

**A Training Manual for Trainee on Knowledge
Management
On Electronic Data Capturing**

Volume 5

By

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Electronic Data Capturing

A Training Manual

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1. Introduction

Challenges in data collection in hard copies and handling are time taking and inefficient, highly prone to hand writing errors, takes time to type into computers with high potential unreadable and confusing hand-written data, delays reporting, difficult to get data from collaborating centres, etc

Electronic data capture and management is fundamental to modern day plant breeding and other research areas focused on data (processing system) specially data collection as it allows an increased scale and efficiency, reduced error and better use of information.

Problems in our current using electronic data collection are turnover of trained researcher, electronic data capture gadgets (tablets) in hand of individual or not used in team, merging problem due to not well-prepared data sheet (filed book) format, missing Kombine path (missed up of Kombine configuration), debugging related issues of the android enabled devices, etc. Data scoring problems due to not checking after merging, not merging regularly after collecting data, missing use of validation rule, etc.

Fieldscore – an android-based mobile program should install into tablets or mobiles that run android OS enables electronic data capture. A CSV (Comma Separated Value) data sheet (Filed book) prepared in computer is imported into the android device or merged using a software program Kombine. Scored data should later merged back to the computer by using Kombine program and synchronize into the computer.

Fieldscorer4Android is an application for collecting trait data in fields using a device running an Android operating system and the version of the OS should be higher than 2.2. This manual is prepared to give intention to use it under different circumstances. Fieldscorer is highly customizable to use as our need and the objective of the data we need to collect. The only thing we should remind to use it is the data sheet or the filed book that we merge or import to Fieldscorer should have a valid format as per mentioned in the manual for filed book preparation. As far as research institutions, Universities, Training centres (such as FTCs), NGOs focused on researchable areas and data collection, organizations having surveying issues and others can use it.

2. Fieldscorer Installation

Minimum Requirements

Android 2.2

Device screen size 3.7 inches or larger (may work on smaller screens)

The APK file

To install Fieldscorer4Android, either [download](#) the APK file using the device, or download it from another device and copy it to the android device. Installing Fieldscorer on a device also can be by using Kombine (Recommended).

Once the APK file is on the device open the APK file using a file manager application. If a file manager is not on your device, there are plenty of free ones available. You will need to ensure that the "Unknown Sources" option must be checked in the devices security settings to install the software, which are out of the manufacturer permission set to the device. This option can be disabled once the application is installed.

The following instructions are based on the Lenovo tablet, but should be similar for most modern android devices.

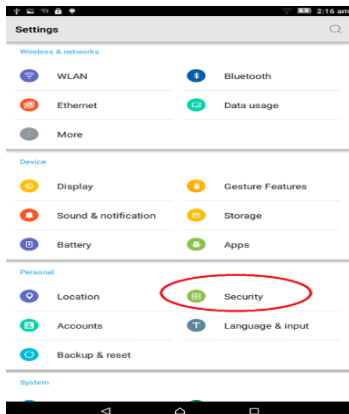
Turn on Unknown sources (Required to install .apk files)

Select Settings

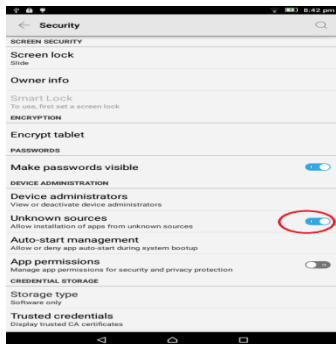


Turn on Unknown sources

Select Security



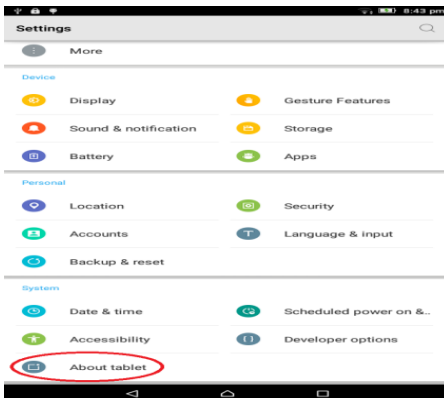
Turn on Unknown sources



USB Debugging Mode

Return to settings

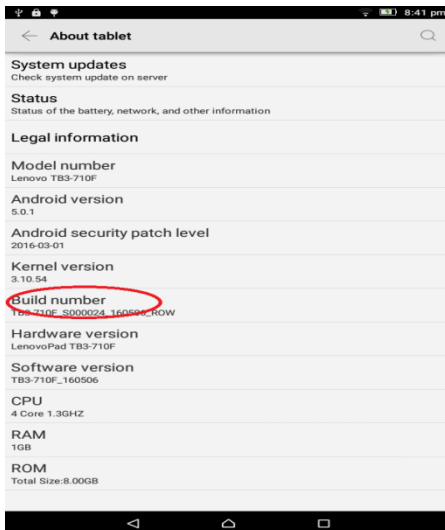
Select About tablet



NB. Only do this if Developer options is not visible

USB Debugging Mode

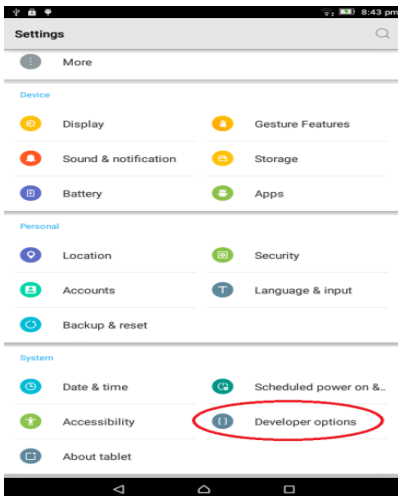
Press Build number 7 times



USB Debugging Mode

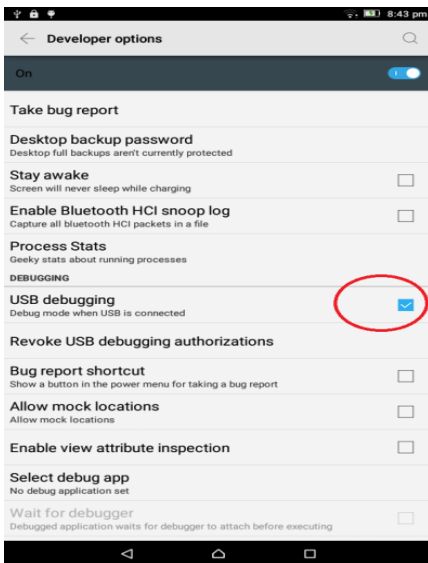
Return to settings

Select Developer options



USB Debugging Mode

Enable USB debugging



2.1. Installing Fieldscorer using Kombine

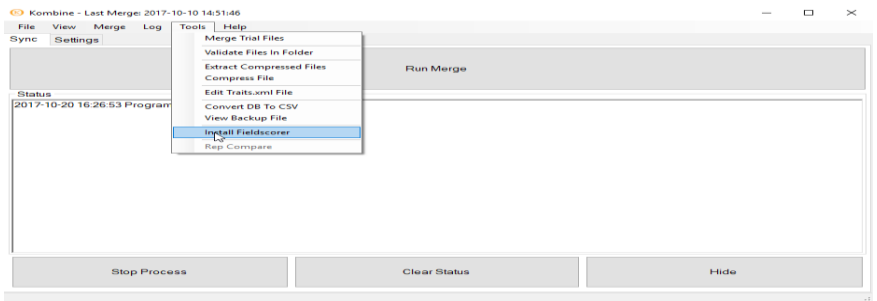
Using Kombine

Must be version 2.0.5.0 or later

Make sure device is accessible from PC and running the “adb” driver is running.

Run Kombine

Tools -> Install Fieldscorer

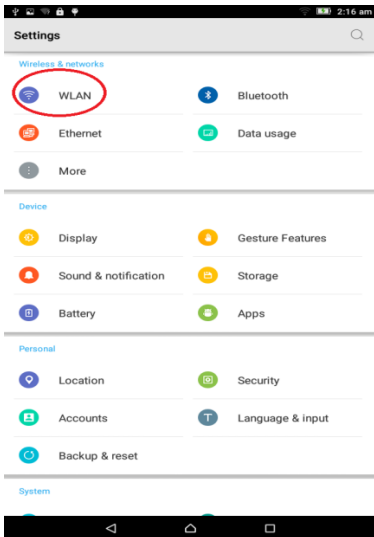


2.2. Download the .apk file

Return to settings

Select WLAN

Connect to WiFi

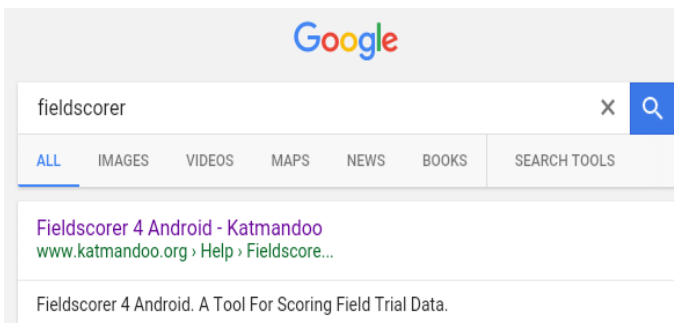


Download the .apk file

Return to home screen

Open Chrome browser

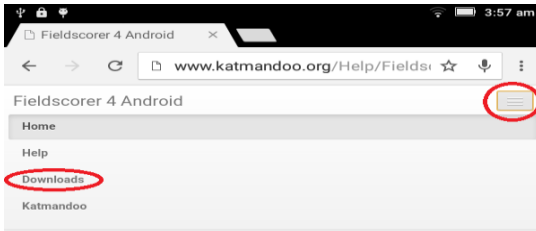
Search “Fieldscorer”



Download the .apk file

Select the navigation button

Select Downloads



Fieldscore 4 Android

Fieldscore 4 Android is an application for collecting trait data in field trials using an Android™ device in a simplistic way.

Development and support of the application is by the Department of Agriculture and Fisheries in Queensland.

Fieldscore 4 Android is the Android™ version of an application(Fieldscore) which has been used for field data capture within the department for more than 10 years.

FS4A:AndroidDemo.csv

Column	Row	Replicate	Plot
1	1	1	Ch11

G10
G0011/G09001

DTF LDG

Comment

1	2	3	>
4	5	6	Tab
7	8	9	> []
0			

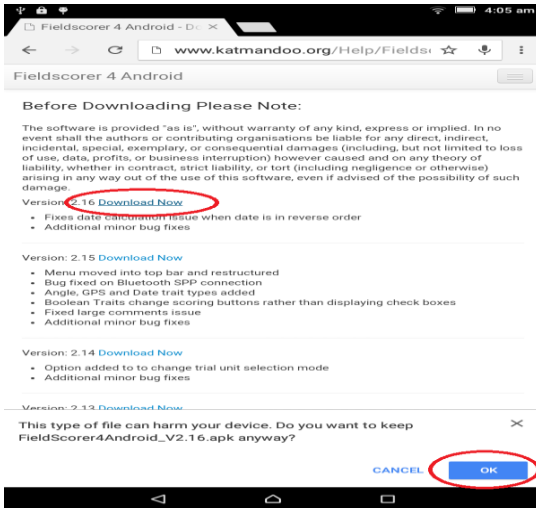
Download the .apk file

Download the latest version

Press OK on the popup

Download icon will appear

NB. Android 6 & 7 devices may require installation of 2.14 prior to 2.16 to enable permissions during installation



Install the .apk file

Return to home screen

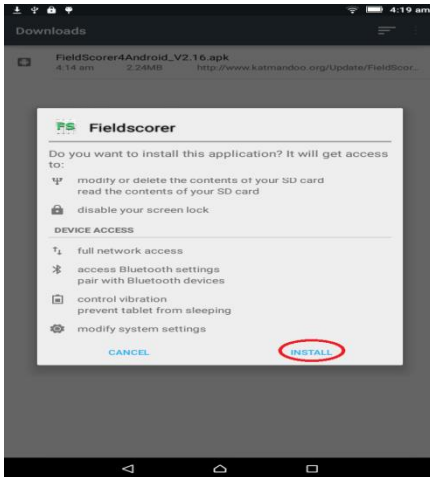
Open Downloads

Select the Fieldscorer file

Install the .apk file

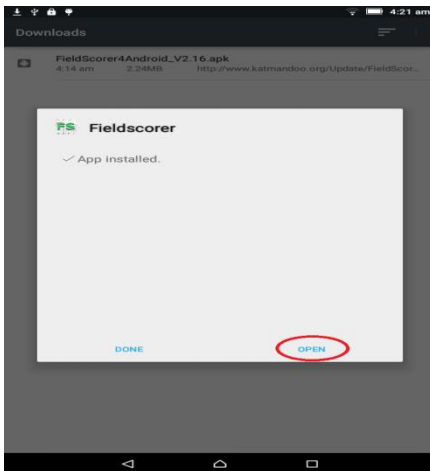
Select Next or scroll down

Select Install



Install the .apk file

Select Open

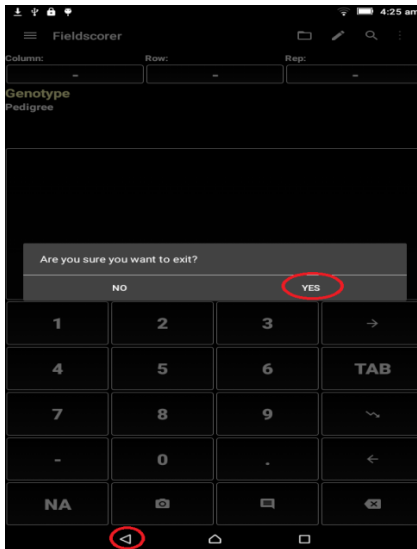


Exit Fieldscorer

Press back

Select YES

NB. Fieldscorer must be opened once to create a blank database file for Kombine



2.3. Manual Installation

Requires a file browser (eg. Amaze from the google play store)

Connect the tablet to a PC

Copy the file to the device

Open file browser on the tablet

Find the apk file

Click the apk file to install

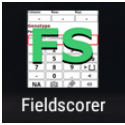
Creating a shortcut

Press the Apps Button

Creating a shortcut

Press the Apps Button

Press and hold Icon



Creating a shortcut

Press the Apps Button

Press and hold Icon

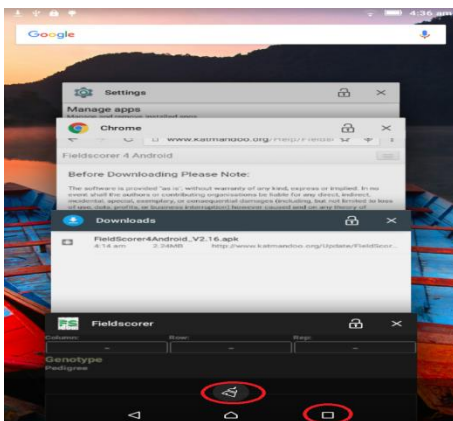
Place the icon



Cleaning up

Press the Overview Button

Close Apps using broom icon



Once installed the Fieldscorer Application Icon will appear under Apps.

Screen layouts

Fieldscorer 4 Android has support for most screen layouts. Functionality is the same between layouts, but the position of controls varies, to ensure that the soft input keyboard can still be used for various layouts. Due to the large number of screen sizes available for Android we cannot test layouts on all devices.

A **portrait** and **landscape** layout are offered for various screen sizes. The layout will lock when Fieldscorer is opened. It is recommended that you lock the screen orientation of the device before using Fieldscorer.

Portrait Layout

The portrait layout is the default option for scoring on most devices.

FS4A:AndroidDemo.csv			
Column	Row	Replicate	Plot
1	1	1	Ch11

G10
G0011/G09001
DTF LDG

Comment

1	2	3	>
4	5	6	Tab
7	8	9	> []
-	0	.	<
NA			

Landscape Layout

The landscape layout can be run by opening Fieldscorer with the device in the landscape mode

FS4A:AndroidDemo.csv					
Column	Row	Replicate	Plot		
1	1	1	Ch11 Hrs 1-1		

G10
G0011/G09001
DTF DTF-SEG T F GR

Comment

1	2	3	-	<	>
4	5	6	.	Tab	> []
7	8	9	0	NA	

Unit Position Buttons

The Unit Position buttons allow quick jumping to plots within the current trial.

Column and Row indicate positions within the trial grid. Pressing the button will bring up a list of all available column or row positions. Selecting one of these positions will jump to the corresponding row and column number in the trial.

The Replicate button allows a user to jump quickly to a different replicate plot of the current genotype. The Replicate button is only visible if a replicate column exists in the current trial.

The barcode control can be used to jump to a different plot by either entering a plot barcode or scanning using the devices built in camera or a connected barcode scanner. This option can be enabled under the Barcode Options Menu

Column	Row	Replicate	Plot
1	1	1	Ch11 Hrs

Genotype and Pedigree Display

The Genotype and Pedigree display shows the Genotype and Pedigree for the current plot. If the detail is too long then the text can be scrolled. A long press of the text will bring up a window with the full name.

G10

G0011/G09001

Trait Scoring

Depending on the trait settings, the display for trait input can be quite different.

Boolean traits have two checkboxes for True and False with an empty score for either true or false.

The default trait box has a single text box, which will allow for any input.

Days Calculation Traits have 2 boxes, an offset box and a score value box. The offset is used to calculate the difference between today and a particular date, such as the date sown, the first of January or the date of emergence. eg. if Scoring Days to Flower and the plant flowered yesterday, the user would enter -1 into the offset box.

Comma separated validation traits display as a single textbox with the scoring buttons changing to fit.

DTF	DTF-SEG	GR
<input type="text" value="+-"/>	<input type="text"/> <input type="checkbox"/> T <input type="checkbox"/> F	<input type="text"/>

Trial Unit Comment

The trial unit comment (plot comment) is designed for generic comments about a plot. When selected, on most devices the selection of this box will bring up soft input keyboard on the device. NB. These comments will not be date stamped

Comment

Scoring Buttons

The scoring button panel default is 0-9, minus, period and NA. NB. NA is a standard scoring value for scoring a missing plot and is ignored by validation.

Long pressing these buttons allows the ability to temporary change the input value. Restarting the application will reset the scoring buttons to the standard defaults. When scoring a trait with a comma separated validation the default scoring buttons will be replaced by the comma separated list.

1	2	3
4	5	6
7	8	9
-	0	.

Next Plot Button

This button will jump to the next plot in the walking path sequence order

Tab Button

This button will jump to the next trait in order. If Auto-Progress Trial unit is selected, the tab button will jump to the next trait once after the final trait is reached

Next Blank Button

This button will jump to the next plot in sequence where the currently selected trait has no value. This feature is commonly used for traits that are scored over a period rather than all at once e.g. days to flower.

Previous Plot Button

This button will jump to the previous plot in the walking path sequence order

Backspace Button

The backspace button will remove text from the currently selected trait

Camera Button

Take a photo of the current plot to store as a Trial Unit Image, or view the Trial Unit Information dialog (with images) if a photo has been taken.

Multiple photos of the same plot are given unique names with the file names being stored in a semi-colon separated list in the database.

Comments Button

The comments button opens up a dialog for viewing large comments, which can be used to quickly select previous comments from a unique list of all comments previously recorded for the current file.

File Menu

Import - Open import dialog to import a CSV trial file into the database.

Save As - Export the current trial file with a different file name.

Open - Open a trial file that has been imported into the database.

Check for Updates - Check if an updated version of Fieldscorer exists. If a new version exists, a dialog will prompt user to download and install.

Help - Open this help documentation through a web browser.

About - View version and licensing information.

Exit - Close down the trial and exit the application.

Trial

Trial Unit Information - Display plot information including plot images.

Export Trials - Bulk Export database trials to CSV overwriting the files with the same filename.

Delete Trials - Remove a trial from the database. N.b. Please ensure you have exported your trial file or backed up your database before deleting trials.

Search Trial - Search the trial using a single condition based on any column within the file

Trial Progress Map - Display which plots have a particular trait scored using the trial grid.

Preview Trial - Display a grid with all data from the current trial file as it will appear when exported to CSV.

Traits

Open the [traits dialog](#) to select traits for scoring

Database

Backup Database - Copy database file to another location

Restore Database - Overwrite database with a backup version

Options

Walking Path

Serpentine column by row

Sort scoring sequence to go along the column and back the next

Serpentine row by column

Sort scoring sequence to go along the row and back the next

Column by row

Sort scoring sequence to go along columns

Row by column

Sort scoring sequence to go along rows

Original file order

Use the original import file order to sort the scoring sequence

Sort by column and row only

Check this if scoring across multiple adjoining trials (or trial types) at once

Progression

Auto progress traits

If Auto Progress Length is set for the trait, scoring of a trait will automatically select the next trait in sequence once the character length is reached.

Auto progress trial unit

Jump to the next plot after the last trait box in sequence.

Notify end of column

Play a sound whenever the column changes

Notify end of row

Play a sound whenever the row changes

Use Vibration

Vibrate device when notification sounds occur

Skip Decimal Rows

Forces sequence to only use column numbers. A sound is played when a skipped row is crossed.

Skip Decimal Columns

Forces sequence to only use column numbers. A sound is played when a skipped column is crossed.

NB. Decimal plots are often used for spray lanes or when plants within plots are scored.

Date Format

Use Sown column

Calculate days traits using difference between sown date column and the current date with offset

Use Ordinal Date

Calculate days traits using difference between January 1 of the current year and the current with date offset

Use Custom Column

Calculate days traits using difference between user specified date column and the current date with offset

DD/MM/YY, DD-MMM-YYYY, YYYY-MM-DD HH:MM: SS

Date/Time stamp date format for traits that have date stamping enabled

File Format

Use Trial Name

Use the trial details to label image files.

Use File Name

Use the file name to label image files.

Barcodes

The barcode menu allows quick jumping to a plot using a unique position code (plot barcode)

Use Barcode

Hide/show the barcode control on the main scoring screen.

Text Box

Enable barcode textbox for entering barcodes or using a connected barcode scanner.

QG Code

Use internal camera to scan a QR Code Barcode (Requires [zXing Barcode Scanner](#)).

Code 39

Use internal camera to scan a Code 39 Barcode (Requires [zXing Barcode Scanner](#)).

Code 128

Use internal camera to scan a Code 128 Barcode (Requires [zXing Barcode Scanner](#)).

EAN 13

Use internal camera to scan a EAN Barcode (Requires [zXing Barcode Scanner](#)).

Quick Jump

Opens the quick jump dialog to enter a plot number to progress to.

Column Mapping

Set fields to be displayed below the [genotype and pedigree display](#) on the main scoring screen

Additional Options

Use dark backgrounds

Set background to black for better visibility in the sun and improved battery life on some devices.

Invert control colours

Invert all control colours on the scoring screen

Show soft input

Always display soft input whenever a trait is manually focused (by touching it rather than auto progression or use of the tab button). N.b. Some devices require this setting checked to accept any input.

Hide simple button layout

Show/Hide additional next plot, previous plot and next blank buttons at the screen for use with soft input keyboard.

Use text to speech

Device will speak the current score value as it is entered.

Voice recognition

When a trait is selected activate voice recognition. N.b. Voice recognition in Fieldscorer requires internet connection. It can be slow and may cause invalid data scores. Please use caution if experimenting with the voice recognition feature.

Use external camera App

Use either the default external camera application or the camera dialog built into Fieldscorer for taking trait and plot images

Web Proxy

Set proxy address and port (if required) for use with the [check For updates option](#)

Currently Fieldscorer4Android imports and exports using a comma-separated file format (.CSV). Data is stored in a SQLite database file format, which can be access and modified using and external editor if necessary. File naming include information about the trial into the filename. In this case, few columns are mandatory (should be included in the filed book) to run Filedscorer4Android correctly. Such as, Row, Column, Block (Replication).

3. Creating a Field book file

Example MS2018SGEMN

MS is the site

2018 is the year

SGEMN is the trial type code

With a consistent naming convention files can be sorted and searched easier

Underscores and dashes can be used as separators in file names

When a backup or copy is made add a date to the filename

Spreadsheet layout

CSV is comma delimited use in Fieldscorer plain text using comma as a delimiter, faster load times **and** what you put in is what you get out than using XLS/XLSX (Excel workbook) which may consist multiple Sheets and contain fonts, colours, formulas, macros etc.

All image files are stored in the JPEG file format. Quality is dependent upon the camera built into the device.

Trial Files

Fieldscorer uses a flat file format so there needs to be unique values in each row of the combined SiteYear, SiteName, TrialType Name, TrialNumber, Column and Row. These columns are not all required, though they are used to differentiate multiple trials within a single csv file.

Column naming

Aim for consistent column and trait names

Yield is not the same as YLD or Yield (kg/ha)

Trial_no is not the same as TrialNo or Trial# or Trial Number

Field book template

Contains all of the columns you might need, consistent between trials and makes it easier to stack data (join trials into one file)

Fieldscorer hard coded columns used by the system are:

Site Year (or Year)

SiteName (or Site)

Trial TypeName (or TrialType or Type)

Trial Number (or Trialno)

Column (or Col or Range)

Row

Sown (or Planted, or DateSown, or DatePlanted, or Planting or SownDate, or Trial Start Date)

Trial Unit Comment (or Comment, or Comments, or PlotComment)

Genotype Name (or Genotype, or cultivar, or variety, or entry number, or entry#)

GenotypeId (or GID)

Pedigree

Replicate Number (or Replicate, or Rep)

Trial Unit Barcode (or Plot Barcode or Sample Entry Number, or Plot Number, or Plot or PlotNo, or Plot#.)

N.b. Columns in bold are required for import.

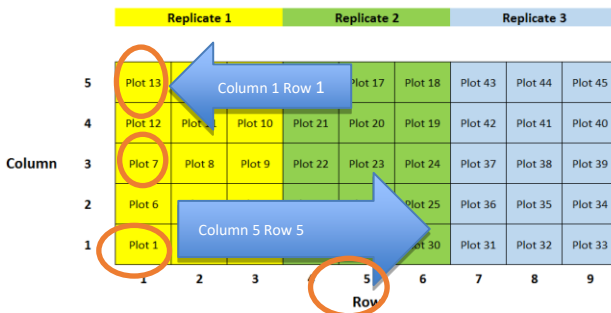
Genotype Names

Enforce consistency within a sheet and watch out for spelling mistakes and local names. Spaces matter example GEN106 is not the same as GEN 106 to a computer and 1 Space does not equal 2 spaces ie. GEN 106 vs GEN 106

Spatial columns

provides capacity to sort using various walk path options, useful for describing planting layout, ensure that planting layout is retained in data file and terms Column and Row can be reversed, but try to be consistent within your group and required for future spatial analysis

	Replicate 1			Replicate 2			Replicate 3		
5	Plot 13	Plot 14	Plot 15	Plot 16	Plot 17	Plot 18	Plot 43	Plot 44	Plot 45
4	Plot 12	Plot 11	Plot 10	Plot 21	Plot 20	Plot 19	Plot 42	Plot 41	Plot 40
3	Plot 7	Plot 8	Plot 9	Plot 22	Plot 23	Plot 24	Plot 37	Plot 38	Plot 39
2	Plot 6	Plot 5	Plot 4	Plot 27	Plot 26	Plot 25	Plot 36	Plot 35	Plot 34
1	Plot 1	Plot 2	Plot 3	Plot 28	Plot 29	Plot 30	Plot 31	Plot 32	Plot 33
	1	2	3	4	5	6	7	8	9



An Example of a Trial File:

Year	Site	Type	Plot	Column	Row	Replicate	PlotBarco	Genotype	Pedigree	Female	Male	Check	Old_geno	Sown
2018	Mieso	MS17 Early Maturing National Sorghum	1	1	1	1	*MS18 Ear	Pipeline 2	(Teshale)	(Teshale)	EBC3F3			
2018	Mieso	MS17 Early Maturing National Sorghum	2	1	2	1	*MS18 Ear	14MWLSD	WSV387	WSV387	E-36-1			
2018	Mieso	MS17 Early Maturing National Sorghum	3	1	3	1	*MS18 Ear	2401	(S35/B35)	(S35/B35)	S35			
2018	Mieso	MS17 Early Maturing National Sorghum	4	1	4	1	*MS18 Ear	Melkam	WSV 387	WSV 387				
2018	Mieso	MS17 Early Maturing National Sorghum	5	1	5	1	*MS18 Ear	14MWLSD	SDSL2690	SDSL2690	76T1#23			
2018	Mieso	MS17 Early Maturing National Sorghum	6	1	6	1	*MS18 Ear	12MW624	WSV 387	WSV 387	76T1#23			

4. Creating a Traits file

Trait file must be named Traits.csv, uses hard coded column names, used to lookup additional information for field book column headers

Trait Name: The name of the trait that will appear on the scoring screen
 Examples: DTF, LDG, PH, Height, etc. Often abbreviated to save space on the screen in Fieldscorer and so that it can easily be seen in a spreadsheet. Ensure that the name matches up with column headers and to create repeated measures of a trait the trait column header in the field book file can use a double underscore to separate the instances.

Trait Name: The name of the trait that will appear on the scoring screen Examples: DTF, LDG, PH, Height, etc. Often abbreviated to save space on the screen in Fieldscorer and so that it can easily be seen in a spreadsheet. Ensure that the name matches up with column headers and to create repeated measures of a trait the trait column header in the field book file can use a double underscore to separate the instances.

i. e. A Trait Name of Plant Height (PHT) will work for columns PHT__1, PHT__2 and PHT__5

TraitValRule: Trait validation rule which is used to enforce data integrity, the value “NA” is always valid, numeric datatypes use two full stops to define range example: 1.9, String validation uses comma separated validation example: Red,Green,Blue and cannot combine two methods eg 1.9,18,25 X

Data Type: The data type of the trait.

Integer – Whole number values. Eg. 1, -1, 1024

Decimal – Decimal numbers (whole numbers also accepted). Eg. 1.35, 0.6

String – any set combination of characters. Used for words and sentences. Eg. Red, Blue, A Trait Value, Tex, VC5

Boolean – TRUE and FALSE values

Photo – take a picture which embeds the trait name

Date – Select a date

DateTime – select a date with the current time

Angle – Decimal angle of the device. NB. Move device slowly to get more accurate readings.

GPS – Latitude and longitude values of current position

Auto Progress Field Length: The number of characters required before the auto progression to next trait/trial unit will trigger. If left blank then auto progression of this trait will be disabled. If using barcode heights leave the Auto Progress Field Length value blank as the barcode scanner will progress automatically after a scan. Best suited for single button press trait scores. Examples 1-9, Red, Green, Blue, TRUE & FALSE

IsDaysTrait: Determines whether day offset calculations are used to process this trait. If TRUE then the value scored will be a calculated value of the number of days between today and planting date (or the alternative specified) added to the offset entered by the user. Choose FALSE for all other traits

DateStamp: Determines whether a generated Date Stamp column will be used for the trait. If TRUE then a column with the prefix “Date_” will be used to hold the time stamp of the trait score. Scoring HGT will put the current date & time into Date_HGT. FALSE will not save the date value when scoring

TraitUnits: The units that define the trait. Eg. cm, days, kg, etc. This field can also be used to provide a description about the trait as it is displayed below the trait name on the trait selection screen. Eg. Common Leaf Rust Severity Rating (1= clean, no infection) to (5= severely diseased)

Connection: Used to hold the pipe separated list of values required to connect to a digital device. Currently only works with devices connected using Bluetooth wireless technology. Includes MAC address of connection and polling and stable string information. Example Traits.csv file

TraitName	TraitValRu	DataType	AutoProgr	IsDaysTrai	DateStamp	TraitUnits	Connection
DTE	3..15	I		TRUE	TRUE	Days to 50% emergence from dat	
Vigour	1..5	I		FALSE	TRUE	Score (1-5)	
DTF	30..150	I		TRUE	TRUE	Days to 50% flowering (number c	
PHT1	30..600	D		FALSE	TRUE	cm (Plant Height)	
InsectScore	1..5	I		FALSE	TRUE	Over-all insect resistance score (
DiseaseScore	1..5	I		FALSE	TRUE	Over-all disease resistance score	
DroughtScore	1..5	I		FALSE	TRUE	Tolerance to soil moisture deficit	
RootLodging	1..5	I		FALSE	TRUE	Score (1-5)	
StemLodging	1..5	I		FALSE	TRUE	Score (1-5)	
BirdDamage		S		FALSE	TRUE	% bird damage	
DTM		I		TRUE	TRUE	Days to maturity (number of day	
RawWeight		D		FALSE	TRUE	g (Raw head weight)	
Yield/Plot		D		FALSE	TRUE	g (Grain yield per plot)	
YieldKg/Ha		D		FALSE	TRUE	Kg (Grain yield per hectare)	
PAS	1..5	I		FALSE	TRUE	Over-all plant aspect/agronomic	
1000GW		D		FALSE	TRUE	1000 kernel weight (weight of 10	

5. Kombine

Importing Files

To add data to trial files, the file must be imported into the database. To import a trial file, open the File menu and select Import. The import dialog will open appear and files can be selected to open. Multiple files can be imported at once by selecting more than one before pressing the import button.

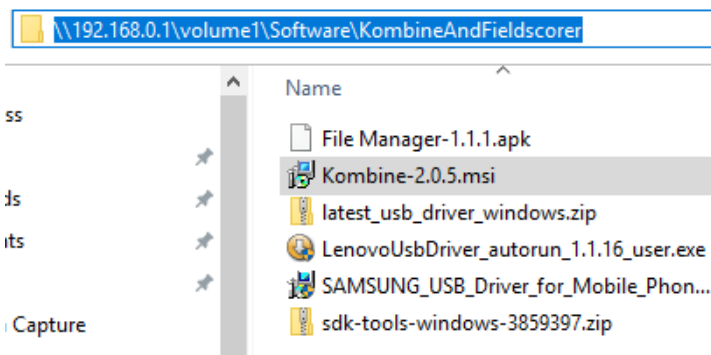
N.B. Importing files could take several minutes depending on the size and number of files and the speed of the device therefore using combine is better.

Kombine synchronises data/files from multiple devices to a single csv file on a PC or server share Copy the Kombine installer

Double click Kombine-2.0.5.msi

Follow the prompts

Requires Administrator Privileges



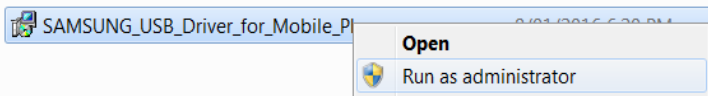
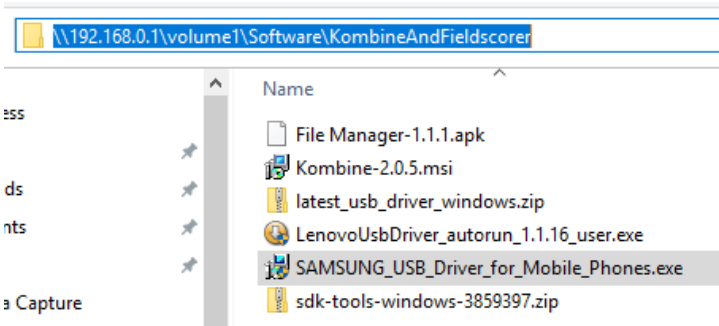
Installing the Samsung driver (Samsung users)

Copy the driver installer

Right click the file: SAMSUNG_USB_Driver_for_Mobile_Phones.exe

Select Run as administrator

Follow the prompts to install the driver



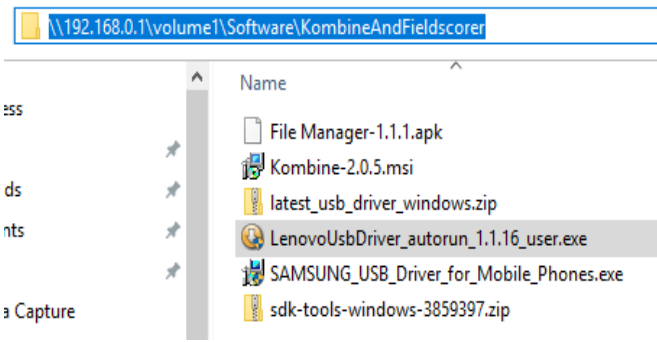
Installing the Lenovo driver (Lenovo users)

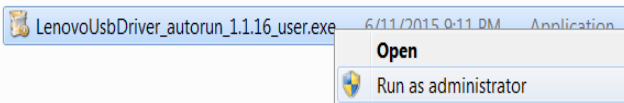
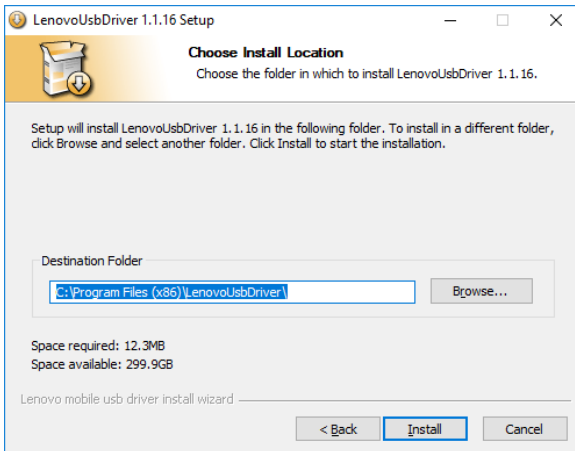
Copy the driver

Ensure that the Lenovo device is not connected to the computer

Right click the file: LenovoUsbDriver_autorun_1.1.16_user.exe

Select Run as administrator

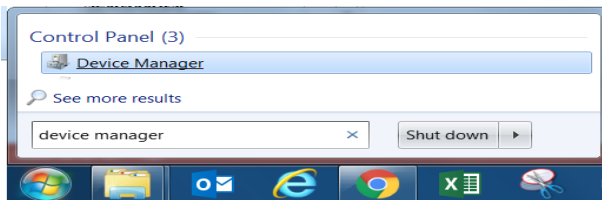




Installing the Lenovo Tablet driver

Click the start button and type device manager into the search box

Click Device Manager

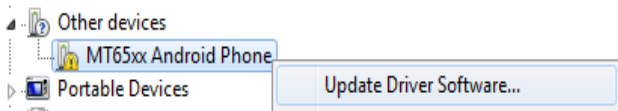


Installing the Lenovo Tablet driver

Connect the Lenovo tablet and allow windows some time to detect the device

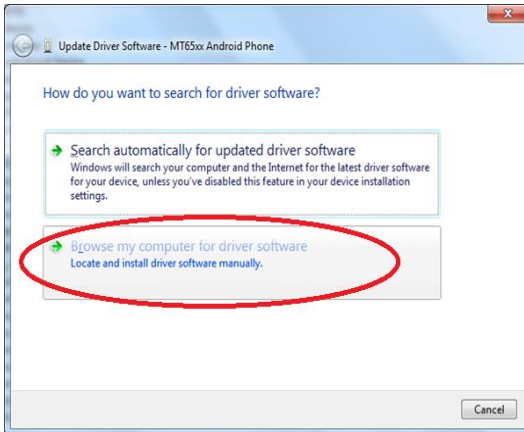
An unknown device called MT65xx Android Phone may be visible in the list of devices

Right click the MT65xx device and Select Update Driver Software...



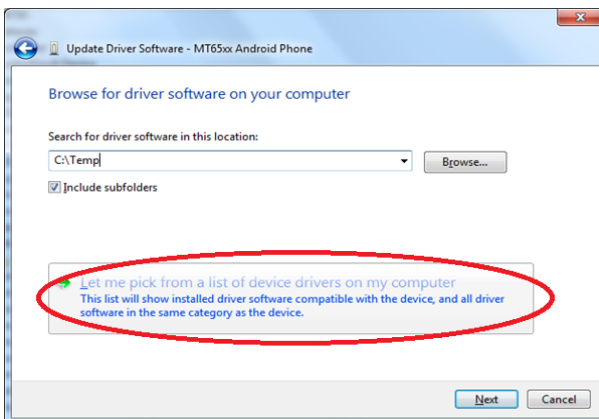
Installing the Lenovo Tablet driver

Select Browse my computer for driver software



Installing the Lenovo Tablet driver

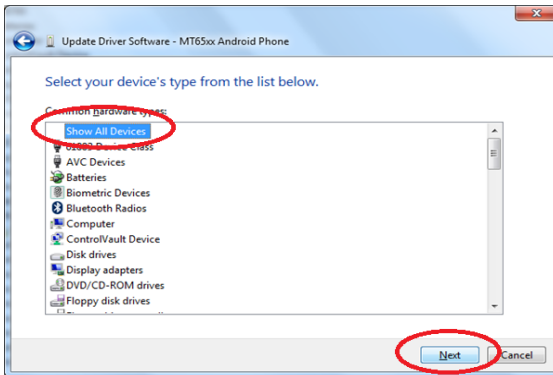
Select Let me pick from a list of device drivers on my computer



Installing the Lenovo Tablet driver

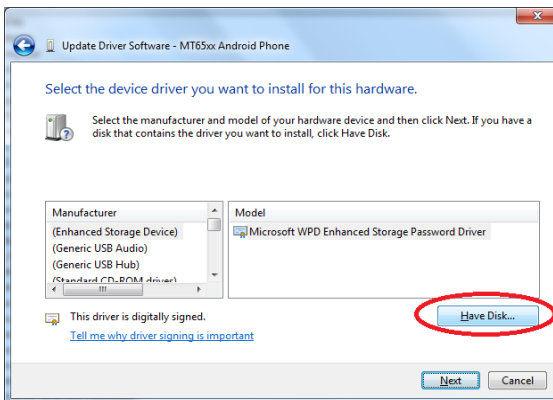
Select Show All Devices

Click Next



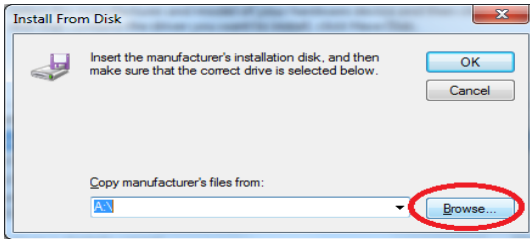
Installing the Lenovo Tablet driver

Select Have Disk



Installing the Lenovo Tablet driver

Select Browse to locate the driver file



Installing the Lenovo Tablet driver

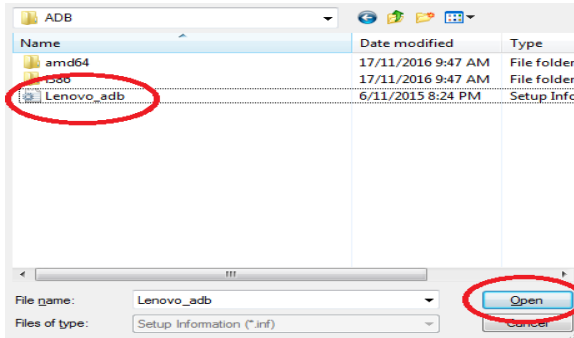
Located the Lenovo_adb file in

C:\Program Files (x86)\LenovoUsbDriver\ADB or

C:\Program Files\LenovoUsbDriver\ADB

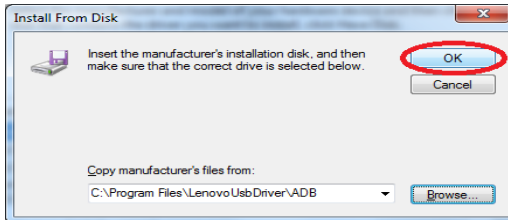
Select Open

C:\Program Files (x86)\LenovoUsbDriver\



Installing the Lenovo Tablet driver

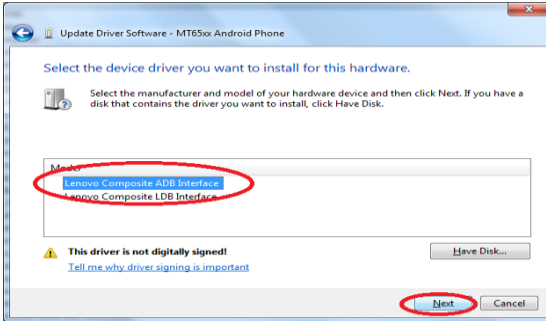
Select Okay to confirm the file location



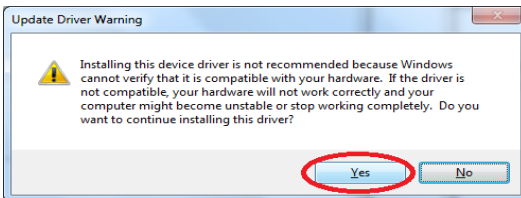
Installing the Lenovo Tablet driver

Select Lenovo Composite ADB Interface

Select Next

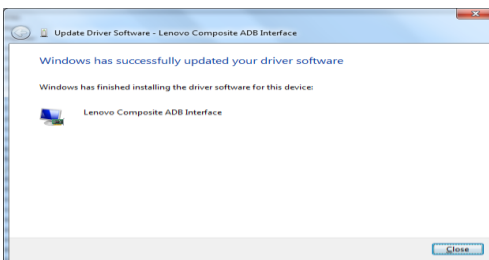


Installing the Lenovo Tablet driver



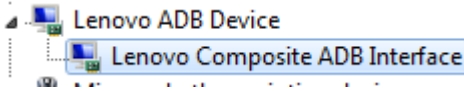
Installing the Lenovo Tablet driver

Close the window



Installing the Lenovo Tablet driver

The driver should now be updated in device manager

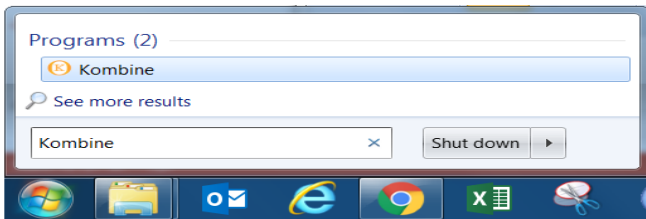


5.1. Merging files

Synchronization issues and procedures

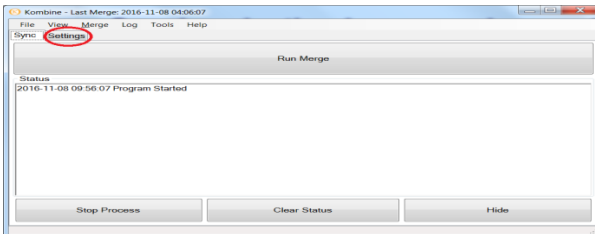
Open Kombine

The other way to bring files from computers into the database and store back scored data into the files in the computer is via the program Kombine. As far as Kombine works properly which is the case in most situation, merging using the program should be followed. Merge settings are as follows



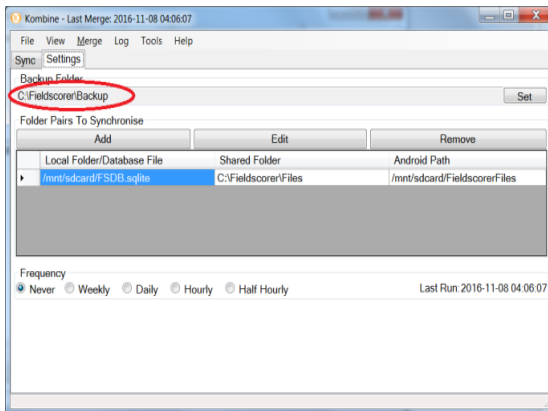
Synchronisation Setup

Select the settings tab



Synchronisation Setup

Backup path (shared location)

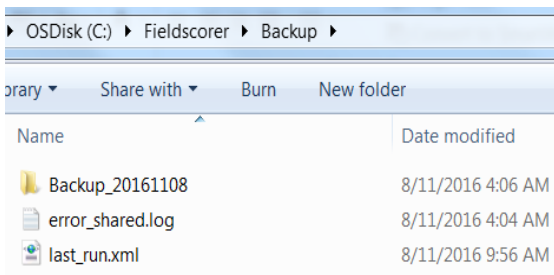


Synchronisation Setup

Backup path (shared location)

Creates a folder for each day that a merge occurred

Holds lock file and logs



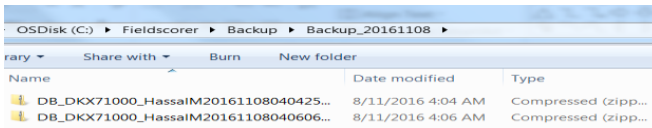
Synchronisation Setup

Backup path (shared location)

Creates a folder for each day that a merge occurred

Holds lock file and logs

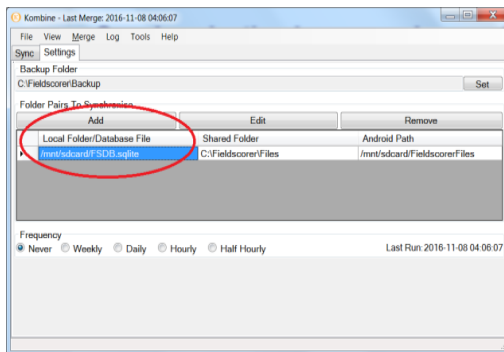
Daily folder contains compressed database backups and csv files where changes have occurred



Synchronisation Setup

Folder pairs

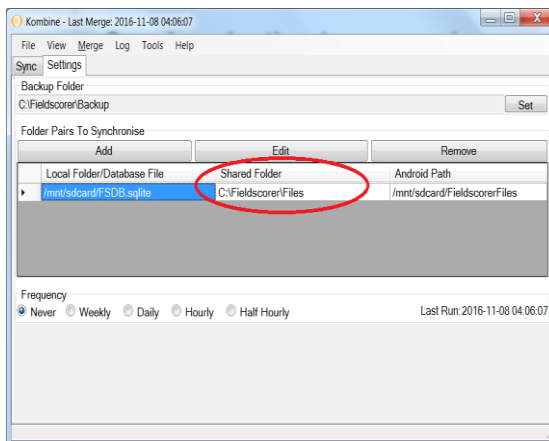
FSDB.sqlite file is the database file on the device



Synchronisation Setup

Folder pairs

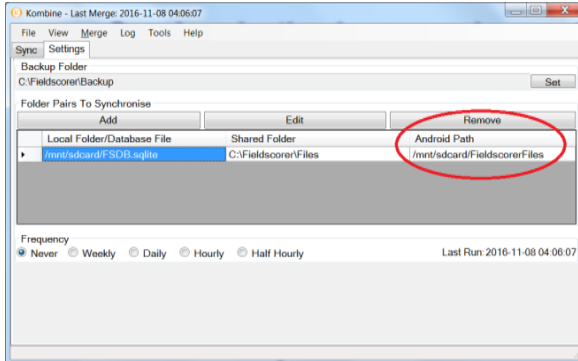
Shared folder



Synchronisation Setup

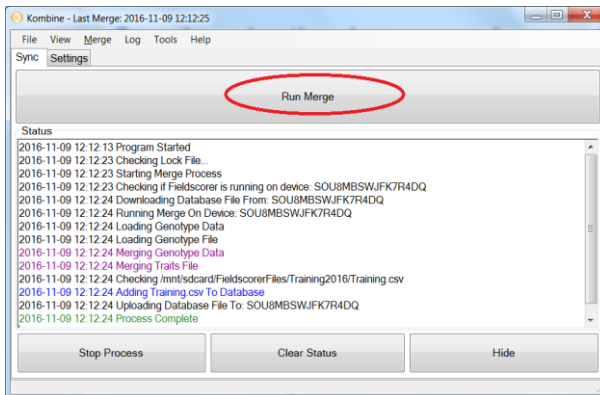
Android path

For exports and images (retains file structure)



Merging Data

Select Run Merge



Merging Data (process)

Downloads database and new images

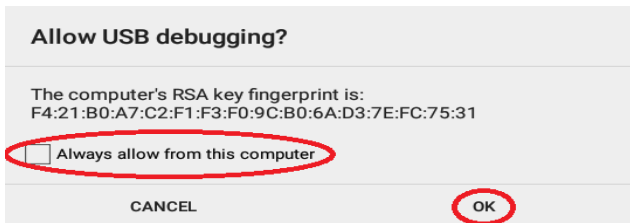
Creates a compressed backup file

Merges Traits and Genotypes files

Iterates through folders

Checks for changes and master/deleted files
If changes exist then merge files together
Both files get data using keys
If duplicate data exists then new version is used

Common errors



Device Authorisation

Check tablet for Allow USB debugging prompt

Select always allow from this computer

Device not found

Ensure that tablet is connected

Ensure ADB drivers installed

Ensure USB Debugging mode is enabled on the tablet

Primary Keys do not match

Ensure that file keys (column, row etc) match that in the file

Set master file if keys have changed

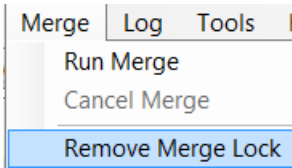
Failed to load file

Ensure that the csv file is closed and try again

Checking lock file repeats and reports lock files

Confirm that no one else is running a merge

Lock can be removed from Merge button -> Remove Merge Lock



Master Files

Required if design changes

Forces connected device to use the shared version

Creates a backup before overwriting

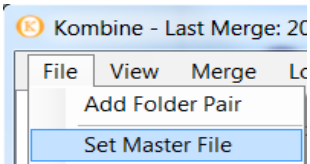
Retains a log of who has been updated

To set a master file

File -> Set Master File

Select master file

Select file to replace



Deleted Files

Used to remove a file from the devices

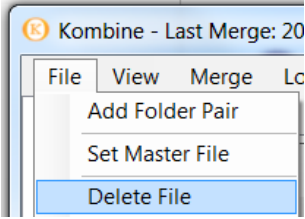
If deleted through the file manager it will be retained in the database

File will be backed up before deletion

To mark a file for Deletion

Select File->Delete File

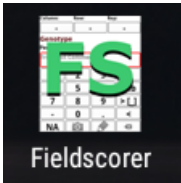
Choose file to be deleted



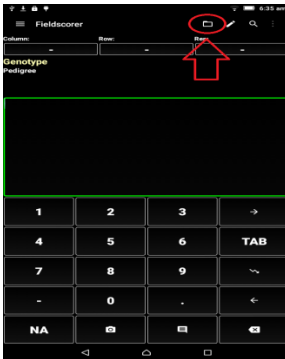
Opening Files

Once a trial file has been added to the database it can be opened by selecting the Open option from the file menu. There may be a short delay while the walk path sequence is generated. Opening a trial should jump to the first plot in the trial as determined by the walk path sequence.

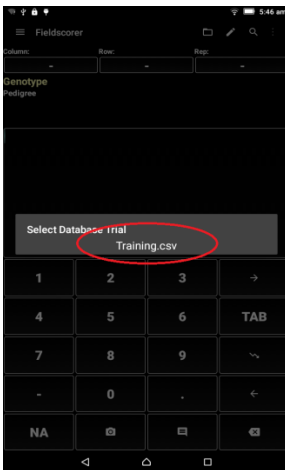
Scoring traits using Fieldscorer



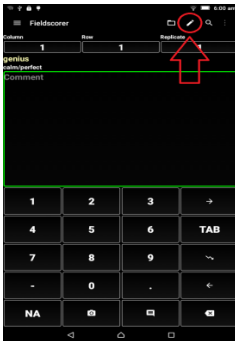
Open a trial using the folder icon



Select Training.csv

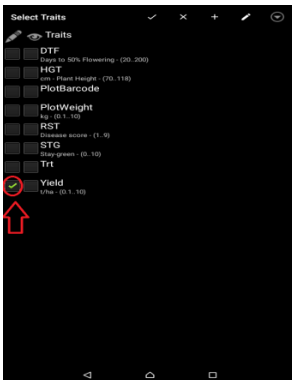


Select the traits button



Check Yield

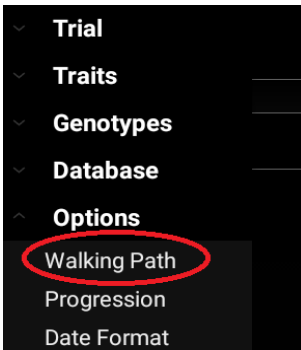
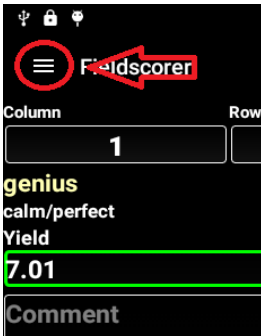
Press back to return to the scoring screen



Select the Menu button

Select Options

Select Walking Path

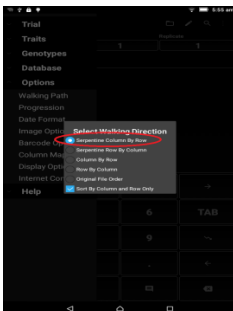


Select Serpentine Column by Row

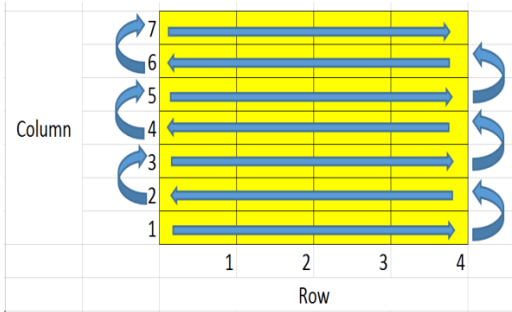
This means you are walking along the column in a zig zag fashion

Press back to return

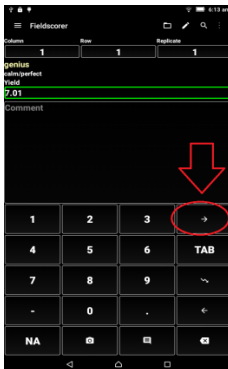
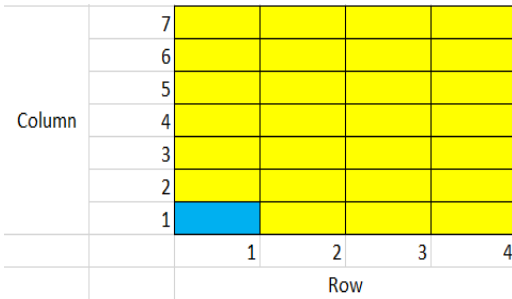
Tap outside of the menu to return



Serpentine Column by Row



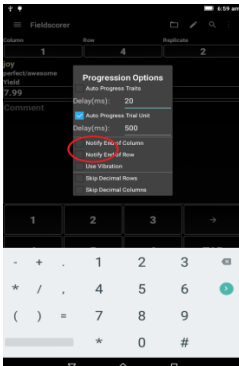
Press the next plot button to advance to the next row



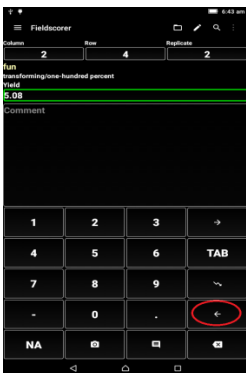
Press options button
Select Progression Options



Press options button
 Select Progression Options



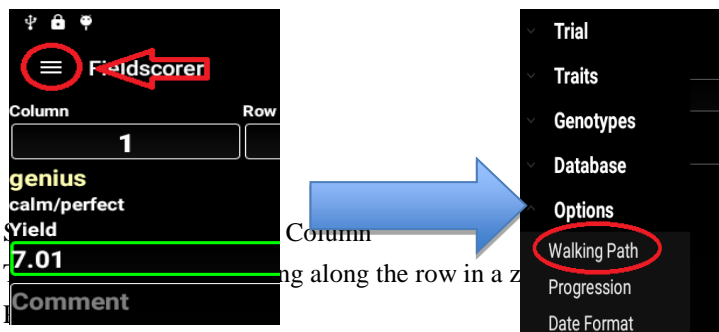
Press previous plot button to go back one plot
 Press and hold to go to beginning



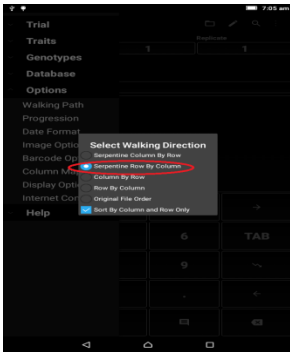
Select the Menu button

Select Options

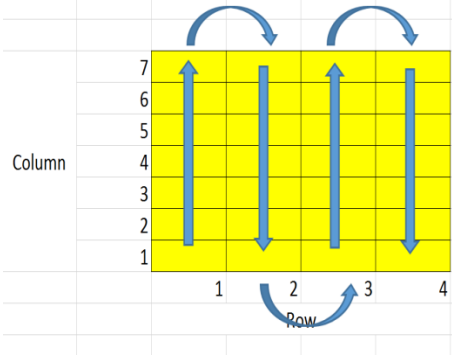
Select Walking Path



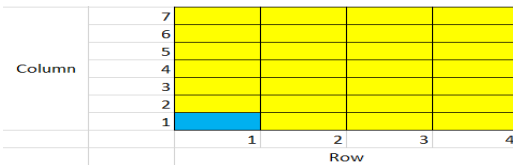
Tap outside of the menu to return

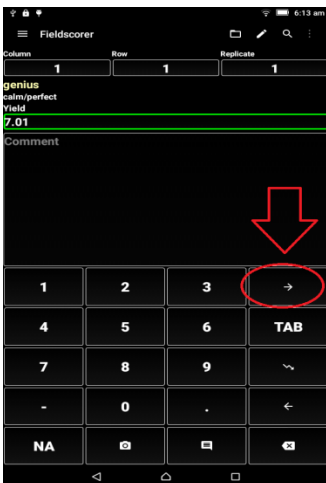


Serpentine Row by Column



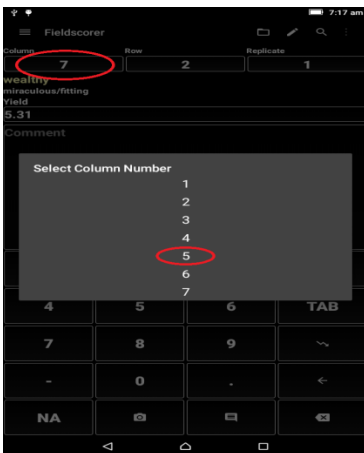
Press the next plot button to advance to the next column





Press the Column button

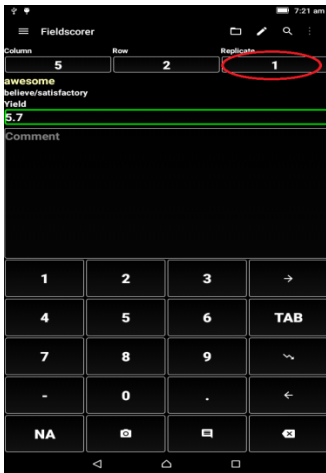
Select Column 5



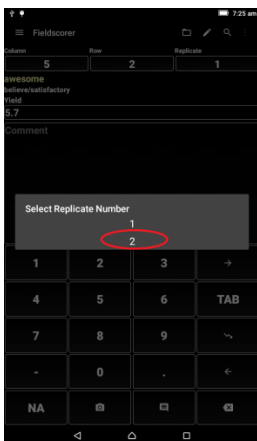
Jumps to Column 5 Row 2

Press the replicate button

	7				
	6				
	5				
Column	4				
	3				
	2				
	1				
		1	2	3	4
		Row			



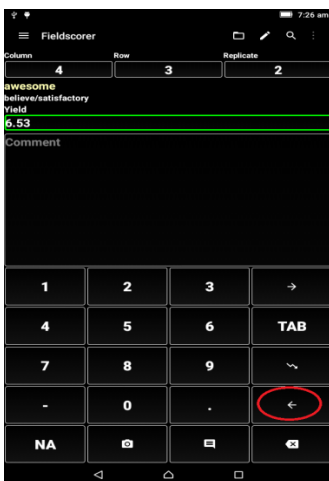
Select Replicate 2



Press and hold to go to the first plot

Experiment with other walking path layouts

NB. Original file order will use the sort order of your original CSV file



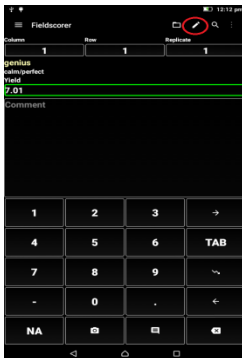
Row by Column

Column	7	↑	↑	↑	↑
	6				
	5				
	4				
	3				
	2				
	1				
		1	2	3	4
		Row			

Column by Row

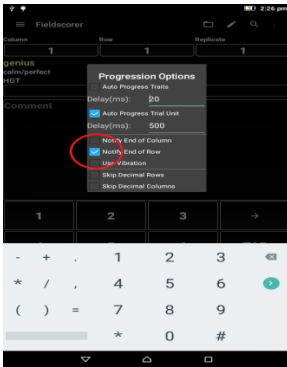
Column	7	→			
	6	→			
	5	→			
	4	→			
	3	→			
	2	→			
	1	→			
		1	2	3	4
		Row			

Select the trait icon



Select Notify End of Row

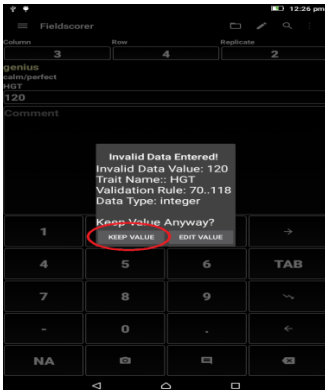
Press back to return to the scoring screen



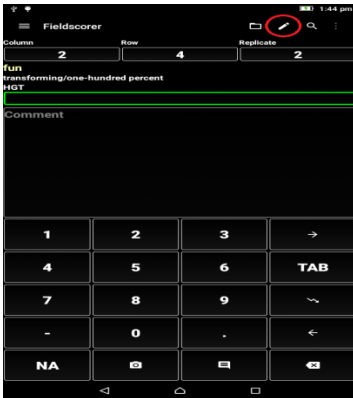
At column 3 row 4 an invalid data entered message will appear

Select Keep Value

NB. If the value is invalid select Edit Value option and it will be highlighted for overwriting



Select the trait icon



Highlight the Row by selecting the trait name

Select the Edit Icon

NB. On smaller screens the menu in the top right will be required to select the edit option

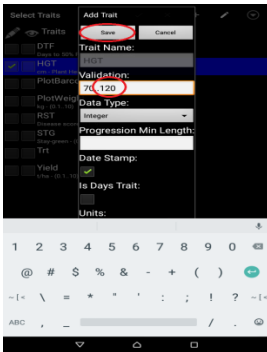


Increase the range to 120

Ie. 70..120

Select Save to update the trait

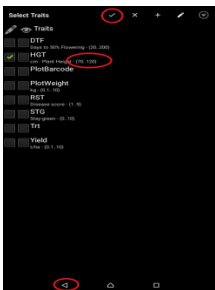
NB. The device keyboard usually has an option in the bottom left to change between alpha and numeric characters



Note that the validation rule has now changed

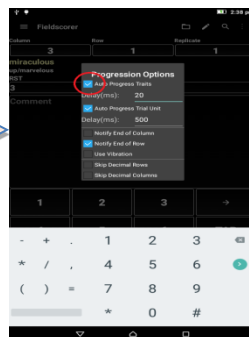
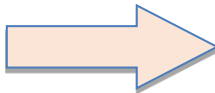
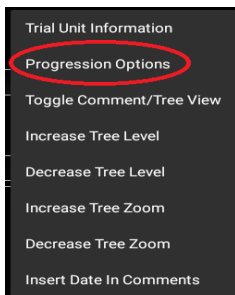
Press the back button or the tick to return to the trait scoring screen

Continue scoring and note that values greater than 118 are now accepted



Select progression options

Select auto progress traits



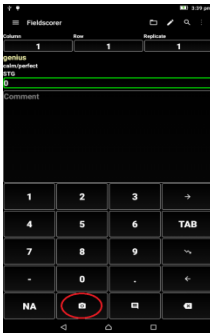
Return to the first plot
 Select DTF for scoring
 Score flowering visit 1
 Monday is -2 (2 days ago)
 Tuesday is -1 (1 day ago)
 Wednesday is 0 (for today)



The NA button is used to represent a missing plot
 NA is always accepted regardless of the validation rule that has been set

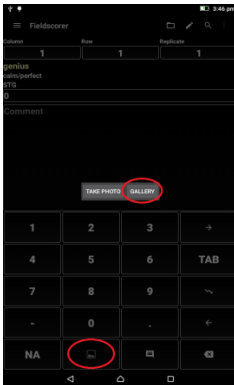


The camera button is used to take a photo linked to the current plot
 File names append the column and row number



If the current plot has a photo then the icon changes to a gallery icon
 Selecting this icon provides the option to take another picture or view the gallery

Photos can be viewed and deleted from the gallery



Comments can either be entered using the input box or pressing the comment button

The comment button allows selection of previously entered comments



Return to the trait screen

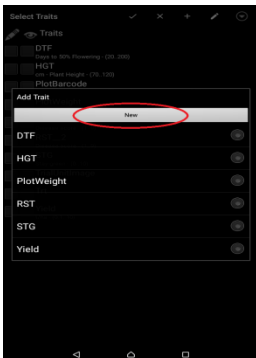
Select the Add Icon



This is the full list of traits from Traits.csv

Add a new trait by selecting it

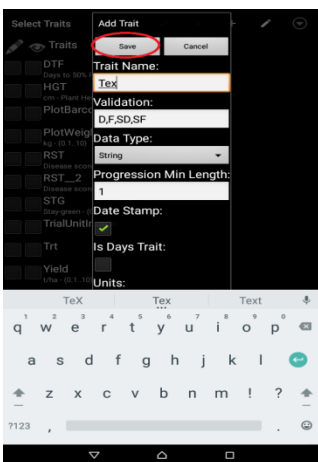
If the trait is not in the list then select New



Enter details for the trait

String traits have a comma separated validation

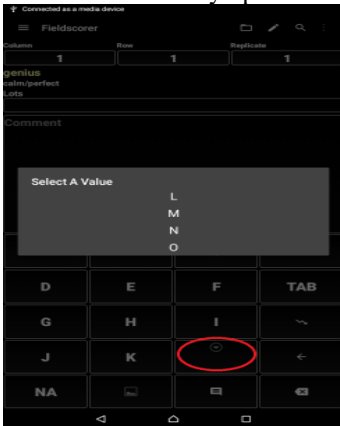
Select Save



Note that the buttons change to match the validation rule



If there are too many options the 12th button provides an overflow



The Boolean data type provides TRUE and FALSE options



Import Trial File is used to manually import data

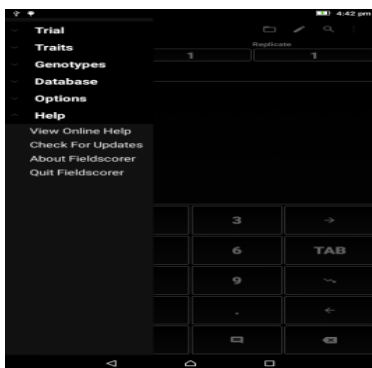
Export Trials is used to write CSV files to the tablet. These files can be emailed or copied to a backup location



View Online Help will open the online help page for Fieldscorer

Check for updates checks for new versions of Fieldscorer and provides a download option if one exists

Both options require internet access



Exporting Data

Exported Data is in a flat file CSV file format, with each plot representing one row in the file. Additional instances will occur with a double underscore (Height, Height__2, Height__3) and date stamping will occur with a Date_ prefix (Date_Height).

To export data either select Save As from the file menu or Export Trials from the trial menu.

For a preview of the data to be exported, Preview Trial from the Trial Menu will generate an example of how the output should look.

Exporting trials will overwrite the existing CSV files with whatever data is in the database for that trial. If using a folder with Internet synchronization of files, please ensure that care is taken if files are shared across multiple devices. Once a CSV file is exported it can be edited and re-imported back into the database. Importing a file into a database that already contains the trial file will overwrite all data for that trial. A backup file is created whenever this occurs before the data is overwritten.

Bibliography

Source: <http://www.katmandoo.org/Help/Fieldscore4Android/menu.html>