GP 3/93

GUIDELINES ON
EFFICACY DATA REQUIREMENTS
FOR
PESTICIDE REGISTRATION

Pesticides Board
Malaysia
2009

PREFACE

The Pesticides Board in its efforts to further upgrade its services to the public, in particular companies applying for the registration of pesticides has prepared these guidelines to supplement the existing ones. These supplementary guidelines published in 4 booklets provide information in greater detail on the requirements for registration on the following aspects:

i) Products chemistry;
ii) Efficacy;
iii) Toxicology and
iv) Residue

In the preparation of these guidelines references were made to some international and national guidelines such as those published by FAO, OECD and the USEPA. It is hoped that with these guidelines the time taken for registration of pesticides will be reduced. Applicants who require further clarification on these guidelines or other matters related to registration may contact the Secretary of the Pesticides Board at the following address:

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Efficacy Data Requirement for Pesticide Registration

Substantiation of claims made on the efficacy of a product submitted for registration is a requirement under the Pesticides Act 1974. To assist applicants in their submission for registration, the following additional guidelines have been prepared. Applicants are advised to follow the harmonised protocols developed under the FAO through its Regional Project on the Implementation of the Code of Conduct on the Distribution and Use of Pesticides (GCP/ITN/456/JPN). Appendix 1 shows the protocols presently available. In cases where there are no harmonised protocols, applicants are advised to use the following general guidelines.

A. GENERAL REQUIREMENTS

1. For all proprietary pesticides recommended to be used on major crops i.e. rice, oil palm, cocoa, and rubber, efficacy evaluation results obtained from local verification trials is required. For other crops, result(s) obtained from trials conducted in other countries under similar climatic regime and cultural practice may be considered.

2. For commodity products efficacy data is not required if label claim is similar to that shown in the "Approved Uses for Commodity Pesticides", document number GP5/93. Any other additional claim(s) must be substantiated with data.

B. GUIDELINES FOR EFFICACY EVALUATION OF INSECTICIDES USED IN AGRICULTURE.

1. Experimental Conditions

1.1 **Selection of crop and cultivar, test organisms** – The selection of crop, cultivar, and insects must be relevant to the (proposed) label claims.

1.2 **Trial Conditions** – Trials should be conducted only on crops with known history of uniform high infestation of the targeted pest(s). Cultural conditions e.g. soil type, fertilizers, tillage, row spacing etc. should be uniform for all plots of the trial and should conform with local agricultural practices. The timing, amount and method of irrigation, if applied, should be recorded. Trials should be carried out in different regions with distinct environmental conditions and preferably in different planting seasons (where applicable).

1.3 **Treatments** – Test product(s), reference product(s) and untreated control, arranged in a randomized block or any other statistically suitable design.

1.4 **Plot size and replication** – Net plot size: at least 15 square meters or 25 plants depending on type of plants, formulation of insecticides, and type of equipment to be used in applying the insecticides.

Replicates: at least three, provided the error degrees of freedom are at least 12.

2. Application of Treatments

2.1 **Test Product(s)** – The formulated product under investigation.

2.2 **Reference Product(s)** – Registered product known to be satisfactory for the control of the insect pest(s) under investigation. In general, formulation, type and mode of action should be close to those of the test product(s).

2.3 **Mode of Application** – Application should comply with good agricultural practice.

2.4 **Type of Application** – as specified on the (proposed) label.

2.5 **Type of equipment used** – should be of a type in current use .It should provide an even distribution of product on the whole plot or accurate directional application where appropriate. Factors which may affect efficacy (such as operating pressure, nozzle type, depth of incorporation) should be recorded, together with any deviations in dosage of more than 10%.
Precaution should be taken to avoid drift between plots.

2.6 **Time and frequency of application** – The time and frequency of application will normaly be specified on the (proposed) label. The number of application and the date of each application should be recorded.

2.7 **Doses and volumes used** – According to instructions on the (proposed) label. The products should be tested at the recommended dose and may also usefully be tested at other doses. The dosage will normally be expressed in kg or 1 of formulated product per ha. It may also be useful to record the dose in g of active ingredient per ha. For sprays, data on concentration (%) and volume (1/ha) should also be given.

2.8 **Data on chemicals used against other pests** – If other chemicals have to be used, they should be applied uniformly to all plots, separately from test product(s) and reference product(s). Possible interference with these should be kept to a minimum. Precise data on the applications should be given.

3. Assessment, Recording and Measurements

3.1 **Meteorological and edaphic data** – On the date of application, meteorological data which are likely to affect the quality and persistence of the treatment should be recorded. This normally includes at least precipitation (type and amount in mm) and temperature (average, maximum, minimum in ^{o}C) Any significant change in weather should be noted, and in particular its time relative to the time of treatment. Around the date of application, meteorological data should be recorded which are likely to affect the development of the crop and/ or pests and the action of the insecticide.

Throughout the trial period, extreme weather conditions, such as severe or prolonged drought, heavy rain, hail etc., which are likely to influence the results, should be reported.

3.2 **Edaphic data** – Depth of water layer, over-flowing water or drainage, excessive algal growth or excessive organic matter content of water or soil should be recorded.

3.3 **Type, time and frequency of assessment** – Type of assessment depends on the type of pest(s) but normally by number of insects on all plants in the trial. Preliminary assessment is done immediately before treatment; first assessment 1-3 days after treatment; second assessment 7 – 14 days after treatment. If long-term effects are claimed, further assessments at 14 days intervals should be carried out.

3.4 **Direct effects on the crop** – The crop should be examined for presence or absence of phytotoxic effects. The type and extent of these should be recorded. In addition, any positive effects should be noted.

Phytotoxicity is recorded as follows:

(a) if the effect can be counted or measured, it may be expressed in absolute figures;

(b) in other cases, the frequency and intensity of damage may be estimated. This may be done in either of two ways: each plot is scored for phytotoxicity by reference to a scale which should be recorded; or each treated plot is compared with an untreated plot and % phytotoxicity estimated.

In all cases, symptoms of damage to the crop should be accurately described (stunting, chlorosis, deformation, etc.). Should symptoms of phytotoxicity be detected, a more detailed assessment should be carried out following the FAO Guidelines for Phytotoxicity Assessment (FAO/AP/027).

3.5 **Effects on other pests** – Any effects, positive or negative, on the incidence of other pests should be noted.

3.6 **Effects on other non-target organisms** – Any observed environmental effects should also be recorded, especially effects on wildlife and/or beneficial organisms. Any observed effects on human safety should also be recorded.

3.7 **Quantitative and/ or qualitative recording of yield** – Quantitative yield recording is not required, but any effects on the quality of the product should be noted (e.g. marketability of produce).

4. Results

4.1 The results should be reported in a systematic form and the report should include an analysis and evaluation. Original (raw) data should be available. Statistical analysis should be used, where appropriate, by methods which should be indicated. For further details, refer to Appendix 2.

C. GUIDELINES FOR EFFICACY EVALUATION OF FUNGICIDES USED IN AGRICULTURE.

1. Experimental Conditions

1.1. **Selection of crop and cultivar, test organisms** – The selection of crop, cultivar, and pathogens must be relevant to the proposed label claims.

1.2. **Trial Conditions** – Trials should be conducted only on crops with known history of uniform high infestation of the target diseases. Cultural conditions e.g. soil type, fertilizers, tillage, row spacing etc. should be uniform for all plots of the trial and should conform with local agricultural practices. The timing, amount and method of irrigation, if applied, should be recorded. Trials should be carried out in different regions with distinct environmental conditions and preferably in different planting seasons where applicable.

1.3. **Treatments** – Test product(s), reference product(s) and untreated control, arranged in a randomized block or any other statistically suitable design.

1.4 **Plot size and replication** – Net plot size: for tree crops such as oil palm, rubber, cocoa and citrus at least 4 trees depending on type of plants, diseases, formulation of fungicides, and type of equipment to be used in applying the fungicides.

Replicates: at least three, provided the error degrees of freedom are at least 12.

2. Application of Treatments

2.1 **Test Product(s)** – The formulated products under investigation.

2.2. **Reference Product(s)** – Registered product known to be satisfactory for the control of the disease(s) under investigation. In general, formulation, type and mode of action should be close to those of the test product(s).

2.3 **Mode of Application** – Application should comply with good agricultural practice.

2.4 **Type of application** – As specified on the (proposed) label.

2.5 **Type of equipment used** – should be of a type in current use. It should provide an even distribution of product on the whole plot or accurate directional application where appropriate. Factors which may affect efficacy (such as operating pressure, nozzle type) should be recorded, together with any deviations in dosage of more than 10%.

Precaution should be taken to avoid drift between plots.

2.6 **Time and frequency of application** – The time and frequency of application should correspond to that specified on the (proposed) label. The number of application and the date of each application should be recorded.

2.7 **Doses and volumes used** – According to instructions on the (proposed) label. The product should be tested at the recommended dose and may also usefully be tested at other doses. The dosage will normally be expressed in kg or 1 of formulated product per ha. It may also be useful to record the dose in g of active ingredient per ha. For sprays, data on concentration (%) and volume (1/ha) should also be given.

2.8 **Data on chemicals used against other pests** – If other chemicals have to be used, they should be applied uniformly to all plots, separately from test product(s) and reference product(s). Possible interference with these should be kept to a minimum. Precise data on the applications should be given.

3. Assessment, Recording and Measurements

3.1 **Meteorological and edaphic data** – On the date of application, meteorological data should be recorded which are likely to affect the quality and persistence of the treatment. This normally includes at least precipitation (type and amount in mm) and temperature (average, maximum, minimum in ^{o}C). Any significant change in weather should be noted, and in particular its time relative to the time of treatment. Around the date of application, meteorological data should be recorded which are likely to affect the development of the crop and/ or disease(s) and the action of the fungicide.

Throughout the trial period, extreme weather conditions, such as severe or prolonged drought, heavy rain, hail etc., which are likely to influence the results, should be reported.

3.2 **Edaphic data** – Depth of water layer, over-flowing water or drainage, excessive algal growth or excessive organic matter content of water or soil should be recorded.

3.3 **Type, time and frequency of assessment** – Type of assessment depends on the disease(s) under investigation but normally by % infestation per unit area of plant parts on all plants in the trial. A practical scale for assessment should be used.

Preliminary assessment is done immediately before treatment;

1st assessment – 1 to 3 days after treatment;

2nd assessment – 7 to 14 days after treatment;

If long-term effects are claimed, further assessments at 14 days intervals should be carried out.

For diseases which are long term such as root diseases, the symptoms of infestation on the whole tree e.g. wiltering, crown collapse etc. can be taken.

3.4 **Direct effects on the crop** – The crop should be examined for presence or absence of phytotoxic effects. The type and extent of these should be recorded. In addition, any positive effects should be noted.

Phytotoxicity is recorded as follows:

(a) if the effect can be counted or measured, it may be expressed in absolute figures;

(b) in other cases, the frequency and intensity of damage may be estimated. This may be done in either of two ways: each plot is scored for phytotoxicity by reference to a scale which should be recorded; or each treated plot is compared with an untreated plot and % phytotoxicity estimated.

In all cases, symptoms of damage to the crop should be accurately described (stunting, chlorosis, deformation, etc.) Should symptoms of phytotoxicity be detected, a more detailed assessment should be carried out following the FAO Guidelines for Phytotoxicity Assessment (FAO/AP/027).

3.5 **Effects on other pests** – Any effects, positive or negative, on the incidence of other pests should be noted.

3.6 **Effects on other non-target organisms** – Any observed environmental effects should also be recorded, especially effects on wildlife and/or beneficial organisms. Any observed effects on human safety should also be recorded.

3.7 **Quantitative and/or qualitative recording of yield** – Quantitative yield recording is not required, but any effects on the quality of the product should be noted (e.g. marketability or produce).

4. Results

4.1 The results should be reported in a systematic form and the report should include an analysis and evaluation. Original (raw) data should be available. Statistical analysis should be used, where appropriate, by methods which should be indicated. For further details, refer to Appendix 2.

D. GUIDELINES FOR EFFICACY EVALUATION OF HERBICIDES

1. The biological evaluation of a herbicide involves a programme of trials for assessment of efficacy in weed control and of selectivity to the crop (crop safety). Trials may be used either for evaluating weed control or crop safety according to weed occurrence, provided the conditions specified in the test protocol are satisfied.

2. Experimental Conditions

2.1 **Selection of crop, cultivar and weeds** – The selection of crop, cultivar, and weeds must be relevant to the (proposed) label claims. Consideration with regard to crop safety may also be given to cover crops, where applicable, which may be sown together with the primary crop. If crop safety of more than one cultivar needs to be tested, special varietal trials should be carried out.

2.2 **Evaluation of efficacy in weed control** – The plots should be known to carry a varied but uniform weed population. The weed population should correspond to the specific action spectrum of the herbicide to be tested (e.g. grasses, sedges and/or broadleaf weeds, annuals and/or perennials).

2.3 **Evaluation of crop safety** – The plots should preferably be as free from weeds as possible. Other herbicides should not be used, unless one is certain that they have no effect on the crop and do not interact with the test product(s) or reference product(s). If any weeds remain, they should preferably removed by hand or mechanically.

2.4 **Trial Conditions** – Cultural conditions e.g. soil type, fertilizers, tillage, row spacing etc. should be uniform for all plots of the trial and should conform with local agricultural practices. The timing, amount and method of irrigation, if applied, should be recorded. Trials should be carried out in different regions with distinct environmental conditions and preferably in different planting seasons where applicable.

2.5 **Treatments** – The product(s) and reference product(s) at individual doses and/or application times, and untreated control(s), arranged in a randomized block or any other statistically suitable design.

2.6 **Plot size and replication** – Net plot size: at least 10 meter square depending on type of plants, mode of application of the herbicide(s), and type of equipment to be used in applying the herbicide(s). For crop safety tests the net plot size should be at least 4 plants. Depending on the type of application, actual plot size may have to be larger than net plot size in order to take account of possible drift.

Replicates: at least three, provided the error degrees of freedom are at least 12.

3. Application of Treatments

3.1 **Test Product(s)** – The formulated product under investigation.

3.2 **Reference Product(s)** – Registered product(s) known to be satisfactory for the control of the weed types under investigation. In general formulation type and mode of action should be close to those of the test product(s)

3.3 **Mode of Application** – Application should conform with good agricultural practice.

3.4 **Type of application** – The type of application as specified on the (proposed) label.

3.5 **Type of equipment used** – The equipment should be of a type in current use. It should provide an even distribution of product(s) on the whole plot or accurate directional application where appropriate. Factors which may affect efficacy and/or duration of weed control and/or crop safety (such as operating pressure, nozzle type, depth of incorporation) should be recorded, together with any deviations on dosage of more than 10%.
Precaution should be taken to avoid drift between plots.

3.6 **Time and frequency of application** – The time and frequency of application should correspond to that specified on the (proposed) label. Application times should be related to the emergence of the crop and of the weeds. The same product may be applied once or in follow up application.
The number of applications and the date of each application should be recorded.

3.7 **Doses and volumes used** – According to instructions on the (proposed) label. The product(s) should be tested at the recommended dose and may also usefully be tested at other doses. The dosage will normally be expressed in kg or 1 of formulated product per ha. It may also be useful to record the dose in g of active ingredient per ha. For sprays, data on concentration (%) and volume (1/ha) should also be given.

3.8 **Data on chemicals used against other pests** – If other chemicals have to be used, they should be applied uniformly to all plots, separately from test product(s) and reference product(s). Possible interference with these should be kept to a minimum. Precise data on the applications should be given.

4. Assessment, Recording and Measurements

4.1 **Meteorological and edaphic data** – On the date of application, meteorological data should be recorded which are likely to effect the quality and persistence of the treatment. This normally includes at least precipitation (type and amount in mm) and temperature (average, maximum, minimum in ^{o}C). Any significant change in weather should be noted, and in particular its time relative to the time of treatment. Around the date of application, meteorological data should be recorded which are likely to affect the development of the crop and/or weeds and the action of the herbicides.

Throughout the trial period, extreme weather conditions, such as severe or prolonged drought, heavy rain, hail etc., which are likely to influence the results, should be reported.

4.2 **Edaphic data** – The following characteristics of the of the soil should be recorded: pH, organic matter content, soil type (according to a specified national or international standard), moisture (e.g. dry, wet, waterlogged), seed bed quality (tilth) and fertilizer regime.

4.3 **Observation on weeds** – The weed population of a plot can be recorded in terms of numbers, cover or mass (normally dry weight). These may be assessed in absolute terms and/or estimated.

4.3.1 Absolute assessment

Individual plants may be counted for each weed species or the mass of each species may be determined by weighing (normally dry weight). These assessments can be made on whole plots or on randomly selected marked quadrats (up to 1 m sq.) in each plot. In certain cases, it may be preferable to count or measure particular plant organs (e.g. flowering or fruiting tillers in weeds).

4.3.2 Estimation

Each treated plot is compared with an adjacent untreated plot or control strip, and the relative weed population is estimated. The assessment involves a general estimation of the total weed population or of individual weed species, combining in one figure an estimate of number, cover, height and vigour (i.e. virtually weed volume). It is in principle rapid and simple. The result may be expressed simply as a percentage (i.e. on a linear scale from 0 = no weeds to 100 = same weed infestation as untreated). An equivalent inverted scale may be used to express percent weed control (0 = no weed control, 100 = full weed control). Information should also be provided on the absolute level of weed infestation in the untreated plots or strips (absolute assessment of weed cover). In order to describe exactly the mode of action of the product, symptoms of damage to the weeds should be accurately described (stunting, chlorosis, deformation, etc.).

Effects on weeds can usefully be noted over 2 seasons. This is essential for deep rooted or difficult weeds (such as Cyperus rotundus, Imperata cylindrical) as they may not be killed and might reappear the following year.

4.4 **Observation on the crop** – Phytotoxicity is evaluated primarily on crop safety plots which are also harvested. However, the type and extent of damage to the crop should be recorded on efficacy plots and may provide useful additional information.

Phytotoxicity is recorded as follows:

(a) if the effect can be counted or measured, it may be expressed in absolute figures;

(b) in other cases, the frequency and intensity of damage may be estimated. This may be done in either of two ways: each plot is scored for phytotoxicity by reference to a scale which should be recorded; or each treated plot is compared with an untreated plot and % phytotoxicity estimated.

In all cases, symptoms of damage to the crop should be accurately described (stunting, chlorosis, deformation, etc.). Should symptoms of phytotoxicity be detected, a more detailed assessment should be carried out following the FAO Guidelines for Phytotoxicity Assessment (FAO/AP/027).

4.5 **Observation on side-effects** – Any effects on non-target organisms should be recorded.

4.6 **Time and frequency** – The times given apply to weed control and crop safety assessment, unless otherwise indicated. Frequency of assessment should cover possibility of regrowth.

(a) Pre-emergence applications:
- 1st assessment – when approximately 90 % of the crop has emerged in the untreated plot.
- 2nd assessment – 20 to 30 days after treatment.
- 3rd assessment – 60 days after application.
- 4th assessment – before harvest.

(b) Post-emergence applications:
- 1st assessment (preliminary) – on the day of treatment, the weed and crop cover in each plot should be recorded.
- 2nd assessment (weed control only) – 3 to 5 days after treatment.
- 3rd assessment – 10 to 20 days after treatment.
- 4th assessment – 30 to 50 days after treatment.
- 5th assessment – before harvest.

4.7 **Quantitative and/ or qualitative recording of yield** – For crop safety testing and weed control testing harvesting is optional in most cases.

5. Results

5.1 The results should be reported in a systematic form and the report should include an analysis and evaluation.
Original (raw) data should be available. Statistical analysis should be used, where appropriate, by methods which should be indicated. For further details, refer to Appendix 2.

E. GUIDELINES FOR BIOLOGICAL EVALUATIONS OF HOUSEHOLD INSECTICIDE PRODUCTS IN THE LABORATORY

1. Experimental Conditions

1.1 **Equipments and test organisms** – A transparent glass chamber or Peet Grady chamber (between 70 x 70 x 70cm to 180 x 180 x 180cm) and laboratory-cultured adult insects of known age group (eg. sucrose-fed female mosquitoes aged 2 – 5 days) should be used. In case of mosquitoes Aedes aegypti or Culex quinquefasciatus, being easily available, are the preferred species.

1.2 **Treatments and Replicates** – Test product(s) and reference product(s) should be tested and replicated at least three times.

2. Application of Treatments

2.1 **Test Product(s)** – The formulated product(s) under investigation.

2.2 **Reference Product(s)** – Registered product(s) known to be satisfactory for the control of the household insect pest(s) under investigation.

2.3 **Mode of Application** – Application method should correspond to the method proposed on the label.

2.4 **Type of equipment used** – should be of a type in current use. It should provide an even distribution of product in the test chamber.

2.5 **Doses and volumes used** – According to instructions on the (proposed) label. The product should be tested at the recommended dose and at other doses where appropriate.

3. Assessment and Recording.

3.1 **Type, time and frequency of assessment** – Assessment should be by number of insects knocked down observed at indicated intervals up to 20 minutes. Mortality after 24 hours posttreatment should be recorded.

4. Results

4.1 The results should be reported in a systematic form and the report should include an analysis and evaluation. Original (raw) data should be available. Statistical analysis should be used, where appropriate, by methods which should be indicated. For further details, refer to Appendix 3.

5. General

5.1 Applicants are advised to follow the test methods stated in the following documents.

(a) Glass Chamber Method for testing mosquito coils (SIRIM MS 23);
(b) Peet Grady Chamber Method for testing mosquito coils
(c) Glass Chamber Method for testing mosquito mats (SIRIM MS 1044);
(d) Peet Grady Chamber Method for testing mosquito mats;
(e) Glass Chamber Method for testing of aerosols against mosquitoes (SIRIM MS 1186);
(f) Peet Grady Chamber Method for testing of aerosols against mosquitoes;
(g) Glass Cylinder Method for testing of aerosols on cockroaches (SIRIM MS 1100);
(h) Residual tests on polywood plate/ cement block for cockroaches (SIRIM MS 1130);

In cases where there are no test methods specified applicants are advised to use the above guidelines.

Appendix 1

LIST OF HAMONISED BIOEFFICACY PROTOCOLS

FAO/AP/001	-	Planthoppers on Rice
FAO/AP/002	-	Stemborers on Rice
FAO/AP/003	-	Leafhoppers on Rice
FAO/AP/004	-	Plutella xylostella
FAO/AP/005	-	Alternaria solani and Phytophthora infestans on tomato
FAO/AP/006	-	Phytophthora infestans on Potato.
FAO/AP/007	-	Weeds in Rice.
FAO/AP/008	-	Weeds in Sugarcane.
FAO/AP/009	-	Weeds in Maize.
FAO/AP/010	-	Weeds in Banana.
FAO/AP/011	-	Seed Bugs on Rice.
FAO/AP/012	-	Rice Water Weevil.
FAO/AP/013	-	Leaf Folders on Rice.
FAO/AP/014	-	Sheath Blight of Rice.
FAO/AP/015	-	Blast Disease of Rice.
FAO/AP/016	-	Mites on Citrus.
FAO/AP/017	-	Scale Insects on Citrus.
FAO/AP/018	-	Heliothis armigera on Citrus.
FAO/AP/019	-	Citrus Leafminer.
FAO/AP/020	-	Webworm and Heartworm on Cabbage.
FAO/AP/021	-	Anthracnose of Capsicum spp.
FAO/AP/022	-	Corn Borers on Maize.
FAO/AP/023	-	Bollworms on Cotton.
FAO/AP/024	-	Rice Hispa.
FAO/AP/025	-	Apple Scab.
FAO/AP/026	-	Armyworms on Maize.
FAO/AP/027	-	Guidelines for Phytotoxicity Assessment.
FAO/AP/028	-	Sucking Insect Pests of Cotton.
FAO/AP/029	-	Mites on Apple.
FAO/AP/030	-	Aphids on Apple.
FAO/AP/031	-	Whorl Maggots on Rice.
FAO/AP/032	-	Black Bugs on Rice.
FAO/AP/033	-	Weeds on Oil Palm and Rubber.
FAO/AP/034	-	Weeds on Phaseolus, Pisum and Vigna.
FAO/AP/035	-	Blue Mould of Tobacco.
FAO/AP/036	-	Fruit Flies on Cucurbits.
FAO/AP/037	-	Hoppers on Mango.
FAO/AP/038	-	Fruit Flies on Mango.
FAO/AP/039	-	Codling Moth on Apple.
FAO/AP/040	-	Numerical Code for the Growth Stages of the Rice Plant.

Appendix 2

GUIDELINES FOR REPORTING OF EFFICACY EVALUATION

It is essential that the presentation of the results should be standardized in order to facilitate understanding of the trial results. Therefore, the data should preferably be presented in the following way:

- name of the experimenter and organization responsible for the trial;
- objective and location of the trial;
- chemical name and formulation;
- insect pest, disease or weed against which tested;
- crops and cultivars;
- plant growth stage;
- soil type;
- experimental design, size and number of plots treated;
- application dates and rates;
- application method and equipment;
- volume of spray liquid or other carrier types;
- weather conditions during and after treatment;
- treatment of the plots with other crop protecting materials, fertilizers and other products;
- application dates;
- dates of assessment;
- size and frequency of sampling;
- quantity and quality of yield of the harvested crop where required;
- any results on crop safety including intervals to be observed in order to avoid phytotoxic effects;
- data assessment including significance;
- interpretation and discussion on the results of the experiment in comparison with similar trials.

Appendix 3

GUIDELINES FOR REPORTING OF LABORATORY BIOLOGICAL EVALUATIONS OF HOUSEHOLD INSECTICIDE PRODUCTS

The data obtained from laboratory evaluations of household insecticide products should preferably be presented in the following manner:

- name of the experimenter and organization responsible for the test(s);
- objective of the test(s);
- chemical name and formulation;
- insect pest(s) against which tested;
- sample size and number of replicates tested;
- evaluation dates and rates;
- evaluation method and equipment;
- volume of spray and/ or duration of exposure of test insects;
- dates of assessment;
- data assessment including significance;
- interpretation and discussion on the results of the test(s).