

The Triticeae Toolbox: Transitioning to Breedbase



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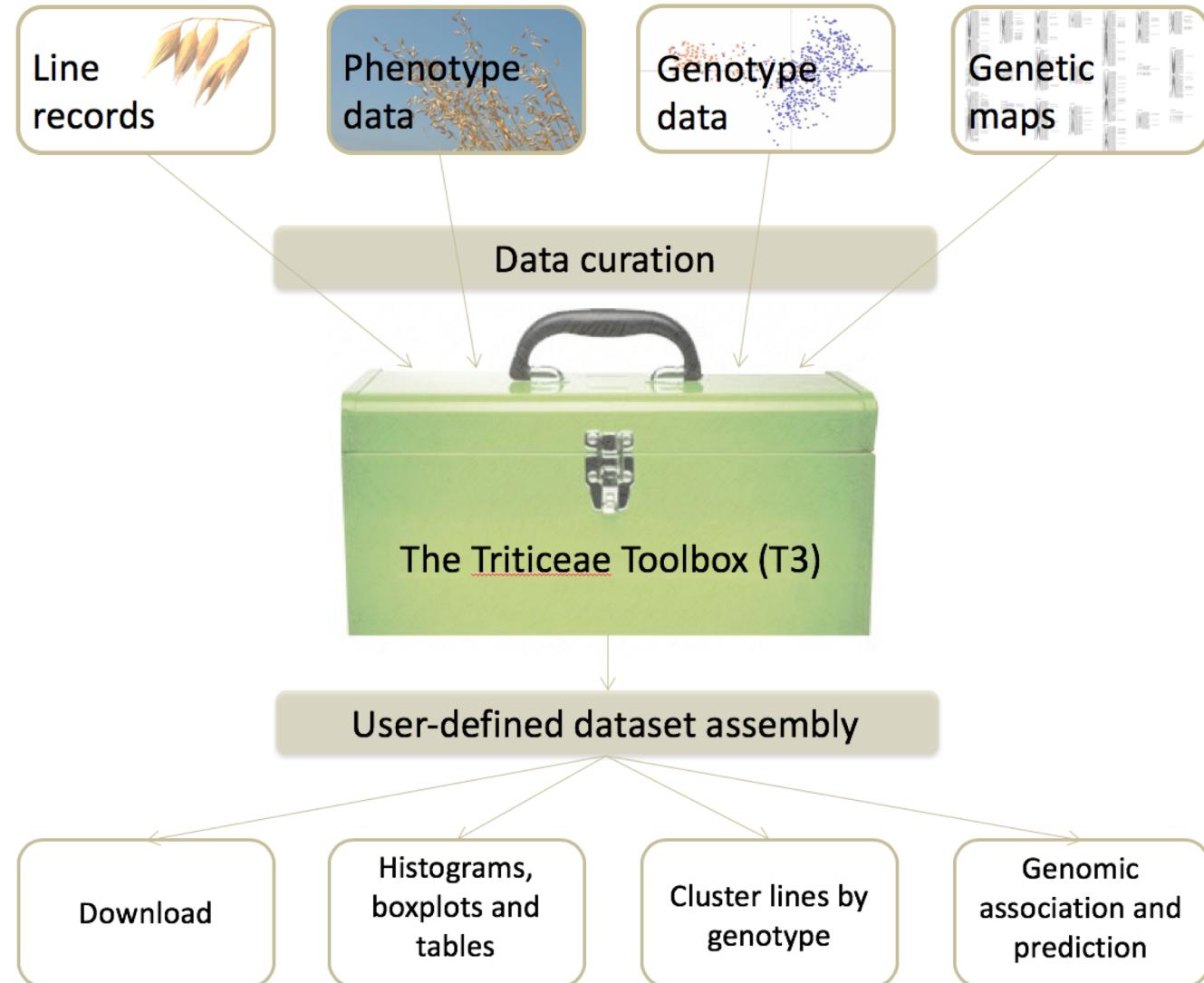


What is T3?



- 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





[Contact Us](#)

T3/Wheat

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.

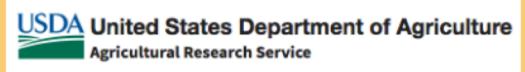
How to Select Data

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](#).



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. 2011-65002-30029 from the USDA National Institute of Food and Agriculture.

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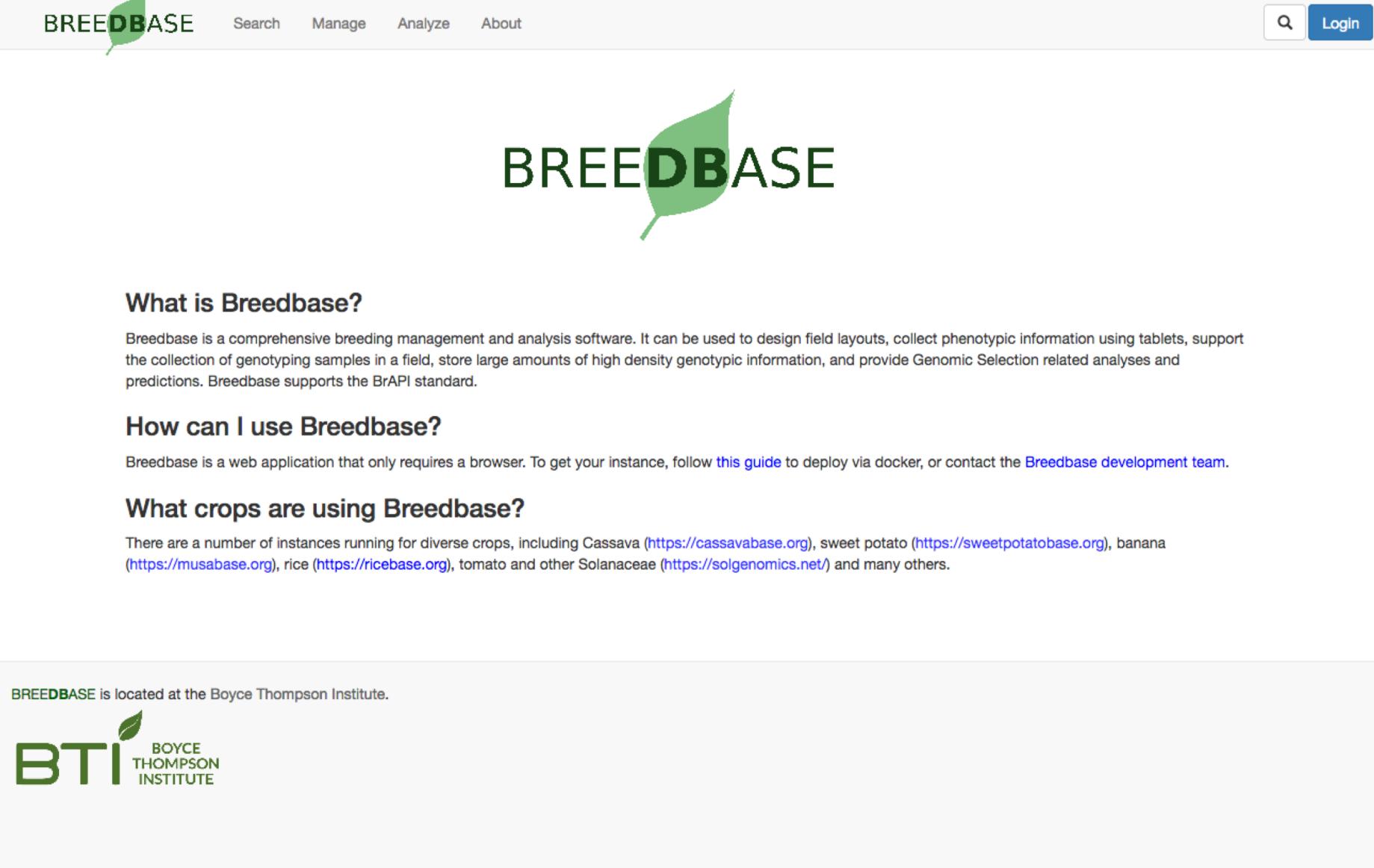
The Hordeum Toolbox was developed for the Barley CAP

The Triticeae Toolbox was expanded from THT for the Triticeae CAP

Tools have been added periodically to T3

Transition to Breedbase

 <https://breedbase.org>



The screenshot shows the Breedbase homepage. At the top left is the Breedbase logo (green leaf icon and text). To its right are navigation links: Search, Manage, Analyze, and About. On the far right are a search bar with a magnifying glass icon and a blue 'Login' button. The main title 'BREEDBASE' is centered above a large green leaf graphic. Below the title, there are three sections: 'What is Breedbase?', 'How can I use Breedbase?', and 'What crops are using Breedbase?'. Each section contains a brief description and a link to more information. At the bottom left, it says 'BREEDBASE is located at the Boyce Thompson Institute.' and shows the BTI logo.

BREEDBASE

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.

BTI 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 main production site's homepage. At the top, there's a navigation bar with links for 'Search', 'Manage', 'Analyze', 'Maps', and 'About'. A 'Login' button is also present. Below the navigation, a banner reads 'Welcome to the New T3/Wheat'. It contains text about the project's funding and a 'Leave Feedback' button. On the left, there's a 'News' sidebar with two items: 'T3 Phenotype Data Loaded' (March 13, 2019) and 'News Item Title' (March 10, 2019). The main content area features a section titled 'Explore T3' with a search wizard and buttons for 'Search Accessions', 'Search Trials', 'Search Traits', 'Search Genotyping Projects', and 'Search Markers'. Below this is a 'Submit Data' section and a link to 'Manage your Phenotypic Data to create...'. A small note at the bottom says 'Manage your Phenotypic Data to create...'.

Sandbox / Test Site

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

The screenshot shows the sandbox/test site's homepage. The top navigation and login are identical to the main site. The banner reads 'Sandbox SITE - Data added to this site will be periodically cleared'. Below it, a 'Welcome to the New T3/Wheat Sandbox' message is displayed. It includes a note about the site being used for testing and clearing data. The 'Explore T3' section and 'Submit Data' section are identical to the main site. The 'News' sidebar shows the same two items as the main site. The overall layout is very similar to the main production site.

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



New T3/Wheat Search Manage Analyze Maps About

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

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

Contributing data to T3?

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

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

[Manage Phenotypic Data](#)

[Upload Files](#)

User Guides

New to T3?

View the [Documentation](#) to learn about available features.

[Read Documentation](#)

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 "Login" Button



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

Creating an Account



The screenshot shows the New T3/Wheat homepage. At the top, there's a navigation bar with links for New, T3/Wheat, Search, Manage, Analyze, Maps, About, and a search icon. Below the navigation is a banner with the text "Welcome to the New T3/Wheat". A detailed description of the system follows, mentioning its purpose as a repository for wheat data generated by NIFA, USDA, and AFRI, and its evolution from The Triticeae Toolbox. A callout box highlights the "New User" link in the login modal.

Welcome to the New T3/Wheat

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

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

Username
Password

Forgot password? [New User](#)

Reset Login

Close

(Wheat CAP). Funding is provided by the National Institute of Food and Agriculture (NIFA) and the United States Department of Agriculture (USDA). The current project is funded through the Agricultural Research Service (AFRI).

Click "New User"

Search Wizard Open Search Wizard

Search Accessions Search Trials Search Traits

Search Genotyping Projects Search Markers

Submit Data

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Manage your Phenotypic Data to create spreadsheets for new uploads, add new data, and/or manage your existing uploads.

Or Upload Files for various other types of data.

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T3 is open source software and available under the MIT License and may be downloaded from GitHub.

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.

Fill out the new account registration form.

Creating an Account



You will receive an email (from 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.

A screenshot of the Graingenes website. At the top, there is a navigation bar with a wheat icon, a 'New T3/Wheat' button, and links for Search, Manage, Analyze, Maps, and About. On the far right of the bar are a search icon and a blue 'Login' button. Below the navigation bar, a success message reads 'Confirmation successful for username testing.' followed by a link '[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



A screenshot of the 'Search Wizard' interface. The title bar says '[NEW] T3/Wheat - Brave'. The main area is titled 'Search Wizard' and contains four identical search panels, each with a 'Select Column Type' dropdown, a 'Search' input field, and a 'Select All' button. Below these panels are sections for 'Load/Create Datasets using' (with 'Match Columns' and 'Load' buttons), 'Related Genotype Data', 'Related Trial Metadata', and 'Related Trial Phenotypes'. A navigation bar at the top includes 'New T3/Wheat', 'Search', 'Manage', 'Analyze', 'Maps', and 'About'.

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

wheat.triticeatoolbox.org/breeders/search

New T3/Wheat Search Manage Analyze Maps About

dwaring87 Lists Calendar

Select First Filter Type

Select Second Filter Type

Add Item to Selection

Selected Items

Match ANY ALL

Toggle the results of the second filter between union and intersection

Trials

Search

Select All 3/2456 Clear

- + 2012_SRWW_Elite
- + 2014_HapMap_GB
- + 2014_HapMap_WE
- + 2017_WheatCAP
- + 2017_WheatCAP_L

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

Traits

Search

Select All 2/4 Clear

- + Heading time Julian day
- + Plant height cm|CO_3

Select Column Type

Search

Select All 0/0 Clear

- x Grain test weight g/l|C
- x Grain yield kg/ha|CO_

Select Column Type

Search

Select All 0/0 Clear

- x
- x

Match ANY ALL

Add Create

Add to Add

Create New Create

Search Wizard

Don't see your data? Refresh Lists Update Wizard

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 Triticea Toolbox interface with the title bar "[NEW] T3/Wheat - Brave". The main menu includes New, Search, Manage, Analyze, Maps, About, and a user dropdown "dwaring87". Below the menu are two search panels with "Match ANY ALL" buttons and "Add to" dropdowns. A sidebar on the left allows loading datasets using "Match Columns". The central panel displays "Related Genotype Data", "Related Trial Metadata", and a large section for "Related Trial Phenotypes", which is circled in orange. This section shows "3 trials" and offers download options for "CSV" or "Plots". It includes checkboxes for "Include timestamps" and "Suppress user defined phenotype outliers". At the bottom, there's a trait search field "Trait Name Contains" and a "Phenotypes" button. An orange arrow points from the text "Download Phenotype Data" to the "Phenotypes" button.

Download Trial Phenotypes:

- 1) Click 'Related Trial Phenotypes'
- 2) Click the 'Phenotypes' button to download a CSV file

The Search Wizard



Example Phenotype Spreadsheet

phenotype.csv - LibreOffice Calc

File Edit View Insert Format Styles Sheet Data Tools Window Help

Liberation Sans 10 b i u 97X0850-16

S	W	X	Y	Z	AN	AO	AP	AQ	AR
	observationUnitName	replicate	blockNumber	plotNumber	Grain test weight g/l CO_321:0001210	Grain yield kg/ha CO_321:0001218	notes		
4	germplasmName								
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-2006-AMES_CAMELOT_11020	2	1	11020	700.125	7740.47400000000		

Advanced Search: Accessions



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

The screenshot shows the T3/Wheat search interface. At the top, there is a navigation bar with links for New, T3/Wheat, Search, Manage, Analyze, Maps, and About. Below the navigation bar is a search bar with a magnifying glass icon and a dropdown menu labeled "testing". To the right of the search bar are buttons for "Lists" and "Calendar". A blue arrow points from the text "Select 'Accessions and Plots' from the Search menu" to the "Search" button in the navigation bar. A red circle highlights the "Search" button. A secondary red circle highlights the "Accessions and Plots" option in the dropdown menu. The main content area features a heading "The New T3/Wheat" and a paragraph about the public wheat data generated by the Wheat Coordinated Agricultural Project (Wheat CAP). It also mentions the funding provided 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). Below this, there is a section titled "Explore T3" with a "Search Wizard" button and links for "Search Accessions", "Search Trials", "Search Traits", "Search Genotyping Projects", and "Search Markers". There are also sections for "T3 Phenotype Data Loaded" (March 13, 2019) and "News Item Title" (March 10, 2019).

Select
“Accessions
and Plots”
from the
Search menu

Select
“Accessions
and Plots”
from the
Search Menu

Advanced Search: Accessions



Screenshot of the Advanced Search interface for Accessions:

The top navigation bar includes: New T3/Wheat, Search, Manage, Analyze, Maps, About, testing, Lists, Calendar.

The search form has sections for Name Search (Stock Name or Description, Stock Type: accession) and Advanced Search (Properties, Usage, Phenotypes, Genotypes). The Genotypes section is highlighted with an orange circle.

The Select Locus dropdown menu lists various genetic characters and loci, with "Fhb1" selected and highlighted with an orange arrow. An orange callout text says: "Select one or more Genetic Characters / Loci of interest".

The Search Results table shows 10 entries of accessions, with columns for Stock Name, Stock Type, and Organization.

Stock Name	Stock Type	Organization
00S0249-9	accession	Triticum
00B553	accession	Triticum
00S0224-23	accession	Triticum
00S0211-29-4	accession	Triticum
00S0240-3	accession	Triticum
00S0291-3	accession	Triticum
00S0063-1	accession	Triticum
001169-7E15	accession	Triticum
00S0251-6	accession	Triticum
00U04*12	accession	Triticum

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

Select Locus: Fhb1 Add

Select Allele Value: Present

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 Previous 1 2 3 4 5 6 Next

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



New T3/Wheat Search Manage Analyze Maps About

Organism: **Triticum aestivum**
Stock type: **accession**
Uniquename: **AR06024-7-2**
Description:

CB stock 221085 (AR06024-7-2)

Additional Info View and edit additional properties such as synonyms, editors, and all types of properties.

Synonyms:

Additional information:

institute code UAR
institute name University of Arkansas
notes In TCAP project 14_TCAP_ABB_SRW_STH
PUI <http://triticumbase.sgn.cornell.edu/stock/221085/view>
organization University of Arkansas
pedigree AR800-1-3-1/VA01W-476

Associated loci

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



The screenshot shows the 'Search' interface for 'Accessions and plots'. At the top, there are tabs for 'Wizard', 'Accessions and plots' (which is selected), 'Markers', 'Images', and 'People'. Below the tabs, there's a search bar with dropdowns for 'Stock Name or Description' (set to 'contains' and 'accession') and 'Stock Type' (set to 'accession'). A 'Name Search' section follows. On the left, a sidebar has sections for 'Advanced Search' (circled in orange), 'Properties' (also circled in orange), 'Search By Another Property:' (circled in orange), 'Usage', 'Phenotypes', and 'Genotypes'. A large dropdown menu under 'Search By Another Property:' lists various accession-related properties, with 'pedigree' highlighted in blue. An orange arrow points from the text 'Select the "pedigree" property' to this highlighted term. At the bottom, there's a 'Search Results' section with a table header for 'Stock Name', 'Stock Type', 'Organism', 'Synonyms', 'Owners', and 'Organization'. The table shows 10 entries, with the first one being 'T3/Wheat'.

Search by Pedigree:

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

Advanced Search: Accessions



The screenshot shows the 'Search' interface for 'Accessions and plots'. The top navigation bar includes 'New T3/Wheat', 'Search', 'Manage', 'Analyze', 'Maps', 'About', and various links for 'dwaring87', 'Lists', 'Calendar', and a 'Search' icon.

The main search area is titled 'Search Accessions and Plots'. It features several search sections:

- Name Search:** Includes fields for 'Stock Name or Description' (with dropdown for 'contains' and a search input 'Type search here...') and 'Stock Type' (set to 'accession').
- Advanced Search:** Contains sections for 'Properties' (Organism dropdown, Stock Owner input), 'Organization' (input 'Type to Autocomplete'), and 'Search By Another Property'. The 'Search By Another Property' section has an 'Add' button highlighted with an orange circle, and a note: 'Add the property to the search criteria'.
- pedigree:** A field with dropdown 'contains' and input 'JERRY'.
- Usage, Phenotypes, Genotypes:** Additional sections for other search properties.

At the bottom is a large blue 'Search' button highlighted with an orange circle, and a note: 'Type the name of the Accession that you want in the pedigree string'.

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

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 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



New T3/Wheat Search Manage Analyze Maps About

Search Wizard

Add 1 or more filtering criteria

Locations

Search

Select All 1/221 Clear

- + Aberdeen, ID
- + Akron, CO
- + Alliance, NE
- + Altus, OK
- + Archer, WY

X Ames, IA

Match ANY ALL

Add to Li: Add

Create New Create

Trials

Search

Select All 10/10 Clear

- X ARS-NRPN-1998-A
- X ARS-NRPN-1999-A
- X ARS-NRPN-2000-A
- X ARS-NRPN-2001-A
- ✓ ARS-NRPN-2002-A

Match ANY ALL

Add to Li: Add

Ames Tri Create

Select Column Type

Search

Select All 0/0 Clear

Select Column Type

Search

Select All 0/0 Clear

Don't see your data? Refresh Lists Update Wizard

Load/Create Datasets using Match Columns

Load Dataset Load

Create New Dataset Create

Related Genotype Data

Related Trial Metadata

Related Trial Phenotypes

Diagram illustrating the Search Wizard interface for creating lists. It shows two columns of search fields for Locations and Trials, each with dropdown menus and search boxes. Below these are lists of selected items with checkboxes and clear buttons. Arrows point from the text "Select the items you're interested in" to the checkboxes in the Trials section. Another set of arrows points from the text "Add to an existing List OR Create a new List" to the "Add to Li:" buttons and the "Create" buttons at the bottom of the interface.

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

Using Lists



Screenshot of a web application interface showing a search results table for trials. The table includes columns for Trial name, Description, Breeding program, Folder, Year, Location, Trial type, Design, Planting Date, Harvest Date, and Download.

A search bar at the top right contains the text "Search: Ames". An orange arrow points to this search bar with the label "Filter Trials Table".

The table displays two entries:

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			<button>Download Plot Layout</button>
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			<button>Download Plot Layout</button>

At the bottom of the page, there is a "Copy Results to a List" section. It includes fields for "New list..." and "SST ADV 2001", and two buttons: "add to new list" and "add to list". Orange arrows point to these buttons with the labels "Add the visible items to a new List" and "Add the visible items to an existing 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



New T3/Wheat Search Manage Analyze Maps About

dwaring87 Lists Calendar

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
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

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](#)

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



The screenshot shows the 'Your Lists' modal window from the T3/Wheat software. At the top, there's a header bar with 'New T3/Wheat', 'Search', 'Manage', 'Analyze', 'Maps', and 'About'. Below the header is a search bar and user information ('dwarding87', 'Lists', 'Calendar'). The main area is titled 'Your Lists' and contains a form for creating a new list. It has fields for 'Create New List:' (with placeholder 'Create New List. Type New List Name Here') and 'Description For New List'. A large blue 'New List' button is highlighted with a yellow circle and arrow. Below the form is a table listing existing lists. The table columns are: List Name, Description, Count, Type, Validate, View, Delete, Download, Share, and Group. The lists include: '5ST ADV 2001', 'Ames Trials', 'Checks', 'Example Traits', 'Infinium_90K_Lines', 'Lines with NING7840', 'NRPN Ames 2005-2007', 'SD Winter Wheat', 'Single Trial Test', and 'UIL 2018'. Each list entry has a 'View' icon, a crossed-out 'Delete' icon, a download icon, a share icon, and a group icon. At the bottom of the table, it says 'Showing 1 to 10 of 10 entries'. Navigation buttons 'Previous', '1', and 'Next' are also present. A note at the bottom left says 'Click the List name to modify its contents'. A note at the bottom right says 'View Public Lists' and 'Close'.

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"/>

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



The screenshot shows the 'List Contents' dialog box. At the top, it displays 'List ID: 188', 'List name: 2020 Checks', and 'Description: Checks used in the 2020 Trials'. Below these, the 'Type:' field is set to 'accessions'. A blue arrow points from the text '1. Select list type' to this field. In the 'Add New Items:' section, there is a text input field containing 'JERRY', 'ERNIE', and 'BESS', with a blue arrow pointing from the text '2. Enter names of list items' to this field. The 'Add' button is highlighted with a red oval and a blue arrow pointing from the text '3. Add items' to it. At the bottom, there are 'Sort Ascending' and 'Sort Descending' buttons, a 'Search:' input field, and a message 'No data available in table'. The footer shows 'Showing 0 to 0 of 0 entries' and a 'Close' button.

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



A screenshot of a web browser window displaying the URL wheat.triticeaetoolbox.org. The page shows a list titled "2020 Checks" with the description "Checks used in the 2020 Trials". The list contains one item: "accessions". In the top right corner of the page, a modal dialog box is open with the text "wheat.triticeaetoolbox.org says This list passed validation." and an "OK" button. On the left side of the page, under the heading "Type", there is a "Validate" button which is circled in orange. Below the "Validate" button are other buttons: "Fuzzy Search", "Find Synonyms", and "See Available Seedlots". At the bottom of the page, there is a search bar labeled "Search:" and a table showing three entries: JERRY, ERNIE, and BESS, each with a "Remove" button next to it. A footer at the bottom left says "Showing 1 to 3 of 3 entries".

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



The screenshot shows the 'Search Wizard' interface. At the top, there's a navigation bar with icons for New, T3/Wheat, Search, Manage, Analyze, Maps, About, and user information (dwaring87). Below the navigation bar is a search bar with a magnifying glass icon and a dropdown menu labeled 'dwaring87'. There are also buttons for 'Lists' and 'Calendar'.

The main area is titled 'Search Wizard' and contains four search panels:

- Trials:** A dropdown menu set to 'Trials'. Below it is a 'Search' input field and a 'Select All' button followed by '0/1061' and a 'Clear' button. A list of trials is shown:
 - + 5STADV_2001_BrownCo
 - + 5STADV_2001_Columbia
 - + 5STADV_2001_LoganCo
 - + 5STADV_2001_PortageCo
 - + 5STADV_2001_Urbana
- Select Column Type:** A dropdown menu set to 'Select Column Type'. Below it is a 'Search' input field and a 'Select All' button followed by '0/0' and a 'Clear' button.
- Select Column Type:** Another dropdown menu set to 'Select Column Type'. Below it is a 'Search' input field and a 'Select All' button followed by '0/0' and a 'Clear' button.

On the left side of the interface, there's a sidebar with the title 'List of Accessions selected'. It shows a list of three accessions with red 'X' icons:

- X JERRY
- X ERNIE
- X BESS

At the bottom of the sidebar, there are buttons for 'Match ANY ALL', 'Add to List...', 'Add', 'Create New List', and 'Create'.

Two orange arrows point from the text 'List of Accessions selected' to the 'JERRY', 'ERNIE', and 'BESS' entries in the sidebar.

List Usage – Search Wizard:

Lists can be used as selections in the search wizard

Using Lists



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

List of Entries

List of Checks

List Usage – Trial Design:

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

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

Welcome to the **SANDBOX**

Select “Field Trials” This is the **SANDBOX** site can be used to test the addition of new data to T3. Data added to this site will be periodically cleared and resubmit your data.

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

The New T3 is the next evolution of T3’s data and tools to the improvements, missing too

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

can be used to test the addition of new data to T3. Data added to this site will be periodically cleared and resubmit your data.

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

We are in the process of transitioning all you to leave feedback about feature 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.

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

Manage Field Trials:

Select “Field Trials” from the Manage menu

Trial Design



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

The screenshot shows the 'Sandbox Site' interface with the title 'Sandbox Site - Data added to this site will be periodically cleared'. The top navigation bar includes 'Search', 'Manage', 'Analyze', 'Maps', and 'About' buttons. A user profile 'dwareng87' is shown along with 'Lists' and 'Calendar' buttons.

The main area is titled 'Manage Trials' and contains the following text:

- Add a Trial by uploading a plot layout template** (with an arrow pointing to the 'Upload Existing Trial' button)
- Upload Existing Trial** (button circled in orange)
- Design New Trial** (button circled in orange)
- Add a Trial by creating the plot layout using the Trial Design Wizard** (with an arrow pointing to the 'Design New Trial' button)

On the left, there are sections for 'Information', 'Search' (with a search input field), 'Download Trial Phenotypes' (with a 'Download Phenotypes' button), 'Double click trial (🔗) or folder (📁) to view detail page.', and 'Breeding programs' (with a list of institutions).

On the right, there is a sidebar titled 'Breeding Programs -- Folders -- Trials' containing a list of breeding programs:

- 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
- KWIC Canada

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)
Heifer, NY
Ithaca, NY
Ketola, NY
McGowan, NY
Owadale, 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

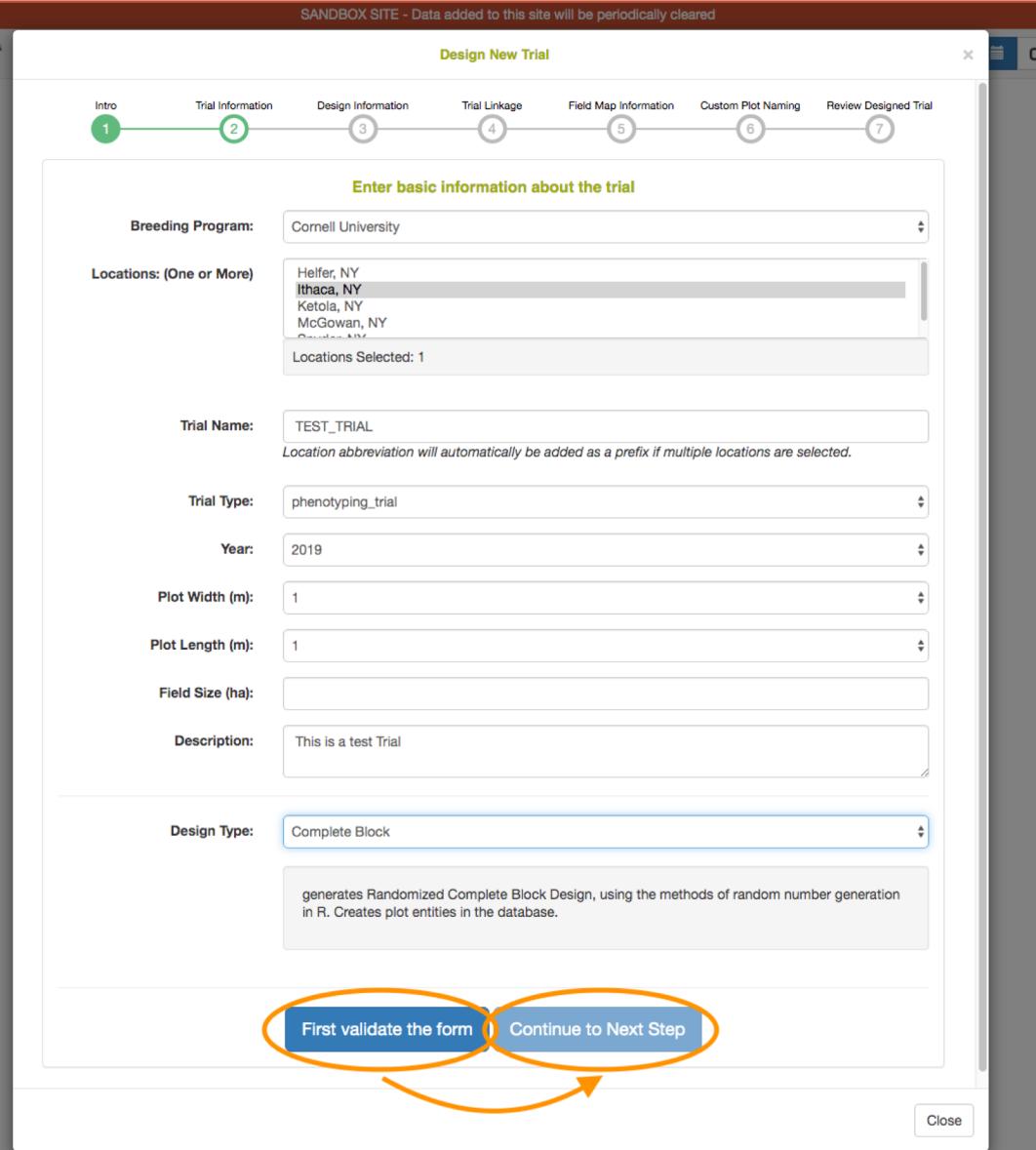
Field Size (ha):

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

Pioneer
PSB Collection



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

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

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

Genesis Seeds

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 Trial Information Design Information Trial Linkage Field Map Information Custom Plot Naming Review Designed Trial

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): Enter number of Rows

Plot layout format: Serpentine

Continue to Next Step

Close

Move folder

Gortzen

Kansas State University

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
19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54
55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72
73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90
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		

Design New Trial:

Each block is a rep

Randomly assigns entries to plots within each block / rep

Dark blue plots are checks

Close

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

37

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 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



The screenshot shows the 'Upload Data Files' section of the Phenotype Upload interface. At the top left is a cloud icon with an upward arrow. Next to it is the text 'Upload Data Files' with a yellow circle around it. Below this is a section titled 'Data Collection Files' with three subsections: 'Phenotyping Spreadsheets', 'Android Field Book Layout', and 'Data Collector Spreadsheet'. To the right of these are two buttons: 'Create Spreadsheet' (circled in yellow) and 'Create Field Book'. Below this is another section titled 'Upload Phenotyping Files' with three subsections: 'Phenotyping Spreadsheets', 'Android Field Book Exported', and 'Data Collector Spreadsheet', each with an 'Upload' button. At the bottom is a section titled 'Uploaded Phenotyping Files' with a table header row containing 'Filename', 'Date Uploaded', 'Uploaded By', 'File Type', and '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



The screenshot shows a modal window titled "Create Phenotyping Spreadsheet". It contains the following fields:

- Trial: TEST_TRIAL
- Trait List: Example Traits (highlighted with an orange arrow pointing to the text "List of Traits observed in this Trial")
- Include Notes Column:
- Spreadsheet Format: Detailed
- Data Level: Plots

At the bottom right of the modal are "Close" and "Submit" buttons.

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-SD10065-1_16			
18	Plot name: includes trial name, rep number, accession name and plot number			
19		Enter test weight here	Enter grain yield here	
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	Date	Enter date here								
4	Trial location(s)	TEST_TRIAL: Ithaca	Design Type(s)	TEST_TRIAL: RCBD								
5	Predefined Columns	I										
6												
7	plot_name	accession_name	plot_number	block_number	is_a_contr	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-		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				1		1		TEST_TRIAL			
19	TEST_TRIAL-rep1-SD13062-2_12				1		1		TEST_TRIAL			
20	TEST_TRIAL-rep1-SD110044-7_13				1		1		TEST_TRIAL			
21	TEST_TRIAL-rep1-SD12008-2_14	SD12008-2			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			

Accession
Name Plot
Number

Enter
test weight
here Enter
grain yield
here

Phenotype Upload



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

Data Files

Data Collection Files

- Phenotyping Spreadsheets
- Android Field Book Layout
- Data Collector Spreadsheet

[Create Spreadsheet](#)

[Create Field Book](#)

[Create DataCollector Spreadsheet](#)

Upload Phenotyping Files

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

Upload

Upload

Upload

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

Select Spreadsheet Format

Select your phenotyping spreadsheet

Verify **Store**

File format information
Spreadsheet Format

Spreadsheet Format: Detailed

Timestamps Included:

Data Level: Plots

Phenotype Spreadsheet: Choose File downloadjuvob.xls

Close

Upload Phenotyping Spreadsheet:

Select the format of the phenotyping spreadsheet

Choose your phenotyping spreadsheet

Verify the file

Store the observations

Phenotype Upload



Phenotype Summary Statistics

View and download uploaded phenotype data.

Download Trial Data

Raw Data Statistics

Display: Trait Values for Plots in this Trial

Show 10 entries

Search:

Trait	Mean	Min	Max	Std Dev	CV	Count	Percent Missing	His
Grain test weight g/l CO_321:0001210	711.06	706.76	716.06	1.93	0.27%	108	0%	Histogram
Grain yield kg/ha CO_321:0001218	3300.12	3296.22	3304.22	1.82	0.06%	108	0%	Histogram

Showing 1 to 2 of 2 entries

Previous 1 Next

Raw Data Histogram

Select: Grain test weight g/l|CO_321:0001210

Display: Values for Plots in this Trial

A histogram titled 'Raw Data Histogram' showing the distribution of grain test weight. The x-axis represents plot numbers from 706 to 717, and the y-axis represents frequency from 0 to 20. The distribution is highly skewed, with the highest frequency occurring at plot 709 (approx. 22), followed by plot 710 (approx. 19). Other peaks are at plots 711, 712, and 713, with frequencies around 15-17. The distribution tapers off significantly towards the right side of the chart.

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

The screenshot shows the 'Phenotype Upload Instructions' page of the Triticea Toolbox. The top navigation bar includes links for New, T3/Wheat, Search, Manage, Analyze, Maps, About, and user-specific options like dwaring87, Lists, and Calendar. The main content area has a heading 'Phenotype Upload Instructions' and a paragraph explaining the process: creating a phenotype trial and uploading results to T3. It requires creating an account and logging in. A link to contact support is provided. Below this, there are three sections: 'Breeding Program', 'Locations', and 'Accessions'. The 'Breeding Program' section states that all data is associated with a breeding program and provides steps to ensure it exists in the database. The 'Locations' section explains that trials must be linked to specific locations and provides steps to add or associate locations. The 'Accessions' section states that each accession must have its own entry in the database and match names in the trial design.

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:
 - Find the location on the map
 - Click the **Edit** link
 - 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.
 - 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>

The screenshot shows the homepage of the Trial Summary Tool. At the top, there is a navigation bar with links for 'New T3/Wheat', 'Search', 'Manage', 'Analyze' (which is highlighted with an orange circle), 'Maps', and 'About'. Below the navigation bar, there is a search bar and user account information ('dwaring87').

Select "Summarize Trials" from the Analyze Menu

Welcome to Wheat

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

The New T3 is the new version of the system, transitioning all of T3 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.

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**.

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: 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.

Select “Summarize Trials” from the “Analyze” Menu

Trial Summary Tool



Select a
List
containing
2+ Trials

Summarize trials

Choose a list of 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.

Summarize

Select the Traits to 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



LS Means for each Trait across all Trials

Trial Summary										
LS Means										
Show 10 entries		Copy	CSV	Print						
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

Separate summary table for each Trait

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

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

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?

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