



Results and lessons learnt from wheat- based cropping system activity

Use your mouse to read tooltips or to link to more information

Background

- Wheat-based is one of the major annual cropping system in Europe
- On-farm and on-station experiments have been conducted on the main pests and pathogens in Europe.
- Weeds → annual flora :
 - *Apera spica-venti*, *Lolium multiflorum*, *avena fatua*
 - *Galium aparine*, *Centaurus cyanum*, *Matricaria* sp.
- Diseases:



Location of on-station experiments



IPM strategies

To reduce the dependence on herbicides and fungicides.

IPM 1 = more diverse crop rotation + more use of preventive cultural practices + mechanical weed control measures and disease resistant varieties

IPM 2 = further crop diversification + cover crops + more use of forecasting models and decision support system + innovative IPM tools



Crop rotations



Current system	IPM1	IPM2
WW-WW-WOSR	SB-WW-WOSR	PEA-WW-WOSR
WOSR-WW-WW	WOSR-WW-SB	WOSR-WW-SO
WOSR-WW-WW	WOSR-WW-SB	WOSR-WW-SB
M-WW-WB	M-WW-WB	M-WW-WB
PEA/WOSR-WDW-SB-WW	BW/SL-WDW-SB-WW	ALF-ALF-ALF-WW-SL-WFB-WW
WOSR-WW-SFB-WW	WFB-WW-WOSR-WW-SB	SFB-WW-HE-TR-M-WW

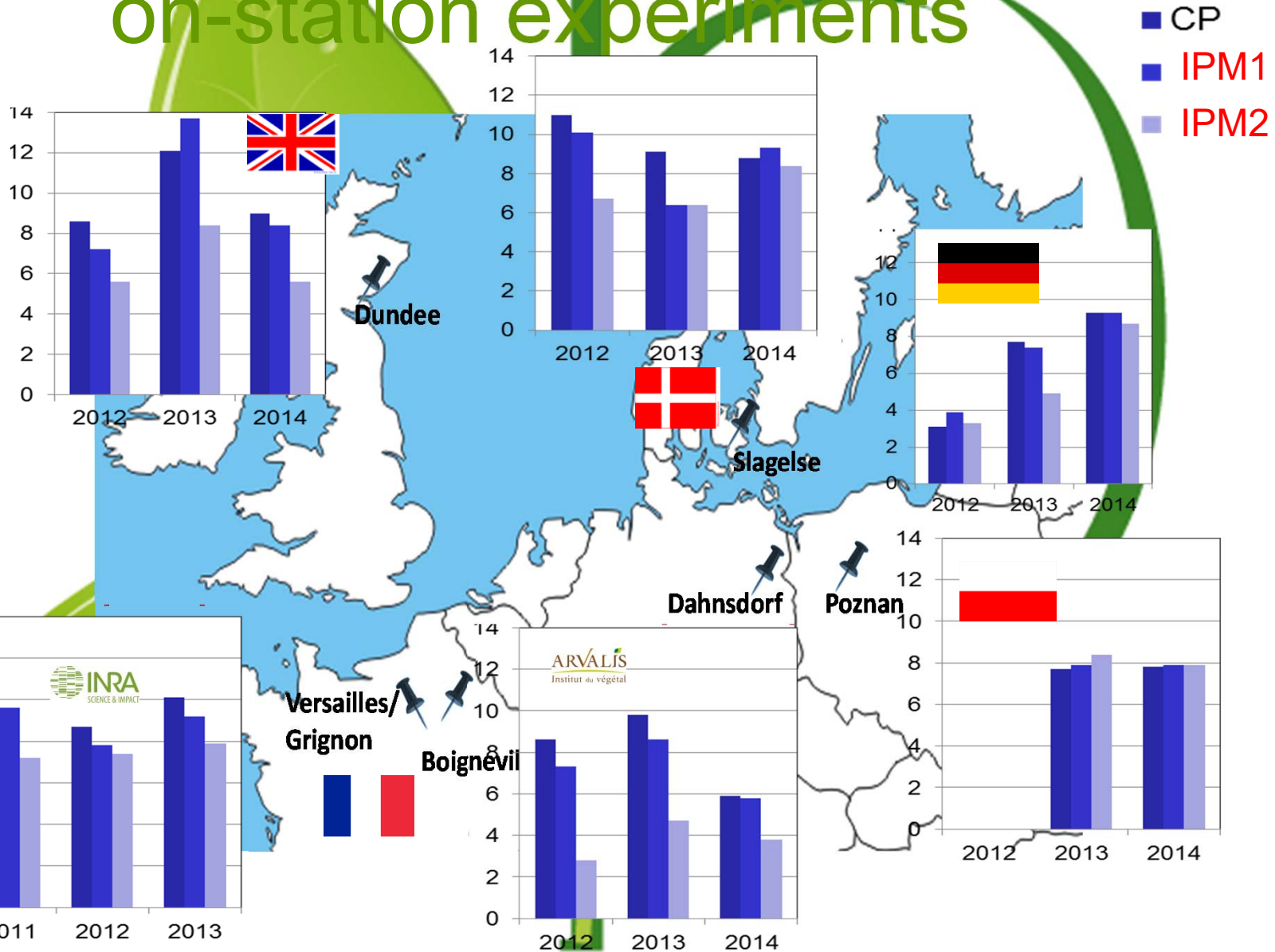
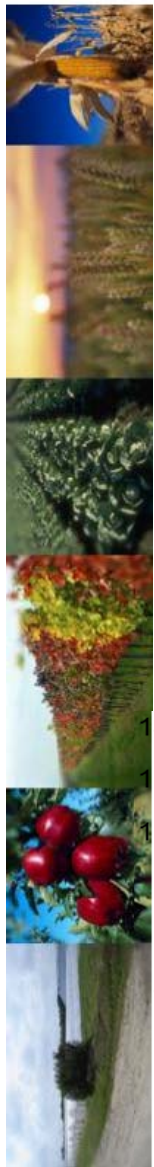


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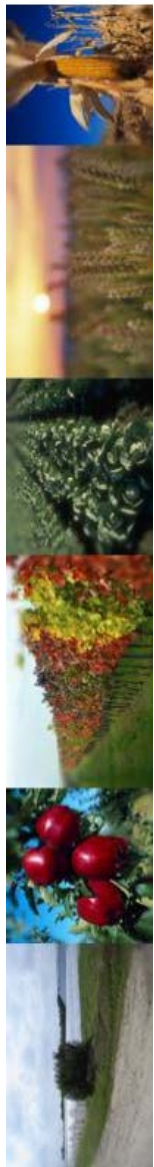
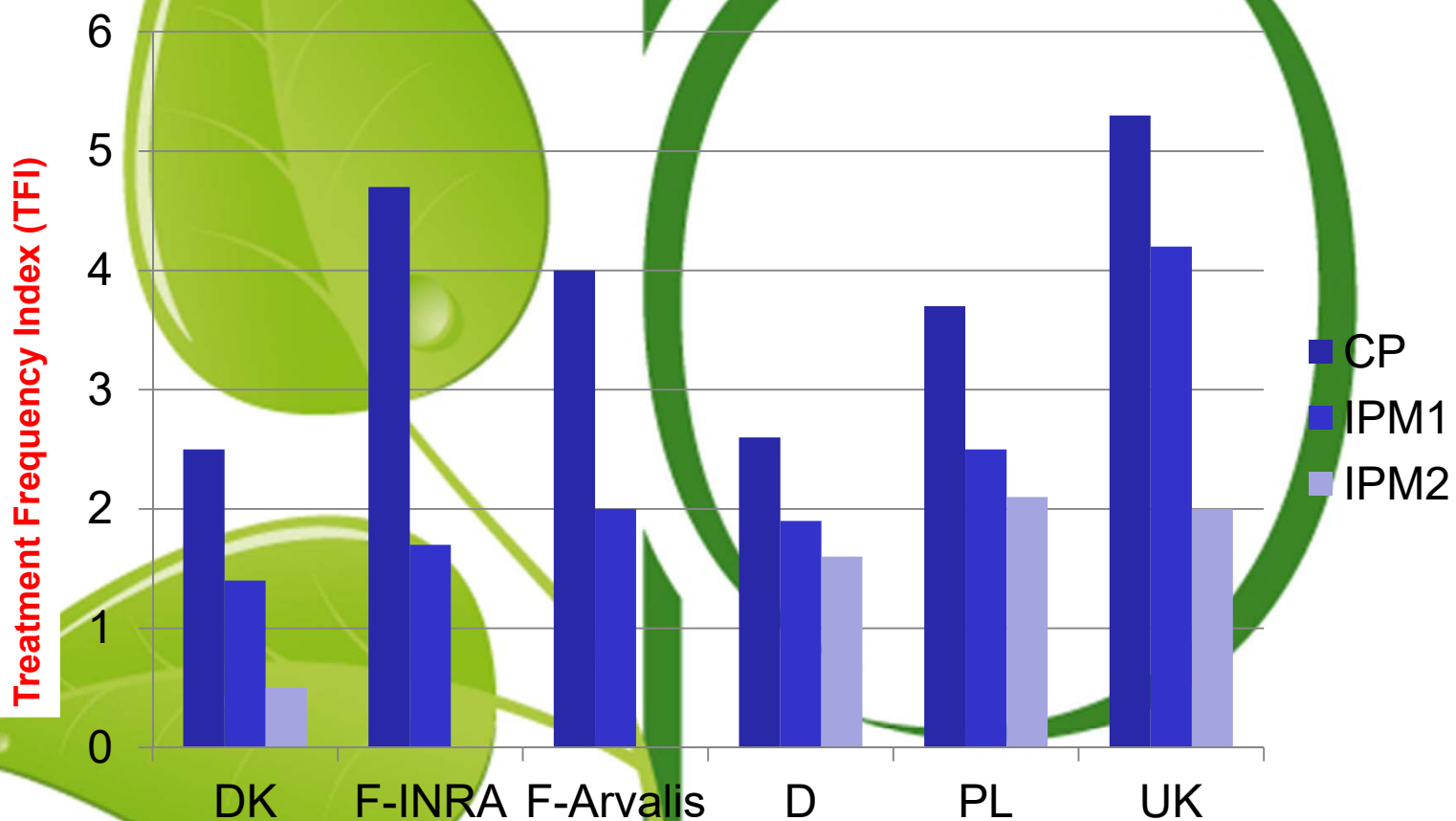
Wheat yields in 6 on-station experiments



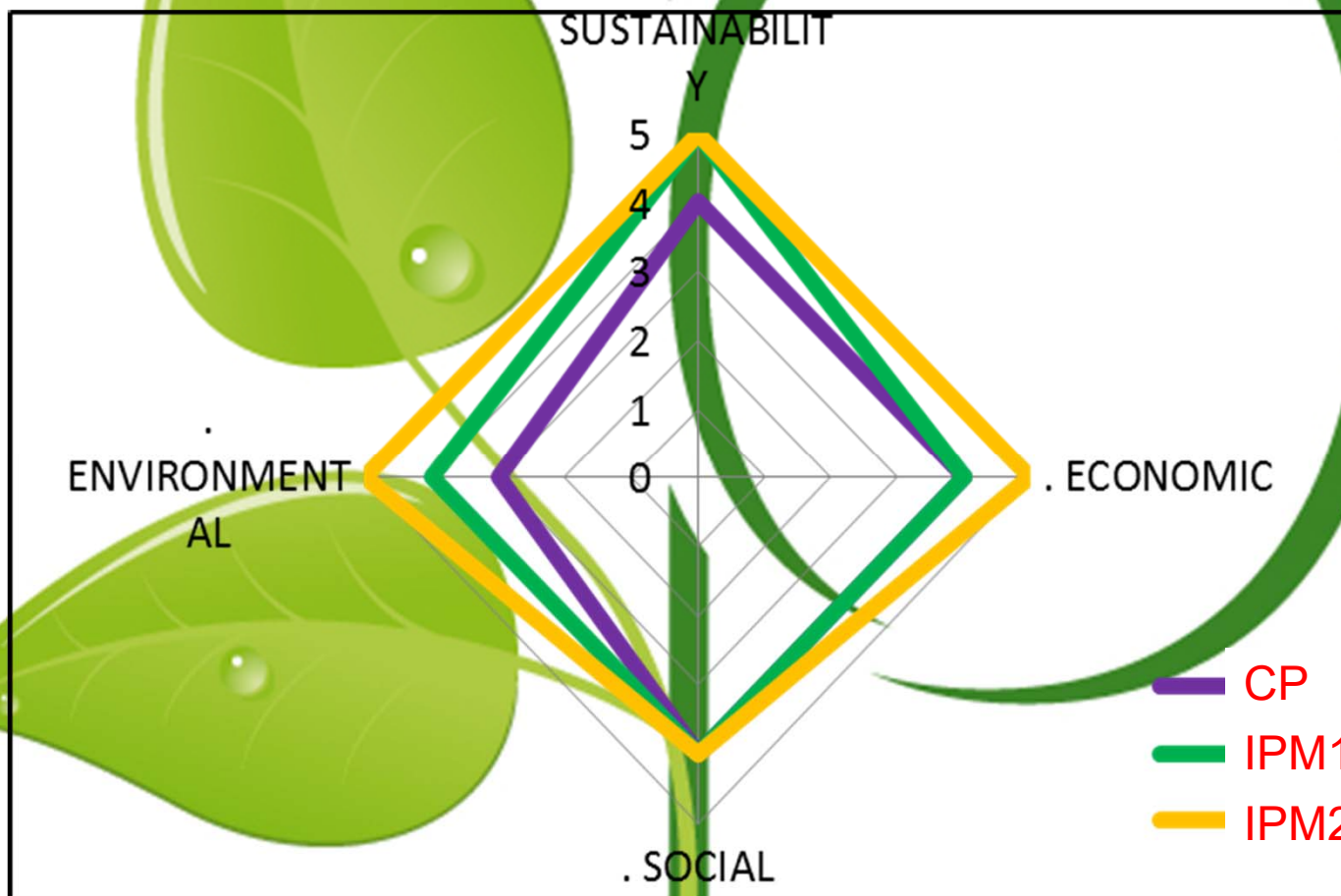
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Treatment Frequency Index (TFI)








DEXiPM analyses of the Arvalis on-station experiment

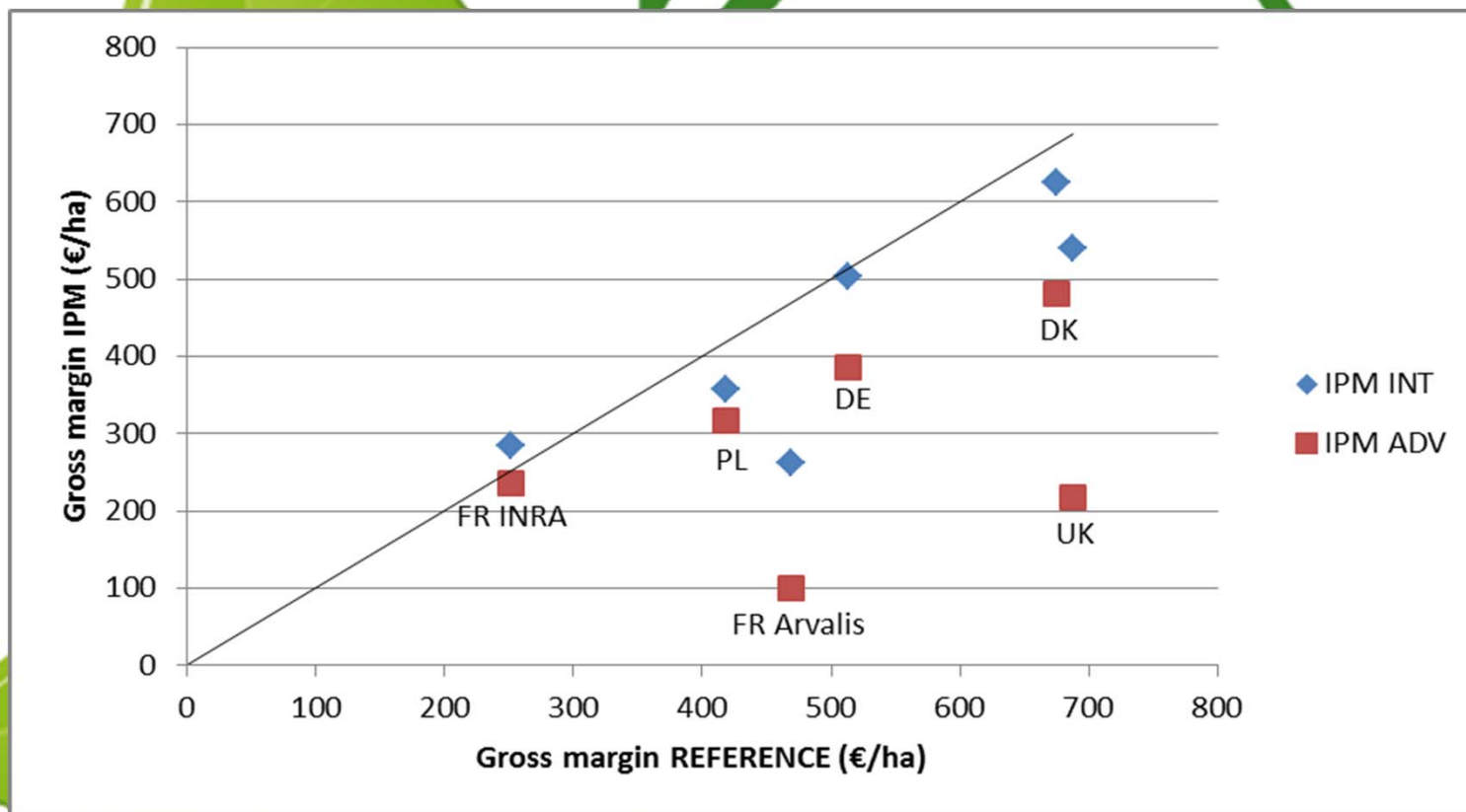


Results of the SYNOPS analyses (1 m distance to water courses was assumed) are available for three of the six on-station experiments



	Risk aquatic organism		Risk groundwater	
	Acute	Chronic	Single substance	All substances
	CP>IPM1>IPM2	CP>IPM1>IPM2	CP>IPM1>IPM2	CP>IPM1>IPM2
	CP>IPM1>IPM2	CP>IPM1>IPM2	CP>IPM1>IPM2	CP>IPM1>IPM2
	IPM1>CP	CP>IPM1	CP>IPM1	CP>IPM1
				
	CP>IPM1	CP>IPM1	CP=IPM1	CP=IPM1

Cost benefit analyses



Crop diversity

- Four of the six on-station trials have only run for 3 years and no conclusions concerning the impact of crop diversity can be drawn
- The two French trials have run for longer and have high diversity of crops but it is difficult to assess the effect of crop diversity because it is confounded by the effects of the other cultural differences between the CP, IPM1 and IPM2 systems.



Variety mixtures

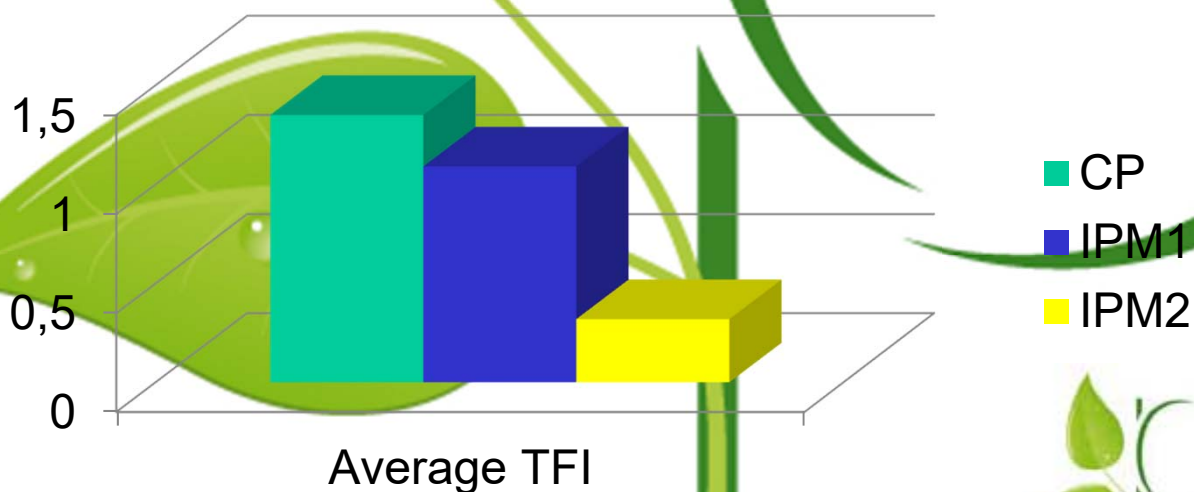
- The potential benefits of variety mixtures are illustrated very clearly looking at the assessments of septoria in the Danish experiment

		% attack of septoria on flag leaves			
		2012	2013	2014	Average
CP	Control	10.0	30.0	53.0	31.0
CP	Treated	0.7	3.0	21.0	8.2
IPM1	Control	0.1	32.0	21.0	17.7
IPM1	Treated	0	3.0	2.2	2.6
IPM2	Control	0.5	0.7	13.0	4.7
IPM2	Treated	0.5 ^{no treatment}	0	7.3	3.9



Variety mixtures

- In all three growing seasons the level of attack in the control plots was lower in IPM2 than in CP (most widely grown variety) and IPM1 (a partly resistant variety) allowing a for reduced input of fungicides.



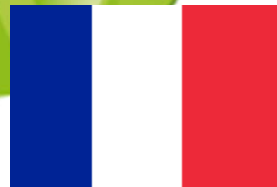
Weed harrowing

- Weed harrowing with flex tine harrows has shown promise for mechanical weed control in spring sown cereals. In PURE the harrow was used in oat.
- The results revealed once again very variable effects



Inter-row cultivation

- Inter-row cultivation was practiced in winter oilseed rape on several locations. Instead of sowing the crop at the standard 12 cm row distance it was sown at 50 cm row distance.



- Inter-row cultivation can also be done in combination with band spraying



Conclusion

- To omit the use of pesticides can result in pronounced yield losses in winter wheat
- This is also highlighted by the fact that the yield losses in IPM1 were small compared to the very significant reductions in pesticide use

- Exceptions:
 - Inter-row cultivation
 - Use of variety mixtures



For more information

Download the following documents

- the [BOOKLET](#)
- the [IPM guidelines](#)
- More e-learning
 - [Combinaison of agronomical levers \(FR\)](#)
 - [Delayed sowing](#)

Go to the field visits

[Denmark 2012](#)

[Denmark 2013](#)

