

**Generation of Pesticide
Residue Data for Pesticide
Minor Use Permit
Applications in Vegetable
Crops 2007 - Agrisearch**

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Agrisearch Services Pty Ltd

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VG06156

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GENERATION OF PESTICIDE RESIDUE DATA FOR MINOR-USE PERMIT APPLICATIONS IN VARIOUS VEGETABLE CROPS 2007

STUDIES CONDUCTED BY AGRISEARCH SERVICES PTY LTD AUSTRALIA, 2007-2009

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1. MEDIA SUMMARY

In Australia, before an agrochemical product can be sold or used, it first must be registered by the Australian Pesticides and Veterinary Medicines Authority (APVMA). In order for a manufacturer to register a product they are required to submit a comprehensive data package to the APVMA. The costs for generating and collating such data are high and unfortunately many vegetable crops are too small individually for agrochemical manufacturers to bear the high cost of registering products for use in those crops. As a result, vegetable growers are often placed in situations where they risk severe crop losses from insects, weeds and diseases because appropriate pesticides are not available. On the other hand, they risk buyers rejecting their produce and other penalties if they are detected using products that are not registered for that specific use.

The APVMA's National Permit System adds some flexibility to the lengthy registration process and legalises the availability of products for minor-use purposes, not specified on the product label. However, off-label permits issued by the APVMA still must be applied for along with information and data submitted that verifies that the permitted use will be effective and will not have any harmful effects on humans, the crops or the environment.

In this project, 8 studies were conducted on 11 different fungicides, herbicides and insecticides. These studies were conducted at 42 different field sites in New South Wales, Queensland, Victoria and South Australia on the crops; greenhouse and hydroponic grown eggplant, capsicums, chilli, cucumbers and leafy lettuce and field grown silverbeet, spinach, celery, Asian root vegetables, eggplant, head lettuce and leafy lettuce.

The studies involved one or multiple applications of the pesticides on the target crops, sampling the crops at or around the normal commercial harvest time, and then analysing the sampled plant parts for residues of the target pesticide. Detailed study reports on the field and analytical components were prepared and these were used as part of the permit applications to the APVMA.

The major outcome of this project is that pesticides that could not be legally used by vegetable growers will now be available. This project has been part of a larger programme of research that has been conducted over the past few years. Although the outcomes of this project have been met there is an ongoing need for growers to have access to newer and better pesticides and so similar projects should be planned and conducted in the future.

2. TECHNICAL SUMMARY

Eight studies were conducted on 11 different fungicides, herbicides and insecticides. These studies were conducted at 42 different field sites in New South Wales, Queensland, Victoria and South Australia on the crops; greenhouse and hydroponic grown eggplant, capsicums, chilli, cucumbers and leafy lettuce and field grown silverbeet, spinach, celery, Asian root vegetables, eggplant, head lettuce and leafy lettuce. The study co-ordination was conducted by Agrisearch Services Pty Ltd at Orange, New South Wales and the analytical component was conducted at Agrisearch Analytical Pty Ltd at Rozelle, New South Wales. The studies were conducted under the OECD Principles of Good Laboratory Practice (GLP).

The test substances and their active ingredients were as follow:

ACRAMITE MITICIDE - 480 g/L bifenazate
AGRI-FOS 600 SYSTEMIC FUNGICIDE – 600 g/L phosphorous acid present as mono-di potassium phosphite
DUPONT LANNATE L INSECTICIDE – 225 g/L methomyl
REGENT 200 SC INSECTICIDE – 200 g/L fipronil
BETANAL HERBICIDE SPRAY – 157 g/L phenmedipham
KARATE WITH ZEON TECHNOLOGY INSECTICIDE – 250 g/L lambda-cyhalothrin
SWITCH FUNGICIDE – 375 g/kg cyprodinil and 250 g/kg fludioxonil
THIODAN EC INSECTICIDE – 350 g/L endosulfan
BRAVO WEATHER STIK FUNGICIDE – 720 g/L chlorothalonil
CHESS INSECTICIDE – 500 g/kg pymetrozine

The studies conducted were as follows:

Bifenazate and phosphorous acid in greenhouse/hydroponic grown leafy lettuce – HAL1433, AVG667
Fipronil, methomyl and phenmedipham in field grown head/leafy lettuce – HAL1513, HAL1634, AVG172
Lambda-cyhalothrin in greenhouse hydroponic and field grown cucumber, phosphorous acid in greenhouse hydroponic grown and field grown capsicum and cyprodinil+fludioxonil in greenhouse hydroponic grown and field grown cucumber, capsicum and leafy lettuce – HAL1388, AVG598, HAL1541
Chlorothalonil in greenhouse hydroponic grown cucumber and endosulfan in greenhouse hydroponic grown cucumber, capsicum and chilli – HAL1427, HAL1208
Methomyl in silverbeet and chlorothalonil in silverbeet and English spinach – AVG142, AVG447, AVG138
Fipronil in celery – AVG70
Methomyl in Asian root vegetables – HAL1496
Pymetrozine and phosphorous acid in greenhouse/hydroponic and field grown eggplant – AVG1069, AVG1542

Field sites were selected at locations where the nominated crop was commonly grown. Specific site details and requirements were as per the approved Study Plan and the Standard Operating Procedures (SOPs) of Agrisearch Services Pty Ltd. More than one study may have been conducted at a particular site, as detailed in the specific Study Plan. Treatment application timing and sampling was according to Good Agricultural Practice and locally accepted procedures.

Each trial within a study was established using an unrandomised and unreplicated large block design.

The pesticide treatments were applied in a manner, which simulated best commercial practice for the application of fungicides and insecticides to the target crops. The method used replicated how the co-operator farmer typically grows and sprays the crop.

Sampling was carried out according to documented Standard Operating Procedures relevant to crop and plant portion to be sampled and analysed.

Plant samples that were collected from each field site were sent frozen to Agrisearch Analytical Pty Ltd and the samples were analysed as per the Study Plan with the laboratory report sent to the Study Director for inclusion in a composite Study Report for each of the eleven studies.

The data generated from the studies have been included or will be included in submissions to the Australian Pesticides and Veterinary Medicines Authority. These submissions are for permit applications, pesticide label extensions or for inclusion in complete pesticide registration applications.

3. INTRODUCTION

Eight studies were conducted on 11 different fungicides, herbicides and insecticides. These studies were conducted at 42 different field sites in New South Wales, Queensland, Victoria and South Australia on the crops; greenhouse and hydroponic grown eggplant, capsicums, chilli, cucumbers and leafy lettuce and field grown silverbeet, spinach, celery, Asian root vegetables, eggplant, head lettuce and leafy lettuce. The study co-ordination was conducted by Agrisearch Services Pty Ltd at Orange, New South Wales and the analytical component was conducted at Agrisearch Analytical Pty Ltd at Rozelle, New South Wales. The studies were conducted under the OECD Principles of Good Laboratory Practice (GLP).

This report contains the experimental methods used and presents the results obtained.

The trial was conducted under Horticulture Australia Limited project VG06156 Agrisearch Project HAL/GLP/07/03.

4. MATERIALS AND METHODS

4.1 Individual Study Details

Eight studies were conducted according to approved Study Plans that had been prepared as per the OECD GLP Guidelines. Each Study Plan number and title and summary details of the individual studies were as follows:

HAL/GLP/07/03-1; Residues of bifentazate and phosphorous acid in greenhouse hydroponic grown leafy lettuce - Studies HAL1433 and AVG667 – Four sites; two studies in Adelaide region South Australia, and two studies in Gosford region New South Wales.

HAL/GLP/07/03-2; Residues of fipronil, methomyl and phenmedipham in field grown head and leafy lettuce - Studies HAL1513, HAL1634 and AVG172 – Six sites, two studies in Adelaide region South Australia, two studies in Melbourne region Victoria, and two studies in Gin Gin region Western Australia.

HAL/GLP/07/03-3; Residues of lambda-cyhalothrin in greenhouse hydroponic and field grown cucumber, phosphorous acid in greenhouse hydroponic grown and field grown capsicum and cyprodinil+fludioxonil in greenhouse hydroponic grown and field grown cucumber, capsicum and leafy lettuce - Studies HAL1388, AVG598 and HAL1541 - Nine sites; one field lettuce plus one protected cropping cucumber and capsicum study in Adelaide region South Australia, two protected cropping lettuce and one protected cropping capsicum and cucumber study in Gosford region New South Wales, and one field cucumber and capsicum study in Bundaberg region Queensland.

HAL/GLP/07/03-4; Residues of chlorothalonil in greenhouse hydroponic grown cucumber and endosulfan in greenhouse hydroponic grown cucumber, capsicum and chilli - Studies HAL1427 and HAL1208 – Six sites, one protected cropping cucumber and capsicum study in Adelaide region South Australia, one protected cropping cucumber and field chilli study in Melbourne region Victoria, one protected cropping cucumber and capsicum study in Gosford region New South Wales.

HAL/GLP/07/03-5; Residues of methomyl in silverbeet and chlorothalonil in silverbeet and English spinach - Studies AVG142, AVG447 and AVG138 – Six sites, one silverbeet and one spinach study in Adelaide region South Australia, one silverbeet and one spinach study in Melbourne region Victoria, and two silverbeet studies in Gosford region New South Wales.

HAL/GLP/07/03-6; Residues of fipronil in celery - Study AVG70 – Four sites; two studies in Melbourne region Victoria, one study in Adelaide region South Australia, one study in Toowoomba region Queensland.

HAL/GLP/07/03-7; Residues of methomyl in Asian root vegetables - Study HAL1496 – Four sites; one study on taro and one study on yam beans in Atherton Tableland region Queensland, one study on taro and one study on root vegetable in Toowoomba region Queensland.

HAL/GLP/07/03-8; Residues of pymetrozine and phosphorous acid in greenhouse hydroponic grown and field grown eggplant - Studies AVG1069 and AVG1542 – Three sites; two protected cropping studies in Adelaide region South Australia, one field study in Bundaberg region Queensland.

4.2 Trial Sites

Field sites were selected at locations where the nominated crop was commonly grown. Specific site details and requirements were as per the approved Study Plan and the Standard Operating Procedures (SOPs) of Agrisearch Services Pty Ltd. More than one study may have been conducted at a particular site, as detailed in the specific Study Plan. Treatment application timing and sampling was according to Good Agricultural Practice and locally accepted procedures.

4.3 Trial Design

Each trial within a study was established using an unrandomised and unreplicated large block design. The individual plot sizes generally ranged between 10-20 m² in area. Larger plot sizes were used if it was deemed necessary to obtain the required sample sizes. Each plot size was sufficient to produce duplicate, fresh-weight samples of produce on multiple occasions after the last application of each treatment, in sufficient quantity and number to satisfy international sampling requirements.

The untreated plots were situated as up-slope and as up-wind from each treated plot as practical, to prevent contamination of the untreated plot. Each plot was marked to completely and uniquely identify it by its geometry, trial number and treatment number. Test plots were considered as restricted access areas with measures taken to exclude unauthorised persons from the test area.

4.4 Formulations

The pesticide formulations used in the studies were as follows:

ACRAMITE MITICIDE - a suspension concentrate formulation containing 480 g/L bifentazate as the active ingredient. The test item was supplied by Chemtura Australia Pty Ltd.

KARATE WITH ZEON TECHNOLOGY INSECTICIDE - an emulsifiable concentrate formulation containing 250 g/L lambda-cyhalothrin as the active constituent. The test item was supplied by Syngenta Crop Protection Pty Ltd.

AGRI-FOS 600 SYSTEMIC FUNGICIDE - a liquid formulation containing 600 g/L phosphorous acid present as mono-di potassium phosphate as the active constituent. The test item was supplied by Agrichem.

BETANAL HERBICIDE SPRAY - a liquid formulation containing 157 g/L phenmedipham as the active constituent. The test item was supplied by Bayer CropScience.

SWITCH FUNGICIDE - a water dispersible granule formulation containing 375 g/kg cyprodinil and 250 g/kg fludioxonil as the active constituents. The test item was supplied by Syngenta Crop Protection Pty Ltd.

BRAVO WEATHER STIK FUNGICIDE - a suspension concentrate formulation containing 720 g/L chlorothalonil as the active constituent as marketed by Syngenta Crop Protection Australia.

THIODAN EC INSECTICIDE - an emulsifiable concentrate formulation containing 350 g/L endosulfan as the active constituent. The test item was supplied by Bayer CropScience Pty Ltd.

DUPONT LANNATE L INSECTICIDE – a liquid formulation containing 225 g/L methomyl as the active constituent. The test item was supplied by Nufarm Australia Limited.

REGENT 200 SC INSECTICIDE – a suspension concentrate formulation containing 200 g/L fipronil as the active constituent. The test item was supplied by Bayer CropScience.

CHESS INSECTICIDE – a water dispersible granule formulation containing 500 g/kg pymetrozine as the active constituent. The test item was marketed by Syngenta Crop Protection.

4.5 Treatment Method

The pesticide treatments were applied in a manner, which simulated best commercial practice for the application of fungicides and insecticides to the target crops. The method used replicated how the co-operator farmer typically grows and sprays the crop.

Pre-harvest foliar treatments were generally applied on a field hectare basis spraying all parts of the plant foliage to just before the point of run-off using a motorised pump, hose and hand gun or lance or a pressurised tank, hose and hand gun or lance. A horizontal or vertical boom may have been used. A vertically held boom was generally used when the target crop was trellised. The inter-rows were not sprayed unless this was the typical method. Droppers may have been used to improve the coverage of the underside of leaves.

The total spray volume was typically a maximum of 1000 L/ha depending on plant size and growing density. Full application details were recorded in the individual study reports.

4.6 Sampling Procedures

Sampling was carried out according to documented Standard Operating Procedures relevant to the crop and plant portion to be sampled and analysed. In general, plant portions were collected from 12 locations or plants within each plot for each sample taken. The end plants of each plot were not sampled. Two samples were taken from each treatment on each sampling date with one being the Primary Sample and the other the Reserve Sample.

The Primary Samples were the samples that were sent to the laboratory for analysis. The Reserve Samples remain in the freezer for at least 12 months after the completion of each study after which time they are discarded.

4.7 Analysis of Samples

Plant samples that were collected from each field site were sent frozen to the nominated analytical laboratory, Agrisearch Analytical Pty Ltd, as per the Study Plan. The samples were analysed as per the Study Plan with the laboratory report sent to the Study Director for inclusion in a composite Study Report for each of the eight studies.

5. RESULTS AND DISCUSSION

Summaries of the eight studies, including results and discussions, are presented below.

5.1 **HAL/GLP/07/03-1; Residues of bifenazate and phosphorous acid in greenhouse hydroponic grown leafy lettuce - Studies HAL1433 and AVG667 – Four sites; two studies in Adelaide region South Australia, and two studies in Gosford region New South Wales.**

This study was conducted to determine the tissue residue profile of bifenazate and phosphorous acid when applied to hydroponic leafy lettuce grown in protected structures. The study consisted of four field sites at Two Wells and Longwood SA, and Doyalson NSW.

The test items were as follows:

ACRAMITE MITICIDE – a suspension concentrate formulation containing 480 g/L bifenazate as the active constituent. The test item was supplied by Chemtura Australia Pty Ltd.

AGRI-FOS 600 SYSTEMIC FUNGICIDE - a liquid formulation containing 600 g/L phosphorous acid present as mono-di potassium phosphate as the active constituent. The test item was supplied by Agrichem.

An un-replicated large plot design was used at each test site.

The treatments and sampling times for Trials 7435, 7436, 7437 and 7438 are presented in the tables below:

Trial 7435, Two Wells SA

| Number | Treatment | Rate Applied | Application Times DBFH | Sampling Times DALA |
|--------|-------------------|--------------|---------------------------|------------------------|
| 1. | Untreated Control | | | 4 |
| 2. | ACRAMITE | 65 mL/100 L | 24, 3 | 0, 4, 6, 11 |
| 3. | AGRI-FOS 600 | 300 mL/100 L | 22, 15, 8, 1 | 0, 1, 4, 7 |

DBFH - days before first harvest (optimum commercial harvest)

DALA - days after last application

Trial 7436, Longwood SA

| Number | Treatment | Rate Applied | Application Times DBFH | Sampling Times DALA |
|--------|-------------------|--------------|---------------------------|------------------------|
| 1. | Untreated Control | | | 3 |
| 2. | ACRAMITE | 65 mL/100 L | 24, 3 | 0, 3, 6, 10 |
| 3. | AGRI-FOS 600 | 300 mL/100 L | 22, 15, 8, 1 | 0, 1, 3, 8 |

DBFH - days before first harvest (optimum commercial harvest)

DALA - days after last application

Trial 7437, Doyalson

| Number | Treatment | Rate Applied | Application Times DBFH | Sampling Times DALA |
|--------|-------------------|--------------|---------------------------|------------------------|
| 1. | Untreated Control | | | 0 |
| 2. | ACRAMITE | 65 mL/100 L | 24, 3 | 0, 3, 5, 10 |
| 3. | AGRI-FOS 600 | 300 mL/100 L | 22, 15, 8, 1 | 0, 1, 3, 7 |

DBFH - days before first harvest (optimum commercial harvest)

DALA - days after last application

Trial 7438, Doyalson NSW

| Number | Treatment | Rate Applied | Application Times DBFH | Sampling Times DALA |
|--------|-------------------|--------------|---------------------------|------------------------|
| 1. | Untreated Control | | | 0 |
| 2. | ACRAMITE | 65 mL/100 L | 24, 3 | 0, 3, 5, 10 |
| 3. | AGRI-FOS 600 | 300 mL/100 L | 22, 15, 8, 1 | 0, 1, 3, 7 |

DBFH - days before first harvest (optimum commercial harvest)

DALA - days after last application

The treatments were applied in a manner that simulated best commercial practice for the application of ACRAMITE and AGRI-FOS 600 in leafy lettuce. Treatments were applied by boom spray in sufficient water to ensure even and thorough coverage of all parts of each plant.

At least 12 lettuce heads were harvested with roots removed from 12 individual lettuce plants of each treatment for each sample. The samples were taken from all parts of the plot; however the ends of each plot were not sampled. Two samples were taken from each treatment on each sampling date with one being the Primary Sample and the other the Reserve Sample.

Bifenazate residues were determined according to:

“Validation of Working Method for Determination of Combined Bifenazate and UCC-D3598 Residues in Almond Nutmeat and Hulls”, GRL-FR-11866, Jennifer E. Bernstead, Crompton Co., July 2001

Phosphorous acid residue was determined according to an analytical method developed by Agrisearch Analytical Pty Ltd:

“Determination of Phosphorous acid in Vegetables and Fruits by HPLC/MS/MS”, AATM-R-127, Revision 2, April 2009, Agrisearch Analytical Pty Ltd

Residues of bifenazate greater than the limit of detection (0.05 mg/kg) were found in all of the treated samples of lettuce.

Bifenazate/ACRAMITE;

Residues of bifenazate were a maximum of 6.1 mg/kg at 0 days, and 0.33 mg/kg at 10 days after 2 applications of ACRAMITE applied at 21 day intervals.

Residues of phosphorous acid greater than the limit of quantitation (1.0 mg/kg) were found in all of the treated samples of lettuce. The range of phosphorous acid residues found in treated lettuce are summarised in the table below:

| Trial Number | Phosphorous Acid Found Range (mg/kg) |
|--------------|--------------------------------------|
| 7435 | 13-32 |
| 7436 | 9.8-50 |
| 7437 | 21-69 |
| 7438 | 12-34 |

Phosphorous acid/AGRIFOS 600;

Residues of phosphorous acid were a maximum of 69 mg/kg at 0 days, and 21 mg/kg at 7 days after 4 applications of AGRIFOS 600 applied at 7 day intervals.

5.2 HAL/GLP/07/03-2; Residues of fipronil, methomyl and phenmedipham in field grown head and leafy lettuce - Studies HAL1513, HAL1634 and AVG172 – Six sites, two studies in Adelaide region South Australia, two studies in Melbourne region Victoria, and two studies in Gin Gin region Western Australia.

This study was conducted to determine the tissue residue profile of fipronil, methomyl and phenmedipham when applied to head and leafy lettuce grown in field situations. The study consisted of six field sites at Waterloo Corner South Australia, Boneo and Baccus Marsh Victoria, York and Gingin Western Australia.

The test items were as follows:

DUPONT LANNATE L INSECTICIDE – a liquid formulation containing 225 g/L methomyl as the active constituent. The test item was supplied by Nufarm Australia Limited.

REGENT 200 SC INSECTICIDE – a suspension concentrate formulation containing 200 g/L fipronil as the active constituent. The test item was supplied by Bayer CropScience.

BETANAL HERBICIDE SPRAY – a liquid formulation containing 157 g/L phenmedipham as the active constituent. The test item was supplied by Bayer CropScience.

An unreplicated large plot design was used at each test site.

The treatments and sampling times for Trials 7440, 7441, 7442, 7443, 7444 and 7445 are presented in the tables below:

Trial 7440, Waterloo Corner SA

| Number | Treatment | Rate Applied (Actual) | Application Times DBFH | Sampling Times DALA |
|--------|-------------------|-----------------------|------------------------|---------------------------------|
| 1. | Untreated control | | | 8 |
| 2. | REGENT 200 SC | 250 mL/ha (253.5) | 21, 8 | 0, 3, 7, 9 |
| 3. | LANNATE L | 2.0 L/ha (1.996) | 12, 9, 5, 3 | Just prior, 0, 1, 7, 14, 21, 28 |

Trial 7441, Waterloo Corner SA

| Number | Treatment | Rate Applied (Actual) | Application Times DBFH | Sampling Times DALA |
|--------|-------------------|-----------------------|------------------------|---------------------------------|
| 1. | Untreated control | | | 8 |
| 2. | REGENT 200 SC | 250 mL/ha (243) | 21, 8 | 0, 3, 7, 9 |
| 3. | LANNATE L | 2.0 L/ha (1.943) | 12, 9, 5, 3 | Just prior, 0, 1, 7, 14, 21, 28 |

Trial 7442 Baccus Marsh Vic

| Number | Treatment | Rate Applied (Actual) | Application Time | Sampling Times DALA |
|--------|-------------------|-----------------------|-------------------------|---------------------|
| 1. | Untreated control | | | 28 |
| 4. | BETANAL | 1.2 L (2.3) | 8 days after transplant | 28 |

Trial 7442 Boneo Vic

| Number | Treatment | Rate Applied (Actual) | Application Times DBFH | Sampling Times DALA |
|--------|-------------------|-----------------------|------------------------|---------------------------------|
| 1. | Untreated control | | | 0, 28 |
| 2. | REGENT 200 SC | 250 mL/ha (257) | 21, 7 | 0, 3, 7, 10 |
| 3. | LANNATE L | 2.0 L/ha (2.06) | 12, 9, 6, 3 | Just prior, 0, 1, 7, 14, 21, 28 |

Trial 7443, Baccus Marsh Vic

| Number | Treatment | Rate Applied (Actual) | Application Times DBFH | Sampling Times DALA |
|--------|-------------------|-----------------------|-------------------------|---------------------------------|
| 1. | Untreated control | | | 0, 28 |
| 2. | REGENT 200 SC | 250 mL/ha (263) | 21, 7 | 0, 3, 7, 10 |
| 3. | LANNATE L | 2.0 L/ha (2.006) | 12, 9, 6, 3 | Just prior, 0, 1, 7, 14, 21, 28 |
| 4. | BETANAL | 1.2 L/ha (2.3) | 8 days after transplant | 28 |

Trial 7444, York WA

| Number | Treatment | Rate Applied (Actual) | Application Times DBFH | Sampling Times DALA |
|--------|-------------------|-----------------------|------------------------------|---------------------------------|
| 1. | Untreated control | | | 0, 56 |
| 2. | LANNATE L | 2.0 L/ha (2.004) | 12, 9, 6, 3 | Just prior, 0, 1, 7, 14, 21, 28 |
| 3. | BETANAL | 4.5 L/ha (4.547) | within 14 days of transplant | 56 |

Trial 7445, Gingin WA

| Number | Treatment | Rate Applied (Actual) | Application Times DBFH | Sampling Times DALA |
|--------|-------------------|-----------------------|--------------------------|---------------------------------|
| 1. | Untreated control | | | 0, 28 |
| 2. | LANNATE L | 2.0 L/ha (1.994) | 12, 9, 6, 3 | Just prior, 0, 1, 7, 14, 21, 28 |
| 3. | BETANAL | 4.5 L/ha (4.586) | 25 days after transplant | 28 |

The treatments were applied in a manner that simulated best commercial practice for the application of DUPONT LANNATE L INSECTICIDE, REGENT 200 SC INSECTICIDE and BETANAL HERBICIDE SPRAY in head and leafy lettuce. Treatments were applied by boom spray in sufficient water to ensure even and thorough coverage of all parts of each plant.

At least 12 lettuce heads were harvested with roots removed from 12 individual lettuce plants of each treatment for each sample. The samples were taken from all parts of the plot; however the ends of each plot were not sampled. Two samples were taken from each treatment on each sampling date with one being the Primary Sample and the other the Reserve Sample.

Fipronil residues were determined according to an analytical method developed by Agrisearch Analytical Pty Ltd:

*“Determination of Multi-Residues in Fruit and Vegetables using DSPE”
AATM-S-60, Revision 8, Agrisearch Analytical Pty Ltd, September 2008.*

Methomyl residues were determined according to an analytical method developed by Agrisearch Analytical Pty Ltd:

*“Determination of Multi-Residues in Fruit and Vegetables using DSPE”
AATM-S-60, Revision 8, Agrisearch Analytical Pty Ltd, September 2008.*

Phenmedipham residues were determined according to an analytical method developed by Agrisearch Analytical Pty Ltd:

*“Determination of Multi-Residues in Fruit and Vegetables using DSPE”
AATM-S-60, Revision 8, Agrisearch Analytical Pty Ltd, 22 September 2008.*

Residues of fipronil greater than the limit of quantitation (0.01mg/kg) were found in most of the treated samples of lettuce. A summary of the range of fipronil and metabolites residues found in treated samples from each of the four trial sites are given below:

| Trial Number | Residue Range (mg/kg) | | | |
|--------------|-----------------------|-----------------------------|--------------------------|--------------------------|
| | Fipronil (mg/kg) | Fipronil Desulfinyl (mg/kg) | Fipronil Sulfide (mg/kg) | Fipronil Sulfone (mg/kg) |
| 7440 | <LOD-0.82 | <LOD-0.06 | <LOD | <LOD-0.03 |
| 7441 | 0.02-0.89 | 0.02-0.06 | <LOD-<LOQ | <LOD-0.03 |
| 7442 | 0.02-0.34 | <LOD | <LOD | <LOD-0.01 |
| 7443 | <LOD-0.67 | <LOD-0.04 | <LOD | <LOD-0.03 |

Residues of methomyl and methomyl oxime greater than the limit of quantitation (0.02mg/kg) were found in some of the treated samples of the lettuce. A summary of the range of methomyl and metabolite residues found in treated samples from each of the six trial sites are given below:

| Trial Number | Residue Range (mg/kg) | |
|--------------|------------------------|------------------|
| | Methomyl Oxime (mg/kg) | Methomyl (mg/kg) |
| 7440 | <LOD-0.08 | <LOD-7.8 |
| 7441 | <LOD-0.09 | <LOD-10.9 |
| 7442 | <LOQ-0.02 | 0.08-0.89 |
| 7443 | <LOD-0.04 | <LOD-3.6 |
| 7444 | <LOD-0.05 | <LOD-4.6 |
| 7445 | <LOD-0.12 | <LOD-8.4 |

All of the treated samples were found to contain quantifiable (>0.05 mg/kg) residues of phenmedipham. The range of phenmedipham residues found in treated lettuce samples ranged from 0.10 mg/kg to 0.70 mg/kg at 28 days after a single application of BETANAL.

5.3 HAL/GLP/07/03-3; Residues of lambda-cyhalothrin in greenhouse hydroponic and field grown cucumber, phosphorous acid in greenhouse hydroponic grown and field grown capsicum and cyprodinil+fludioxonil in greenhouse hydroponic grown and field grown cucumber, capsicum and leafy lettuce - Studies HAL1388, AVG598 and HAL1541 - Nine sites; one field lettuce plus one protected cropping cucumber and capsicum study in Adelaide region South Australia, two protected cropping lettuce and one protected cropping capsicum and cucumber study in Gosford region New South Wales, and one field cucumber and capsicum study in Bundaberg region Queensland.

This study was conducted to determine the tissue residue profile of cyprodinil and fludioxonil when applied to hydroponic, grown in protected structures, and field grown leafy lettuce, cucumber and capsicum; lambda – cyhalothrin when applied to hydroponic, grown in protected structures, and field grown cucumber; and phosphoric when applied to hydroponic, grown in protected structures, and field grown capsicums. The study consisted of nine field sites located at Doyalson, Peats Ridge and Glenorie in New South Wales, Waterloo Corner, Two Wells and Virginia in South Australia, and Wallaville and Alloway in Queensland, Australia.

The test items were as follows:

KARATE WITH ZEON TECHNOLOGY INSECTICIDE - an emulsifiable concentrate formulation containing 250 g/L lambda-cyhalothrin as the active constituent. The test item was supplied by Syngenta Crop Protection Pty Ltd.

AGRI-FOS 600 SYSTEMIC FUNGICIDE - a liquid formulation containing 600 g/L phosphorous acid present as mono-di potassium phosphate as the active constituent. The test item was supplied by Agrichem.

SWITCH FUNGICIDE - a water dispersible granule formulation containing 375 g/kg cyprodinil and 250 g/kg fludioxonil as the active constituents. The test item was supplied by Syngenta Crop Protection Pty Ltd.

An unreplicated large plot design was used at each test site.

The treatments and sampling times for Trials 7447, 7448, 7449, 7450, 7451, 7452, 7453, 7454, and 7455 are presented in the tables below:

Trial 7447, Doyalson NSW

| Number | Treatment | Rate of Formulation Per 100 L | Application Times DBFH | Sampling Times DALA |
|--------|-------------------|----------------------------------|---------------------------|------------------------|
| 1. | Untreated Control | | | 0 |
| 2. | SWITCH | 100 g | 8, 1 | 0, 1, 5, 10 |

DBFH - days before first harvest

DALA - days after last application

Trial 7448, Doyalson NSW

| Number | Treatment | Rate of Formulation Per 100 L | Application Times DBFH | Sampling Times DALA |
|--------|-------------------|----------------------------------|---------------------------|------------------------|
| 1. | Untreated Control | | | 0 |
| 2. | SWITCH | 100 g | 8, 1 | 0, 1, 5, 10 |

DBFS - days before first harvest

DALA - days after last application

Trial 7449, Waterloo Corner SA

| Number | Treatment | Rate of Formulation Per Hectare | Application Times DBFH | Sampling Times DALA |
|--------|-------------------|------------------------------------|---------------------------|------------------------|
| 1. | Untreated Control | | | 8 |
| 2. | SWITCH | 1 kg | 8, 1 | 0, 1, 6, 9 |

DBFS - days before first harvest

DALA - days after last application

Trial 7450, Two Wells SA

| Number | Treatment | Rate of Formulation Per 100 L | Application Times DBFH | Sampling Times DALA |
|--------|-------------------|----------------------------------|---------------------------|------------------------|
| 1. | Untreated Control | | | 4 |
| 2. | SWITCH | 100 g | 7, 1 | 0, 3, 4, 10 |
| 3. | KARATE | 7.0 mL | 11, 2 | 0, 1, 4, 7 |

DBFS - days before first harvest

DALA - days after last application

Trial 7451, Peats Ridge NSW

| Number | Treatment | Rate of Formulation Per 100 L | Application Times DBFH | Sampling Times DALA |
|--------|-------------------|----------------------------------|---------------------------|------------------------|
| 1. | Untreated Control | | | 0 |
| 2. | SWITCH | 100 g | 8, 1 | 0, 1, 5, 10 |
| 3. | KARATE | 7.0 mL | 12, 2 | 0, 2, 5, 7 |

DBFS - days before first harvest

DALA - days after last application

Trial 7452, Wallaville Qld

| Number | Treatment | Rate of Formulation Per Hectare | Application Times DBFH | Sampling Times DALA |
|--------|-------------------|------------------------------------|---------------------------|------------------------|
| 1. | Untreated Control | | | 0 |
| 2. | SWITCH | 1kg | 8, 1 | 0, 1, 5, 10 |
| 3. | KARATE | 70 mL | 12, 2 | 0, 2, 5, 7 |

DBFS - days before first harvest

DALA - days after last application

Trial 7453, Virginia SA

| Number | Treatment | Rate of Formulation Per 100 L | Application Times DBFH | Sampling Times DALA |
|--------|-------------------|----------------------------------|---------------------------|------------------------|
| 1. | Untreated Control | | | -5 |
| 2. | SWITCH | 100 g | 8, 0 | 0, 1, 7, 10 |
| 3. | AGRI-FOS | 300 mL | 21, 14, 6, 0 | 0, 1, 5, 7 |

DBFS - days before first harvest

DALA - days after last application

Trial 7454, Glenorie NSW

| Number | Treatment | Rate of Formulation Per 100 L | Application Times DBFH | Sampling Times DALA |
|--------|-------------------|----------------------------------|---------------------------|------------------------|
| 1. | Untreated Control | | | 0 |
| 2. | SWITCH | 100 g | 8, 1 | 0, 1 5, 10 |
| 3. | AGRI-FOS | 300 mL | 22, 15, 8, 1 | 0, 1, 4, 7 |

DBFS - days before first harvest

DALA - days after last application

Trial 7455, Alloway Qld

| Number | Treatment | Rate of Formulation Per Hectare | Application Times DBFH | Sampling Times DALA |
|--------|-------------------|------------------------------------|---------------------------|------------------------|
| 1. | Untreated Control | | | 0 |
| 2. | SWITCH | 1 kg | 8, 1 | 0, 1 5, 10 |
| 3. | AGRI-FOS | 3.0 L | 22, 15, 8, 1 | 0, 1, 3, 7 |

DBFS - days before first harvest

DALA - days after last application

The treatments were applied in a manner that simulated best commercial practice for the application of SWITCH in lettuce, cucumbers, and capsicum; KARATE in cucumbers; and AGRI-FOS 600 in capsicums. Treatments were applied by a gas operated hand held boom spray in sufficient water to ensure even and thorough coverage of all parts of each plant. Appropriate nozzle types were used to maximise the coverage of all parts of the crop.

At least 12 lettuce heads were harvested with roots removed from 12 individual lettuce plants, of each treatment for each sample. The samples were taken from all parts of the plot; however the ends of each plot were not sampled.

At least 12 cucumber or capsicum fruit were collected from all parts of the plot, except for Trial 7450 sampled 27 December 2008. The ends of each plot were not sampled. Each sample collected weighed a minimum 2 kg.

Two samples were taken from each treatment on each sampling date with one being the Primary Sample and the other the Reserve Sample.

Lambda cyhalothrin, cyprodinil, and fludioxonil residues were determined according to an analytical method developed by Agrisearch Analytical Pty Ltd:

*“Determination of Multi-Residues in Fruit and Vegetables using DSPE”
AATM-S-60, Revision 7, Agrisearch Analytical Pty Ltd, 20 August 2007.*

Phosphorous acid residues were determined according to an analytical method developed by Agrisearch Analytical Pty Ltd:

“Determination of Phosphorous acid in Vegetables and Fruits by HPLC/MS/MS”, AATM-R-127, Revision 1, January 2009, Agrisearch Analytical Pty Ltd.

Residues of lambda cyhalothrin greater than the limit of quantitation (0.02 mg/kg) were found in none of the treated samples of cucumber. The range of lambda cyhalothrin residues found in test samples ranges from <LOD to <LOQ.

Residues of cyprodinil greater than the limit of detection (0.05 mg/kg) were found in most of the treated samples of capsicum, cucumber and lettuce.

Cyprodinil/SWITCH;

Residues of cyprodinil in lettuce were a maximum of 5.5 mg/kg at 0 days and 0.74 mg/kg at 10 days after 2 applications of SWITCH applied at 6-8 day intervals.

Cyprodinil/SWITCH;

Residues of cyprodinil in cucumbers were a maximum of 0.17 mg/kg at 0 days and 0.10 mg/kg at 10 days after 2 applications of SWITCH applied at 6-8 day intervals.

Cyprodinil/SWITCH;

Residues of cyprodinil in capsicums were a maximum of 0.21 mg/kg at 0 days, 0.34 mg/kg at 5 days, and 0.10 mg/kg at 10 days 2 applications of SWITCH applied at 6-8 day intervals.

Residues of fludioxonil greater than the limit of detection (0.02 mg/kg) were found in most of the treated samples of capsicum, cucumber and lettuce.

Fludioxonil/SWITCH;

Residues of fludioxonil in lettuce were a maximum of 4.4 mg/kg at 0 days and 1.4 mg/kg at 10 days after 2 applications of SWITCH applied at 6-8 day intervals.

Fludioxonil/SWITCH;

Residues of fludioxonil in cucumbers were a maximum of 0.11 mg/kg at 0 days and 0.10 mg/kg at 10 days after 2 applications of SWITCH applied at 6-8 day intervals.

Fludioxonil/SWITCH;

Residues of fludioxonil in capsicums were a maximum of 0.19 mg/kg at 0 days, 0.28 mg/kg at 5 days, and 0.21 mg/kg at 10 days after 2 applications of SWITCH applied at 6-8 day intervals.

Residues of phosphorous acid greater than the limit of quantitation (1.0 mg/kg) were found in all of the treated samples of capsicum. The range of phosphorous acid residues found in test samples ranges from 5.4 mg/kg to 21 mg/kg.

Phosphorous acid/AGRI-FOS 600;

Residues of phosphorous acid in capsicums were a maximum of 17 mg/kg at 0 days and 21 mg/kg at 7 days after 4 applications of AGRI-FOS 600 applied at 6-8 day intervals.

5.4 HAL/GLP/07/03-4; Residues of chlorothalonil in greenhouse hydroponic grown cucumber and endosulfan in greenhouse hydroponic grown cucumber, capsicum and chilli - Studies HAL1427 and HAL1208 – Six sites, one protected cropping cucumber and capsicum study in Adelaide region South Australia, one protected cropping cucumber and field chilli study in Melbourne region Victoria, one protected cropping cucumber and capsicum study in Gosford region New South Wales.

This study was conducted to determine the tissue residue profile of chlorothalonil in hydroponic grown cucumber in protected structures, and endosulfan in hydroponic grown cucumber, capsicum and chilli in protected structures. The study consisted of six field sites at Two Wells in South Australia, Peats Ridge in New South Wales, Tynong North in Victoria, Virginia in South Australia, Glenorie in New South Wales and Monbulk in Victoria, Australia.

The test substances were as follows:

BRAVO WEATHER STIK FUNGICIDE – a suspension concentrate formulation containing 720 g/L chlorothalonil as the active constituent. The test item was supplied by Syngenta Crop Protection Pty Ltd.

THIODAN EC INSECTICIDE - an emulsifiable concentrate formulation containing 350 g/L endosulfan as the active constituent. The test item was supplied by Bayer CropScience Pty Ltd.

An unreplicated single plot design was used at each test site.

The treatments and sampling times for Trials 7457, 7458, 7459, 7460, 7461 and 7462 are presented in the tables below:

Trial 7457, Two Wells SA

| Number | Formulation | Rate Applied | Application Times DBFH | Sampling Times DALA |
|--------|-------------------|--------------|---------------------------|------------------------|
| 1. | Untreated control | | | 5 |
| 2. | BRAVO | 230 mL | 21, 14, 7, 1 | 0, 1, 5, 7 |
| 3. | THIODAN | 190 mL | 13, 10, 7 | 0, 3, 7, 10 |

Trial 7458, Peats Ridge NSW

| Number | Formulation | Rate Applied | Application Times DBFH | Sampling Times DALA |
|--------|-------------------|--------------|---------------------------|------------------------|
| 1. | Untreated control | | | 0 |
| 2. | BRAVO | 230 mL | 22, 14, 8, 1 | 0, 1, 3, 7 |
| 3. | THIODAN | 190 mL | 13, 10, 7 | 0, 3, 7, 10 |

Trial 7459, Tynong North Vic

| Number | Formulation | Rate Applied | Application Times DBFH | Sampling Times DALA |
|--------|-------------------|--------------|---------------------------|------------------------|
| 1. | Untreated control | | | 0 |
| 2. | BRAVO | 230 mL | 22, 16, 8, 1 | 0, 1, 3, 7 |
| 3. | THIODAN | 190 mL | 12, 10, 7 | 0, 3, 7, 10 |

Trial 7460, Virginia SA

| Number | Formulation | Rate Applied | Application Times DBFH | Sampling Times DALA |
|--------|-------------------|--------------|---------------------------|------------------------|
| 1. | Untreated control | | | 9 |
| 2. | THIODAN | 190 mL | 15, 11, 7 | 0, 3, 7, 10 |

Trial 7461, Glenorie NSW

| Number | Formulation | Rate Applied | Application Times DBFH | Sampling Times DALA |
|--------|-------------------|--------------|---------------------------|------------------------|
| 1. | Untreated control | | | 0 |
| 2. | THIODAN | 190 mL | 13, 10, 7 | 0, 3, 7, 10 |

Trial 7462, Monbulk Vic

| Number | Formulation | Rate Applied | Application Times DBFH | Sampling Times DALA |
|--------|-------------------|--------------|---------------------------|------------------------|
| 1. | Untreated control | | | 0 |
| 2. | THIODAN | 190 mL | 13, 10, 7 | 0, 3, 7, 10 |

The treatments were applied in a manner that simulated best commercial practice for the application of BRAVO WEATHER STIK FUNGICIDE in cucumbers grown in protected structures, and THIODAN EC INSECTICIDE in cucumbers, capsicums and chilli's grown in protected structures. Treatments were applied by boom spray in sufficient water to ensure even and thorough coverage of all parts of each plant.

At least 12 cucumbers or capsicum fruit were harvested from separate plants, and a minimum sample size of 2 kg per sample was taken for the majority of samples. At least 24 chilli fruit from 12 separate plants, and a minimum sample size of 2 kg per sample was taken for the majority of samples. Some samples taken were less than the required amount. The samples were taken from all parts of the plot; however the ends of each plot were not sampled. Two samples were taken from each treatment on each sampling date with one being the Primary Sample and the other the Reserve Sample.

Residues were determined according to an analytical method developed by Agrisearch Analytical Pty Ltd: "Determination of Multi-Residues in Fruit and Vegetables using DSPE" AATM-S-60, Revision 4, Agrisearch Analytical Pty Ltd, 21 November 2005.

Cucumbers

Residues of chlorothalonil greater than the limit of quantitation (0.1 mg/kg) were found in all of the treated samples of cucumbers.

Chlorothalonil/BRAVO;

Residues of chlorothalonil in cucumbers were a maximum of 1.4 mg/kg at 0 days and 1.1 mg/kg at 7 days after four applications of BRAVO applied at 6-8 day intervals.

Residues of endosulfan greater than the limit of quantitation (0.05 mg/kg) were found in all of the treated samples of cucumbers.

Endosulfan/THIODAN;

Residues of total endosulfan in cucumbers were a maximum of 0.71 mg/kg at 0 days and <0.20 mg/kg at 10 days after three applications of THIODAN applied at 2-3 day intervals.

Capsicums

Residues of endosulfan greater than the limit of quantitation (0.05 mg/kg) were found in all of the treated samples of capsicums.

Endosulfan/THIODAN;

Residues of total endosulfan in capsicums were a maximum of <0.71 mg/kg at 0 days and 0.42 mg/kg at 10 days after 3 applications of THIODAN applied at 3-4 day intervals.

Chilli

Residues of endosulfan greater than the limit of quantitation (0.05 mg/kg) were found in all of the treated samples of chillies.

Endosulfan/THIODAN;

Residues of total endosulfan in chillies were a maximum of <0.60 mg/kg at 0 days and <0.34 mg/kg 10 days after 3 applications of THIODAN applied at 3 day intervals.

5.5 HAL/GLP/07/03-5; Residues of methomyl in silverbeet and chlorothalonil in silverbeet and English spinach - Studies AVG142, AVG447 and AVG138 – Six sites, one silverbeet and one spinach study in Adelaide region South Australia, one silverbeet and one spinach study in Melbourne region Victoria, and two silverbeet studies in Gosford region New South Wales.

This study was conducted to determine the tissue residue profile of methomyl when applied to silverbeet and chlorothalonil when applied to silverbeet and English spinach. The study consisted of six field sites at Clyde in Victoria, Mangrove Mountain in New South Wales and Waterloo Corner in South Australia.

The test items were as follows:

DUPONT LANNATE L INSECTICIDE – a liquid formulation containing 225 g/L methomyl as the active constituent. The test item was supplied by Nufarm Australia Limited.

BRAVO WEATHER STIK FUNGICIDE – a suspension concentrate formulation containing 720 g/L chlorothalonil as the active constituent. The test item was supplied by Syngenta Crop Protection Pty Limited.

An unreplicated, non-randomised single plot design was used at each test site.

The treatments and sampling times for Trials 7464, 7465, 7466, 7467, 7468 and 7469 are presented in the tables below:

Trial 7464, Clyde Vic

| Number | Treatment | Rate Applied per ha | Application Times DBFH | Sampling Times DALA |
|--------|-------------------|---------------------|---------------------------|------------------------|
| 1. | Untreated control | | | 0 |
| 2. | LANNATE L | 2.0 L | 20, 16, 14 | 7, 14, 21 |
| 3. | BRAVO | 2.3 L | 22, 15, 8, 1 | 0, 1, 3, 7 |

DBFH - days before first harvest

DALA - days after last application

Trial 7465, Waterloo Corner SA

| Number | Treatment | Rate Applied per ha | Application Times DBFH | Sampling Times DALA |
|--------|-------------------|---------------------|---------------------------|------------------------|
| 1. | Untreated control | | | 1 |
| 2. | LANNATE L | 2.0 L | 21, 17, 14 | 7, 14, 21 |
| 3. | BRAVO | 2.3 L | 22, 15, 8, 1 | 0, 1, 4, 7 |

DBFH - days before first harvest

DALA - days after last application

Trial 7466, Mangrove Mountain NSW

| Number | Treatment | Rate Applied per ha | Application Times DBFH | Sampling Times DALA |
|--------|-------------------|---------------------|---------------------------|------------------------|
| 1. | Untreated control | | | 0 |
| 2. | LANNATE L | 2.0 L | 20, 17, 14 | 7, 14, 21 |
| 3. | BRAVO | 2.3 L | 25, 18, 10, 1 | 0, 1, 3, 7 |

DBFH - days before first harvest

DALA - days after last application

Trial 7467, Mangrove Mountain NSW

| Number | Treatment | Rate Applied per ha | Application Times DBFH | Sampling Times DALA |
|--------|-------------------|---------------------|---------------------------|------------------------|
| 1. | Untreated control | | | 0 |
| 2. | LANNATE L | 2.0 L | 20, 17, 14 | 7, 14, 21 |

DBFH - days before first harvest

DALA - days after last application

Trial 7468, Clyde Vic

| Number | Treatment | Rate Applied per ha | Application Times DBFH | Sampling Times DALA |
|--------|-------------------|---------------------|---------------------------|------------------------|
| 1. | Untreated control | | | 0 |
| 2. | BRAVO | 2.3 L | 22, 15, 8, 1 | 0, 1, 3 |

DBFH - days before first harvest

DALA - days after last application

Trial 7469, Waterloo Corner SA

| Number | Treatment | Rate Applied per ha | Application Times DBFH | Sampling Times DALA |
|--------|-------------------|---------------------|---------------------------|------------------------|
| 1. | Untreated control | | | 1 |
| 2. | BRAVO | 2.3 L | 23, 15, 8, 1 | 0, 1, 2, 7 |

DBFH - days before first harvest

DALA - days after last application

The treatments were applied in a manner that simulated best commercial practice for the application of fungicides and insecticides in silverbeet and English spinach. Treatments were applied by a gas operated hand held boom spray in sufficient water to ensure even and thorough coverage of all parts of each plant. Appropriate nozzle types were used to maximise the coverage of all parts of the crop.

At least 12 plants (without roots) were sampled from each treatment for each sample, with the majority of samples being over 1 kg in weight except for some samples in Trials 7468 and 7469. The samples were taken from all parts of the plot; however the ends of each plot were not sampled. Two samples were taken from each treatment on each sampling date with one being the Primary Sample and the other the Reserve Sample.

Methomyl and chlorothalonil residues were determined according to an analytical method developed by Agrisearch Analytical Pty Ltd:

*“Determination of Multi-Residues in Fruit and Vegetables using DSPE”
AATM-S-60, Revision 8, Agrisearch Analytical Pty Ltd, 22 September
2008.*

Residues of methomyl oxime greater than the limit of quantitation (0.02mg/kg) were not found in any of the treated samples of the silverbeet. Residues of methomyl greater than the limit of quantitation (0.02 mg/kg) were found in some of the treated samples of the silverbeet. The range of methomyl residues found in treated silverbeet samples ranged from lower than limit of detection to 0.70 mg/kg.

Methomyl/LANNATE L;

Residues of total methomyl (methomyl + methomyl oxime) in silverbeet were a maximum of <0.72 mg/kg at 7 days, <0.08 mg/kg at 14 days, and <LOD at 21 days after 3 applications of LANNATE L applied at 2 to 4 day intervals.

All of the treated samples were found to contain quantifiable (>0.1mg/kg) residues of chlorothalonil. The range of chlorothalonil residues found in treated silverbeet and spinach samples ranged from 8.5 mg/kg to 107 mg/kg except one of the treated samples <LOD.

Chlorothalonil/BRAVO WEATHER STIK;

Residues of chlorothalonil in silverbeet were a maximum of 51.3 mg/kg at 0 days, and 19.4 mg/kg at 7 days after 3 applications of BRAVO WEATHER STIK applied at 7 to 9 day intervals.

Chlorothalonil/BRAVO WEATHER STIK;

Residues of chlorothalonil in English spinach were a maximum of 107 mg/kg at 0 days, and 66.3 mg/kg at 7 days after 3 applications of BRAVO WEATHER STIK applied at 7 to 8 day intervals.

5.6 HAL/GLP/07/03-6; Residues of fipronil in celery - Study AVG70 – Four sites; two studies in Melbourne region Victoria, one study in Adelaide region South Australia, one study in Toowoomba region Queensland.

This study was conducted to determine the tissue residue profile of fipronil when applied to field grown celery. The study consisted of four field sites at Angle Vale in South Australia, Cora Lynn and Boneo in Victoria, and Toowoomba in Queensland.

The test item was as follows:

REGENT 200 SC INSECTICIDE – a suspension concentrate formulation containing 200 g/L fipronil as the active constituent. The test item was supplied by Bayer CropScience.

An unreplicated large plot design was used at each test site.

The treatments and sampling times for Trials 7471, 7472, 7473 and 7474 are presented in the tables below:

Trial 7471, Angle Vale SA

| Number | Formulation | Rate ai/ha | Rate of Formulation per Hectare | Application Times DBFH | Sampling Times DALA |
|--------|-------------------|------------|---------------------------------|------------------------|---------------------|
| 1. | Untreated control | | | | 3 |
| 2. | REGENT 200 SC | 50 g | 250 mL | 13, 9, 6 | 0, 3, 7, 10 |

DBFH – days before first harvest

DALA – days after last application

Trial 7472, Cora Lynn Vic

| Number | Formulation | Rate ai/ha | Rate of Formulation per Hectare | Application Times DBFH | Sampling Times DALA |
|--------|-------------------|------------|---------------------------------|------------------------|---------------------|
| 1. | Untreated control | | | | 0 |
| 2. | REGENT 200 SC | 50 g | 250 mL | 13, 10, 6 | 0, 3, 7, 10 |

DBFH – days before first harvest

DALA – days after last application

Trial 7473, Boneo Vic

| Number | Formulation | Rate ai/ha | Rate of Formulation per Hectare | Application Times DBFH | Sampling Times DALA |
|--------|-------------------|------------|---------------------------------|------------------------|---------------------|
| 1. | Untreated control | | | | 0 |
| 2. | REGENT 200 SC | 50 g | 250 mL | 14, 10, 7 | 0, 2, 7, 10 |

DBFH – days before first harvest

DALA – days after last application

Trial 7474, Angle Vale SA

| Number | Formulation | Rate ai/ha | Rate of Formulation per Hectare | Application Times DBFH | Sampling Times DALA |
|--------|-------------------|------------|---------------------------------|------------------------|---------------------|
| 1. | Untreated control | | | | 0 |
| 2. | REGENT 200 SC | 50 g | 250 mL | 14, 10, 7 | 0, 3, 7, 10 |

DBFH – days before first harvest

DALA – days after last application

The treatments were applied in a manner that simulated best commercial practice for the application of ACRAMITE and AGRI-FOS 600 in leafy lettuce. Treatments were applied by boom spray in sufficient water to ensure even and thorough coverage of all parts of each plant.

At least 12 celery plants were harvested without roots from each treatment for each sample. The samples were taken from all parts of the plot; however the ends of each plot were not sampled. Two samples were taken from each treatment on each sampling date with one being the Primary Sample and the other the Reserve Sample.

Fipronil residues were determined according to an analytical method developed by Agrisearch Analytical Pty Ltd:

*“Determination of Multi-Residues in Fruit and Vegetables using DSPE”
AATM-S-60, Revision 8, Agrisearch Analytical Pty Ltd, September 2008.*

Residues of fipronil greater than the limit of quantitation (0.01 mg/kg) were found in most of the treated samples of celery. A summary of the range of fipronil and metabolites residues found in treated samples from each of the four trial sites are given below:

| Trial Number | Residue Range (mg/kg) | | | |
|--------------|-----------------------|-----------------------------|--------------------------|--------------------------|
| | Fipronil (mg/kg) | Fipronil Desulfinyl (mg/kg) | Fipronil Sulfide (mg/kg) | Fipronil Sulfone (mg/kg) |
| 7471 | <LOQ-0.18 | <LOD-<LOQ | <LOD | <LOD-<LOQ |
| 7472 | 0.01-0.24 | <LOQ-0.02 | <LOD | <LOQ-0.01 |
| 7473 | 0.06-0.29 | <LOQ | <LOD | <LOQ-0.02 |
| 7474 | <LOD-0.05 | <LOD-0.03 | <LOD | <LOD-<LOQ |

5.7 HAL/GLP/07/03-7; Residues of methomyl in Asian root vegetables - Study HAL1496 – Four sites; one study on taro and one study on yam beans in Atherton Tableland region Queensland, one study on taro and one study on root vegetable in Toowoomba region Queensland.

This study was conducted to determine the tissue residue profile of methomyl when applied to field grown Asian leafy vegetable crops. The study consisted of four field sites at Tolga in Queensland, Mangrove Mountain in New South Wales, El Arish in Queensland and Murwillumbah in New South Wales. The study was conducted under the OECD Principles of Good Laboratory Practice (GLP).

The test item was as follows:

DUPONT LANNATE L INSECTICIDE – a liquid formulation containing 225 g/L methomyl as the active constituent. The test item was supplied by Nufarm Australia Limited.

An unreplicated large plot design was used at each test site.

The treatments and sampling times for Trials 7476, 7477, 7478 and 7479 are presented in the tables below:

Trial 7476, Tolga Qld

| Number | Formulation | Rate ai/ha | Rate of Formulation per Hectare | Application Times DBFH | Sampling Times DALA |
|--------|-------------------|------------|---------------------------------|------------------------|---------------------|
| 1. | Untreated control | | | | 0 |
| 2. | LANNATE L | 450 g | 2.0 L | 20, 17, 14 | 7, 13, 21 |

DBFH – days before first harvest.

DALA – days after last application

Trial 7477, Mangrove Mountain NSW

| Number | Formulation | Rate ai/ha | Rate of Formulation per Hectare | Application Times DBFH | Sampling Times DALA |
|--------|-------------------|------------|---------------------------------|------------------------|---------------------|
| 1. | Untreated control | | | | 0 |
| 2. | LANNATE L | 450 g | 2.0 L | 20, 17, 14 | 7, 14, 21 |

DBFH – days before first harvest.

DALA – days after last application

Trial 7478, El Arish Qld

| Number | Formulation | Rate ai/ha | Rate of Formulation per Hectare | Application Times DBFH | Sampling Times DALA |
|--------|-------------------|------------|---------------------------------|------------------------|---------------------|
| 1. | Untreated control | | | | 0 |
| 2. | LANNATE L | 450 g | 2.0 L | 20, 16, 14 | 7, 14, 21 |

DBFH – days before first harvest.

DALA – days after last application

Trial 7479, Murwillumbah NSW

| Number | Formulation | Rate ai/ha | Rate of Formulation per Hectare | Application Times DBFH | Sampling Times DALA |
|--------|-------------------|------------|---------------------------------|------------------------|---------------------|
| 1. | Untreated control | | | | 7 |
| 2. | LANNATE L | 450 g | 2.0 L | 21, 18, 14 | 7, 14, 21 |

DBFH – days before first harvest.

DALA – days after last application

The treatments were applied in a manner that simulated best commercial practice for the application of LANNATE L INSECTICIDE . Treatments were applied by boom spray (or spray mister with Trial 7476) in sufficient water to ensure even and thorough coverage of all parts of each plant.

At least 12 tubers or roots, for a total of >2 kg, were collected for each treatment sample and sampling time except for Trial 7479, Murwillumbah where <2 kg was collected at each sampling. The samples were taken from all parts of the plot; however the ends of each plot were not sampled. Two samples were taken from each treatment on each sampling date with one being the Primary Sample and the other the Reserve Sample.

Methomyl residues were determined according to an analytical method developed by Agrisearch Analytical Pty Ltd:

*“Determination of Multi-Residues in Fruit and Vegetables Using DSPE”
AATM-S-60, REVISION 8, Agrisearch Analytical Pty Ltd, September 2008.*

Residues of methomyl and methomy oxime greater than the limit of quantitation (0.02mg/kg) were not found in any of the treated samples of the root vegetables of yambean, taro and daikon. One treated sample of taro contained a trace of methomyl between the Limit Of Detection (LOD) and the Limit Of Quantitation (LOQ).

Methomyl/LANNATE L;

Residues of methomyl and methomyl oxime in taro, yam bean, and daikon, were below the Limit of Quantitation (0.02 mg/kg) at 7, 14 and 21 days after 3 applications of LANNATE-L applied at 2-4 day intervals.

5.8 HAL/GLP/07/03-8; Residues of pymetrozine and phosphorous acid in greenhouse hydroponic grown and field grown eggplant - Studies AVG1069 and AVG1542 – Three sites; two protected cropping studies in Adelaide region South Australia, one field study in Bundaberg region Queensland.

This study was conducted to determine the tissue residue profile of pymetrozine and phosphorous acid when applied to protected structure hydroponic grown and field grown eggplant. The study consisted of one field site at Calavos Queensland, and two protected structure hydroponic sites at Virginia South Australia, and Rossmore New South Wales.

The test substances were as follows:

CHESSE INSECTICIDE – a water dispersible granule formulation containing 500 g/kg pymetrozine as the active constituent. The test item was marketed by Syngenta Crop Protection.

AGRI-FOS 600 SYSTEMIC FUNGICIDE - a liquid formulation containing 600 g/L phosphorous acid present as mono-di potassium phosphite. The test item was marketed by Agrichem.

An unreplicated large plot design was used at each test site.

The treatments and sampling times for Trials 7481, 7482 and 7483 are presented in the tables below:

Trial 7481, Calavos Qld

| Number | Formulation | Rate ai/ha | Rate of Formulation per Hectare (Actual [^]) | Application Times DBFH* | Sampling Times DALA |
|--------|-------------------|------------|--|-------------------------|---------------------|
| 1. | Untreated control | | | | 0 |
| 2. | CHESSE | 100 g | 200 g (203.6 g) | 10, 3 | 0, 3, 7, 10 |
| 3. | AGRI-FOS 600 | 1800 g | 3.0 L (3.012 L) | 22, 15, 8, 1 | 0, 1, 3, 7 |

* DBFH – days before first harvest.

[^]Actual – The average rate actually applied

Trial 7482, Virginia SA

| Number | Formulation | Rate ai/100 L | Rate of Formulation per 100 L | Application Times DBFH* | Sampling Times DALA |
|--------|-------------------|---------------|-------------------------------|-------------------------|---------------------|
| 1. | Untreated control | | | | 0 |
| 2. | CHESSE | 10 g | 20 g | 9, 3 | 0, 3, 8, 10 |
| 3. | AGRI-FOS 600 | 180 g | 300 mL | 22, 15, 7, 1 | 0, 1, 3, 8 |

* DBFH – days before first harvest.

Trial 7483, Rossmore NSW

| Number | Formulation | Rate ai/100 L | Rate of Formulation per 100 L | Application Times DBFH* | Sampling Times DALA |
|--------|-------------------|---------------|-------------------------------|-------------------------|---------------------|
| 1. | Untreated control | | | | 0 |
| 2. | CHESS | 10 g | 20 g | 11, 3 | 0, 3, 7, 10 |
| 3. | AGRI-FOS 600 | 180 g | 300 mL | 21, 15, 9, 1 | 0, 1, 3, 7 |

* DBFH – days before first harvest.

The treatments were applied in a manner that simulated best commercial practice for the application of CHESS and AGRI-FOS 600 in protected structure hydroponic grown and field grown eggplant. Treatments were applied by boom spray or hand lance in sufficient water to ensure even and thorough coverage of all parts of each plant.

At least 12 eggplant fruits were harvested by removal from the stem from each treatment for each sample. The samples were taken from all parts of the plot; however the ends of each plot were not sampled. Two samples were taken from each treatment on each sampling date with one being the Primary Sample and the other the Reserve Sample.

Pymetrozine residues were determined according to an analytical method developed by Agrisearch Analytical Pty Ltd:

*“Determination of Multi-Residues in Fruit and Vegetables using DSPE”
AATM-S-60, Revision 8, Agrisearch Analytical Pty Ltd, September 2008.*

Phosphorous acid residues were determined according to an analytical method developed by Agrisearch Analytical Pty Ltd:

“Determination of Phosphorous acid in Vegetables and Fruits by HPLC/MS/MS”, AATM-R-127, Agrisearch Analytical Pty Ltd.

Residues of pymetrozine greater than the limit of quantitation (0.05 mg/kg) were not found in any of the treated samples of the eggplant.

Residues of phosphorous acid greater than the limit of quantitation (1.0 mg/kg) were found in all of the treated samples of eggplant. The range of phosphorous acid residues found in test samples ranges from 5.1 mg/kg to 32 mg/kg.

Phosphorous acid/AGRIFOS 600;

Residues of phosphorous acid in field grown eggplants were a maximum of 21 mg/kg at 0 days, and a maximum of 29 mg/kg at 7 days after 4 applications of AGRI-FOS 600 applied at 7 day intervals.

Residues of phosphorous acid in protected structure hydroponic grown eggplants were a maximum of 21 mg/kg at 0 days, and a maximum of 32 mg/kg at 3 days after 4 applications of AGRI-FOS 600 applied at 6-8 day intervals.

6. TECHNOLOGY TRANSFER

The data generated from the studies reported on here have been included or will be included in submissions to the Australian Pesticides and Veterinary Medicines Authority. These submissions are for permit applications, pesticide label extensions or for inclusion in complete pesticide registration applications. The results of the applications are disseminated on the APVMA website, the Government Gazette and by industry publications. There is also an ongoing rationalisation of pesticide permits and the transfer of permits to current pesticide labels.

7. RECOMMENDATIONS

The major outcome of this project is that pesticides that could not be legally used by vegetable growers will now be available, thus providing growers with a broader range of options in the control of diseases and insect pests from which their crops suffer.

This project has been part of a larger programme of research that has been conducted over the past few years. Although the outcomes of this project have been met there is an ongoing need for growers to have access to newer and better pesticides and so similar projects should be planned and conducted in the future.