

Varietal characters for sustainable agriculture

Simon Kightley

NIAB

Cambridge



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Current VCU trials

Traditional characters will remain important
to growers

- Yield
- Quality
- Field characters
- Disease resistance



Defra Project

- Examine varietal characters that are advantageous to reduced input systems
- Recommendations on the relative importance of these characters and on possible ways to assess them



A collaborative project:

- NIAB, Cambridge
- Agricultural and Environmental Research Unit (AERU) - University of Hertford
- Department of Agriculture, University of Reading
- Consultation with stakeholders in the industry



Crops:

- Winter wheat
- Spring barley
- Winter oilseed rape
- Grain peas
- Potatoes

Looking at different cropping scenarios and
environmental sensitivities



The approach

- 1) Analysis of the production cycle for its impact on:
 - Energy use
 - Ecotoxicity and pollution of ground water / waterways
 - Food safety
 - Value to growers



The approach

- 2) Identification of characters contributing to sustainability
- 3) Assessment of the characters as expressed by current varieties and looking at scope for improvement
- 4) Propose new guidelines for VCU - National Listing



Winter oilseed rape

Month	Activity	Inputs
Aug	Establish crop	Seed / insecticides / herbicides
Sept	Pest and weed control	Insecticides / herbicides
Oct	Fertiliser	Compound N,P,K
Nov	Disease control (Stem canker)	Fungicide
Dec	Pigeon control	Shooting

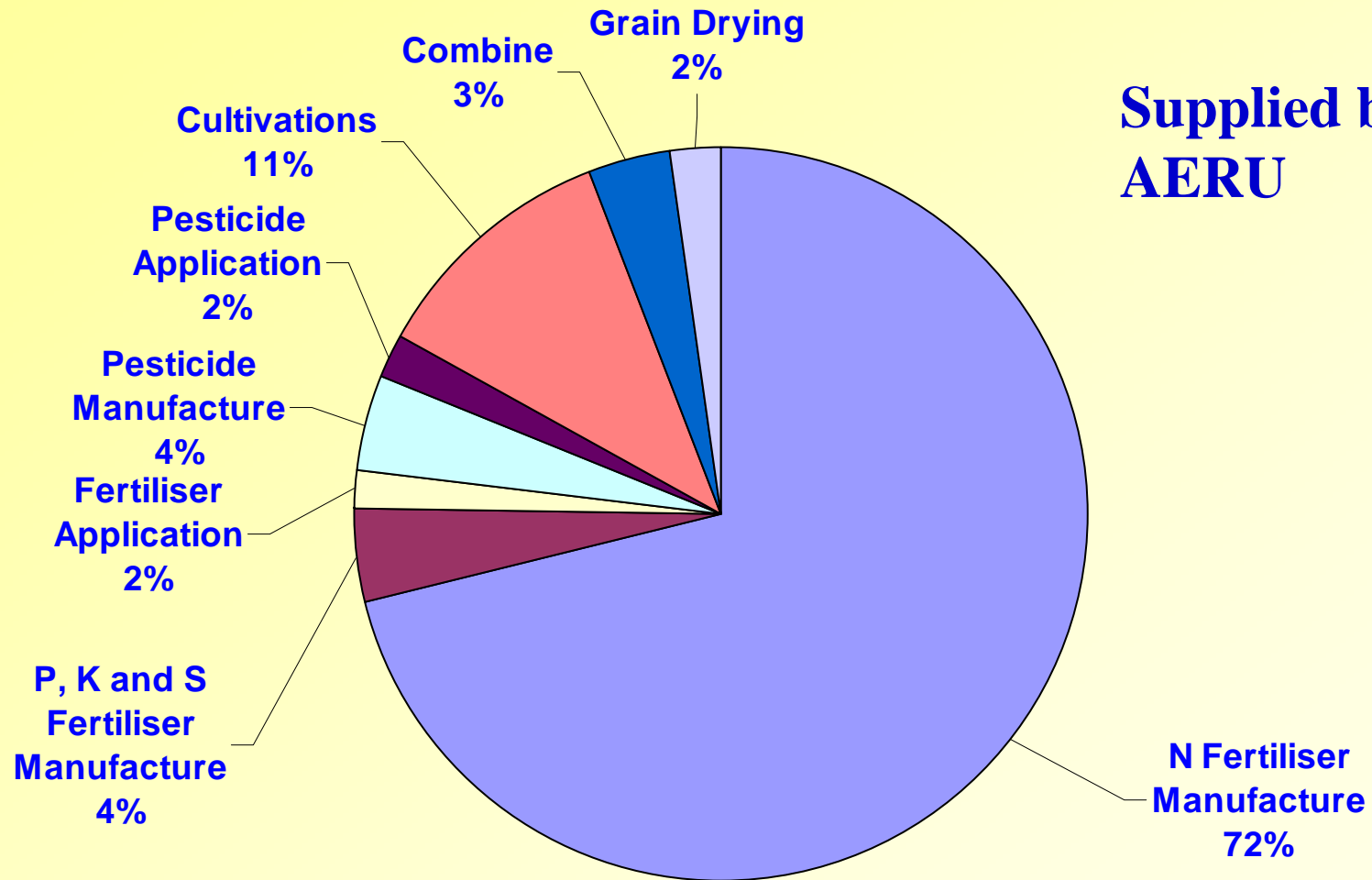


Winter rape (continued)

Jan	Continue pigeon control till March	
Feb	Disease control (LLS)	Fungicide
Mar	Fertiliser	N, S
	Pollen beetle control	Insecticide
Apr	Fertiliser	N
May	Disease control (Scl)	Fungicide
	Insect control	Insecticide
June	Pre-harvest: Swath or desiccate	Swather energy Desiccant
July	Harvest/cart/dry	Energy



Energy analysis for rape cultivation



Products and their eco-ratings and risk alerts (AERU)

Product (active substance)	eco-rating	orange alerts	red alerts
Diquat	-686	7	2
Chinook SD - Imidacloprid	-594	4	4
Butisan - metazachlor	-562	3	1
Draza - methiocarb *	-429	1	4
Treflan - trifluralin *	-396	1	2
Compass - iprodione	-373	3	0
Punch - flusiazole	-196	1	0
Folicur - tebuconazole	-169	0	0
Cyperkill 10 - cypermethrin *	-124	1	0
Decis - deltamethrin *	-121	1	0
Fusilade - fluazifop-p-butyl	-48	0	0



Characters under consideration

- Rapid emergence
- Early vigour
- Herbicide tolerance
- Insect resistance
- Early flowering
- Leaf habit
- Disease resistance
- Reduced nutrient demand
- Root development
- Short plants
- Uniform, early maturity
- Reduced biomass
- Pod shatter resistance



Conclusions - based on environmental impact, value to grower and potential for improvement

Major characters

Intermediate characters

Minor characters

Areas of interest



Major characters:

Flea beetle res.	<i>Screening test</i>
Good early vigour	<i>Assess in more detail</i>
Stem canker res.	<i>Existing assessments</i>
Reduced N requirement	<i>Variety interactions</i>
10% yield increase	<i>Existing assessments</i>
Sclerotinia res.	<i>New T/UT screening</i>



Intermediate characters (1):

Slug resistance	<i>Develop screening</i>
Competitive growth (in spring)	<i>Measure weed suppression</i>
Uniform pod maturity	<i>Special obs. plots</i>
Seed weevil res.	<i>Develop tests if claims made by breeders</i>
Pollen beetle res.	



Intermediate characters (2):

Light leaf spot res.	<i>Continue current tests</i>
Pod shatter res.	<i>Special test for claims</i>
Bladder pod midge res.	<i>Special test for claims</i>
Reduced aerial mass (low biomass)	<i>Investigate value and develop assessment</i>



Minor character

Lodging resistance/Straw stiffness

Important to growers, but good varieties already exist and there are few implications for the environment from further improvement



Areas of interest

- Depth and speed of rooting
Competition for water and nutrients
- Allegenic factors
Important if crop is to expand
- Green tissue glucosinolate
Improved pest and disease resistance?

