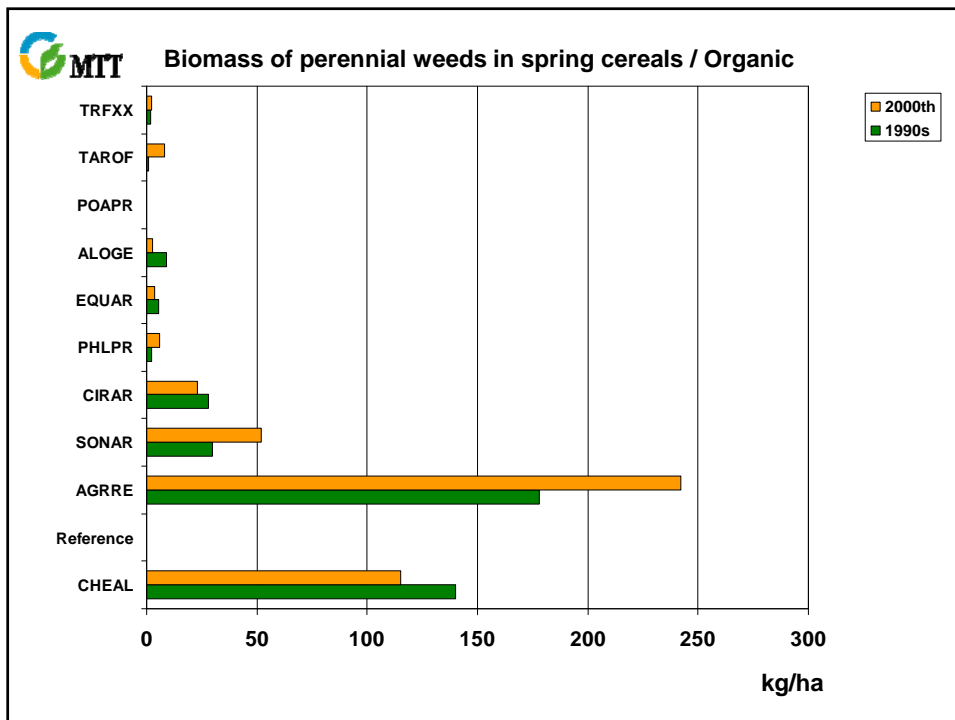
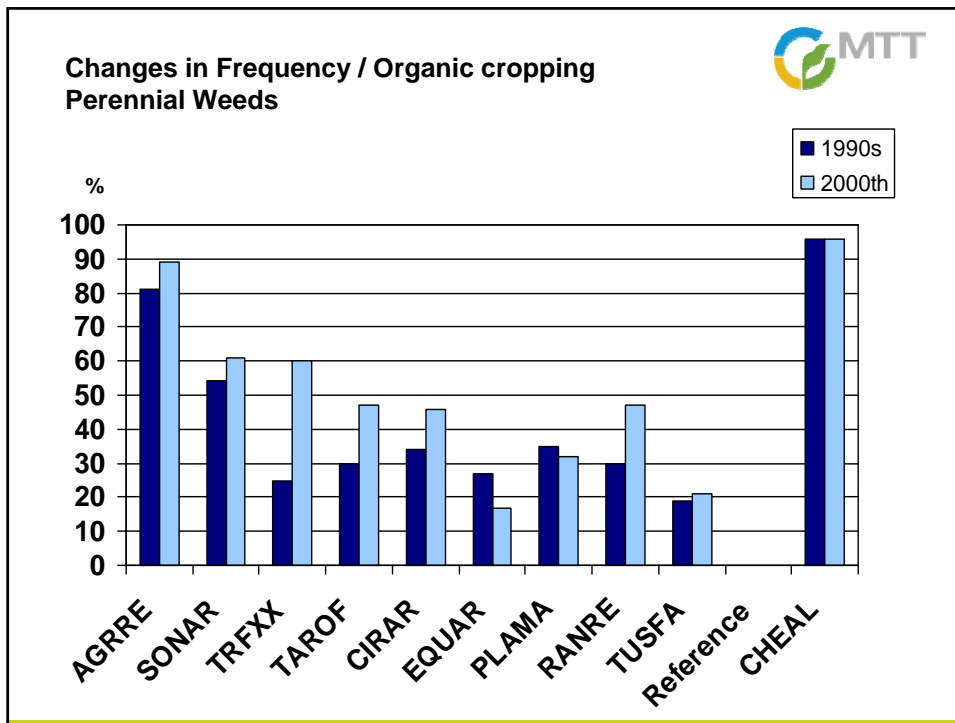
**Median = 63 kg/ha  
Mean=163 kg/ha**

**Median = 83 kg/ha  
Mean= 167 kg/ha**

**Changes in Frequency / Conventional cropping  
Perennial Weeds**

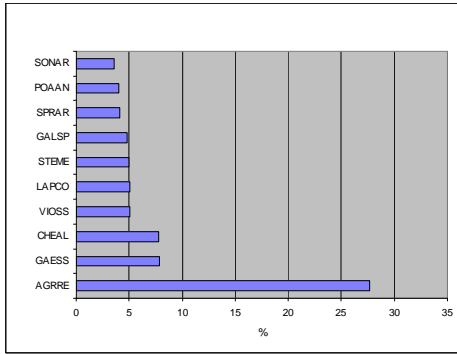




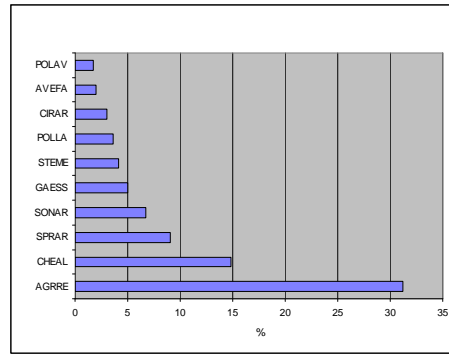


**WEED BIOMASS production in spring cereals in Finland**  
**PROPORTION of DIFFERENT SPECIES in the 2000th**

**Conventional, sprayed (N=503)**



**Organic (N=72)**



**TOTAL INFESTATION**

**Median = 83 kg/ha**  
**Mean=167 kg/ha**

**Median = 563 kg/ha**  
**Mean= 775 kg/ha**

**To plough or not to plough, that is the question...**



# Primary tillage differs....



Plough



Survey fields, %  
1990s    2000th

85

52



Reduced



15

29



Direct



0

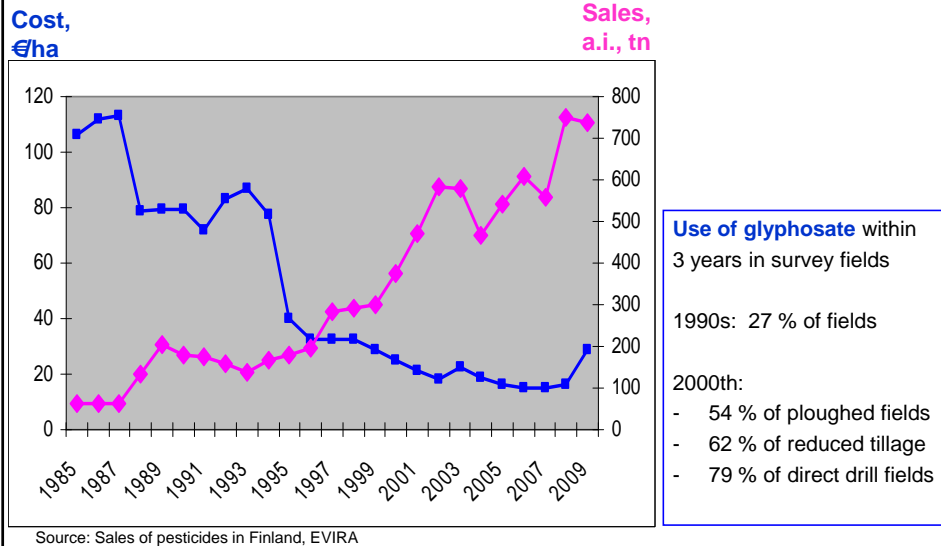
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## GLYPHOSATE in Finland

Common "tool" for grass weed control in conventional cropping of spring cereals



## Some conclusions

- **Couch grass (kveke)** is the major perennial species
  - Biomass production is reduced in conventional cropping (glyphosate)
  - Biomass production is increased in organic cropping
  - About 30% of weed biomass in spring cereal fields
- *Sonchus arvensis* is more common than *Cirsium arvense*
- Successful species in recent years
  - *Taraxacum officinale* (reduced tillage)
  - *Cirsium arvense*
  - *Trifolium repens* (in organic cropping)
  - Seed-propagated grasses, like *Phleum pratense*, *Poa* spp., *Festuca* spp.
- Less successful species
  - Typical perennials in grasslands, like *Achillea*, *Ranunculus*, *Rumex*

**Scenario:**  
**The odds are in favour of grass species...**



*Phleum pratense*

*Apera spica-venti*

*Poa spp.*

*Bromus spp.*



Thank You for  
The Invitation  
&  
Your  
Attention

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Picture by E. Korsmo, NO

## Key to EPPO weed codes:

Code	Latin name	På svenska
AGRRE	<i>Elytrigia repens</i>	Kvickrot
CIRAR	<i>Cirsium arvense</i>	Åkertistel
EQUAR	<i>Equisetum arvense</i>	Åkerfräken
PLAMA	<i>Plantago major</i>	Groblad
RANRE	<i>Ranunculus repens</i>	Revsmörblomma
SONAR	<i>Sonchus arvensis</i>	Åkermolke (fettistel)
TAROF	<i>Taraxacum officinale</i>	Maskros
TRFXX	<i>Trifolium</i> spp.	Klöver arter
TUSFA	<i>Tussilaga farfara</i>	Hästhov
CHEAL	<i>Chenopodium album</i>	Svinmålla
GAESS	<i>Galeopsis</i> spp.	Dån arter
SPRAR	<i>Spergula arvensis</i>	Åkerspergel
STEME	<i>Stellaria media</i>	Våtarv

## Publications

### Weed flora in Finland:

- Salonen, J., Hyvönen, T. & Jalli, H. 2001. Weeds in spring cereal fields in Finland – a third survey. *Agricultural and Food Science in Finland*, 10: 347-364.
- Hyvönen, T., Ketoja, E. & Salonen, J. 2003. Changes in the abundance of weeds in spring cereal fields in Finland. *Weed Research*, 43: 348-356.
- Hyvönen, T. 2007. Can conversion to organic farming restore the species composition of arable weed communities? *Biological Conservation* 137: 382-390.
- Hyvönen, T. & Huusela-Veistola, E. 2008. Arable weeds as indicators of agricultural intensity - A case study from Finland. *Biological Conservation* 141: 2857-2864.
- Salonen, J., Hyvönen, T. & Jalli, H. 2011. Composition of weed flora in spring cereals in Finland – a fourth survey. *Agricultural and Food Science* (submitted)
- Riesinger, P. & Hyvönen, T. 2006. Weed occurrence in Finnish coastal regions: a survey of organically cropped spring cereals. *Agricultural and Food Science* 15: 166-182.
- Riesinger, P. & Hyvönen, T. 2006. Impact of management on weed species composition in organically cropped spring cereals. *Biological agriculture & horticulture* 24: 257-274.
- Salonen, J., Hyvönen, T. & Jalli, H. 2005. Weed flora and weed management of field peas in Finland. *Agricultural and Food Science* 14: 189-201.

### Management of perennial weeds:

Vanhala, P., Lötjönen, T., Hurme, T. & Salonen, J. 2006. Managing *Sonchus arvensis* using mechanical and cultural methods. *Agricultural and Food Science*, 15: 444-458. (available as pdf file at [www.mtt.fi/english>Publications](http://www.mtt.fi/english>Publications))

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