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Electronic collection of field data

Instructions on how to create an application in CyberTracker

The goal is to make a CybertTracker application to collect data for the purpose of measuring growth over time of mango branches which have been trimmed.

1. Download the Cybertracker software from their website: https://www.cybertracker.org/

Go to 'Software' and select 'Free Download'.

	Tracker Discover, Explore and F	Protect Our Planet	ROLEX Aucard for Enterprise
HOME OUR STORY USES Free Software and eBoo Use CyberTracke	SOFTWARE PARTNERS Introduction Free Download Getting Started Step-by-Step Tutorial Feature List CyberTrackerWiki	SCIENCE TRACKING BORN Iownloads! ne for field data co	TORUN
	Technical Support		

Scroll down the page and click on "Download CyberTracker Software: Version 3.507 - 15MB" to obtain the CyberTracker software.



Follow the website instructions for any troubleshooting.

2. Open CyberTracker and select "New Database"





Australian Government Department of Industry, Innovation and Science







CyberTracker	v3.507				
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Start 👻	1				
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New Database	Open Database	Open Sample	Download Data	About CyberTracker	
	1				

3. Select "Edit Application"

<u>File</u> <u>Edit</u> <u>V</u> i	iew <u>T</u> ools <u>H</u> elp					
Applications 👻		Application 1 -		= PDA -	≡ Zoom 100% ▼	
*	*			1		
New Screen	New Subscreen	Delete Screen	Edit Application	Manage Applications	Layout Mode	Edit User Lists
icreen			Proper	ties		

Change name to "Mango Trimming Barcode"

E	dit Appli	cation					×
	General	GPS	Field maps	Goto	History	Web Update	
	Name	•					Mango Trimming Barcode
		-					
ľ	App	earanc	e				

Select "OK"

4. Select "New Screen"

Application	1*	Mango Tri	nming 🔻	■ PDA ▼
*	*			Ţ,
New Screen	New Subscreen	Delete Screen	Edit Application	Manage Application

In the window, select "Note" then "OK"

New Screen	×
Screen Templates Custom Templates	
Single select list Multi select list Multi select list Multi select list Number select Number select Records (Android colu) Records (Android colu) Sore rist Oute select Sore rist Simple white Simple black	Note Tap to edit
	<u>Q</u> K <u>C</u> ancel

5. Rename the screen to "User ID" and then press Enter

/



6. Click on the three dots (...) to the right of "Result Element"

n Edit Application Manage Applic	ations Layout Mode E	dit User Lists Test Run In
Properties		Lieon
Screen		User
Name	User ID	
Element Text Ed	it 🗖	
🔺 Result Element		
Navigator		_ _
Show next	\checkmark	
Show save 1		
Take GPS reading	\checkmark	Tap to
→>> Save 1 target		

In the new window, type in "User Name", press Enter and then "OK"

ubscreen Delete Screen | Edit Application Manage Applications | Layout Mode | Edit User Lists | Test Run Install To Mobile

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* User Name		
		<u>N</u> ew E
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7. Untick "Take GPS reading"



8. Click on "Layout Mode"

<u>File</u> <u>Edit</u> <u>V</u> i	ew <u>T</u> ools <u>H</u> elp					
Application	5 🕶	Application	1 🛨	■ PDA ▼	= Z	oom 100% 👻
New Screen	New Subscreen	Delete Screen	Edit Application	Manage Applications	Layout Mode	Edit User Lists
)creen			Properti	ies		

Where it says "Screen", select the drop down to the right then select "Navigator"

New Screen	New Subscreen	Delete Screen	Edit Anali	· 💦			Edit Application	Manage Applications	Layout Mode	Edit User Lis
Screen	Hen Subscreen	belete bereen	- cur Appin	o manage Applicate	and Layout	Wode Care of these	Screen	n		~ :
📑 User ID				Screen			Screen	1		
				Properties			Panel			
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Untick all the boxes except "Show next"

Vavigator	`	~
^o roperties		
Lock properties	Show next; Show save 1; 1	^
Lock properties basic	<none></none>	
Border color	Black	
Border line width	1	
Border style	None	
Border width	0	
Button border	None	
Button border line width	1	
Button border width	0	
Button width	25	
Color	White	
Dock	Bottom	
Left	0	
Height	24	
Show back		
Show GPS		
Show home		
Show next	\checkmark	
Show options		
Show save 1		
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Show skip		
Skip font	Arial,10,	
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Show options)		
)ption button visibility: this butt he sighting data and other opti	on displays a dialog containin ions.	ŋ

Click on "Layout Mode" again to exit

9. Click on "New Screen"

<u>File</u> <u>Edit</u> <u>V</u> iew	<u>T</u> ools <u>H</u> elp					
Applications 🔻		Application	1 -	■ PDA ▼	= 2	Zoom 100% 🔻
New Screen N	ew Subscreen	Delete Screen	Edit Application	(Manage Applications	Layout Mode	Edit User List
icreen	J		Properti	ies		

In the new window, select "Barcode (Android only)" then "OK".

Please note the mobile device must have a separate barcode reading app installed.

creen Templates Custom Templates	
Image: Single select list Image: Mumber list Number select Image: Note Repaid Image: Photo Image: Note Repaid Image: Note Rephoto Repaid <	Barcode (Android only)

10. Rename the screen to "Branch ID" and press Enter



11. For the "Branch ID" screen,

Select "Layout mode", then from the drop down next to "Screen" select "Navigator"

Untick all the boxes other than "Show next" & "Show back".

Be sure to scroll down to untick the "GPS".

Select "Layout mode" again to exit

12. Click on "New Screen"

Select "Number Keypad" then "OK"

Single select list Multi select list Single select		Numbe	r keypad	d
Number keypad Photo Barcode (Android only) Note	7	8	9	с
User list Date select Standard	4	5	6	<
 Simple Write Simple black 	1	2	3	
		0		+/-

Rename to "Length of New Growth" and press Enter

13. For the "Length of New Growth" screen

Click on the three dots (...) to the right of "Result Element"

Type "Length of New Growth" in to the window that pops up, press enter first then "OK"

Go to "Layout Mode", select "Navigator", untick everything other than "Show Next" and "Show Back".

Click on Layout Mode to exit navigator

14. Click on New Screen - select "Single select list" then "OK"

Single select list Multi select list	Single select list
Number list Number elect Number (keppad Surcher (keppad Does (keppad) Does (keppad) Simple white Simple black	Element 1 Element 2 Element 3 Element 4 Element 5 Element 6 Element 7 Element 8 Element 9 Element 10

Rename to "Type of Tip"

15. For the "Type of Tip" Screen

Click on the three dots at Elements

9:16 AM	New Screen	New Subscreen	Delete Screen	Edit App	e lication Mar	age Application	ns Layout Mode	Edit Us	er Liste	Test Run	Install To Mobile Devi	ce
	Screen				Properties					Tune	of Tip	
5	📰 User ID				Screer	i .				туре	eor rip	
9:09 AM	📰 Branch I	D			Name		Type of Tip					
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6	📰 Type of	Tip			🔒 🔒 Element	8						
8:47 AM					Result B	lement						
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0:54 AM					->> Save 1	arget				, aatai oot Ei	ionionio proporty:	
	-				->> Next sc	een						
8:10 AM												

Write the following, pressing "Enter" after each one

- Leaf development
- Budding
- Flowering

Be sure to press ENTER after "Flowering".

Your list should look like this

Eait Element List

	Name	Icon 32x32	Add Elements
*			
	Leaf development		<u>N</u> ew Element
	Budding		Edit Element
	Flowering		Earchement

Now select "OK"

16. For the "Type of Tip" screen

Click on "Layout Mode", select "Navigator"

Untick everything other than "Show Next" and "Show Back"

Click on "Layout Mode" to exit

17. Click on "New Screen" and select "Single select list" then "OK"

Rename to "Tip Health"

Click on the three dots to the right of "Elements"

Type in the following, pressing enter after each one

- Mostly green, healthy and growing
- Mostly brown, looks unhealthy
- Mostly brown, may be dying off
- Dead

Name	Icon 32x32	
*		
Mostly green, healthy and growing		I I
Mostly brown, looks unhealthy		
Mostly brown, may be dying off		
Dead		

Select "OK"

Click on "Layout Mode", select "Navigator"

Untick everything other than "Show Next" and "Show Back"

Click on "Layout Mode" to exit

18. Click on "New screen" and select "Photo" and "OK"

New Screen	×
Screen Templates Custom Templates	
Single select list Multi select list Multi select list Number select Namber select Namber select Shoto Shoto Stardard User list Date select Single white Single black	Photo Tap to capture ● △ ▲ ►
	<u>O</u> K <u>Cancel</u>

Rename to "Photo of Tip"

Click on "Layout Mode" and select "Navigator"

This time untick all but "Show back" and "Show Save 1 Target"

Select "Layout Mode" to exit

Now you have made all your screens and they have all the elements you need. Now it is just a matter of connecting the screens.

Applications			Mango Trin	nming 🔻
×		*		
New	Screen	New Subscreen	Delete Screen	Edit Appl
Screen				
-8	User ID			
-8	Branch I	D		
-8	Length o	of New Growth		
-8	Type of	Тір		
-8	Tip Heal	th		
-8	Photo of	Tip		

For each screen you will now need to indicate in what order the screens are linked and which screen saves the data.

1. Start with "User ID"

Click next to "Next Screen" and select the drop down arrow.



2. For the "Branch ID" screen

Select the dropdown next to "Next Screen" and select "Length of New Growth"

- 3. For the reminder of your screens select the following as "Next Screen"
 - "Length of New Growth" screen choose "Type of Tip"
 - "Type of Tip" screen choose "Tip Health"
 - "Tip Health" screen choose "Photo of Tip"
- 4. For the "Photo of Tip" screen

Select the drop down next to "Save 1 target"



Choose "Branch ID"

Note: By looping back to the "Branch ID" it avoids having to enter in "User ID" again.

Now, let's test out your loop by clicking on "Test Run"

= Application	s •	Mango Trir	nming 🔻	= PDA -	= 2	Zoom 100% 👻			
New Screen	New Subscreen	Delete Screen	Edit Application	Manage Applications	Layout Mode	Edit User Lists	Test Run	Install To Mobile Device	
Screen			Propert	ies			Us	er ID	

Other than barcode and photo you can enter data and see if the loop works.

Errors

Common errors are; no next screen arrow, or extra icons at the bottom of the screen.

If you are having problems, identify which screen you are having problems with and check that you followed the steps correctly above for that screen. Ie. Make sure a "Next Screen" is selected, and that the correct boxes in "Navigator" are checked/unchecked.

5. When you are happy with your loop, select "File" and "Save Database As".

Save your database in the folder you would like with the file name "Mango Trimming Barcode"

6. Once the test run works currently connect your android phone or tablet to your computer, via a usb cable, and click on "Install to Mobile Device".

You may get the following message

Install to Windows Mobile or Android Device	\times
Connect your Windows Mobile or Android device. CyberTracker will au connect and upload the Application.	tomatically
Information	×
Before your application is installed, the CyberTracker app must be installe your Android device. So, CyberTracker was copied to the root folder of th Use an Android File Manager to locate it. Install He CyberTracker app by o on it. After this, try installing your application again.	d to e device. licking
	ОК
Triggered client install	
Help installing on Android	Close

If so, select "OK"

Go to the "Files" folder on your phone and scroll until you see "Cybertracker".

Movies Music oppo_log Pictures Pictures TouchPal2015 CyberTracker.apk download status txt or a update To Anure.com.apk Update To Anure.com.apk National Sert	Fonts	
Music oppo_log Pictures TouchPal2015 CyberTracker.apk Soft CyberTracker.apk Soft Ota Update To Anure.com.apk New Folder Soft	Movies	• >
oppo_log Pictures TouchPal2015 CyberTracker.apk 3.59 MB download status txt touch download status txt 101 B image: touch touch <t< th=""><th>Music</th><th>></th></t<>	Music	>
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Select and then select "Install".



7. Go back to your PC, and select "Install to Mobile Device" again. You should get the following message

nstall to Windows Mobile or Android Device	×
Connect your Windows Mobile or Android device. CyberTr connect and upload the Application.	acker will automatically
I	
Installation succession.	

8. Go back to your phone and go to "Files" again. Scroll down until you find a file called "cybertracker"



When you select that folder you should find the file to "Mango Trimming Barcode" there.



9. Go back to your home screen and find the downloaded CyberTracker App and select.



Your database should appear on the first screen.



10. You will need to unplug your device to collect data.

You are now ready to go!

Cybertracker has help options here to assist you.

Collecting data

NOTE: A barcode reading app must be installed on the mobile device before collecting data.

- 1. Open the cybertracker app on your device
- 2. Select Mango Trimming Barcode
- 3. Tap centre of screen and align camera with barcode
- 4. Move device to allow focus
- 5. If it reads it correctly then select next. If read incorrectly then click on the screen again to reread.
- 6. Select the Next arrow
- 7. Using calipers or a ruler, measure the distance of new growth from where the branch was trimmed (cm).
- 8. Enter the length of the new growth.
- 9. Select the next arrow
- 10. Identify the types of tip as best you can to the following categories, based on the phenophase photograph and corresponding codes:

Leaf development	Budding	Flowering
017 - 319	010, 011, 013	513 and above
	510, 511	

The program prescribes that data is collected once a month – if a wrong assessment is made then it will become obvious next time the branch is assessed. For example you may believe the tip is leaf development and when you revisit it in a month you record it as flowering. This can be expected when developing such skills and adds a level of interpretation and discussion to your data. It is also the benefit of taking images to look back at assessments made.



- 11. After selecting the tip type select the Next arrow.
- 12. Assess the health of the tip by judging the colour and texture of the tip.
- 13. Select the most appropriate option and select the Next arrow
- 14. To take a photo of the tip tap in the main screen and the camera should appear. Consider light and angles and take a photo of the tip. Option to RETRY if image is not acceptable or OK if acceptable.
- 15. This is the last screen for this branch. Select the Save button (down arrow).
- 16. The Branch ID screen (barcode) should now appear.
- 17. Select the second branch to be recorded on the same tree and repeat the process.
- 18. Each tree should have five marked branches,
- 19. When you want to exit the application after saving data select the back option of your device (not back on cybertracker).

Downloading data from your device

Now that you have collected some data points you can download them and export them to excel.

- 1. Open "Cybertracker" on your computer
- 2. Select "Open Database" and select the folder where you saved your database "Mango Trimming Barcode.MDB", select the file and then "Open"
- 3. Plug your mobile device in to your PC using the usb cable
- 4. Under "Applications" in the top left, select "Reports"



5. Under "File" select "Download Data from Connected Device"

You should now have a list of dates and times in the "Query Editor" window

G Query Editor			
Query 1			
Properties		No Filter	Advanced
Name	Query 1	THO FINOI	Haranooa
Date range	All	Date 🔍 Time 🔍	
Date from	01/01/1970	▶ 06/09/2019 11:51:56	
Date to	07/09/2019	06/09/2019 11:52:18	
Inspector			
	1 of 2		

At the bottom of the query editor it should also identify how many entries you have (record 1 of)

User Name	gthbc	
Length of new <u>c</u>	6356	
Budding		
Mostly brown, Ic		
Record 1 of 2		

6. To visualize all the data in the window

Select the first entry.

New Query Del	ete Query New Si	ghtings Delete Sightings Add Photo I	New View Delete View Edit View Export View
Query Editor			
Query 1			
Properties		No Eller	Advanced
Name	Query 1	NOFILE	Advanceu
Date range	All	Date 🔍 Time 🔍	
Date from	01/01/1970	▶ 09/2019 ↓ 11:51:56	
Date to	07/09/2019	06/09/2019 11:52:18	
Inspector			
	1 of 2		
144 4	► ₩		
Double-click b	elow to create column		
Date	06/09/2019		
Time	11:51:56	8	
User Name	gthbc	8	
Length of ne	ew <u>c</u> 6356		
Budding			
Mostly brow	n, Ic		

Now, double click each of the fields under "Time" (ie "User Name", "Length of new growth") that appear on the left hand side.

	10	if 2	
H		•	₩
Doubl	e-click belov	v to create c	olumn
Date	e	06/09/201	9
Time		11:51:56	
Use	r Name	gthbc	
Leng	gth of new <u>c</u>	6356	
Bud	ding		
Mos	tly brown, Ic		

This will add each of your fields into your window.

					o Elitor			Properties
					io Fiitei		Query 1	Name
🔽 Tip Heal 🗸	Type of 🗸	Length c 🗸	User Nai 🗸	/ Time	Date 📐		All	Date range
Mostly brown	Budding	6356	gthbc	9 11:51:56	06/09/201	₽	01/01/1970	Date from
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))	Budding Budding	6356	gthbc	9 11:51:56 9 11:52:18	06/09/201 06/09/201	<u> </u>	01/01/1970 07/09/2019	Date from Date to

7. When you have all the data listed on the right hand side of the window, select to "Export View"

/

<u>File Edit V</u>	iew <u>T</u> ools <u>H</u> el	p									
Reports 🕶		Report 1	•		= Query 1	•		= Query Ed	itor 🔻	_	
New Query	Delete Query	New Sightings	Delete Sig	ghtings	Add Photo	New View	Delete View	Edit View	Export View	Manage Reports	Applications
G Query Ed	ditor							l			8
Query 1											
Properties		N	o Filtor							Aduana	
Name	Query 1		ornicer			_				Advanc	eu
Date rang	e All		Date 🔍	Time	🗸 User Nai 🗸	Length c 🤍	Type of 🗸	Tip Heal 🤍			
Date from	01/01/1	970 🕨	06/09/2019	11:51:56	gthbc	6356	Budding	Mostly brown			
Date to	07/09/2	019	06/09/2019	11:52:18			Budding	Mostly browr			
In the sector.											

You will be asked to save your file as a .csv file. Choose the location where you would like it to be saved, and label it "Mango Trimming Barcode xx_xx_xxxx" with xx_xx_xxx as today's date

The saved .csv file can be opened in excel, where you can edit and analyse your data.

Each time you collect data using the "Mango Trimming Barcode" application on your phone, and download it to your computer, Cybertracking will add any new data points to your database, under the entries you already have.

Analysing the data

There are a number of options for how to interpret and discuss the data collected:

Within a term	Look at how accurate each user group were. Ask questions such as:
	 Did the branches get bigger or smaller
	 Was the average between groups or trees comparable
	 What was the range of measurements
	\circ What predictions can be made about the number of fruit to be
	harvested
	$_{\odot}$ Was there a correlation between branch death and time it was
	trimmed
After a Year	Which trees produced the highest number of fruit
	Compare the harvest between trimming groups
	• Make an informed decision as to when the best time to trim the trees are
	Was there a difference between varieties