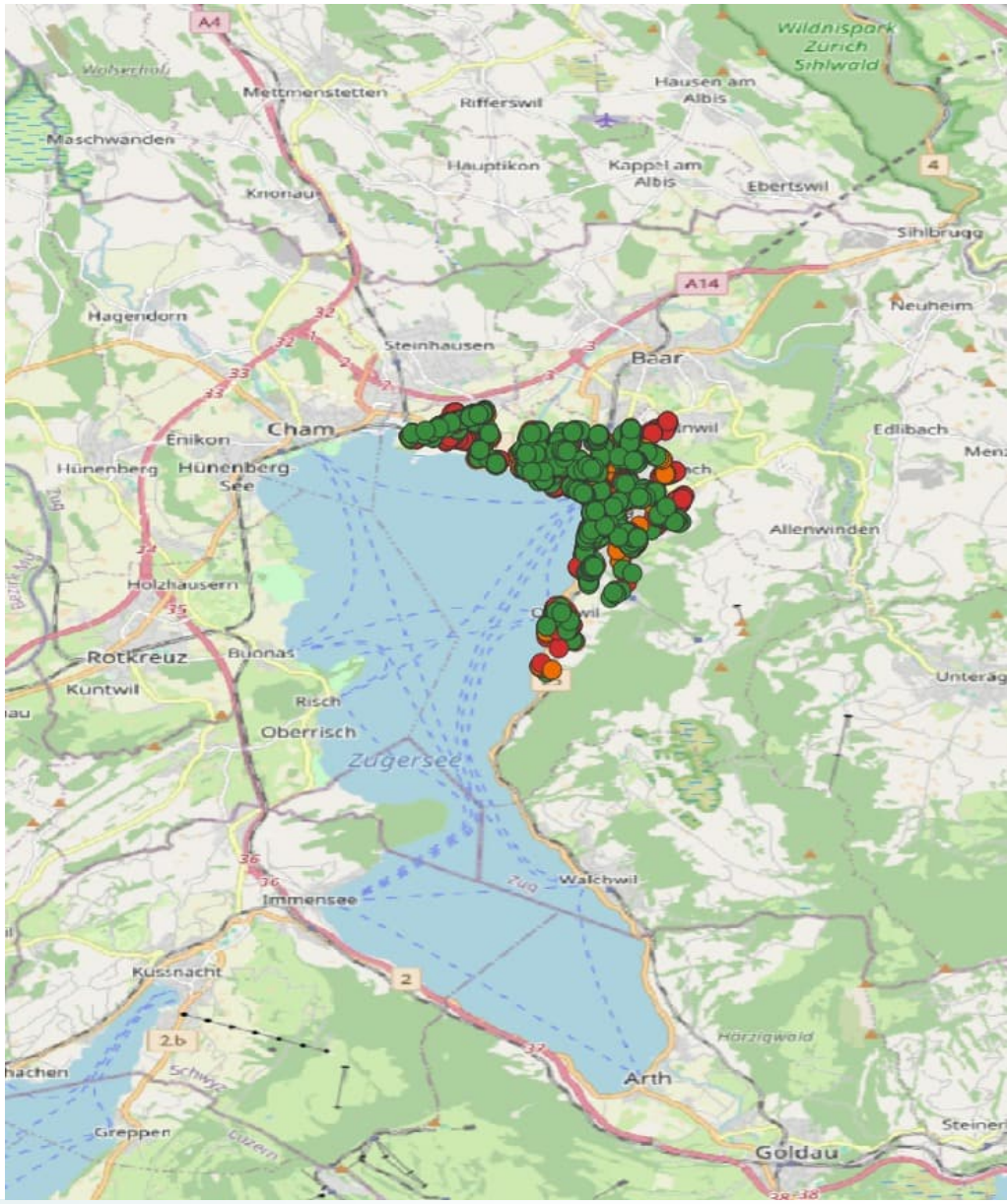
FREE3 tool

A step-by-step user guide

Decision-support tool for assessing urban tree inventories by harmonising species names, screening for potential pest–host associations, and analysing tree diversity and population structure

Part 1 of 3 Inventory table and QGIS plugin (Steps 1-7)

Also Part 2: Shiny app ; **Part 3:** Troubleshooting and reference



Version 2.0 / October 2026

FREE3 user guide

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Click any line to jump to that slide. G1-G3: see Part 1 (QGIS), 2 (Shiny app) or 3 (Troubleshooting).

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Start here

The 10 steps

1 Table

Check your table

Find the species column; note names

slide 8 ›

2 Table

Prepare the table

5 yes/no questions; fix the NOs

slide 10 ›

3 QGIS

Install QGIS + plugin

Once: QGIS 3.44 LTR + plugin ZIP

slide 16 ›

4 QGIS

Harmonise names

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slide 21 ›

5 QGIS

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6 QGIS

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7 QGIS

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8 Shiny app

Install R, run the app

Once: R + RStudio; then Run App

Guide 2 ›

9 Shiny app

Upload, map columns

Browse… › choose the columns

Guide 2 ›

10 Shiny app

Results and report

Read, download, check

Guide 2 ›

Where are you now?

First time on this computer

Before you start · slide 5 ›

New inventory, tools installed

Step 1 · slide 8 ›

I have the harmonised CSV

Step 8 · Guide 2 ›

I have done this before

Quick reference · Guide 3 ›

Something doesn’t work

Troubleshooting · Guide 3 ›

From tree inventory to pest–host screening

Prepare › Harmonise › Screen › Inspect › Export › Analyse

Prepare your tree inventory in a supported format with a species column.

Match species names against the reference taxonomy.

Cross-reference each tree against the FREE3 pest–host database.

Explore the screening map in QGIS and inspect individual trees.

Export the harmonised inventory as a CSV file.

Upload the CSV to the Shiny app, map the columns, review the analyses and export the report.

Input | **QGIS plugin** | **Shiny app**

your_inventory.xlsx | harmonized_inventory.gpkg | …_pest_risk.gpkg | pest_risk_summary.csv | harmonized_inventory.csv | FREE3 _report.docx

Why harmonise first?

Tree inventories often contain spelling variants, synonyms, cultivar names, abbreviations and hybrids. Harmonisation standardises these names against the reference taxonomy, allowing records to be matched more reliably with the FREE3 pest–host database.

Before you start

QGIS

Use QGIS 3.44 LTR. Do not use QGIS 4.x unless the FREE3 team confirms plugin compatibility.

qgis.org

The plugin ZIP

The Tree Inventory Harmonizer archive. Keep it zipped — do not extract it.

Supplied by the FREE3 team

R

The statistical environment required to run the Shiny app. Install R before RStudio.

cran.r-project.org

RStudio

Used to open and launch the Shiny application. Install after R.

posit.co

The app script

app3.1.R — the Shiny application file.

Supplied by the FREE3 team

! **Install R before RStudio.**
RStudio needs an existing R installation in order to run the app.

i **Note**
On managed computers, software installation may require approval from your IT department.

How to read this guide

How to follow the steps

1 **Step number.** Follow the numbered steps in order.

1 **Screenshot marker.** The same number appears on the screenshot to show where to click.

File names. File and folder names are shown in this typeface (file_name.gpkg).

Buttons and menus. Buttons, menus and fields are shown in quotation marks (’Run harmonization’).

Boxes you will see

i **Note** background on what the tool is doing.

★ **Tip** A shortcut or a useful way to simplify a step.

! **Important** something that is easy to miss or get wrong.

How the guide is organised

Steps 1–2
Your inventory table
Check your own table and fix only what is needed (P1–P5).

Steps 3–7
The QGIS plugin
Install, harmonise names, screen for pest hosts, export the CSV (A1–A14).

Steps 8–10
The Shiny app
Run the app, map columns, read the results, get and check the report (B1–B7).

Reference
At the back
Quick reference, troubleshooting and glossary.

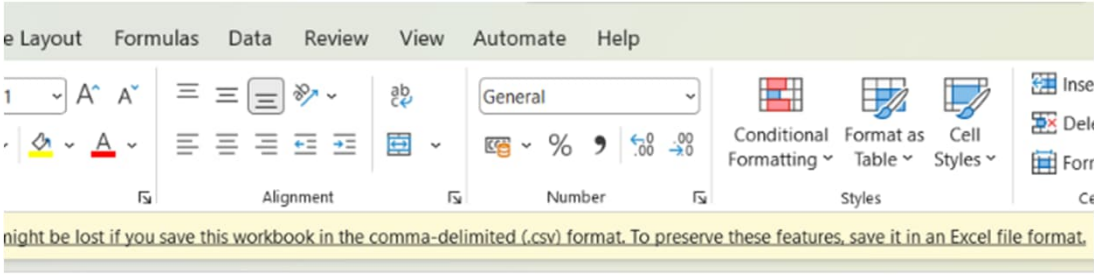
Preparation

Inventory table

Steps 1–2 · P1–P5

1 Check your own table

2 Prepare it — only where needed



E	F	G	H	I	J	K	L
y_WGS84	coord.poin	x_WGS84_	y_WGS84_	species_fu	lang	DBH	plant_year
41.9816	yes	12.06591	41.98326	Acer negur	Italian	30	NA
41.97918	yes	12.06591	41.98326	Acer negur	Italian	31	NA
41.97931	yes	12.06591	41.98326	Acer negur	Italian	45	NA
41.97453	yes	12.06591	41.98326	Acer negur	Italian	35	NA
41.97549	yes	12.06591	41.98326	Acer sp.	Italian	33	NA
41.99662	yes	12.06591	41.98326	Ailanthus a	Italian	58	NA
41.99686	yes	12.06591	41.98326	Ailanthus a	Italian	62	NA
41.97783	yes	12.06591	41.98326	Albizia julit	Italian	35	NA
41.97615	yes	12.06591	41.98326	Albizia julit	Italian	40	NA
41.97633	yes	12.06591	41.98326	Albizia julit	Italian	30	NA
41.98248	yes	12.06591	41.98326	Albizia julit	Italian	30	NA
41.98245	yes	12.06591	41.98326	Albizia julit	Italian	20	NA
41.97937	yes	12.06591	41.98326	Albizia julit	Italian	21	NA
41.97628	yes	12.06591	41.98326	Betula pen	Italian	30	NA
41.99817	yes	12.06591	41.98326	Cedrus atl	Italian	34	NA
41.99811	yes	12.06591	41.98326	Cedrus atl	Italian	44	NA
41.99803	yes	12.06591	41.98326	Cedrus atl	Italian	47	NA
41.99814	yes	12.06591	41.98326	Cedrus atl	Italian	39	NA
41.98851	yes	12.06591	41.98326	Cedrus atl	Italian	21	NA
41.99163	yes	12.06591	41.98326	Cedrus atl	Italian	60	NA
41.99161	yes	12.06591	41.98326	Cedrus atl	Italian	50	NA
41.99124	yes	12.06591	41.98326	Cedrus atl	Italian	55	NA
41.98692	yes	12.06591	41.98326	Cedrus atl	Italian	29	NA
41.98251	yes	12.06591	41.98326	Cedrus atl	Italian	40	NA
41.9808	yes	12.06591	41.98326	Cedrus atl	Italian	55	NA

Step P1

Check your own table

Open your inventory as it is. Find each column below and note its name — you pick the same names in QGIS (A6) and in the app (B5).

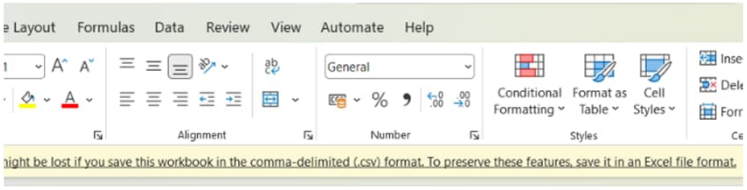
What	What it looks like	Name in your file	Needed for
Species	Latin names, e.g. *Tilia cordata*, *Acer* sp. Often called species, species_full, specie, Art.	_____	Required — every analysis
Genus	Tilia	_____	10–20–30 and Melbourne at genus level
Family	Malvaceae	_____	10–20–30 and Melbourne at family level
DBH	Trunk diameter. Which unit: cm, mm or circumference?	_____ unit: ____	Size classes and basal area
Frequency	Number of trees per row — only in species-count tables.	_____	Species-count datasets
x / y	Coordinates — or a spatial file (SHP, GPKG, GeoJSON).	_____	The map in QGIS

File formats
SHP · GPKG · GeoJSON · CSV · XLSX all open in the QGIS plugin. In an XLSX, keep the data on the first sheet.

Nothing to rename or copy
Only species is required. Missing columns simply leave out those analyses. The next slide shows a real example.

Example inventory and the information required for a complete report

An example municipal tree inventory. The table on the right shows the variables used by the Shiny app and indicates which are already available in this dataset.



S84	y_WGS84	coord.poin	x_WGS84_	y_WGS84_	species_fu	lang	DBH	plant_year
5429	41.9816	yes	12.06591	41.98326	Acer negur	Italian	30	NA
5879	41.97918	yes	12.06591	41.98326	Acer negur	Italian	31	NA
5375	41.97931	yes	12.06591	41.98326	Acer negur	Italian	45	NA
5895	41.97453	yes	12.06591	41.98326	Acer negur	Italian	35	NA
5494	41.97549	yes	12.06591	41.98326	Acer sp.	Italian	33	NA
9976	41.99662	yes	12.06591	41.98326	Ailanthus a	Italian	58	NA
9903	41.99686	yes	12.06591	41.98326	Ailanthus a	Italian	62	NA
5881	41.97783	yes	12.06591	41.98326	Albizia julit	Italian	35	NA
5827	41.97615	yes	12.06591	41.98326	Albizia julit	Italian	40	NA
5894	41.97633	yes	12.06591	41.98326	Albizia julit	Italian	30	NA
5254	41.98248	yes	12.06591	41.98326	Albizia julit	Italian	30	NA
0531	41.98245	yes	12.06591	41.98326	Albizia julit	Italian	20	NA
5177	41.97937	yes	12.06591	41.98326	Albizia julit	Italian	21	NA
5691	41.97628	yes	12.06591	41.98326	Betula pen	Italian	30	NA
9938	41.99817	yes	12.06591	41.98326	Cedrus atl	Italian	34	NA
9931	41.99811	yes	12.06591	41.98326	Cedrus atl	Italian	44	NA
9941	41.99803	yes	12.06591	41.98326	Cedrus atl	Italian	47	NA
9945	41.99814	yes	12.06591	41.98326	Cedrus atl	Italian	39	NA
7774	41.98851	yes	12.06591	41.98326	Cedrus atl	Italian	21	NA
9989	41.99163	yes	12.06591	41.98326	Cedrus atl	Italian	60	NA
9992	41.99161	yes	12.06591	41.98326	Cedrus atl	Italian	50	NA
9952	41.99124	yes	12.06591	41.98326	Cedrus atl	Italian	55	NA
9621	41.98692	yes	12.06591	41.98326	Cedrus atl	Italian	29	NA
5475	41.98251	yes	12.06591	41.98326	Cedrus atl	Italian	40	NA
5497	41.9808	yes	12.06591	41.98326	Cedrus atl	Italian	55	NA

Variables required by the Shiny app

Column	Needed for	In this inventory
Species	Taxonomic harmonisation, pest–host screening	species_full
Genus	Genus limit; 10–20–30 rule	- (added by plugin)
Family	Family limit; Melbourne check	- (added by plugin)
DBH (cm)	Size classes, basal area	DBH
Frequency	Species-count datasets only	- (nor needed)
x / y	QGIS map, Tool 1 only	x_WGS84 / y_WGS84

What is missing, and why it matters

Species and DBH are sufficient for the dataset summary, species-frequency analysis, top-10 assessment, DBH distribution, basal area and pest–host screening.

Step P2

Is your table ready?

Answer five questions about your own table. Fix only what gets a NO.

	Question	If the answer is no	
1	**Is the header in row 1 of the first sheet?**	Delete title rows above it; move the data to the first sheet.	**P4 · slide 12 ›**
2	**Is every tree in its own row?**	A species-count table is fine — choose ‘Species frequencies’ in B5. Mixed rows: see P3.	**P3 · slide 11 ›**
3	**Are species names in their own column, one per cell, without notes?**	Move notes to another column; split cells with two species.	**P3 · slide 11 ›**
4	**Is DBH a number in centimetres — or is there no DBH?**	Convert mm or circumference; remove ‘cm’ text from the cells.	**P4 · slide 12 ›**
5	**Are there no merged cells, totals or empty rows in the list?**	Unmerge, then delete totals and empty rows.	**P4 · slide 12 ›**

✓ **All yes**

Your table is ready. Save it if you changed anything (P5) and continue with Step 3 — install QGIS and the plugin.

Step 3 · slide 16 ›

★ **Very messy, or not in a table yet?**

Start from the FREE3 template or try fixing the old file.

Template · slide 13 ›

Step P3 · if needed

Standardise the values

Write every cell of a column the same way. Column names here are examples, keep your own.

Column	Write it like this	Avoid
species	Tilia cordata · Platanus × hispanica · Acer platanoides 'Crimson King' · Acer sp.	common names only (lime), two species in one cell, notes such as ‘dead?’
genus / family	Tilia · Malvaceae — one word, capital first letter	abbreviations (Mal.), mixed languages, empty for some rows only
dbh_cm	34.5 — a number, in centimetres, one value per tree	‘34 cm’, ranges (30–40), mm or circumference values, 0 for unknown
frequency	12 — whole number, species-count datasets only	text, decimals, a value on individual-tree rows
x / y	12.1012 / 41.9935 — decimal degrees, WGS84 (x = longitude)	degrees-minutes-seconds, swapped x and y, mixed coordinate systems
empty values	leave the cell empty	n/a, –, 0, ‘unknown’, ‘?’
non-tree rows	move to a separate sheet	stumps, empty planting pits and totals inside the tree list

Standardise the structure, not the spelling

Small spelling variants and synonyms are corrected by the plugin in Step A6. Your job is clean, consistent cells.

Step P4 · if needed

Clean the table in Excel

Work on a copy of the original file. Each line is a menu path in Excel for Windows or Mac.

1	**Unmerge cells**	**Select all** (Ctrl + A) › **Home** › **Merge & Center** › **Unmerge Cells**
2	**Remove stray spaces**	**Empty column: =TRIM(B2)** › **fill down** › **Copy** › **Paste Values over species**
3	**Fill or delete rows without species**	**Data** › **Filter** › **species header arrow** › **(Blanks)** › **fill in or delete**
4	**Turn text into numbers**	**Select the DBH cells** (green corner = text) › **warning icon** › **Convert to Number**
5	**Convert DBH to cm**	**Empty column: =E2/10** (from mm) › **or =E2/PI()** (from circumference) › **fill down** › **Paste Values over dbh_cm**
6	**Spot typos in genus and family**	**Data** › **Filter** › **genus header arrow** — look for near-duplicates (Tilia / tilia)
7	**Delete everything that is not a tree**	Totals, notes, extra header rows, empty rows at the bottom.

! **Don’t use ‘go to special › blanks › delete row’**
It also deletes real trees that only have an empty DBH cell. Filter on the species column instead (line 3).

★ **Stop Excel turning numbers into dates**
Before pasting, select the DBH, x and y columns › Home › Number Format › ‘Number’.

Optional

Start from the template

Only if your table is very messy or not digital yet. Otherwise skip this page, your own table works as it is.

	A	B	C	D	E	F	G	H
1	**tree_id**	**species**	**genus**	**family**	**dbh_cm**	**frequency**	**x**	**y**
2	T0001	Tilia cordata	Tilia	Malvaceae	34.5		12.1012	41.9935
3	T0002	Platanus × hispanica	Platanus	Platanaceae	61		12.1018	41.9941
4	T0003	Acer platanoides 'Crimson King'	Acer	Sapindaceae	18		12.1025	41.9930
5	T0004	Quercus ilex	Quercus	Fagaceae	47.2		12.1031	41.9927

Row 1 = headers only

One header row with short, unique names. No title, logo or empty row above it.

One row = One tree

Each tree gets its own row and a unique tree_id. Leave frequency empty.

Then continue with P5

Paste your data as values from cell A2 (Home › Paste › Paste Values), then save.

Species counts instead of individual trees?

Use one row per species, put the number of trees in frequency, and leave dbh_cm, x and y empty. Choose ‘Species frequencies’ as dataset type in Step B5.

Step P5

Check and save the table

If you changed anything, run through this list once more and save. Then go to Step 3.

Checklist

- [ ] Data is on the first sheet; the header is in row 1
- [ ] Column names are short and unique
- [ ] One tree per row (or one species per row with a frequency)
- [ ] Every row has a species name
- [ ] No merged cells, totals, notes or empty rows in the list
- [ ] DBH is a number in centimetres
- [ ] Unknown values are empty cells
- [ ] Coordinates, if present, are decimal degrees in WGS84

Save it

File › Save As › Excel Workbook (*.xlsx)

Name it with place and date:
city_inventory_2026-10_clean.xlsx

Keep the original file untouched in the same folder, so the cleaning can be checked later.

You don’t need to make the CSV yourself
The plugin reads .xlsx directly. The CSV for the Shiny app is written by QGIS in Step A14, with the harmonised names already in it.

Part A

The QGIS plugin

Steps 3–7 · A1–A14

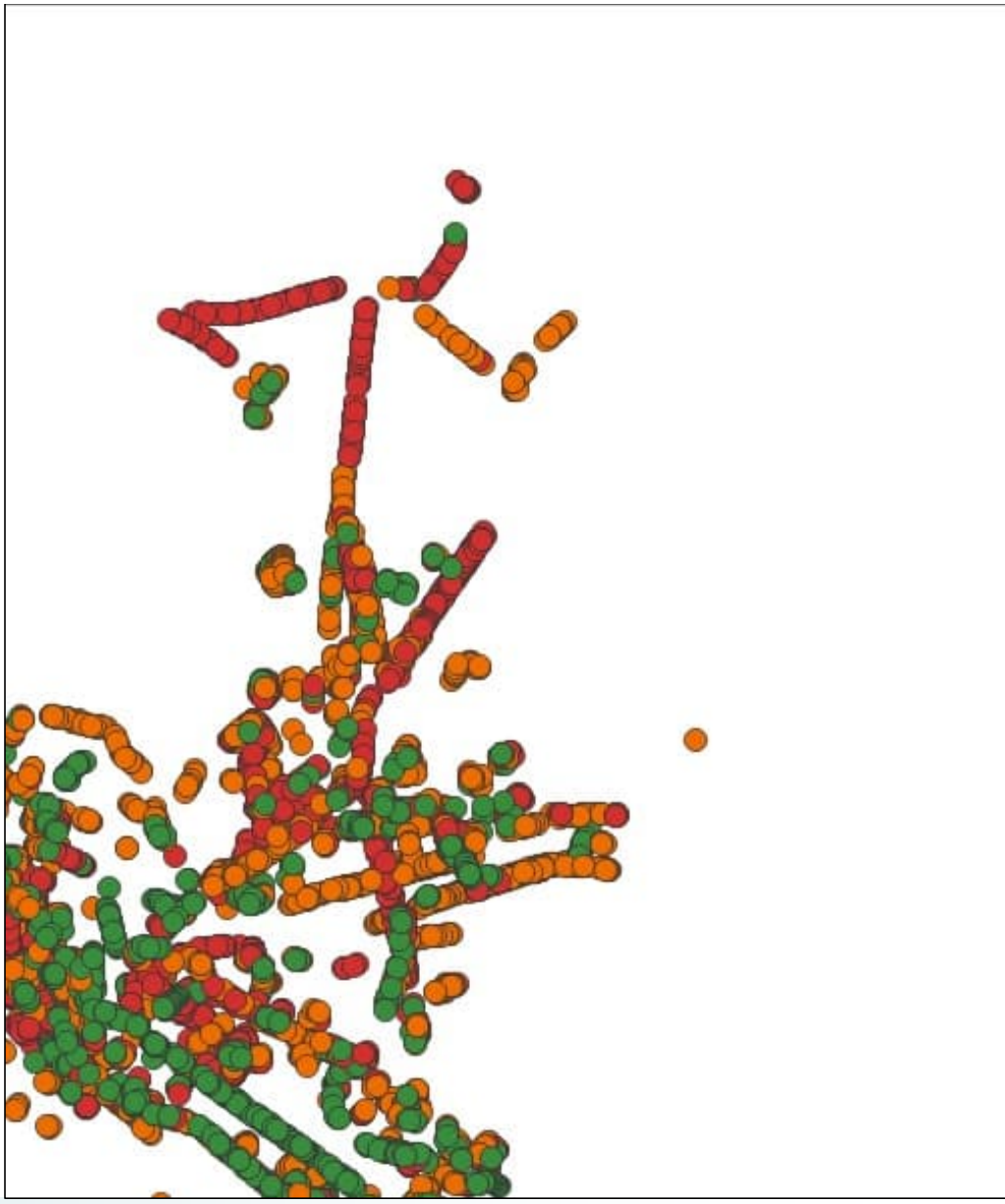
3 Install QGIS and the plugin

4 Harmonise names

5 Check the matches

6 Screen for pest hosts

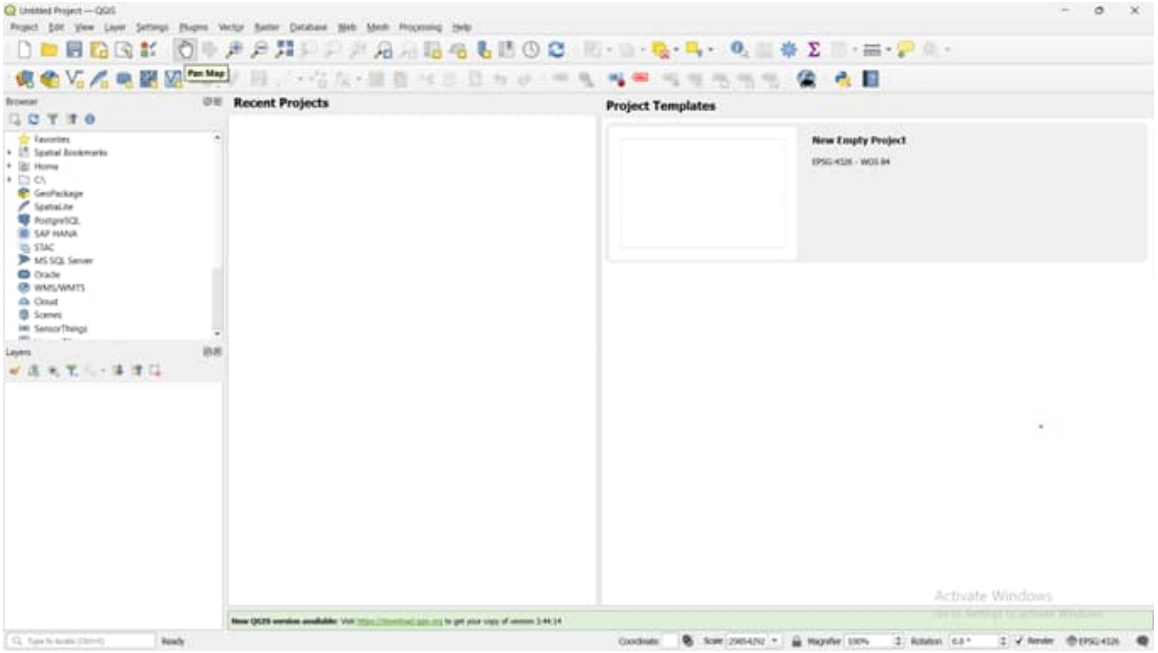
7 Export the CSV



Step A1

Install QGIS

1. **Open qgis.org in a browser.**
2. **Download the long-term release (LTR) for your operating system. The LTR is more stable than the latest release and is what the plugin is tested against.**
3. **Run the installer** and accept the default options.
   The download is relatively large, so installation may take a few minutes.
4. **Open QGIS.** The start screen will display “Recent Projects”.
   You do not need to create a project before using the plugin.



What is QGIS?
A free, open-source geographic information system used to view and work with spatial data. The FREE3 plugin runs within QGIS, and no previous GIS experience is required.

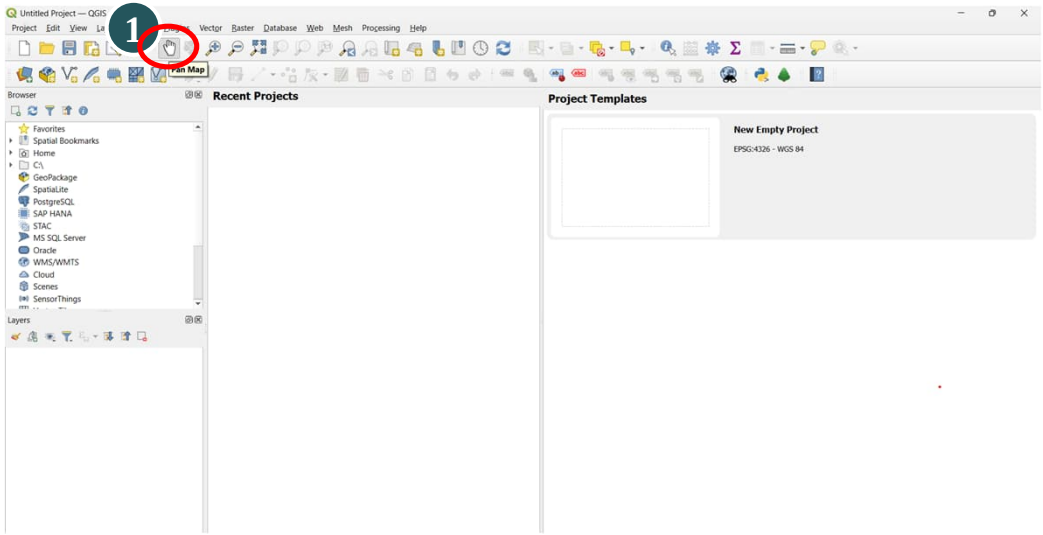
Already have QGIS?
Skip to Step A2. If the plugin does not install, check your QGIS version under Help → About.

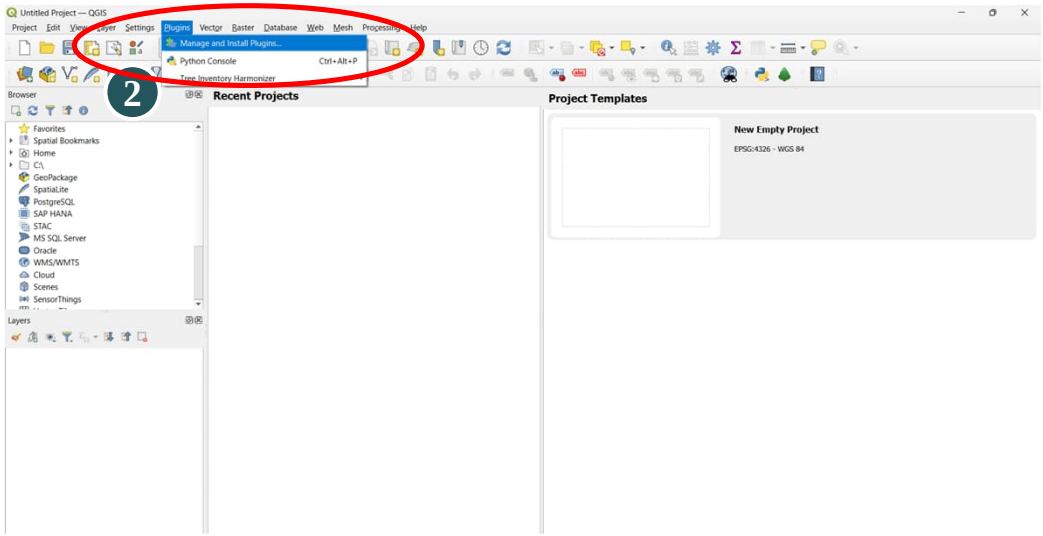
Step A2

Open the Plugin Manager

1. **In the QGIS menu bar, click 'Plugins'.**

2. **Choose 'Manage and Install Plugins…'** The Plugins dialog opens. This is where every QGIS add-on is installed and switched on.





> **Note**
> The 'Plugins' menu is always in the top menu bar, between ‘Settings' and 'Vector'. It does not depend on having a project or a map open.

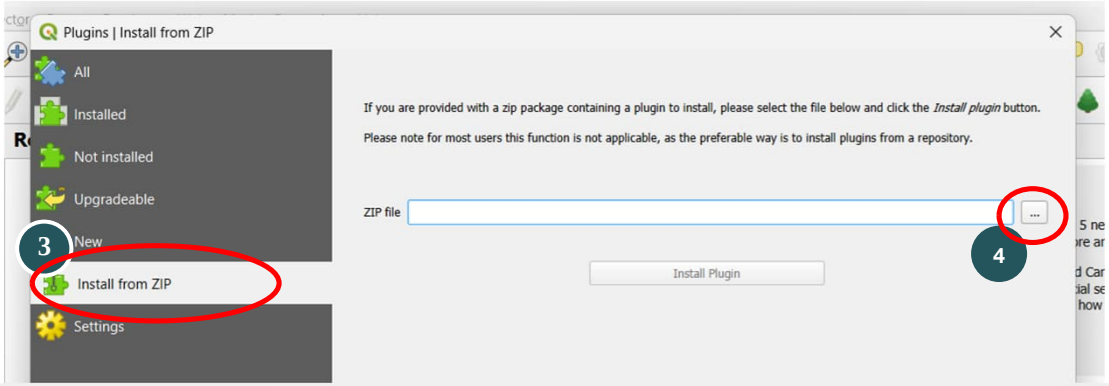
Step A3

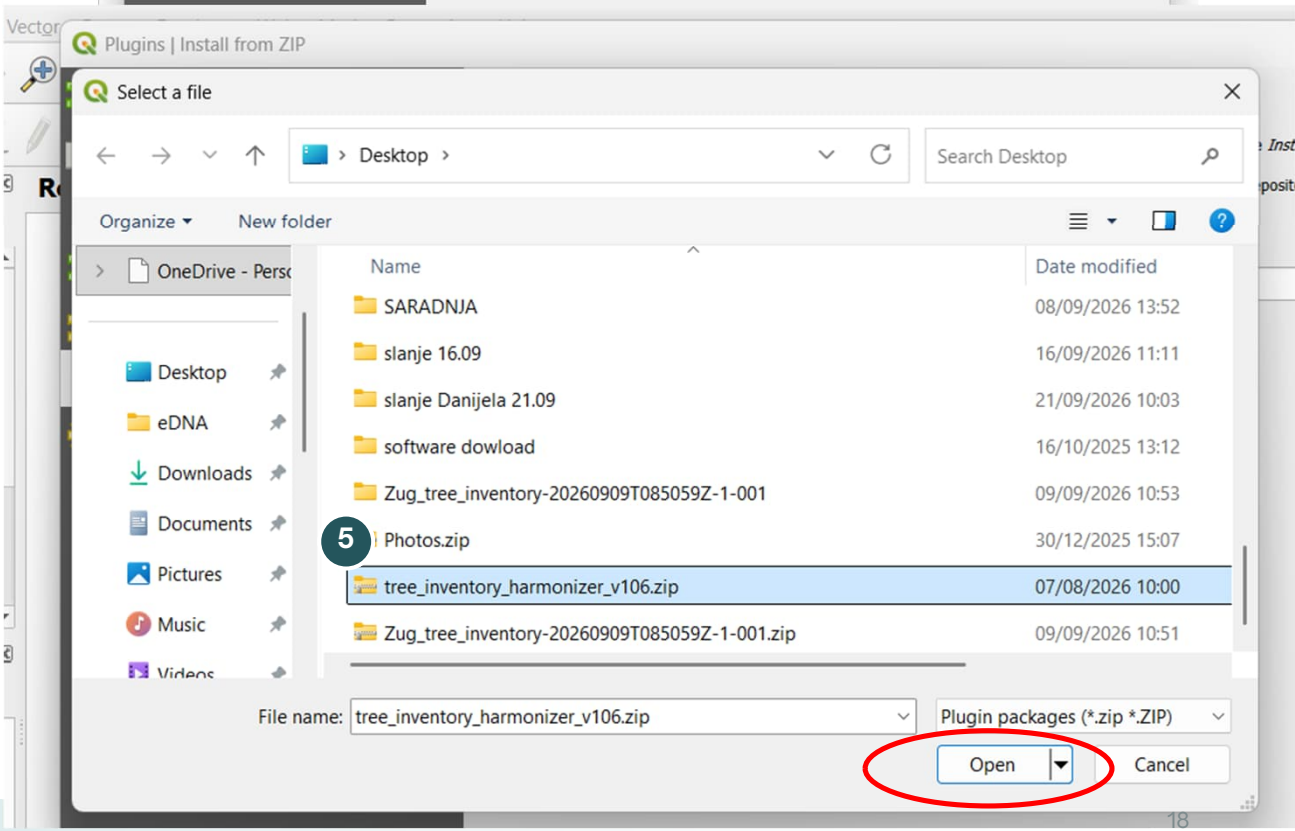
Install the plugin from the ZIP file

3 **In the left-hand list of the Plugins dialog, click 'Install from ZIP'.**

4 **Click the '…' button** at the end of the 'ZIP file' field to browse your computer.

5 **Select tree_inventory_harmonizer_….zip** and click 'Open'. The file type shown should be 'Compressed (zipped) Folder'.





! Do not unzip the file

QGIS installs the plugin from the ZIP archive itself. If you extract it first there will be no .zip to select and pointing at the extracted folder will not work.

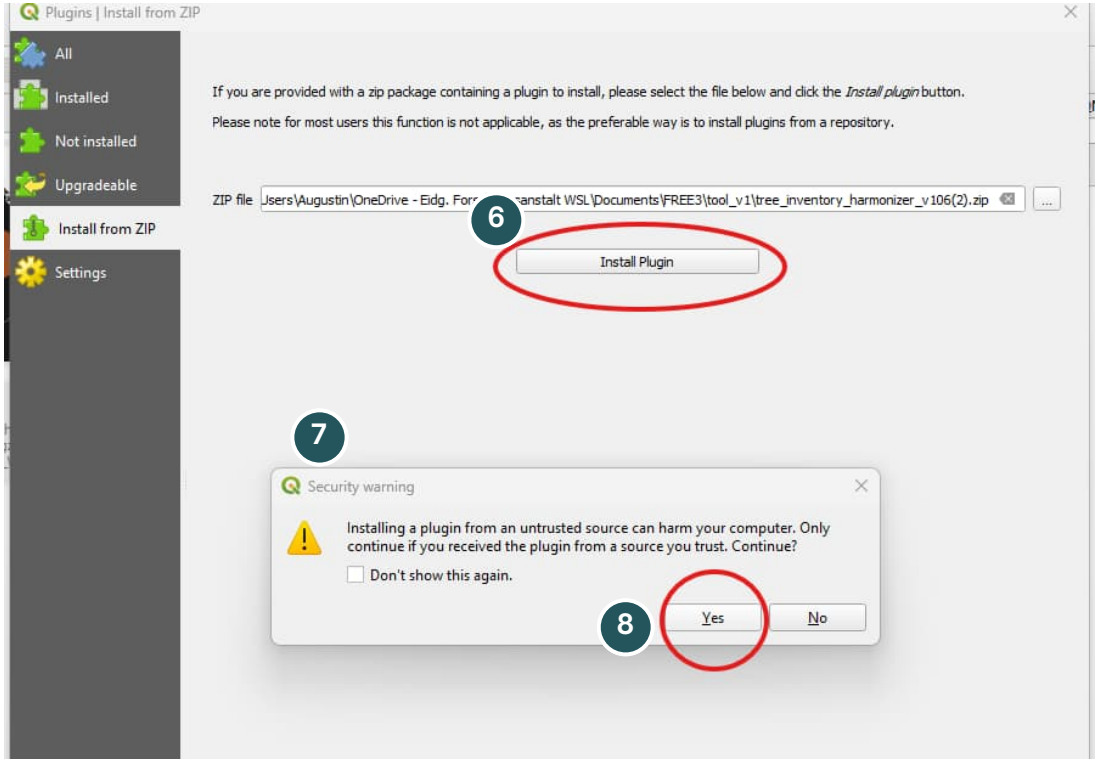
Step A4

Confirm the installation

6 **Click 'Install Plugin'.**

7 **A 'Security warning' appears.** QGIS shows this for every plugin installed from a ZIP file rather than from the official repository. It is not a sign that anything is wrong.

8 **Click 'Yes' to continue.** Installation takes a few seconds. You can then close the Plugins dialog.



Why the warning appears

Plugins from the QGIS repository are reviewed centrally; a ZIP could come from anywhere, so QGIS asks you to confirm you trust the source. Only continue if you received the ZIP from the FREE3 team.

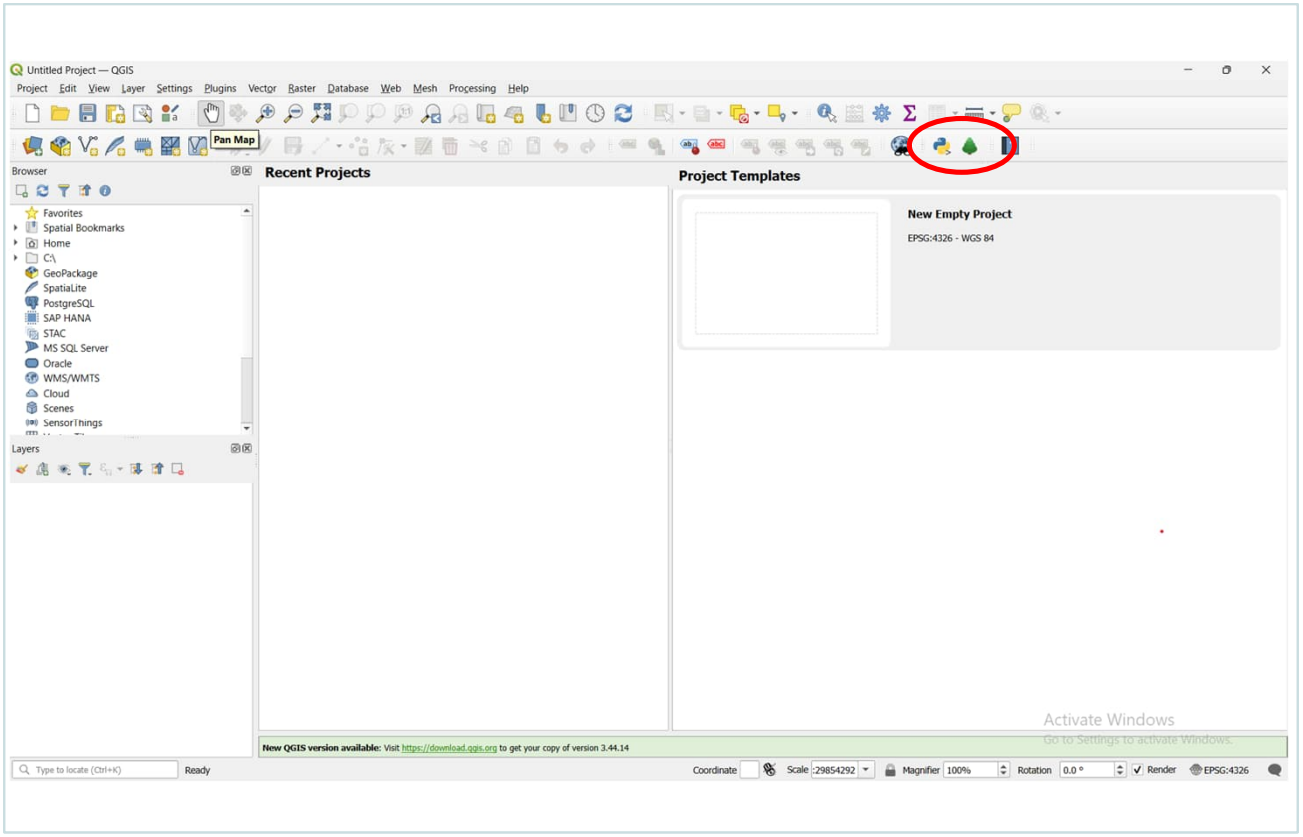
Tip

Leave 'Don't show this again' unticked so the check still runs for other plugins.

Step A5

Check that the plugin is installed

A new button should appear in the QGIS toolbar. Use this button to open the Tree Inventory Harmonizer.





Look for this button

A small green tree icon should appear in the QGIS toolbar.

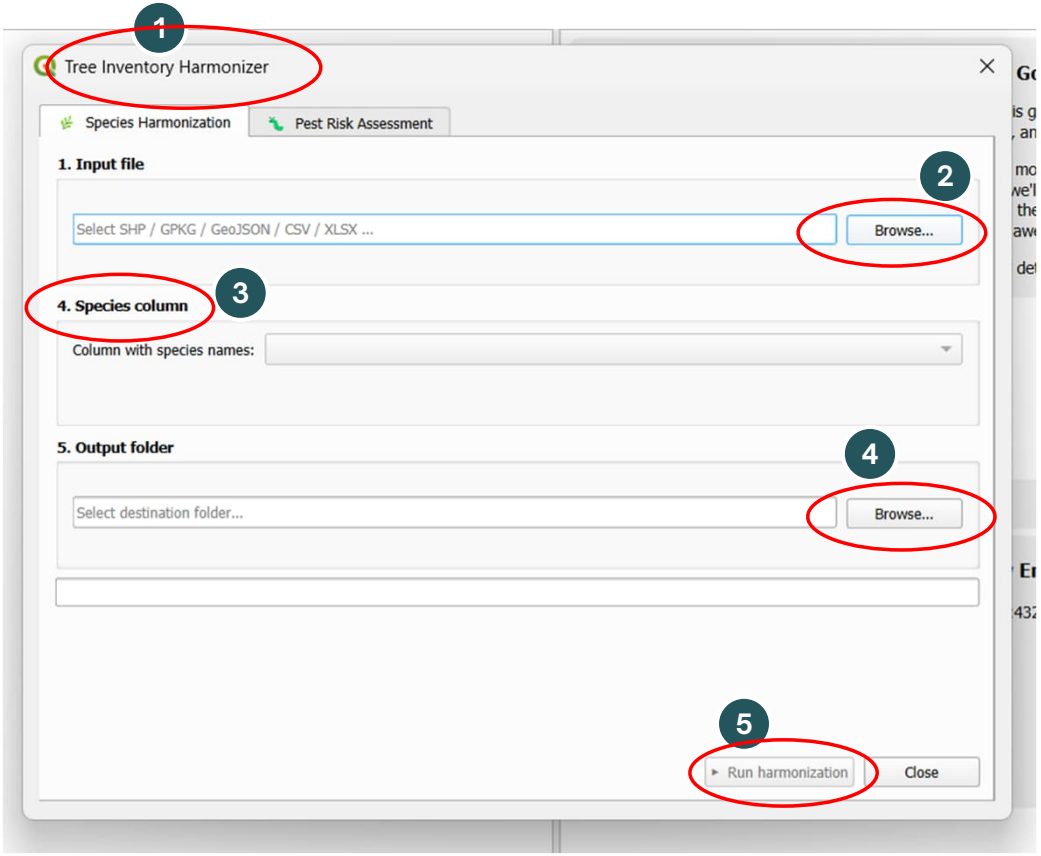
Button not there?

If the button does not appear
Try the following:
Restart QGIS.
Open **Plugins → Manage and Install Plugins → Installed** and make sure **Tree Inventory Harmonizer** is enabled.
Check **View → Toolbars** and make sure the plugin toolbar is visible.
If installation failed, return to the Plugins window and check the error message.

Step A6

Harmonise your species names

1. **Click the plugin button** in the toolbar. The 'Tree Inventory Harmonizer' window opens on the 'Species Harmonization' tab.
2. **Input file — 'Browse…'** and select your tree inventory. SHP, GPKG, GeoJSON, CSV and XLSX all work. For CSV or XLSX, also choose the x / y columns and the CRS (EPSG:4326).
3. **Species column** — choose the column that holds the species names — the name you noted in Step P1.
4. **Output folder — 'Browse…'** and choose where the results should be written. This field is obligatory.
5. **Click 'Run harmonization'.** A progress bar runs to 100%. Large inventories take a minute or two.



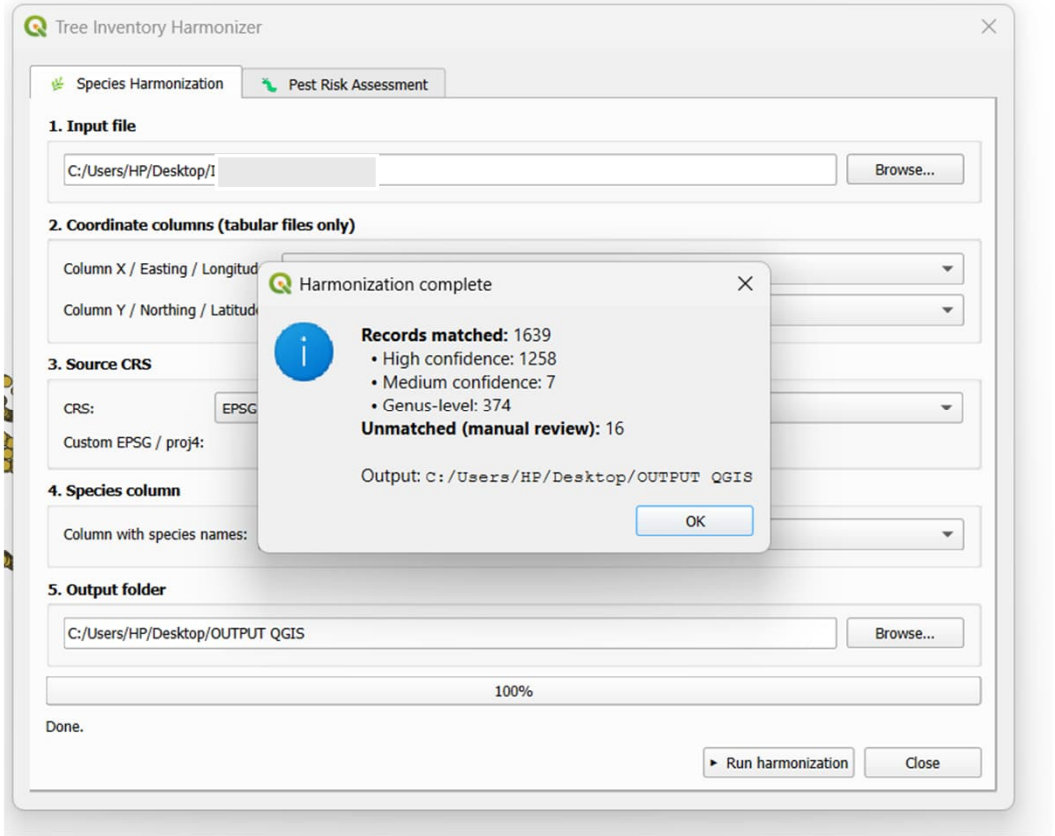
★ **Use an empty folder**

The plugin writes several files. Giving each city or each run its own folder keeps the outputs from overwriting one another.

Step A7

Read the harmonisation result

After harmonisation, the plugin reports how many records were matched and the confidence level of each match.



How to interpret the harmonisation results

Line	Meaning	Recommended action
High confidence	Exact match to an accepted species name, or an unambiguous correction.	None
Medium confidence	Match based on a synonym, cultivar suffix or likely spelling error.	Spot-check
Genus-level	Only the genus could be resolved; screening is therefore less specific.	Spot-check
Unmatched	No reliable match was found. These records are not included in pest–host screening.	Review

Unmatched records have not been screened

Unmatched records are not assigned a pest–host class because their species names could not be reliably resolved. Review these records before interpreting the screening results.

Pests included in the host screening

Each harmonised tree record is screened against 11 regulated pests after taxonomic name matching to the reference dataset.

PEST	COMMON NAME	ORGANISM GROUP
Agrilus planipennis	emerald ash borer	Insect
Anoplophora glabripennis	Asian longhorned beetle	Insect
Anoplophora chinensis	citrus longhorned beetle	Insect
Aromia bungii	red-necked longhorn beetle	Insect
Bursaphelenchus xylophilus	pine wood nematode	Nematode
Ceratocystis platani	canker stain of plane	Ascomycete
Dendrolimus sibiricus	Siberian silk moth	Insect
Phytophthora ramorum	sudden oak death	Oomycete
Popillia japonica	Japanese beetle	Insect
Rhynchophorus ferrugineus	red palm weevil	Insect
Xylella fastidiosa	olive quick decline	Bacteria

Watch out Absence of a match should not be interpreted as absence of risk.

Reference taxonomy

126 families

540 genera

2,219 species

TREE NAME → REFERENCE TAXONOMY → 11 SELECTED PESTS → PEST–HOST MATCH

How this affects the result

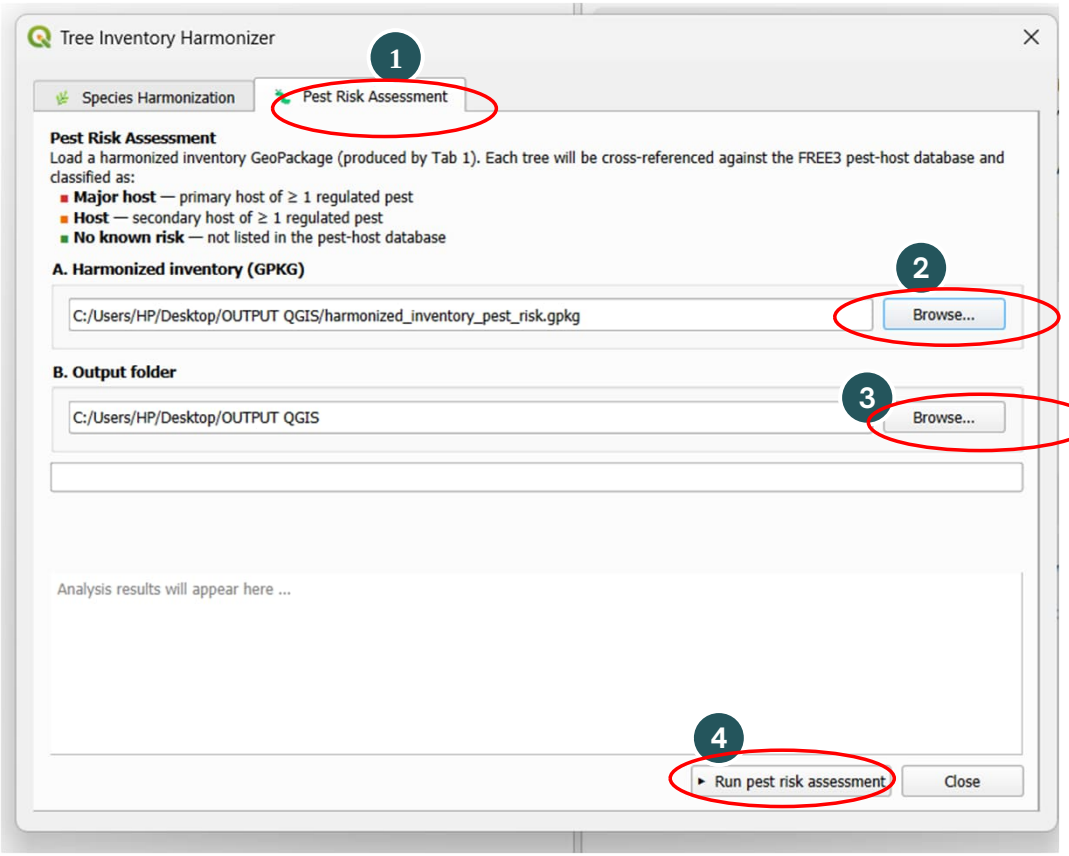
Only the pests listed here are included in the screening. An unresolved tree name, or the absence of a pest from the screening list, should therefore not be interpreted as evidence of no phytosanitary risk.

Step A8

Run the pest risk assessment

1. **Open the 'Pest Risk Assessment' tab** at the top of the plugin window.
2. **Harmonized inventory (GPKG) — 'Browse…'** and select harmonized_inventory.gpkg from the output folder you chose in step A6.
3. **Output folder — 'Browse…'** and choose where the risk results should be written.
4. **Click 'Run pest risk assessment'.** Every tree is cross-referenced against the FREE3 pest-host database and given a screening class.

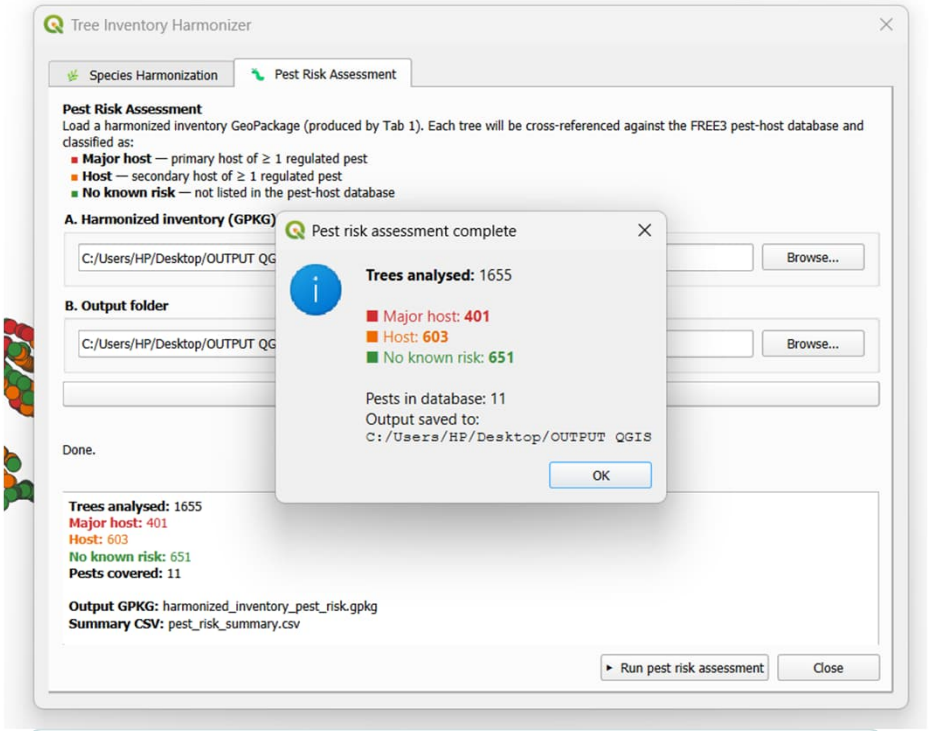
> **! Use the gpkg, not your original file**
> This tab only accepts the harmonised GeoPackage produced by the first tab. Pointing it at your original inventory will fail, because the harmonised species names are not in that file.



Step A9

Read the risk summary

The plugin summarises the screening results and adds a colour-coded layer to the QGIS map.



Check the totals add up

Major host + Host + No known risk should equal the total number of trees analysed. If not, repeat Step A8.

The three screening classes

Major host

Primary host of at least one regulated pest.
Highest priority for further inspection and monitoring.

Host

Secondary host of at least one regulated pest.
Potentially relevant for monitoring, depending on the pest and local context.

No known risk

Not listed as a host in the FREE3 pest–host database.
This does not mean that the species is pest-free or risk-free.

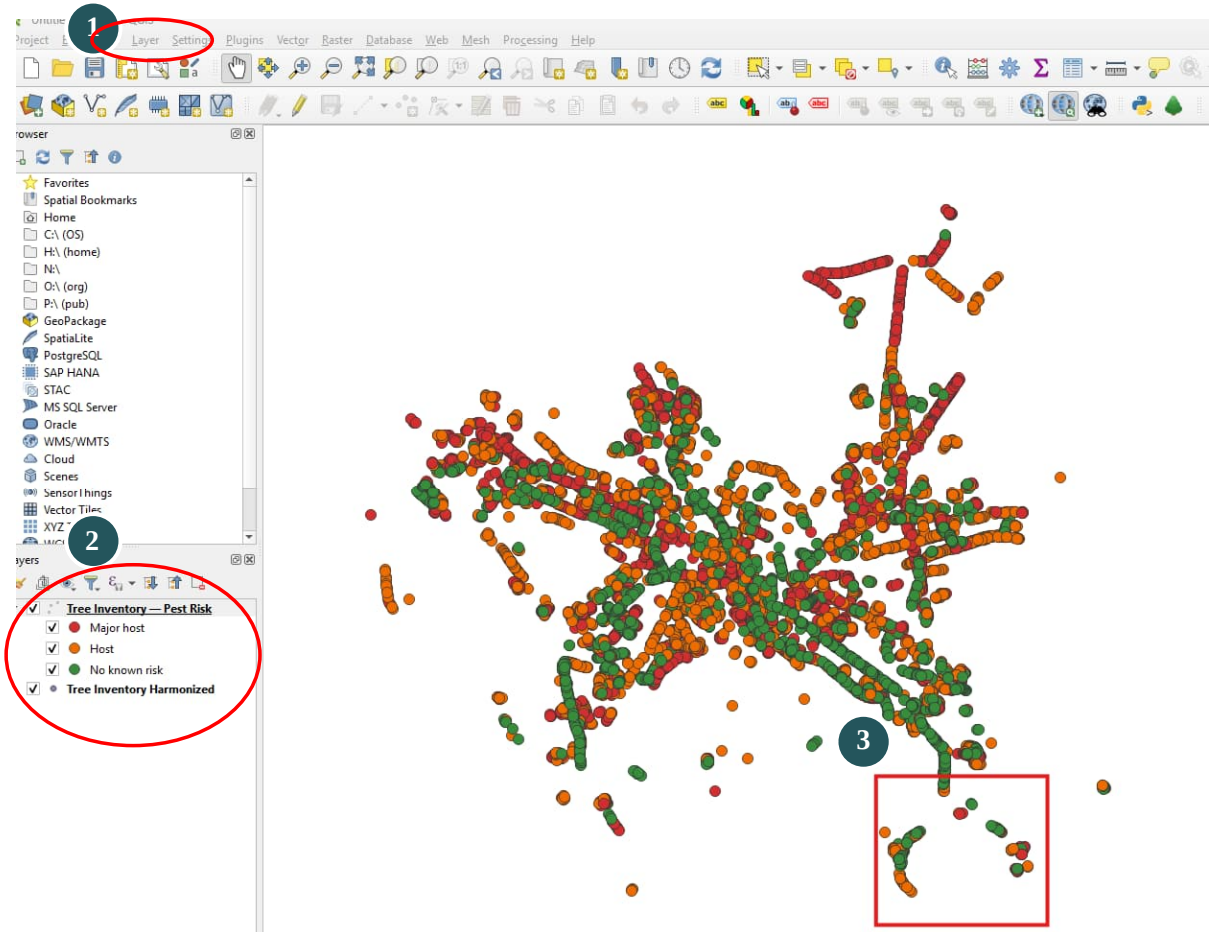
‘No known risk’ means ‘not listed in the database’

Interpret this category as absence of a known pest–host match in the database, not as evidence that the tree is safe from pests.

Step A10

Read the risk map

The plugin adds a layer called ‘Tree Inventory - Pest Risk’ allowing you to explore spatial patterns across the inventory.



1. **Find the new layer** in the *Layers* panel. It appears above the harmonised inventory.

2. **Read the legend** under the layer name: *Major host*, *Host* and *No known risk*.

3. **Look for spatial clusters** of red and orange trees. These may indicate areas where pest–host associations are concentrated.

Too many points to interpret?

Temporarily hide the ‘No known risk’ class in the layer legend to make spatial patterns among matched host trees easier to see.

Colour vision

Red, orange and green can be difficult to distinguish for some readers. When exporting figures, identify the classes in the caption as well as by colour.

Step A11

Zoom in

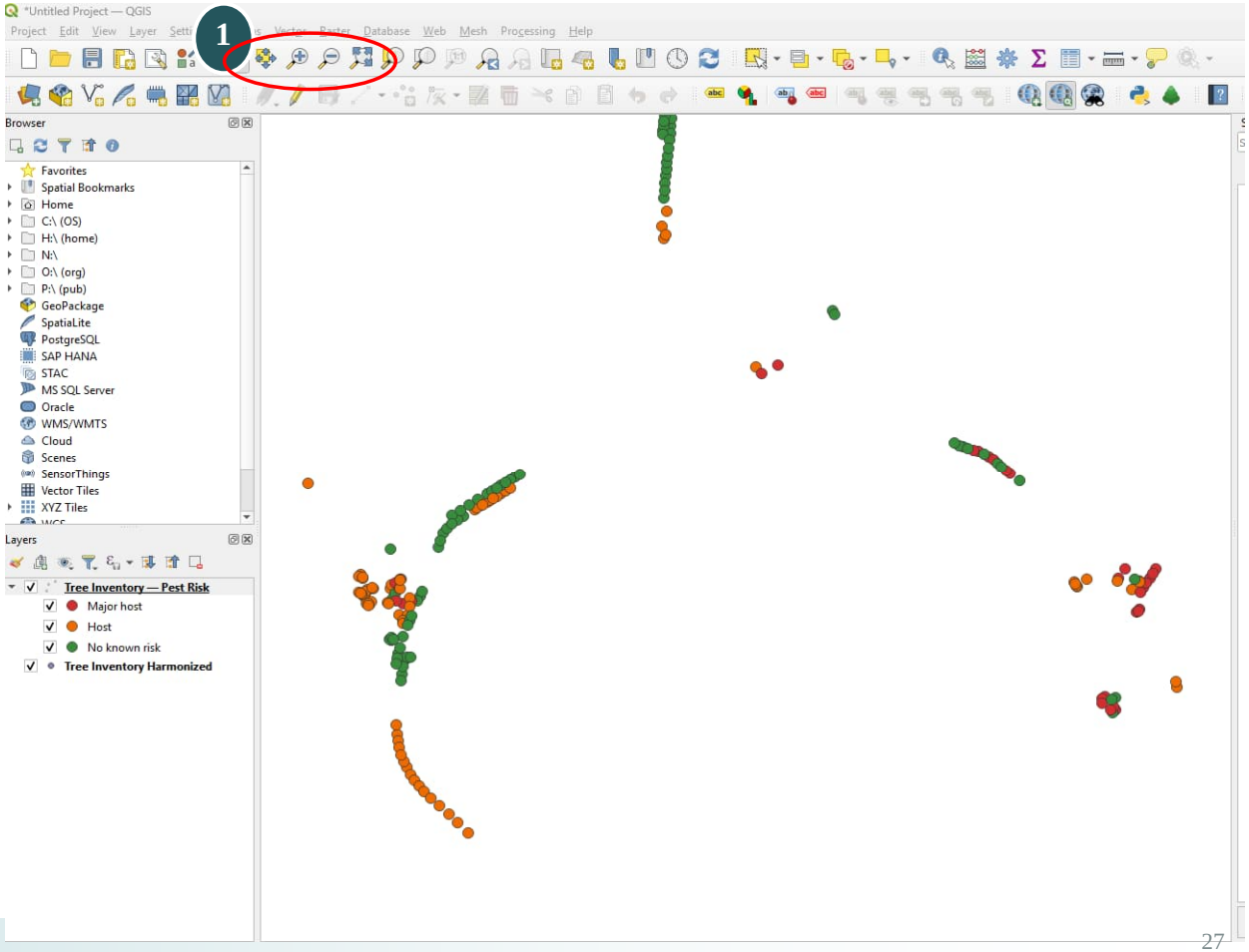
Zoom in to examine local clusters and individual trees.

1 **Scroll the mouse wheel** over the map to zoom in or out, or use the zoom buttons in the QGIS toolbar. **Hold down the mouse wheel** and drag to pan across the map. **Zoom in until individual trees are clearly visible.**
This makes local spatial patterns easier to examine.

Get back to the whole city
Right-click the layer in the 'Layers' panel and choose 'Zoom to Layer(s)' to fit the full inventory in the window again.

Add a background map

Streets and parks make clusters easier to read. See Step A12.

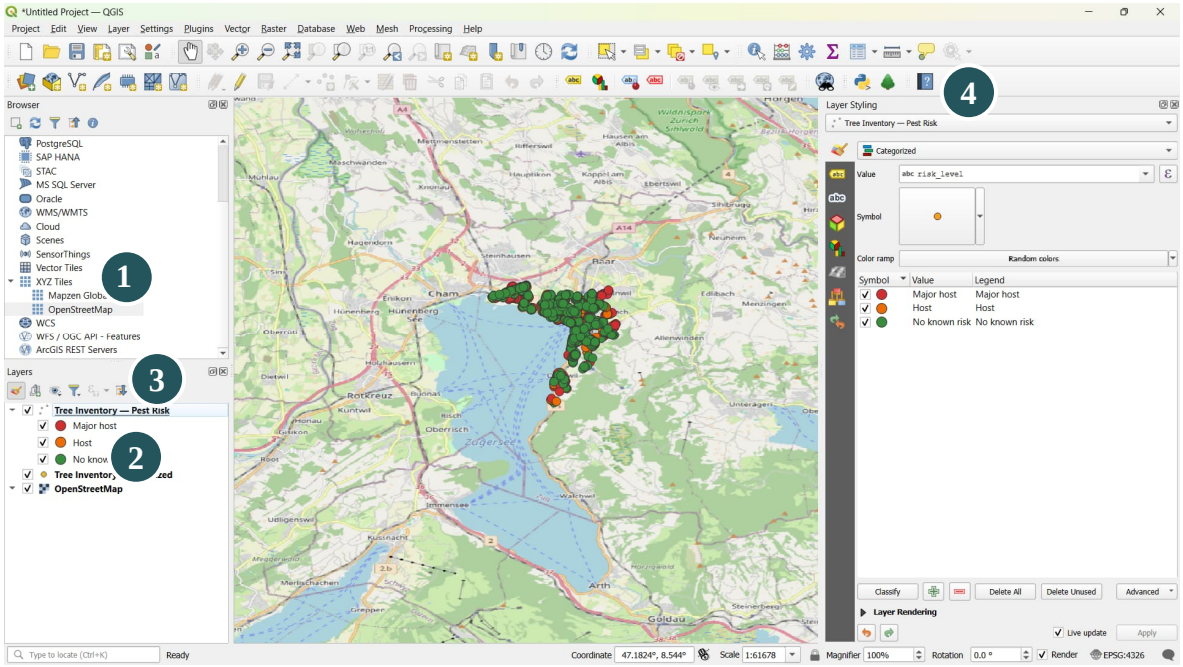


Step A12

Add a basemap

A basemap provides spatial context and helps you relate tree locations to streets, parks and other features.

1. **In 'Browser', open 'XYZ Tiles'** and double-click 'OpenStreetMap'.
2. **Drag 'OpenStreetMap' to the bottom** of the 'Layers' panel, below both tree layers.
3. **If the trees disappear,** right-click the tree layer and choose 'Zoom to Layer(s)'.
4. **Reduce the basemap opacity** select 'OpenStreetMap' in the Layer Styling panel, open 'Transparency' and set 'Global Opacity' to 50–60%.



Layer order

Top: Tree Inventory — Pest Risk

Middle: Tree Inventory Harmonized

Bottom: OpenStreetMap

Watch out Do not press 'Classify' while editing the layer style, as this may replace the existing red, orange and green screening colours.

Step A13

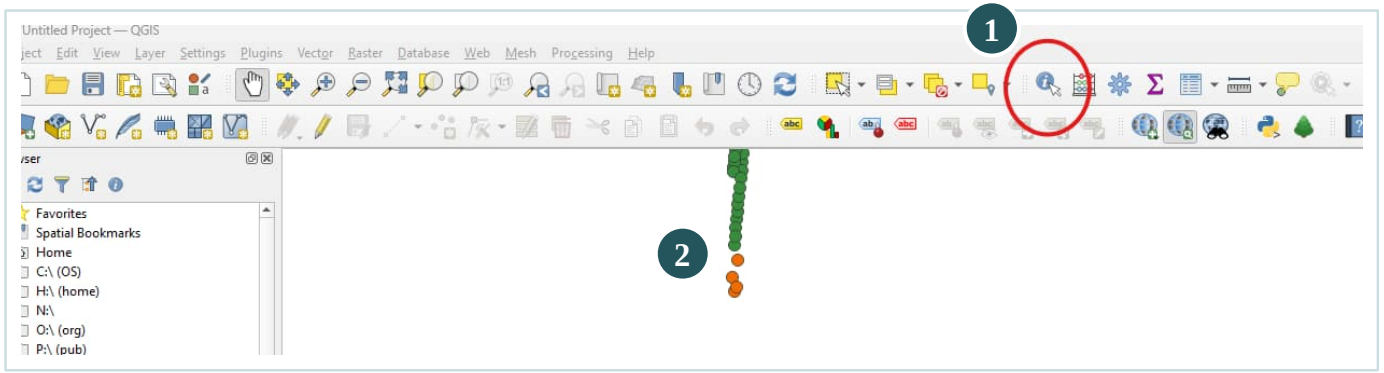
Look up an individual tree

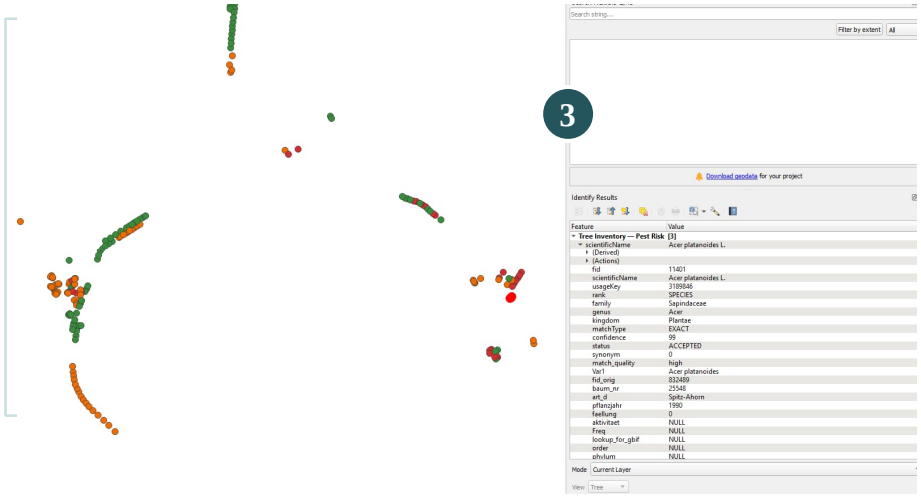
Click a tree on the map to view its attributes, harmonised name and pest–host screening information.

1. **Click the 'Identify Features' tool in the QGIS toolbar.**

2. **Click any tree on the map.** The 'Identify Results' panel opens at the side.

3. **Review the attributes**, including the original record, harmonised species name, match confidence, screening class and associated pests.





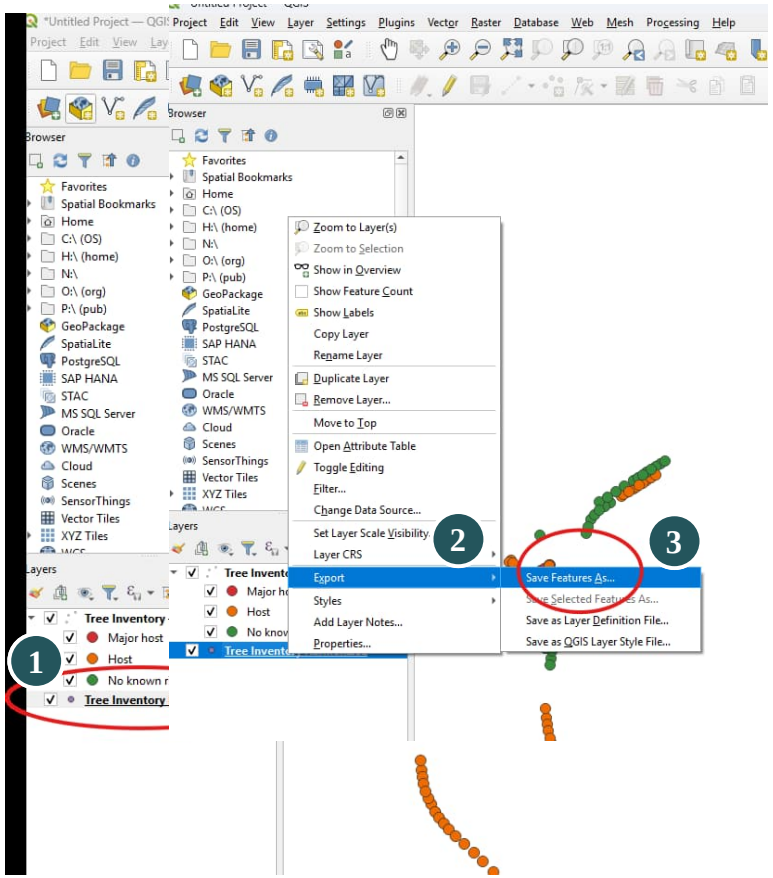
Checking an uncertain match

To verify a medium-confidence or genus-level match, click the tree and compare the original species name with the harmonised name.

Export the harmonised inventory (1 of 2)

The Shiny app accepts CSV files only, so the harmonised layer must first be exported from QGIS.

1. **In the 'Layers' panel, right-click 'Tree Inventory Harmonized'.**
2. **Hover over 'Export'** in the context menu.
3. **Click 'Save Features As…'** The 'Save Vector Layer as…' dialog opens. Continue on the next page.



! Select the correct layer

Export 'Tree Inventory Harmonized', not 'Tree Inventory — Pest Risk'. The harmonised layer is the standard input for the Shiny app. If you also want to retain the screening classes, export the pest-risk layer separately and use clear file names.

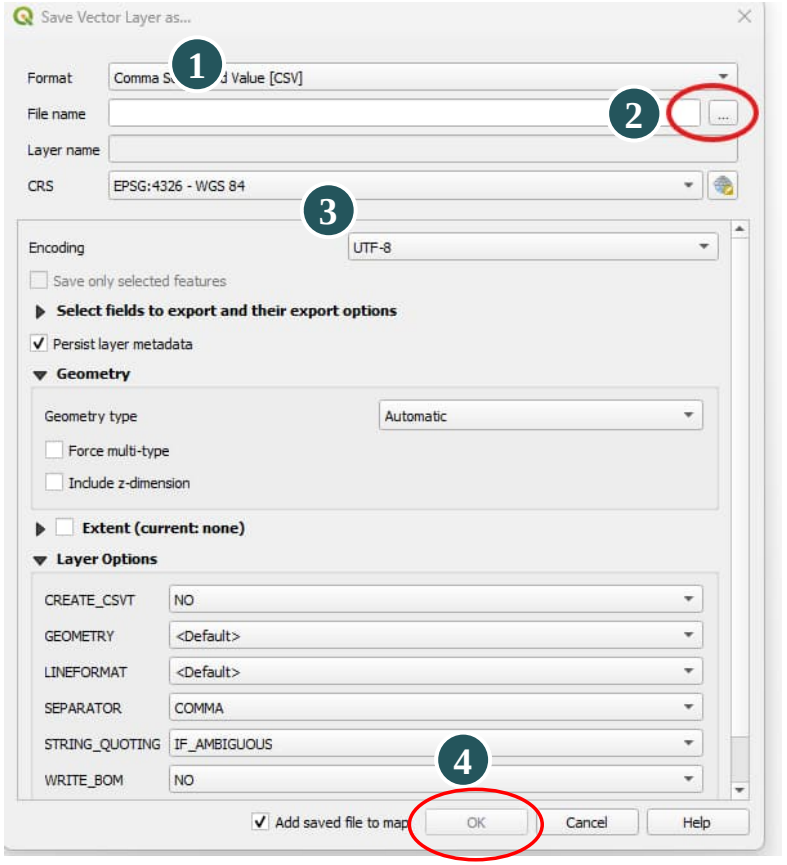
Export the harmonised inventory (2 of 2)

1. **Set 'Format' to 'Comma Separated Value [CSV]'.** This is required for the Shiny app.

2. **Click the '…' button next to 'File name'** and choose where to save the file.

3. **Keep the default settings**, including UTF-8 encoding and EPSG:4326.

4. **Click 'OK'.** Your harmonised inventory is now saved as a .csv and is ready for Part B.



Name the file so you can find it again

Something like city_harmonized_2026.csv. You will be picking this file out of a list in Step B5.

Note

Special characters in species names survive the export as long as encoding stays UTF-8.

Tool 1 output files

The plugin creates four main output files. This table summarises what each file contains and how it is used.

FILE	MADE IN	WHAT IT CONTAINS	USE IT FOR
harmonized_inventory.gpkg	Step A6	The inventory with harmonised species names and match-confidence information added to each record.	Input to step A8
harmonized_inventory_pest_risk.gpkg	Step A8	The harmonised inventory with screening classes and associated pests added to each tree.	Pest–host map and inspection in QGIS
pest_risk_summary.csv	Step A8	Summary counts by screening class and pest for the full inventory.	Reporting and summary statistics
harmonized_inventory.csv	Step A14	The harmonised inventory exported as a CSV file.	Input for the Shiny app

Gpkg?

A GeoPackage (.gpkg) is a single-file format for storing spatial features and their attributes. Unlike a shapefile, which consists of several separate files, a GeoPackage keeps the full layer in one file.

Keep the run together

Keep the output folder together with a copy of the input file and the date of the analysis. This makes it easier to reproduce the results later if needed.