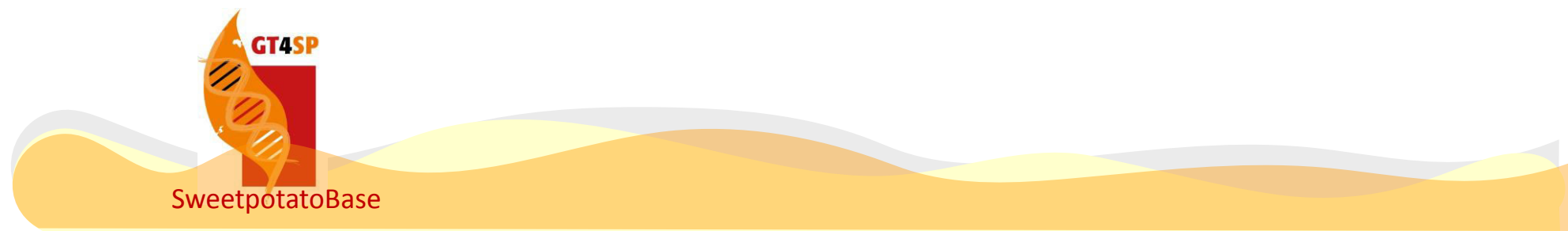


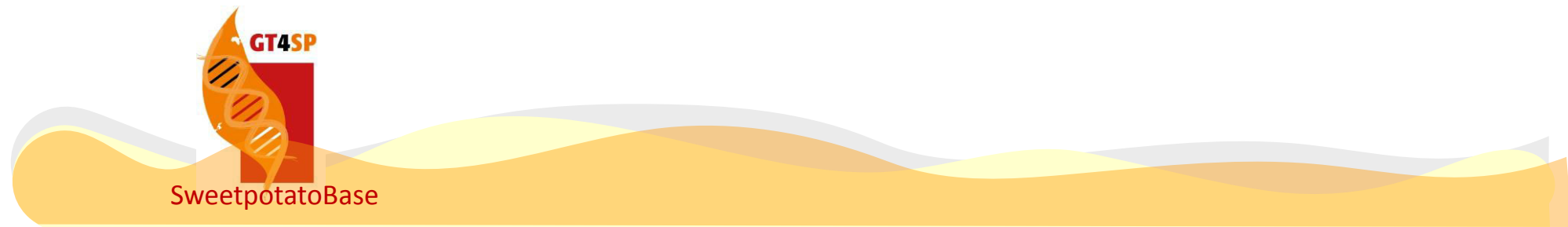
SWEETPOTATOBASE AND THE NEED OF A BREEDER IN A DATABASE

15TH SPHI Sweetpotato SpeedBreeders Annual Meeting
BecA-ILRI, Nairobi, Kenya – June, 2016



Outline

- ❖ What Breeders need in a database?
- ❖ What Sweetpotatobase offers to Breeders/Users



What Breeders Need in a Database

- ❖ A database with simple interface for data curation
- ❖ A platform with the appropriate tools that ensures data quality and integrity.
- ❖ Ensures data storage and security.
- ❖ Supports effortless data sharing and archiving.
- ❖ Supports various forms of data retrieval for analysis and decision making.
- ❖ Provides platform for Phenotypic data analysis.
- ❖ Provides valuable metadata information on accessions, trials and weather information for trial sites.
- ❖ A very intuitive and user friendly web interface or framework.



Data Curation: Managing Accessions In SPBase



SweetPotatoBase

Search

Manage

Analyze

About



Login

Accession: Beauregard

Stock details

[New QTL population](#) | [Back to stock search](#)

[\[New\]](#) [\[Edit\]](#) [\[Delete\]](#)

Organism	Ipomoea batatas
Stock type	accession
Stock name	Beauregard
Uniquename	Beauregard
Description	

SPB stock 38831 (Beauregard)



SPB38831

Stock editors: Luis Duque

Synonyms

[Additional information](#)

Add property

- ☒ variety
- ☐ donor
- ☐ donor institute
- ☐ country
- ☐ state
- ☐ adaptation
- ☐ notes

[\[Add\]](#)

[\[Add\]](#)

Data Curation: Managing Trials in SDBase

SweetPotatoBase Search Manage Analyze About

GT4SP

ogbalex

Add New Trial [X]

Trial Name:

Year(s):

Location:

Breeding Program:

Description:

Design Type:

- ✓ Completely Randomized
- Complete Block
- Alpha Lattice
- Augmented
- Modified Augmented Design

List of:

Number of Replicates (Required):

Close Add Trial

Data Quality and Integrity: SP Ontology Browser



SweetPotatoBase

Search

Manage

Analyze

About



Login

Ontology browser

Search and browse ontologies

Find exact ID

Find

clear highlight

reset view

Search for text

GO (Gene Ontology)

Search

- GO:0008150 biological_process
- GO:0003674 molecular_function
- GO:0005575 cellular_component
- PO:0025131 plant anatomical entity
- PO:0009012 plant growth and development stage
- SO:0000400 sequence_attribute
- SO:0001060 sequence_variant
- SO:0000110 sequence_feature
- SO:0001260 sequence_collection
- PATO:0000001 quality
- CO_331:0000000 CGIAR sweetpotato trait ontology
 - is_a CO_331:0000001 Agronomic trait
 - is_a CO_331:0000005 Biotic stress trait
 - is_a CO_331:1000006 Early Blight: (Alternaria) 1
 - VARIABLE_OF CO_331:2000006 Early Blight 1 symptoms estimating 1-9
 - is_a CO_331:1000007 Early Blight: (Alternaria) 2
 - is_a CO_331:1000020 Reaction to sweet potato weevil 1
 - is_a CO_331:1000033 Reaction to sweet potato weevil 2
 - is_a CO_331:1000003 Virus symptoms 1
 - is_a CO_331:1000004 Virus symptoms 2
 - is_a CO_331:1000032 Virus symptoms 3

Data Quality and Integrity : Field Book App

List Contents ×

List ID31

List name:

Type:

Add New Items:

Search:

Early Blight 1 symptoms estimating 1-9|CO_331:2000006

☒ categorical Early Blight 1 symptoms estimating 1-9|CO_331:2000006

Add trait

FormatCategorical

TraitEarly Blight 1 symptoms estimating 1-9|CO_331:2000006

DetailsOptional

Categorises1/2/3/4/5/6/7/8/9

plot_id13RPN00001

seed_nameKharkof

pedigreeKharkof

Early Blight 1 symptoms estimating 1-9|CO_331:2000006

row: 1

plot: 1

1

2

3

4

5

6

7

8

9

Data Quality and Integrity : SPBase Phenotype Upload

SweetPotatoBase Search Manage Analyze About

ogbalex

Upload Phenotype Spreadsheet

File format information
Spreadsheet Format

Timestamps Included: ☐

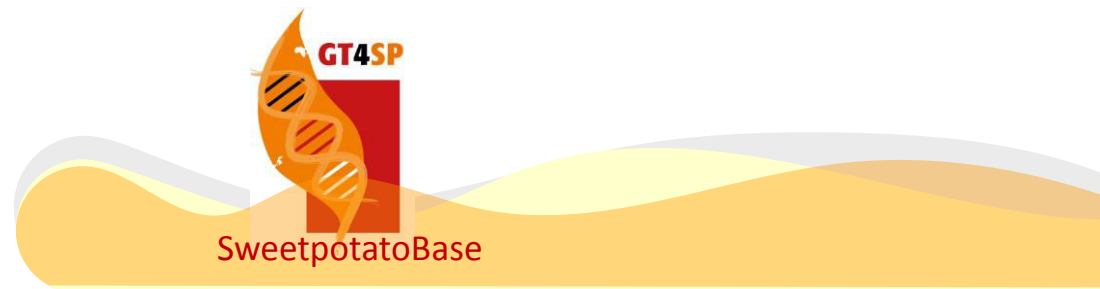
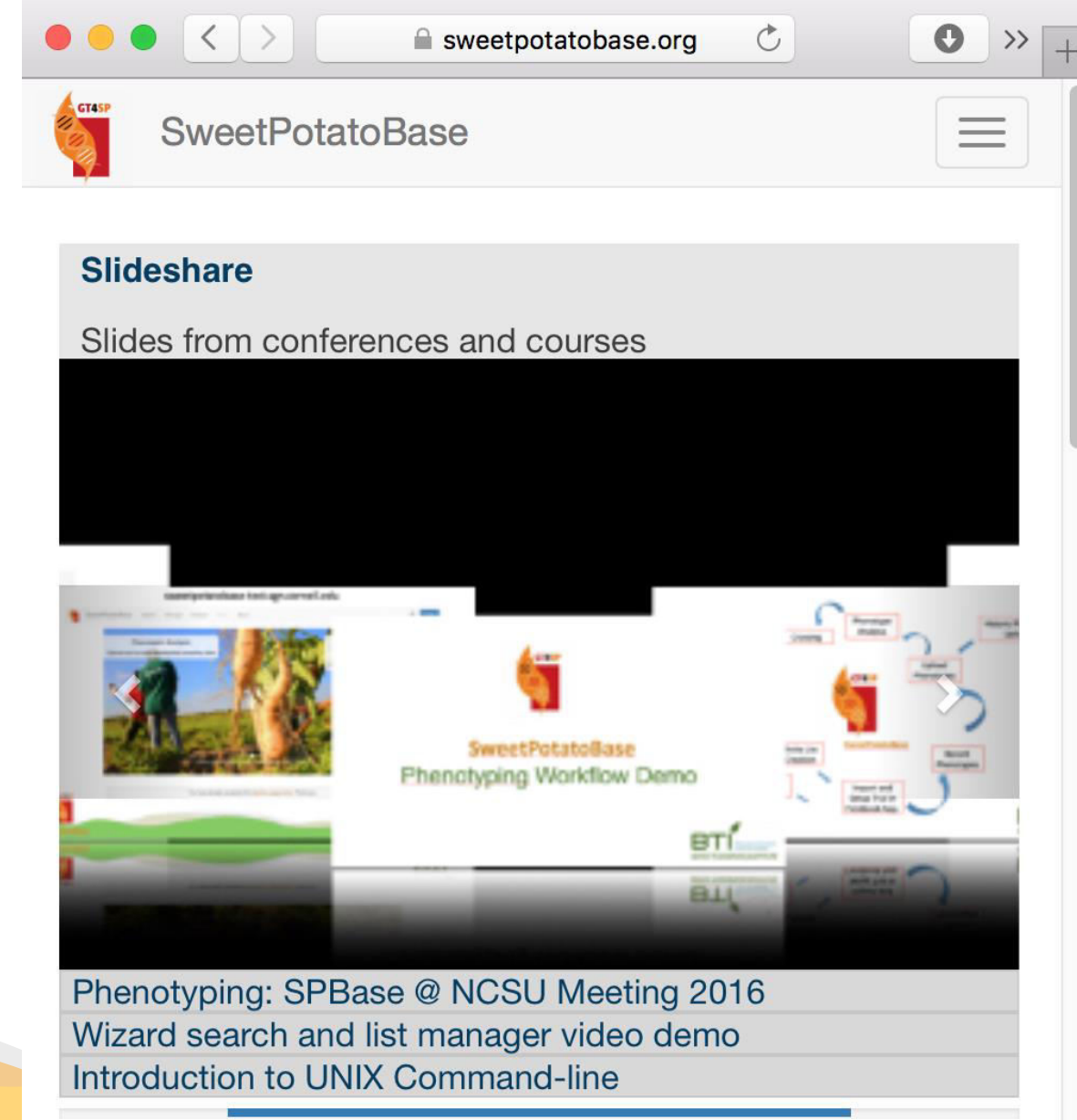
Phenotype Spreadsheet: 2016-06-01_..._pheno.xls

File 2016-06-01_14_01_59_50_15AYT7SPimprovNAM_pheno.xls saved in archive. ✓

File valid: 2016-06-01_14_01_59_50_15AYT7SPimprovNAM_pheno.xls. ✓

Data Security, Sharing and Archiving

- ❖ Data are protection from unauthorized access, use, change and destruction
- ❖ SPBase is open to any registered user
- ❖ Network is secured
- ❖ Backups and storage
- ❖ Data sets are easily archived
- ❖ Supports file formats such as xls, csv, txt and others
- ❖ Acknowledges ownership



Phenotypic Data Analysis: SPBase Raw Data Statistics



⊖ Traits assayed

Download trial data [xls] [csv]

Raw Data Statistics

Show 10 entries

Search:

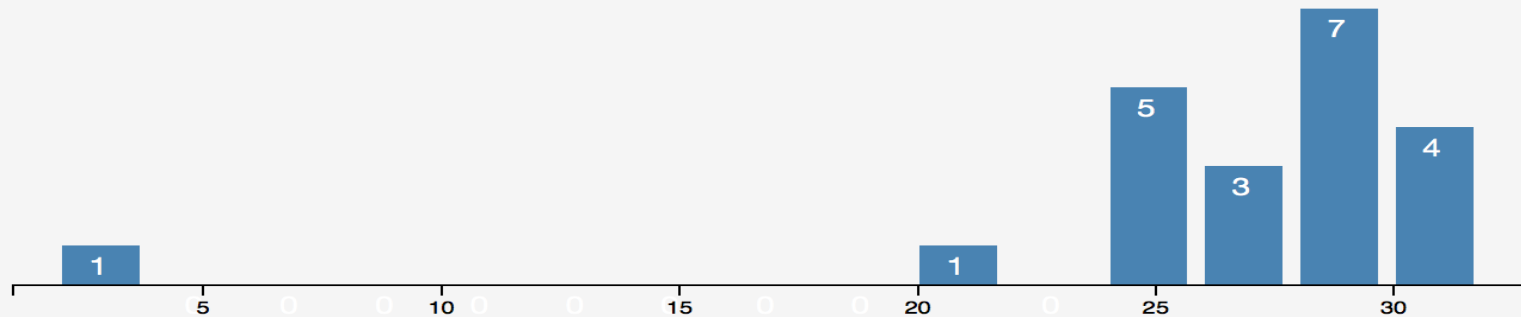
Trait	Average	Min	Max	Std Dev	Count	More Info
Dry weight of vines measuring g of sample	0.013	0.003	0.027	0.007	21	
Number of commercial storage roots counting number per plot	5.905	0.000	24.000	6.848	21	

Raw Data Histogram

Select:

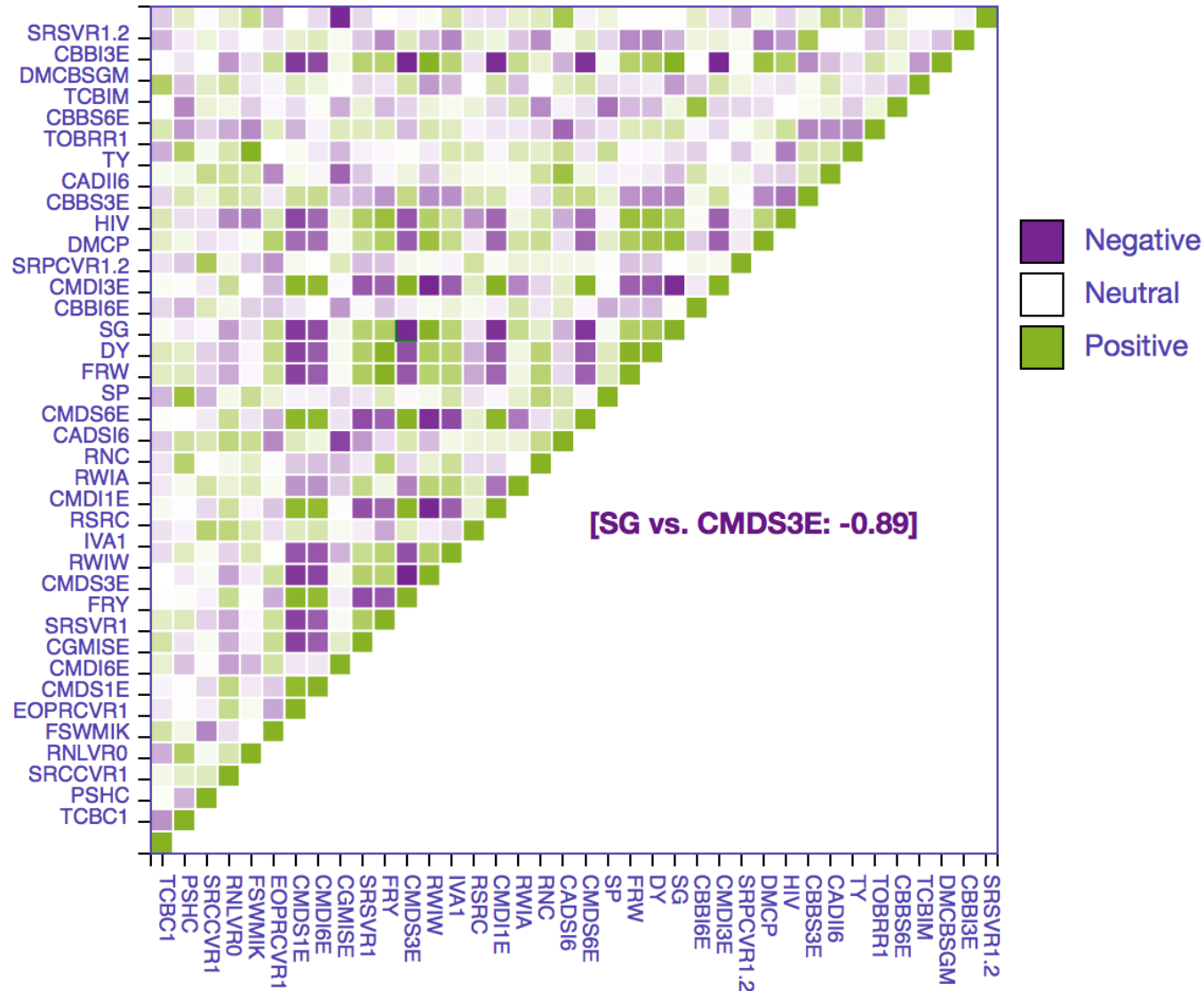
Plants harvested counting number per plot

Definition



Phenotypic Data Analysis: SPBase Correlation Analysis

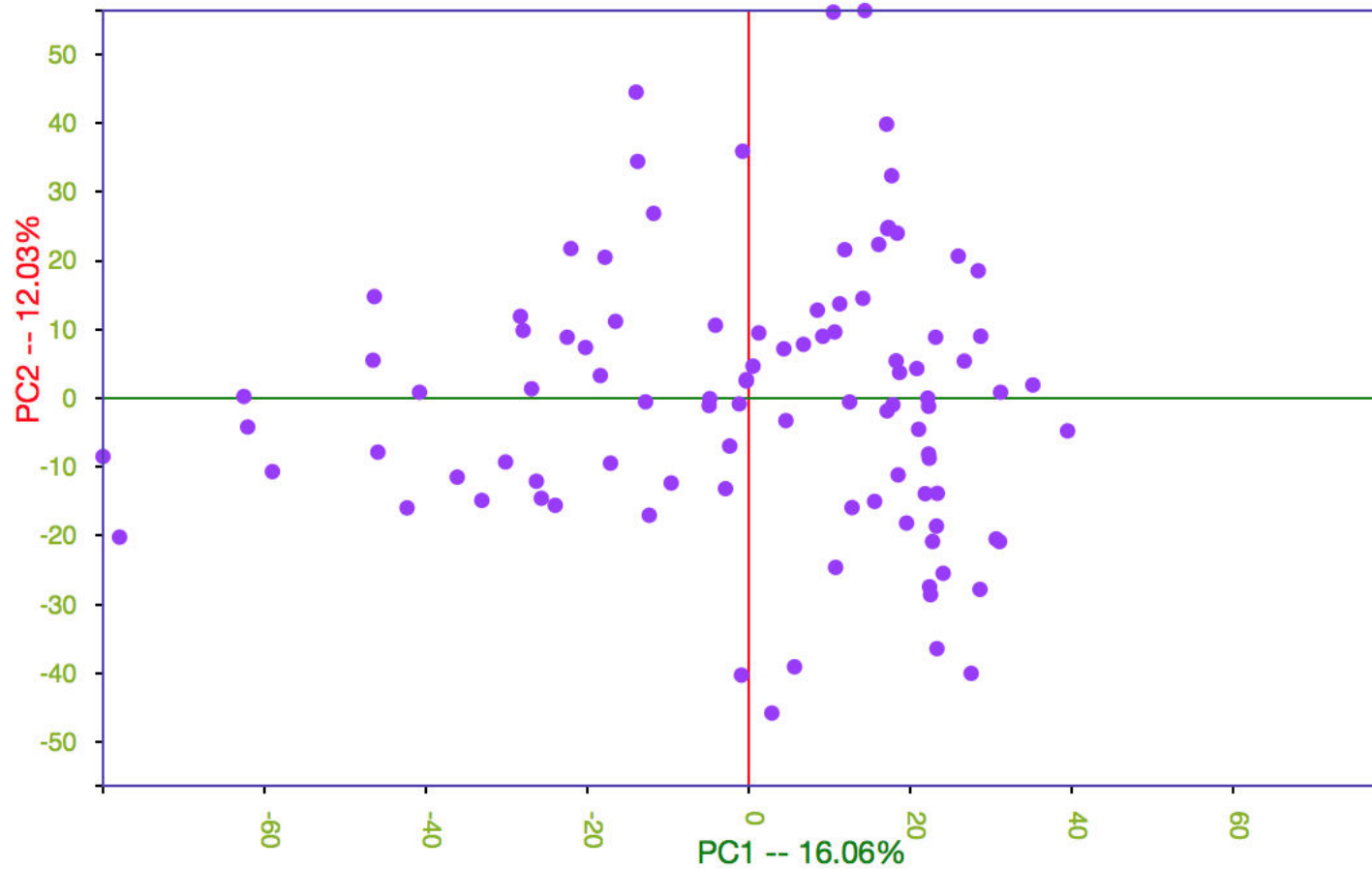
Phenotypic correlation analysis



[Download correlation coefficients]

Phenotypic Data Analysis: SPBase Pop. Structure Analysis

Population structure analysis - PCA



[Download PCA scores]

Phenotypic Data Analysis: HIDAP



SweetPotatoBase

Search

Manage

Analyze

About



ogbalex



Trial detail for 15HealthStatus5(OP/NET)FU

+ Trial details

Folder

[New Folder] | [Change]

CSIR-CRI

- HIDAP Trial Analysis

Phenotype Plot
Map



Phenotype
Correlation



Analysis Report



+ Physical Trial Layout

[Upload trial coordinates]



SweetpotatoBase

Meta Data Information: Accessions

Accession: **Tanzania**

Stock details

[New QTL population](#) | [Back to stock search](#)

[\[New\]](#) [\[Edit\]](#) [\[Delete\]](#)

Organism	Ipomoea batatas
Stock type	accession
Stock name	Tanzania
Uniquename	Tanzania
Description	

SPB stock 42728 (Tanzania)



SPB42728

Stock editors: **spb user35**

Synonyms

[\[Add...\]](#)

+ Additional information

[\[Add...\]](#)

+ Associated loci (0)

+ Experimental data

Stock history

None

Pedigree

[\[Add parent \]](#) [\[Remove parent \]](#)

+ Descendants

Pedigree string

Meta Data Information: Field Trials



SweetPotatoBase

Search

Manage

Analyze

About



ogbalex



Trial detail for 15AT7pokuase

+ Trial details

Folder

[New Folder] | [Change]

CSIR-CRI

+ Physical Trial Layout

[Upload trial coordinates]

+ Design

Download layout [xls] [csv]

+ Traits assayed

Download trial data [xls] [csv]

+ Trial JBrowse

+ Files

+ Data Agreement

[Add/edit data agreement]

+ Delete trial data

Deletion cannot be undone

+ Phenotypic correlation analysis

+ Population structure analysis - PCA

Meta Data Information: Site Weather

RTRbase



Weather Database

weather.rtbbase.org

Options

Select a location:

Namulonge

Select a date range (defaults to latest month available
for the selected options):

2015-11-18 - 2015-12-17

Select data types:

Day Length
Dew Point
Intensity
Precipitation
Relative Humidity
Temperature

Select measurement type:

Daily averages

Hourly averages

Individual values

Select All

Submit

Tables

Summary

Raw Data

Copy

CSV

Print

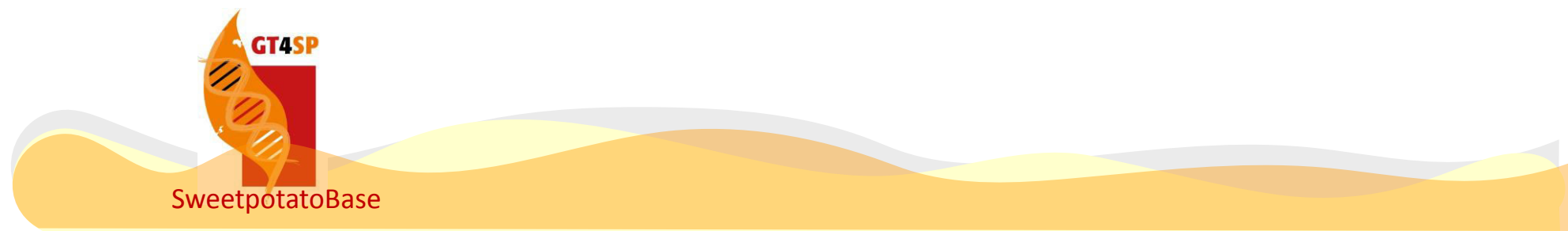
Search:

Data

Std

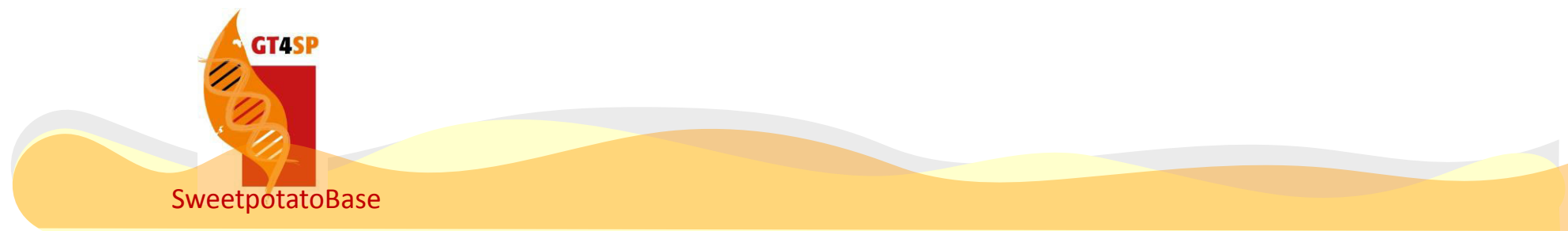
Total

Demo by Bryan

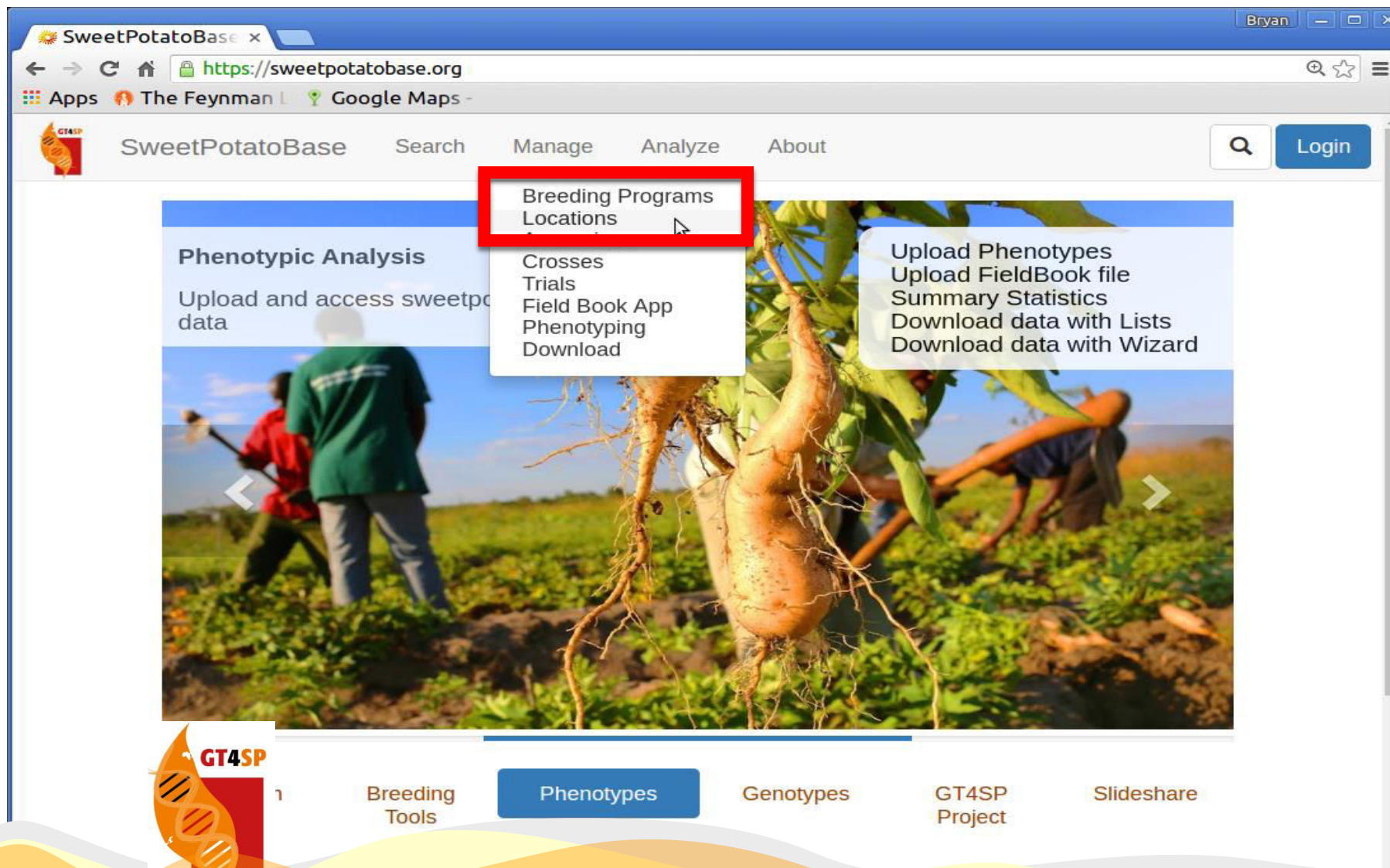


Demonstration workflow

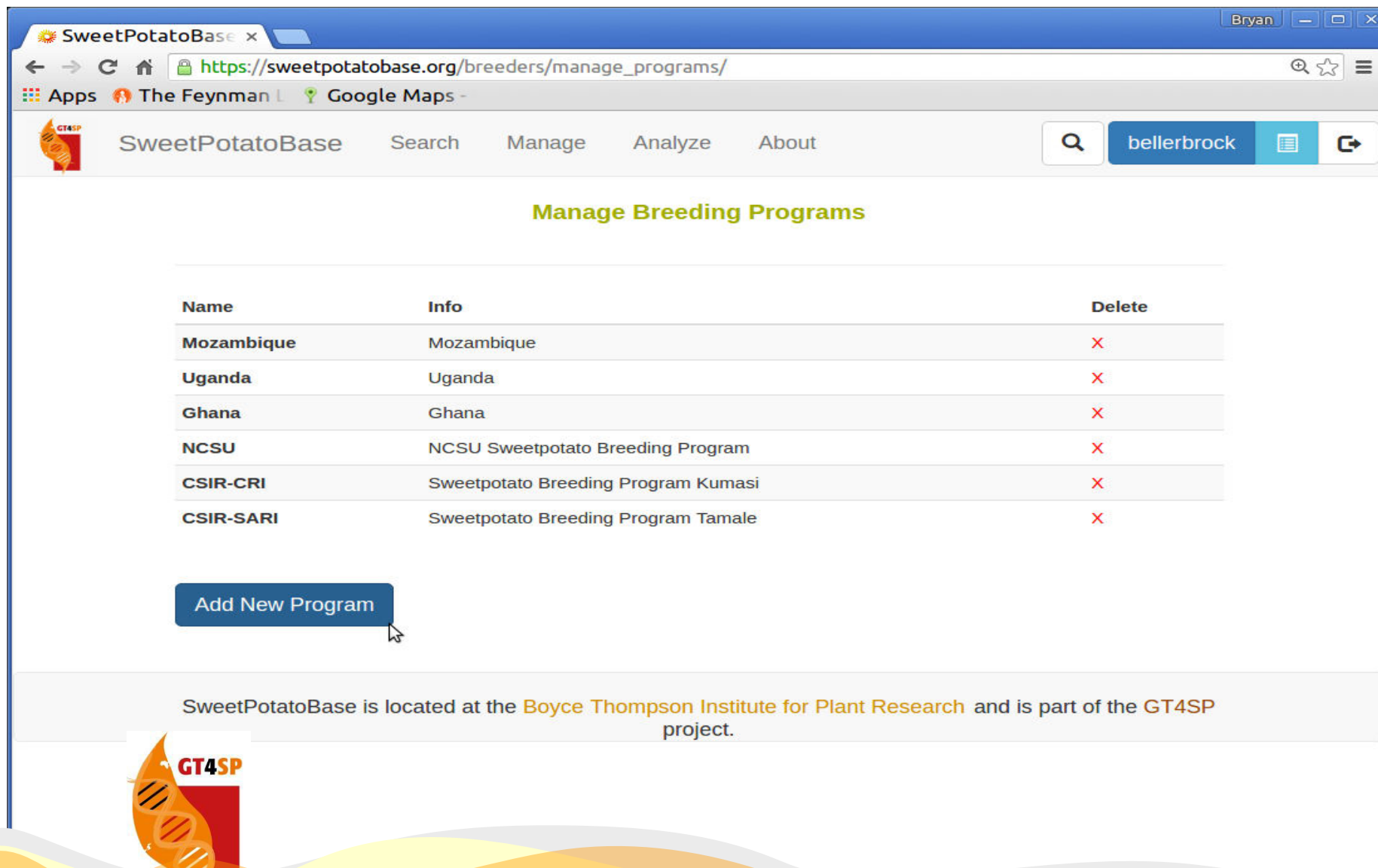
- ❖ Managing Breeding Programs and Locations
- ❖ Managing Accessions and the List Manager
- ❖ Managing Trials and Phenotyping



Managing Breeding Programs and Locations



Managing Breeding Programs



The screenshot shows a web browser window with the URL https://sweetpotatobase.org/breeders/manage_programs/. The page title is "Manage Breeding Programs". Below the title is a table with three columns: "Name", "Info", and "Delete". The table lists six breeding programs. Below the table is a blue button labeled "Add New Program". At the bottom of the page, there is a footer text: "SweetPotatoBase is located at the Boyce Thompson Institute for Plant Research and is part of the GT4SP project." The GT4SP logo is also visible in the bottom left corner of the page.

Name	Info	Delete
Mozambique	Mozambique	X
Uganda	Uganda	X
Ghana	Ghana	X
NCSU	NCSU Sweetpotato Breeding Program	X
CSIR-CRI	Sweetpotato Breeding Program Kumasi	X
CSIR-SARI	Sweetpotato Breeding Program Tamale	X

[Add New Program](#)

SweetPotatoBase is located at the Boyce Thompson Institute for Plant Research and is part of the GT4SP project.



Managing Locations

The screenshot shows the SweetPotatoBase web application interface. The browser address bar displays the URL <https://sweetpotatobase.org/breeders/locations>. The application header includes the SweetPotatoBase logo, navigation links (Search, Manage, Analyze, About), a search bar containing 'bellerbrock', and a user profile icon labeled 'Bryan'.

The main content area is titled 'Manage Locations' and features a sidebar with a 'Locations' toggle. The main panel displays three location categories, each with a table of specific locations and their trial counts.

CSIR-CRI

Location	Count
Pokuase	(1 trials)
Fumesua, Ghana	(2 trials)

CSIR-SARI

Location	Count
Tono, Ghana	(2 trials)
Wa, Ghana	(3 trials)
Nyankpala, Ghana	(3 trials)

Ghana

Location	Count
Manga-Bawku, Ghana	(1 trials)
Fumesua, Ghana	(1 trials)
Tono, Ghana	(1 trials)

An [Add Location](#) link is located in the top right corner of the CSIR-CRI section.

Managing Accessions and the List Manager

The screenshot shows the SweetPotatoBase web application interface. The browser address bar displays <https://sweetpotatobase.org/breeders/locations>. The user is logged in as 'Bryan'. The navigation bar includes 'SweetPotatoBase', 'Search', 'Manage', 'Analyze', and 'About'. A search bar contains the text 'bellerbrock'. A dropdown menu is open, showing options: 'Breeding Programs', 'Locations', 'Accessions' (highlighted with a red box), 'Trials', 'Field Book App', 'Phenotyping', and 'Download'. The main content area displays a list of locations under the heading 'Locations'. The locations are grouped into sections: 'CSIR-CRI', 'CSIR-SARI', and 'GT4SP'. Each section has a table of locations and their trial counts.

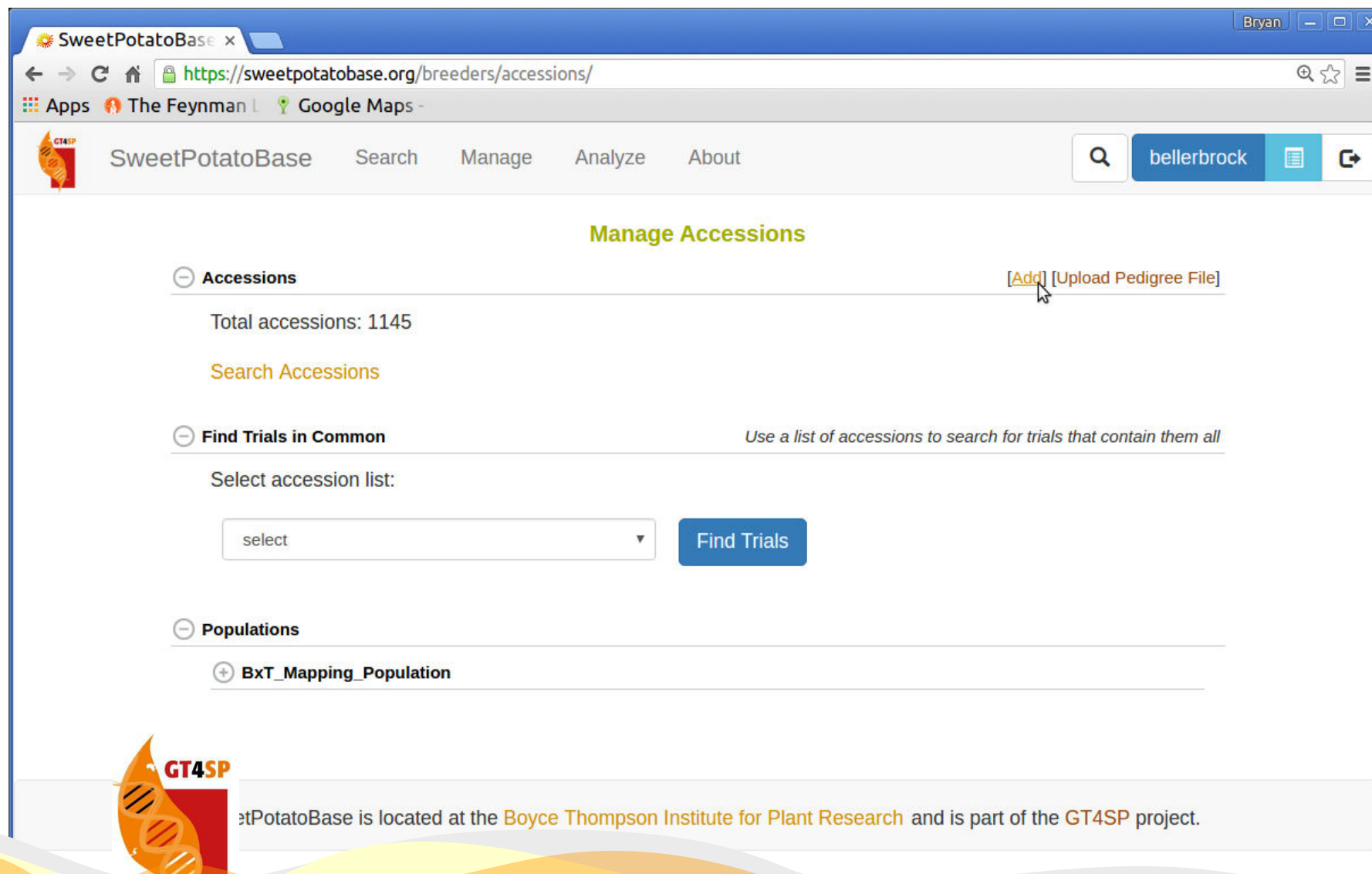
Location	Count
Pokuase	(1 trials)
Fumesua, Ghana	(2 trials)

Location	Count
Tono, Ghana	(2 trials)
Wa, Ghana	(3 trials)
Nyankpala, Ghana	(3 trials)

Location	Count
Bawku, Ghana	(1 trials)

SweetpotatoBase

Managing Accession



The screenshot shows a web browser window with the URL <https://sweetpotatobase.org/breeders/accessions/>. The page title is "SweetPotatoBase" and the navigation bar includes links for "Search", "Manage", "Analyze", and "About". A search bar contains the text "bellerbrock".

The main content area is titled "Manage Accessions" and features three expandable sections:

- Accessions**: Shows "Total accessions: 1145" and a link to "Search Accessions". It also includes links for "[Add]" and "[Upload Pedigree File]".
- Find Trials in Common**: Includes the instruction "Use a list of accessions to search for trials that contain them all". It has a "Select accession list:" dropdown menu with "select" as the current selection and a "Find Trials" button.
- Populations**: Includes a link for "BxT_Mapping_Population".



SweetPotatoBase is located at the Boyce Thompson Institute for Plant Research and is part of the GT4SP project.

The List Manager

The screenshot shows the SweetPotatoBase web application interface. A modal window titled "Available Lists" is open, allowing users to manage their lists. The modal includes a search bar, a "New List" button, and a table of existing lists.

List Name	Count	Type	Actions
<input type="checkbox"/> early_traits	3	traits	
<input type="checkbox"/> post_harvest_traits	5	traits	

Buttons at the bottom of the modal: View Public Lists, Close.



Managing Trials and Phenotyping

The screenshot shows the SweetPotatoBase website interface. The browser address bar displays <https://sweetpotatobase.org/breeders/accessions/>. The website header includes the SweetPotatoBase logo, navigation links (Search, Manage, Analyze, About), a search bar with the text 'bellerbrock', and a user profile 'Bryan'. A dropdown menu is open under the 'Manage' link, with the 'Trials' option highlighted by a red rectangle. The main content area features a section titled 'Accessions' with a sub-header 'Total accessions: 1145' and a 'Search Accessions' button. Below this is a 'Find Trials in Common' section with a description 'Use a list of accessions to search for trials that contain them all' and a 'Find Trials' button. The 'Populations' section is also visible, showing a '+ BxT_Mapping_Population' link. The footer contains the GT4SP logo and text stating 'SweetPotatoBase is located at the Boyce Thompson Institute for Plant Research and is part of the GT4SP project.'



Managing Trials

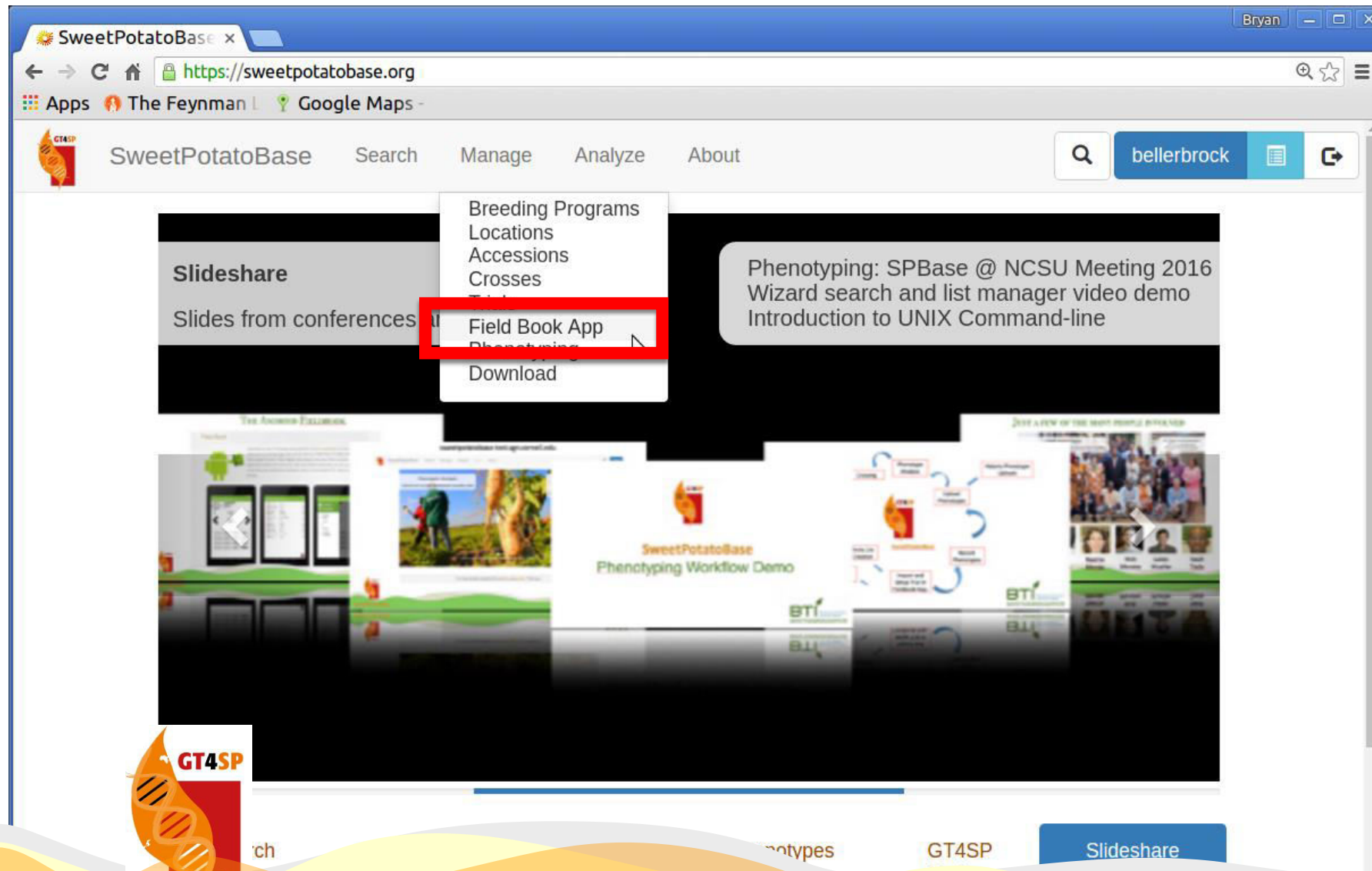
Managing Trials

The screenshot shows the SweetPotatoBase web application interface. The browser address bar displays the URL <https://sweetpotatobase.org/breeders/trial/151?format=>. The page features a navigation bar with links for Search, Manage, Analyze, and About. A search bar contains the text "bellerbrock". A central modal window displays the word "Working" in green and a loading spinner. The main content area lists various trial management options: "Accessions", "Controls", "Plots", "Traits assayed", "Trial JBrowse" (with a note "No Jbrowse instance found for this trial."), and "Files". Under the "Files" section, there is a table with columns for "Phenotyping Spreadsheets", "Android Field Book Layout", and "Data Collector Spreadsheet". The "Create Field Book" link is highlighted with a red box. Other links include "Download trial data [xls] [csv]", "[Create Spreadsheet]", "[Create Data Collector Spreadsheet]", and "[Upload]".

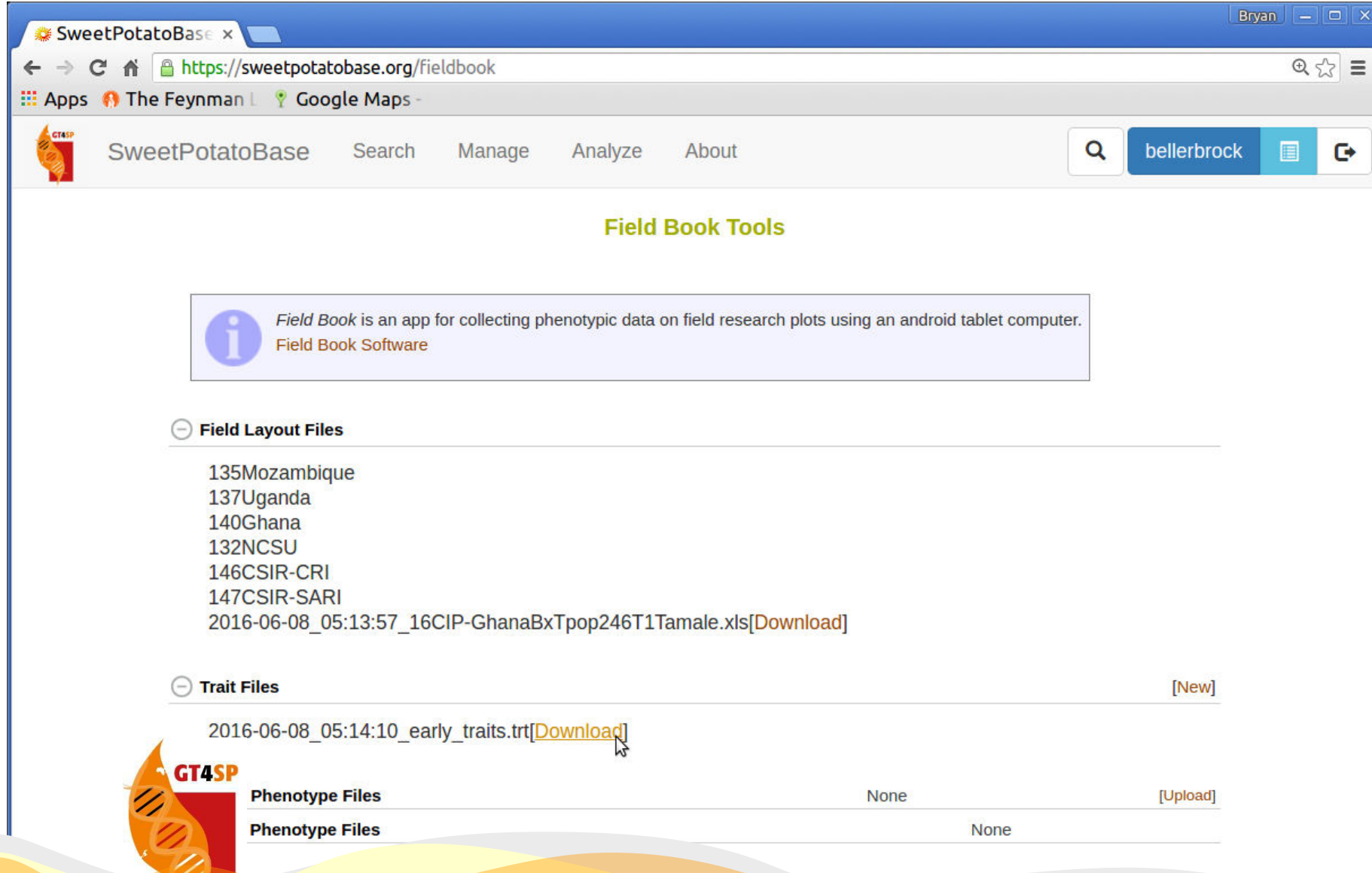
Phenotyping Spreadsheets	Android Field Book Layout	Data Collector Spreadsheet
None	None	None
[Create Spreadsheet]	[Create Field Book]	[Create Data Collector Spreadsheet]



Phenotyping: FieldBook App



Phenotyping: FieldBook App



The screenshot shows a web browser window with the address bar displaying <https://sweetpotatobase.org/fieldbook>. The page title is "SweetPotatoBase" and the navigation menu includes "Search", "Manage", "Analyze", and "About". A search bar contains the text "bellerbrock".

The main content area is titled "Field Book Tools". Below this title is an information box that reads: "Field Book is an app for collecting phenotypic data on field research plots using an android tablet computer. Field Book Software".

Under the "Field Layout Files" section, there is a list of files:

- 135Mozambique
- 137Uganda
- 140Ghana
- 132NCSU
- 146CSIR-CRI
- 147CSIR-SARI
- 2016-06-08_05:13:57_16CIP-GhanaBxTpop246T1Tamale.xls[Download]

Under the "Trait Files" section, there is a list of files:

- 2016-06-08_05:14:10_early_traits.trt[Download]

At the bottom of the page, there is a section for "Phenotype Files" with a table:

Phenotype Files	None	[Upload]
Phenotype Files	None	



Just a few of the many people involved



Guillaume
Bauchet



Alex
Ogonna



Naama
Menda



Nick
Morales



Lukas
Mueller



Isaak
Tecle