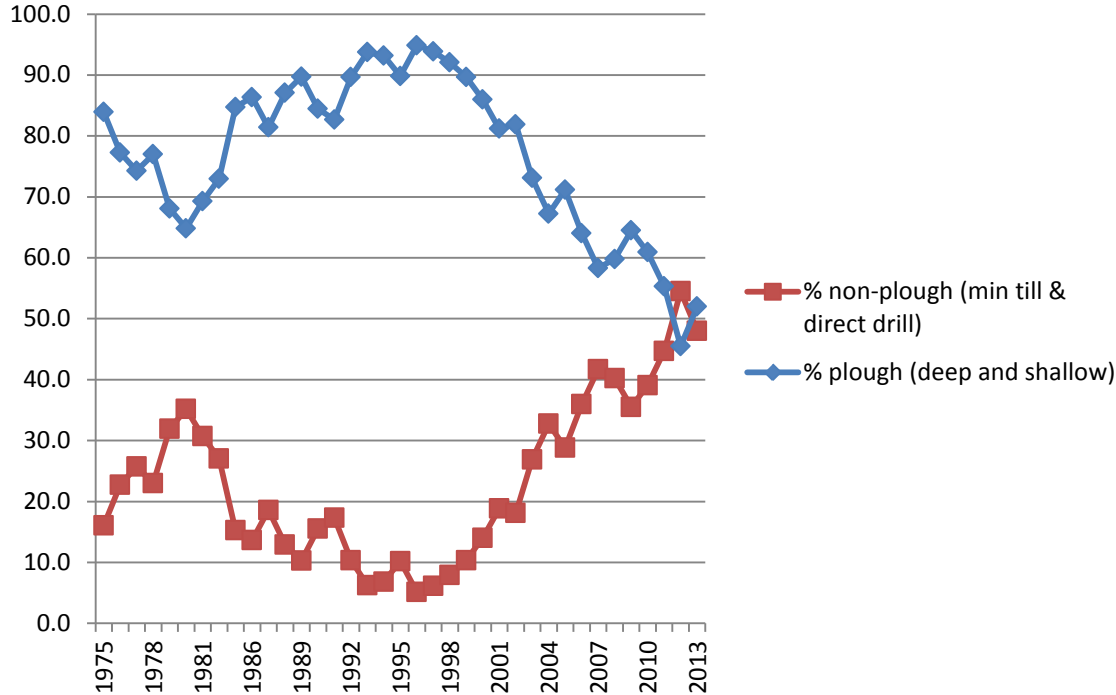


# The Impact of Cultivations on Weed Control in Cereals

Mark Ballingall

SRUC Applied Practice Team

# Area of arable land under different cultivation regimes, source Defra



# From this



Good ploughing  
inverts grass  
seeds- rot or  
predated

# To this

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Minimal tillage favours grass weeds as retains seed close to the surface

# Drivers to changes in cultivation techniques

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- Introduction of paraquat and then glyphosate
- Massive increase in autumn drilled crops
- Shorter rotations; earlier drilling
- Winter wheat became the most profitable crop
- As farming systems evolved so too did the weeds

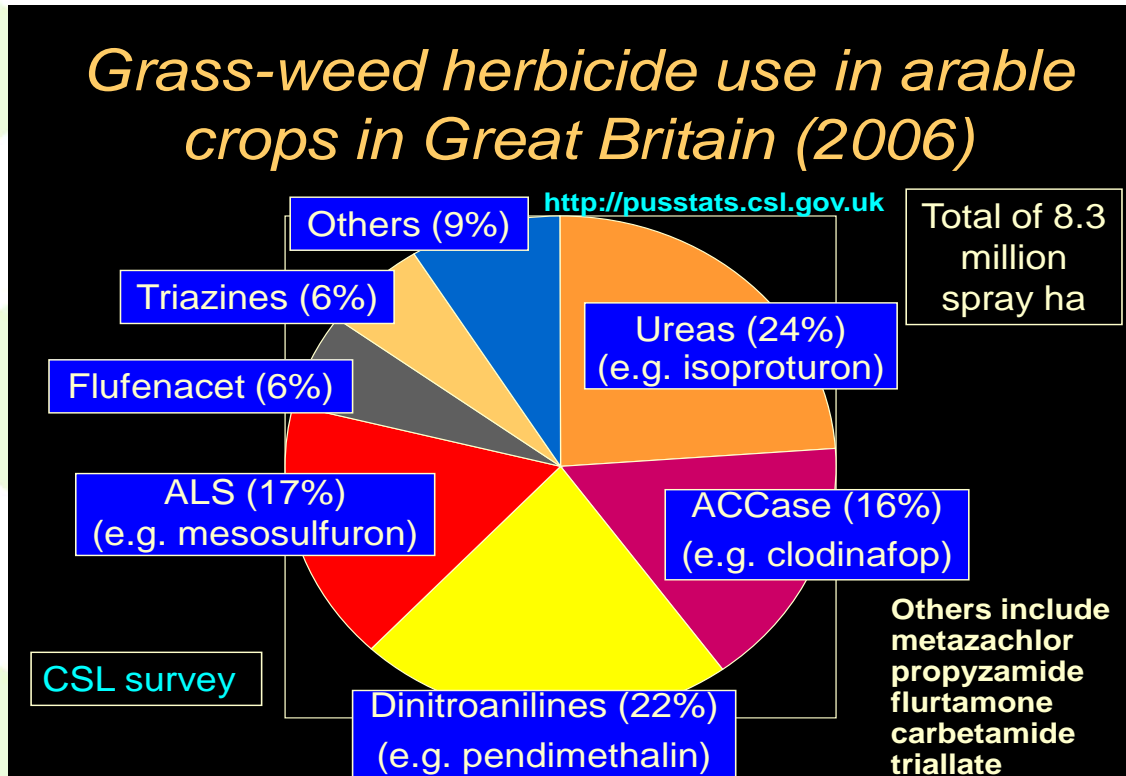
# What happened next ?

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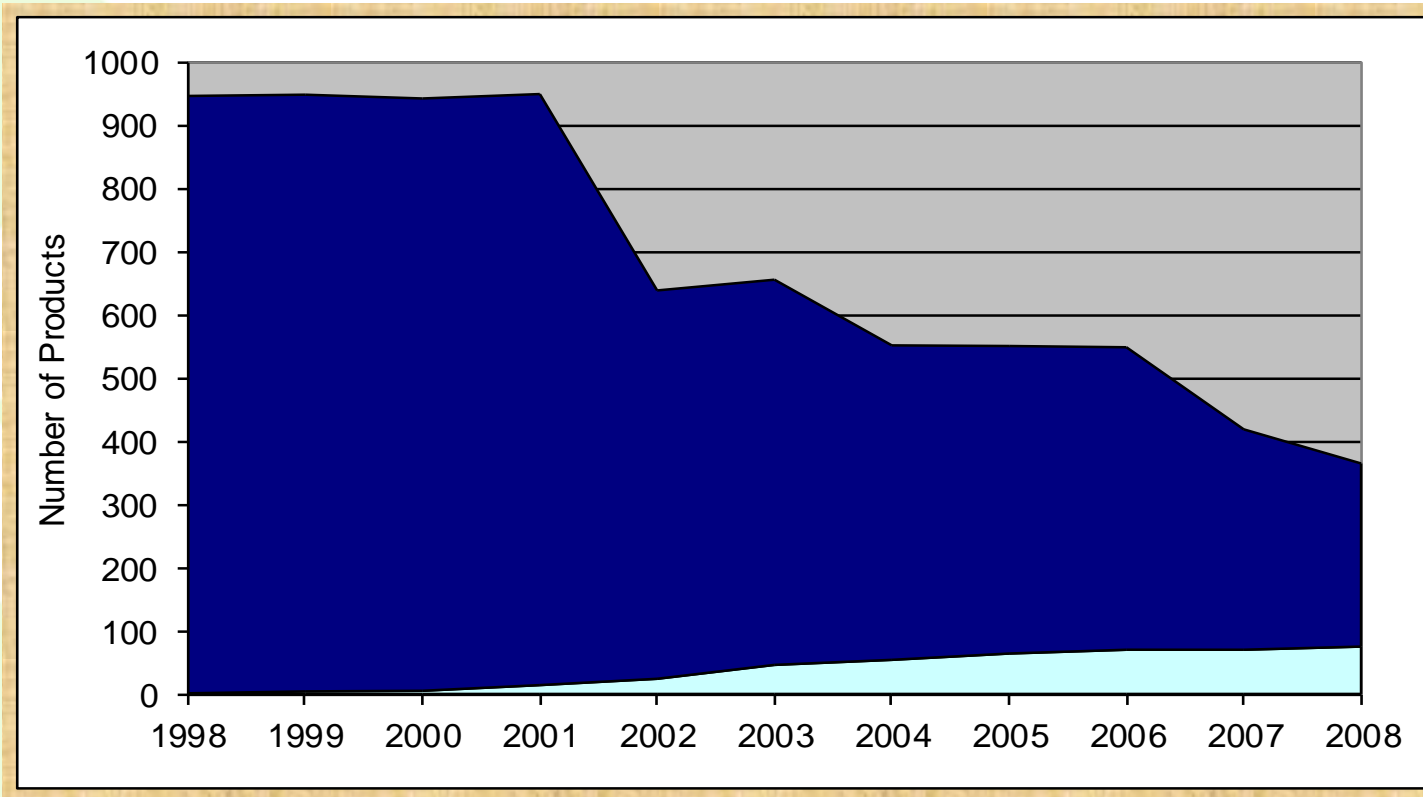
- An increasing reliance on herbicides to control changes in grass weeds:
- Black-grass rapidly became the dominant weed in arable rotations in England
- Wild oats became the next dominant weed
- Annual meadow-grass too

# Herbicide use for grass-weed control in cereals in Great Britain in the 2006 cropping year, in terms of spray hectares (CSL, 2006).



# Number of available pesticide products 1998 - 2008

(slide courtesy of ECPA)





## Average numbers of Alopecurus myosuroides plants m<sup>2</sup>

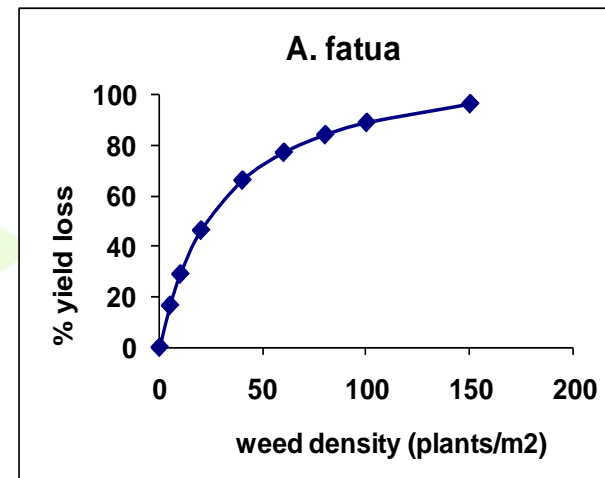
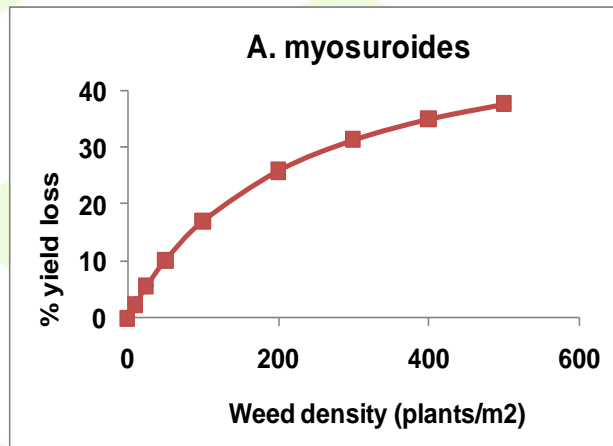
Impact of Tillage regimes following ploughing, non-inversion cultivation and direct drilling,  
based on -analysis of data from 25 field experiments. (P J W LUTMAN\*, S R MOSS\*, S COOK† & S J WELHAM)



	Noninversion cultivation	Ploughing	Direct drilling	SED (38 d.f.)
Log10 transformed mean (plants/m <sup>2</sup> )	118	37	137	0.045
% Change		-69	16	

# Yield loss response curves for black-grass (*A. myosuroides*) and wild-oat (*A. fatua*)

(from Wilson & Wright 1990)



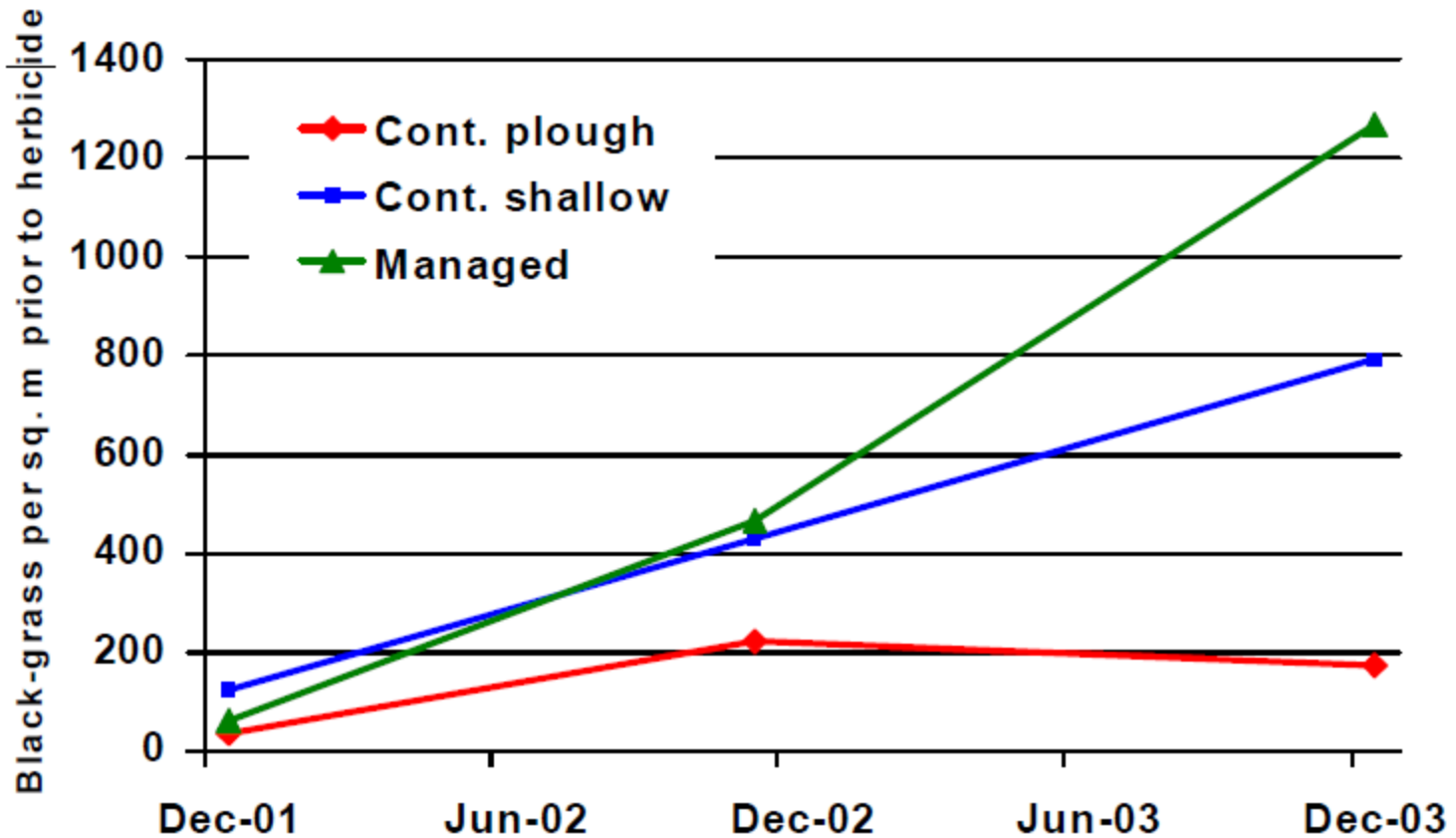
# The influence of stubble and winter cultivations on the number of *A. fatua* seedlings and seeds (in the soil) in June (from Cussans *et al.*, 1979)



September stubble cultivation	Winter cultivation	Seedlings/m <sup>2</sup>	Seed/m <sup>2</sup>
Yes	Plough	156	256
No	Plough	80	138
Yes	Tine	221	283
No	Tine	110	56

# Long term Black –Grass Trial, Lincolnshire

S K COOK<sup>1</sup>, J H CLARKE<sup>1</sup>, Z S HUGHES<sup>2</sup>, S R MOSS<sup>2</sup>  
the Sustainable Arable LINK (LK0923)



Managed – 2001 plough; 2002 shallow; 2003 delayed shallow tine, same drill date

# SEERAD-funded reduced tillage trial in Midlothian 2002, (extract from SAC Technical note 580)



**Table 1: Impact of reduced tillage treatment on weeds in winter wheat in trial in Midlothian. Not treated with herbicide. Weed number/m<sup>2</sup> on 9 December 2002**

	Annual meadow-grass	Volunteer oilseed rape	Common chickweed	Forget-me-not	Field pansy
Plough	548	24	44	4	36
Reduced tillage	1168	0	544	0	0

# SEERAD-funded reduced tillage trial in Midlothian 2002, (extract from SAC Technical note 580)



**Table 3: % Eyespot on stem base**

Year	2002	2003	2004	Average
Reduced tillage	41.7	30.6	20.3	31
Ploughed	39.0	35.6	32.6	37

**Table 4: Impact of reduced tillage on crop yields (t/ha)**

Year	2002	2003	2004	Average
Reduced tillage	10.4	8.9	9.5	9.6
Ploughed	8.9	9.1	8.2	8.7

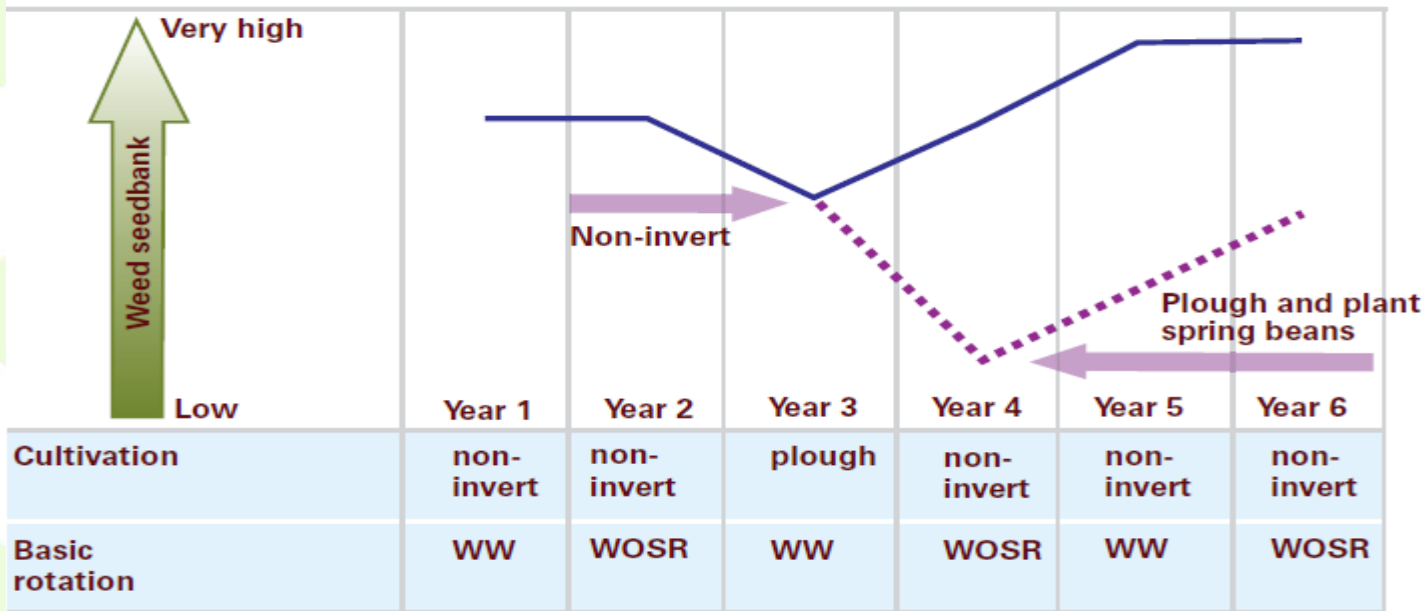
# Back to this

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Rotational ploughing reduces the risk of grass weeds by burying shed seeds

# How ploughing could fit in to a Rotation ?



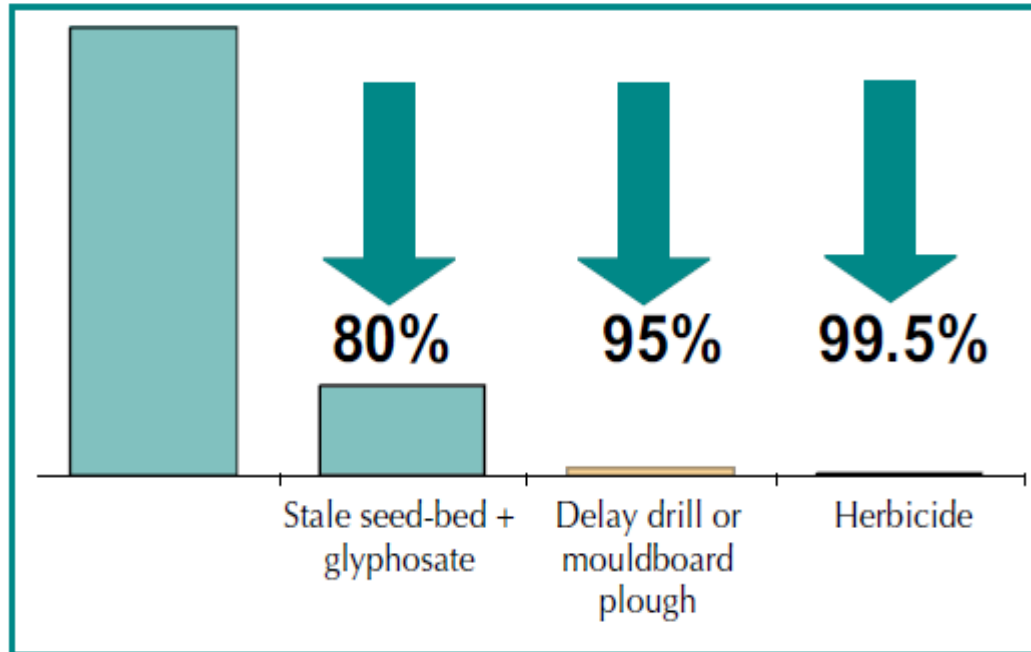
WW = winter wheat    WOSR = winter oilseed rape

— Current practice    ..... Suggested improvements



# Integrated Control Gives the best results !

Fig 2: An example of potential cumulative benefit of cultural control: sterile brome



# Brome. an issue following minimal tillage

