

# **Varietal characters for sustainable agriculture**

**NIAB, AERU, Reading University**



*Presentation for WGIN 10th June 2004*

# 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



# 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:

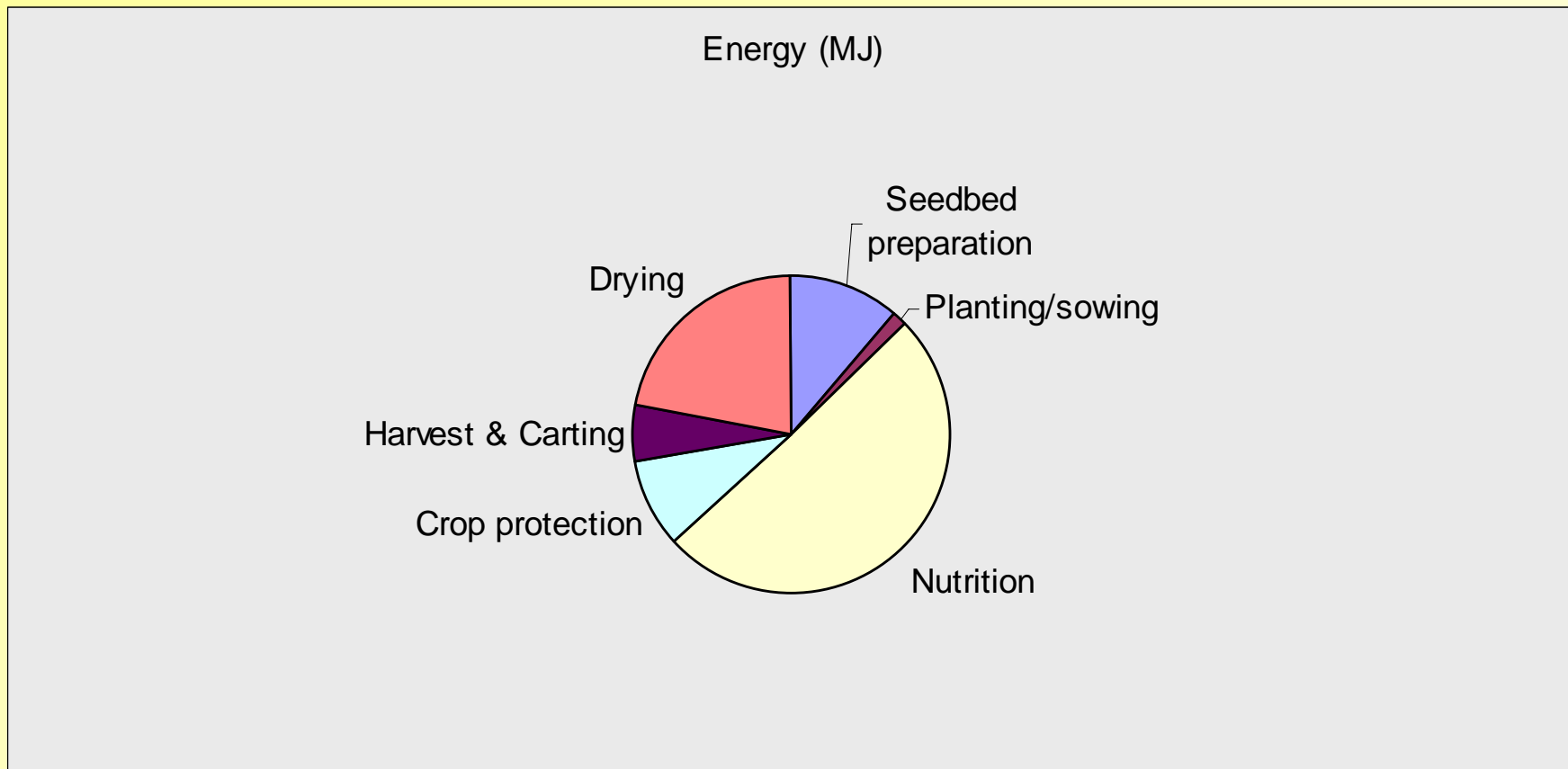
- Energy use
- Ecotoxicity and pollution of ground water / waterways
- Food safety
- Value to growers



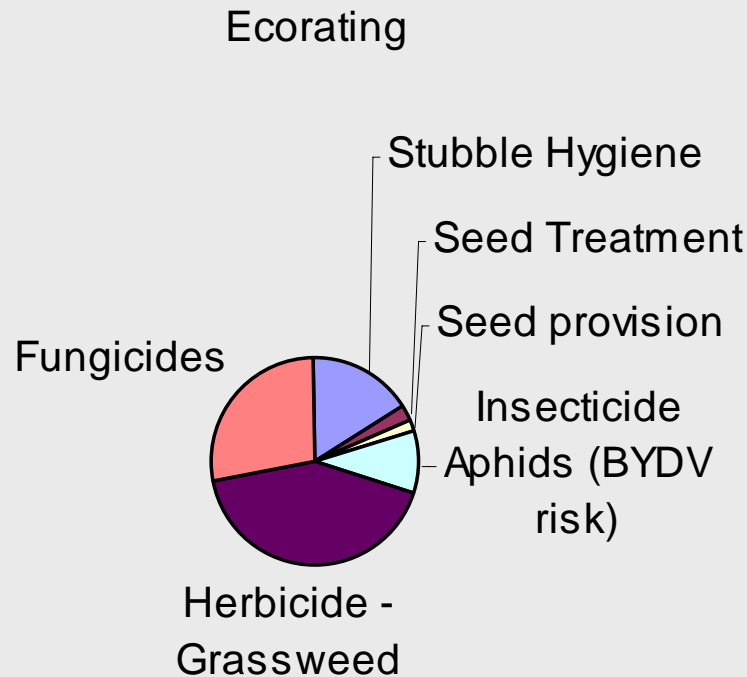
# The approach

- 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

# Energy Use for Winter Wheat



# Eco-rating for Winter Wheat



# Defining Characters

<b>Activity</b>	<b>Product</b>	<b>Character contributing to reduced inputs</b>	<b>Potential % saving</b>
Seed Treatment	Anchor - Carboxin	Bunt resistance	50
Aphid control	Toppel 10 – cypermethrin	BYDV resistance	100
Herbicide - Grassweed	Stomp - pendimethalin + IPU500 - isoproturon	Early vigour	20

# Ascribing value

E.g. Toppel 10 has ecotoxicity rating score of 11.9.

Resistance to BYDV obviates the need for Toppel 10 and gives a eco-rating saving of 11.9

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

**Major characters**

**Intermediate characters**

**Minor characters**

**Areas of interest**



# Winter Wheat Characters

## Major characters

Nitrogen requirement

Sprouting resistance

Adult plant competitive ability

Early vigour

*Septoria* resistance

*Septoria* and rust resistance

Adaptation to later sowing

BYDV resistance

10% increase in yield

## Action recommended for sustainability assessment

Special trials

Special test

Special trials or additional assessments on existing trials after a pilot investigation

New assessment on existing trials

Continue existing assessments

Continue existing assessments

Investigation of proxy measures

Routine test after pilot experiment

Continue existing assessments



# Winter Wheat Characters

## Medium characters

Nitrogen recovery:

Extension of existing test to all NL varieties

Mildew resistance:

Continuation of current assessment

Bunt resistance:

Respond to special claims

Seedling *Fusarium* resistance:

Respond to special claims plus investigation

Ergot resistance:

Investigation of varietal differences

Ear *Fusarium* resistance:

Consider routine testing

## Minor characters

Straw strength

Continue existing assessments

Aphid resistance

No action



# Varieties for Sustainable Production?

- Enables the evaluation of potential genetic improvement in terms of savings in energy & environmental toxicity
- How to design a testing system that identifies sustainable varieties?
- How to encourage breeders to develop sustainable traits?
- How to encourage growers to use them in a sustainable manner?

