



AGRICULTURAL RESEARCH COUNCIL
PLANT PROTECTION RESEARCH INSTITUTE
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**GUIDELINES FOR FIELD TESTING INSECTICIDES FOR
LOCUST CONTROL IN SOUTH AFRICA WITH A VIEW
TO REGISTRATION IN TERMS OF ACT 36/1947**

All Acridicides must be registered before use in South Africa in terms of Act 36/1947

1. Prior to commencing trials, consult the Locust Research Division of the Plant Protection Research Institute (Agricultural Research Council) and/or the Locust Control Organisation of the Directorate of Natural Agricultural Resource Conservation for advice.

Objectives

2. To determine the efficacy of pesticides for the control of locusts. A particular product should be tested in the field by means of range finding trials to determine the minimum effective dose necessary for 90% kill. Environmental considerations are however of paramount importance.

Targets

3. For hopper band control, the principal target for obtaining efficacy data for a given product (chemical or non-chemical) is the late instar gregarious hopper stage. This is the 5th instar hopper in the brown locust, African migratory locust and southern African desert locust and the 6th instar red locust hopper. For adult swarms, the insects should be at least one week old, otherwise they are too susceptible.

Trials

4. Small-scale field trials should be representative of control operations and should be conducted over at least two locust seasons. Results should be provided for both summer and autumn conditions in the Karoo, when maximum air temperatures of $>30^{\circ}\text{C}$ and $<25^{\circ}\text{C}$, respectively, prevail. Results require verification under operational conditions in order to arrive at the optimum field dose.

5. Sites used should be typical of areas where locusts occur naturally and where control operations are expected to take place. In the case of the Karoo, data for both mixed grassveld and pure stand Karoo bush veld is required.
6. Careful calibration using relevant manuals should be carried out before starting trials. Although a similar blank formulation can be sometimes used, flow rate is best determined using the actual product. The area dosage rate must be accurately applied. Volume rates between 1-2.5ℓ/ha are recommended.
7. Plot sizes will depend on target size and the application method used. In general, plot sizes will range from 0,1-1ha for ground application trials and up to 5 ha for aerial applications. For IGRs and for barrier treatments larger plots, through which hopper bands must march, may be necessary. Flagmen should be placed at either end. A minimum of five replicates are required for each treatment. An untreated control check is also necessary.
8. Comparison against a standard reference insecticide, eg. deltamethrin or fenitrothion, must be made.

Application

9. Spraying should take place in the early morning, under dry conditions, at temperatures <26°C and without too much air turbulence. This will leave the rest of the day available for assessing efficacy. Wind speeds up to 7m/s are suitable for ULV drift spraying. Application should be made at right angles to the prevailing wind, working upwind to avoid contamination from airborne spray. The incremental drift technique should be used with a number of parallel passes being made, so as to obtain an even spray cover.
10. The formulation used, equipment, methods of application and environmental conditions at the time of application must be stated. The following details are relevant:-
 - trial site and location
 - target species, stage, phase and instar
 - predominant vegetation of habitat
 - product name, concentration and formulation
 - area dosage rate / volume rate / flow rate
 - atomiser type
 - track interval (nominal swath)
 - aircraft type (if applicable)
 - speed of application
 - cloud cover
 - wind speed
 - air temperature
 - soil-surface temperature
 - relative humidity
 - date, time, company, responsible officer

Biological performance

11. Estimates of mortalities and speed of kill must be recorded. These can be made either by counting densities before and after treatment, use of quadrats or by collecting samples of sprayed locust immediately after application and comparing these over time with unsprayed controls.
12. Kills are best assessed in the downwind part of the plot by recording the number of:-
 - dead (no movement)
 - moribund (down, but still kicking)
 - affected (upright, but obviously affected)
 - unaffected
13. Hourly counts over the first 5-6h will give the speed of kill and then again at 24 hour intervals for up to 2-3 days (chemicals) and ± 5 days (non-chemicals) after treatment to give total kill. Remember, a kill of at least 90% is required. Be careful of recovery of moribund locusts affected by pyrethroid insecticides. Records of maximum air and maximum soil surface temperature throughout the post application period are important.
14. Assessment of kill can be made either by corralling a portion of a treated brown locust hopper band in open, smooth-sided, enclosures ($\pm 2\text{m}^2$) or by means of caged samples for adults. Enclosures will not work for red locust hoppers which can climb smooth vertical surfaces. Cages should be of a sufficient volume (± 20 litres) to permit free movement of insects inside. Whatever the method used, unsprayed grass must be provided as food. 50-100 hoppers per enclosure and 20-50 adults per cage is about the recommended sample size.
15. Some indication of possible environmental effects, e.g. on wildlife, birds etc., with supportive residue and toxicological data (to establish stock withholding periods) are required. All possible detrimental side effects should be clearly stated.

Reporting

16. A brief written report giving a detailed account of the results of the trials should be submitted for evaluation. Statistical analyses should be applied where possible. Percentage mortalities are, however, acceptable. All relevant data for demonstrating efficacy of a specific dose rate in terms of Act 36/1947 should be provided to the Registrar's office, Private Bag X343, Pretoria 0001.

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