

Testing soils for residues of persistent chemicals

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Why test soils?

Past use of persistent organic pesticides, e.g. DDT and dieldrin, means that some agricultural soils are contaminated with chemical residues. In broadacre farming, these chemicals were used directly on soil or were applied to crops, contaminating soil via runoff or spray drift.

Similarly, arsenic used in cattle and sheep dip baths has contaminated soils around these facilities.

Pesticide contamination may cause residues in stock or crops raised on affected land.

Soil residue tests determine if pesticides are present and at what levels, so that the risk to livestock or crops can be assessed and remedial actions focused on affected areas.

This Primefact describes the process for sampling soils and sending them to the laboratory to be tested for pesticide residues.

Before collecting samples

Contact the laboratory for advice on components of the analysis, current charges and turnaround times or obtain a Sample Submission Form from

<http://www.dpi.nsw.gov.au/aboutus/services/das/chemistry-tests>

Laboratory Contact Details

**Wollongbar Environmental Laboratory, NSW
Department of Primary Industries**
1243 Bruxner Highway Wollongbar NSW 2477

Telephone (02) 6626 1103

Fax. (02) 6626 1276

The laboratory is NATA accredited for soil residue testing and a wide range of other analyses.

NB. Special arrangements need to be made if the results of the tests are to be used for legal purposes. Call the laboratory for advice.

Submitting samples

1. Include a completed Sample Submission Form identifying each sample and the analysis that you require. The form can be downloaded from NSW Department of Primary Industries website <http://www.dpi.nsw.gov.au/aboutus/services/das/chemistry-tests> or by calling the laboratory (see above).
2. Samples should be placed in plastic bags with stick-on labels marked with a waterproof pen. Labels should include sample number or ID.
3. Place sample bags in a container or cardboard box and send to the laboratory (address above).

Preparation for sample collection

The area of the site and depth of possible residues need to be considered. Samples must be representative of the site to give meaningful information about contamination.

Mapping – for large sites, a site map marked with features e.g. posts, gates, buildings, and the sample locations is helpful to relate the laboratory results to the sampling positions.

Area – Large sites should be divided into blocks or sections. The maximum size of the sampling block is determined by pesticide application history.

Where there is varied or uncertain application history the block size should be no greater than 2 Ha. In other circumstances block sizes up to 10 Ha will provide sufficient information.

A number of core samples or slices (40 to 50 samples) are taken from each block and pooled into a composite sample as described below.



Depth – The depth of sampling will be determined by cultivation history:

- **Cultivated soil** – Cores or slices should generally be taken down to tillage depth (up to 150 mm).
- **Uncultivated soil** -- cores or slices are taken down to a depth of 50 – 80 mm

Hotspots or high levels – if an area is suspected of containing high levels of pesticides (drum storage or chemical preparation areas, cattle and sheep dipyards, spray races and orchard packing sheds) then this spot should be sampled separately. The purpose of sampling is to locate the limits of pesticide contamination.

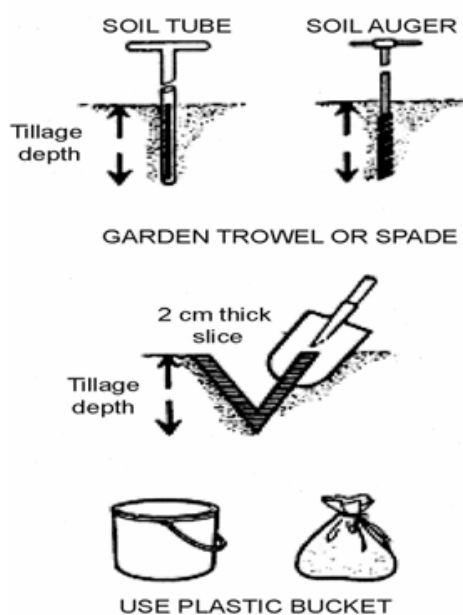


Figure 1. Tools for taking soil samples

Equipment

Basic equipment required to take soil samples are shown in Figure 1 plus clean buckets or plastic bags

Sample collection

To obtain a representative sample of soil from each block, adopt the following procedures:

- Walk down each block in a zig-zag fashion collecting 40-50 equal sized cores or slices (at least 2cm wide) per block and covering as much of the area as possible.
- Remove the vegetation (grass) to expose the soil underneath before collecting each sample
- Place all cores or slices from the block in a clean bucket or wheelbarrow and mix thoroughly. The mixed or composite sample is considered representative of the area in question.
- Take one kilogram of the mixed sample, place in a clean, strong plastic bag and clearly label for dispatch to the laboratory

Hotspots or high levels – use a spade or trowel to take multiple individual samples (of approximately one kilogram) to a depth of 150 mm at increasing distances from the centre of the suspect site. **Do not pool these samples.** The distance between each sampling site and the depth of sampling will be determined by the past pesticide usage and the purpose of the testing. Pesticide contamination can be found up to 2 m or more from livestock dip baths, especially at the sides of the entry point (splash areas) and may extend to a depth of 600 mm.

Other considerations

Contact the laboratory's Enquiries Officer for specific advice if there are complications or special circumstances about the area to be sampled.

Acknowledgement

This Primefact is based on an earlier Agnote written by Robert Black and K. McDougall.

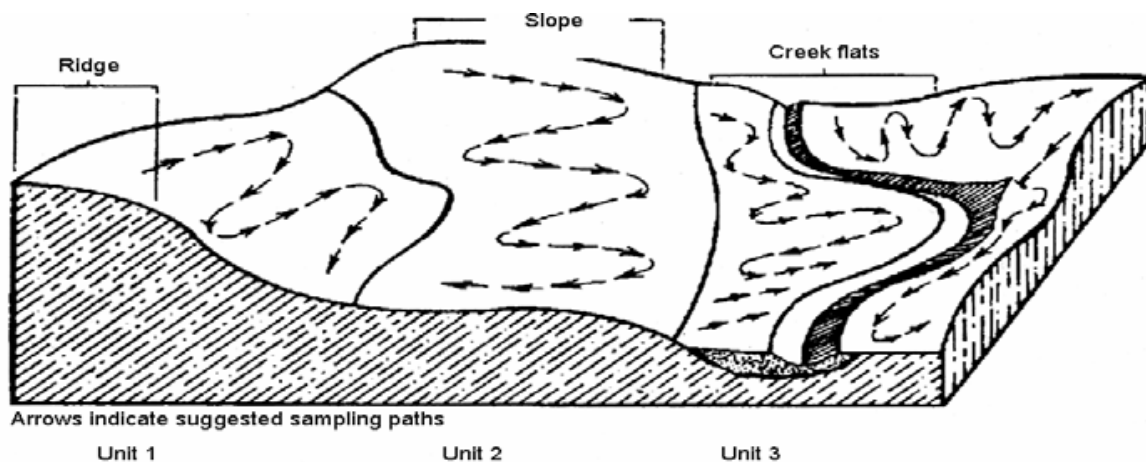


Figure 2. Sample sites for chemical testing

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Disclaimer: The information contained in this publication is based on knowledge and understanding at the time of writing (December 2006). However, because of advances in knowledge, users are reminded of the need to ensure that information upon which they rely is up to date and to check currency of the information with the appropriate officer of New South Wales Department of Primary Industries or the user's independent adviser.

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