Field Trials of Agricultural Crops for Pesticide Residue Analysis (Metric units)

SECTION 1. TEST CONDITIONS

1.1 Locality. If practicable, carry out trials in, preferably, three different geographical areas in which the crop is cultivated.

1.2 Test plots. The area of each test plot shall be at least 8.5 ares in the case of sparsely covered crop land but may be smaller in the case of tree plots. (The number of trees selected for test purposes shall comply with the requirements laid down by the Registrar of Pesticides.)

NOTE: The same test plots may be used for residue analysis and the evaluation of phytotoxicity and biological efficacy.

1.3 Test plot design. A randomized block design is normally used but any other design may be adopted provided that it has been submitted to and accepted by both the Adviser to and the Registrar of Pesticides of the Department of Agricultural Technical Services.

SECTION 2. EQUIPMENT

2.1 Application device. Any device or apparatus that is normally used for the application of pesticides.

2.2 Containers for composite samples. Suitable plastic bags or other plastic containers.

2.3 Transit containers. Use suitable opaque heat-insulated containers partially filled with dry ice for the transport of the composite samples to the test laboratory.

NOTE: One kilogram of dry ice per kilogram of sample is usually enough to keep a sample frozen for at least 48 hours, but the appropriate ratio depends upon the container and on ambient temperatures.

2.4 Balance. A suitable balance.

2.5 Meteorological apparatus

NOTE: If the apparatus described below is not available, it is permissible to use meteorological data obtained from the following two publications[1] provided that such data is correlated with the data obtained at the local Weather Bureau office for the specific period of test and for the area in which the test is conducted:

a) Climate of South Africa, Part 1, Climatic statistics (WB 19)
b) Climate of South Africa, Part 8, General survey (WB 28)

a) Thermometers. A maximum thermometer and a minimum thermometer of the type in which the engraved stem is sealed in a glass sheath, the bulb is spherical, the graduations are at 0.5-degree intervals, and negative values on the stem are preceded by minus signs. The range of the maximum thermometer shall be from -20 to 55°C and that on the minimum thermometer from -30 to 45°C.

b) Wet- and dry-bulb hygrometers. Two thermometers (of the type in which the engraved stem is sealed in a glass sheath, the graduations are at 0.5-degree intervals, and range is from -20 to 55°C) mounted vertically, on a suitable support, at a height of 1.2 m above ground level. The bulb of one of the thermometers shall be enclosed in muslin to which is attached a wick whose lower end is housed in a narrow-necked water container.

c) Thermohygrographs. Thermohygrographs that are capable of recording data over 1-week periods and of the type recommended by the Weather Bureau for field trial testing.

NOTE: The apparatus described in (a) to (c) above shall be housed in Stevenson screens that comply with the requirements of the Weather Bureau. The bottoms of the screens shall be 1.0 m above ground level.

d) Sunshine recorders. Sunshine recorders that are suitable for the latitude range 25 - 60° South.

e) Rainfall recorder. A rainfall recorder having the rim of the rain gauge 1.2 m above ground level.

g) Anemograph. A portable anemograph.

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1) Obtainable from the Weather Bureau, Department of Transport, Private Bag 193, Pretoria.

SECTION 3. FIELD TRIAL PROCEDURE

3.1 Select suitable test plots for the field trials, the untreated control plots being located at such a distance from the treated plots as will obviate possible contamination by drift during application of the pesticide.

3.2 In each area (see 1.1), apply the pesticide under test to three test plots, using the appropriate dosage recommended by the manufacturer, and applying the pesticide in accordance with the test plot design.

NOTE: If a biological test in which the pesticide under test is applied (to different plots) at three different dosages, i.e. one below, one above, and one at the recommended dosage, is to be carried out simultaneously with the field test for residue analysis, samples for residue analysis shall be taken from plots on which the pesticide is applied at the recommended dosage only.

3.3 For each test plot, record the following at the time of application:

a) Locality;
b) size of test plot;
c) method of application;
d) dosage;
e) chemical name of pesticide;
f) type of formulation;
g) type of pesticide, i.e. systemic or non-systemic;
h) type of crop (variety);
i) date and time of application;
j) growth stage of plants at the time of application.

3.4 Record the following daily throughout the test period:

a) Maximum thermometer reading at 8 a.m.;
b) minimum thermometer reading at 2 p.m.;
c) wet- and dry-bulb hygrometer readings preferably at 2 p.m. (Record precise time of reading if not taken at 2 p.m.);
d) rainfall during the 24-hour period ending at 8 a.m.;
e) hours of sunshine. (Take the reading after sunset.)

3.5 At 10 a.m. on the same day of each week, wash the hair-elements of thermohygrographs thoroughly with distilled water, using a soft camel-hair brush to remove adhering dirt, and obtain the maximum humidity reading on the hygrograph. Use the maximum hygrograph reading so obtained to adjust the values recorded by the hygrograph.

3.6 Record the maximum wind velocity registered on the anemograph during each period of application.

SECTION 4. SAMPLING PROCEDURE

4.1 To prevent contamination, collect samples from the untreated control plots first and then from the treated plots. Use the procedure given in Table 1 for each batch of samples. Do not take samples when dew is present on the crops or from border rows or the ends of rows. After application of the pesticide, allow the treated crop to dry for at least 2 hours, and then take the first batch of field samples (from both the untreated and treated plots). Take the second batch of samples 24 hours after application of the pesticide, and further batches at intervals that follow, if practicable (see 4.4), a geometrical progression (i.e. 2 x 24 hrs, 4 x 24 hrs, 8 x 24 hrs after application) over the total sampling period, the start of which shall be so based on a pre-harvest limitation on time of application(that has been laid down by the Registrar of Pesticides) that the final sampling is done at harvesting time.

If possible, record the growth stage of the crop at each stage of sampling. If additional treatments are applied, record the data outlined in 3.3(c) to 3.3(g) inclusive, 3.3(i), and 3.3(j) and take further samples as described above. Do not wash samples unless washing is normal practice, as for instance in the case of root crops.

4.2 Where applicable weigh the samples to ensure that the correct quantities have been taken. Record the time and date of sampling. If insect infestation is present on the crop, record the degree of infestation on the plants from which the samples were taken.

4.3 Obtain the composite sample (see Column 5 of Table 1) by carefully mixing the three replicate batch samples (see Column 3 of Table 1) quartering, mixing one pair of diagonally opposite quarters, quartering, and continuing thus until the appropriate size of sample is obtained. Place the composite sample in a plastic container (see 2.2), insert a label into the container and attach a second label securely to the outside of the container, each label bearing the sample number written legibly in water-resistant marking ink.
To prevent the samples from sweating, place them immediately in a container containing dry ice (see 2.3).

4.4 Complete form A (see Appendix), and ensure that it accompanies the samples and that the period of transport to the test laboratory is kept to a minimum. This period should not exceed 2 days and the date of sampling and despatch should be such as to preclude the arrival of the samples at the laboratory during a week-end.

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Approved by the
COUNCIL OF THE SOUTH AFRICAN BUREAU OF STANDARDS