



Replenished Roots
Consulting

HEALTHY SOIL · HEALTHY PLANTS · HEALTHY PEOPLE

FIELD REFERENCE
SEPTEMBER 2026

SOIL, COMPOST & LIQUID BIOLOGY · SAMPLING PROTOCOL

A result is only as good as *how the sample was taken*

A step-by-step field protocol for collecting soil, compost, and liquid biology samples – consistent enough to trust, and simple enough to use on any property.

USE IT FOR

Any farm, garden, or compost operation
Soil · compost · extracts & teas

METHOD REFERENCE

Soil Food Web Foundation
Sample-collection standards

BEFORE YOU GO

Define the question first
See Part I

Define the question, then the *area*

Before anything is collected, write down the specific question this sample needs to answer — *is the biology different between the healthy bed and the weak one? What's missing around this crop's root zone? Did a treatment change the food web?* The question decides where you sample, so it comes first.

Keep areas separate when they differ by

- Plant community, crop family, or successional stage
- Soil type or moisture condition
- Management history — tillage, fertilizer, pesticide, irrigation
- Microclimate — sun/shade, wet/dry
- Plant health or treatment history

MIXED POLY CULTURES

For a diverse garden or food forest, group plants by successional stage or function (nitrogen-fixers vs. everything else, for example) and sample each group in proportion to how much of the area it covers — never as one undifferentiated mix.

Common sample types

- **Representative / composite** — one reasonably uniform zone, built from cores combined across several randomly selected grid cells.
- **Comparison** — two or more zones kept in separate containers throughout (healthy vs. weak, treated vs. untreated).
- **Targeted problem sample** — a defined trouble spot, never mixed with the normal soil around it.
- **Follow-up / monitoring** — the same zone, same method, later in time — but a different nearby plant each round, so the root system is never disturbed twice.

Map, grid & randomly select

Sketch or print a property map. Draw a boundary around each distinct sampling area — crop, plant community, management zone, wet or dry ground — and mark obvious disturbances, paths, and edges. Overlay a numbered grid on each area. There is no single correct cell size: size each grid cell to the scale of variability actually on the ground.

Grid sizing by property scale

AREA	GRID CELLS	NOTES
Small (~100 m ²)	3–5 cells, ~20–30 m ² each	Backyard or small-bed scale
Medium (~1 ha)	10–20 cells, ~500–1,000 m ² each	Typical field or block scale
Large (>50 ha)	Break into 10–20 ha blocks, then 1–5 ha subunits, then grid each subunit	Sample in phases if needed — e.g. 5 ha/week

Maximum grid cell $\approx$ 1 acre (0.4 ha). Small plants such as grass or clover can use cells as small as ~1 m².

SELECTION RULE

Randomly select **3 grid cells, or 40% of all grid cells — whichever number is larger. Always round up.** Use a free random-number tool so selection stays unbiased. Use the same grid method every time you compare zones or monitor the same zone over time — never average biologically different zones together.

PART II • COLLECTING THE SAMPLE

Soil, compost & liquid — each with its own method

Tools for soil: a soil core sampler or apple corer, a clean bag or cleanable container, and a permanent marker.

I Enter a selected grid cell

Go near its center and find the nearest plant that represents the crop or plant group being tested.

II Expose the soil

Brush aside loose, undecomposed surface litter at the exact sampling point. Sample the soil and root-zone material, not the litter.

III Core at the root zone

Take 3 soil cores **halfway between the stem/trunk and the dripline**, depth **3–6 in (7.6–15 cm)**, adjusted for the crop's root depth or the sampling objective.

IV Repeat at 3 plants per grid cell

Move to a different random spot in the same cell and sample another representative plant. Repeat once more. Minimum: 3 plants $\times$ 3 cores = **9 cores per selected grid cell**.

V Combine correctly

All cores for the same assessment or zone go into the same bag or bucket. Keep comparison zones, problem areas, or treatments in separate containers.

VI Repeat across every selected grid cell

Same depth, same technique. On a later resample of the same zone, use a different nearby plant — never core the same plant twice.

VII Control bias & contamination

Avoid field edges, paths, roads, spills, or obviously atypical spots unless they are the specific target. Sanitize tools between distinct samples, especially for microbial work.

Compost

Tools: a teaspoon or small trowel, a bag or container, a permanent marker.

- Single pile or batch: collect a **minimum of 5** teaspoon-size (~5 mL) grab samples from different areas and depths.
- Windrow or larger pile: collect a **minimum of 20** grab samples, spread across ends, sides, shoulders, interior, and deeper zones — never all from one face or depth.
- Combine every grab for one pile or batch into a single clean container and mix thoroughly.
- Label and store exactly as for soil (Part III).

Liquid — extracts, teas & water

Tools: a clean, non-breakable, sealable container (4–8 oz).

- Collect from the **top 1–2 in (2.5–5 cm)** while the liquid is aerated or right after mixing. Never immerse a hand or arm.
 - Take about 10 mL, wait 10–15 seconds, take another ~10 mL into the **same** container, and repeat a third time. The combined liquid is the sample.
 - Fill the container **no more than half full** so oxygen stays available.
 - Assess within **4–6 hours** if at all possible — liquid samples go anaerobic fast.
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PART III • HANDLING WHAT YOU'VE COLLECTED

Amount, timing & labeling decide whether the result means anything

Sample amount & oxygen

- Minimum needed to assess bacteria, fungi, protozoa and nematodes: **1 g or 1 mL**. In the field, fill the bag to at least **100 g (~¾ cup)**.
- Never fill a bag more than **half full** — the air space keeps organisms supplied with oxygen. Don't press the air out.
- If a location is very dry, keep the bag closed and assess as soon as possible rather than leaving it open to the air.

Labeling

- Label the **outside** of the bag in permanent marker: date, location, sample type, collector, grid or zone ID.
- Never put a paper label or note **inside** the bag — moisture makes it illegible, and a decomposing label can alter the sample.

Transport & storage timing

- **Best case:** assess the same day or the next day — overnight or urgent shipping if the sample is going to a lab.
- **Finished compost or bare soil** with no active plant growth: assessing within **3–5 days** is fine.
- **Actively growing soil, or any liquid sample:** assess within **24 hours**.
- **Hard ceiling for a management decision:** complete the assessment within **2 days** of collection, keeping the bag semi-open and close to its original moisture and ambient temperature.
- Store out of direct light, near the temperature it was collected at. **Don't refrigerate** unless the sample was collected in cold winter conditions.

When to sample

- **Before planting** — correct microbial deficiencies while the bed is still open.
- **10–14 days after** a biological application — check whether the target organisms took hold.
- **Ongoing:** every 6–8 weeks through spring and early summer while establishing; every 2 months once levels are on target, sooner if disease or pest issues appear.
- **Season:** sample during active growth — roughly spring bud-break through the first consistent hard freeze. Extreme summer heat can slow biology too, in hot climates.

How many samples

- Minimum **3–5 samples per treatment or comparison area** — more if the area is visibly variable.
- On relatively uniform land, one assessment built from 3 composited grid samples can represent a fairly large area.
- Polyculture or intercropped areas need denser sampling — map the crop zones and sample each proportionally, rather than sampling randomly across the whole mix.
- If one sample's result is a clear outlier against the others in the same zone, re-sample a different randomly chosen grid cell rather than discarding the data.

Reference: cores & plants by sample type

SAMPLE TYPE	METHOD	MIN. CORES / GRABS	MIN. PLANTS / GRID	TOTAL PER GRID
Compost / windrow	Spoon or trowel, composite of small grabs	5 (composite)	—	5 (20 for windrows)
Large plants — trees, shrubs	Corer, halfway between stem and dripline	3	1	3
Medium plants — tomatoes, corn	Corer, halfway between stem and dripline	3	3	9
Small plants — grass, clover, pasture	Corer, random points across grid	1 per 0.5 m ²	distributed	9–15 (3–5 per m ²)

Fill this in at the site

A lab result is only as useful as the sample and the field history behind it. Complete one record per distinct sample or comparison zone — before or immediately after collecting.

Sample details — fill this in the field

FARM / SITE

COLLECTOR

DATE / TIME

SAMPLE ID

FIELD / BED / ZONE

GRID CELLS SAMPLED

SAMPLING QUESTION / PURPOSE

SAMPLE TYPE

COMPARED AGAINST / TREATMENT OR BATCH ID

CURRENT CROP / PLANT COMMUNITY

PREVIOUS CROP / LAND USE

PLANNED NEXT USE

PLANT CONDITION

MOISTURE

IRRIGATION / FERTILIZER / AMENDMENTS

PESTICIDE / HERBICIDE / TILLAGE HISTORY

COMPOST PILE OR BATCH ID, DATE BUILT,
STAGE

FEEDSTOCKS / RECIPE / SOURCE

LIQUID SOURCE / HOW IT WAS MIXED

TIME FROM COLLECTION TO ASSESSMENT

Before you leave the site, confirm

- The correct zone or batch was kept separate from every other sample
- Soil: 3 plants × 3 cores per grid cell, halfway between stem and dripline, 3–6 in deep
- Liquid: collected from the top 1–2 in, 3 sub-samples combined into one container
- Random grid cells were used — 40% of cells, or a minimum of 3
- Compost: 5 grabs for a single pile, 20 for a windrow, spread across spots and depths
- Bag or container no more than half full; tools cleaned; labeled on the outside

- Sample protected from heat and direct sun on the way back
- A photo of the site or zone was taken

Words used in this guide

Grid cell

One numbered section of a mapped sampling area, used to choose sample locations at random rather than by convenience.

Composite sample

Several cores or grabs from one zone, combined into a single container to represent that zone as one result.

Comparison sample

Two or more zones sampled the same way but kept in separate containers, so their results can be set against each other.

Root zone / dripline half-point

The point halfway between a plant's stem and its dripline — the standard coring location, chosen because it represents the overall root system with the least disturbance to the plant.

Anaerobic

Oxygen-depleted. A sample packed too tight or sealed too long can turn anaerobic and stop reflecting the organisms actually living in the field.



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Replenished Roots is not a pest control company. We do not diagnose, treat, or control plant pests or plant diseases. Microscopy describes organisms observed in the sample assessed and does not identify species or confirm pathogenicity. Results vary by property.

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