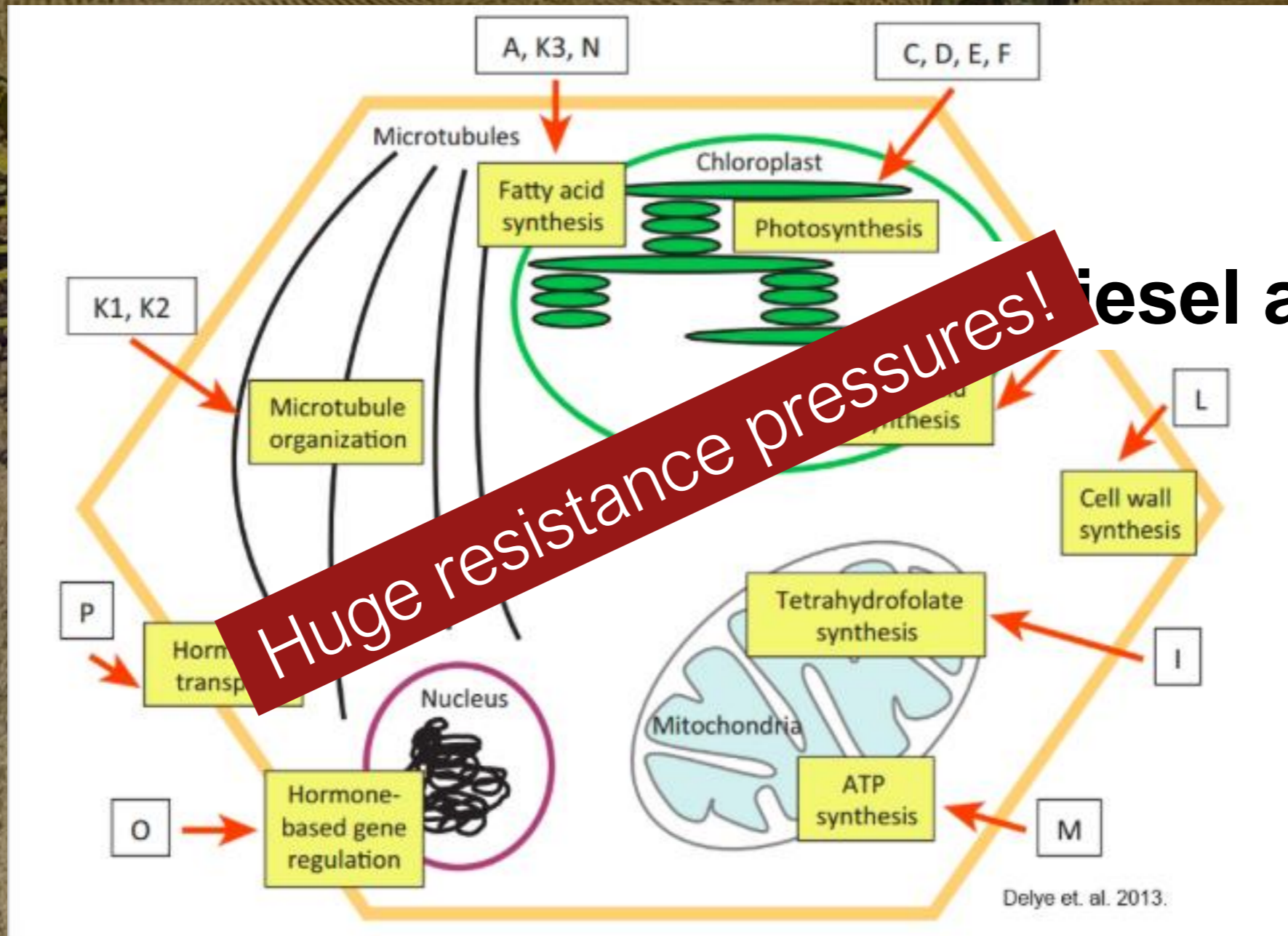


2016

Blackgrass - Keeping rotations profitable  
Ben Taylor-Davies

# Selective herbicide resistance

## Chemical group HRAC



**Diesel and Steel**

However.....

No known resistance to Chemical Group  $C_{12}H_{23} + Fe!$

When speaking to Dr Michael Owen of Iowa State University about preventing glyphosate resistance in blackgrass



“Do not repeat what we have done!  
i.e multiple applications of glyphosate  
with no mechanical tillage”



Dr Martin Vila Aiub, University of Buenos Aires

Stressed weeds are harder to kill than healthy, actively-growing weeds.

Plants can be stressed and not show any distinct visual signs.



### Stress can be caused by:

lack of moisture, dry conditions,

lack of oxygen due to waterlogging

extremes of temperature, for example, cold (frost) and heat

nutrient deficiencies

insect pests, for example aphids and wireworms

disease

mechanical damage, that is, tillage or slashing.

A sublethal dose of herbicide from previous applications or residues



Post emergence applications too soon after a pre emergence herbicide can potentially result in poorer results and faster development of resistance

# Hormesis as a driver for resistance?

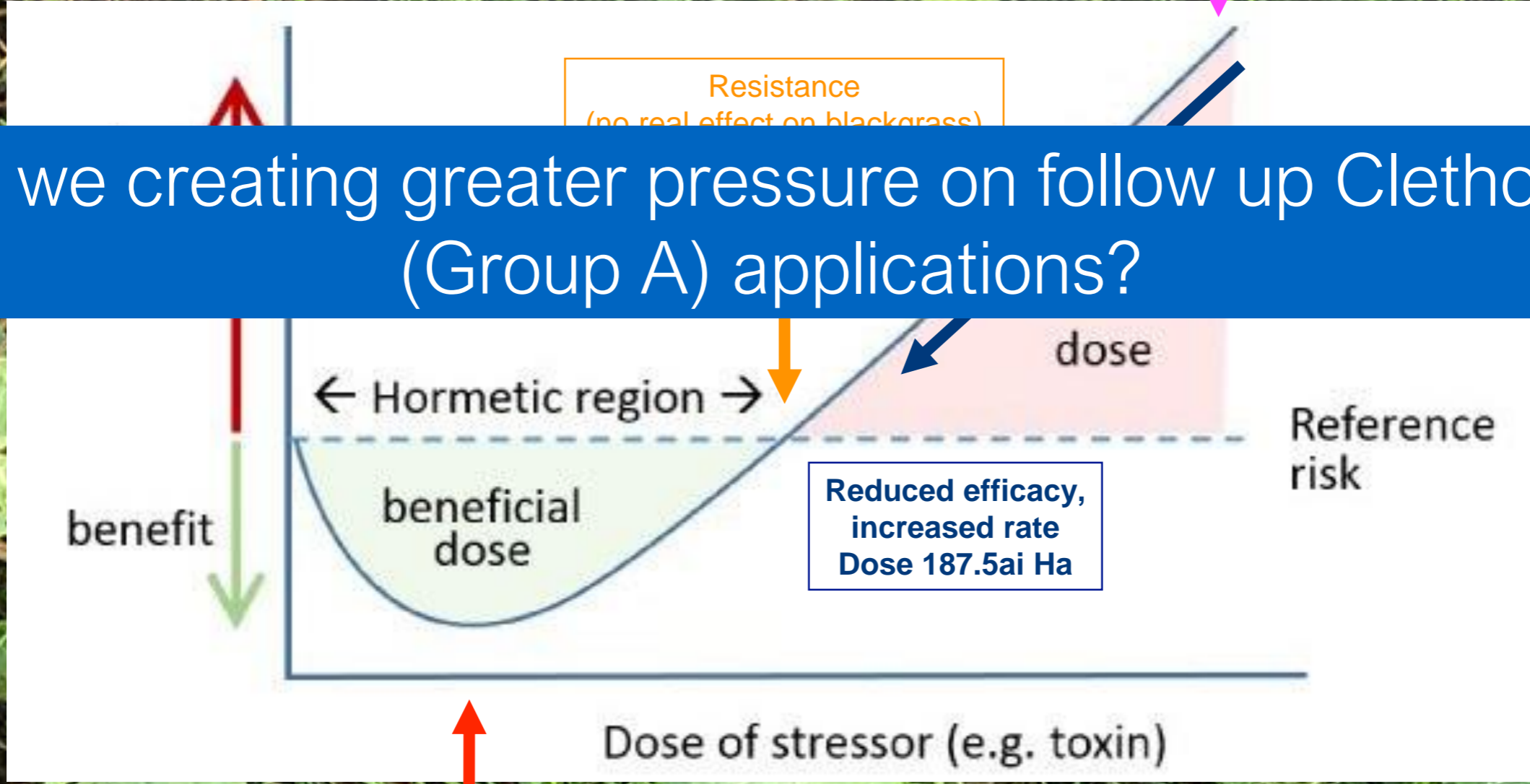
Graminicide example: Fluazifop-P-butyl (Fusilade) (HRAC A)

Use over time

Year of release  
(highly effective on blackgrass)  
Dose 100gm ai Ha

Resistance  
(no real effect on blackgrass)

Are we creating greater pressure on follow up Clethodim (Group A) applications?



years of resistant selection  
(product used at 62.5ai Ha for Volunteer control)

# Blackgrass often described as the 'perfect' weed

Poorly structured soils

Germinates mostly in Autumn 85%

Grows well in very wet soils

Thrives in disturbed soils

Highly competitive

Large tillering capacity

Sheds seed before harvest

Resistant to almost all herbicides

Shallow germinating depth...

**Highly selective**

Selected for blackgrass shorter than the growing crop of clover within 3 years

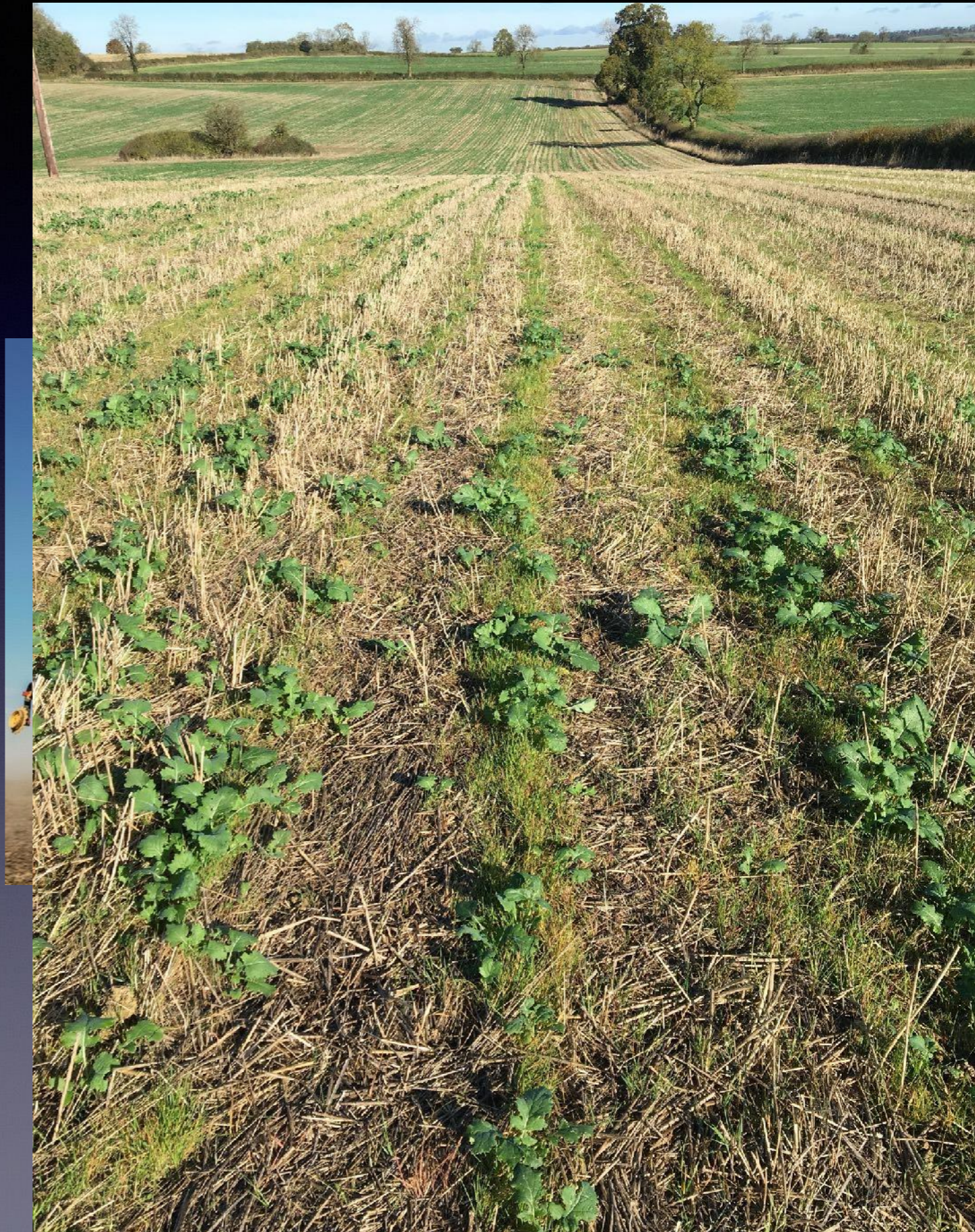


Weed surfer, Used on UK Organic farm



# Less obvious selections in blackgrass.....

- Similar farm with similar issues.
- Carrier to depth of 50mm (surface tillage) Vaderstad rapid drill
- **Selected** BG germinating from >50mm mutation.





# Brome grass samples (Australia)

January 2019

All seeds 'set' on the same day

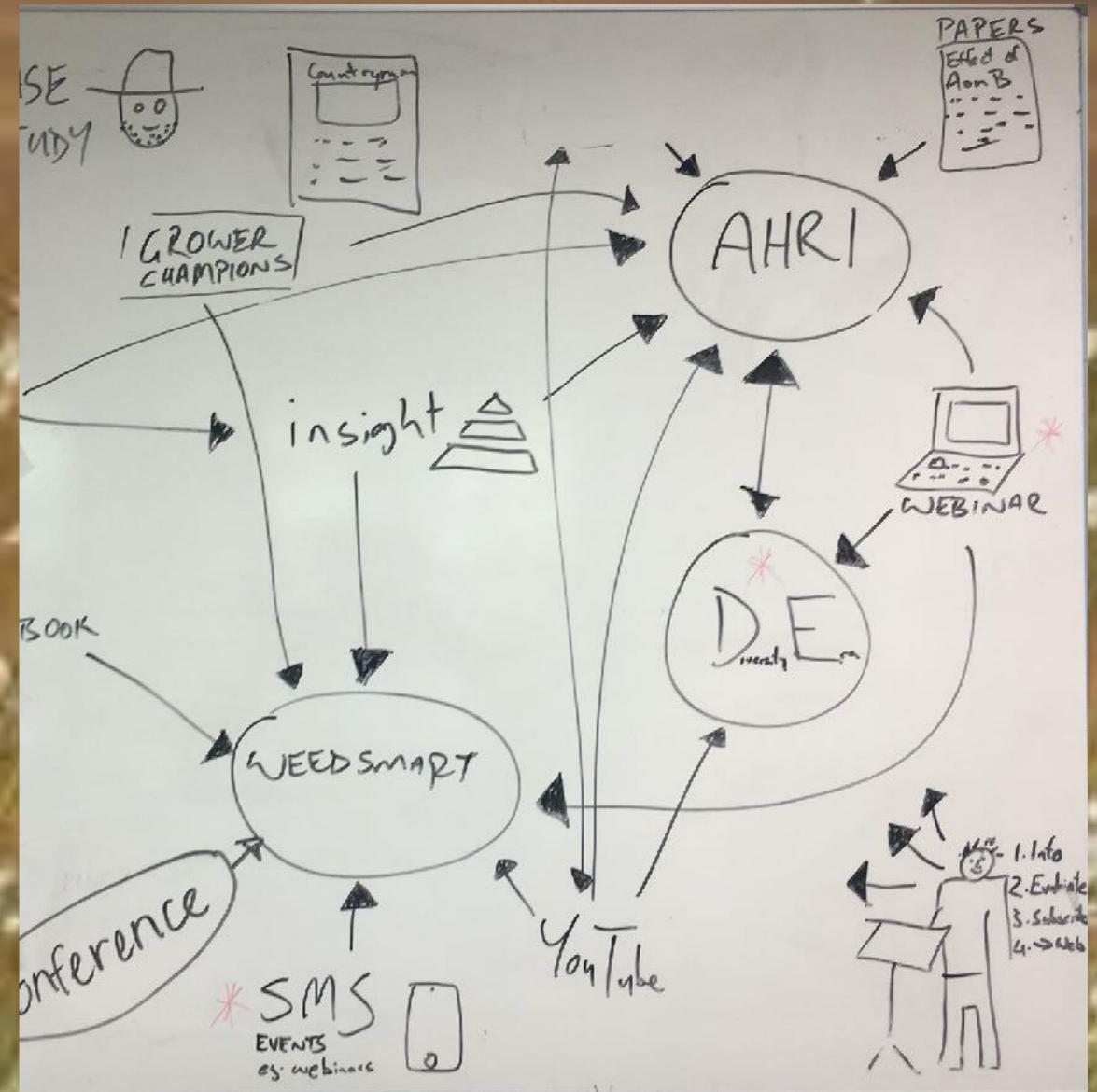


Field population

**Evolving** longer dormancy to avoid pre emergence herbicides!

Standard population (found along roadsides)

# Dr Mike Ashworth



	Selected for early flowering (5 generations)	Control Yuna wild radish (WARR 7)	Selected for late flowering (3 generations)
Days to first flower	29	59	114
Growing Degree Days (°C d) to first flower*	344 °C d	634 °C d	1314 °C d
Height of first flower initiation			141cm
Individual plant biomass at first flower	4g	22g	46g

**What are you selecting for?**



# Crop rotations for blackgrass control

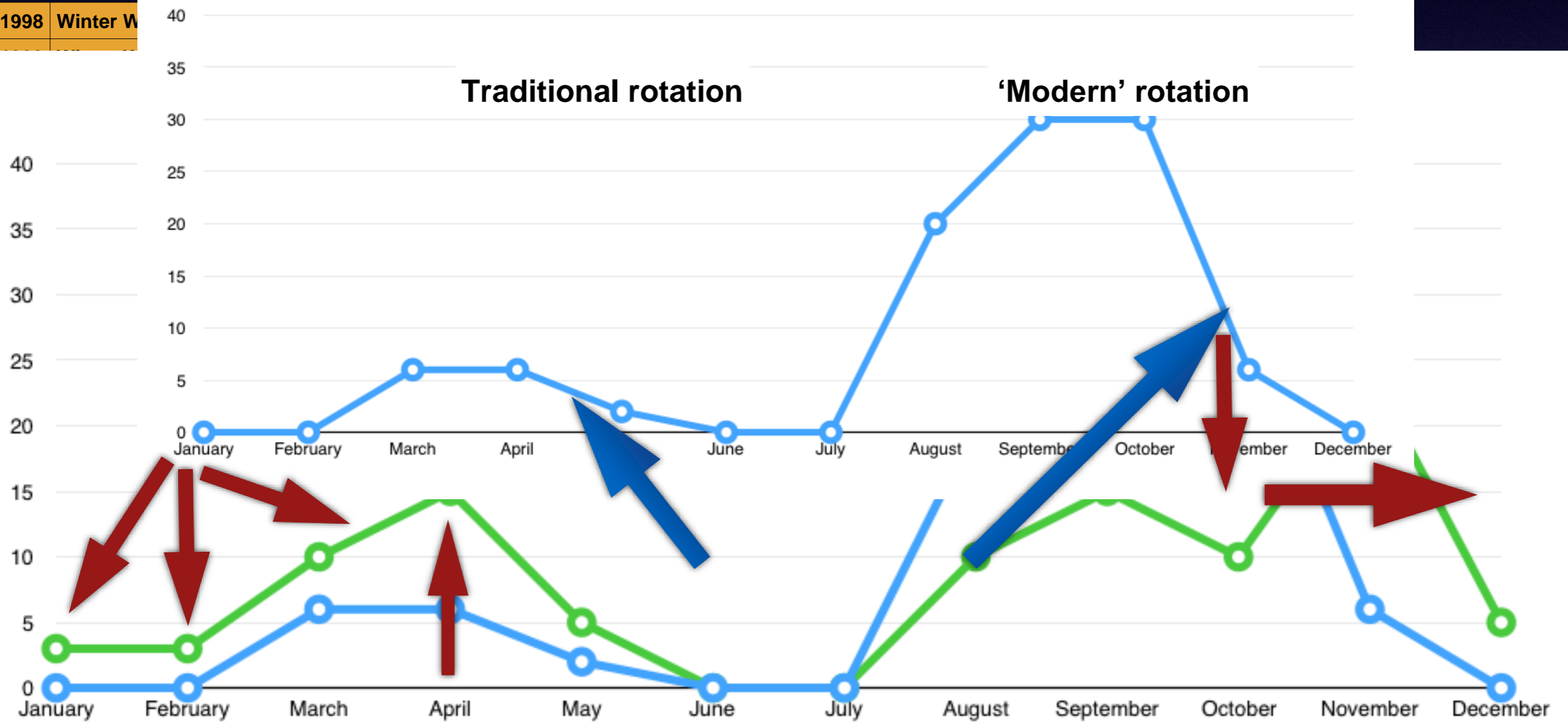
## Clattercote Priory Farm cropping 1998-2018

Traditional rotations of wheat and oilseed rape selected for a very narrow blackgrass germination window

**Blackgrass emergence pattern**

Table 1

1998	Winter W
------	----------



2018 Spring????

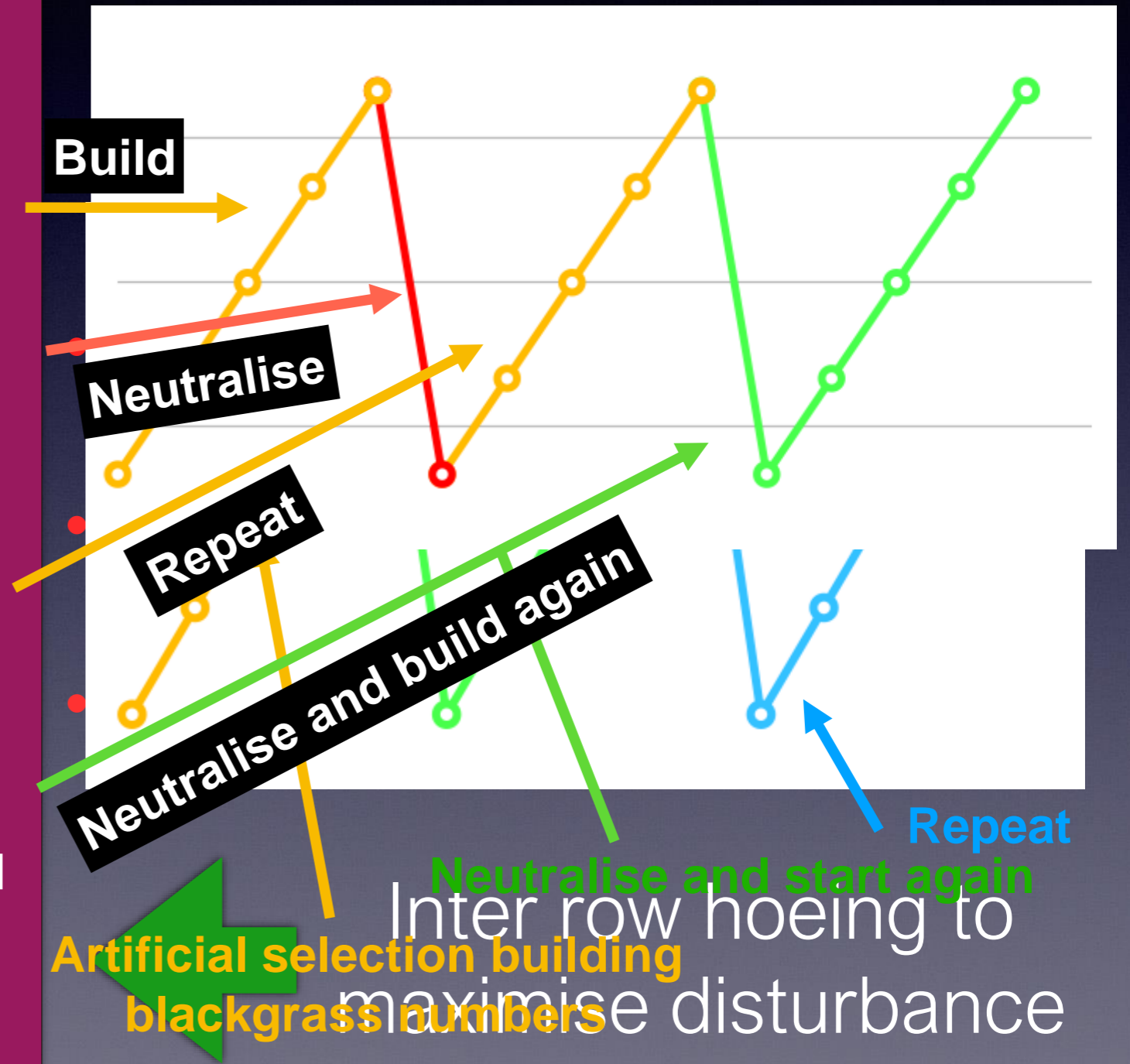
- Spring cropping 88% control

# Manipulating blackgrass

A whole new approach to rotation enhancing nature

Year	Crop block	Block drill timings
1	Winter Wheat	Mid to late October
2	Winter Oats	
3	Winter Wheat	
4	Winter Oats	
5	Winter Wheat	
6	Spring Barley	Mid to late March
7	Spring Oats	
8	Spring Wheat	
9	Spring Barley	
10	Spring Oats	
11	Winter Oilseed rape	Early to Mid September
12	Winter Barley	
13	Winter Oilseed rape	
14	Winter Barley	
15	Winter Oilseed rape	

## Cultivation type 'blocks'



Thank you