

# Population Growth: A Good Thing?

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# OVERVIEW

- **Background**
- **Our journey so far**
- **Where we are & the future**
- **The situation elsewhere in the EU**

# BACKGROUND

- **Our drivers**
  - ◆ **Feed ourselves now and in the future**
  - ◆ **Climate change**
  - ◆ **Energy use**
  - ◆ **Loss of agricultural and bio- diversity**
  - ◆ **Who controls the farmers system**
- **Where we are now**
  - ◆ **Industrialised systems – one size fits all**
  - ◆ **Monoculture**

# MONOCULTURE

- **For the Farmer**
  - ◆ **Ease of planting, harvesting, marketing**
  - ◆ **Familiarity with needs of each variety**
- **For the Corporation**
  - ◆ **Breeding new varieties**
  - ◆ **Inputs**
  - ◆ **Machinery for increasing scale**
  - ◆ **Industrial scale processing and marketing**
  - ◆ **Processed food production and distribution**

# OUTCOME!!

- **Development of 'lock-ins' leading to;**
  - ◆ **Loss of diversity**
  - ◆ **Selection FOR diseases, pests and weeds**
  - ◆ **Increased fossil energy use**
  - ◆ **Pollution and negative impacts on ecosystems**
  - ◆ **LOSS OF CONTROL OF CONTROL BY THE FARMER**

# DIVERSITY

- **Unifying concepts in ecology (Loreau 2010)**
- **There are positive correlations between:**
  - ◆ **DIVERSITY and STABILITY**
  - ◆ **DIVERSITY and PRODUCTIVITY**
- **How do we do this in an artificial ecological system like agriculture?**

# WITHIN-CROP DIVERSITY

## POSITIVE

- **Capacity:** more phenotypic and genotypic variation
- **Complementation:** different genotypes complement each other
- **Compensation:** if some fail, others take their place
- **Change:** evolutionary shifts in response to selection

## NEGATIVE

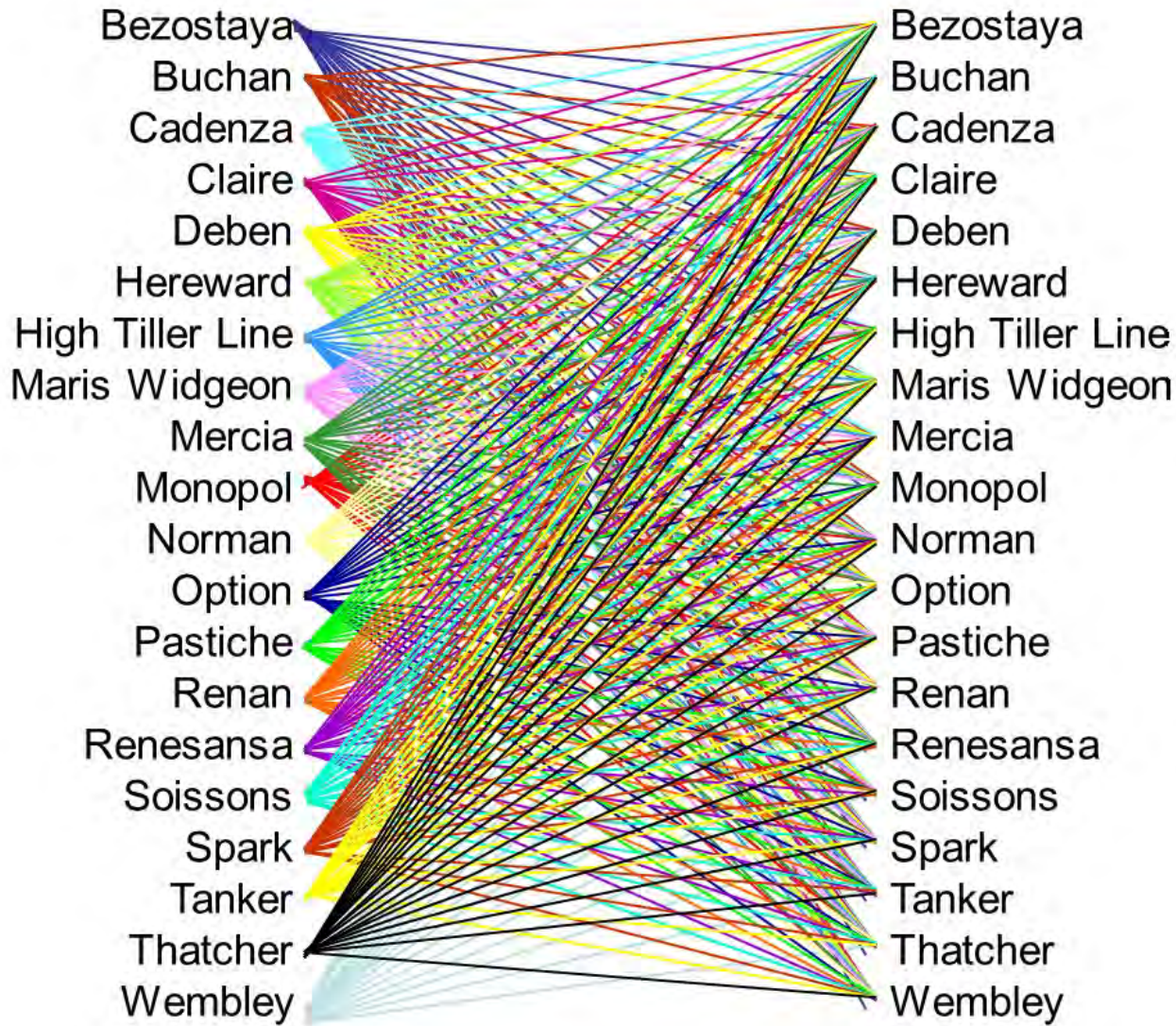
- **Competition:** may work against the four 'Cs' above.

## OUR JOURNEY

- **Wanted to develop diversity within ‘varieties’ of wheat**
- **Composite Cross Populations (CCPs) of wheat**
- **Started in 2001/02**



# The Organic Research Centre



Y - 36 crosses; Q - 66 crosses; YQ - 107 crosses

## OUR JOURNEY

- **Bulking up seed over the years by sowing and re-sowing**
- **Resulting seed is genetically very diverse**
- **Tested on**
  - ◆ **Organic and conventional farms around the UK**
  - ◆ **Organic and conventional trial sites in UK**
- **After a decade of work our conclusions are;**

# CONCLUSIONS

- **Greater yield stability**
- **Protein content and hardness were significantly increased**
  - ◆ **Baking quality**
  - ◆ **As nutritious**
  - ◆ **Suitable as an animal feed**
- **Genetic level**
  - ◆ **Require directed selection to cause adaptation**
  - ◆ **They maintain their genetic diversity**
  - ◆ **Capacity to cope with changing environmental conditions**

# Alchemy & CCP drilled - 16/10/12



The Organic Research Centre

# Alchemy & CCP drilled - 25/10/12



The Organic Research Centre

## CONCLUSIONS

- Farmers wanted to buy it
- BUT.....



**.....MARKETING OF THE SEED WAS ILLEGAL!!**

# DIDN'T FIT THE EU SEED REGS

**Quality**

**Seed health**

**DUS**

**Distinct**

**Stable**

**Uniform**

**VCU**

**Needs to be Interpreted  
more broadly**





## OUR JOURNEY

- **Alongside the breeding research we worked on policy**
- **Aim to be able to market heterogeneous material**
- **Right from the start in 2001**
- **Worked with Defra and UK Seeds Authority**
- **Project and other partners & EU commission**
- **Present the case for change to seed regulations**
- **Became a reality in March 2014**

**COMMISSION IMPLEMENTING DECISION**

**of 18 March 2014**

**on the organisation of a temporary experiment providing for certain derogations for the marketing of populations of the plant species wheat, barley, oats and maize pursuant to Council Directive 66/402/EEC**

*(notified under document C(2014) 1681)*

**(Text with EEA relevance)**

(2014/150/EU)

THE EUROPEAN COMMISSION,

Having regard to the Treaty on the Functioning of the European Union,

Having regard to Council Directive 66/402/EEC of 14 June 1966 on the marketing of cereal seed <sup>(1)</sup>, and in particular Article 13a thereof,

Whereas:

populations and the information to the user can be ensured, with guarantees similar to those resulting from Article 3(1) and Article 10, based on traceability requirements and identification of the places of production.

- (4) Given the characteristics of populations, the certification of seed from populations might imply a disproportionate burden for authorities and for operators. It is therefore appropriate to gather information on the possibility to provide for a system of controls of the production and marketing of seed of populations not requiring certification.

# OUR JOURNEY

- **Temporary Marketing Experiment**
- **1<sup>st</sup> March 2014 -31<sup>st</sup> December 2018**
- ***Avena spp., Hordeum spp., Triticum spp. and, Zea mays L.***



## WHERE WE ARE NOW

- We decided to market a wheat population in autumn 2015
- We talking with UK Seed Authority on what needed to be done
- UK Seed Authority is being very helpful

TEMPORARY LICENCE

2014/01

PLANT VARIETIES AND SEEDS ACT 1964

THE SEED MARKETING REGULATIONS 2011

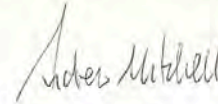
Temporary Licence, pursuant to Commission Implementing Decision 2014/150/EU, providing for certain derogations for the marketing of populations of the plant species wheat, barley, oats and maize for the purpose of a temporary experiment.

1. The Secretary of State for Environment, Food and Rural Affairs acting in exercise of the powers vested in him by Regulation 21A of the Seed Marketing Regulations 2011 (SI No 463) ("the Regulations") and of all other powers enabling him in that behalf, hereby authorises, with effect from the date of this Licence, an exemption from compliance with certain provisions of the Regulations for breeders and producers authorised and registered to participate for the purpose of a temporary experiment organised by the Commission Implementing Decision of 18 March 2014 (2014/150/EU) under Article 13a of Council Directive 66/402/EEC on the marketing of cereal seed ("the Directive").
2. This Licence applies to seed from populations belonging to the species *Avena* spp., *Hordeum* spp., *Triticum* spp. and *Zea mays* L. ("the populations"), where:
  - (a) they result from a given combination of genotypes;
  - (b) they are considered as units with regard to their suitability for being reproduced unchanged once established in a given region of production with specific agro-climatic conditions and;
  - (c) they are generated by one of the following techniques:
    - (i) crossing five or more varieties in all combinations followed by bulking of the progeny and exposing the stock to natural selection in successive generations;
    - (ii) growing together at least five varieties of a predominantly cross-fertilising species, bulking the progeny, repeatedly re-sowing and exposing the stock to natural selection until plants of the original varieties are no longer present;
    - (iii) inter-crossing varieties using crossing protocols different from those in (i) or (ii) to produce a similarly diverse population that does not contain varieties.

This Licence is subject to the conditions set out in the Annex below.

This Licence shall have effect until and including 31 December 2018 unless earlier revoked.

Dated: 9 June 2014



**Andrew Mitchell**  
For the Secretary of State for  
Environment, Food and Rural Affairs

**ANNEX**

1. Breeders, Producers and persons responsible for the maintenance of populations must be registered with the seed certification authority. The application for registration must contain:
  - (a) their name, address and contact details,
  - (b) the denomination of the population concerned.
2. An application for authorisation of populations containing the following information must be submitted to the seed certification authority:
  - (a) name and address of the applicant;
  - (b) species and denomination of the population;
  - (c) a description of the type of technique used to generate the population, with reference, as applicable, to Paragraph 2(c)(i), (ii) or (iii) of the Licence;
  - (d) objectives of the breeding programme;
  - (e) breeding and production method: breeding scheme as defined by the respective protocols, varieties used to breed and produce the population, and own production control programme used by the operator concerned;
  - (f) a description of its characteristics:

## WHAT WE NEED TO DO TO MARKET

- We must be registered with the seed certification authorities
- Apply for authorisation and register seed
  - ◆ Parent description: population objective
  - ◆ Crossing method
  - ◆ Generation number
  - ◆ Cultivation history (include data summaries if available)
  - ◆ Standard seed certification & inspection

## WHAT WE NEED TO DO TO MARKET

- **Specific Seed Label**
- **Records**
- **Ensure they are traceable**
- **Comparative field trials**
- **Marketing partner - Organic Seed Producers Ltd (OSP)**
- **Find a name!**

## FINDING A NAME



# ORC Wakelyns Population







# FINAL REPORT

Suffolk Seed Laboratory  
The Counting House  
Moat Park  
Earl Soham  
Woodbridge  
Suffolk  
IP13 7SR

Tests requested :  
Bunt  
Microdochium and Septoria

Date Received : 18/09/2015  
Sample Description : Wheat Population

Labtest Sample No : 124199  
Customer Reference : OP 939 EX WAKELYNS

Test	Result
Bunt	11.2 Spores per grain of seed
Microdochium and Septoria	0.0 % of seeds infected with Septoria spp. 0.0 % seeds infected with Microdochium nivale

### Specification / Technique used

Documented In-House Method based upon ISTA work sheet (No.53)

Documented In-House Method Based on ISTA Work Sheet

## FUTURE & LESSONS LEARNED

- **Some reserve seed stock still existed**
- **This planted autumn 2015 for 2016 marketing**
- **Leave it to the professionals**
  - ◆ **John Bradwell Consultancy and Seed Services**
- **Intend to market in autumn 2016**

## WHAT ELSE IS BEING DONE

- **Denmark has applied for approval for populations of;**
  - ◆ winter wheat
  - ◆ common & purple spring wheat
  - ◆ naked & hulled barley
  - ◆ winter oat
- **Danish authorities have been very flexible and open minded**

## WHAT ELSE IS BEING DONE

- **France**
  - ◆ April 2015 a call for French Government for participation to the EU experiment on heterogeneous material commercialisation.
  - ◆ 2 CCP populations of wheat (ORC & INRA)
  - ◆ Maize?
- **GERMANY**
  - ◆ No details but UK government inform us that they understand a CCP of maize is being prepared
- **Netherlands**
  - ◆ 2 spring wheat CCPs

# WHAT ELSE IS BEING DONE

- ◆ **Issues are arising about traceability**
  - **VCU?**
  - **Paper based system may open up opportunities for other crops ie OP veg.**

## FUTURE

- We need to get going
- Experiment ends in 3 years time?
- Other types of populations
- Other ways to market/own/fund populations?

