



<http://www.jic.ac.uk/GERMPLAS/Index.htm>

**Mike Ambrose**  
**Germplasm Resources Unit:**  
**BBSRC-supported National Capability**





# Update on Global Wheat Genebanks and Information Systems (*part 1*) and recent developments at the Germplasm Resources Unit (*part 2*)

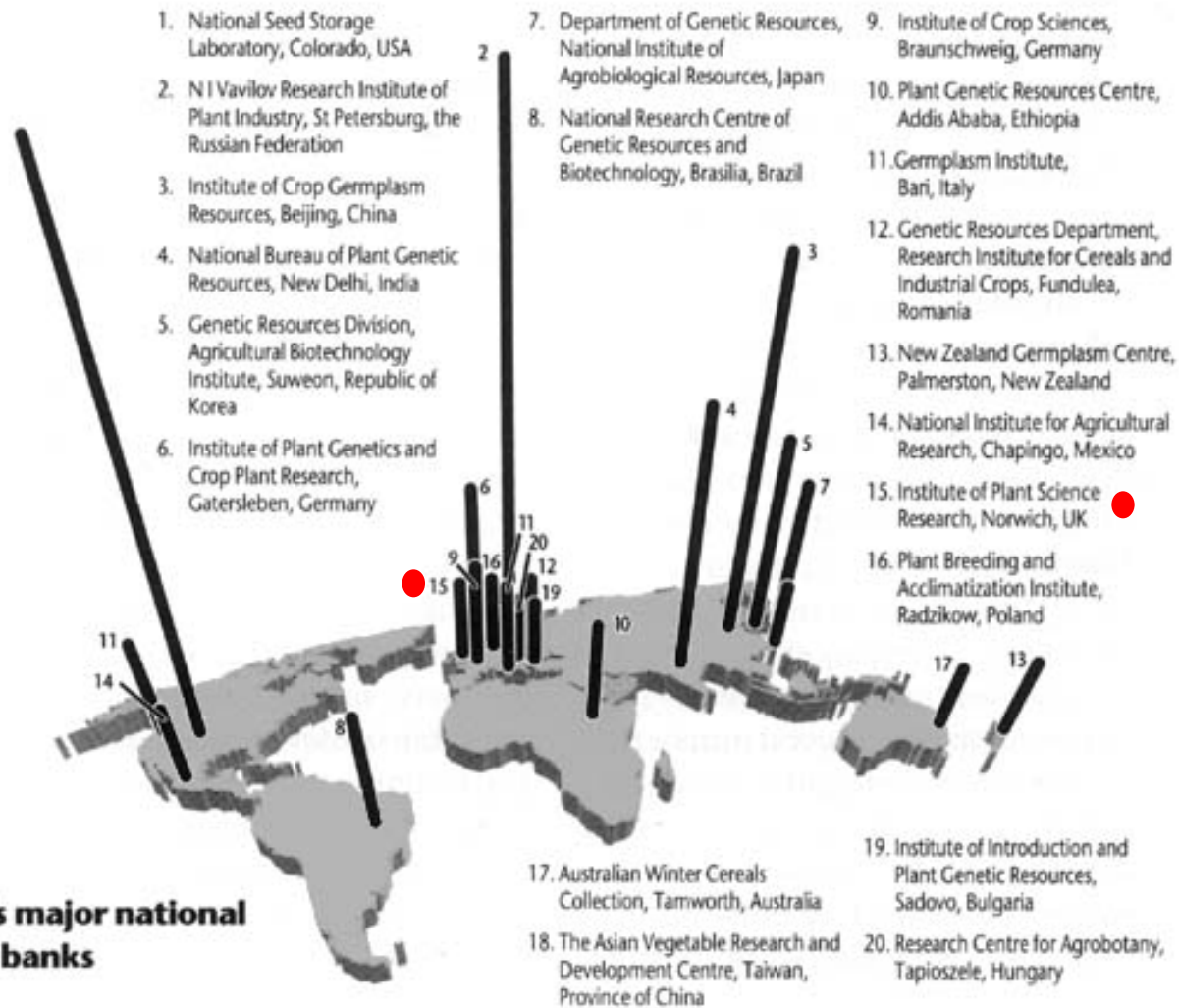
Mike Ambrose

WGIN Meeting 27<sup>th</sup> November 2012



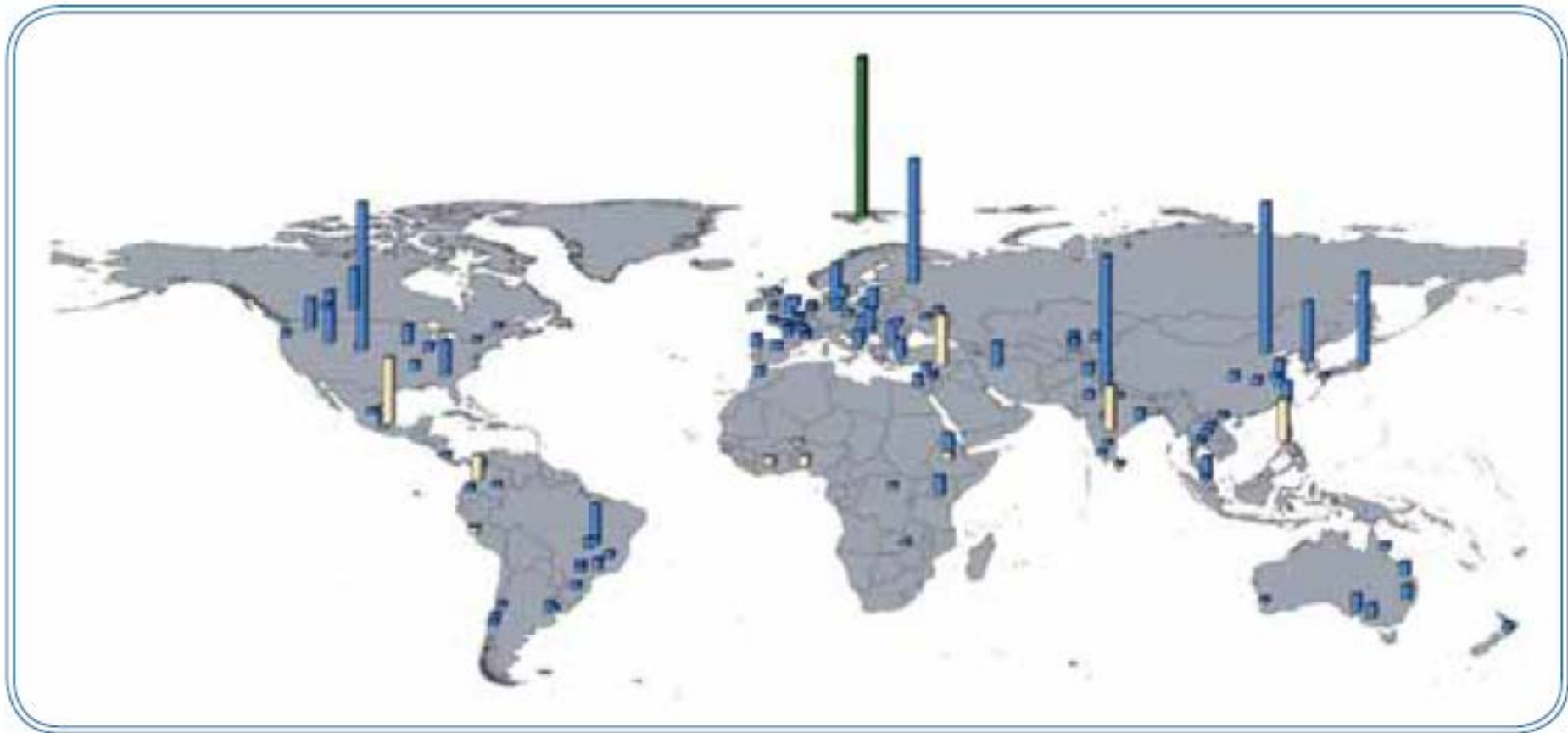


## The world's major national plant gene banks





Geographic distribution of genebanks with holdings of >10 000 accessions (national and regional genebanks in blue; CGIAR centres genebanks in beige; SGSV in green)<sup>5</sup>



Source: WIEWS 2009; Country reports; USDA-GRIN 2009



**TABLE 7. Collections of a Global Network of Wheat Genetic Resources**

Country	Institute	No. of accessions
Australia	Australian Winter Cereals Collection, Tamworth	23,917
Bulgaria	Institute for Plant Genetic Resources "K. Malkov", Sadovo	9,747
Canada	Plant Gene Resources of Canada, Saskatoon	5,052
Cyprus	National Genebank (CYPARI), Agricultural Research Institute, Nicosia	7,696
Czech Republic	Research Institute of Crop Production, Prague	11,018
Ethiopia	Plant Genetic Resources Centre, Institute of Biodiversity Conservation and Research, Addis Ababa	10,745
France	INRA Station d'Amelioration des Plantes, Clermont-Ferrand	15,850
Germany	Genebank, Institute for Plant Genetics and Crop Plant Research (IPK), Gatersleben	9,633
Global	CIMMYT, El Batan, Mexico	111,681
Global	ICARDA, Aleppo, Syria	37,830
India	National Bureau of Plant Genetic Resources (NBPGR), New Delhi	32,880
Iran	National Genebank of Iran, Genetic Resources Division, Karaj	12,169
Japan	Genetic Resources Management Section, NIAR (MAFF), Tsukuba	7,148
Japan	Plant Germplasm Institute, Graduate School of Agriculture, Kyoto University	4,378
Netherlands	Centre for Genetic Resources, Wageningen	5,529
Russia	N.I. Vavilov Research Institute of Plant Industry (VIR), St. Petersburg	39,880
Spain	Centro de Recursos Fitogeneticos, INIA, Madrid	3,183
Sweden	Nordic Gene Bank, Alnarp	1,843
Switzerland	Station Federale de Recherches en Production Vegetale de Changins, Nyon	6,996
Turkey	Plant Genetic Resources Department, Aegean Agricultural Research Institute, Izmir	6,381
United Kingdom	Crop Genetics Department, John Innes Centre, Norwich	9,584
USA	USDA-ARS, National Small Grains Facility, Aberdeen, Idaho	56,218
USA	Wheat Genetics Resource Center, Kansas State University, Manhattan	5,000
<b>Total</b>	<b>23 institutes</b>	<b>434,358</b>

Source: Biodiversity, 2006

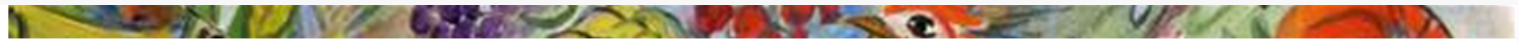




**TABLE 6. Collection managers' and collection users' perceptions of inadequately conserved genetic variability in existing wheat collections (responses normalized to a standard sample size)**

Genetic Resource	Bread Wheat		Durum Wheat	
	Collection Managers	Collection Users	Collection Managers	Collection Users
Modern cultivars	**		**	**
Obsolete cultivars		*		*
Landraces	****	**	****	*
Primary gene pool species	***	*	**	*
Secondary gene pool species	**	***	*	***
Genetic stocks	*	**	*	***
Mutants		****		***
Mapping populations	*	*****	*	****

*'This survey result suggests that for many genebanks there remains a gap between the perception of genebank managers and users in the major function of collections.'*



# The GIGA project

Access to information bridging the conservation and the use of the global crop diversity

ICT for Agriculture and Biodiversity Conservation  
15th January 2009, UNESCO, Paris

**Elizabeth Arnaud**  
Biodiversity International



## The aims of the GIGA project



- ✓ Provide access to the global accession-level information
- ✓ Provide tools to use this information
- ✓ Deploy and support best practices in data management for Plant Genetic Resources (PGR)
- ✓ Allows to obtain germplasm of interest for breeders and pre-breeders
- ✓ Facilitate rational use of the diversity in the PGR



# PGR Networks



UK

European

Plant



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**Welcome to the EURISCO site !**



**Creating a European Plant  
Genetic Resources Search  
Catalogue with passport  
data on *ex situ* collections  
maintained in Europe**

**Supporting the creation and  
providing technical support  
to National Plant Genetic  
Resources Inventories**



[www.eurisco.ecpgr.org](http://www.eurisco.ecpgr.org)



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*A window to Europe's plant diversity*

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### About EURISCO



The EURISCO web catalogue receives data from the National inventories, and provides access to all ex situ PGR information in Europe. [\[More\]](#)

### Search the Database



**Quick Search**  
Make a search using key criteria

**Advanced Search**  
Use various criteria to search in the database

### News

**19 November 2012: Invitation: contributions for last EURISCO e-bulletin - 2012**

**12 November 2012: Course on METABOLOMICS AND PLANT BREEDING, 15-19 April, 2013, Foggia, Italy**

**5 November 2012: Abdou Salam Ouédraogo Fellowship 2012 - Winner**

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## A European Genebank Integrated System



- About AEGIS
- Membership
- Structure
- European Collection
- AQUAS
- AEGIS ROAD MAP
- AEGIS Grant Scheme
- Documents

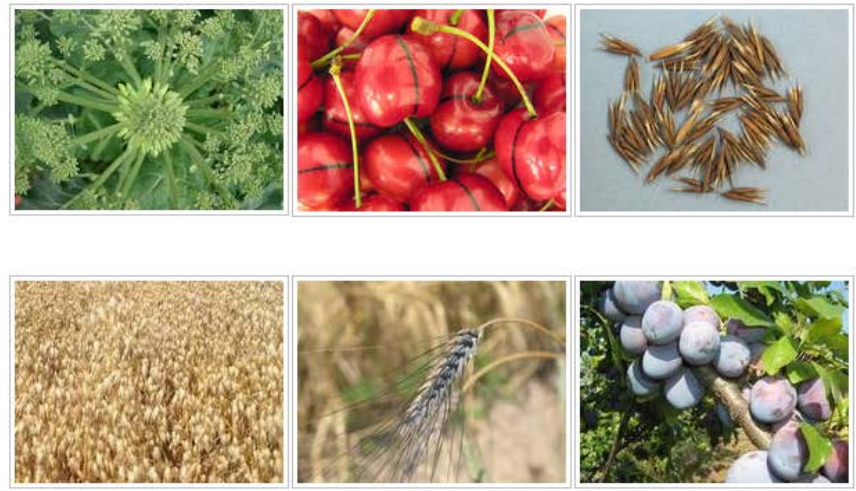


A **European Genebank Integrated System**, or AEGIS for short, aims to establish a European Collection, which would be a virtual European Genebank, to be maintained in accordance with agreed quality standards, and to be freely available in accordance with the terms and conditions set out in the International Treaty on Plant Genetic Resources for Food and Agriculture...

[More about AEGIS](#)



- [Membership](#)
- [Structure](#)
- [Documents](#)
- [European Collection](#)
- [AQUAS](#)
- [AEGIS Road Map](#)







## FIGS - Focused Identification of Germplasm Strategy

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GEOMAPS

SURVEY

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PROFILE

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Collaborators

Scientists

The Project

FIGS Sets



Contact Us



Providing access to an impressive combined collection of over **15,000** bread wheat landrace accessions collected from a diverse range of environments, housed in three genbanks **VIR, ICARDA, and AWCC**

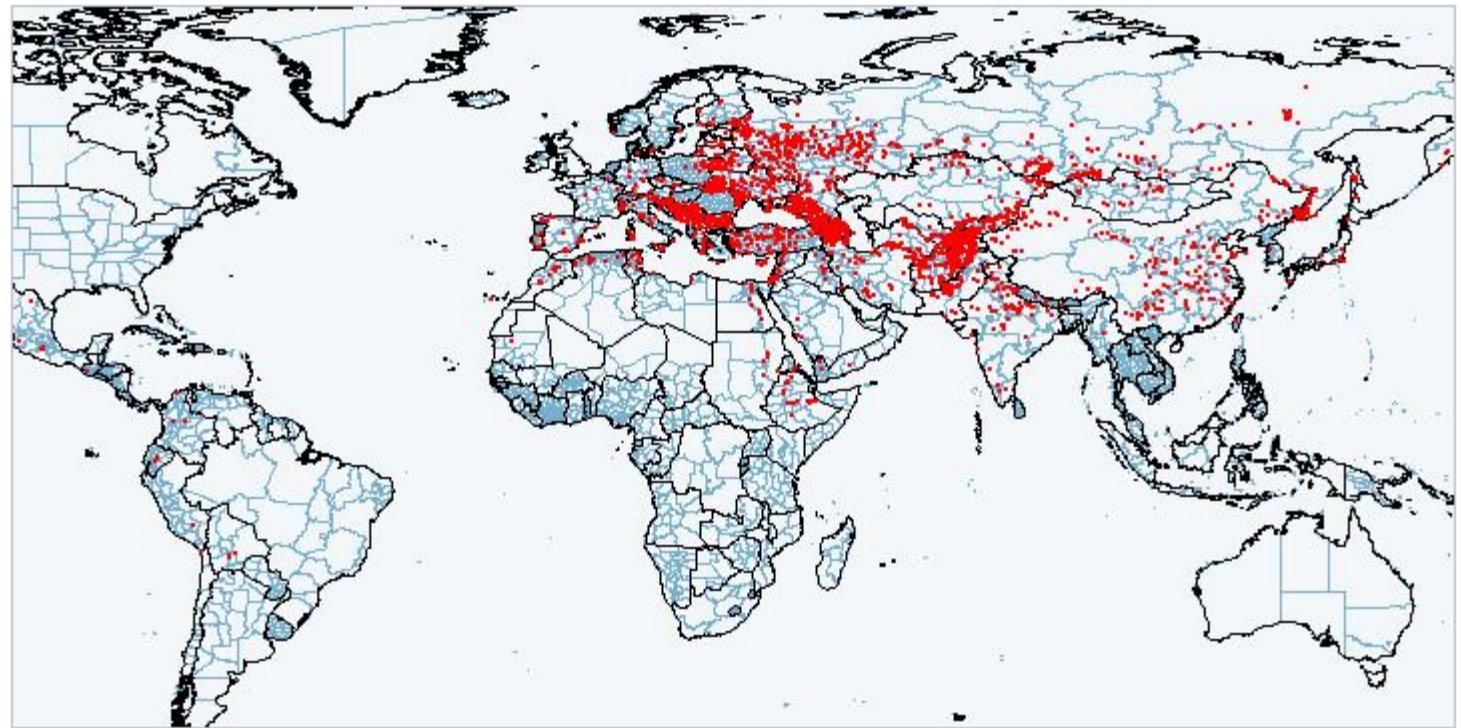


Select Query:   

Select Query:   

Select Query:   

Select Query:   





## Query on collection site data

Country:

- Afghanistan
- Albania
- Algeria
- Armenia
- Austria
- Azerbaijan
- Belarus

Rainfall:

Altitude:

Salinity Class:  ▼

Aridity Class:  ▼



## Query on FIGS sets

ANY of the selected  ALL of the selected

Core  Drought  Salinity







BBSRC supported national capability

Part of the International Network of Seed  
Banks

*'Curating, characterising and promoting  
our resources to the wider Biosciences  
Community- enhancing scientific  
knowledge and helping to improve the  
crops of tomorrow'*



## *'What does this translate into?'*

- Investment in the long term potential of the GRU
- Ring-fenced funding
- Direct dialogue with the Research Council coupled with directly accountability
- New partnerships
- Increased staff resources

# Germplasm Resources Unit



Externally recognised as an important UK land-based facility with collections of high international standing



Home to the UK Small Grain Cereal collections and other major wheat germplasm resources



The pea collection has been the international centre for mutant stocks since 1994



Recently extended our remit to include curation of key *Brassica napus* resources co-ordinated by PL's at JIC





# Public Collections 'Currency'



- **BBSRC Small Grain Cereal Collections**

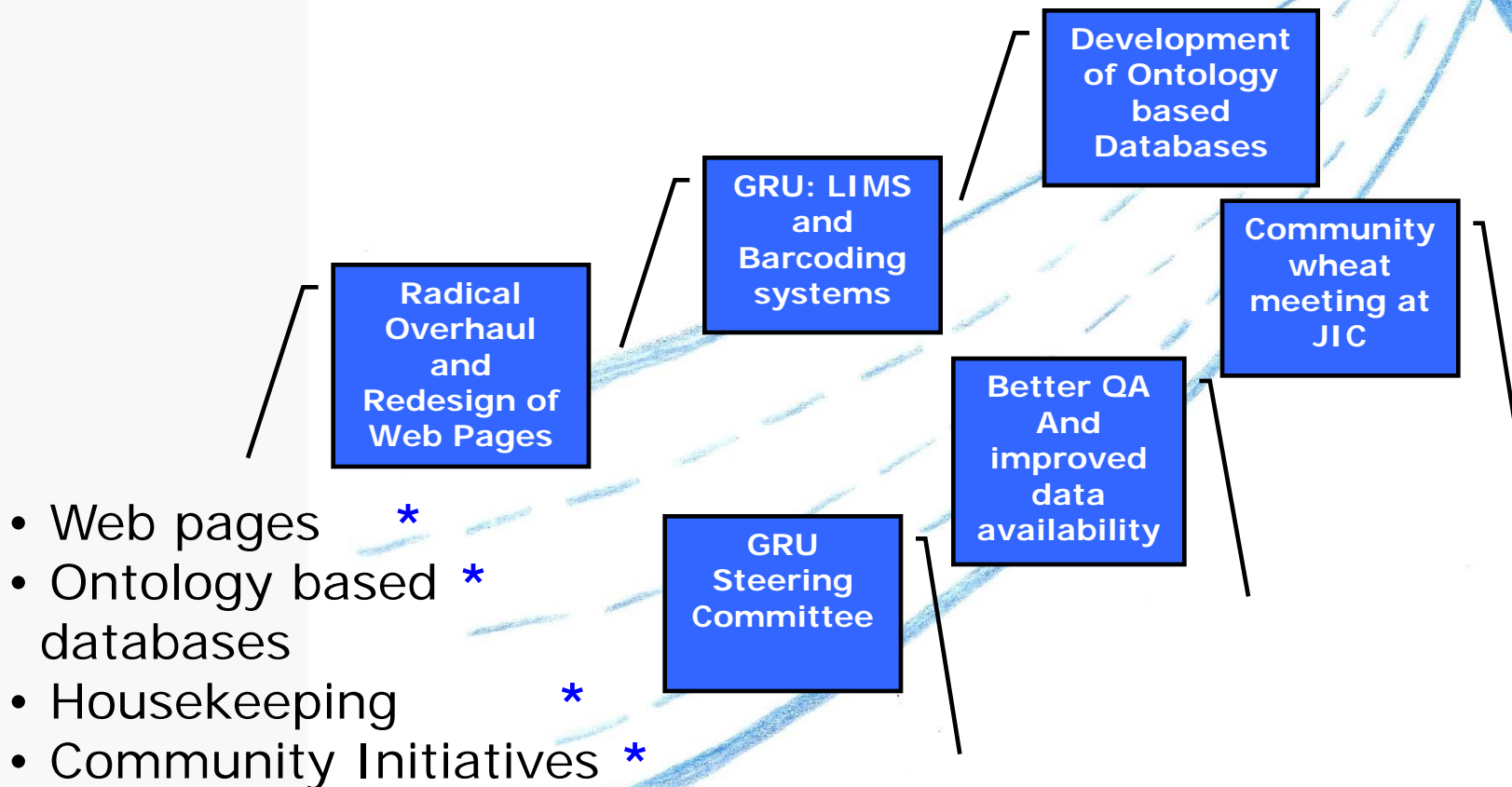
- Wheat ( 9400)
- Barley ( 10500)
- Oats ( 3000)
- Wild barley Collection ( 13000)
- Pisum Collection ( 3582)
- Field Bean Collection ( 300)

- **Specialist Collections**

- Precise genetic stocks
- Mapping populations (DHLs, RILs)
- Near-isogenic lines



## Roadmap



# 'Business approach'



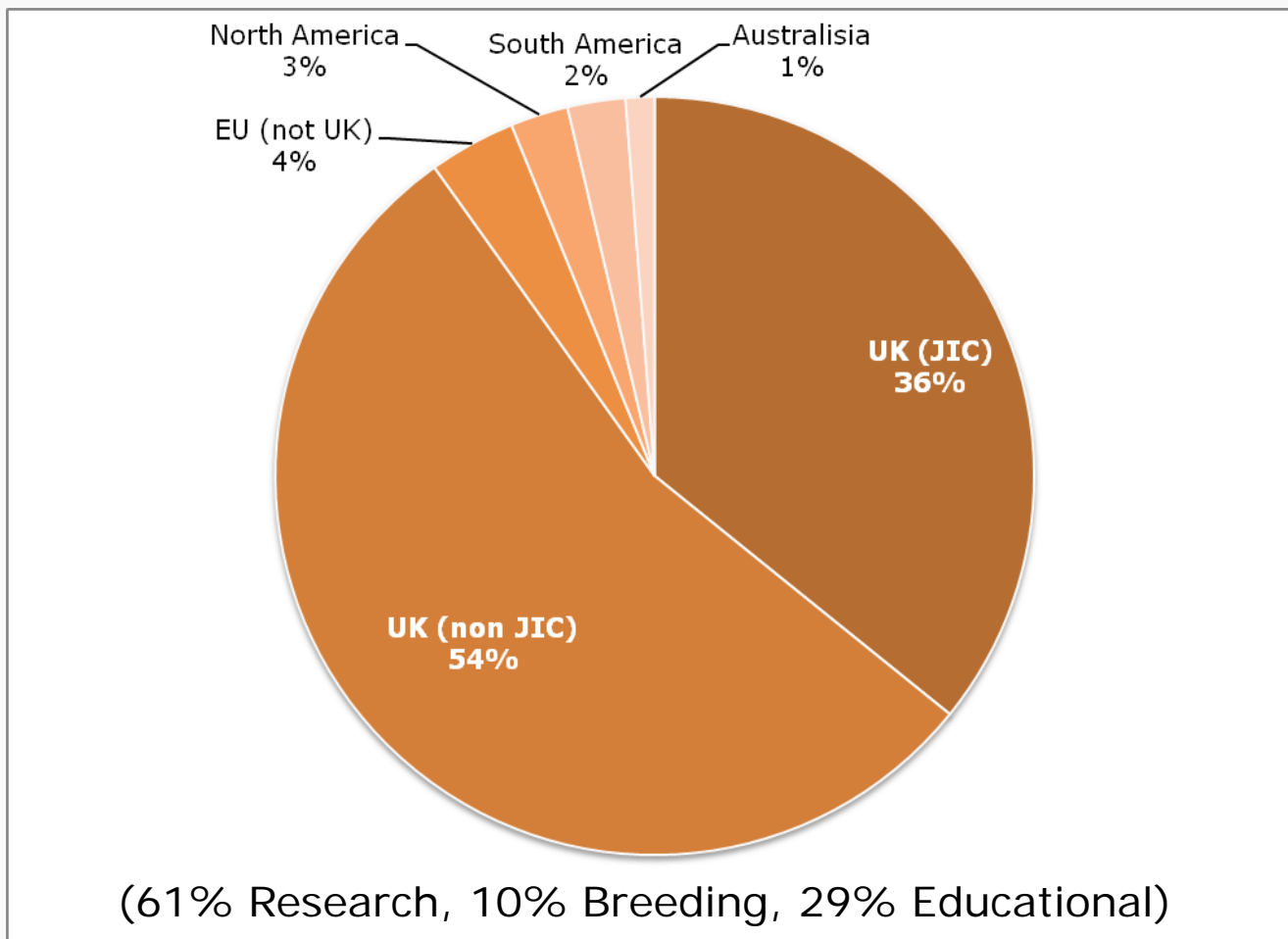
- Assets and currencies
- Market analysis and defining our 'USP'
- Investment returns
- Client base
- Business plan and road map
- Routes to market
- Performance indicators
- Brand awareness and marketing



# 'Market Breakdown'



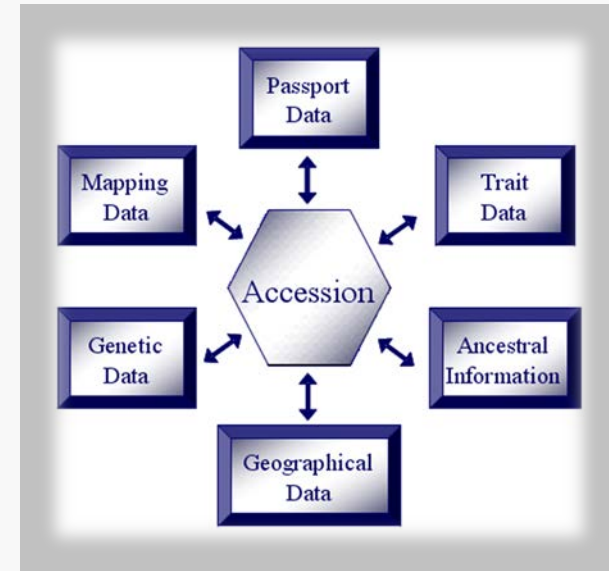
## Enquiry profile for the wheat Public Collections (2010-11)





## Future Operational Objectives

- Improving Quality Assurance
- More data collection in field and lab
- Increased in online availability of data sets
- Expansion of the UK co-ordination role in small grain cereals
- Redesign of website
- More growing demonstrations in collaboration with others



Lead in developing community web resources

# Preview of new web page



## GERMPLASM RESOURCES UNIT (GRU)

A NATIONAL CAPABILITY SUPPORTED BY BBSRC



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## Germplasm Resources

### Germplasm Collections

The GRU curates germplasm collections of a range of temperate crop species and their wild relatives.

These resources range from large general public collections to more specialist resources such as precise genetic stocks, near-isogenic lines, mapping populations, host differentials for disease testing and variant collections developed and targeted at the research and breeding communities.

Details on the various collections and their terms of access can be found by following the links on the Germplasm Collections link.



# Germplasm Resources Unit



eNewsletters introduced in 2011

- ✓ extended our outreach
- ✓ brought in new subscribers
- ✓ enhanced engagement and uptake



Welcome to this, the first eNewsletter from the John Innes Centre as a further channel to share our recent activities and to flag the work we are planning for 2011.

First let's start by introducing the team. *Left:* Mike Ambrose who Manages the BBSRC Small Grain Cereals and the *Middle:* Liz Sayers, Co-Curator of the Collections and responsible for the multiplication programme. *Right:* Steve Reader, Curator of the Precise Genetic Stocks collections

#### 2010: Busiest year ever

The GRU recorded a 14% increase in accessions seen over the previous five years and it remains to be seen but we like to think it will continue.



#### GRU Web Developments

The GRU currently curates 4 databases and you can either pick lists for fixed term or exact term or use text or number boxes, the searches are now 'entered text'. Clicking on search will now return records which can be clicked on to export.

Our thanks to Mike Harvey in TOC for his help with the databases.

1. BBSRC Small Grain Cereal Collections  
[www.jic.ac.uk/GERMPLAS/bbsrc\\_cereals/](http://www.jic.ac.uk/GERMPLAS/bbsrc_cereals/)  
<http://data.jic.bbsrc.ac.uk/cqi-bin/germ>

JOHN INNES CENTRE	From	To	Go
Accession Number			
Accession Name			
Genus and Species	Arvensis	ADCV	
Country of Origin	SELECT		



#### Growing Demonstrations

1. The demonstration of heritage wheats that have all survived the winter and are now growing away well. The demonstration this year has been set up to accommodate other heritage germplasm that we are evaluating.

#### 2. Pisum Diversity

This is your chance to walk through the genetic diversity of Pisum accessions of broad taxonomic diversity that is grown out as a demonstration based on an analysis of 101 AFLP and 276 SSAP markers.



#### Regeneration Listings

1. **Wild Triticeae Collection:** The first half of a two year exercise we have planted out 186 accessions of the *Aegilops* genus out on the plots.



# Germplasm Resources Unit



## New for 2012: Information Resources

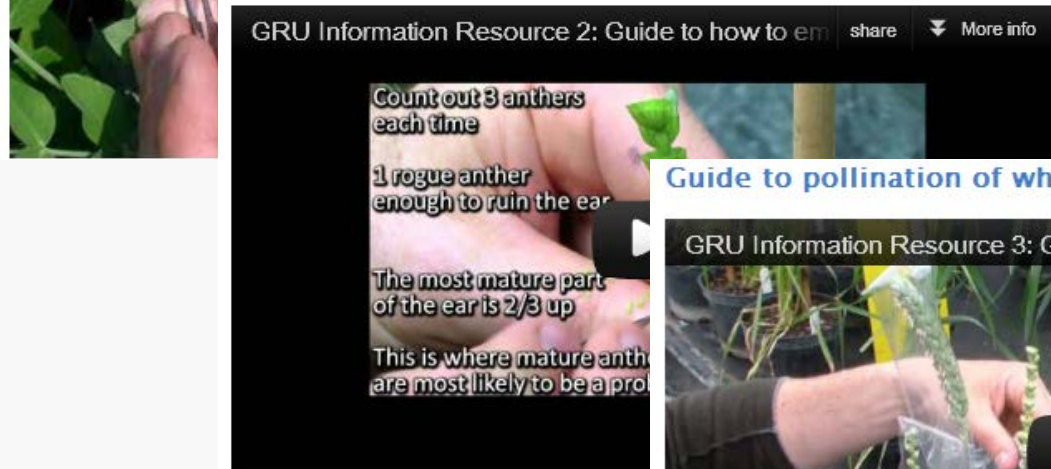
 JIC Germplasm Channel

- ✓ extended our outreach
- ✓ Useful resources for the wider community

### Guide to how to cross peas



### Guide to emasculatation of wheat florets



### Guide to pollination of wheat florets





# Germplasm Resources Unit



**Thank you for your attention**

