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A new online system used for the management of seed stocks from the various collections of the Germplasm Resources Unit. Incorporating both a public facing aspect to allow easy searches against the collection and a restricted LIMS to enable managed processing of requests by GRU staff.

This workshop session is intended as a starting point for JIC staff to familiarise themselves with the various public facing search tools and to seek feedback to improve these tools and for future development of the resource.
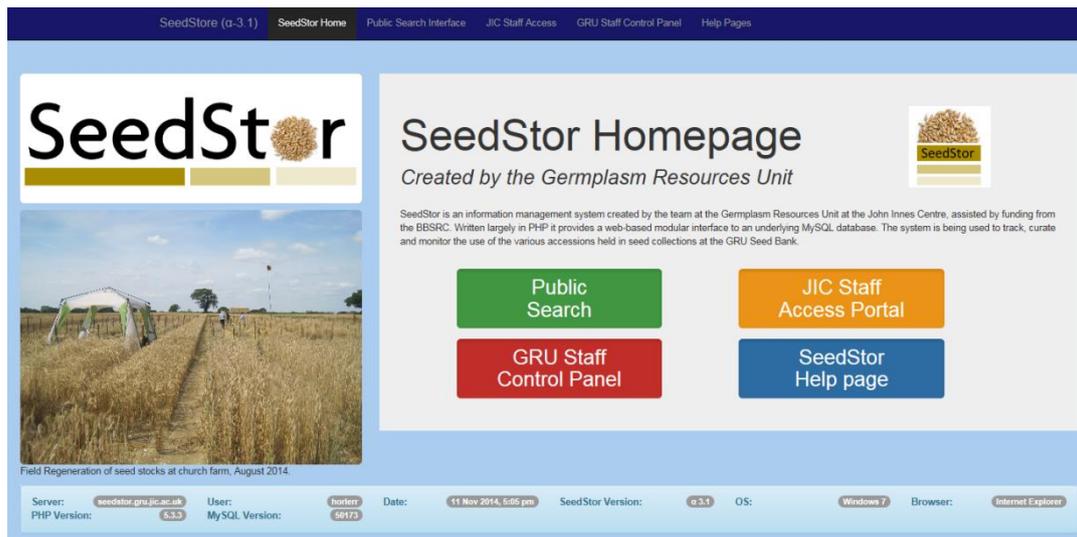
The SeedStor Homepage: This is the current version of the homepage of SeedStor incorporating both functions (http://seedstor.gru.jic.ac.uk/).

Today's workshop will be focused on the "Public Search" functionality of the site, accessed via the green button above or the "Public Search Interface" link on the navigation bar that remains at the top of all pages on the site.
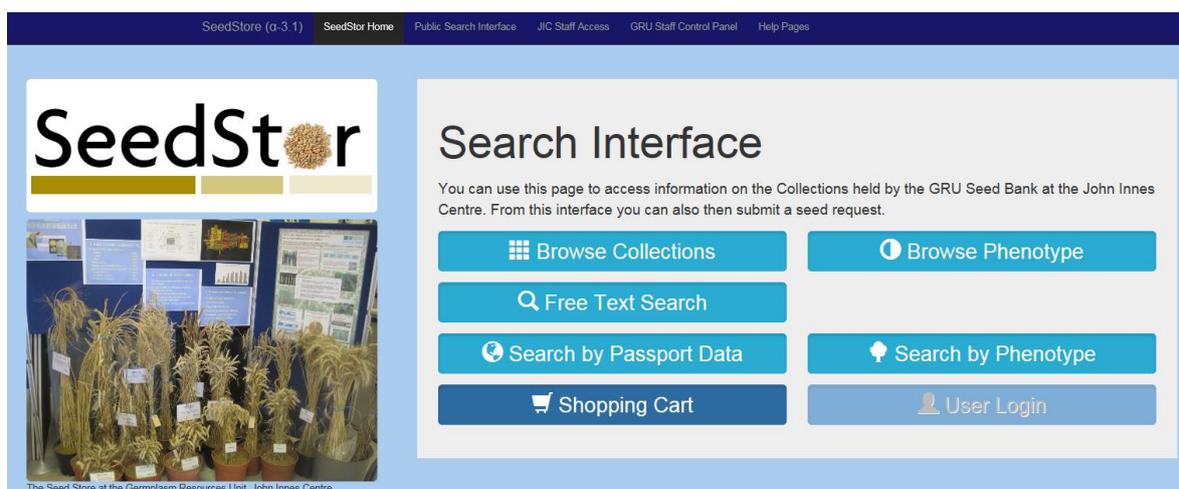
The SeedStor Public Search Interface: This is the access point that will be publically available via the Internet for all users and allows JIC staff and the general public to interrogate the database of accessions held by the GRU.

Browse Collections

There are many methods that can be used to access the accessions held by the GRU the simplest (but potentially the least useful) is to merely browse by collection. This will provide an overview of specific collections held by the GRU and allow one to read information about the collection via the ⓘ icon. Clicking on the Collection Name or photo will take you to a list of accessions held within that collection.
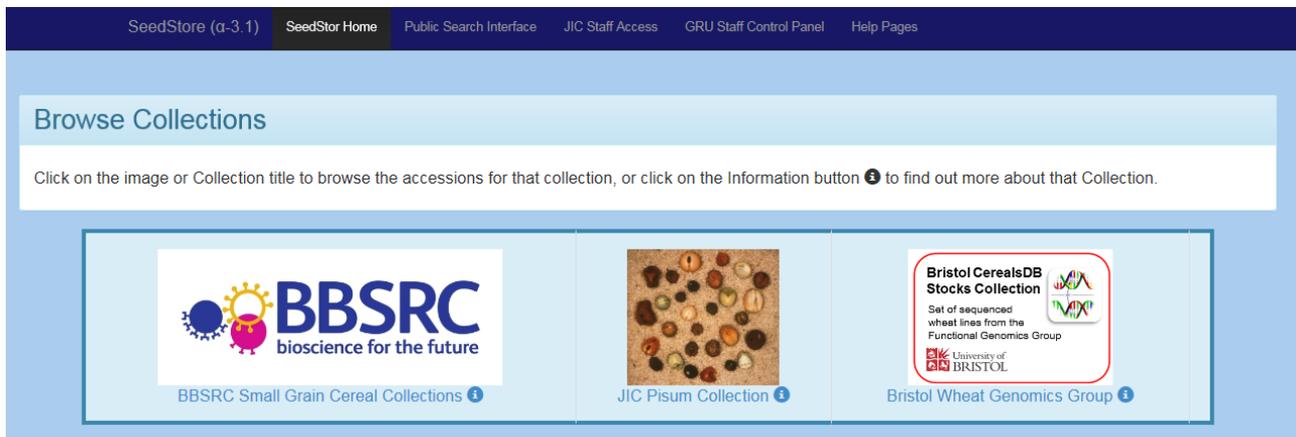
Browse Accessions:
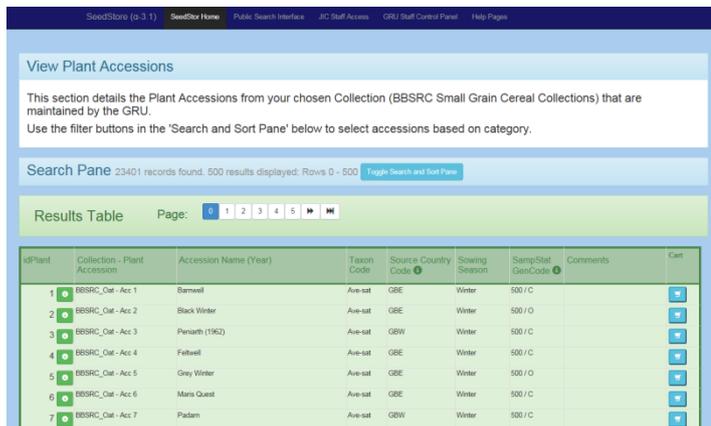
View Collection Information:
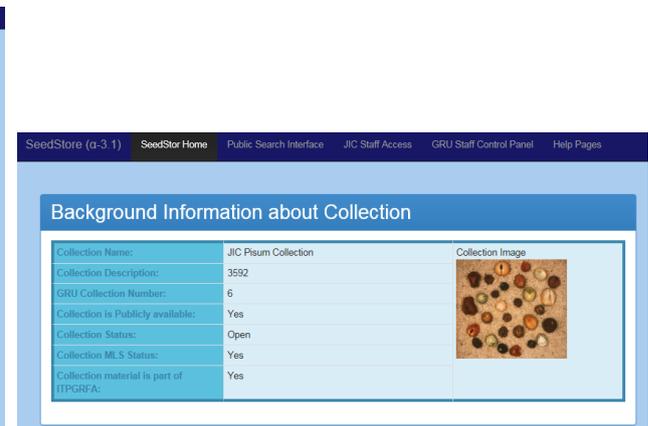
> **QUESTION**: What are the Accession Names of the first three accessions within the *Pisum* collection?

The page of accessions will show how many accessions are associated with that collection and then list the first 500. As there are many accessions in each of the collections they are split across multiple pages, these can be accessed from Page links by clicking on the relevant page number.

> **QUESTION**: How many pages are required to show the entire BBSRC Small Grain Cereal collection?

To view the specific information for an accession click on the information button ⓘ for the line of interest. This will take you to a multi tabbed view of the accession. The tabs include data on:

- Passport – Core accession information
- Seed Stock – Current Stock availability
- Taxonomy – Taxonomy of the accession
- Expedition – Original collection source info
- Phenotype – Recorded phenotypic descriptions.
- Accession Images – Any Accession images and photos.
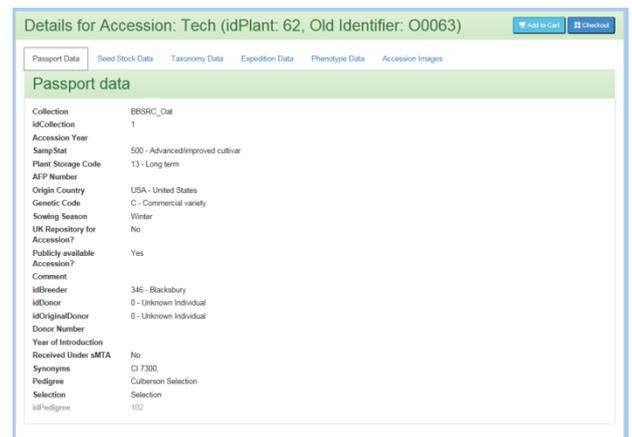
Free Text Search

This will be one of the most useful ways to interrogate the collections; this allows a specific search term to be used. You can search for a specific term in a number of different fields within different information sources. The simplest to understand is a search for a known accession name, type the term you wish to look for in the "search text" box and then select "Accession Name" and finally click on Search. This will then result in a list, which will show any results that contain the term as shown in the search "green" against Accession Name and the matches below.

QUESTION: When searching Accession Name which of the four Seasons does not produce any matches?

One point to remember is that each record is a separate stock that may be not be unique – we may have more than one source of a specific cultivar e.g. Green mountain above. Other searches can be done against many other fields, for example search the Comments field in passport for "salt".

QUESTION: How many unique accessions have the synonym "Irish red Velvet Chaff"?

Search by Passport data

There are some core parameters that make up the Passport data for each accession including genus, species, sowing period and country of origin these allow the user to narrow down searches based on particular desired characters. It is possible to select multiple characteristics or allow the search to include all values for a specific character. Some selections can alter the options presented in other boxes, for example selecting a specific genus will limit the species shown to those within the genus (Dependent on the browser used, does not work with Internet Explorer). The UK is divided into nations with the UK prefix within SeedStor e.g. UK - Wales.

> **QUESTION:** How many Wild (SampStat) Oat (*Avena*) accessions does the GRU store?

The Search box will show the resulting query terms sent to the database and allow you to reset the query to perform a new search. If you do not select any parameters, SeedStor will cancel the search so as not to download over fifty thousand matches and present a warning message. If no matches are found then a message is displayed to state this.

> **QUESTION:** How many Egyptian *Triticum aestivum* accessions does the GRU store?

> **QUESTION:** How many Wild, English accessions does the GRU store?

Browse by Phenotype

This allows users to look at specific phenotype distributions from within a specific genus. First select the genus from the list then select the phenotype of interest. This will result in a pie chart showing the different values assigned to plant accessions of that phenotype. The blurb text states the total number of accessions with data on the phenotype and then the pie chart shows the percentage for each value, clicking on a specific slice of the pie chart will take you to a list of accessions that match that phenotypic value. The system will merge all values that comprise less than 3% of accessions into a pooled group known as 'others' and then list these and their percentages above the chart.

Phenotype Pie chart

Show observed values for a chosen phenotype for a selected genus as pie charts

Search Box

Select Collections / Taxon To Search Across

Taxon

Aegilops
Agropyron
Avena
Dasypyrum
Eremopyron
Henradia
Hordeum
Pisum

Click the button below to submit your search

🔍 Search within Taxon

Phenotypes listed for *Pisum*

Phenotypes

Flowers - Flower Wings
Flowers - Flowers per Node
Foliage - Leaf Anthocyanin
Foliage - Leaf Colour
Habit - Aerial Branching
Habit - Basal Branch Number
Habit - Fasciation
Habit - Inter Node Length
Habit - Rogue
Inflorescence - Height to Flower
Inflorescence - Nodes to Flower
Leaflets - Leaflet Margin
Leaflets - Leaflet Margin Grey Spot
Leaflets - Leaflet Margin Lower Wax
Leaflets - Leaflet Margin Upper Wax

🔍 Display   🔁 Reset

Showing Hilum Colour for *Pisum*

We have a total of 2888 accessions with this phenotype defined, phenotype values that make up less than 3% of observed values are amalgamated into 'Others'

Black 15.1%
Brown 23.9%
Cream 60.9%

There are 436 Accessions that meet your search criteria. All Results Listed
Hilum Colour: Black in *Pisum*

idPlant	Accession Name (Year) [Old DB - Accession Number]	Matching Phenotypes	Comments
26542 🔍	P. ELATIUS (1991) [Pisum - #3155]	Hilum Colour: Black	
26433 🔍	P. ABYSSINICUM (1997) [Pisum - #3046]	Hilum Colour: Black	
26334 🔍	RIL 15x1194_08 (1994) [Pisum - #2947]	Hilum Colour: Black	
26163 🔍	APPELBLOSSOM-cr (1994) [Pisum - #2776]	Hilum Colour: Black	de Haan line
26085 🔍	P. HUMILE (1994) [Pisum - #2698]	Hilum Colour: Black	from the Weizmann Inst. Israel
26017 🔍	P. ELATIUS (1992) [Pisum - #2629]	Hilum Colour: Black	
25940 🔍	P. SATIVUM (1991) [Pisum - #2552]	Hilum Colour: Black	
25911 🔍	P. FULVUM (1991) [Pisum - #2523]	Hilum Colour: Black	

QUESTION: How many different Aleurone colours exist within the genus *Hordeum?*

QUESTION: What percentage of *Triticum* accessions have a Black Kernal colour?

Search by Phenotype

This allows users to look for accessions that match a specific phenotype or set of phenotypes. This can also be limited to a specific genus but unlike Browse by phenotype need not be. Once the genus has been selected (or "Search Whole Database") a list of phenotypes stored within the system is shown together with the possible defined values that exist. One or more phenotypes can be selected and then a "search performed", remember that combining phenotypes can easily result in no matching accessions.

If you chose only a single phenotype to search against then results will be shown immediately, if instead you chose to identify accessions that match multiple phenotypes then a summary showing the matches that meet 2 or more of the selected characteristics are shown up to accessions that meet all criteria. For example searching within *Hordeum* accessions for *Red Aleurone, smooth awns, grey lemma and 6 row ear distribution* produced three sets of results: 4 accessions that meet three of the four criteria and a further 669 that meet two of the four criteria selected, you will note that we do not have any accessions that meet ALL four criteria selected. These individual summaries can be expanded by the Toggle Results button to reveal the matching accessions. The toggled results table will show the matching phenotypes and their trait values adjacent to the accession information.

> **QUESTION:** How many *Avena* accessions does the GRU have that meet the following phenotypes: Awned, Compound diaspore, White Lemma, Equilateral Panicle Distribution and Simultaneous maturation?

> **QUESTION:** From the *pisum* collection how many accessions show both 'Rogue Syndrome' and green testa?

> **QUESTION:** Name the accessions in the genus *Hordeum* that have 'Very deciduous' Awn retention?

Filters & Sorting

Many of the results from the search and browse functions have the option of imposing filters on the resulting data. These can be accessed from the "Toggle Search and Sort Pane" button next to the result summary. It is also worth noting that we may have equivalent lines from multiple original sources and so these are often shown as repeats with for example different Accession Years.

The default option is to remove any filters in place, and using the drop down boxes you can select filters to add. The filters are cumulative and will only update the results once the Filter Results button has been clicked. Another filtering function allows you to extract specific search terms from the page in a similar method to using Find via your browser but it will hide rows that do not match rather than highlight those that do match.

Sorting the resulting plant accession list can be done by a number of different fields by simply clicking on the blue sort buttons to sort A through Z or ascending numerical order or vice versa.

Shopping Cart

For Seed requests there is a simple interim Shopping cart which allows seed requests to be made via email to the GRU team. Lines can be added to the shopping cart by simply clicking on the "Add to Cart" button found on the specific accession page or on many search result pages each record has the ability to add and remove single accessions by clicking on the cart or tick buttons respectively.

To checkout select the checkout option from either the Public Search home page or the specific accession page. This will then take you to your shopping cart for review and then once "Checkout" is selected a form will appear for you to complete. This form asks for name, address and email so that we can link the request to a specific person to ship to. Future progress will expand the information requested to allow users to create accounts with SeedStor so they can save this information between job requests. A comments field allows notes for GRU staff to be included.

QUESTION: Send a seed request for the following Barley Lines: Albion, Fox and Zulu.