

# The Triticeae Toolbox: Transitioning to Breedbase



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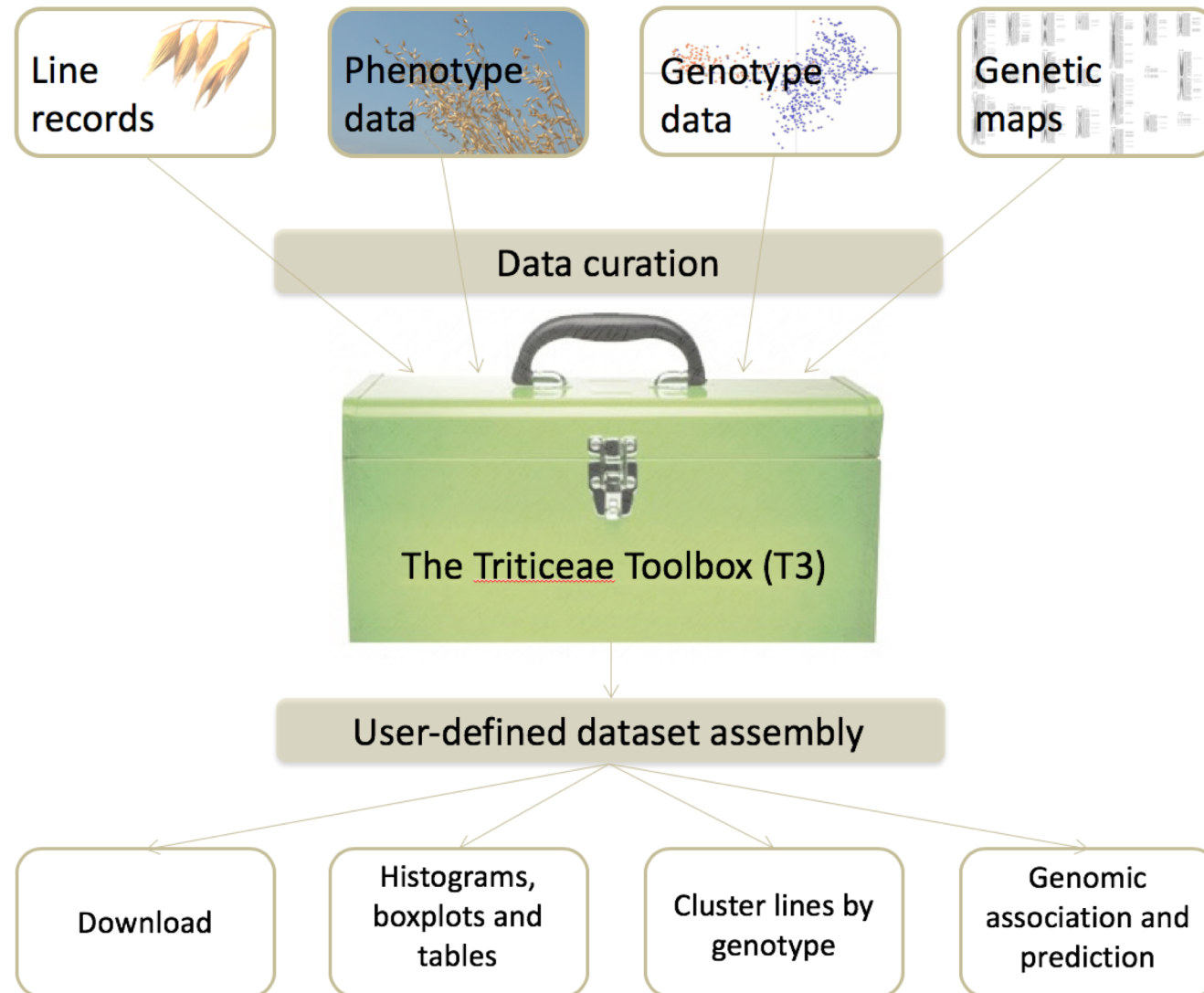
# What is T3?



- The Triticeae Toolbox is a centralized database for small grains breeders (wheat, oat, barley)
- Combines accession information, phenotype trial data, and genotype data from various sources
- Allow users to create custom datasets
- Provide summary and analytical tools



# The T3 Method





## T3/Wheat

Contact Us

Home Select ▾ Analyze ▾ Download ▾ Search ▾ Reports ▾ Manage ▾ Resources ▾

### Quick Links

[Login/Register](#)

**Current selections:**  
Lines:  
Markers: All  
Traits: 0  
[Genotype Experiments](#)

Quick search...

### What's New

**Annotations**  
Genes Sept 2019 Ensembl  
Protein Sept 2019 UniProt  
Pathway Apr 2019 JBrowse

**Resources**  
SNP Primer Design  
KASP Primer Design  
EcoTILLING BLAST  
Tutorial  
[Variant Effects](#), Tutorial

**Reports**  
[Designed Primers for Wheat\\_CAP](#)  
Gene Annotations from TGACv1, RefSeq\_v1, and Pangenome  
[Variation Effects](#) list consequence and impact for markers.

### Welcome to The Triticeae Toolbox (T3)

The Triticeae Toolbox (T3) is a repository for public wheat data generated by the Wheat Coordinated Agricultural Project (Wheat CAP). Funding is provided by the National Institute for Food and Agriculture (NIFA) and the United States Department of Agriculture (USDA). The current project is funded through NIFA's International Wheat Yield Partnership (IWYP) and part of the Agriculture and Food Research Initiative (AFRI). A Project Description, T3 Team, and Collaborators are [described here](#).

### Explore T3

Start to navigate the line information, phenotype trials, genotype experiments and genetic maps available in T3.



### How to Select Data


Learn how to use the selection tools found under the "Select" menu, how to download this data and how to analyze it using one of the tools in the "Analyze" menu.

### Submit Data


Find out how to upload data to T3 using the data submission templates.

Blake, V., Birkett, C.L., Matthews, D.E., Hane, D., Bradbury, P., Jannink, J. 2015. The Triticeae Toolbox: Combining Phenotype and Genotype Data to Advance Small-Grains Breeding. The Plant Genome. doi: 10.3835/PlantGenome2014.12.0099.  
The T3 software is open source and available under the GNU General Public License ([LICENSE](#)) and may be downloaded from [GitHub](#).





**United States Department of Agriculture**  
Agricultural Research Service



To send questions or suggestions to the T3 curators, please [click here](#).

The Triticeae Toolbox is part of the Triticeae CAP project, supported by Agriculture and Food Research Initiative Competitive Grant no. 2011-68002-30029 from the USDA National Institute of Food and Agriculture.

Copyright © 2006 - 2010

The Hordeum Toolbox was developed for the Barley CAP

The Triticeae Toolbox was expanded from THT for the Triticeae CAP

Tools have been added periodically to T3


Blake, V.C., et. al. 2012. The Hordeum Toolbox: The Barley Coordinated Agricultural Project genotype and phenotype resource. Plant Gen. 5:81–91.


Blake, V.C., et. al. 2016. The Triticeae Toolbox: Combining Phenotype and Genotype Data to Advance Small-Grains Breeding. Plant Gen. 9:1-10

# Transition to Breedbase

 <https://breedbase.org>



 [Search](#) [Manage](#) [Analyze](#) [About](#)



### What is Breedbase?

Breedbase is a comprehensive breeding management and analysis software. It can be used to design field layouts, collect phenotypic information using tablets, support the collection of genotyping samples in a field, store large amounts of high density genotypic information, and provide Genomic Selection related analyses and predictions. Breedbase supports the BrAPI standard.


### How can I use Breedbase?

Breedbase is a web application that only requires a browser. To get your instance, follow [this guide](#) to deploy via docker, or contact the [Breedbase development team](#).

### What crops are using Breedbase?

There are a number of instances running for diverse crops, including Cassava (<https://cassavabase.org>), sweet potato (<https://sweetpotatobase.org>), banana (<https://musabase.org>), rice (<https://ricebase.org>), tomato and other Solanaceae (<https://solgenomics.net/>) and many others.

BREEDBASE is located at the Boyce Thompson Institute.



# What is Breedbase?



- A "comprehensive breeding management and analysis software"
- Database, analytical tools and website
- Developed by Lukas Mueller's lab at Boyce Thompson Institute
- Currently used by multiple crops: cassava, sweet potato, banana, rice, Solanaceae crops

# Breedbase Features



- Design field layouts
- Store phenotype trial information
  - Tightly integrated with Fieldbook / Pheno Apps
- Store genotype information
- Provides summary and analytical tools
- BrAPI compliant

# Why Choose Breedbase?



- More developers
  - Core development team at BTI
  - Already being used by multiple crops
- Unified database
  - Sharing of ideas, database structures, tools...
- Unique Features
  - Trial Design
  - Seedlot Management
  - Barcodes (seedlots, accessions, plots, etc)

# Current Status of Transition



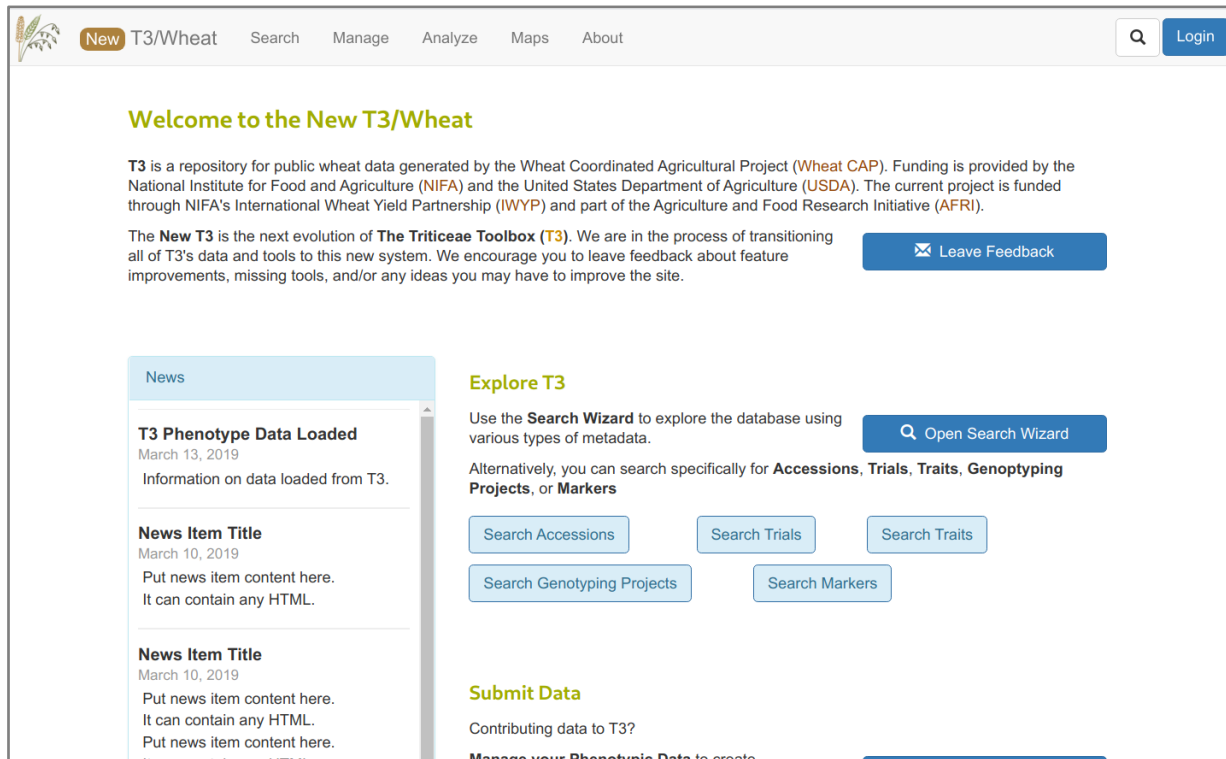
- **Wheat:** Data from T3/Classic has been migrated  
Needs some manual reorganization
- **Oat:** Trait ontology created  
Starting to load Accessions
- **Barley:** Coming Soon

# The New T3/Wheat



## Main Production Site

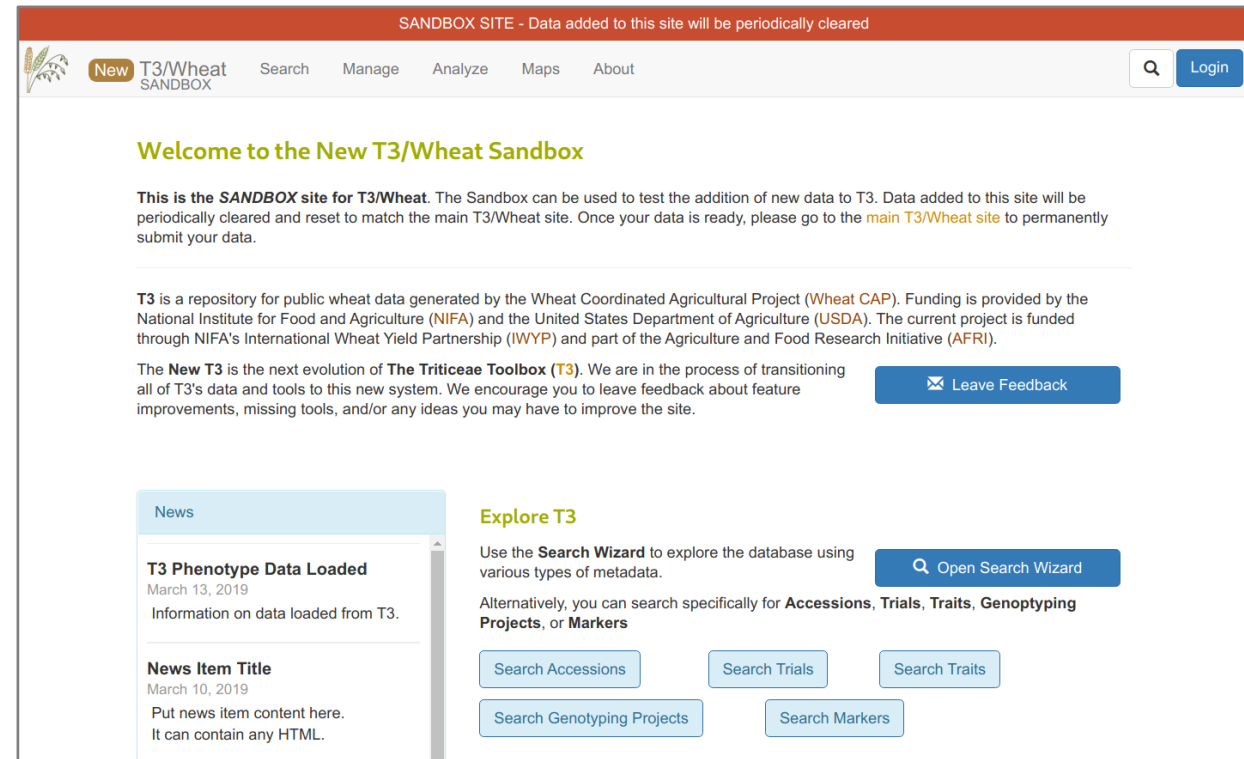
 <https://wheat.triticeaetoolbox.org>



The screenshot shows the homepage of the T3/Wheat website. The header includes a logo, a 'New T3/Wheat' badge, and navigation links: Search, Manage, Analyze, Maps, and About. A search bar and a 'Login' button are on the right. The main content area features a 'Welcome to the New T3/Wheat' section with a paragraph about the project's funding and a 'Leave Feedback' button. Below this is a 'News' sidebar with a 'T3 Phenotype Data Loaded' item and two 'News Item Title' placeholders. The main content area also has an 'Explore T3' section with a 'Search Wizard' button and a grid of search buttons for Accessions, Trials, Traits, Genotyping Projects, and Markers. At the bottom, there is a 'Submit Data' section.

## Sandbox / Test Site

 <https://wheat-sandbox.triticeaetoolbox.org>



The screenshot shows the homepage of the T3/Wheat Sandbox site. The header includes a logo, a 'New T3/Wheat SANDBOX' badge, and navigation links: Search, Manage, Analyze, Maps, and About. A search bar and a 'Login' button are on the right. The main content area features a 'Welcome to the New T3/Wheat Sandbox' section with a paragraph explaining the site's purpose and a 'Leave Feedback' button. Below this is a 'News' sidebar with a 'T3 Phenotype Data Loaded' item and two 'News Item Title' placeholders. The main content area also has an 'Explore T3' section with a 'Search Wizard' button and a grid of search buttons for Accessions, Trials, Traits, Genotyping Projects, and Markers. At the bottom, there is a 'Submit Data' section.



# T3 Demos



- Live Demos
- Screenshots in presentation
- Presentation will be available:
  - New T3/Wheat website

# T3 Demos



- Creating an Account
- The Search Wizard
- Searching Accessions
- Using Lists
- Trial Design Tool
- Uploading Phenotype Data
- Trial Summary Tool

# Creating an Account



<https://wheat.triticeaetoolbox.org/user/new>

- An account is required to:
  - add any data to the database
  - view some types of data in the database (such as phenotype trial results)
  - use some of the tools (such as summarizing trials)
- To check if you already have an account:
  - Go to: Search > People to see if your name is already associated with an account

# Creating an Account



The screenshot shows the T3/Wheat website interface. At the top, there is a navigation bar with the T3/Wheat logo, a 'New' button, and links for Search, Manage, Analyze, Maps, and About. In the top right corner, there is a search icon and a 'Login' button. An orange arrow points from the text 'Click "Login" Button' to the 'Login' button. The main content area includes a 'Welcome to the New T3/Wheat' section with a paragraph about the repository and a 'Leave Feedback' button. Below this is a 'News' section with three news items, each with a title, date, and content placeholder. To the right of the news section is an 'Explore T3' section with a 'Search Wizard' button and several search buttons for Accessions, Trials, Traits, Genotyping Projects, and Markers. Below the explore section is a 'Submit Data' section with a 'Manage Phenotypic Data' button and an 'Upload Files' button. At the bottom is a 'User Guides' section with a 'Read Documentation' button. The footer contains a citation for Blake et al. (2015) and a note about the MIT License and GitHub availability.

**Welcome to the New T3/Wheat**

T3 is a repository for public wheat data generated by the Wheat Coordinated Agricultural Project (Wheat CAP). Funding is provided by the National Institute for Food and Agriculture (NIFA) and the United States Department of Agriculture (USDA). The current project is funded through NIFA's International Wheat Yield Partnership (IWYP) and part of the Agriculture and Food Research Initiative (AFRI).

The **New T3** is the next evolution of **The Triticeae Toolbox (T3)**. We are in the process of transitioning all of T3's data and tools to this new system. We encourage you to leave feedback about feature improvements, missing tools, and/or any ideas you may have to improve the site.

[Leave Feedback](#)

**News**

**T3 Phenotype Data Loaded**  
March 13, 2019  
Information on data loaded from T3.

**News Item Title**  
March 10, 2019  
Put news item content here.  
It can contain any HTML.

**News Item Title**  
March 10, 2019  
Put news item content here.  
It can contain any HTML.  
Put news item content here.  
It can contain any HTML.  
Put news item content here.  
It can contain any HTML.  
Put news item content here.  
It can contain any HTML.

**News Item Title**  
March 10, 2019  
Put news item content here.

**Explore T3**

Use the **Search Wizard** to explore the database using various types of metadata. [Open Search Wizard](#)

Alternatively, you can search specifically for **Accessions, Trials, Traits, Genotyping Projects, or Markers**

[Search Accessions](#) [Search Trials](#) [Search Traits](#)  
[Search Genotyping Projects](#) [Search Markers](#)

**Submit Data**

Contributing data to T3?

**Manage your Phenotypic Data** to create spreadsheets for new uploads, add new data, and/or manage your existing uploads. [Manage Phenotypic Data](#)

Or **Upload Files** for various other types of data. [Upload Files](#)

**User Guides**

New to T3? [Read Documentation](#)

View the **Documentation** to learn about available features.

Blake, V., Birkett, C.L., Matthews, D.E., Hane, D., Bradbury, P., Jannink, J. 2015. **The Triticeae Toolbox: Combining Phenotype and Genotype Data to Advance Small-Grains Breeding**. The Plant Genome. doi: 10.3835/PlantGenome2014.12.0099.

T3 is open source software and available under the [MIT License](#) and may be downloaded from [GitHub](#).

Click the “Login” Button in the top right of any page

# Creating an Account



A screenshot of the T3/Wheat website interface. A white login pop-up window is centered on the screen. The pop-up has a title bar that says "Login" with a close button (X). It contains two input fields for "Username" and "Password". Below these are links for "Forgot password?" and "New User". At the bottom of the pop-up are buttons for "Reset", "Login", and "Close". An orange arrow points from the text "Click 'New User'" to the "New User" link in the pop-up. The background website shows a navigation bar with "New T3/Wheat", "Search", "Manage", "Analyze", "Maps", and "About". The main content area includes a "Welcome to the New T3/Wheat" message, a "News" sidebar with several news items, and sections for "Submit Data", "User Guides", and a footer with a citation and license information.

Click the “New User” link in the login pop-up window

# Creating an Account



**Create New Account**

Notice

- **Before** creating a new account, please check if you **already have an account** using the **directory search**.
- A link will be emailed to you. Please click on it to activate the account.
- **All fields are required.**

First Name:

Last Name:

Organization:

Username:

Username must be at least 7 characters long.

Password:

Password must be at least 7 characters long and different from your username.

Confirm Password:

Password must be at least 7 characters long and different from your username.

Email Address:

An email will be sent to this address requiring you to confirm its receipt to activate your account.

Reset

Create Account

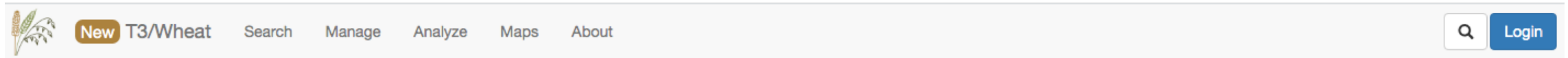
Fill out the new account registration form.

# Creating an Account



You will receive an email (from [noreply@graingenes.org](mailto:noreply@graingenes.org) - check your Junk/Spam folder) with a link to confirm your email address.

You must open the confirmation link before you can login to your account.



Confirmation successful for username **testing**.

[\[Login Page\]](#)

# The Search Wizard



<https://wheat.triticeaetoolbox.org/breeders/search>

- The Search Wizard can be used to:
  - Explore the database
  - Filter data by 1 or more search criteria
  - Download filtered and/or combined datasets
- You must have an account to download data



# The Search Wizard



The screenshot shows the 'Search Wizard' interface on the website [wheat.triticeaetoolbox.org/breeders/search](http://wheat.triticeaetoolbox.org/breeders/search). The browser window is titled '[NEW] T3/Wheat - Brave'. The page has a navigation bar with links: 'New T3/Wheat', 'Search', 'Manage', 'Analyze', 'Maps', and 'About'. The main content area is titled 'Search Wizard' and includes a search bar with the text 'dwaring87'. Below the search bar are four columns, each with a 'Select Column Type' dropdown, a 'Search' input, and 'Select All', '0/0', and 'Clear' buttons. At the bottom, there are sections for 'Load/Create Datasets using Match Columns' and 'Related Genotype Data'.

The Search Wizard can be used to filter data by up to 4 different data types:

- Accessions
- Breeding Programs
- Genotyping Protocols
- Genotyping Projects
- Locations
- Traits
- Trials
- Years

# The Search Wizard



[NEW] T3/Wheat - Brave

[NEW] T3/Wheat x +

wheat.triticeaetoolbox.org/breeders/search

New T3/Wheat Search Manage Analyze Maps About

dwaring87 Lists Calendar

### Search Wizard

Don't see your data? Refresh Lists Update Wizard

**Select First Filter Type**

Trials

Search

Select All 3/2456 Clear

- + 2012\_SRWW\_Elite
- + 2014\_HapMap\_GB
- + 2014\_HapMap\_WE
- + 2017\_WheatCAP
- + 2017\_WheatCAP\_L

Selected Items

- × ARS-NRPN-2005-AMI
- × ARS-NRPN-2006-AMI
- × ARS-NRPN-2007-AMI

Match ANY ALL

Add

Create

**Add Item to Selection**

**Toggle the results of the second filter between union and intersection**

**Select Second Filter Type**

Traits

Search

Select All 2/4 Clear

- + Heading time Julian d
- + Plant height cm|CO\_3

- × Grain test weight g/l|C
- × Grain yield kg/ha|CO\_

Match ANY ALL

Add to Add

Create Ne Create

Select Column Type

Search

Select All 0/0 Clear

Select Column Type

Search

Select All 0/0 Clear

## Filter by Trials & Traits:

- 1) Select 'Trials'
- 2) Choose (+) Trials to include
- 3) Select 'Traits'
- 4) Choose (+) Traits to include
- 5) Optionally continue to select specific Accessions...

# The Search Wizard



The screenshot shows the 'Search Wizard' interface for wheat. The browser tab is '[NEW] T3/Wheat' and the URL is 'wheat.triticeaetoolbox.org/breeders/search'. The search bar contains 'dwaring87'. The interface has a top navigation bar with 'New T3/Wheat', 'Search', 'Manage', 'Analyze', 'Maps', and 'About'. Below this, there are two panels for 'Match ANY ALL' with 'Add to' and 'Add' buttons, and 'Create Ne' and 'Create' buttons. On the left, there's a 'Load/Create Datasets using Match Columns' section with 'Load Dataset' and 'Load' buttons, and 'Create New Dataset' and 'Create' buttons. On the right, there's a 'Related Genotype Data' section, a 'Related Trial Metadata' section, and a 'Related Trial Phenotypes' section which is circled in orange. Below this, there's a '3 trials' section, a 'CSV' dropdown, a 'Plots' dropdown, and two checkboxes: 'Include timestamps' and 'Supress user defined phenotype outliers'. At the bottom, there's a 'Trait Name Contains' field, 'Min Value' and 'Max Value' fields, and a 'Download Phenotype Data' button (labeled 'Phenotypes' in the image) which is pointed to by an orange arrow from the text 'Download Phenotype Data'.

## Download Trial Phenotypes:

1) Click 'Related Trial Phenotypes'

2) Click the 'Phenotypes' button to download a CSV file

phenotype.csv - LibreOffice Calc

File Edit View Insert Format Styles Sheet Data Tools Window Help

Liberation Sans 10 b i U % 0.0 .00 .0

A5:AMJ5 fx Σ = 97X0850-16

	S	W	X	Y	Z	AN	AO	AP	AQ	AR
	germplasmName	observationUnitName	replicate	blockNumber	plotNumber	Grain test weight g/l CO_321:0001210	Grain yield kg/ha CO_321:0001218	notes		
5	97X0850-16	ARS-NRPN-2005-AMES_97X0850-16_15064	2	1	15064	732.72	5218.6			
6	BC97-ROM50W	ARS-NRPN-2005-AMES_BC97-ROM50W_15062	2	1	15062	719.175	5171.525			
7	CAMELOT	ARS-NRPN-2005-AMES_CAMELOT_15022	2	1	15022	762.39	5393.45			
8	HARDING	ARS-NRPN-2005-AMES_HARDING_15004	2	1	15004	772.065	3174.2			
9	KHARKOF	ARS-NRPN-2005-AMES_KHARKOF_15002	2	1	15002	772.065	3241.45			
10	MACE	ARS-NRPN-2005-AMES_MACE_15016	2	1	15016	753.36	4909.25			
11	N02Y5075	ARS-NRPN-2005-AMES_N02Y5075_15010	2	1	15010	774	5329.5625			
12	N02Y5078	ARS-NRPN-2005-AMES_N02Y5078_15012	2	1	15012	777.87	4657.0625			
13	N02Y5106	ARS-NRPN-2005-AMES_N02Y5106_15014	2	1	15014	760.455	4926.0625			
14	NE02513	ARS-NRPN-2005-AMES_NE02513_15024	2	1	15024	771.42	5198.425			
15	NE02528	ARS-NRPN-2005-AMES_NE02528_15026	2	1	15026	775.935	5464.0625			
16	NE02584	ARS-NRPN-2005-AMES_NE02584_15028	2	1	15028	795.285	5158.075			
17	NE02592	ARS-NRPN-2005-AMES_NE02592_15030	2	1	15030	761.1	5719.6125			
18	NEKOTA	ARS-NRPN-2005-AMES_NEKOTA_15008	2	1	15008	758.52	4408.2375			
19	NH01036	ARS-NRPN-2005-AMES_NH01036_15036	2	1	15036	750.78	5386.725			
20	NH01048	ARS-NRPN-2005-AMES_NH01048_15038	2	1	15038	715.95	4724.3125			
21	NI02425	ARS-NRPN-2005-AMES_NI02425_15040	2	1	15040	783.675	5867.5625			
22	NI03427	ARS-NRPN-2005-AMES_NI03427_15032	2	1	15032	762.39	5564.9375			
23	NP-02	ARS-NRPN-2005-AMES_NP-02_15018	2	1	15018	755.295	3917.3125			
24	NUPLAINS	ARS-NRPN-2005-AMES_NUPLAINS_15006	2	1	15006	783.03	4549.4625			
25	OVERLAND	ARS-NRPN-2005-AMES_OVERLAND_15034	2	1	15034	768.195	6402.2			
26	SD00032	ARS-NRPN-2005-AMES_SD00032_15042	2	1	15042	768.195	3698.75			
27	SD00258	ARS-NRPN-2005-AMES_SD00258_15044	2	1	15044	776.58	6187			
28	SD01054	ARS-NRPN-2005-AMES_SD01054_15046	2	1	15046	766.26	5107.6375			
29	SD01W064	ARS-NRPN-2005-AMES_SD01W064_15056	2	1	15056	772.065	4868.9			
30	SD02024	ARS-NRPN-2005-AMES_SD02024_15048	2	1	15048	753.36	4492.3			
31	SD02039	ARS-NRPN-2005-AMES_SD02039_15050	2	1	15050	781.74	4169.5			
32	SD02480	ARS-NRPN-2005-AMES_SD02480_15052	2	1	15052	775.29	5309.3875			
33	SD02771	ARS-NRPN-2005-AMES_SD02771_15054	2	1	15054	768.84	5131.175			
34	SD02W129	ARS-NRPN-2005-AMES_SD02W129_15058	2	1	15058	755.295	4495.6625			
35	SD98W175-1	ARS-NRPN-2005-AMES_SD98W175-1_15060	2	1	15060	788.19	5716.25			
36	TX00V1117	ARS-NRPN-2005-AMES_TX00V1117_15020	2	1	15020	783.03	5494.325			
37	98X0435-15	ARS-NRPN-2006-AMES_98X0435-15_11040	2	1	11040	788.19	6365.2125			
38	CAMELOT	ARS-NRPN-2005-AMES_CAMELOT_11020	2	1	11020	760.195	7740.4740000000			

Sheet 1 of 1 Selected: 1 row, 1,024 columns Default English (USA) Average: 26053.732; Sum: 260537.32 100%

# Advanced Search: Accessions



<https://wheat.triticeaetoolbox.org/search/stocks>

**Select "Accessions and Plots" from the Search menu**

The screenshot shows the T3/Wheat website. The navigation bar includes 'New T3/Wheat', 'Search' (highlighted with an orange circle), 'Manage', 'Analyze', 'Maps', and 'About'. The 'Search' dropdown menu is open, listing options: Wizard, Accessions and Plots (highlighted with an orange arrow), Field Trials, Traits, Locations, Genotyping Protocols, Genotyping Projects, Markers, Loci & Genes, Genome features, Images, and People. The main content area features a 'The New T3/Wheat' section, an 'Explore T3' section with search buttons for Accessions, Trials, Traits, Genotyping Projects, and Markers, and a 'Submit Data' section.

Select  
"Accessions  
and Plots"  
from the  
Search Menu

# Advanced Search: Accessions



**Search Accessions and Plots**

**Search**

**Name Search**

Stock Name or Description: contains Type search here...

Stock Type: accession

**Advanced Search**

**Properties**

**Usage**

**Phenotypes**

**Genotypes**

Search By Locus Allele Value:

Select Locus:

- 1RS:1AL
- 1RS:1BL
- ALMT1
- Awmed
- Ax1 or null allele
- Ax2\* allele
- Bdv2/3
- Bx7 over-expressing
- Chaff
- Color
- Fhb1**
- Fhb\_1A\_Neuse
- Fhb\_1B\_Jamestown
- Fhb\_2B\_Bess
- Fhb\_2DL\_Wuhan/W14
- Fhb\_3B\_Bess
- Fhb\_4A\_Neuse
- Fhb\_5A
- Fhb\_6A\_Jamestown
- Fhb\_6A\_Neuse
- Fhb\_Massey\_3BL
- Glu 2+12 allele
- Glu 5+10 allele
- Glu-B3c
- Growth habit
- H13
- H9
- Hardness
- Height
- HGPC/Yr36
- Lr19/Sr25
- Lr21
- Lr34/Yr18/Pm38
- Lr37/Yr17/Sr38
- Lr42
- Lr67
- Lr68
- Lr9
- PHS 3AS
- Pina-D1a

**Search Results**

View Another Property:

Show 10 entries

Stock Name	Stock Type	Org
00S0249-9	accession	Trit
00B553	accession	Trit
00S0224-23	accession	Trit
00S0211-29-4	accession	Trit
00S0240-3	accession	Trit
00S0291-3	accession	Trit
00S0063-1	accession	Trit
001169-7E15	accession	Trit
00S0251-6	accession	Trit

## Search by Genetic Character:

- Select “Advanced Search” then “Genotypes”
- Select a Locus (Genetic Character)
- Select an Allele value

# Advanced Search: Accessions



New T3/Wheat

Search

Manage

Analyze

Maps

About

testing

Lists

Calendar

Genotypes

Search By Locus Allele Value:

Select Locus:

Fhb1

Add

Select Allele Value:

Fhb1:

Present

X

Search

Search Results

View Another Property:

variety

Add

Show 10 entries

Stock Name	Stock Type	Organism	Synonyms	Owners	Organization
AR06024-7-2	accession	Triticum aestivum		Clay Birkett	University of Arkansas
GA04496-S5	accession	Triticum aestivum		Clay Birkett	University of Georgia
GA04496-S8	accession	Triticum aestivum		Clay Birkett	University of Georgia
ARGE07-1354-2-6-1	accession	Triticum aestivum		Clay Birkett	University of Arkansas
ARGE08-1398	accession	Triticum aestivum		Clay Birkett	University of Arkansas
GAMD08-27-E9-S13	accession	Triticum aestivum		Clay Birkett	University of Georgia
GA04496-S6	accession	Triticum aestivum		Clay Birkett	University of Georgia
15NORD-25	accession	Triticum aestivum		Clay Birkett	USDA-ARS
16NORD-62	accession	Triticum aestivum		Clay Birkett	USDA-ARS
16NORD-54	accession	Triticum aestivum		Clay Birkett	USDA-ARS

Showing 1 to 10 of 56 entries

Previous123456Next

Results are Accessions that are characterized as 'Present' for Fhb1

## Search by Genetic Character:

- The results table contains Accessions that match all search criteria
- Results can be saved to a List



# Advanced Search: Accessions



The screenshot shows the T3/Wheat database interface. At the top, there's a navigation bar with 'New', 'T3/Wheat', 'Search', 'Manage', 'Analyze', 'Maps', and 'About'. Below this, a table displays accession details: Organism (Triticum aestivum), Stock type (accession), Uniquename (AR06024-7-2), and Description. A QR code is also present, labeled 'CB stock 221085 (AR06024-7-2)'. The 'Navigator' section on the left includes 'Additional Info' and 'Associated loci'. The 'Associated loci' table lists various genetic characters and their alleles.

Locus name	Allele name	Phenotype
1RS:1AL	Absent	
1RS:1BL	Absent	
Ax1 or null allele	Absent	
Ax2* allele	Present	
Bdv2/3	Absent	
Bx7 over-expressing	Absent	
Color	Red	
Fhb1	Present	
Glu 2+12 allele	Present	
Glu 5+10 allele	Absent	
Growth habit	Winter	
H13	Absent	
H9	Absent	

**All characterized genetic characters for this specific Accession**

## Search by Genetic Character:

- The Accession detail page includes a table of all associated Loci that have been characterized for the Accession



# Advanced Search: Accessions



**Search**

Wizard | Accessions and plots | Markers | Images | People

**Search Accessions and Plots**

Search

**Name Search**

Stock Name or Description: contains Type search here...

Stock Type: accession

**Advanced Search**

**Properties**

Organism: Organization: Type to Autocomplete

Stock Owner: Type to Autocomplete

**Search By Another Property:**

- ✓ variety
- donor
- donor institute
- donor PUI
- country of origin
- state
- institute code
- institute name
- biological status of accession code
- notes
- accession number
- PUI
- seed source
- type of germplasm storage code
- acquisition date
- organization
- location\_code
- ploidy\_level
- genome\_structure
- ncbi\_taxonomy\_id
- transgenic
- introgression\_parent
- introgression\_backcross\_parent
- introgression\_map\_version
- introgression\_chromosome
- introgression\_start\_position\_bp
- introgression\_end\_position\_bp
- pedigree**

**Search Results**

View Another Property:

Show 10 entries

Stock Name	Stock Type	Organism	Synonyms	Owners	Organization
------------	------------	----------	----------	--------	--------------

## Search by Pedigree:

- Select “Advanced Search” then “Properties”
- Next to “Search By Another Property” select “pedigree”

# Advanced Search: Accessions



The screenshot shows the T3/Wheat web application's search interface. At the top, there's a navigation bar with 'New T3/Wheat', 'Search', 'Manage', 'Analyze', 'Maps', and 'About'. A search bar contains 'dwaring87', and there are links for 'Lists' and 'Calendar'. Below this, a 'Search' section has tabs for 'Wizard', 'Accessions and plots', 'Markers', 'Images', and 'People'. The 'Accessions and plots' tab is active, showing 'Search Accessions and Plots'. A 'Search' dropdown is open, revealing several search criteria sections: 'Name Search' (with 'contains' and 'accession' selected), 'Advanced Search' (with 'Properties' selected), 'Usage', 'Phenotypes', and 'Genotypes'. Within 'Advanced Search', the 'Properties' section has fields for 'Organism', 'Stock Owner', and 'Organization'. The 'Search By Another Property' section has 'pedigree' selected, with an 'Add' button circled in orange. Below this, the 'pedigree' field has 'contains' selected and 'JERRY' entered in the text box, with an orange arrow pointing to it and the text 'Type the name of the Accession that you want in the pedigree string'. At the bottom of the search criteria, a 'Search' button is circled in orange.

## Search by Pedigree:

- Select “Advanced Search” then “Properties”
- Next to “Search By Another Property” select “pedigree”

# Advanced Search: Accessions



Search Results

View Another Property:

pedigree

Add

Show 10 entries

Stock Name	Stock Type	Organism	Synonyms	Owners	organization	pedigree
NDSU-12	accession	Triticum aestivum		Transfer From T3	North Dakota State University	11M228A-32-2 = RWG21 (QTL5AS,5AL)/JERRY
CA9W07-817	accession	Triticum aestivum		Transfer From T3	USDA-ARS	Falcon/Jerry
CA9W08-856	accession	Triticum aestivum		Transfer From T3	USDA-ARS	Jerry/CDC Falcon
NDSU-11	accession	Triticum aestivum		Transfer From T3	North Dakota State University	11M225-123-2 = RWG10 (FHB1)/JERRY
15NORD-25	accession	Triticum aestivum		Transfer From T3	USDA-ARS	CM82036/Jerry
CA9W07-818	accession	Triticum aestivum		Transfer From T3	USDA-ARS	Jerry/Falcon
NDSU-10	accession	Triticum aestivum		Transfer From T3	North Dakota State University	11M225-123-1 = RWG10 (FHB1)/JERRY
CA9W07-819	accession	Triticum aestivum		Transfer From T3	USDA-ARS	Jerry/Falcon
16NORD-58	accession	Triticum aestivum		Transfer From T3	USDA-ARS	SD07W083-4/Jerry
15NORD-32	accession	Triticum aestivum		Transfer From T3	USDA-ARS	RWG10/Jerry

Showing 1 to 10 of 19 entries

Previous

1

2

Next

## Search by Pedigree:

The results table will only include Accessions that have JERRY in their Purdy pedigree

# Using Lists



- Lists are used throughout various parts of Breedbase:
  - List of Accessions are required for creating a trial
  - List of Traits are required for creating a phenotyping spreadsheet
  - Lists can be used in the Search Wizard
- Lists can be generated in many ways:
  - From the Search Wizard
  - From a Search Result table
  - Manually through the List Manager
- Lists can be made public and shared

# Using Lists



## Create a List - Search Wizard:

Lists can be created directly from the Search Wizard

Any selected items of any data type can be added to an existing or new List

The screenshot shows the 'Search Wizard' interface with four columns for selecting data. The first column is 'Locations' with 1/221 items selected. The second column is 'Trials' with 10/10 items selected. The third and fourth columns are 'Select Column Type' with 0/0 items selected. The 'Trials' list includes items like 'ARS-NRPN-1998-A', 'ARS-NRPN-1999-A', 'ARS-NRPN-2000-A', 'ARS-NRPN-2001-A', and 'ARS-NRPN-2002-A'. Annotations with orange arrows point to the 'Trials' list and the 'Add' button, stating: 'Select the items you're interested in', 'Add to an existing List OR Create a new List'. The interface also includes a 'Load/Create Datasets using Match Columns' section at the bottom left and a 'Related Genotype Data', 'Related Trial Metadata', and 'Related Trial Phenotypes' section at the bottom right.

**Add 1 or more filtering criteria**

**Search Wizard**

Don't see your data? [Refresh Lists](#) [Update Wizard](#)

Locations: Select All 1/221 Clear

Trials: Select All 10/10 Clear

Select Column Type: Select All 0/0 Clear

Select Column Type: Select All 0/0 Clear

Match ANY ALL

Add to Li: Add

Create New List Create

Load/Create Datasets using Match Columns

Load Dataset Load

Create New Dataset Create

Related Genotype Data

Related Trial Metadata

Related Trial Phenotypes

**Select the items you're interested in**

**Add to an existing List OR Create a new List**

# Using Lists



The screenshot shows the T3/Wheat web application interface. At the top, there's a navigation bar with 'New T3/Wheat', 'Search', 'Manage', 'Analyze', 'Maps', and 'About'. A search bar contains 'dwarig87' and buttons for 'Lists' and 'Calendar'. Below this is a 'Search' section with tabs for 'Wizard', 'Accessions and plots', 'Markers', 'Images', and 'People'. The main section is titled 'Trial Search' and shows a table of search results. An orange arrow points to the search bar with the text 'Filter Trials Table'. The table has columns: Trial name, Description, Breeding program, Folder, Year, Location, Trial type, Design, Planting Date, Harvest Date, and Download. Two entries are visible: 'ARS-NRPN-1998-AMES' and 'ARS-NRPN-1999-AMES'. Below the table, it says 'Showing 1 to 10 of 10 entries (filtered from 2,434 total entries)'. At the bottom, there's a section titled 'Copy Results to a List' with a text input field, a dropdown menu showing '5ST ADV 2001', and two buttons: 'add to new list' and 'add to list'. Orange arrows point to these buttons with the text 'Add the visible items to a new List' and 'Add the visible items to an existing List'.

**Search**

Wizard Accessions and plots Markers Images People

**Trial Search**

Show 10 entries Search: Ames

Trial name	Description	Breeding program	Folder	Year	Location	Trial type	Design	Planting Date	Harvest Date	Download
ARS-NRPN-1998-AMES	Northern Regional Performance Nursery, USDA-ARS Hard Winter Wheat Regional Nursery Program Trials - Northern Regional Performance Nursery, Lat and Lon positions are for nearby town centers. Actual planting date unknown. Actual harvest date unknown.	USDA-ARS		1998	Ames, IA	phenotyping_trial	CRD			Download Plot Layout
ARS-NRPN-1999-AMES	Northern Regional Performance Nursery, USDA-ARS Hard Winter Wheat Regional Nursery Program Trials - Northern Regional Performance Nursery, Lat and Lon positions are for nearby town centers. Actual planting date unknown. Actual harvest date unknown.	USDA-ARS		1999	Ames, IA	phenotyping_trial	CRD			Download Plot Layout

Showing 1 to 10 of 10 entries (filtered from 2,434 total entries) Previous 1 Next

**Copy Results to a List** Copy the trial names currently showing in the search results table to a new or existing list

New list...

5ST ADV 2001

add to new list

add to list

## Create a List – Search Results:

Lists can be created from most tables (such as search results)

Look for the “Copy Results to a List” section

**NOTE:** Only the visible items will be added to the list (ie, items on other pages will NOT be added)

# Using Lists



The screenshot shows the T3/Wheat website. The top navigation bar includes a logo, a 'New' button, and links for 'T3/Wheat', 'Search', 'Manage', 'Analyze', 'Maps', and 'About'. On the right, there is a search bar with the text 'dwaring87', a 'Lists' button (highlighted with an orange circle), a 'Calendar' button, and a share icon. The main content area has a 'Welcome to the New T3/Wheat' section with introductory text and a 'Leave Feedback' button. Below this, there is a 'News' section with a post titled 'T3 Phenotype Data Loaded' and an 'Analyze, Selection Index' section. To the right, there is an 'Explore T3' section with a 'Search Wizard' button and several search buttons for 'Accessions', 'Trials', 'Traits', 'Genotyping Projects', and 'Markers'.

## Manage Your Lists:

Lists can be created manually, by entering the names of the items

To manage your Lists, click the “Lists” button from the top right corner of any page.

# Using Lists



**Your Lists**

Create New List:

Add a List name and (optionally) a description

Description For New List

Show 10 entries Search:

List Name	Description	Count	Type	Validate	View	Delete	Download	Share	Group
5ST ADV 2001		6	trials	✓	⌵	✕	↓	🔗	<input type="checkbox"/>
Ames Trials		10	trials	✓	⌵	✕	↓	🔗	<input type="checkbox"/>
Checks	null	2	accessions	✓	⌵	✕	↓	🔗	<input type="checkbox"/>
Example Traits		2	traits	✓	⌵	✕	↓	🔗	<input type="checkbox"/>
Infinium_90K_Lines		339	accessions	✓	⌵	✕	↓	🔗	<input type="checkbox"/>
Lines with NING7840	null	10	accessions	✓	⌵	✕	↓	🔗	<input type="checkbox"/>
NRPN Ames 2005-2007		3	trials	✓	⌵	✕	↓	🔗	<input type="checkbox"/>
SD Winter Wheat	null	34	accessions	✓	⌵	✕	↓	🔗	<input type="checkbox"/>
Single Trial Test	null	1	trials	✓	⌵	✕	↓	🔗	<input type="checkbox"/>
UIL 2018		6	trials	✓	⌵	✕	↓	🔗	<input type="checkbox"/>

Showing 1 to 10 of 10 entries Previous 1 Next

Click the List name to modify its contents

## Create a List – Manually:

Enter the List name and description (optional)

Click the “New List” button to create the List

Click the List Name to edit the List contents



# Using Lists



**List Contents**

List ID: 188

List name:  **Update**

Description:  **Update**

Type:  **Validate**

**Fuzzy Search**

**Find Synonyms**

**See Available Seedlots**

**Add New Items:** **Add**

JERRY  
ERNIE  
BESS

**3. Add items**

1. Select list type

2. Enter names of list items

Sort Ascending

Sort Descending

Search:

No data available in table

Showing 0 to 0 of 0 entries

**Close**

## Modify a List (Add Items):

Select the List type

Enter the names of the list items  
(one item per line)

- The names must match existing items in the database

Click the “Add” button to add the items to the List

# Using Lists



The screenshot shows a web browser window with the URL `wheat.triticeaetoolbox.org`. A modal window is open, displaying details for a list with ID 188. The modal includes fields for 'List name' (2020 Checks) and 'Description' (Checks used in the 2020 Trials), both with 'Update' buttons. Under the 'Type' section, the 'Validate' button is circled in orange, and the text 'Validate List Items' is displayed next to it. Other buttons in this section include 'Fuzzy Search', 'Find Synonyms', and 'See Available Seedlots'. Below these is an 'Add New Items' section with an 'Add' button and a text area for adding items. At the bottom, there are 'Sort Ascending' and 'Sort Descending' buttons, a search bar, and a table of items. The table has three rows: 'JERRY', 'ERNIE', and 'BESS', each with a 'Remove' button. The text 'Showing 1 to 3 of 3 entries' is at the bottom left of the table. A 'Close' button is at the bottom right of the modal. A notification box at the top of the modal says 'wheat.triticeaetoolbox.org says This list passed validation.' with an 'OK' button.

List ID: 188

List name:  Update

Description:  Update

Type: **Validate** **Validate List Items**

Fuzzy Search

Find Synonyms

See Available Seedlots

Add New Items:  Add

Sort Ascending Sort Descending

Search:

JERRY	<button>Remove</button>
ERNIE	<button>Remove</button>
BESS	<button>Remove</button>

Showing 1 to 3 of 3 entries

Close

## Validate the List:

Validating the List ensures all of the List items are valid entries for the specified List Type

Click the “Validate” button under the “Type” section

# Using Lists



**Search Wizard**

Don't see your data? [Refresh Lists](#) [Update Wizard](#)

**Panel 1: 2020 Checks**

2020 Checks ▾

Search

Select All 3/3 Clear

+

×

JERRY

×

ERNIE

×

BESS

Match ANY ALL

Add to List... ▾ Add

Create New Li Create

**Panel 2: Trials**

Trials ▾

Search

Select All 0/1061 Clear

+ 5STADV\_2001\_Brownstc

+ 5STADV\_2001\_Columbie

+ 5STADV\_2001\_LoganCo

+ 5STADV\_2001\_Portagev

+ 5STADV\_2001\_Urbana

**Panel 3: Select Column Type**

Select Column Type ▾

Search

Select All 0/0 Clear

**Panel 4: Select Column Type**

Select Column Type ▾

Search

Select All 0/0 Clear

## List Usage – Search Wizard:

Lists can be used as  
selections in the  
search wizard

# Using Lists



## List Usage – Trial Design:

Lists of Accessions are used to specify the entries and checks used in a phenotyping Trial

Design New Trial

Intro

Trial Information

Design Information

Trial Linkage

Field Map Information

Custom Plot Naming

Review Designed Trial

1

2

3

4

5

6

7

Design your trial layout

Which accessions will be in the field?

List of accessions to include (required):

SD Winter Wheat

List of checks to include. Checks list should be separate from accessions list. (optional):

Checks

Need to create a list of accessions?

Manage Lists

Number of blocks (required):

Continue to Next Step

Close

# Trial Design



- A Trial must be created before any phenotyping data can be added
- A Trial contains metadata about itself:
  - Trial Name (must be unique)
  - Breeding Program (must already exist)
  - Location (must already exist)
  - Trial Type (phenotyping, greenhouse, Preliminary Yield Trial, Advanced...)
  - Year
  - Plot Dimensions
  - Field Size
  - Description
  - Design Type (Randomized, RCBD, Incomplete Block, Augmented, ...)

# Trial Design



- A Trial contains information about the physical plot layout
- Each plot has information about itself:
  - Block
  - Rep
  - Row & Column
  - Accession
  - Observations
- The plots can be created:
  - Using the Trial Design wizard
  - Uploading a plot layout template

# Trial Design



Before you design a new Trial, make sure you have the following:

- Breeding Program
  - Each Trial is associated with a single Breeding Program
  - If your Breeding Program doesn't exist it will have to be added first
- Location
  - Each Trial is assigned to a single location
  - Each Location is associated with one or more Breeding Programs
  - The Location of your Trial needs to exist AND be associated with your Breeding Program
- Lists of Accessions for entries (required) and checks (optional)

# Trial Design



SANDBOX SITE - Data added to this site will be periodically cleared

New T3/Wheat SANDBOX Search **Manage** Analyze Maps About

Select "Field Trials"

Welcome to the Sandbox

This is the **SANDBOX** site. Data added to this site will be periodically cleared and resubmitted. Once your data is ready, please go to the **main T3/Wheat** site to permanently submit your data.

T3 is a repository for public data. The **New T3** is the next evolution of T3's data and tools to the improvements, missing tools, and new features.

Field Trials

Breeding Programs  
Locations  
Accessions  
Crosses  
Field Book Tools  
Field Trials  
Phenotyping Results  
Genotyping Plates

Trait Ontology Browser  
Compose a New Trait

Download  
Upload  
Barcodes

User Roles

Wheat Coordinated Agricultural Project (**Wheat CAP**). Funding is provided by the United States Department of Agriculture (**USDA**). The current project is funded by the **Wheat Yield Project (WYP)** and part of the Agriculture and Food Research Initiative (**AFRI**).

Wheat CAP (**T3**). We are in the process of transitioning all data to the **main T3/Wheat** site. You are invited to leave feedback about features we have to improve the site.

Leave Feedback

News

**T3 Phenotype Data Loaded**  
March 13, 2019  
Information on data loaded from T3.

**News Item Title**  
March 10, 2019  
Put news item content here.  
It can contain any HTML.

**News Item Title**  
March 10, 2019  
Put news item content here.

Explore T3

Use the **Search Wizard** to explore the database using various types of metadata.

Alternatively, you can search specifically for **Accessions, Trials, Traits, Genotyping Projects, or Markers**

Open Search Wizard

Search Accessions Search Trials Search Traits  
Search Genotyping Projects Search Markers

Submit Data

## Manage Field Trials:

Select "Field Trials"  
from the Manage  
menu



# Trial Design



<https://wheat.triticeaetoolbox.org/breeders/trials>

SANDBOX SITE - Data added to this site will be periodically cleared

New T3/Wheat SANDBOX Search Manage Analyze Maps About

dwaring87 Lists Calendar

Manage Trials

Add a Trial by uploading a plot layout template → Upload Existing Trial Design New Trial

Information

Search

Download Trial Phenotypes

Select multiple trials by holding 'Ctrl'.

Download Phenotypes

Double click trial (📁) or folder (📁) to view detail page.

Breeding programs (📁)

Folders

Create new folder

Move trial(s) to folder

Move folder

Breeding Programs -- Folders -- Trials Refresh

- Agriculture and Agri-Food Canada
- Agriculture and Agri-Food Canada Alberta
- Agriculture and Agri-Food Canada Manitoba
- Agriculture and Agri-Food Canada Saskatchewan
- Agri-Food Alberta
- Agri-Food Canada
- Agri-Food Manitoba
- Agri-Food Saskatchewan
- AgriPro-Syngenta
- Cereal Research Inst
- Cereal Research Institute Non-Profit Ltd.
- CIMMYT
- Clemson
- Colorado State Univ
- Colorado State University
- Cornell University
- Dow AgroSciences
- EVIGEZ Czech Republic
- Genesis Seeds
- Gortzen
- Kansas State University
- Kansas State University - Hays
- WMS Canada

Add a Trial by creating the plot layout using the Trial Design Wizard

## Create a Trial:

- Upload Existing Trial
  - You create and upload a template defining the plot layout
- Design New Trial
  - The Trial Design Wizard defines the plot layout

# Trial Design



SANDBOX SITE - Data added to this site will be periodically cleared

## Design New Trial

Intro 1 Trial Information 2 Design Information 3 Trial Linkage 4 Field Map Information 5 Custom Plot Naming 6 Review Designed Trial 7

### Enter basic information about the trial

Breeding Program: Cornell University

Locations: (One or More)

Helpfer, NY  
Ithaca, NY  
Ketola, NY  
McGowan, NY  
Oswego, NY

Locations Selected: 1

Trial Name: TEST\_TRIAL

Location abbreviation will automatically be added as a prefix if multiple locations are selected.

Trial Type: phenotyping\_trial

Year: 2019

Plot Width (m): 1

Plot Length (m): 1

Field Size (ha):

Description: This is a test Trial

Design Type: Complete Block

generates Randomized Complete Block Design, using the methods of random number generation in R. Creates plot entities in the database.

First validate the form

Continue to Next Step

Close

## Design New Trial:

Click the “Design New Trial” button from the Manage Trials page

Fill out the basic information about the Trial:  
location, plot dimensions, design type, etc...

Validate the form

Continue

# Trial Design



SANDBOX SITE - Data added to this site will be periodically cleared

## Design New Trial



### Design your trial layout

Which accessions will be in the field?

List of accessions to include (required):

SD Winter Wheat Accessions

List of checks to include. Checks list should be separate from accessions list.  
(optional):

Checks

Need to create a list of accessions?

Manage Lists

Number of blocks (required):

3

Continue to Next Step

Close

## Design New Trial:

Select the Lists of entries and checks

Enter the number of blocks

Continue

# Trial Design



SANDBOX SITE - Data added to this site will be periodically cleared

### Design New Trial

Intro 1 Trial Information 2 Design Information 3 Trial Linkage 4 Field Map Information 5 Custom Plot Naming 6 Review Designed Trial 7

**Specify the number of rows and columns for the entire field**

By default field map display is set to serpentine and uses the block or rep number as row number.  
If you do not want to create field map along with this trial, set 'Plot layout format' to 'select plot layout format'.  
If you do not know exactly in which rows and columns you will end up planting the plots, do not provide this and go to the next step.  
If you will plant your plots in an irregular (non-rectangular) layout, do not provide this and go to the next step.  
You can upload the exact row and column information for your plots (in any layout shape) on the Trial Detail Page after you have created the trial in the database and actually planted the experiment.

Field map display: ☒

Number of rows (optional):

Plot layout format:

**Continue to Next Step**

**Close**

## Design New Trial:

Enter the number of rows  
(needs to be a number  
that gives rows with an  
equal number of plots)

Choose plot layout format  
Serpentine:

1	2	3
6	5	4
7	8	9

ZigZag:

1	2	3
4	5	6
7	8	9

# Trial Design



SANDBOX SITE - Data added to this site will be periodically cleared

### Design New Trial

Intro 1 Trial Information 2 Design Information 3 Trial Linkage 4 Field Map Information 5 Custom Plot Naming 6 Review Designed Trial 7

**Review the generated trial layout. Make sure to click Submit at the bottom of this page if you approve of the trial!**

Check to confirm that your design looks good. If there are any problems you can redo the randomization step.

Legend:  
Even Block Numbers (e.g. 2,4,...) Odd Block Numbers (e.g. 1,3,...) Checks Odd Rep Numbers (e.g. 1,3,...)  
Even Rep Numbers (e.g. 2,4,...)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
2	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
3	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54
4	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72
5	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90
6	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108

Plot Name	Accession Name	Check Name	Plot Number	Row number	Col number	Block Number	Block Row Number	Block Col Number	Rep Number	Seedlot Name	Num Seeds Per Plot
TEST_TRIAL-rep1-SD12DHA01373_1	SD12DHA01373		1	1	1	1			1		
TEST_TRIAL-rep1-SD10066_2	SD10066		2	1	2	1			1		
TEST_TRIAL-rep1-SD10135_3	SD10135		3	1	3	1			1		
TEST_TRIAL-rep1-SD12DHA03614_4	SD12DHA03614		4	1	4	1			1		
TEST_TRIAL-rep1-SD12DHA01556_5	SD12DHA01556		5	1	5	1			1		

Close

Pioneer

## Design New Trial:

Each block is a rep

Randomly assigns entries to plots within each block / rep

Dark blue plots are checks

# Trial Design



Redo Randomization

✓

Trial Is Valid

The following trial will be added

Design type

Randomized Complete Block Design

Number of locations

1

Number of accessions

36

Number of checks

2

Number of blocks

3

Number of accessions per block

Block 1: 36 accessions

Block 2: 36 accessions

Block 3: 36 accessions

Number of reps

3

Treatments:

Add Field Management Factor(s) to Design

Confirm (Saves Trial In Database)

Close

## Design New Trial:

- Redo Randomization:
  - Will reshuffle the plot assignments with the same parameters
- Confirm
  - Will save the Trial to the database

# Trial Design



SANDBOX SITE - Data added to this site will be periodically cleared

New T3/Wheat SANDBOX Search Manage Analyze Maps About

Q dwaring87 Lists Calendar


### Trial detail for TEST\_TRIAL

**Trial Details** View and edit basic information about the experiment.

Edit Trial Details


Trial Name	TEST_TRIAL
Breeding Program	Cornell University
Trial Location	Ithaca, NY
Year	2019
Trial Type	phenotyping_trial
Planting Date	[No Planting Date]
Harvest Date	[No Harvest Date]
Description	This is a test Trial
Folder	Cornell University


New Folder Change Folder



TEST\_TRIAL SGN6182

Plot Width (m)	1
Plot Length (m)	1
Field Size (ha)	[No Field Size]
Trial Will Be Genotyped	no
Trial Will Be In Crosses	no

 Generate barcode labels for plots or plants or accessions in this trial. Go

 Directly record phenotypes to database for this trial. Go

**Field Layout** View and edit the spatial layout of the experiment. Also view a heatmap for phenotyped traits.

Tools and Phenotype Heatmap

## Design New Trial:

An empty trial now exists

Trial Details can be modified

Field layout can be modified

Phenotype observations can be added

# Phenotype Upload



Once the Trial has been added to the database:

- A “phenotyping spreadsheet” can be created for the trial
  - Specific to an individual trial
  - Contains a column for each selected trait
- Observations are added to the phenotyping spreadsheet
- The phenotyping spreadsheet is uploaded for the trial



# Phenotype Upload



Open the Trial Detail page:

- Search > Field Trials
  - Filter by name in the Search box
  - Click Trial name
- Manage > Field Trials
  - Expand Breeding Program
  - Double click Trial name
- Search > Wizard
  - Include any filters before Trials
  - Filter by Trial
  - Click Trial name

# Phenotype Upload



**Compute New Phenotypes** Compute derived traits or compute plot phenotypes from plant phenotypes.

**Upload Data Files** Phenotypic data collection using Excel or Android Fieldbook. Also upload any additional files for this trial.

**Data Collection Files**

- Phenotyping Spreadsheets** **Create Spreadsheet**
- Android Field Book Layout** **Create Field Book**
- Data Collector Spreadsheet** **Create DataCollector Spreadsheet**

**Upload Phenotyping Files**

- Phenotyping Spreadsheets** **Upload**
- Android Field Book Exported** **Upload**
- Data Collector Spreadsheet** **Upload**

**Uploaded Phenotyping Files** **Phenotypes Fully Uploaded?**

Filename	Date Uploaded	Uploaded By	File Type	Options
----------	---------------	-------------	-----------	---------

## Create Phenotyping Spreadsheet:

From the Trial Detail page:

- Find the “Upload Data Files” section
- Find the “Data Collection Files” subsection
- Next to “Phenotyping Spreadsheets” click the “Create Spreadsheet” button

# Phenotype Upload



Download Phenotype Spreadsheet for TEST\_TRIAL

Trial: TEST\_TRIAL

Trait List: Example Traits List of Traits observed in this Trial

Include Notes Column ☒

Spreadsheet Format: Detailed

Data Level: Plots

Close Submit

## Create Phenotyping Spreadsheet:

Select the list of Traits that will be observed in this Trial

Optionally include a column for plot-level notes

Spreadsheet Format:

- **Simple:** includes a plot name column and a column for each trait
- **Detailed:** includes more trial and plot-level information

# Phenotype Upload



## Populate Phenotyping Spreadsheet: Simple Format

	A	B	C	D
1	observationunit_name	Grain test weight g/l CO_321:0001210	Grain yield kg/ha CO_321:0001218	notes
2	TEST_TRIAL-rep1-SD12DHA01373_1			
3	TEST_TRIAL-rep1-SD10066_2			
4	TEST_TRIAL-rep1-SD10135_3			
5	TEST_TRIAL-rep1-SD12DHA03614_4			
6	TEST_TRIAL-rep1-SD12DHA01556_5			
7	TEST_TRIAL-rep1-SD12DHA01364_6			
8	TEST_TRIAL-rep1-SD13052-1_7			
9	TEST_TRIAL-rep1-SD110060-7_8			
10	TEST_TRIAL-rep1-SD12DHA01328_9			
11	TEST_TRIAL-rep1-SD110038-3_10			
12	TEST_TRIAL-rep1-SD12DHA01024_11			
13	TEST_TRIAL-rep1-SD13062-2_12			
14	TEST_TRIAL-rep1-SD110044-7_13			
15	TEST_TRIAL-rep1-SD12008-2_14			
16	TEST_TRIAL-rep1-SD10257-2_15			
17	TEST_TRIAL-rep1-SD10085-4_16			
18	<b>Plot name: includes trial name, rep number, accession name and plot number</b>			
19				
20				
21				
22				
23				
24	TEST_TRIAL-rep1-SD13090-7_23			

# Phenotype Upload



## Populate Phenotyping Spreadsheet: Detailed Format

	A	B	C	D	E	F	G	H	I	J	K	L
1	Spreadsheet ID	ID3081575492609	Spreadsheet for	BasicExcel								
2	Trial name(s)	TEST_TRIAL	Operator	Enter operator here								
3	Description(s)	TEST_TRIAL: This is	Date	Enter date here								
4	Trial location(s)	TEST_TRIAL: Ithaca,	Design Type(s)	TEST_TRIAL: RCBD								
5	Predefined Columns											
6												
7	plot_name	accession_name	plot_number	block_number	is_a_control	rep_number	planting_date	harvest_date	trial_name	Grain test weight g/l	Grain yield kg/ha	notes
8	TEST_TRIAL-rep1-SD12DHA01373_1	SD12DHA01373	1	1		1			TEST_TRIAL			
9	TEST_TRIAL-rep1-SD10066_2	SD10066	2	1		1			TEST_TRIAL			
10	TEST_TRIAL-rep1-SD10135_3	SD10135	3	1		1			TEST_TRIAL			
11	TEST_TRIAL-rep1-SD12DHA03614_4	SD12DHA03614	4	1		1			TEST_TRIAL			
12	TEST_TRIAL-rep1-SD12DHA01556_5	SD12DHA01556	5	1		1			TEST_TRIAL			
13	TEST_TRIAL-rep1-SD12DHA01364_6	SD12DHA01364	6	1		1			TEST_TRIAL			
14	TEST_TRIAL-rep1-SD13052-1_7	SD13052-1	7	1		1			TEST_TRIAL			
15	TEST_TRIAL-rep1-SD110060-7_8	SD110060-7	8	1		1			TEST_TRIAL			
16	TEST_TRIAL-rep1-SD12DHA01328_9	SD12DHA01328	9	1		1			TEST_TRIAL			
17	TEST_TRIAL-rep1-SD110038-3_10	SD110038-3	10	1		1			TEST_TRIAL			
18	TEST_TRIAL-rep1-SD12DHA01024_11	SD12DHA01024	11	1		1			TEST_TRIAL			
19	TEST_TRIAL-rep1-SD13062-2_12	SD13062-2	12	1		1			TEST_TRIAL			
20	TEST_TRIAL-rep1-SD110044-7_13	SD110044-7	13	1		1			TEST_TRIAL			
21	TEST_TRIAL-rep1-SD12008-2_14	SD12008-2	14	1		1			TEST_TRIAL			
22	TEST_TRIAL-rep1-SD10257-2_15	SD10257-2	15	1		1			TEST_TRIAL			
23	TEST_TRIAL-rep1-SD110085-1_16	SD110085-1	16	1		1			TEST_TRIAL			
24	TEST_TRIAL-rep1-SD13099-8_17	SD13099-8	17	1		1			TEST_TRIAL			
25	TEST_TRIAL-rep1-SD12DHA01131_18	SD12DHA01131	18	1		1			TEST_TRIAL			
26	TEST_TRIAL-rep1-ERNIE_19	ERNIE	19	1	1	1			TEST_TRIAL			
27	TEST_TRIAL-rep1-SD12DHA00324_20	SD12DHA00324	20	1		1			TEST_TRIAL			
28	TEST_TRIAL-rep1-SD12DHA01353_21	SD12DHA01353	21	1		1			TEST_TRIAL			
29	TEST_TRIAL-rep1-SD12DHA01038_22	SD12DHA01038	22	1		1			TEST_TRIAL			
30	TEST_TRIAL-rep1-SD13090-7_23	SD13090-7	23	1		1			TEST_TRIAL			

# Phenotype Upload



The screenshot shows a web interface for uploading phenotypic data. At the top left is a cloud upload icon. Below it, a header bar contains a minus icon, the word 'Upload' in green, and a description: 'Phenotypic data collection using Excel or Android Fieldbook. Also upload any additional files for this trial.' Below the header is a section titled 'Data Files' in green. The main content area has two expandable sections. The first, 'Data Collection Files', contains three rows: 'Phenotyping Spreadsheets' with a 'Create Spreadsheet' button, 'Android Field Book Layout' with a 'Create Field Book' button, and 'Data Collector Spreadsheet' with a 'Create DataCollector Spreadsheet' button. The second expandable section, 'Upload Phenotyping Files', contains three rows: 'Phenotyping Spreadsheets' with a blue 'Upload' button (circled in orange), 'Android Field Book Exported' with a blue 'Upload' button, and 'Data Collector Spreadsheet' with a blue 'Upload' button.

## Upload Phenotyping Spreadsheet:

From the Trial Detail page:


- Find the “Upload Data Files” section
- Find the “Data Collection Files” subsection
- Next to “Phenotyping Spreadsheets” click the “Upload” button

# Phenotype Upload



SANDBOX SITE - Data added to this site will be periodically cleared

### Upload Phenotype Spreadsheet

**File format information**  
Spreadsheet Format

**Select Spreadsheet Format**

Spreadsheet Format: Detailed

Timestamps Included: ☐

Data Level: Plots

Phenotype Spreadsheet: Choose File downloadjuvob.xls

**Select your phenotyping spreadsheet**

Close Verify Store

## Upload Phenotyping Spreadsheet:

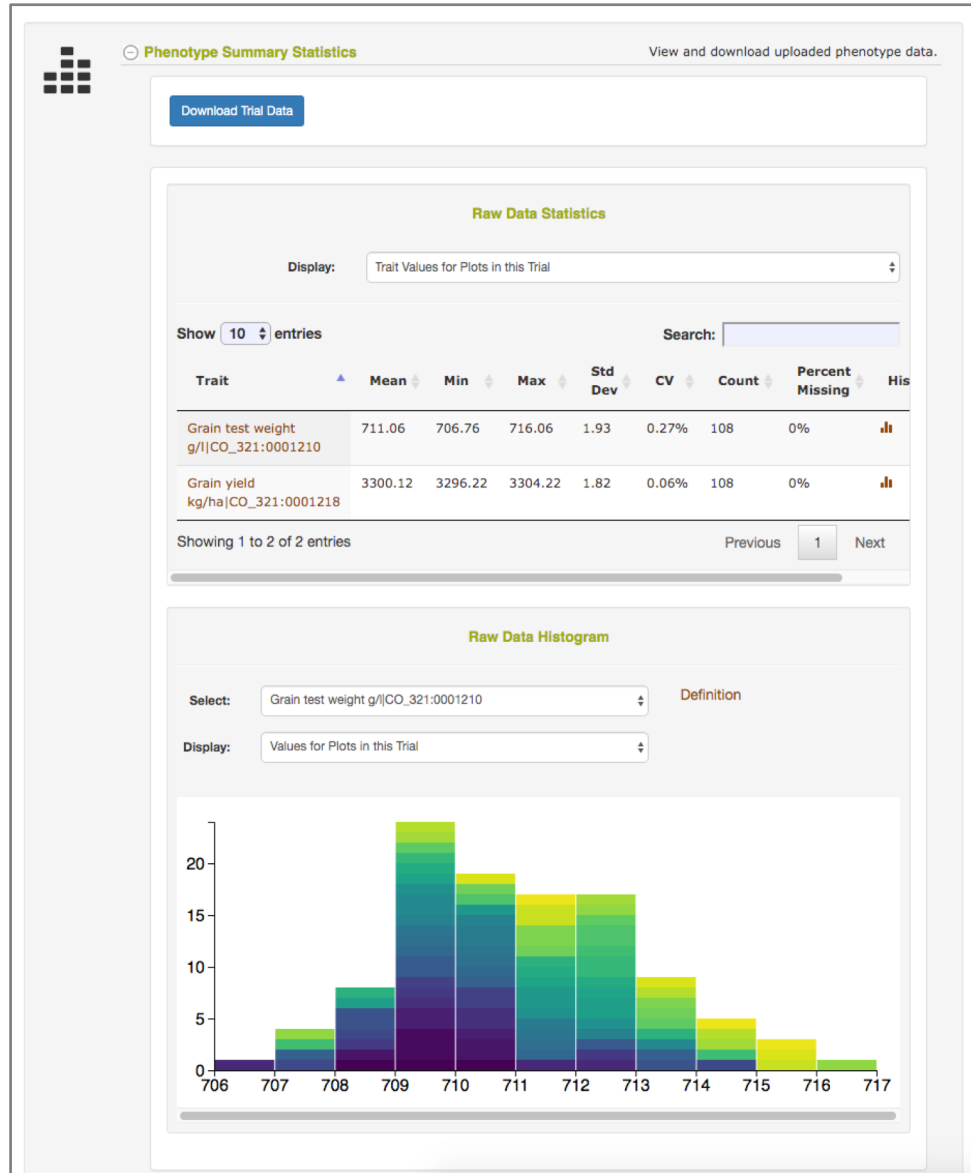
Select the format of the phenotyping spreadsheet

Choose your phenotyping spreadsheet

Verify the file

Store the observations

# Phenotype Upload



## After Upload:

Phenotype summary available on the Trial Detail Page

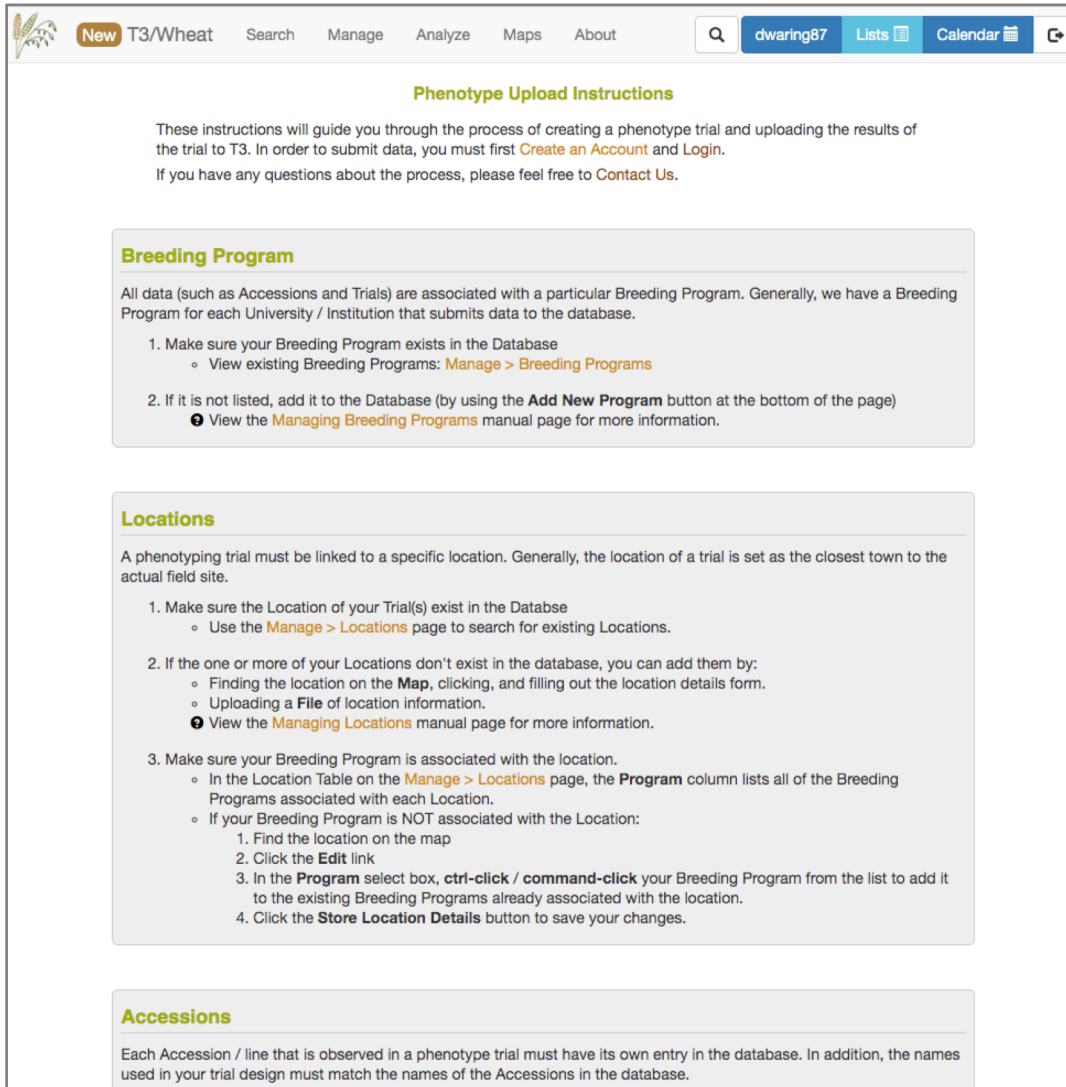
Includes mean, ranges, histograms of each trait



# Phenotype Upload



 [https://wheat.triticeaetoolbox.org/help/phenotype\\_upload\\_workflow](https://wheat.triticeaetoolbox.org/help/phenotype_upload_workflow)



The screenshot shows the 'Phenotype Upload Instructions' page. At the top is a navigation bar with links: New, T3/Wheat, Search, Manage, Analyze, Maps, About. A search bar contains 'dwaring87'. Below the navigation bar, the page title 'Phenotype Upload Instructions' is followed by a paragraph explaining the process and a link to 'Contact Us'. The page is divided into three main sections: 'Breeding Program', 'Locations', and 'Accessions'. Each section contains detailed instructions and links to related manual pages.

**Phenotype Upload Instructions**

These instructions will guide you through the process of creating a phenotype trial and uploading the results of the trial to T3. In order to submit data, you must first [Create an Account](#) and [Login](#). If you have any questions about the process, please feel free to [Contact Us](#).

**Breeding Program**

All data (such as Accessions and Trials) are associated with a particular Breeding Program. Generally, we have a Breeding Program for each University / Institution that submits data to the database.

1. Make sure your Breeding Program exists in the Database
  - View existing Breeding Programs: [Manage > Breeding Programs](#)
2. If it is not listed, add it to the Database (by using the **Add New Program** button at the bottom of the page)
  - View the [Managing Breeding Programs](#) manual page for more information.

**Locations**

A phenotyping trial must be linked to a specific location. Generally, the location of a trial is set as the closest town to the actual field site.

1. Make sure the Location of your Trial(s) exist in the Database
  - Use the [Manage > Locations](#) page to search for existing Locations.
2. If the one or more of your Locations don't exist in the database, you can add them by:
  - Finding the location on the **Map**, clicking, and filling out the location details form.
  - Uploading a **File** of location information.
  - View the [Managing Locations](#) manual page for more information.
3. Make sure your Breeding Program is associated with the location.
  - In the Location Table on the [Manage > Locations](#) page, the **Program** column lists all of the Breeding Programs associated with each Location.
  - If your Breeding Program is NOT associated with the Location:
    1. Find the location on the map
    2. Click the **Edit** link
    3. In the **Program** select box, **ctrl-click** / **command-click** your Breeding Program from the list to add it to the existing Breeding Programs already associated with the location.
    4. Click the **Store Location Details** button to save your changes.

**Accessions**

Each Accession / line that is observed in a phenotype trial must have its own entry in the database. In addition, the names used in your trial design must match the names of the Accessions in the database.

## Upload Workflow and Instructions:

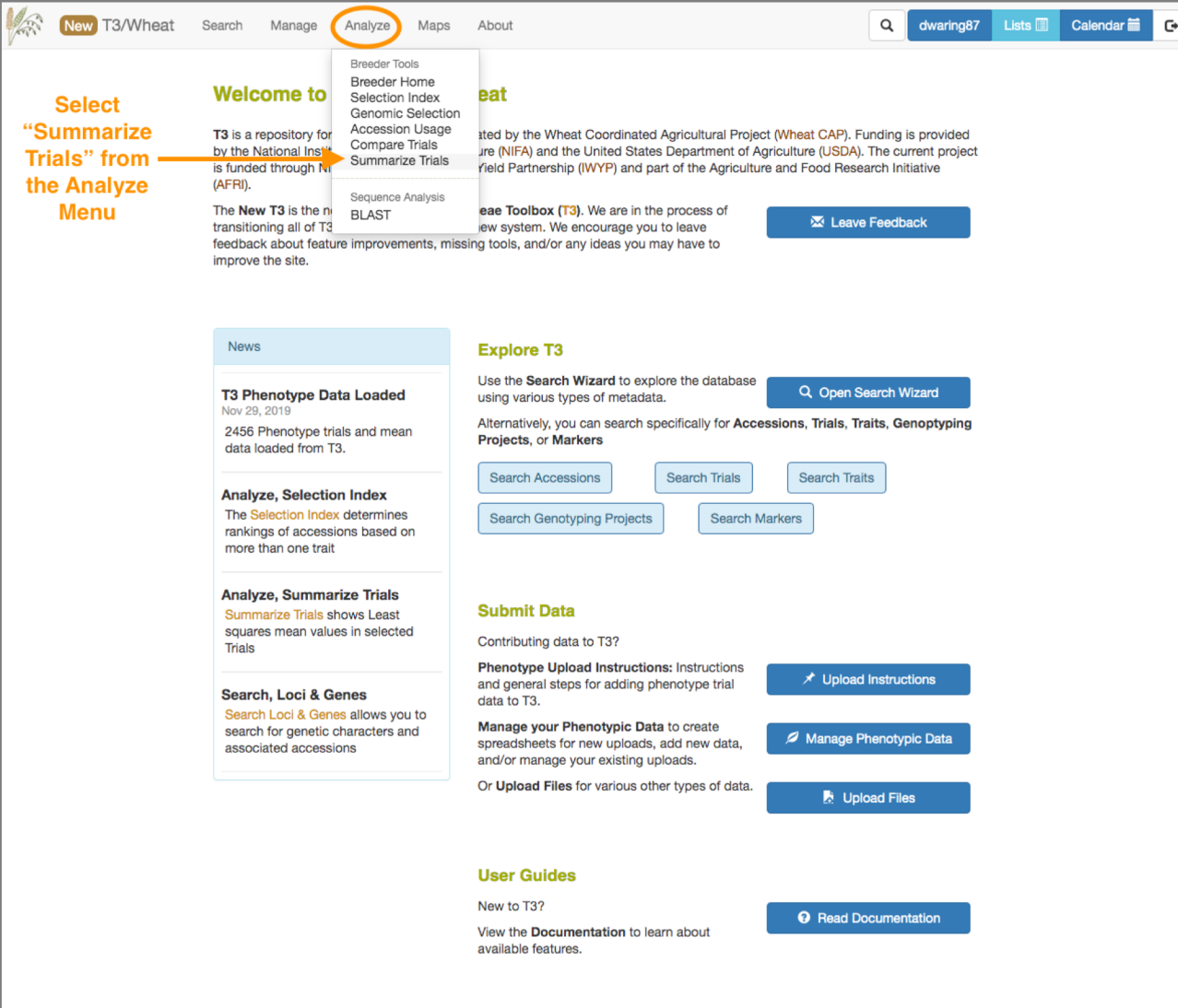
General steps for uploading data for a phenotyping trial

- Check prerequisites
- Create the Trial
- Create the phenotyping spreadsheet
- Upload the phenotyping spreadsheet

# Trial Summary Tool



 <https://wheat.triticeaetoolbox.org/tools/trial/summary/list>



**Select "Summarize Trials" from the Analyze Menu**

**New T3/Wheat** Search Manage **Analyze** Maps About

**Welcome to T3**

T3 is a repository for wheat and triticale data, funded by the National Institute of Food and Agriculture (NIFA) and the United States Department of Agriculture (USDA). The current project is funded through the Wheat Yield Partnership (WYP) and part of the Agriculture and Food Research Initiative (AFRI).

The **New T3** is the next generation of the T3 system, transitioning all of T3's data to a new system. We encourage you to leave feedback about feature improvements, missing tools, and/or any ideas you may have to improve the site.

**Summarize Trials**

**News**

**T3 Phenotype Data Loaded**  
Nov 29, 2019  
2456 Phenotype trials and mean data loaded from T3.

**Analyze, Selection Index**  
The **Selection Index** determines rankings of accessions based on more than one trait

**Analyze, Summarize Trials**  
**Summarize Trials** shows Least squares mean values in selected Trials

**Search, Loci & Genes**  
**Search Loci & Genes** allows you to search for genetic characters and associated accessions

**Explore T3**

Use the **Search Wizard** to explore the database using various types of metadata. [Open Search Wizard](#)

Alternatively, you can search specifically for **Accessions, Trials, Traits, Genotyping Projects, or Markers**

[Search Accessions](#) [Search Trials](#) [Search Traits](#)  
[Search Genotyping Projects](#) [Search Markers](#)

**Submit Data**

Contributing data to T3?

**Phenotype Upload Instructions:** Instructions and general steps for adding phenotype trial data to T3. [Upload Instructions](#)

**Manage your Phenotypic Data** to create spreadsheets for new uploads, add new data, and/or manage your existing uploads. [Manage Phenotypic Data](#)

Or **Upload Files** for various other types of data. [Upload Files](#)

**User Guides**

New to T3? [Read Documentation](#)

Select "Summarize Trials" from the "Analyze" Menu

# Trial Summary Tool



**Summarize trials**

Choose a list of trials:

Select a List containing 2+ Trials

✓

-----YOUR LISTS BELOW-----

- 5ST ADV 2001
- ABB North Trials
- NRPN Ames 2005-2007
- UIL 2018**

-----PUBLIC LISTS BELOW-----

- 1998NRPN
- 5ST ADV 2001
- UIL 2018

**Note:** Only traits that are observed across all Trials are available to summarize.

Summarize

Select a List that contains 2 or more Trials

# Trial Summary Tool



**Summarize trials**

Choose a list of trials:

UIL 2018

**Note:** The list must contain at least 2 trials.

Select traits to summarize:

Grain test weight g/l|CO\_321:0001210  
Grain yield kg/ha|CO\_321:0001218  
Plant height cm|CO\_321:0001301

**Note:** Only traits that are observed across all Trials are available to summarize.

**Select the Traits to summarize**

Summarize

Select 1 or more traits to summarize

**Note:** Only traits that have been observed in all of the Trials will be shown

# Trial Summary Tool



## Trial Summary

### LS Means

Show 10 entries

Copy CSV Print

Search:

Accession	Grain test weight g/l	Grain yield kg/ha	Plant height cm
AGRIMAXX413	720.70	6115.20	83.26
AGRIMAXX438	737.43	5737.25	87.49
AGRIMAXX444	726.93	6248.66	84.38
AGRIMAXX446	728.00	6522.82	81.84
AGRIMAXX454	735.77	6321.07	86.08
AGRIMAXX463	723.49	5646.72	82.55
AGRIMAXX473	733.30	5911.58	87.63
AGRIMAXX475	749.75	6084.53	80.86
AGRIMAXX480	740.70	5182.73	85.23
AGRIMAXX485	747.48	5741.55	81.28
LSD	31.09	548.00	3.91
HSD	68.03	1199.03	8.56

Showing 1 to 10 of 88 entries

Previous 1 2 3 4 5 ... 9 Next

LS Means for  
each Trait  
across all Trials

### Grain test weight g/l

Show 10 entries

Copy CSV Print

Search:

Accession	UIL-WHEAT-2018-BELLEVILLE	UIL-WHEAT-2018-ELKVILLE	UIL-WHEAT-2018-HAMPSHIRE	UIL-WHEAT-2018-NEOGA	UIL-WHEAT-2018-PERRY	UIL-WHEAT-2018-URBANA
AGRIMAXX413	--	--	745.67	--	680.93	726.37
AGRIMAXX438	--	--	749.54	--	720.83	732.80
AGRIMAXX444	746.57	730.74	--	712.59	--	--
AGRIMAXX446	694.06	737.95	--	761.12	--	--
AGRIMAXX454	759.83	740.01	--	716.58	--	--
AGRIMAXX463	694.70	734.60	767.56	727.78	702.81	713.49
AGRIMAXX473	732.42	701.14	770.13	737.18	721.73	737.18
AGRIMAXX475	774.76	723.15	740.53	779.27	728.17	752.62

Separate  
summary table  
for each Trait

## Trial Summary Tool Output:

A table with LS Means for each Trait across all Trials

A table summarizing each Trait

# Future Work



- Organizing Phenotyping Trials
  - Within Breeding Programs
  - Breeding Programs can contain folders for separate experiments
  - Create Breeding Programs for Cooperative Nurseries?
- Adding Tools / Report Pages from T3/Classic
  - Which ones are most useful?
  - Genomic Selection tool?

# Feedback



## Get In Touch:

Email: [djw64@cornell.edu](mailto:djw64@cornell.edu)

Website: <https://wheat.triticeaetoolbox.org/contact/form>

What tools do you want to see in the New T3?

How can we make it easier to submit data?

# Acknowledgements

## The TriticeaeToolbox

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## Breedbase

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