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PESTICIDE USAGE IN NORTHERN IRELAND

SURVEY REPORT 207

Vegetable Crops

2004

Agriculture, Fishing & Forestry

A National Statistics Publication

PESTICIDE USAGE SURVEY REPORT 207

NORTHERN IRELAND VEGETABLE CROPS

2004

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SUMMARY

This is the fourth survey of pesticide usage on outdoor vegetable crops in Northern Ireland, providing comparative data to that obtained in the previous surveys in 1991, (Jess *et al*., 1993), 1995 (Kidd *et al*., 1998) and 1999 (Kearns *et al*., 2002). Information on all aspects of pesticide usage was collected from 92 holdings throughout the province. Quantitative data have been adjusted to provide estimates of total pesticide usage. The area of vegetable crops grown in Northern Ireland in 2004 was 1465 hectares; a 4% increase compared with 1999.

By comparison with 1999, the pesticide-treated area increased by 8%, to 11,299 spray hectares, while the weight of pesticide (active ingredients) remained similar to 1999 at approximately 7 tonnes, indicating an increase in the number of spray applications but a decrease in the weight of pesticide applied per treatment. The fungicide-treated area increased by 21%, while the weight of fungicide active ingredients (a.i.) applied decreased by 20%. Overall, both the application area and weight of herbicides and desiccants applied increased by 23% and 16%, respectively. Both the treated area and the weight of insecticides applied decreased by 13% and 49%, respectively. The area treated with molluscicides and the weight applied decreased by 60% and 79%, respectively. However, 1999 recorded a significant rise in molluscicides compared with previous years and the 2004 applications are more comparable to usage pre-1999. The area of vegetable crops sown or planted with treated seed increased by 37% in the five-year period 1999 to 2004 and the weight of active ingredients used also significantly increased.

Fungicides, applied to 22% of the pesticide-treated area, accounted for 14% of the weight of pesticides applied. Herbicides and desiccants accounted for 41% of the pesticide-treated area and 76% of the total weight of pesticides used. Insecticides, applied to 29% of the pesticide-treated area, accounted for 8% of the total weight of pesticides used. Seed treatments applied to vegetable crops grown in 2004 accounted for 7% of the pesticide-treated area representing 2% of the weight of active ingredients applied. Molluscicides accounted for 10% of the total pesticide-treated area and less than 1% of the weight of pesticides applied to vegetable crops grown in Northern Ireland in 2004.

Brassica crops received 30% of the total weight of fungicides applied, representing 39% of the area of vegetable crops treated with fungicides. The single most commonly used fungicide active ingredient applied to brassicas was difenoconazole. Carrots and parsnips collectively accounted for 42% of the weight of fungicide active ingredients applied, representing 43% of the area treated with fungicides, with the active ingredient azoxystrobin being most frequently used on these vegetable crops.

Trifluralin was the herbicide/desiccant active ingredient most commonly applied to vegetable crops, particularly brassicas. Overall, 25% of all herbicide/desiccant applications were applied to brassica crops

Carrots and parsnips collectively accounted for 52% of the insecticide-treated area, representing 17% of the weight of insecticide active ingredients applied. Brassicas accounted for 41% and 74% of the insecticide-treated area and weight applied, respectively. Pyrethroids were the most frequently used insecticide active ingredients, particularly lambda-cyhalothrin, which was the most frequently used insecticide.

DEFINITIONS AND NOTES

- 'Basic area' refers to the actual planted area of crop, which was treated with a given pesticide.
- 'Treated area' refers to the total area treated with a pesticide, which includes all repeated applications to the basic area.
- 'Reasons for use'; the reasons reported for the use of pesticides are the growers stated reason for use and may sometimes be inappropriate.
- 'Rounding', due to rounding of figures, there may be slight differences in totals both within and between tables.
- Propagation: pesticides applied at the propagation stage are normally applied when the plants are indoors and in trays. This should be taken into account when comparing area grown and pesticide-treated area.

INTRODUCTION

As a participant of the UK Working Party on Pesticide Usage Surveys, the Department of Agriculture and rural Development for Northern Ireland (DARD), conducts a programme of surveys to examine pesticide usage in all sectors of the agricultural and horticultural industry. Principally, the data collected provides information for consideration by the Advisory Committee on Pesticides. In addition, the information may be used by those involved in residue testing, for public information and to evaluate the impact of policy and trends in pesticide usage.

This is the fourth survey examining pesticide usage practices on vegetable crops grown in Northern Ireland. Summary results from the previous surveys conducted in 1991 (Jess *et al*., 1993), 1995 (Kidd *et al*., 1998) and 1999 (Kearns *et al*., 2002) are included in the report for comparative purposes.

A list of published Northern Ireland Pesticide Usage Survey reports are shown in Appendix 1.

METHODS

The sample of holdings to be surveyed was selected from each of the six counties, on the basis of the total area of vegetable crops grown, using data from the Northern Ireland Agricultural Census, June 2003 (Anon., 2004). However, due to sampling procedures and the distribution of vegetable production in Northern Ireland, no holdings were selected from County Fermanagh.

The sample was stratified into five size groups, according to the total area of vegetable crops grown in each region. Holdings were selected at random within each of the size groups and the number of holdings selected was proportional to the total area of vegetable crops grown.

The purpose of the survey was explained to the occupiers of selected holdings in preliminary correspondence. A total of 92 holdings were visited during the period November 2003 to April 2004 and data collected by personal interview. The data collected included; the area of crops grown, area treated, target crop, pesticide used and number of treatments applied. The grower's stated reasons for pesticide use were also included but may not always seem appropriate. Holdings selected in the original sample unable to provide data were replaced

with those from the same county and size group held on a reserve list. The total number of farms in each size group and the number of farms sampled are shown in Table 1. The collected data were entered using Oracle, a relational database programme. Validated data were downloaded for analysis using SPSS software.

RESULTS AND DISCUSSION

CROPS

The number and areas of crops surveyed, are shown in Table 2. Data from 92 farms provided information on 433 examples of 22 crop types (including one group of organic crops). Crops included, Brussels sprouts, cabbage, cauliflower, calabrese, turnips and swedes, beans, peas, leeks, onions, spring onions, carrots, parsnips, soup celery (no table celery grown outdoors was recorded in this survey), parsley, lettuce, beetroot and rhubarb. The total area of crops sampled in the survey was representative of the area of vegetable crops grown in Northern Ireland in 2004.

Brassicas were grown on 36% of the total area of vegetable crops grown. Cabbages (including savoys) collectively accounted for 40% of the area of brassicas grown. Carrots and parsnips collectively represented 28% of the vegetable growing area, while turnips/swedes accounted for 17% of the total area grown. Alliums including leeks, spring onions and onions, collectively accounted for 11% of the total area of outdoor vegetable crops grown in Northern Ireland in 2004 (Table 3, Figure 2).

REGIONAL PESTICIDE USAGE (Table 4, Figure 3)

County Down accounted for 51% of the area of vegetables grown and 46% of the total pesticide-treated area. Overall, 48% of herbicides, 47% of fungicides, 42% of insecticides and 57% of molluscicides were applied to vegetables in this county. County Armagh accounted for 32% of the area of vegetables grown and 34% of the pesticide-treated area. Counties Tyrone accounted for 10%, Londonderry 7% and Antrim 3% of the total pesticide-treated area of vegetable crops in 2004.

PESTICIDE USAGE ON CROPS (Tables 5 & 6)

Carrot crops, grown on 21% of the total area of vegetable crops, received the highest pesticide usage and accounted for 36% of the total pesticide-treated area and 31% of the weight of pesticides applied. Carrot crops represented 34% of the area sown with treated seed (66% of the weight of seed treatment active ingredients) and 33% of the herbicide-treated area (31% of the weight of herbicides applied). An estimated 41% of the area treated with insecticides was carrot crops (14% of the weight of insecticides applied). The area of carrots treated with fungicides accounted for 35% of the total fungicide-treated area and the weight of fungicide active ingredients applied to carrot crops represented 35% of the total weight of fungicides used.

Cabbages (including Savoy's) accounted for 14% of both the total area grown and the total pesticide-treated area, accounting for 12% of the total weight of pesticide applied. However, 30% of the total weight of insecticides applied to vegetables was applied to cabbage crops, proportionally more than was applied to other brassicas. The area of cabbages treated with an insecticide (18% of the total insecticide-treated area) or a fungicide (19% of the total fungicide-treated area) was also proportionally high, indicating multiple applications to these crops. Calabrese, grown on 9% of the vegetable area, represented 8% of the total pesticide-treated area and 7% of the weight of pesticide applied. Cauliflowers, grown on 11% of the vegetable area accounted for 8% of the total pesticide-treated area and 7% of the weight applied. Collectively, leeks, spring onions and onion crops were grown on 11% of the total area of vegetable crops grown in Northern Ireland in 2004, representing 9% of the total pesticide-treated area and 17% of the total weight of pesticide used. An estimated 13% (20% of the total weight of fungicide used) of all fungicide applications were applied to these crops. Parsnips, grown on 6% of the vegetable area, represented 9% of the total pesticide-treated area and 8% of the weight of pesticide applied. Brussels sprouts grown on 2% of the total vegetable area accounted for 3% of the total pesticide-treated area and weight of pesticide applied.

PROPORTION OF CROPS TREATED

The proportional areas of crops treated with different pesticide groups, together with the number of spray applications are shown in Table 7.

All crop types received herbicide and/or desiccant treatments. An average of two or three applications of herbicide was applied with the exception of onions, which received eight applications.

All crops except onions and rhubarb, received insecticide treatments. Carrots and parsnips received an average of five and three applications of insecticides, respectively.

Onion crops received an average of 9 fungicide applications. Fungicides were applied to 80% of carrot crops.

Seed treatments were used on 95% of turnip & swede crops.

TOTAL PESTICIDE USAGE (Tables 8 & 9)

A total of 7 tonnes of pesticide active ingredients were applied to 11,298 spray hectares of outdoor vegetable crops grown in Northern Ireland in 2004.

Carrot and parsnip crops received 43% of fungicide applications, with a further 39% applied to brassica crops. Difenoconazole was the most frequently used fungicide, applied to 23% of the total fungicide-treated area (4% of the weight of fungicides used), with 94% of all applications being made to brassica crops. Azoxystrobin, applied to 21% of the total fungicide-treated area and accounting for 13% of the weight of fungicides used, was mainly applied to carrot and parsnip crops.

Carrot and parsnip crops collectively accounted for 42% of all herbicide and desiccant applications, with a further 25% being applied to brassica crops. Trifluralin was the herbicide/desiccant active ingredient most frequently used (accounting for 22% of the total herbicide/desiccant-treated area and 18% of the weight used). Over half of all trifluralin applications were to brassica crops. Linuron, applied to 18% of the total herbicide/desiccant-treated area (13% of the weight of herbicide/desiccant applied) was primarily used (86%) on carrot and parsnip crops. With the exception of two formulations, herbicide and desiccants were applied as single active ingredients Paraquat, while used pre-planting on all crop types, accounted for only 2% of the herbicide/desiccant-treated area, representing 1% of the weight applied.

The insecticide active ingredient lambda-cyhalothrin accounted for 66% of the total insecticide-treated area, representing only 5% of the weight of insecticides used. An estimated 71% of all applications of this active ingredient were applied to carrot and parsnip crops.

Seed treatments applied to vegetable crops grown in 2004 accounted for 7% of the pesticide-treated area, while representing 2% of the weight of active ingredients applied. Treatments to carrot seed accounted for 66% of the seed-treated area. Iprodione, mainly applied as a treatment on turnip seed was the single active ingredient most frequently used, accounting for 32% of the area sown with treated seed.

Molluscicide treatments were applied to less than 1% of both the total pesticide-treated area and weight of pesticides applied to vegetable crops. Brassica crops received 89% of all molluscicide applications.

The fifty most commonly used active ingredients, ranked by spray area and weight, are shown in Tables 10 and 11, respectively.

PESTICIDE USAGE ON INDIVIDUAL CROPS:

BRUSSELS SPROUTS (Table 12)

Fungicides accounted for 38% of the pesticide-treated area (28% of the weight of pesticides applied), insecticides 35% (36%), herbicides 18% (33%) and molluscicides accounted for 7% of the pesticide-treated area and 9% of the weight of pesticides applied (Tables 5 & 6).

Approximately 64% of fungicide active ingredients were applied as a general disease control and a further 14% were applied to control diseases at the propagation stage. The fungicide difenoconazole was the most frequently used active ingredient accounting for 53% of the fungicide-treated area.

Pre-emergence weed control accounted for 59% of the herbicide/desiccant-treated area. Trifluralin applied to 38% and metazachlor (36%) of the herbicide/desiccant-treated area were the two herbicides most commonly used.

Approximately 58% of insecticide applications were for the control of aphids. The carbamoyl triazole insecticide triazamate was the active ingredient most extensively used, applied to 26% of the insecticide-treated area, principally to control aphids.

Metaldehyde and methiocarb were the two molluscicides recorded used on Brussels sprouts.

SPRING CABBAGE: (Table 13)

Fungicides accounted for 32% of the pesticide-treated area of spring cabbage, representing 20% of the weight of pesticides used on this crop. As in 1999, difenoconazole was the fungicide most extensively used on the crops grown in the field, while dichlofluanid was applied to 30% of the fungicide-treated area at the propagation stage to control downy mildew (*Peronospora parasitica*). An estimated 35% of all fungicide applications were applied during the propagation stage.

Trifluralin, applied as a single active ingredient, was the most extensively used herbicide, applied to 35% of the herbicide/desiccant treated area with 96% of its applications as a pre-emergence weed control. Overall, 70% of all herbicide/desiccants were applied for pre-emergence weed control.

Insecticides accounted for 31% of the pesticide-treated area of this crop, representing 27% of the weight of active ingredients applied. The pyrethroid active ingredient lambda-cyhalothrin was the most extensively used insecticide, applied to 38% of the insecticide-treated area, but only accounted for less than 1% of the weight of insecticides used. Pyrethroid active ingredients accounted for 51% of the insecticide-treated area, but only represented 1% of the weight of insecticides used. Conversely, organophosphates represented 90% of the weight of insecticides used but accounted for only 17% of the insecticide-treated area. This was because the principal organophosphate chlorpyrifos, is used at a relatively high rate compared to the Pyrethroids.

Methiocarb was the only molluscicide active ingredient recorded on this crop.

SUMMER CABBAGE: (TABLE 14)

The area of summer cabbage decreased by 42% compared with 1999. The area treated with fungicides also decreased by 42%. Fungicides accounted for 14% of the pesticide-treated area of summer cabbage crops and 9% of the weight of pesticides applied. An estimated 42% of all fungicide applications were to control downy mildew (*Peronospora parasitica*) at the propagation stage with the active ingredient dichlofluanid being the most extensively used, accounting for 42% of the fungicide-treated area and 40% of the weight of fungicides used on summer cabbages. Difenoconazole was applied to a further 28% of the area treated with fungicides, primarily to control ring spot (*Mycosphaerella brassicicola*).

Herbicides accounted for 31% of the pesticide-treated area of summer cabbage while accounting for 76% of the weight of pesticides applied. Pre-emergence weed control (62%) was the main reason given for herbicide applications. Trifluralin, applied as a single active ingredient, was the most extensively used herbicide applied to 51% of the herbicide-treated area and representing 54% of the weight of herbicides used. Metazachlor was applied to a further 43% of the herbicide-treated area.

Insecticides accounted for 53% of the pesticide-treated area representing 13% of the weight of pesticides applied. While 48% of all insecticide applications were to control aphids a further 46% of applications were used to control caterpillars. The pyrethroid lambda-cyhalothrin (50%) and the carbamate pirimicarb (47%) were the insecticide active ingredients most extensively used on summer cabbage crops.

The molluscicide methiocarb was applied to approximately 10 hectares of summer cabbage crops.

WINTER CABBAGE & SAVOYS: (Tables 15 & 16)

Proportionally, pesticide usage was similar between winter cabbage and savoys. Fungicides were used on 32% and 37% of the treated area of these two crops, respectively, insecticides 31% for both crop types and herbicides accounted for 33% of winter cabbage and 27% of savoy pesticide-treated areas.

The fungicide active ingredient difenoconazole was most extensively used on both crop types. General disease control was the reason most commonly given for fungicide applications, a further 30% of fungicide applications on savoy crops were applied to control propagation diseases.

Pre-emergence weed control accounted for 67% of herbicide applications on winter cabbage and 56% on savoy crops. The herbicide active ingredient trifluralin was most extensively used on both crop types.

In common with other cabbage crops, the most extensively used insecticide was lambda-cyhalothrin, accounting for 51% and 36% of the insecticide-treated areas of winter cabbage and savoys, respectively. Aphid control was the most common reason for insecticide applications.

Approximately 1.5 hectares each of winter cabbage and savoys were treated with the molluscicide methiocarb and no other molluscicides were recorded on these crops.

CALABRESE (Table 17)

The area of calabrese grown in Northern Ireland in 2004 had more than doubled since the survey in 1999. Insecticides accounted for 35% of the treated area, representing 19% of the weight of pesticides applied. Herbicides/desiccants represented 33% of the treated area, accounting for 67% of the weight of pesticide active ingredients applied to this crop. Fungicides accounted for 27% of the pesticide-treated area and 9% of the weight of pesticides used.

The protectant and curative fungicide difenoconazole was the most extensively used fungicide active ingredient, applied to 75% of the fungicide-treated area, principally as a general disease control (72%) but also to control *Alternaria* spp.

The soil incorporated herbicide trifluralin was the most extensively used herbicide, principally applied as a pre-emergence weed control.

The carbamate insecticide pirimicarb was the most extensively used (46% of the insecticide-treated area), applied solely to control aphids. The pyrethroid active ingredient lambda-cyhalothrin, applied principally for caterpillar control was applied to a further 38% of the calabrese area treated with insecticides.

Of the 134 hectares of calabrese crops only 1.7 hectares were treated with methiocarb to control slugs.

CAULIFLOWER (Table 18)

Fungicides accounted for 20% of the pesticide-treated area and 12% of the weight of pesticides applied. Approximately 42% of fungicide applications were applied for general disease control, with a further 27% to control diseases at the propagation stage. The active ingredient difenoconazole was the most extensively used fungicide, applied to 51% of the fungicide-treated area, accounting for 55% of the weight of fungicides applied to cauliflower crops. Dichlofluanid, applied solely to control downy mildew (*P. parasitica*) during the propagation stage, accounted for a further 24% of fungicides applied

Herbicides accounted for 69% of the weight of pesticides used and 37% of the active ingredients applied to the treated area. Collectively, pre-emergence weed control (63%) and general weed control (31%) accounted for 94% of all herbicide applications. Trifluralin accounted for 45% of the herbicide-treated area and 50% of the weight of herbicides used.

Metazachlor accounted for a further 39% of the area treated with this pesticide type and 31% of the weight of herbicides applied.

Insecticides accounted for 39% of the pesticide-treated area of cauliflower crops and 19% of the weight of pesticides used. The carbamate active ingredient pirimicarb, principally applied to control aphids was the most extensively used insecticide, applied to 42% of the insecticide-treated area. The pyrethroid active ingredient lambda-cyhalothrin accounted for 41% of the area treated with insecticide; over half of its applications were to control caterpillars. Aphid control (56%) and caterpillar control (30%) together accounted for 86% of insecticide applications to cauliflower crops in Northern Ireland in 2004. Organophosphates accounted for approximately 4% of both the area treated and the weight of insecticides used on this crop.

Approximately 9 hectares of cauliflower crops were treated with molluscicide applications.

TURNIPS & SWEDES (Table 19)

The area of turnip & swede crops grown in Northern Ireland in 2004 doubled in comparison with 1999 to an estimated 255 hectares.

Fungicide applications accounted for less than 1% of both the pesticide-treated area and the weight of pesticides used on turnip & swede crops and were applied solely to control downy mildew (*P. parasitica*).

Herbicides accounted for 66% of the pesticide-treated area and 94% of the weight of pesticides used. An estimated 68% of all herbicide applications were as a pre-emergence weed control. Trifluralin (46%) and metazachlor (35%) were the active ingredients most extensively used on the herbicide-treated area of this crop.

Insecticide applications accounted for 4% of the pesticide-treated area and 5% of the weight of pesticides used on turnip and swede crops. The organophosphate chlorfenvinphos was applied to 65% of the insecticide-treated area, accounting for 85% of the weight of insecticides used. Approval for the use of this active ingredient was discontinued in 2001. Approximately 99% of all insecticide applications were to control cabbage root fly. There are however no insecticides currently approved for this pest on turnip and swede crops.

No molluscicides were recorded used on these crops.

BEANS & PEAS (Tables 20 & 21)

Collectively, an estimated 7 hectares of peas and beans were grown in Northern Ireland in 2004.

Herbicides were used on 44% and 60% of the bean and pea pesticide-treated areas, respectively. The active ingredient paraquat was the most extensively used herbicide on both crops, predominantly applied as a pre-emergence herbicide

Insecticides were applied to 6% and 20% of the bean and pea pesticide-treated areas, representing less than 1% of the weight of pesticides used on both these crops. The pyrethroid lambda-cyhalothrin was the insecticide most extensively used on both crops types, with pirimicarb being the only other insecticide active ingredient recorded used on bean crops only.

Fungicides accounted for 27 % of the pesticide-treated area and 33% of the weight of pesticides applied to beans, with 58% of all fungicide applications on this crop to control chocolate spot (*Botrytis fabae*). No fungicides were recorded used on peas.

LEEKS (Table 22 & 22b)

Collectively an estimated 79 hectares of table and soup leeks were grown in Northern Ireland in 2004. Approximately 2 hectares received insecticide treatments.

Fungicides accounted for 24% and 30% of the table and soup leek pesticide-treated area, respectively. Tebuconazole was the fungicide most extensively used on both table and soup leeks. An estimated 80% of fungicides were applied to control rust (*Puccinia alii*).

Herbicides accounted for 63% (88% of the weight) and 57% (85% of the weight) of the pesticide-treated area of table and soup leek crops, respectively. Ioxynil, applied as a general weed control was the most extensively used herbicide on table leeks and propachlor, applied principally as a pre-emergence weed control, was the herbicide active ingredient most frequently used on the herbicide-treated area of soup leek crops.

ONIONS & SPRING ONIONS (Tables 23 & 25)

Approximately 12 hectares of onions and 55 hectares of spring onions were recorded grown in 2004.

Fungicides accounted for 53% and 21% of the pesticide-treated area (52% and 7% of the weight of pesticides used) of onion and spring onion crops, respectively. The fungicide and bactericide copper oxychloride was most extensively used on onion crops accounting for 44% of the onion fungicide-treated area. Combined mildew (*Peronospora destructor*) and *Botrytis* accounted for 67% of all fungicide applications to onion crops. The fungicide active ingredient most extensively used on spring onions was chlorothalonil accounting for 35% of the fungicide-treated area of this crop. An estimated 58% of all fungicide applications on spring onions were to control mildew (*P. destructor*).

Herbicide and desiccants represented 47% and 72% (48% and 93% of the weight of pesticides used) of the pesticide-treated areas of onion and spring onion crops, respectively. Ioxynil and pendimethalin were the most extensively used of the six herbicide active ingredients recorded on onion crops. The herbicide active ingredient propachlor, accounting for 31% of the herbicide-treated area was the most extensively used herbicide active ingredient on spring onions.

The pyrethroid insecticide lambda-cyhalothrin was applied to approximately 18 spray hectares to control aphids on spring onions.

CARROTS AND PARSNIPS (TABLES 25 & 26)

Approximately 314 hectares of carrots and 89 hectares of parsnips were grown in Northern Ireland in 2004.

Metalaxyl-M (25%) on carrots and tebuconazole (39%) on parsnips were the fungicide active ingredients most extensively applied to these crops. Alternaria leaf blight (*Alternaria dauci*), was the reason given for 45% and 34% of all fungicide applications on parsnips and carrots, respectively.

Herbicides were primarily applied for ‘general weed control’. Linuron was the most commonly used herbicide on both crop types, accounting for 33% and 51% of the herbicide-treated area of carrots and parsnips, respectively.

Insecticides accounted for 34% and 37% of the total pesticide-treated area of carrots and parsnips, respectively. The pyrethroid insecticide lambda-cyhalothrin was the most extensively used insecticide accounting for 89% of the carrot and 97% of the parsnip insecticide-treated areas. An estimated 57% of all insecticide applications on carrots and 96% of insecticide usage on parsnips was to control carrot fly (*Psila rosae*).

Approximately one hectare of carrots was treated with the molluscicide methiocarb for slug control.

PARSLEY AND SOUP CELERY (Tables 27 & 28)

There were an estimated 37 hectares of parsley and 28 hectares of soup celery grown in Northern Ireland in 2004.

Fungicides accounted for 32% of the total pesticide-treated area of soup celery but less than 1% of the pesticide-treated area of parsley. Chlorothalonil and azoxystrobin were the only fungicides recorded applied to parsley crops to control blight (*Septoria* spp.) Difenoconazole was the fungicide active ingredient most extensively used on soup celery accounting for 75% of the fungicide-treated area of this crop.

Herbicides accounted for 55% and 46% of the total pesticide-treated area of parsley and soup celery, respectively. Linuron was the most extensively used herbicide active ingredient on both crops.

Insecticides accounted for approximately 20% of the total pesticide-treated area of both crops. Of the three insecticide active ingredients recorded used on parsley and soup celery, lambda-cyhalothrin was the most extensively used, principally to control carrot fly (*P. rosae*) on both crop types.

The molluscicide methiocarb was applied to less than 1 hectare of both parsley and soup celery crops.

LETTUCE (Table 29)

There were approximately 39 hectares of lettuce grown outdoors in this survey period.

Fungicides accounted for 25% of the pesticide-treated area and 24% of pesticide applications. An estimated 76% of all fungicide applications were to control either powdery mildew (*Eryisphe cichoracearum*) and downy mildew (*Bremia lactucae*). Iprodione was the fungicide active ingredient most commonly used, being applied to 56% of the fungicide-treated area.

While accounting for 30% of the pesticide-treated area, herbicides represented 66% of the weight of pesticides used. An estimated 60% of herbicide applications were for 'general weed control'.

Insecticides accounted for 34% of the pesticide-treated area and 6% of the weight of pesticides used. Pirimicarb was the insecticide active ingredient most commonly used. Insecticide applications to outdoor lettuce crops were principally applied to control aphids (78% of applications).

Five hectares of outdoor lettuce crops were treated with the molluscicide methiocarb.

RHUBARB (Table 30)

Approximately nine hectares of rhubarb were recorded grown during this survey period. Herbicides were the only pesticide group recorded, applied for general weed control.

BEETROOT (Table 31)

There were three hectares of beetroot grown in Northern Ireland in 2004. Herbicides accounted for 80% of the pesticide-treated area and 93% of the weight of pesticides used on beetroot crops. The contact herbicide phenmedipham was the active ingredient most frequently used.

Only one fungicide product, propiconazole, was recorded on beetroot crops and was applied to 0.5 hectares. The only insecticide active ingredient recorded used on one hectare of beetroot crops was chlorpyrifos.

COMPARISON WITH PREVIOUS SURVEYS

Area of vegetable crops grown (Table 32)

The total area of vegetable crops grown in Northern Ireland in 2004 was approximately 1,615 hectares, a 5% decrease compared with 1999.

Overall, there was an 11% decrease in the area of brassicas grown, with a significant (74%) decrease in the area of Brussels sprouts grown in 2004. The area of turnips & swedes doubled compared with other years. The combined area of leeks and onions increased by 17% compared to 1999. Carrot and parsnip crops decreased by 4% and 9% respectively compared with the area grown in 1999. The area of celery recorded in 2004 was not directly comparable to previous years in that it did not include table celery. In the minor crops, the area of outdoor lettuce increased by 59% compared with 1999. The area of beetroot grown in 2004 decreased by half, while there was a 77% increase in the area of rhubarb grown compared with 1999.

Trends in pesticide usage (Table 33)

The pesticide-treated area of vegetable crops increased by 8%, while the weight of pesticides used decreased by 20%. The area treated with fungicides increased by 21% and the weight of fungicides used decreased by 20%, suggesting that fungicides were applied at reduced rates. The area treated and the weight of herbicides/desiccants active ingredients applied increased by 23% and 46%, respectively. The insecticide-treated area of vegetable crops decreased by 13% and the weight of insecticides applied decreased by 49%. The amount of carbamates used decreased significantly (79%), while pyrethroid usage continued to increase (9%) but at lower rates, when compared with 1999. The data also indicated that molluscicide usage was decreasing with a 60% decrease compared with 1999. The area of vegetable crops sown or planted with treated seed increased by 36%.

Comparison of pesticide usage on brassicas (Table 34)

While the area of brassica crops grown in 2004 decreased by 11% the pesticide-treated area decreased by only 6% and the weight of active ingredients applied decreased by 9% compared with 1999.

Fungicide usage decreased by 11%. Similar to 1999, difenoconazole was the fungicide active ingredient most frequently used on brassica crops.

The area of brassica crops treated with herbicides increased by 18%, while the weight of active ingredients applied decreased by 3%. Similar to 1999, trifluralin was the herbicide active ingredient most frequently used.

Overall, applications of insecticides to brassica crops decreased by 19%, almost proportional to the decrease in area of brassica crops grown in 2004. However, the weight of active ingredients applied increased by 49% compared with 1999. This may be attributed to the use of chlorpyrifos at the propagation stage. There was however an overall significant decrease (80%) in the area treated with organophosphates as usage in the field declined, but conversely the usage of carbamates increased by more than 50%, principally due to the increased usage of pirimicarb for aphid control. Pyrethroid usage decreased by 17% compared with 1999

An estimated 67 hectares of brassica crops were treated with molluscicides. While there was a 53% decrease in molluscicide usage compared with 1999, all brassica crops received treatments for slug control.

An estimated 138 hectares of brassica crops were sown or planted with pesticide-treated seed compared with only 7 hectares in 1999 and 57 hectares in 1995. The only seed treatment recorded used on brassica crops was imidacloprid.

Comparison of pesticide usage on turnip & swedes (Table 35)

The area of turnip and swede crops grown in 2004 more than doubled compared with 1999, which was reflected in the increase in the total pesticide-treated area and weight of pesticides applied.

The area treated with fungicides continued to decline with only two hectares receiving fungicide treatments in 2004.

The increase observed in the area treated with herbicides/desiccants corresponds with the increase in cropping area. Trifluralin and metazachlor were the herbicide active ingredients most frequently used on turnip and swede crops.

In comparison with 1999 there was a significant decrease (86%) in insecticide usage, with 2004 having the lowest insecticide usage on turnip and swede crops over all years since 1991. This may be attributed to the decline in insecticide active ingredients available, particularly for the control of cabbage root fly, for which no chemical control currently exists for use on these crops.

All turnip and swede seed that was sown in 2004 received a seed treatment, with iprodione being the only seed treatment recorded.

No molluscicides were recorded used on turnip and swede crops in 2004.

Comparison of pesticide usage on leeks (Table 36)

The area of leeks grown in 2004 increased by 32% compared with that grown in 1999. However, the pesticide-treated area increased by 52% and the weight of active ingredients applied by 15%.

The fungicide-treated area of leeks increased by 54%, with the weight increasing by 49% compared with 1999. Rust (*Puccinia porri*) was the main reason for fungicide applications to leek crops,
Tebuconazole was the fungicide active ingredients most frequently used.

There was a 44% increase in the herbicide/desiccant-treated area (12% of the weight of herbicides applied) compared with 1999. The contact herbicide ioxynil was the active ingredient most frequently used on leek crops in 2004.

Insecticide usage was similar to 1999 with only two hectares receiving insecticide applications

An estimated 72 hectares of leek crops were sown with treated seed.

No molluscicides were recorded on leek crops in 2004.

Comparison of pesticide usage on carrots (Table 37)

The area of carrots grown in 2004 decreased by 4% compared with that recorded in 1999. However, the pesticide-treated area increased by 16% and the weight of active ingredients applied by 5%.

During the five-year period 1999-2004, the area of carrot crops treated with fungicides increased by 88% while the weight of active ingredients applied decreased by 12%, suggesting the use of fungicides at reduced rates. Similar to 1999, metalaxyl-M and tebuconazole were the fungicide active ingredients most extensively used.

Both the treated area and the weight of herbicides/desiccants increased, by 19% and 32% respectively, compared with 1999. Similar to previous years, linuron continued to be the herbicide active ingredient most frequently used.

The area treated with insecticides decreased marginally (1%) compared with 1999. However, the weight of insecticides used decreased significantly (81%). This may be the result of organophosphates being replaced by Pyrethroids, which are used at much lower rates. Only one hectare of carrots was treated with organophosphates. The use of carbamates reduced by 63% while pyrethroid usage, first recorded in use on carrot crops in Northern Ireland in 1999, increased by 27%.

Molluscicides were applied to two hectares of carrot crops in 2004.

An estimated 286 hectares of carrots sown in Northern Ireland in 2004 received seed treatments.

Comparison of pesticide usage on parsnips (Table 38)

There was a 9% decrease in the area of parsnips grown in 2004 compared with 1999. The pesticide-treated area of parsnips decreased by 6%, while the weight of pesticides applied increased by 8%.

The area treated with fungicides continued to rise with a 64% increase. However the weight of fungicides used decreased by 16% compared with 1999. Almost 25% of all fungicide applications were to treat cavity spot (*Pythium* spp.).

There was a marginal increase (4%) in the area treated with herbicide/desiccants. However, the weight of herbicide active ingredients used increased by 45%.

The insecticide-treated area of parsnip crops decreased by 14%, with the weight applied decreasing by 86%, as with carrot crops this is possibly due to the use of pyrethroids, which are used at much lower rates. No organophosphate insecticides were recorded applied to parsnip crops in 2004. While, there was a significant decrease (91%) in the area treated with carbamates compared to 1999, the area treated with pyrethroids increased by 19%.

Only three hectares of parsnips received a seed treatment in 2004.

No molluscicides were recorded used on this crop in 2004.

Comparison of pesticide usage on lettuce (Table 39)

The area of outdoor lettuce crops increased by 59% when compared with 1999, but was similar to that grown in 1995. The pesticide-treated area more than doubled compared with 1999 while the weight of pesticides used increased by 16%.

The fungicide-treated area reflects the increase in the total pesticide-treated area, as it increased two-fold compared with fungicide usage in 1999. Iprodione, principally used to control powdery and downy mildews, was the fungicide active ingredient most frequently used on lettuce crops in 2004. The average number of applications of fungicides increased from two in 1999 to three in 2004, suggesting more disease present this year.

Herbicide usage increased in both area treated and weight of active ingredients used compared with 1999.

Compared with 1999, there was a significant increase (4-fold) in insecticide usage. However, when compared with 1995 that had a similar area grown to 2004, there was only an 11% increase. The usage of carbamates, first recorded on lettuce in 1999, continued to increase with 44 spray hectares treated with the carbamate insecticide pirimicarb in 2004. While only five hectares were treated with organophosphates, the area of lettuce crops treated with pyrethroids doubled compared with 1999 and showed a 53% increase compared with 1995.
Five hectares of lettuce crops received molluscicides to control slugs.

An estimated 33 hectares of lettuce crops received seed treatments in 2004.

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Figure 1 The regional distribution of vegetable crops grown in Northern Ireland, 2004.

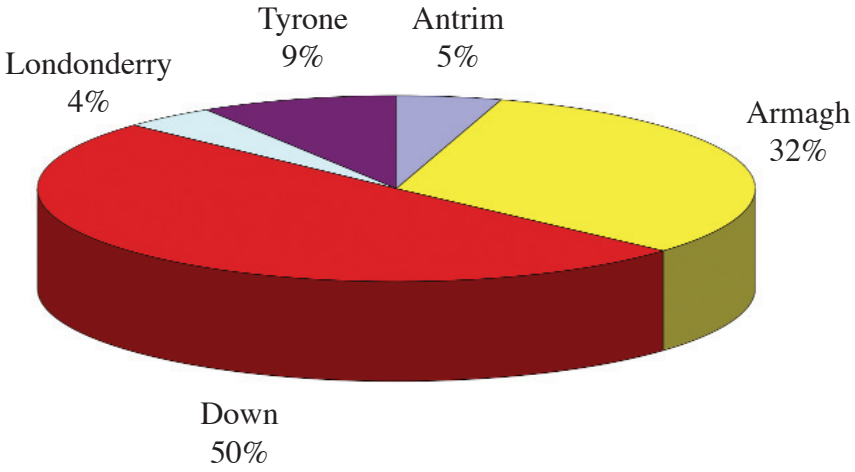

Figure 2 The utilisation of vegetable land in Northern Ireland, 2004.

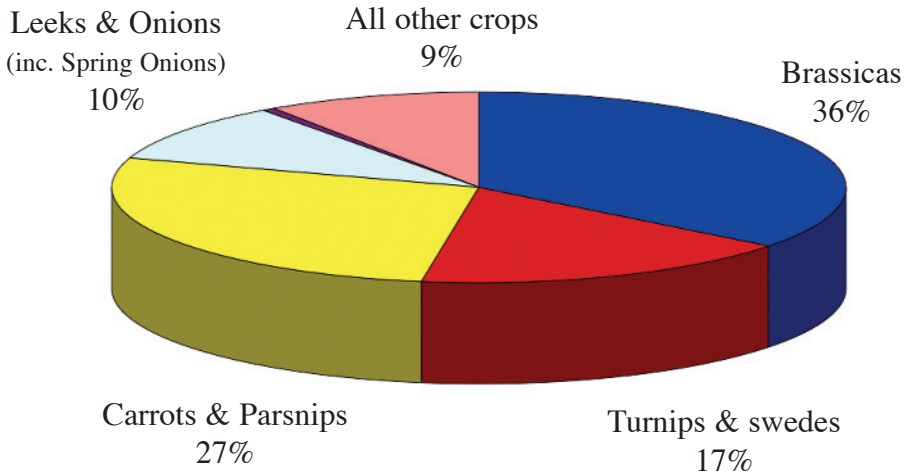

Figure 3 The area of vegetable crops treated (spray hectares) with each pesticide type in the county regions of Northern Ireland, 2004.

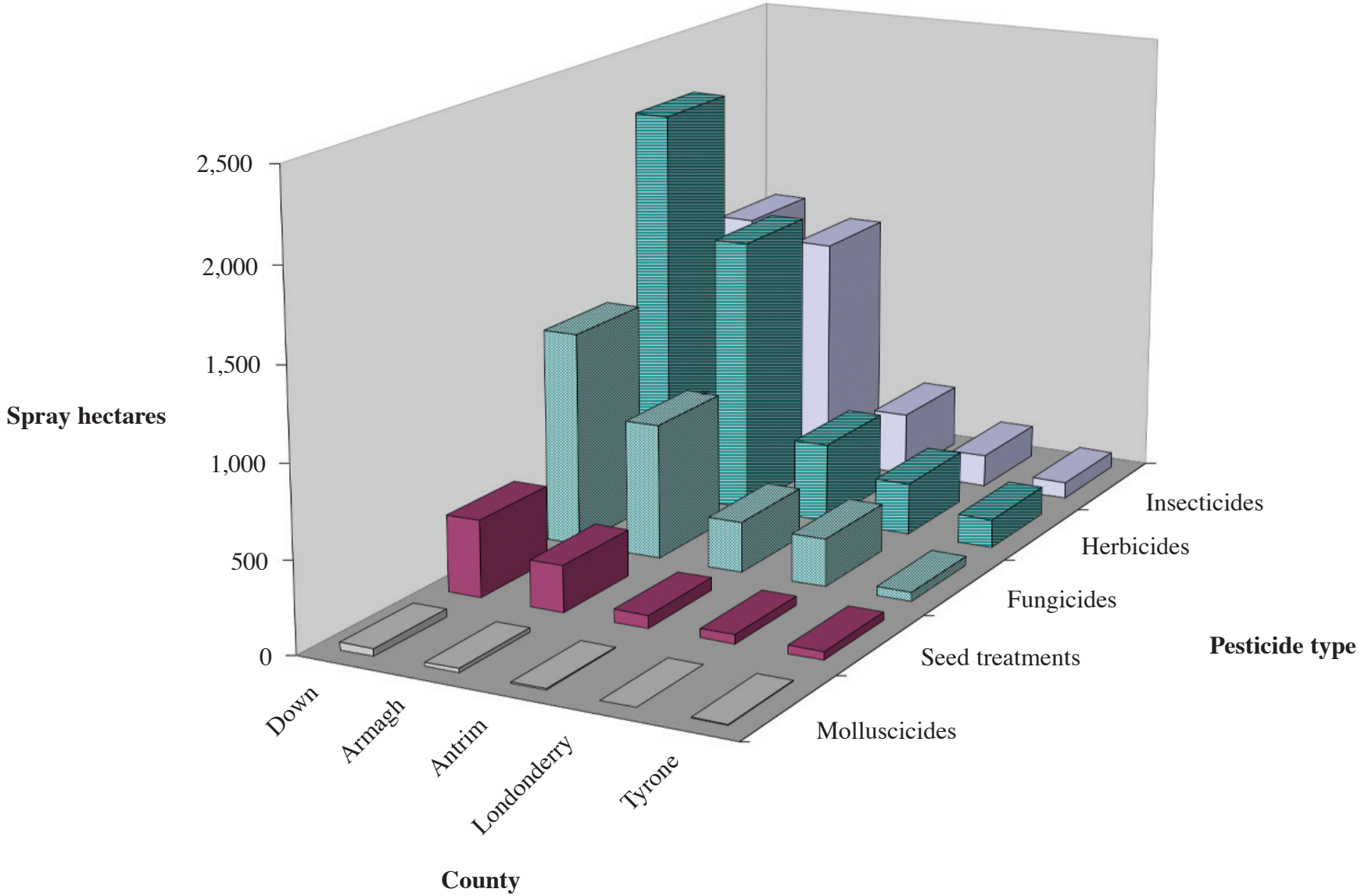

Table 1 **The total number of farms in each size group with vegetable crops in the June 2004 census and number of samples from each size group.**

	Size group (hectares)											
	<2		2<3		3<5		5<10		10+		Total	
County	A	B	A	B	A	B	A	B	A	B	A	B
Antrim	12	9	3	1	0	0	3	3	2	2	20	15
Armagh	14	5	2	2	3	1	2	1	8	7	29	16
Down	13	7	2	2	9	8	7	6	22	20	53	43
Fermanagh	0	0	0	0	0	0	0	0	0	0	0	0
Londonderry	2	2	2	1	0	0	2	2	2	2	8	7
Tyrone	6	3	3	3	3	3	1	1	1	1	14	11
Northern Ireland	**47**	**26**	**12**	**9**	**15**	**12**	**15**	**13**	**35**	**32**	**124**	**92**

Legend
A = Total number of holdings in strata
B = Number of holdings surveyed

Table 2 **Total number and area of crops surveyed (hectares) in Northern Ireland, 2004.**

Crop	Number of crops surveyed	Surveyed area (ha)
Brussel sprouts	22	24.6
Spring cabbage	24	35.4
Summer cabbage	15	69.4
Winter cabbage	17	46.8
Savoys	27	56.4
Calabrese	26	133.5
Cauliflower	28	154.6
Turnips&swedes	27	254.6
Beans	8	5.1
Peas	6	1.9
Table leeks	20	54.3
Soup leeks	26	24.7
Onions&Spring onions	26	67.0
Carrots	47	313.5
Parsnips	22	88.9
Soup celery	33	28.4
Parsley	33	36.9
Lettuce	8	38.8
Beetroot	6	3.0
Rhubarb	2	8.9
Organic crops	10	18.5
All crops	**433**	**1465.2**

Table 3 **Estimated area (hectares) of vegetable crops grown regionally in Northern Ireland 2004.**

Crop type	County					Northern Ireland
	Antrim	Armagh	Down	Londonderry	Tyrone	
Brussel sprouts	3.4	3.0	20.0	0.4	3.0	29.8
Spring cabbage	0.9	9.5	19.2	4.4	6.2	40.2
Summer cabbage	0.2	52.7	14.1	1.0	8.6	76.6
Winter cabbage	.	2.3	43.8	1.0	5.5	52.6
Savoys	1.2	9.3	45.1	0.7	7.1	63.3
Calabrese	9.4	57.0	78.0	2.0	1.2	147.5
Cauliflower	0.5	54.4	105.5	2.0	8.9	171.4
Turnips	27.4	125.2	117.0	4.7	6.4	280.8
Beans	1.4	1.1	4.1	.	.	6.6
Peas	0.7	0.2	1.6	.	.	2.4
Table leeks	2.1	10.1	46.8	.	1.6	60.7
Soup leeks	1.3	5.0	21.5	1.1	0.3	29.2
Onions&Spring onions	4.1	8.7	37.2	15.6	9.5	75.1
Carrots	2.5	148.2	105.0	34.3	57.8	347.8
Parsnips	6.7	4.5	62.9	0.9	24.6	99.6
Soup celery	0.9	1.0	29.6	0.6	0.1	32.2
Parsley	0.9	2.5	37.1	1.3	0.1	41.9
Lettuce	.	26.1	16.7	.	.	42.8
Beetroot	1.2	0.7	1.9	.	.	3.8
Rhubarb	10.8	.	.	.	.	10.8
Organic crops	2.2	.	17.6	1.9	2.7	24.3
All vegetable crops	**77.6**	**521.5**	**824.6**	**71.9**	**143.6**	**1,639.2**

Table 4 **Estimated area (spray hectares) of vegetable crops treated regionally in Northern Ireland with each pesticide type.**

Pesticide type	County					Northern Ireland
	Antrim	Armagh	Down	Londonderry	Tyrone	
Fungicides	49.3	739.7	1,178.4	261.9	277.2	2,506.4
Herbicides & desiccants	157.0	1,519.5	2,182.6	284.7	434.9	4,578.6
Insecticides	90.8	1,293.6	1,384.6	178.3	348.4	3,295.8
Molluscicides	3.1	23.0	42.4	.	6.2	74.7
Seed treatments	46.1	255.5	422.0	49.6	69.9	843.1
All pesticides	**346.3**	**3,831.2**	**5,210.0**	**774.5**	**1,136.6**	**11,298.5**

Table 5 The total area (spray hectares) and the basic area (hectares), of vegetable crops in Northern Ireland 1999 treated with each pesticide type.

	Pesticide Type											
	Fungicides		Herbicides & desiccants		Insecticides		Molluscicides		Seed treatments		All pesticides	
Crop type	(sp ha)	(ha)	(sp ha)	(ha)	(sp ha)	(ha)	(sp ha)	(ha)	(sp ha)	(ha)	(sp ha)	(ha)
Brussel sprouts	107.7	23.8	50.6	27.8	99.1	24.4	19.1	19.1	9.5	9.5	286.0	25.0
Spring cabbage	91.9	25.6	81.3	39.7	87.7	33.2	14.0	12.9	9.8	9.8	284.7	36.2
Summer cabbage	67.1	17.5	144.5	76.1	251.6	76.5	10.2	10.2	7.0	7.0	480.4	74.6
Winter cabbage	111.7	35.1	114.5	45.9	108.3	41.2	1.5	1.5	16.3	16.3	352.3	42.4
Savoys	171.0	54.6	123.9	53.9	143.8	57.0	11.0	11.0	15.7	15.7	465.3	52.1
Calabrese	240.3	63.2	292.7	145.8	304.4	127.9	1.7	1.7	42.9	42.9	882.0	104.7
Cauliflower	186.5	78.0	348.1	169.7	363.9	151.4	9.2	9.2	36.2	36.2	943.8	152.2
Turnips&swedes	1.6	1.6	574.5	141.8	32.3	17.5	.	.	266.0	266.0	874.4	141.9
Beans	7.4	3.9	12.0	6.6	1.7	1.8	.	.	5.9	5.9	27.0	5.3
Peas	.	.	4.0	2.4	1.3	1.3	1.3	1.3	.	.	6.7	2.4
Table leeks	90.4	42.3	242.3	49.1	1.1	1.1	.	.	49.1	49.1	382.9	41.3
Soup leeks	52.6	16.3	100.2	25.7	1.2	1.1	.	.	23.2	23.2	177.2	26.7
Onions	119.5	13.3	106.2	13.3	.	.	.	.	.	.	225.7	13.3
Spring onions	52.5	32.5	182.3	50.6	17.7	8.9	.	.	.	.	252.6	48.6
Carrots	876.8	278.2	1,502.2	282.2	1,346.3	321.3	1.3	1.3	286.0	286.0	4,012.5	268.5
Parsnips	197.0	83.6	412.0	97.0	354.2	94.7		.	2.9	2.9	966.1	95.2
Soup celery	45.0	21.6	65.0	31.3	30.4	13.5	0.1	0.1	.	.	140.4	31.3
Parsley	1.4	0.9	86.9	37.0	31.9	13.5	0.6	0.6	37.2	37.2	158.0	37.0
Lettuce	85.6	31.6	102.2	33.6	118.0	26.9	4.8	4.8	33.1	33.1	343.6	32.3
Beetroot	0.5	0.5	15.0	4.3	1.0	1.0	.	.	2.3	2.3	18.8	4.3
Rhubarb	.	.	18.2	7.4	.	.	.	.	.	.	18.2	7.38
All vegetable crops	**2,506.4**	**823.9**	**4,578.6**	**1,341.1**	**3,295.8**	**1,014.0**	**74.7**	**73.5**	**843.1**	**843.1**	**11,298.5**	**1242.5**

Table 6 **The total quantities (kilograms) of each pesticide type used on vegetable crops in Northern Ireland 2004.**

Crop type	Pesticide type					
	Fungicides	Herbicides & desiccants	Insecticides	Molluscicides	Seed treatments	Total quantity (kg)
Brussel sprouts	50.0	59.2	64.3	2.9	3.5	180.0
Spring cabbage	46.9	117.0	62.1	1.9	0.8	228.7
Summer cabbage	18.0	147.6	25.4	1.8	1.3	194.1
Winter cabbage	24.7	129.1	9.3	0.3	1.1	164.5
Savoys	58.4	136.0	69.6	1.7	1.3	267.1
Calabrese	43.6	316.0	92.0	0.3	19.9	471.8
Cauliflower	54.7	326.7	90.2	1.6	1.4	474.6
Turnips&swedes	0.6	698.2	40.3	.	0.5	739.6
Beans	5.9	11.7	0.1	.	0.4	18.1
Peas	.	4.5	<0.1	0.3	.	4.8
Table leeks	44.9	337.6	0.2	.	1.0	383.8
Soup leeks	27.9	156.0	0.2	.	0.4	184.6
Onions	99.1	92.8	.	.	.	191.9
Spring onions	29.9	386.2	0.2	.	.	416.3
Carrots	348.6	1,701.9	77.9	0.2	81.6	2,210.1
Parsnips	74.5	496.6	15.6	.	<0.1	586.7
Soup celery	14.1	60.4	0.3	<0.1	.	74.7
Parsley	1.0	78.6	0.4	0.1	0.5	80.6
Lettuce	53.8	149.7	12.5	0.6	9.6	226.2
Beetroot	0.1	10.1	0.5	.	0.2	10.8
Rhubarb	.	33.4	.	.	.	33.4
All vegetable crops	**996.6**	**5,449.3**	**561.2**	**11.6**	**123.5**	**7,142.3**

Table 7 **The proportional area (%) of each crop treated with pesticides and the number of spray applications.**

Crop type	Pesticide Type									
	Fungicides		Herbicides & desiccants		Insecticides		Molluscicides		Seed treatments	All pesticides	
Brussels sprouts	79.8%	(3.5)	93.3%	(1.6)	82.0%	(2.6)	64.0%	(1.0)	32.0%	83.8	(2.3)
Spring cabbage	63.8%	(3.2)	98.8%	(1.8)	82.8%	(2.4)	32.1%	(1.2)	24.3%	90.1	(2.2)
Summer cabbage	22.8%	(2.7)	99.3%	(1.5)	99.8%	(1.9)	13.3%	(1.0)	9.2%	97.4	(1.8)
Winter cabbage	66.7%	(2.6)	87.2%	(1.8)	78.4%	(2.3)	2.8%	(1.0)	31.1%	80.6	(2.2)
Savoys	86.3%	(3.1)	85.2%	(1.8)	90.0%	(2.5)	17.3%	(1.0)	24.8%	82.3	(2.3)
Calabrese	42.8%	(3.7)	98.8%	(1.7)	86.7%	(2.2)	1.2%	(1.0)	29.1%	70.9	(2.3)
Cauliflower	45.5%	(3.0)	99.1%	(1.7)	88.4%	(2.5)	5.3%	(1.0)	21.1%	88.8	(2.2)
Turnips & swedes	< 1	(1.0)	50.5%	(1.7)	6.2%	(2.1)	.	.	94.7%	50.5	(1.8)
Beans	58.7%	(1.3)	100.0%	(1.5)	26.5%	(1.0)	.	.	88.7%	79.9	(1.4)
Peas	.	.	100.0%	(1.3)	54.7%	(1.0)	54.7%	(1.0)	.	100.0	(1.3)
Table Leeks	69.6%	(2.2)	80.9%	(2.9)	1.8%	(1.0)	.	.	80.8%	68.1	(2.6)
Soup Leeks	55.9%	(2.6)	88.0%	(2.6)	3.8%	(1.6)	.	.	79.5%	91.6	(2.5)
Onions	100.0%	(9.0)	100.0%	(8.0)	.	.	.	.	.	100.0	(8.5)
Spring onions	52.6%	(1.6)	82.0%	(2.5)	14.3%	(2.0)	.	.	.	78.6	(2.2)
Carrots	80.0%	(3.5)	81.1%	(3.5)	92.4%	(4.8)	< 0.5	(1.0)	82.2%	77.2	(3.9)
Parsnips	84.0%	(2.3)	97.3%	(2.8)	95.0%	(3.2)	.	.	3.0%	95.6	(2.8)
Soup Celery	67.1%	(2.2)	97.2%	(2.0)	41.9%	(2.0)	<0.5	(1.0)	.	97.2	(2.0)
Parsley	2.2%	(1.5)	88.4%	(2.0)	32.2%	(2.0)	1.5%	(1.0)	88.8%	88.3	(1.9)
Lettuce	73.7%	(2.7)	78.5%	(2.7)	62.7%	(2.4)	11.3%	(1.0)	77.3%	75.3	(2.5)
Beetroot	12.3%	(1.0)	100.0%	(2.5)	26.4%	(1.0)	.	.	61.7%	100.0	(2.2)
Rhubarb	.	.	68.5%	(1.3)	.	.	.	.	.	68.5	(1.3)
All crops	**50.3%**	**(2.8)**	**81.8%**	**(2.2)**	**61.9%**	**(2.8)**	**4.5%**	**(1.0)**	**51.4%**	**249.9%**	**(2.4)**

NB This table is not directly comparable to Table 6 in the Survey Report 109, Vegetable crops 1991.

Table 8 **Estimated area (spray hectares) of vegetable crops treated with pesticide formulations in Northern Ireland 2004.**

Pesticide type & formulation	Crop type: Brassicas	Turnip & swedes	Peas & beans	Leeks	Onions & spring onions	Carrots & parsnips	Parsley	Soup Celery	Lettuce	Other vegetables	Total area (sp ha)
Fungicides											
Azoxystrobin	75	.	2	15	57	387	<0.5	1	<0.5	.	536
Benomyl	.	.	.	.	1	.	.	.	.	.	1
Carbendazim	2	1	.	.	.	.	.	1	.	.	4
Chlorothalonil	12	.	2	5	18	.	1	8	.	.	47
Chlorothalonil/metalaxyl	50	<0.5	4	16	15	.	.	<0.5	<0.5	.	84
Chlorothalonil/metalaxyl-m	7	.	.	13	.	.	.	.	.	.	20
Copper oxychloride	.	.	.	.	53	.	.	.	.	.	53
Dichlofluanid	152	.	.	.	.	.	.	.	15	.	166
Difenoconazole	530	.	.	.	1	.	.	34	.	.	564
Dimethomorph/mancozeb	.	.	.	.	27	.	.	.	.	.	27
Fenpropimorph	.	.	.	18	.	73	.	.	.	.	92
Fosetyl-aluminium	24	.	.	.	1	.	.	.	1	.	26
Iprodione	11	.	.	2	1	.	.	.	48	.	61
Iprodione/thiophanate-methyl	.	.	.	.	.	64	.	.	.	.	64
Mancozeb	<0.5	.	.	8	.	.	.	1	.	.	9
Mancozeb/metalaxyl-m	18	.	.	.	.	1	.	.	22	.	41
Metalaxyl-m	.	.	.	.	1	268	.	.	.	.	269
Propamocarb hydrochloride	19	.	.	.	.	.	.	.	.	.	19
Propiconazole	.	.	.	9	.	.	.	.	.	1	9
Tebuconazole	51	.	.	58	.	274	.	.	.	.	383
Tolclofos-methyl	23	.	.	.	.	.	.	.	<0.5	.	24
Zineb	3	.	.	.	.	.	.	.	.	.	3
Unknown fungicide	.	.	.	.	.	7	.	<0.5	.	.	7
All fungicides	**976**	**2**	**7**	**143**	**172**	**1,074**	**1**	**45**	**86**	**1**	**2,506**

Table 8 (cont.) **Estimated area (spray hectares) of vegetable crops treated with pesticide formulations in Northern Ireland 2004.**

Pesticide type & formulation	Brassicas	Turnip & swedes	Peas & beans	Leeks	Onions & spring onions	Carrots & parsnips	Parsley	Soup Celery	Lettuce	Other vegetables	Total area (sp ha)
Herbicides & desiccants											
Bentazone	.	.	<0.5	.	.	.	.	.	.	.	<0.5
Chloridazon	.	.	.	.	13	.	.	.	.	.	13
Chlorpropham	.	.	.	46	14	.	.	.	.	.	60
Chlorpropham/pentanochlor	.	.	.	1	.	36	4	2	.	.	43
Cyanazine	40	.	.	12	.	.	.	.	.	.	52
Dichlobenil	.	.	.	.	.	.	.	.	.	<0.5	<0.5
Diquat/paraquat	.	.	.	.	.	10	.	.	.	.	10
Ethofumesate	.	.	.	.	.	.	.	.	.	1	1
Fluroxypyr	.	.	.	7	13	.	.	.	.	.	20
Glyphosate	95	32	2	16	18	139	2	2	14	12	332
Ioxynil	.	.	.	87	84	.	.	.	.	.	171
Lenacil	.	.	.	.	.	.	.	.	.	1	1
Linuron	32	14	.	<0.5	.	706	40	31	.	.	821
MCPB	.	.	<0.5	.	.	.	.	.	.	.	<0.5
Metamitron	.	.	.	.	.	.	.	.	.	<0.5	<0.5
Metazachlor	420	201	.	.	.	.	.	.	5	.	627
Metoxuron	.	.	.	.	.	333	.	.	.	.	333
Metribuzin	.	.	.	.	.	46	.	.	.	.	46
Paraquat	7	10	6	11	8	47	4	2	5	2	101
Pendimethalin	10	12	<0.5	55	66	283	13	13	.	.	453
Pentanochlor	.	.	.	.	.	50	.	.	.	.	50
Phenmedipham	.	.	.	.	.	.	.	.	.	9	9
Prometryn	.	.	.	19	.	16	21	12	.	.	68
Propachlor	42	39	.	77	70	3	1	1	27	<0.5	260
Propaquizafop	.	.	.	<0.5	2	42	.	.	.	.	44
Propyzamide	.	.	.	.	.	.	.	.	31	7	38
Simazine	.	.	2	.	.	.	.	.	.	.	2
Tepraloxydim	.	.	.	12	1	.	3	2	.	.	18
Terbuthylazine/terbutryn	.	.	5	.	.	.	.	.	.	.	5
Trifluralin	509	267	1	1	.	203	<0.5	<0.5	20	1	1,002
All herbicides & dessicants	**1,156**	**575**	**16**	**343**	**289**	**1,914**	**87**	**65**	**102**	**33**	**4,579**

Table 8 (cont.) **Estimated area (spray hectares) of vegetable crops treated with pesticide formulations in Northern Ireland 2004.**

Pesticide type & formulation	Brassicas	Turnip & swedes	Peas & beans	Leeks	Onions & spring onions	Carrots & parsnips	Parsley	Soup Celery	Lettuce	Other vegetables	Total area (sp ha)
Insecticides											
Bifenthrin	<0.5	.	.	.	.	.	.	.	.	.	<0.5
Carbosulfan	1	3	.	.	.	49	.	.	.	.	53
Chlorfenvinphos	.	21	.	.	.	<0.5	.	.	.	.	21
Chlorpyrifos	73	6	.	2	.	1	1	<0.5	5	1	88
Cypermethrin	51	.	.	<0.5	.	.	<0.5	<0.5	5	.	56
Deltamethrin	29	.	.	.	.	.	.	.	22	.	50
Dimethoate	40	<0.5	.	.	.	.	.	.	.	.	40
Lambda-cyhalothrin	549	3	2	.	18	1,542	31	30	<0.5	.	2,176
Lambda-cyhalothrin/pirimicarb	40	.	.	.	.	.	.	.	43	.	83
Pirimicarb	516	.	1	.	.	109	.	.	44	.	670
Triazamate	52	.	.	.	.	.	.	.	.	.	52
Trichlorfon	4	.	.	.	.	.	.	.	.	.	4
Unknown insecticide	3	.	.	.	.	<0.5	.	.	.	.	3
All insecticides	**1359**	**32**	**3**	**2**	**18**	**1,701**	**32**	**30**	**118**	**1**	**3,296**
Molluscicides											
Metaldehyde	<0.5	.	.	.	.	.	.	.	.	.	<0.5
Methiocarb	67	.	1	.	.	1	1	<0.5	5	.	75
Molluscicides	**1,359**	**32**	**3**	**2**	**18**	**1,701**	**32**	**30**	**118**	**1**	**3,296**
Seed Treatments											
Cymoxanil/Fludioxonil/Metalaxyl-m	.	.	.	.	.	114	.	.	.	.	114
Iprodione	.	266	.	.	.	.	.	.	.	.	266
hymexazol	.	.	.	.	.	.	.	.	.	2	2
Thiram	.	.	6	.	.	.	37	.	.	.	43
Imidacloprid	138	.	.	.	.	.	.	.	33	.	171
tefluthrin	.	.	.	72	.	175	.	.	.	.	247
All seed treatments	**138**	**266**	**6**	**72**	**.**	**289**	**37**	**.**	**33**	**2**	**843**
All pesticides	**3,695**	**874**	**34**	**560**	**478**	**4,979**	**158**	**140**	**344**	**37**	**11,299**

Table 9 **Estimated quantities (kilograms) of pesticide formulations used on vegetable crops in Northern Ireland 2004.**

Pesticide type & formulation	Brassicas	Turnips & swedes	Peas & beans	Leeks	Onions & spring onions	Carrots & parsnip	Parsley	Soup Celery	Lettuce	Other vegetables	Total quantity (kg)
Fungicides											
Azoxystrobin	17	.	<0.5	4	12	92	<0.5	<0.5	<0.5	.	126
Benomyl	.	.	.	.	<0.5	.	.	.	.	.	<0.5
Carbendazim	<0.5	<0.5	.	.	.	.	.	1	.	.	1
Chlorothalonil	15	.	1	4	18	.	1	9	.	.	49
Chlorothalonil/metalaxyl	55	<0.5	4	17	3	.	.	<0.5	1	.	81
Chlorothalonil/metalaxyl-m	7	.	.	13	.	.	.	.	.	.	20
Copper oxychloride	.	.	.	.	53	.	.	.	.	.	53
Dichlofluanid	36	.	.	.	.	.	.	.	4	.	40
Difenoconazole	31	.	.	.	<0.5	.	.	3	.	.	33
Dimethomorph/mancozeb	.	.	.	.	40	.	.	.	.	.	40
Fenpropimorph	.	.	.	12	.	54	.	.	.	.	66
Fosetyl-aluminium	68	.	.	.	2	.	.	.	11	.	82
Iprodione	5	.	.	1	<0.5	.	.	.	16	.	23
Iprodione/thiophanate-methyl	.	.	.	.	.	54	.	.	.	.	54
Mancozeb	<0.5	.	.	9	.	.	.	1	.	.	10
Mancozeb/metalaxyl-m	19	.	.	.	.	1	.	.	22	.	41
Metalaxyl-m	.	.	.	.	<0.5	162	.	.	.	.	162
Propamocarb hydrochloride	8	.	.	.	.	.	.	.	.	.	8
Propiconazole	.	.	.	2	.	.	.	.	.	<0.5	2
Tebuconazole	12	.	.	10	.	60	.	.	.	.	82
Tolclofos-methyl	21	.	.	.	.	.	.	.	<0.5	.	21
Zineb	1	.	.	.	.	.	.	.	.	.	1
All fungicides	**296**	**1**	**6**	**73**	**129**	**423**	**1**	**14**	**54**	**<0.5**	**997**

Table 9 (cont.) **Estimated quantities (kilograms) of pesticide formulations used on vegetable crops in Northern Ireland 2004.**

Pesticide type & formulation	Brassicas	Turnips & swedes	Peas & beans	Leeks	Onions & spring onions	Carrots & parsnip	Parsley	Soup Celery	Lettuce	Other vegetables	Total quantity (kg)
Herbicides & desiccants											
Bentazone	.	.	<0.5	.	.	.	.	.	.	.	<0.5
Chloridazon	.	.	.	.	6	.	.	.	.	.	6
Chlorpropham	.	.	.	34	10	.	.	.	.	.	43
Chlorpropham/pentanochlor	.	.	.	2	.	64	7	5	.	.	78
Cyanazine	16	.	.	5	.	.	.	.	.	.	22
Dichlobenil	.	.	.	.	.	.	.	.	.	3	3
Diquat/paraquat	.	.	.	.	.	10	.	.	.	.	10
Ethofumesate	.	.	.	.	.	.	.	.	.	1	1
Fluroxypyr	.	.	.	0	1	.	.	.	.	.	1
Glyphosate	99	34	2	16	13	145	2	1	12	15	339
Ioxynil	.	.	.	18	18	.	.	.	.	.	36
Lenacil	.	.	.	.	.	.	.	.	.	2	2
Linuron	53	13	.	<0.5	.	589	28	23	.	.	706
MCPB	.	.	1	.	.	.	.	.	.	.	1
Metamitron	.	.	.	.	.	.	.	.	.	<0.5	<0.5
Metazachlor	312	162	.	.	.	.	.	.	4	.	479
Metoxuron	.	.	.	.	.	710	.	.	.	.	710
Metribuzin	.	.	.	.	.	22	.	.	.	.	22
Paraquat	6	6	3	6	6	22	2	1	1	0	53
Pendimethalin	12	17	<0.5	44	59	390	15	16	.	.	553
Pentanochlor	.	.	.	.	.	54	.	.	.	.	54
Phenmedipham	.	.	.	.	.	.	.	.	.	4	4
Prometryn	.	.	.	12	.	15	21	12	.	.	60
Propachlor	199	174	.	354	367	14	4	3	87	1	1,202
Propaquizafop	.	.	.	<0.5	<0.5	5	.	.	.	.	5
Propyzamide	.	.	.	.	.	.	.	.	31	16	47
Simazine	.	.	2	.	.	.	.	.	.	.	2
Tepraloxydim	.	.	.	1	<0.5	.	<0.5	<0.5	.	.	1
Terbuthylazine/terbutryn	.	.	7	.	.	.	.	.	.	.	7
Trifluralin	534	293	1	1	.	159	<0.5	<0.5	15	1	1,004
All herbicides & desiccants	**1,232**	**698**	**16**	**494**	**479**	**2,199**	**79**	**60**	**150**	**44**	**5,449**

Table 9 (cont.) **Estimated quantities (kilograms) of pesticide formulations used on vegetable crops in Northern Ireland 2004.**

Pesticide type & formulation	Brassicas	Turnips & swedes	Peas & beans	Leeks	Onions & spring onions	Carrots & parsnip	Parsley	Soup Celery	Lettuce	Other vegetables	Total quantity (kg)
Insecticides											
Bifenthrin	<0.5	.	.	.	.	.	.	.	.	.	<0.5
Carbosulfan	2	3	.	.	.	57	.	.	.	.	62
Chlorfenvinphos	.	34	.	.	.	<0.5	.	.	.	.	34
Chlorpyrifos	284	3	.	1	.	<0.5	<0.5	<0.5	3	1	291
Cypermethrin	1	.	.	.	.	.	.	.	<0.5	.	2
Deltamethrin	1	.	.	.	.	.	.	.	<0.5	.	1
Dimethoate	10	<0.5	.	.	.	.	.	.	.	.	10
Lambda-cyhalothrin	6	<0.5	<0.5	.	0	21	<0.5	<0.5	<0.5	.	27
Lambda-cyhalothrin/pirimicarb	9	.	.	.	.	.	.	.	5	.	13
Pirimicarb	96	.	<0.5	.	.	15	.	.	4	.	116
Triazamate	3	.	.	.	.	.	.	.	.	.	3
Trichlorfon	3	.	.	.	.	.	.	.	.	.	3
All insecticides	**413**	**40**	**<0.5**	**1**	**<0.5**	**94**	**<0.5**	**<0.5**	**13**	**1**	**561**
Molluscicides											
Metaldehyde	<0.5	.	.	.	.	.	.	.	.	.	<0.5
Methiocarb	11	.	<0.5	.	.	<0.5	<0.5	<0.5	1	.	12
All molluscicides	**11**	**.**	**<0.5**	**.**	**.**	**<0.5**	**<0.5**	**<0.5**	**1**	**.**	**12**
Seed treatments											
Cymoxanil/Fludioxonil/Metalaxyl-m	.	.	.	.	.	<0.5	.	.	.	.	<0.5
Iprodione	.	1	.	.	.	.	.	.	.	.	1
hymexazol	.	.	.	.	.	.	.	.	.	<0.5	<0.5
Thiram	.	.	<0.5	.	.	.	1	.	.	.	1
Imidacloprid	29	.	.	.	.	.	.	.	10	.	39
tefluthrin	.	.	.	2	.	82	.	.	.	.	83
All seed treatments	**29**	**1**	**<0.5**	**2**	**.**	**82**	**1**	**.**	**10**	**<0.5**	**124**
All pesticides	**1,981**	**740**	**23**	**568**	**608**	**2,797**	**81**	**75**	**226**	**44**	**7,142**

Table 10 **The fifty active ingredients most extensively used on vegetable crops in Northern Ireland 2004, ranked by treated area (spray hectares).**

	Active ingredient	Treated area (sp ha)
1.	Lambda-cyhalothrin	2,258.4
2.	Trifluralin	1,002.4
3.	Linuron	821.3
4.	Pirimicarb	752.1
5.	Metazachlor	626.7
6.	Difenoconazole	564.2
7.	Azoxystrobin	557.8
8.	Pendimethalin	452.7
9.	Tebuconazole	382.9
10.	Metoxuron	332.7
11.	Glyphosate	331.8
12.	Metalaxyl-m	329.3
13.	Propachlor	260.0
14.	Ioxynil	170.9
15.	Dichlofluanid	166.3
16.	Chlorothalonil	151.4
17.	Iprodione	125.0
18.	Paraquat	110.6
19.	Chlorpropham	102.4
20.	Pentanochlor	92.8
21.	Fenpropimorph	91.5
22.	Chlorpyrifos	87.8
23.	Metalaxyl	84.3
24.	Mancozeb	75.7
25.	Methiocarb	74.6
26.	Prometryn	68.4
27.	Thiophanate-methyl	63.8
28.	Cypermethrin	55.9
29.	Copper oxychloride	53.1
30.	Carbosulfan	52.7
31.	Triazamate	52.4
32.	Cyanazine	51.7
33.	Deltamethrin	50.1
34.	Fosetyl-aluminium	47.2
35.	Metribuzin	45.5
36.	Propaquizafop	44.4
37.	Dimethoate	40.0
38.	Propyzamide	37.7
39.	Dimethomorph	26.6
40.	Tolclofos-methyl	23.8
41.	Chlorfenvinphos	21.3
42.	Fluroxypyr	19.9
43.	Propamocarb hydrochloride	18.9
44.	Tepraloxydim	17.6
45.	Chloridazon	13.3
46.	Diquat	10.2
47.	Propiconazole	9.3
48.	Phenmedipham	8.7
49.	Terbuthylazine	4.9
50.	Terbutryn	4.9

Table 11 **The fifty active ingredients most extensively used on vegetable crops in Northern Ireland 2004, ranked by weight (kilograms).**

	Active ingredient	Quantity (kg)
1.	Propachlor	1,202.3
2.	Trifluralin	1,004.0
3.	Metoxuron	709.7
4.	Linuron	705.9
5.	Pendimethalin	552.5
6.	Metazachlor	478.5
7.	Glyphosate	339.3
8.	Chlorpyrifos	291.3
9.	Metalaxyl-m	166.0
10.	Chlorothalonil	137.5
11.	Pirimicarb	127.6
12.	Azoxystrobin	125.7
13.	Pentanochlor	105.3
14.	Mancozeb	85.0
15.	Tebuconazole	81.9
16.	Fosetyl-aluminium	81.9
17.	Chlorpropham	69.1
18.	Fenpropimorph	66.4
19.	Carbosulfan	62.4
20.	Prometryn	59.9
21.	Paraquat	58.8
22.	Copper oxychloride	53.1
23.	Iprodione	49.8
24.	Propyzamide	46.8
25.	Dichlofluanid	39.7
26.	Ioxynil	36.0
27.	Chlorfenvinphos	34.1
28.	Difenoconazole	33.3
29.	Lambda-cyhalothrin	28.4
30.	Thiophanate-methyl	27.1
31.	Metribuzin	22.1
32.	Cyanazine	21.7
33.	Tolclofos-methyl	21.2
34.	Methiocarb	11.6
35.	Metalaxyl	10.5
36.	Dimethoate	9.8
37.	Propamocarb hydrochloride	8.2
38.	Chloridazon	6.0
39.	Terbutryn	5.2
40.	Propaquizafop	5.1
41.	Dimethomorph	4.3
42.	Diquat	4.1
43.	Phenmedipham	3.9
44.	Dichlobenil	3.3
45.	Triazamate	2.9
46.	Trichlorfon	2.5
47.	Propiconazole	2.3
48.	Terbuthylazine	2.2
49.	Lenacil	1.9
50.	Simazine	1.7

Table 12 **Brussels sprouts: pesticide-treated area (spray hectares), basic area treated (hectares), quantities used (kilograms) and reasons for use.**

Pesticide type and formulation	General disease control	White blister	Ringspot	Leafspot	Propagation botrytis	Propagation rhizoctonia	Propagation mildew	Propagation general disease	Propagation damping-off	Pre-emergence weeds	Annual dicotyledons	Ground preparation	General weed control	Total area treated (sp ha)	Basic area treated (ha)	Total quantity applied (kgs)
Fungicides																
Azoxystrobin	1.40	.	.	0.40	.	.	.	.	.	.	.	.	.	1.80	1.80	0.50
Carbendazim	1.00	.	.	.	.	.	.	.	.	.	.	.	.	1.00	1.00	0.30
Chlorothalonil	1.00	.	.	.	0.40	.	.	.	.	.	.	.	.	1.40	0.90	1.70
Chlorothalonil/metalaxyl	.	14.40	.	.	.	.	.	.	.	.	.	.	.	14.40	10.00	14.80
Chlorothalonil/metalaxyl-m	.	5.50	.	.	.	.	.	.	.	.	.	.	.	5.50	5.50	5.30
Difenoconazole	54.00	.	2.80	.	.	.	.	.	.	.	.	.	.	56.80	19.40	4.50
Fosetyl-aluminium	.	.	.	.	.	.	1.70	.	.	.	.	.	.	1.70	0.40	13.50
Iprodione	2.20	.	.	.	1.70	.	.	.	.	.	.	.	.	3.90	1.20	1.50
Mancozeb	<0.1	.	.	.	.	.	.	.	.	.	.	.	.	<0.1	<0.1	<0.1
Propamocarb hydrochloride	.	.	.	.	.	.	.	0.40	5.30	.	.	.	.	5.70	5.70	1.70
Tebuconazole	6.50	.	.	0.90	.	.	.	.	.	.	.	.	.	7.40	7.00	1.50
Tolclofos-methyl	.	.	.	.	.	0.40	.	.	5.30	.	.	.	.	5.70	5.70	4.20
Zineb	2.20	.	.	.	.	.	.	.	.	.	.	.	.	2.20	0.70	0.80
All fungicides	**68.40**	**19.90**	**2.80**	**1.30**	**2.10**	**0.40**	**1.70**	**0.40**	**10.60**	**.**	**.**	**.**	**.**	**107.70**	**59.40**	**50.00**
Herbicides & desiccants																
Cyanazine	.	.	.	.	.	.	.	.	.	.	1.30	.	.	1.30	1.30	0.50
Glyphosate	.	.	.	.	.	.	.	.	.	.	.	3.40	.	3.40	3.40	3.70
Metazachlor	.	.	.	.	.	.	.	.	.	10.30	.	.	8.00	18.30	18.30	12.90
Paraquat	.	.	.	.	.	.	.	.	.	.	.	2.30	.	2.30	2.30	1.40
Pendimethalin	.	.	.	.	.	.	.	.	.	.	.	.	0.90	0.90	0.90	1.10
Propachlor	.	.	.	.	.	.	.	.	.	0.40	.	.	4.70	5.10	5.10	19.20
Trifluralin	.	.	.	.	.	.	.	.	.	19.20	.	.	.	19.20	19.20	20.40
All herbicides & desiccants	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**29.90**	**1.30**	**5.80**	**13.60**	**50.60**	**50.60**	**59.20**

Pesticide type and formulation	Aphids	Caterpillars	General insect control	Propagation cabbage root fly	Propagation general insect	Slugs	Total area treated (sp ha)	Basic area treated (ha)	Total quantity applied (kgs)
Insecticides									
Chlorpyrifos	.	1.3	.	7.5	5.6	.	14.5	12.7	55
Cypermethrin	.	6.6	.	.	.	.	6.6	4.4	0.2
Dimethoate	12.2	.	0.3	.	.	.	12.5	5.3	3.7
Lambda-cyhalothrin	1.4	18.8	.	.	.	.	20.3	9.5	0.2
Lambda-cyhalothrin/pirimicarb	10.2	1	.	.	.	.	11.2	6.1	2.4
Pirimicarb	8	.	.	.	.	.	8	6.4	1.3
Triazamate	25.4	.	0.3	.	.	.	25.6	13.3	1.4
Unknown insecticide	.	0.5	.	.	.	.	0.5	0.5	.
All Insecticides	**57.2**	**28.3**	**0.5**	**7.5**	**5.6**	**.**	**99.1**	**58.2**	**64.3**
Molluscicides									
Metaldehyde	.	.	.	.	.	0.1	0.1	0.1	<0.1
Methiocarb	.	.	.	.	.	19	19	19	2.9
All molluscicides	**.**	**.**	**.**	**.**	**.**	**19.1**	**19.1**	**19.1**	**2.9**

Table 13 **Spring cabbage: pesticide treated area (spray hectares), basic area treated (hectares), quantities used (kilograms) and reasons for use.**

Pesticide type and formulation	General disease control	White blister	Altenaria	Ringspot	Propagation botrytis	Propagation rhizoctonia	Propagation general disease	Propagation mildew	General weed control	Ground preparation	Pre-emergence weeds	Total area treated (sp ha)	Basic area treated (ha)	Total quantity applied (kgs)
Fungicides														
Azoxystrobin	5.5	.	.	.	.	.	.	.	.	.	.	5.5	5.5	1.1
Chlorothalonil	2.5	.	.	.	0.5	.	.	.	.	.	.	3	2	3.5
Chlorothalonil/metalaxyl	2.2	6.6	.	.	.	.	.	.	.	.	.	8.8	8.8	10.2
Dichlofluanid	.	.	.	.	.	.	.	27.9	.	.	.	27.9	4.6	7
Difenoconazole	14.3	.	8.8	13.3	.	.	.	.	.	.	.	36.4	16.3	2.5
Fosetyl-aluminium	.	.	.	.	.	.	.	1.7	.	.	.	1.7	0.5	13.7
Iprodione	.	.	.	.	1.7	.	.	.	.	.	.	1.7	0.4	0.9
Mancozeb/metalaxyl-m	.	1.1	.	.	.	.	.	.	.	.	.	1.1	1.1	1.1
Propamocarb hydrochloride	.	.	.	.	.	.	0.4	.	.	.	.	0.4	0.4	1.5
Tebuconazole	4.8	.	.	.	.	.	.	.	.	.	.	4.8	4.8	1.2
Tolclofos-methyl	.	.	.	.	.	0.4	.	.	.	.	.	0.4	0.4	4.2
All fungicides	**29.4**	**7.7**	**8.8**	**13.3**	**2.2**	**0.4**	**0.4**	**29.6**	**.**	**.**	**.**	**91.9**	**45**	**46.9**
Herbicides & desiccants														
Cyanazine	.	.	.	.	.	.	.	.	5.8	.	0.3	6.2	5.8	5.8
Glyphosate	.	.	.	.	.	.	.	.	.	5.7	.	5.7	5.7	5.5
Linuron	.	.	.	.	.	.	.	.	.	.	5.5	5.5	5.5	9.3
Metazachlor	.	.	.	.	.	.	.	.	7.7	.	11	18.8	18.8	14
Paraquat	.	.	.	.	.	.	.	.	.	3.7	.	3.7	3.7	3.7
Pendimethalin	.	.	.	.	.	.	.	.	.	.	3.7	3.7	3.7	4.5
Propachlor	.	.	.	.	.	.	.	.	0.5	.	9.1	9.6	9.6	47
Trifluralin	.	.	.	.	.	.	.	.	1.1	.	27	28.1	28.1	27.2
All herbicides & desiccants	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**15.2**	**9.4**	**56.7**	**81.3**	**81**	**117**

Pesticide type and formulation	Aphids	Cabbage rootfly	Caterpillars	Propagation cabbage root fly	Propagation general insect	Slugs	Total area treated (sp ha)	Basic area treated (ha)	Total quantity applied (kgs)
Insecticides									
Carbosulfan	.	0.7	.	.	.	.	0.7	0.7	0.8
Chlorpyrifos	0.5	0.7	.	0.9	2.2	.	4.2	3.8	53.3
Cypermethrin	0.6	.	9.2	.	.	.	9.8	4.7	0.3
Deltamethrin	.	.	2.2	.	.	.	2.2	2.2	0.1
Dimethoate	8.9	.	.	.	.	.	8.9	4.4	1.8
Lambda-cyhalothrin	6.1	11.7	15.1	.	.	.	32.9	23.8	0.3
Lambda-cyhalothrin/pirimicarb	4.4	.	0.7	.	.	.	5.1	2.9	1.1
Pirimicarb	17.7	.	.	.	.	.	17.7	16	3.1
Triazamate	4.4	.	.	.	.	.	4.4	2.2	0.2
Trichlorfon	.	.	1.9	.	.	.	1.9	0.9	1.1
All Insecticides	**42.6**	**13.1**	**29**	**0.9**	**2.2**	**.**	**87.7**	**61.6**	**62.1**
Molluscicides									
Methiocarb	.	.	.	.	.	14	14	12.9	1.9
All molluscicides	**.**	**.**	**.**	**.**	**.**	**14**	**14**	**12.9**	**1.9**

Table 14 **Summer cabbage: pesticide-treated area (spray hectares), basic area treated (hectares), quantities used (kilograms) and reasons for use.**

Pesticide type and formulation	General disease control	White blister	Ringspot	Leafspot	Propagation damping off	Propagation mildew	General weed control	Pre-emergence weeds	General insect control	Cabbage rootfly	Aphids	Caterpillars	Propagation general insect	Propagation cabbage rootfly	Slugs	Total area treated (sp ha)	Basic area treated (ha)	Total quantity applied (kgs)
Fungicides																		
Azoxystrobin	5.5	.	.	1	.	.	.	.	.	.	.	.	.	.	.	6.5	6.5	1.4
Chlorothalonil/metalaxyl	.	6.6	.	.	.	.	.	.	.	.	.	.	.	.	.	6.6	6.6	7.6
Dichlofluanid	.	.	.	.	.	28.5	.	.	.	.	.	.	.	.	.	28.5	4.9	7.2
Difenoconazole	5.7	.	13.3	.	.	.	.	.	.	.	.	.	.	.	.	19	10.7	1.2
Propamocarb hydrochloride	.	.	.	.	2.2	.	.	.	.	.	.	.	.	.	.	2.2	2.2	0.1
Tebuconazole	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	2	1	0.5
Tolclofos-methyl	.	.	.	.	2.2	.	.	.	.	.	.	.	.	.	.	2.2	2.2	<0.1
All fungicides	**11.2**	**6.6**	**13.3**	**3**	**4.4**	**28.5**	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**67.1**	**34.2**	**18**
Herbicides & desiccants																		
Linuron	.	.	.	.	.	.	.	5.5	.	.	.	.	.	.	.	5.5	5.5	9.3
Metazachlor	.	.	.	.	.	.	1.6	61	.	.	.	.	.	.	.	62.7	62.7	47
Propachlor	.	.	.	.	.	.	1.2	1.2	.	.	.	.	.	.	.	2.4	2.4	12.1
Trifluralin	.	.	.	.	.	.	52	21.9	.	.	.	.	.	.	.	73.9	73.9	79.2
All herbicides & desiccants	**.**	**.**	**.**	**.**	**.**	**.**	**54.8**	**89.7**	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**144.5**	**144.5**	**147.6**
Insecticides																		
Chlorpyrifos	.	.	.	.	.	.	.	.	.	.	.	.	2.1	2.4	.	4.5	4.5	0.9
Cypermethrin	.	.	.	.	.	.	.	.	.	.	.	0.2	.	.	.	0.2	0.2	<0.1
Deltamethrin	.	.	.	.	.	.	.	.	0.2	.	.	.	.	.	.	0.2	0.2	<0.1
Lambda-cyhalothrin	.	.	.	.	.	.	.	.	.	11.1	2.1	113	.	.	.	126.2	68.7	0.7
Pirimicarb	.	.	.	.	.	.	.	.	.	.	117.6	.	.	.	.	117.6	64	23.5
Trichlorfon	.	.	.	.	.	.	.	.	.	.	.	0.5	.	.	.	0.5	0.2	0.3
Unknown insecticide	.	.	.	.	.	.	.	.	.	.	.	2.5	.	.	.	2.5	2.5	.
All Insecticides	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**0.2**	**11.1**	**119.7**	**116.1**	**2.1**	**2.4**	**.**	**251.6**	**140.3**	**25.4**
Molluscicides																		
Methiocarb	.	.	.	.	.	.	.	.	.	.	.	.	.	.	10.2	10.2	10.2	1.8
All molluscicides	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**10.2**	**10.2**	**10.2**	**1.8**

Table 15 Winter cabbage: pesticide-treated area (spray hectares), basic area treated (hectares), quantities used (kilograms) and reasons for use.

Pesticide type and formulation	General disease control	White blister	Altenaria	Ringspot	Leafspot	Propagation general disease	Propagation damping-off	Propagation mildew	General weed control	Ground preparation	Pre-emergence weeds	Total area treated (sp ha)	Basic area treated (ha)	Total quantity applied (kgs)
Fungicides														
Azoxystrobin	5.5	.	.	.	1	.	.	.	.	.	.	6.5	6.5	1.4
Chlorothalonil	1.8	.	.	.	.	.	.	.	.	.	.	1.8	1.8	2.2
Chlorothalonil/metalaxyl	.	1.8	.	.	.	.	.	.	.	.	.	1.8	1.8	2
Chlorothalonil/metalaxyl-m	1.9	.	.	.	.	.	.	.	.	.	.	1.9	1.9	2
Dichlofluanid	.	.	.	.	.	.	.	5.6	.	.	.	5.6	5.6	<0.1
Difenoconazole	38.7	1.4	9.2	9.3	.	.	.	.	.	.	.	58.5	23.3	4.4
Fosetyl-aluminium	.	.	.	.	.	1.8	.	5.6	.	.	.	7.4	7.4	0.3
Mancozeb/metalaxyl-m	.	8.3	.	.	.	.	.	.	.	.	.	8.3	8.3	9
Propamocarb hydrochloride	.	.	.	.	.	.	2.7	.	.	.	.	2.7	2.7	0.1
Tebuconazole	5.3	.	5.6	.	2	.	.	.	.	.	.	12.9	11.9	3.2
Tolclofos-methyl	.	.	.	.	.	1.8	2.7	.	.	.	.	4.4	4.4	<0.1
All fungicides	**53.1**	**11.5**	**14.8**	**9.3**	**3**	**3.5**	**5.3**	**11.2**	**.**	**.**	**.**	**111.7**	**75.6**	**24.7**
Herbicides & desiccants														
Cyanazine	.	.	.	.	.	.	.	.	3.7	.	.	3.7	3.7	1.7
Glyphosate	.	.	.	.	.	.	.	.	.	13.5	.	13.5	13.5	13.7
Linuron	.	.	.	.	.	.	.	.	.	.	5.5	5.5	5.5	9.3
Metazachlor	.	.	.	.	.	.	.	.	14.4	.	20.8	35.2	35.2	29.2
Paraquat	.	.	.	.	.	.	.	.	0.4	.	.	0.4	0.4	0.1
Pendimethalin	.	.	.	.	.	.	.	.	1.3	.	.	1.3	1.3	1.6
Propachlor	.	.	.	.	.	.	.	.	1	.	5	6	6	20.6
Trifluralin	.	.	.	.	.	.	.	.	3.3	.	45.6	48.9	48.9	52.8
All herbicides & desiccants	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**24**	**13.5**	**77**	**114.5**	**114.5**	**129.1**

Pesticide type and formulation	General insect control	Aphids	Cabbage rootfly	Caterpillars	Propagation general insect	Propagation cabbage root fly	Slugs	Total area treated (sp ha)	Basic area treated (ha)	Total quantity applied (kgs)
Insecticides										
Chlorpyrifos	1.4	.	3.7	.	2.4	2.7	.	10.2	8.8	3.4
Cypermethrin	.	1.4	.	3.7	.	.	.	5.1	5.1	0.1
Deltamethrin	.	.	.	0.9	.	.	.	0.9	0.9	<0.1
Lambda-cyhalothrin	.	19.8	11.1	24.7	.	.	.	55.5	32.1	0.6
Lambda-cyhalothrin/pirimicarb	.	0.5	.	.	.	.	.	0.5	0.3	0.1
Pirimicarb	.	32.4	.	.	.	.	.	32.4	21.5	4.9
Triazamate	.	3.6	.	.	.	.	.	3.6	1.9	0.2
All Insecticides	**1.4**	**57.7**	**14.8**	**29.3**	**2.4**	**2.7**	**.**	**108.3**	**70.6**	**9.3**
Molluscicides										
Methiocarb	.	.	.	.	.	.	1.5	1.5	1.5	0.3
All molluscicides	**.**	**.**	**.**	**.**	**.**	**.**	**1.5**	**1.5**	**1.5**	**0.3**

Table 16 Savoys: pesticide-treated area (spray hectares), basic area treated (hectares), quantities used (kilograms) and reasons for use.

Pesticide type and formulation	General disease control	White blister	Altenaria	Ringspot	Propagation general disease	Propagation rhizoctonia	Propagation botrytis	Propagation mildew	Propagation damping-off	General weed control	Ground preparation	Pre-emergence weeds	Total area treated (sp ha)	Basic area treated (ha)	Total quantity applied (kgs)
Fungicides															
Azoxystrobin	5.5	.	.	.	.	.	.	.	.	.	.	.	5.5	5.5	1.1
Carbendazim	0.5	.	.	.	.	.	.	.	.	.	.	.	0.5	0.5	0.1
Chlorothalonil	1.1	.	.	.	.	.	0.4	.	.	.	.	.	1.5	1.5	1.8
Chlorothalonil/metalaxyl	2.2	5.3	.	.	.	.	.	.	.	.	.	.	7.5	4.8	8.6
Dichlofluanid	.	.	.	.	.	.	.	33.2	.	.	.	.	33.2	6.4	8.4
Difenoconazole	38.3	1.4	28.1	15.9	.	.	.	.	.	.	.	.	83.7	42.1	6.1
Fosetyl-aluminium	.	.	.	.	.	.	.	1.7	.	.	.	.	1.7	0.4	13.5
Iprodione	.	.	.	.	.	.	1.7	.	.	.	.	.	1.7	0.4	0.9
Mancozeb/metalaxyl-m	.	8.8	.	.	.	.	.	.	.	.	.	.	8.8	8.8	8.9
Propamocarb hydrochloride	.	.	.	.	0.4	.	.	.	6.6	.	.	.	7.1	7.1	1.8
Tebuconazole	10.3	.	.	2.3	.	.	.	.	.	.	.	.	12.7	12.7	3
Tolclofos-methyl	.	.	.	.	.	0.4	.	.	6.6	.	.	.	7.1	7.1	4.2
All fungicides	**57.9**	**15.5**	**28.1**	**18.3**	**0.4**	**0.4**	**2.1**	**34.9**	**13.3**	**.**	**.**	**.**	**171**	**97.3**	**58.4**
Herbicides & desiccants															
Cyanazine	.	.	.	.	.	.	.	.	.	5.3	.	0.3	5.6	5.3	2.4
Glyphosate	.	.	.	.	.	.	.	.	.	.	20.3	.	20.3	20.3	22.8
Linuron	.	.	.	.	.	.	.	.	.	.	.	5.5	5.5	5.5	9.3
Metazachlor	.	.	.	.	.	.	.	.	.	17	.	20	37	37	27.5
Paraquat	.	.	.	.	.	.	.	.	.	0.4	.	.	0.4	0.4	0.1
Pendimethalin	.	.	.	.	.	.	.	.	.	1.3	.	.	1.3	1.3	1.6
Propachlor	.	.	.	.	.	.	.	.	.	1.8	.	2.6	4.5	4.5	22.2
Trifluralin	.	.	.	.	.	.	.	.	.	8.8	.	40.7	49.4	49.4	50.1
All herbicides & desiccants	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**34.5**	**20.3**	**69.1**	**123.9**	**123.6**	**136**

Pesticide type and formulation	General insect control	Aphids	Cabbage rootfly	Caterpillars	Propagation general insect	Propagation cabbage root fly	Slugs	Total area treated (sp ha)	Basic area treated (ha)	Total quantity applied (kgs)
Insecticides										
Carbosulfan	.	.	0.7	.	.	.	.	0.7	0.7	0.8
Chlorpyrifos	1.4	1.1	0.7	.	1.9	4.5	.	9.6	6.8	56.1
Cypermethrin	.	2	.	6.4	.	.	.	8.4	5.1	0.2
Deltamethrin	0.7	.	.	3.5	.	.	.	4.3	4.3	0.1
Dimethoate	.	8.7	.	.	.	.	.	8.7	5.5	2.3
Lambda-cyhalothrin	.	10.5	11.7	29.7	.	.	.	51.9	35.6	0.4
Lambda-cyhalothrin/pirimicarb	.	6.6	.	0.4	.	.	.	6.9	3.7	1.5
Pirimicarb	.	47.4	.	.	.	.	.	47.4	38.8	7.6
Triazamate	.	5.5	.	.	.	.	.	5.5	3.3	0.3
Trichlorfon	.	.	.	0.5	.	.	.	0.5	0.2	0.3
All Insecticides	**2.1**	**81.7**	**13.1**	**40.4**	**1.9**	**4.5**	**.**	**143.8**	**104**	**69.6**
Molluscicides										
Methiocarb	.	.	.	.	.	.	11	11	11	1.7
All molluscicides	**.**	**.**	**.**	**.**	**.**	**.**	**11**	**11**	**11**	**1.7**

Table 17 Calabrese: pesticide-treated area (spray hectares), basic area treated (hectares), quantities used (kilograms) and reasons for use.

Pesticide type and formulation	General disease control	Mildew	White blister	Altenaria	Leafspot	Propagation general disease	Propagation botrytis	Propagation mildew	Propagation rhizoctonia	General weed control	Pre-emergence weeds	Ground preparation	Total area treated (sp ha)	Basic area treated (ha)	Total quantity applied (kgs)
Fungicides															
Azoxystrobin	.	.	16.4	.	2	.	.	.	.	.	.	.	18.4	18.4	4.6
Chlorothalonil	3.5	.	.	.	.	.	0.4	.	.	.	.	.	3.9	3.9	4.8
Chlorothalonil/metalaxyl	.	2.2	1.8	.	.	.	.	.	.	.	.	.	3.9	3.1	4.5
Dichlofluanid	.	.	.	.	.	.	.	11.3	.	.	.	.	11.3	6.9	2.2
Difenoconazole	169	.	.	10.6	.	.	.	.	.	.	.	.	179.6	53.5	4.9
Fosetyl-aluminium	.	.	.	.	.	2.7	.	7.3	.	.	.	.	10	8.7	13.9
Iprodione	0.6	.	.	.	.	.	1.7	.	.	.	.	.	2.3	0.6	1
Propamocarb hydrochloride	.	.	.	.	.	0.4	.	.	.	.	.	.	0.4	0.4	1.5
Tebuconazole	.	.	.	2.8	4	.	.	.	.	.	.	.	6.8	4.8	1.7
Tolclofos-methyl	.	.	.	.	.	2.7	.	.	0.4	.	.	.	3.1	3.1	4.2
Zineb	0.6	.	.	.	.	.	.	.	.	.	.	.	0.6	0.2	0.2
All fungicides	**173.6**	**2.2**	**18.2**	**13.4**	**6**	**5.7**	**2.1**	**18.6**	**0.4**	**.**	**.**	**.**	**240.3**	**103.5**	**43.6**
Herbicides & desiccants															
Cyanazine	.	.	.	.	.	.	.	.	.	7	0.3	.	7.3	7	1.3
Glyphosate	.	.	.	.	.	.	.	.	.	.	.	28.9	28.9	28.9	29.8
Linuron	.	.	.	.	.	.	.	.	.	.	0.5	.	0.5	0.5	0.5
Metazachlor	.	.	.	.	.	.	.	.	.	30.5	80.5	.	111	111	81.6
Paraquat	.	.	.	.	.	.	.	.	.	.	.	0.2	0.2	0.2	0.1
Pendimethalin	.	.	.	.	.	.	.	.	.	0.4	.	.	0.4	0.4	0.5
Propachlor	.	.	.	.	.	.	.	.	.	2.8	9.1	.	11.9	11.9	60.9
Trifluralin	.	.	.	.	.	.	.	.	.	46.3	86.1	.	132.4	132.4	141.2
All herbicides & desiccants	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**87**	**176.5**	**29.1**	**292.7**	**292.3**	**316**

Pesticide type and formulation	General insect control	Aphids	Caterpillars	Propagation general insect	Propagation cabbage root fly	Slugs	Total area treated (sp ha)	Basic area treated (ha)	Total quantity applied (kgs)
Insecticides									
Chlorpyrifos	.	0.8	.	2.2	18.3	.	21.3	12.5	61.3
Cypermethrin	9.3	1.2	0.3	.	.	.	10.8	7.5	0.3
Deltamethrin	.	.	3.5	.	.	.	3.5	3.5	0.1
Dimethoate	.	5.3	.	.	.	.	5.3	2.7	1.1
Lambda-cyhalothrin	2.7	32.4	79.6	.	.	.	114.6	105.7	1.5
Lambda-cyhalothrin/pirimicarb	.	0.6	.	.	.	.	0.6	0.6	0.1
Pirimicarb	.	141.2	.	.	.	.	141.2	113.5	26.9
Triazamate	.	6.6	.	.	.	.	6.6	6.6	0.4
Trichlorfon	.	.	0.5	.	.	.	0.5	0.2	0.3
All Insecticides	**12**	**188.1**	**83.9**	**2.2**	**18.3**	**.**	**304.4**	**252.8**	**92**
Molluscicides									
Methiocarb	.	.	.	.	.	1.7	1.7	1.7	0.3
All molluscicides	**.**	**.**	**.**	**.**	**.**	**1.7**	**1.7**	**1.7**	**0.3**

Table 18 **Cauliflower: pesticide-treated area (spray hectares), basic area treated (hectares), quantities used (kilograms) and reasons for use.**

Pesticide type and formulation	General disease control	White blister	Leafspot	Altenaria	Ringspot	Propagation general disease	Propagation botrytis	Propagation rhizoctonia	Propagation mildew	General weed control	Ground preparation	Pre-emergence weeds	Total area treated (sp ha)	Basic area treated (ha)	Total quantity applied (kgs)
Fungicides															
Azoxystrobin	8.9	19.7	2	.	.	.	.	.	.	.	.	.	30.5	30.5	7.2
Chlorothalonil	.	.	.	.	.	.	0.4	.	.	.	.	.	0.4	0.4	0.5
Chlorothalonil/metalaxyl	.	6.6	.	.	.	.	.	.	.	.	.	.	6.6	6.6	7.6
Dichlofluanid	.	.	.	.	.	.	.	.	45.1	.	.	.	45.1	10.4	11.3
Difenoconazole	69.4	.	2.2	10.6	13.3	.	.	.	.	.	.	.	95.5	63	6.9
Fosetyl-aluminium	.	.	.	.	.	.	.	.	1.7	.	.	.	1.7	0.4	13.5
Iprodione	.	.	.	.	.	.	1.7	.	.	.	.	.	1.7	0.4	0.9
Propamocarb hydrochloride	.	.	.	.	.	0.4	.	.	.	.	.	.	0.4	0.4	1.5
Tebuconazole	.	.	4	.	.	.	.	.	.	.	.	.	4	2	1
Tolclofos-methyl	.	.	.	.	.	.	.	0.4	.	.	.	.	0.4	0.4	4.2
All fungicides	**78.2**	**26.3**	**8.2**	**10.6**	**13.3**	**0.4**	**2.1**	**0.4**	**46.9**	**.**	**.**	**.**	**186.5**	**114.7**	**54.7**
Herbicides & desiccants															
Cyanazine	.	.	.	.	.	.	.	.	.	15.8	.	0.3	16.1	15.8	4.6
Glyphosate	.	.	.	.	.	.	.	.	.	.	23.2	.	23.2	23.2	23.7
Linuron	.	.	.	.	.	.	.	.	.	.	.	8.9	8.9	8.9	14.9
Metazachlor	.	.	.	.	.	.	.	.	.	41.8	.	95.4	137.2	137.2	100
Pendimethalin	.	.	.	.	.	.	.	.	.	2.7	.	.	2.7	2.7	3.2
Propachlor	.	.	.	.	.	.	.	.	.	2.7	.	0.1	2.9	2.9	16.9
Trifluralin	.	.	.	.	.	.	.	.	.	43.8	.	113.3	157.1	157.1	163.4
All herbicides & desiccants	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**106.9**	**23.2**	**218**	**348.1**	**347.7**	**326.7**

Pesticide type and formulation	General insect control	Aphids	Caterpillars	Cabbage root fly	Propagation general insect	Propagation cabbage root fly	Slugs	Total area treated (sp ha)	Basic area treated (ha)	Total quantity applied (kgs)
Insecticides										
Bifenthrin	.	0.1	.	.	.	.	.	0.1	0.1	<0.1
Chlorpyrifos	.	.	0.1	0.1	2	6.6	.	8.8	8.3	54.1
Cypermethrin	8.4	0.6	1.1	.	.	.	.	10.1	7.3	0.3
Deltamethrin	0.7	.	16.8	.	.	.	.	17.6	10.9	0.1
Dimethoate	.	4.4	.	.	.	.	.	4.4	2.2	0.9
Lambda-cyhalothrin	.	56	74.2	17.7	.	.	.	147.9	125.8	2
Lambda-cyhalothrin/pirimicarb	15.3	.	.	.	.	.	.	15.3	15.3	3.4
Pirimicarb	.	136.8	15.3	.	.	.	.	152.1	124.2	28.4
Triazamate	.	6.6	.	.	.	.	.	6.6	6.6	0.4
Trichlorfon	.	.	0.9	.	.	.	.	0.9	0.5	0.6
All Insecticides	**24.5**	**204.6**	**108.4**	**17.8**	**2**	**6.6**	**.**	**363.9**	**301.1**	**90.2**
Molluscicides										
Methiocarb	.	.	.	.	.	.	9.2	9.2	9.2	1.6
All molluscicides	**.**	**.**	**.**	**.**	**.**	**.**	**9.2**	**9.2**	**9.2**	**1.6**

Table 19 **Turnips and swedes: pesticide-treated area (spray hectares), basic area treated (hectares), quantities used (kilograms) and reasons for use.**

Pesticide type and formulation	Mildew	General weed control	Ground preparation	Pre-emergence weeds	Aphids	Cabbage root fly	Total area treated (sp ha)	Basic area treated (ha)	Total quantity applied (kgs)
Fungicides									
Carbendazim	1.3	.	.	.	.	.	1.3	1.3	0.3
Chlorothalonil/metalaxyl	0.3	.	.	.	.	.	0.3	0.3	0.2
All fungicides	**1.6**	**.**	**.**	**.**	**.**	**.**	**1.6**	**1.6**	**0.6**
Herbicides & desiccants									
Glyphosate	.	.	31.9	.	.	.	31.9	31.9	33.8
Linuron	.	.	.	13.5	.	.	13.5	13.5	13
Metazachlor	.	3.5	.	197.8	.	.	201.3	201.3	162.3
Paraquat	.	.	9.7	.	.	.	9.7	9.7	6
Pendimethalin	.	8.9	3	.	.	.	11.9	11.9	16.7
Propachlor	.	0.3	.	39	.	.	39.3	39.3	173.6
Trifluralin	.	124.7	.	142.2	.	.	266.9	210.6	292.9
All herbicides & desiccants	**.**	**137.3**	**44.7**	**392.5**	**.**	**.**	**574.5**	**518.2**	**698.2**
Insecticides									
Carbosulfan	.	.	.	.	.	2.8	2.8	2.8	3.4
Chlorfenvinphos	.	.	.	.	.	20.9	20.9	13.5	34.1
Chlorpyrifos	.	.	.	.	.	5.7	5.7	2.1	2.7
Dimethoate	.	.	.	.	0.3	.	0.3	0.3	0.1
Lambda-cyhalothrin	.	.	.	.	.	2.8	2.8	1.4	0
All insecticides	**.**	**.**	**.**	**.**	**0.3**	**32**	**32.3**	**20**	**40.3**

Table 20 **Beans: pesticide-treated area (spray hectares), basic area treated (hectares), quantities used (kilograms) and reasons for use.**

Pesticide type and formulation	General Disease control	Blight	Chocolate spot	General weed control	Ground preparation	Pre-emergence weeds	Aphids	Total area treated (sp ha)	Basic area treated (ha)	Total quantity applied (kgs)
Fungicides										
Azoxystrobin	1.8	.	.	.	.	.	.	1.8	1.8	0.4
Chlorothalonil	1.2	0.1	0.7	.	.	.	.	2.1	2.1	1.4
Chlorothalonil/metalaxyl	.	.	3.5	.	.	.	.	3.5	1.8	4.1
All fungicides	**3**	**0.1**	**4.3**	**.**	**.**	**.**	**.**	**7.4**	**5.6**	**5.9**
Herbicides & desiccants										
Bentazone	.	.	.	0.3	.	.	.	0.3	0.3	0.2
Glyphosate	.	.	.	.	1.3	.	.	1.3	1.3	1.3
Paraquat	.	.	.	0.4	0.9	3.1	.	4.4	4.4	2.5
Simazine	.	.	.	1	.	0.7	.	1.7	1.7	1.7
Terbuthylazine/terbutryn	.	.	.	3.1	.	0.2	.	3.3	3.3	5
Trifluralin	.	.	.	.	.	1	.	1	1	1
All herbicides & desiccants	**.**	**.**	**.**	**4.8**	**2.2**	**5.1**	**.**	**12**	**12**	**11.7**
Insecticides										
Lambda-cyhalothrin	.	.	.	.	.	.	1	1	1	<0.1
Pirimicarb	.	.	.	.	.	.	0.7	0.7	0.7	0.1
All insecticides	**.**	**.**	**.**	**.**	**.**	**.**	**1.7**	**1.7**	**1.7**	**0.1**

Table 21 **Peas: pesticide-treated area (spray hectares), basic area treated (hectares), quantities used (kilograms) and reasons for use.**

Pesticide type and formulation	General weed control	Ground preparation	Pre-emergence weeds	General insect control	Slugs	Total area treated (sp ha)	Basic area treated (ha)	Total quantity applied (kgs)
Herbicides & desiccants								
Glyphosate	.	0.4	.	.	.	0.4	0.4	0.3
MCPB	0.3	.	.	.	.	0.3	0.3	0.6
Paraquat	.	.	1.3	.	.	1.3	1.3	0.8
Pendimethalin	.	.	0.1	.	.	0.1	0.1	0.1
Terbuthylazine/terbutryn	1.3	.	0.2	.	.	1.5	1.5	2.4
Trifluralin	.	.	0.4	.	.	0.4	0.4	0.4
All herbicides & desiccants	**1.6**	**0.4**	**2**	**.**	**.**	**4**	**4**	**4.5**
Insecticides								
Lambda-cyhalothrin	.	.	.	1.3	.	1.3	1.3	<0.1
All insecticides	**.**	**.**	**.**	**1.3**	**.**	**1.3**	**1.3**	**<0.1**
Molluscicides								
Methiocarb	.	.	.	.	1.3	1.3	1.3	0.3
All molluscicides	**.**	**.**	**.**	**.**	**1.3**	**1.3**	**1.3**	**0.3**

Table 22 **Table Leeks: pesticide-treated area (spray hectares), basic area treated (hectares), quantities used (kilograms) and reasons for use.**

Pesticide type and formulation	General disease control	Rust	White tip	General weed control	Ground preparation	Chickweed	Pre-emergence weeds	Annual dicotyledons	Propagation general insect	Total area treated (sp ha)	Basic area treated (ha)	Total quantity applied (kgs)
Fungicides												
Azoxystrobin	1.2	10.6	.	.	.	.	.	.	.	11.8	11.8	2.9
Chlorothalonil	.	0.9	.	.	.	.	.	.	.	0.9	0.4	<0.1
Chlorothalonil/metalaxyl	.	.	10.9	.	.	.	.	.	.	10.9	6.4	12.3
Chlorothalonil/metalaxyl-m	.	8.9	.	.	.	.	.	.	.	8.9	8.9	9.5
Fenpropimorph	1.5	7.8	.	.	.	.	.	.	.	9.3	4.5	6
Mancozeb	.	.	5.6	.	.	.	.	.	.	5.6	1.9	6.7
Propiconazole	.	8.9	.	.	.	.	.	.	.	8.9	4.4	2.2
Tebuconazole	.	34.3	.	.	.	.	.	.	.	34.3	23.7	5.1
All fungicides	**2.7**	**71.3**	**16.5**	**.**	**.**	**.**	**.**	**.**	**.**	**90.4**	**62**	**44.9**
Herbicides & desiccants												
Chlorpropham	.	.	.	15.5	.	0.5	21	.	.	37	37	28.5
Cyanazine	.	.	.	11.3	.	.	0.3	.	.	11.6	11.3	5.3
Fluroxypyr	.	.	.	6.6	.	.	.	.	.	6.6	6.6	0.3
Glyphosate	.	.	.	.	13.3	.	.	.	.	13.3	13.3	14.1
Ioxynil	.	.	.	71.1	.	.	.	.	.	71.1	37.7	15.5
Paraquat	.	.	.	.	3.3	.	.	.	.	3.3	3.3	2
Pendimethalin	.	.	.	0.5	.	.	35.1	.	.	35.6	35.6	23.9
Prometryn	.	.	.	6.4	.	.	1.9	1.1	.	9.4	9.4	9.4
Propachlor	.	.	.	1.7	.	.	48.1	.	.	49.8	49.8	238.1
Tepraloxydim	.	.	.	.	.	.	4.6	.	.	4.6	4.6	0.3
Trifluralin	.	.	.	.	.	.	0.1	.	.	0.1	0.1	0.1
All herbicides & desiccants	**.**	**.**	**.**	**113.2**	**16.6**	**0.5**	**111**	**1.1**	**.**	**242.3**	**208.7**	**337.6**
Insecticides												
Chlorpyrifos	.	.	.	.	.	.	.	.	1.1	1.1	1.1	0.2
All insecticides	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**1.1**	**1.1**	**1.1**	**0.2**

Table 22b **Soup Leeks: pesticide-treated area (spray hectares), basic area treated (hectares), quantities used (kilograms) and reasons for use.**

Pesticide type and formulation	Rust	Botrytis	White tip	General weed control	Annual dicotyledons	Ground preparation	Chickweed	Pre-emergence weeds	Aphids	Propagation general insect	Total area treated (sp ha)	Basic area treated (ha)	Total quantity applied (kgs)
Fungicides													
Azoxystrobin	3.1	.	.	.	.	.	.	.	.	.	3.1	3.1	0.8
Chlorothalonil	4.3	.	.	.	.	.	.	.	.	.	4.3	2.3	4.4
Chlorothalonil/metalaxyl	.	.	4.6	.	.	.	.	.	.	.	4.6	3.7	4.8
Chlorothalonil/metalaxyl-m	2.2	.	2	.	.	.	.	.	.	.	4.2	2	3.6
Fenpropimorph	9	.	.	.	.	.	.	.	.	.	9	4.5	6.3
Iprodione	.	1.9	.	.	.	.	.	.	.	.	1.9	0.9	1
Mancozeb	.	.	2.1	.	.	.	.	.	.	.	2.1	0.7	2.5
Tebuconazole	23.5	.	.	.	.	.	.	.	.	.	23.5	11.7	4.5
All fungicides	**42**	**1.9**	**8.7**	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**52.6**	**28.9**	**27.9**
Herbicides & desiccants													
Chlorpropham	.	.	.	4.4	.	.	1.5	2.7	.	.	8.6	8.6	5.1
Chlorpropham/pentanochlor	.	.	.	0.8	.	.	.	.	.	.	0.8	0.8	1.9
Glyphosate	.	.	.	.	.	3	.	.	.	.	3	3	2.1
Ioxynil	.	.	.	16.3	.	.	.	.	.	.	16.3	14.9	2.9
Linuron	.	.	.	.	.	.	.	<0.1	.	.	<0.1	<0.1	<0.1
Paraquat	.	.	.	.	.	7.3	.	.	.	.	7.3	7.3	3.7
Pendimethalin	.	.	.	4.9	.	.	.	14.5	.	.	19.4	19.4	20.3
Prometryn	.	.	.	8.5	1.1	.	.	.	.	.	9.6	9.6	2.7
Propachlor	.	.	.	0.7	.	.	.	26.4	.	.	27.1	27.1	116.3
Propaquizafop	.	.	.	0.3	.	.	.	.	.	.	0.3	0.3	<0.1
Tepraloxydim	.	.	.	7.4	.	.	.	.	.	.	7.4	7.4	0.4
Trifluralin	.	.	.	.	.	.	.	0.4	.	.	0.4	0.4	0.4
All herbicides & desiccants	**.**	**.**	**.**	**43.3**	**1.1**	**10.3**	**1.5**	**44.1**	**.**	**.**	**100.2**	**98.9**	**156**
Insecticides													
Chlorpyrifos	.	.	.	.	.	.	.	.	.	1.1	1.1	1.1	0.2
Cypermethrin	.	.	.	.	.	.	.	.	<0.1	.	<0.1	<0.1	<0.1
All insecticides	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**0**	**1.1**	**1.2**	**1.2**	**0.2**

Table 23 **Onions: pesticide treated area (spray hectares), basic area treated (hectares), quantities used (kilograms) and reasons for use.**

Pesticide type and formulation	General disease control	Mildew	Botrytis	General weed control	Ground preparation	Pre-emergence weeds	Total area treated (sp ha)	Basic area treated (ha)	Total quantity applied (kgs)
Fungicides									
Azoxystrobin	.	13.3	13.3	.	.	.	26.6	13.3	4.6
Chlorothalonil/metalaxyl	13.3	.	.	.	.	.	13.3	13.3	1.5
Copper oxychloride	26.6	26.6	.	.	.	.	53.1	13.3	53.1
Dimethomorph/mancozeb	.	.	26.6	.	.	.	26.6	13.3	39.8
All Fungicides	**39.8**	**39.8**	**39.8**	**.**	**.**	**.**	**119.5**	**53.1**	**99.1**
Herbicides & desiccants									
Chloridazon	.	.	.	13.3	.	.	13.3	13.3	6
Fluroxypyr	.	.	.	13.3	.	.	13.3	13.3	1.1
Glyphosate	.	.	.	.	13.3	.	13.3	13.3	6.6
Ioxynil	.	.	.	26.6	.	.	26.6	13.3	1.8
Pendimethalin	.	.	.	13.3	.	13.3	26.6	13.3	17.5
Propachlor	.	.	.	.	.	13.3	13.3	13.3	59.8
All herbicides & desiccants	**.**	**.**	**.**	**66.4**	**13.3**	**26.6**	**106.2**	**79.7**	**92.8**

Table 24 **Spring onions: Pesticide treated area (spray hectares), basic area treated (hectares), quantities used (kilograms) and reasons for use.**

Pesticide type and formulation	General disease control	Mildew	Blight	Botrytis	General weed control	Ground preparation	Chickweed	Pre-emergence weeds	Aphids	Total area treated (sp ha)	Basic area treated (sp ha)	Total quantity applied (kgs)
Fungicides												
Azoxystrobin	2.7	26.6	0.6	0.2	.	.	.	.	.	30	12.2	7.5
Benomyl	.	0.7	.	.	.	.	.	.	.	0.7	0.7	0.3
Chlorothalonil	15.5	2.7	.	.	.	.	.	.	.	18.2	18.2	18.2
Chlorothalonil/metalaxyl	0.9	0.5	.	.	.	.	.	.	.	1.4	1.4	1.5
Difenoconazole	0.7	.	.	.	.	.	.	.	.	0.7	0.7	0.1
Fosetyl-aluminium	.	.	0.6	.	.	.	.	.	.	0.6	0.6	2.2
Iprodione	.	.	.	0.5	.	.	.	.	.	0.5	0.2	0.2
Metalaxyl-m	.	.	0.5	.	.	.	.	.	.	0.5	0.3	<0.1
All fungicides	**19.8**	**30.4**	**1.7**	**0.7**	**.**	**.**	**.**	**.**	**.**	**52.5**	**34.3**	**29.9**
Herbicides & desiccants												
Chlorpropham	.	.	.	.	2.2	.	1	10.7	.	13.9	13.9	9.6
Glyphosate	.	.	.	.	.	4.4	.	.	.	4.4	4.4	6.4
Ioxynil	.	.	.	.	57	.	.	.	.	57	38.8	15.8
Paraquat	.	.	.	.	2.3	4.5	.	0.7	.	7.6	7.6	5.7
Pendimethalin	.	.	.	.	6.2	.	.	33.7	.	39.9	39.9	41.1
Propachlor	.	.	.	.	.	.	.	56.7	.	56.7	56.7	307.3
Propaquizafop	.	.	.	.	2.3	.	.	.	.	2.3	2.3	0.2
Tepraloxydim	.	.	.	.	0.5	.	.	.	.	0.5	0.5	<0.1
All herbicides & desiccants	**.**	**.**	**.**	**.**	**70.5**	**9**	**1**	**101.8**	**.**	**182.3**	**164.2**	**386.2**
Insecticides												
Lambda-cyhalothrin	.	.	.	.	.	.	.	.	17.7	17.7	8.9	0.2
All insecticides	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**17.7**	**17.7**	**8.9**	**0.2**

Table 25 **Carrots: pesticide-treated area (spray hectares), basic area treated (hectares), quantities used (kilograms) and reasons for use.**

Pesticide type and formulation	General disease control	Cavity spot	Alternaria	Canker	General weed control	Annual dicotyledons	Ground preparation	Pre-emergence weeds	General insect control	Carrot fly	Aphids	Slugs	Total area treated (sp ha)	Basic area treated (ha)	Total quantity applied (kgs)
Fungicides															
Azoxystrobin	164.4	.	175.1	0.4	.	.	.	.	.	.	.	.	340	268.6	80.2
Fenpropimorph	44.7	.	.	.	.	.	.	.	.	.	.	.	44.7	44.7	33.4
Iprodione/thiophanate-methyl	63.8	.	.	.	.	.	.	.	.	.	.	.	63.8	20.5	54.2
Mancozeb/metalaxyl-m	.	.	.	0.9	.	.	.	.	.	.	.	.	0.9	0.9	0.5
Metalaxyl-m	140.2	83.1	.	.	.	.	.	.	.	.	.	.	223.2	210.8	134.4
Tebuconazole	76.7	.	120.5	0.4	.	.	.	.	.	.	.	.	197.6	113.3	45.8
Unknown fungicide	.	6.5	.	.	.	.	.	.	.	.	.	.	6.5	6.5	.
All fungicides	**489.8**	**89.6**	**295.6**	**1.8**	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**876.8**	**665.2**	**348.6**
Herbicides															
Chlorpropham/pentanochlor	.	.	.	.	19.2	.	.	.	.	.	.	.	19.2	13.8	30.8
Diquat/paraquat	.	.	.	.	.	.	.	6.6	.	.	.	.	6.6	6.6	6.6
Glyphosate	.	.	.	.	.	.	92.5	.	.	.	.	.	92.5	92.5	97.5
Linuron	.	.	.	.	354.1	.	.	141.6	.	.	.	.	495.6	323.5	411
Metoxuron	.	.	.	.	307.2	1.5	.	.	.	.	.	.	308.7	231.6	604
Metribuzin	.	.	.	.	45.5	.	.	.	.	.	.	.	45.5	28.7	22.1
Paraquat	.	.	.	.	12.5	.	10.5	15.9	.	.	.	.	38.9	38.9	19.6
Pendimethalin	.	.	.	.	195	.	1	27.1	.	.	.	.	223.1	210.6	309.3
Pentanochlor	.	.	.	.	45.1	.	.	.	.	.	.	.	45.1	20.1	44.3
Prometryn	.	.	.	.	8.4	.	.	.	.	.	.	.	8.4	8.4	8.4
Propachlor	.	.	.	.	0.4	.	.	2.2	.	.	.	.	2.5	2.5	12.9
Propaquizafop	.	.	.	.	41.8	.	.	.	.	.	.	.	41.8	25.2	4.9
Trifluralin	.	.	.	.	112.1	.	.	62.1	.	.	.	.	174.2	174.2	130.4
All herbicides & desiccants	**.**	**.**	**.**	**.**	**1,141.10**	**1.5**	**104.1**	**255.5**	**.**	**.**	**.**	**.**	**1,502.20**	**1,176.70**	**1,701.90**

Table 25 (cont) **Carrots: pesticide-treated area (spray hectares), basic area treated (hectares), quantities used (kilograms) and reasons for use.**

Pesticide type and formulation	General disease control	Cavity spot	Alternaria	Canker	General weed control	Annual dicotyledons	Ground preparation	Pre-emergence weeds	General insect control	Carrot fly	Aphids	Slugs	Total area treated (sp ha)	Basic area treated (ha)	Total quantity applied (kgs)
Insecticides															
Carbosulfan	.	.	.	.	.	.	.	.	.	11.7	29.5	.	41.2	41.2	46.5
Chlorfenvinphos	.	.	.	.	.	.	.	.	.	0.4	.	.	0.4	0.4	<0.1
Chlorpyrifos	.	.	.	.	.	.	.	.	.	0.6	.	.	0.6	0.6	0.2
Lambda-cyhalothrin	.	.	.	.	.	.	.	.	70.2	760.6	366.9	.	1,197.70	328.9	16.3
Pirimicarb	.	.	.	.	.	.	.	.	.	.	106	.	106	41.7	14.8
Unknown insecticide	.	.	.	.	.	.	.	.	.	0.4	.	.	0.4	0.4	.
All insecticides	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**70.2**	**773.7**	**502.4**	**.**	**1,346.30**	**413.1**	**77.9**
Molluscicides															
Methiocarb	.	.	.	.	.	.	.	.	.	.	.	1.3	1.3	1.3	0.2
All molluscicides	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**1.3**	**1.3**	**1.3**	**0.2**

Table 26 **Parsnips: pesticide treated area (spray hectares), basic area treated (hectares), quantities used (kilograms) and reasons for use.**

Pesticide type and formulation	General disease control	Canker	Cavity spot	Alternaria	General weed control	Ground preparation	Pre-emergence weeds	General insect control	Aphids	Carrot Fly	Total area treated (sp ha)	Basic area treated (ha)	Total quantity applied (kgs)
Fungicides													
Azoxystrobin	.	2.7	.	44.3	.	.	.	.	.	.	46.9	24.8	11.7
Fenpropimorph	22.1	6.4	.	.	.	.	.	.	.	.	28.6	28.6	20.7
Metalaxyl-m	.	.	44.7	.	.	.	.	.	.	.	44.7	44.7	27.7
Tebuconazole	15.3	17.8	.	43.8	.	.	.	.	.	.	76.8	60.6	14.3
All fungicides	**37.4**	**26.9**	**44.7**	**88**	**.**	**.**	**.**	**.**	**.**	**.**	**197**	**158.6**	**74.5**
Herbicides													
Chlorpropham/pentanochlor	.	.	.	.	17.2	.	.	.	.	.	17.2	14.6	33.6
Diquat/paraquat	.	.	.	.	.	.	3.5	.	.	.	3.5	3.5	3.5
Glyphosate	.	.	.	.	.	46.7	.	.	.	.	46.7	46.7	47.3
Linuron	.	.	.	.	163.8	.	46.6	.	.	.	210.4	97.2	177.9
Metoxuron	.	.	.	.	24	.	.	.	.	.	24	24	105.7
Paraquat	.	.	.	.	.	2.6	5.3	.	.	.	7.9	7.9	2.4
Pendimethalin	.	.	.	.	49.2	.	10.7	.	.	.	60	60	81
Pentanochlor	.	.	.	.	4.9	.	.	.	.	.	4.9	2.4	9.2
Prometryn	.	.	.	.	8	.	.	.	.	.	8	8	6.6
Propachlor	.	.	.	.	.	.	0.2	.	.	.	0.2	0.2	1
Trifluralin	.	.	.	.	2.8	.	26.3	.	.	.	29.2	29.2	28.4
All herbicides & desiccants	**.**	**.**	**.**	**.**	**269.9**	**49.3**	**92.7**	**.**	**.**	**.**	**412**	**293.7**	**496.6**
Insecticides													
Carbosulfan	.	.	.	.	.	.	.	.	.	7.3	7.3	7.3	10.9
Lambda-cyhalothrin	.	.	.	.	.	.	.	10.6	1	332.5	344.1	94.9	4.2
Pirimicarb	.	.	.	.	.	.	.	.	2.8	.	2.8	1.4	0.4
All insecticides	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**10.6**	**3.8**	**339.8**	**354.2**	**103.6**	**15.6**

Table 27 **Parsley: pesticide-treated area (spray hectares), basic area treated (hectares), quantities used (kilograms) and reasons for use.**

Pesticide type and formulation	Blight	General weed control	Ground preparation	Pre-emergence weeds	Annual dicotyledons	General Insect control	Aphids	Carrot fly	Propagation general insect	Propagation carrot fly	Slugs	Total area treated (sp ha)	Basic area treated (ha)	Total quantity applied (kgs)
Fungicides														
Azoxystrobin	0.4	.	.	.	.	.	.	.	.	.	.	0.4	0.4	0.1
Chlorothalonil	0.9	.	.	.	.	.	.	.	.	.	.	0.9	0.5	0.9
All fungicides	**1.4**	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**1.4**	**0.9**	**1**
Herbicides & desiccants														
Chlorpropham/pentanochlor	.	3.6	.	.	.	.	.	.	.	.	.	3.6	3.6	6.8
Glyphosate	.	.	2.3	.	.	.	.	.	.	.	.	2.3	2.3	1.8
Linuron	.	1.9	.	37.6	.	.	.	.	.	.	.	39.5	38.8	28.2
Paraquat	.	.	4.2	.	.	.	.	.	.	.	.	4.2	4.2	2
Pendimethalin	.	1.2	.	11.5	.	.	.	.	.	.	.	12.8	12.8	14.6
Prometryn	.	19	.	1.3	0.5	.	.	.	.	.	.	20.8	20.8	21.1
Propachlor	.	0.3	.	0.3	.	.	.	.	.	.	.	0.7	0.5	3.9
Tepraloxydim	.	2.9	.	.	.	.	.	.	.	.	.	2.9	2.9	0.1
Trifluralin	.	.	.	0.2	.	.	.	.	.	.	.	0.2	0.2	0.2
All herbicides & desiccants	**.**	**28.9**	**6.5**	**50.9**	**0.5**	**.**	**.**	**.**	**.**	**.**	**.**	**86.9**	**86**	**78.6**
Insecticides														
Chlorpyrifos	.	.	.	.	.	.	.	.	0.5	<0.1	.	0.6	0.6	0.1
Cypermethrin	.	.	.	.	.	.	<0.1	.	.	.	.	<0.1	<0.1	<0.1
Lambda-cyhalothrin	.	.	.	.	.	2	11	18.2	.	.	.	31.2	12.9	0.3
All insecticides	**.**	**.**	**.**	**.**	**.**	**2**	**11**	**18.2**	**0.5**	**0**	**.**	**31.9**	**13.5**	**0.4**
Molluscicides														
Methiocarb	.	.	.	.	.	.	.	.	.	.	0.6	0.6	0.6	0.1
All molluscicides	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**0.6**	**0.6**	**0.6**	**0.1**

Table 28 **Soup celery: pesticide-treated area (spray hectares), basic area treated (hectares), quantities used (kilograms) and reasons for use.**

Pesticide type and formulation	General disease control	Blight	General weed control	Ground preparation	Pre-emergence weeds	General insect control	Aphids	Carrot fly	Propagation carrot fly	Slugs	Total area treated (sp ha)	Basic area treated (ha)	Total quantity applied (kgs)
Fungicides													
Azoxystrobin	.	0.9	.	.	.	.	.	.	.	.	0.9	0.9	0.2
Carbendazim	0.7	.	.	.	.	.	.	.	.	.	0.7	0.7	0.7
Chlorothalonil	1.8	6.5	.	.	.	.	.	.	.	.	8.3	3	9.1
Chlorothalonil/metalaxyl	.	0.3	.	.	.	.	.	.	.	.	0.3	0.3	0.2
Difenoconazole	26.5	7.4	.	.	.	.	.	.	.	.	33.9	16.6	2.7
Mancozeb	.	0.9	.	.	.	.	.	.	.	.	0.9	0.7	1.2
Unknown fungicide	.	0.1	.	.	.	.	.	.	.	.	0.1	0.1	.
All fungicides	**28.9**	**16.1**	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**45**	**22.2**	**14.1**
Herbicides & desiccants													
Chlorpropham/pentanochlor	.	.	2.1	.	.	.	.	.	.	.	2.1	2.1	4.5
Glyphosate	.	.	.	1.5	.	.	.	.	.	.	1.5	1.5	1.3
Linuron	.	.	1.7	.	29	.	.	.	.	.	30.7	30.2	23.3
Paraquat	.	.	0.3	2	.	.	.	.	.	.	2.3	2.3	0.9
Pendimethalin	.	.	0.9	.	12.2	.	.	.	.	.	13.1	13.1	15.5
Prometryn	.	.	11.6	.	0.7	.	.	.	.	.	12.3	12.3	11.6
Propachlor	.	.	0.3	.	0.3	.	.	.	.	.	0.5	0.4	3.1
Tepraloxydim	.	.	2.2	.	.	.	.	.	.	.	2.2	2.2	<0.1
Trifluralin	.	.	.	.	0.2	.	.	.	.	.	0.2	0.2	0.2
All herbicides & desiccants	**.**	**.**	**19.1**	**3.5**	**42.3**	**.**	**.**	**.**	**.**	**.**	**65**	**64.3**	**60.4**
Inseticides													
Chlorpyrifos	.	.	.	.	.	.	.	.	<0.1	.	<0.1	<0.1	<0.1
Cypermethrin	.	.	.	.	.	.	<0.1	.	.	.	<0.1	<0.1	<0.1
Lambda-cyhalothrin	.	.	.	.	.	1	11	18.3	.	.	30.3	13.4	0.3
All insecticides	**.**	**.**	**.**	**.**	**.**	**1**	**11**	**18.3**	**0**	**.**	**30.4**	**13.5**	**0.3**
Molluscicides													
Methiocarb	.	.	.	.	.	.	.	.	.	0.1	0.1	0.1	<0.1
All molluscicides	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**0.1**	**0.1**	**0.1**	**<0.1**

Table 29 **Lettuce: pesticide-treated area (spray hectares), basic area treated (hectares), quantities used (kilograms) and reasons for use.**

Pesticide type and formulation	Mildew	Botrytis	White blister	Propagation general disease	Propagation botrytis	Propagation rhizoctonia	Propagation mildew	General weed control	Ground preparation	Pre-emergence weeds	General insect control	Aphids	Caterpillars	Slugs	Total area treated (sp ha)	Basic area treated (ha)	Total quantity applied (kgs)
Fungicides																	
Azoxystrobin	.	.	.	.	.	<0.1	.	.	.	.	.	.	.	.	<0.1	<0.1	<0.1
Chlorothalonil/metalaxyl	.	.	0.4	.	.	.	.	.	.	.	.	.	.	.	0.4	0.4	0.5
Dichlofluanid	.	.	.	.	.	.	14.6	.	.	.	.	.	.	.	14.6	4.9	3.7
Fosetyl-aluminium	0.6	.	.	0.4	<0.1	.	.	.	.	.	.	.	.	.	1	0.6	11.4
Iprodione	42.9	4.7	.	.	.	.	.	.	.	.	.	.	.	.	47.6	26.1	16.4
Mancozeb/metalaxyl-m	21.5	.	.	.	.	.	.	.	.	.	.	.	.	.	21.5	21.5	21.9
Tolclofos-methyl	.	.	.	0.4	.	.	.	.	.	.	.	.	.	.	0.4	0.4	0
All fungicides	**64.9**	**4.7**	**0.4**	**0.9**	**<0.1**	**<0.1**	**14.6**	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**85.6**	**53.9**	**53.8**
Herbicides & desiccants																	
Glyphosate	.	.	.	.	.	.	.	.	14.4	.	.	.	.	.	14.4	14.4	12.2
Metazachlor	.	.	.	.	.	.	.	0.4	.	4.9	.	.	.	.	5.3	5.3	4
Paraquat	.	.	.	.	.	.	.	4.7	.	.	.	.	.	.	4.7	4.7	1.3
Propachlor	.	.	.	.	.	.	.	27.4	.	.	.	.	.	.	27.4	26.3	86.6
Propyzamide	.	.	.	.	.	.	.	29.2	.	1.5	.	.	.	.	30.7	28.5	31
Trifluralin	.	.	.	.	.	.	.	.	9.7	10	.	.	.	.	19.7	19.7	14.6
All herbicides & desiccants	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**61.7**	**24.1**	**16.4**	**.**	**.**	**.**	**.**	**102.2**	**98.9**	**149.7**
Insecticides																	
Chlorpyrifos	.	.	.	.	.	.	.	.	.	.	4.7	.	.	.	4.7	4.7	3.1
Cypermethrin	.	.	.	.	.	.	.	.	.	.	.	4.7	0.2	.	4.8	4.8	0.1
Deltamethrin	.	.	.	.	.	.	.	.	.	.	.	.	21.5	.	21.5	21.5	0.1
Lambda-cyhalothrin	.	.	.	.	.	.	.	.	.	.	.	0.4	.	.	0.4	0.4	<0.1
Lambda-cyhalothrin/pirimicarb	.	.	.	.	.	.	.	.	.	.	.	42.9	.	.	42.9	21.5	4.7
Pirimicarb	.	.	.	.	.	.	.	.	.	.	.	43.6	.	.	43.6	22	4.4
All Insecticides	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**4.7**	**91.7**	**21.6**	**.**	**118**	**74.9**	**12.5**
Molluscicides																	
Methiocarb	.	.	.	.	.	.	.	.	.	.	.	.	.	4.8	4.8	4.8	0.6
All molluscicides	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**4.8**	**4.8**	**4.8**	**0.6**

Table 30 **Rhubarb: pesticide-treated area (spray hectares), basic area treated (hectares), quantities used (kilograms) and reasons for use.**

Pesticide type and formulation	General weed control	Total area treated (sp ha)	Basic area treated (ha)	Total quantity applied (kgs)
Herbicides & desiccants				
Dichlobenil	0.4	0.4	0.4	3.3
Glyphosate	10.8	10.8	10.8	14.4
Propyzamide	7	7	7	15.8
All herbicides & desiccants	**18.2**	**18.2**	**18.2**	**33.4**

Table 31 **Beetroot: pesticide-treated area (spray hectares), basic area treated (hectares), quantities used (kilograms) and reasons for use.**

Pesticide type and formulation	General disease control	General weed control	Annual dicotyledons	Ground preparation	Pre-emergence weeds	General insect control	Total area treated (sp ha)	Basic area treated (ha)	Total quantity applied (kgs)
Fungicides									
Propiconazole	0.5	.	.	.	.	.	0.5	0.5	0.1
All fungicides	**0.5**	**.**	**.**	**.**	**.**	**.**	**0.5**	**0.5**	**0.1**
Herbicides & desiccants									
Ethofumesate	.	.	1	.	.	.	1	1	0.8
Glyphosate	.	.	.	1	.	.	1	1	1.1
Lenacil	.	.	.	.	1.2	.	1.2	1.2	1.9
Metamitron	.	0.2	.	.	.	.	0.2	0.2	0.3
Paraquat	.	1.8	.	.	.	.	1.8	1.8	0.4
Phenmedipham	.	8.1	0.2	.	0.5	.	8.7	4.2	3.9
Propachlor	.	.	.	.	0.1	.	0.1	0.1	0.8
Trifluralin	.	.	.	.	1	.	1	1	1
All herbicides & desiccants	**.**	**10**	**1.2**	**1**	**2.8**	**.**	**15**	**10.5**	**10.1**
Insecticides									
Chlorpyrifos	.	.	.	.	.	1	1	1	0.5
All insecticides	**.**	**.**	**.**	**.**	**.**	**1**	**1**	**1**	**0.5**

Table 32 **Comparison of the area of vegetable crops grown (hectares) in Northern Ireland and the proportional differences (%) between 1991 - 2004.**

Crop type	Survey year 1991 (ha)	1995 (ha)	1999 (ha)	2004 (ha)	% change in area 2004/1999
Brassicas					
Brussels sprouts	121.6	85.7	114.5	29.8	-74%
Cabbage (summer/autumn)	118.6	61.0	120.7	76.6	-37%
Cabbage (other)*	168.6	202.8	175.3	156.0	-11%
Calabrese	50.6	55.8	60.6	147.5	143%
Cauliflower	166.8	228.8	181.4	171.4	-6%
All brassicas	***626.2***	***634.1***	***652.5***	***581.3***	***-11%***
Turnip & swede	127.6	121.9	121.5	280.8	*131%*
Peas & beans					
Beans	11.8	11.7	9.4	6.6	-30%
Peas	13.2	6.9	5.5	2.4	-56%
All peas & beans	***25.0***	***18.6***	***14.9***	***9.0***	***-39%***
Leeks & onions					
Leeks	39.3	63.5	68.1	89.9	32%
Onions	6.4	.	14.5	13.3	-8%
Spring onions	51.9	42.0	58.9	61.8	5%
All leeks & onions	***97.6***	***105.51***	***141.5***	***164.9***	***17%***
Carrots & parsnips					
Carrots	269.9	261.0	360.8	347.8	-4%
Parsnips	80.9	73.8	109.8	99.6	-9%
All carrots and parsnips	***350.8***	***334.8***	***470.6***	***447.4***	***-5%***
Celery	24.5	27.1	45.5	32.2	-29%
Lettuce	26.6	38.4	27.0	42.8	59%
Parsley*	20.1	31.4	40.0	41.9	5%
Other vegetables					
Cucurbits	0.1	1.5	1.8	.	*N/A*
Beetroot	3.6	3.1	6.9	3.8	-45%
Rhubarb	13.7	6.8	6.1	10.8	77%
All other vegetables	***17.5***	***11.3***	***14.8***	***14.6***	***-1%***
Total vegetable crops	**1,316.0**	**1,323.2**	**1,528.0**	**1,614.9**	**6%**

* Cabbage other includes Spring & Winter cabbage and Savoys for 1999 & 2004.

* Parsley was included in the 'Other vegetables' category in 1991.

Table 33 **Comparison of pesticide usage on *vegetable crops* in Northern Ireland 1991-2004, area treated (spray hectares), quantity applied (kilograms) and the area grown (hectares).**

	Survey year							
	1991		1995		1999		2004	
Pesticide type	**Area (sp ha)**	**Quantity (kg)**	**Area (sp ha)**	**Quantity (kg)**	**Area (sp ha)**	**Quantity (kg)**	**Area (sp ha)**	**Quantity (kg)**
Fungicides	720	814	924	1,304	2,078	1,243	2,506	997
Herbicides & desiccants	2,159	3,558	2,560	3,723	3,735	4,707	4,579	5,449
Insecticides								
Carbamates	*104*	*108*	*269*	*188*	*949*	*649*	*722*	*178*
Organochlorines	*66*	*16*	*17*	*3*	-	-	-	-
Organophosphates	*1,698*	*1,211*	*2,300*	*1,756*	*738*	*424*	*153*	*338*
Pyrethroids	*274*	*7*	*579*	*13*	*2,091*	*23*	*2,282*	*29*
Unknown insecticides	*34*	-	*23*	-	*16*	-	*135*	-
Other	-	-	-	-	*4*	*16*	*4*	*16*
All insecticides	2,176	1,342	3,189	1,961	3,794	1,096	3,296	561
Molluscicides	29	16	33	27	188	56	75	12
Rodenticides	.	.	.	.	50	159	-	-
Seed treatments	874	11	799	8	617	1	843	124
Soil fumigants	4	1,238	-	-	-	-	-	-
All pesticides	**5,962**	**6,979**	**7,505**	**7,024**	**10,460**	**7,262**	**11,299**	**7,142**
Area grown (ha)	1,316		1,323		1,528		1,465	

Table 34 **Comparison of pesticide usage on *brassica crops* in Northern Ireland 1991-2004, area treated (spray hectares), quantity applied (kilograms) and the area grown (hectares).**

	Survey year							
	1991		1995		1999		2004	
Pesticide type	**Area (sp ha)**	**Quantity (kg)**	**Area (sp ha)**	**Quantity (kg)**	**Area (sp ha)**	**Quantity (kg)**	**Area (sp ha)**	**Quantity (kg)**
Fungicides	399	391	449	479	1,102	420	976	296
Herbicides & desiccants	541	1,021	827	1,044	976	1,272	1,156	1,232
Insecticides								
Carbamates	*13*	*13*	*149*	*53*	*335*	*69*	*518*	*97*
Organochlorines	*41*	*13*	*16*	*2*	-	-	-	-
Organophosphates	*908*	*452*	*1,394*	*438*	*565*	*200*	*113*	*294*
Pyrethroids	*260*	*6*	*504*	*11*	*754*	*10*	*629*	*8*
Unknown insecticides	*25*	-	*18*	-	*15*	-	*3*	-
Other	-	-	-	-	-	-	*96*	*14*
All insecticides	1,247	485	2,082	505	1,668	278	1,359	413
Molluscicides	22	12	3	2	143	47	67	11
Rodenticides	-	-	-	-	50	159	-	-
Seed treatments	80	1	57	< 0.5	7	<0.5	138	29
Soil fumigants	4	1,238	-	-	-	-	-	-
All pesticides	**2,293**	**3,147**	**3,419**	**2,030**	**3,946**	**2,177**	**3,695**	**1,981**
Area grown (ha)	628		635		652		521	

Table 35 **Comparison of pesticide usage on *turnip & swede crops* in Northern Ireland 1991-2004, area treated (spray hectares), quantity applied (kilograms), the proportional differences (%) and the area grown (hectares).**

	Survey year							
	1991		1995		1999		2004	
Pesticide type	**Area (sp ha)**	**Quantity (kg)**	**Area (sp ha)**	**Quantity (kg)**	**Area (sp ha)**	**Quantity (kg)**	**Area (sp ha)**	**Quantity (kg)**
Fungicides	55	32	155	76	10	3	2	1
Herbicides & desiccants	170	445	159	239	209	353	575	698
Insecticides								
Carbamates	*46*	*51*	*65*	*86*	*87*	*109*	*3*	*3*
Organochlorines	-	-	-	-	-	-	-	-
Organophosphates	*162*	*122*	*162*	*272*	*130*	*155*	*26*	*27*
Pyrethroids	*1*	*< 0.1*	*23*	*1*	*6*	*<0.1*	*3*	*<0.1*
Unknown insecticides	*2*	-	*1*	-	*1*	-	-	-
All insecticides	210	173	252	358	225	264	32	40
Molluscicides	-	-	23	21	-	< 0.1	-	-
Seed treatments	133	2	115	< 0.5	87	< 0.5	266	1
All pesticides	**568**	**652**	**704**	**695**	**531**	**620**	**874**	**740**
Area grown (ha)	128		122		122		255	

Table 36 **Comparison of pesticide usage on *leek crops* in Northern Ireland 1991-2004, area treated (spray hectares), quantity applied (kilograms), the proportional differences (%) and the area grown (hectares).**

	Survey year							
	1991		1995		1999		2004	
Pesticide type	**Area (sp ha)**	**Quantity (kg)**	**Area (sp ha)**	**Quantity (kg)**	**Area (sp ha)**	**Quantity (kg)**	**Area (sp ha)**	**Quantity (kg)**
Fungicides	64	54	90	57	93	49	143	73
Herbicides & desiccants	95	222	155	299	239	443	343	494
Insecticides								
Carbamates	-	-	-	-	*1*	*1*	-	-
Organochlorines	-	-	-	-	*1*	*1*	-	-
Organophosphates	*7*	*4*	*3*	*3*	-	-	*2*	*0.5*
Pyrethroids	-	-	*3*	*< 0.5*	*0*	*< 0.1*	-	-
Unknown insecticides	-	-	-	-	-	-	-	-
All insecticides	7	4	6	3	2	1	2	1
Molluscicides	-	-	1	1	-	-	-	-
Seed treatments	29	< 0.5	28	< 0.5	34	< 0.5	72	2
All pesticides	**195**	**280**	**280**	**360**	**368**	**494**	**560**	**568**
Area grown (ha)	39		64		68		79	

Table 37 **Comparison of pesticide usage on *carrot crops* in Northern Ireland 1991-2004, area treated (spray hectares), quantity applied (kilograms) and the area grown (hectares).**

	Survey year							
	1991		1995		1999		2004	
Pesticide type	**Area (sp ha)**	**Quantity (kg)**	**Area (sp ha)**	**Quantity (kg)**	**Area (sp ha)**	**Quantity (kg)**	**Area (sp ha)**	**Quantity (kg)**
Fungicides	33	147	70	434	468	398	879	349
Herbicides & desiccants	791	1,104	884	1,348	1,266	1,290	1,502	1,702
Insecticides								
Carbamates	*39*	*38*	*50*	*45*	*394*	*353*	*147*	*61*
Organochlorines	*12*	*< 0.5*	-	-	-	-	-	-
Organophosphates	*465*	*492*	*506*	*778*	*24*	*54*	*1*	*<0.5*
Pyrethroids	-	-	-	-	*943*	*9*	*1,198*	*16*
Unknown insecticides	*6*	-	*4*	-	-	-	*<0.5*	-
All insecticides	523	532	560	823	1,361	415	1,346	78
Molluscicides	3	1	-	-	2	1	1	<0.5
Seed treatments	494	2	503	3	359	< 0.5	286	82
All pesticides	**1,844**	**1,784**	**2,017**	**2,607**	**3,455**	**2,103**	**4,013**	**2,210**
Area grown (ha)	270		261		361		314	

Table 38 **Comparison of pesticide usage on *parsnip crops* in Northern Ireland 1991-1999, area treated (spray hectares), quantity applied (kilograms) and the area grown (hectares).**

	Survey year							
	1991		1995		1999		2004	
Pesticide type	**Area (sp ha)**	**Quantity (kg)**	**Area (sp ha)**	**Quantity (kg)**	**Area (sp ha)**	**Quantity (kg)**	**Area (sp ha)**	**Quantity (kg)**
Fungicides	8	30	17	115	120	89	197	75
Herbicides & desiccants	219	252	194	242	398	343	412	497
Insecticides								
Carbamates	*5*	*5*	*4*	*4*	*115*	*103*	*10*	*12*
Organochlorines	*9*	*< 0.5*	-	-	-	-	-	-
Organophosphates	*85*	*99*	*135*	*200*	*3*	*6*	-	-
Pyrethroids	-	-	-	-	*293*	*3*	*344*	*3*
All insecticides	99	104	139	204	411	111	354	16
Molluscicides	-	-	-	-	33	< 0.5	-	-
Seed treatments	4	-	3	< 0.5	71	< 0.5	3	<0.1
All pesticides	**330**	**386**	**353**	**561**	**1,032**	**543**	**966**	**587**
Area grown (ha)	81		74		110		89	

Table 39 **Comparison of pesticide usage on *lettuce crops* in Northern Ireland 1991-1999, area treated (spray hectares), quantity applied (kilograms) and the area grown (hectares).**

	Survey year							
	1991		1995		1999		2004	
Pesticide type	**Area (sp ha)**	**Quantity (kg)**	**Area (sp ha)**	**Quantity (kg)**	**Area (sp ha)**	**Quantity (kg)**	**Area (sp ha)**	**Quantity (kg)**
Fungicides	57	48	36	41	42	49	86	54
Herbicides & desiccants	25	45	52	70	79	144	102	150
Insecticides								
Carbamates	.	.	.	.	*1*	*< 0.3*	*44*	*4*
Organochlorines	*2*	*1*	.	.	.	.	.	.
Organophosphates	*19*	*16*	*61*	*20*	*3*	*1*	*5*	*3*
Pyrethroids	*11*	*< 0.5*	*45*	*1*	*28*	*<0.3*	*69*	*6*
All insecticides	34	18	106	21	33	1	118	13
Molluscicides	3	3	6	2	2	1	5	1
Seed treatments	7	-	.	.	.	.	33	10
All pesticides	**126**	**114**	**200**	**133**	**155**	**195**	**343**	**226**
Area grown (ha)	27		38		27		39	

Northern Ireland Pesticide Usage Survey Published Reports **Appendix 1**

Report No.	Report title	ISBN
99	Grassland & Fodder Crops 1989	1-85527-079-X
105	Arable Crops 1990	1-85527 130 3
106	Soft Fruit Crops 1990	1-85527 149 4
109	Vegetable Crops 1991	1-85527 137 0
110	Protected Crops 1991 (edible & ornamental)	1-85527 283 0
111	Mushroom Crops 1991	1-85527 150 8
117	Arable Crops 1992	1-85527 193 1
118	Top Fruit Crops 1992	1-85527 194 X
124	Grassland & Fodder crops 1993	1-85527 221 0
131	Forestry 1993	1-85527 282 2
132	Arable Crops 1994	1-85527 314 4
139	Vegetable Crops 1995	1-85527 346 2
140	Mushroom Crops 1995	1-85527 347 0
146	Arable Crops 1996	1-85527 469 8
147	Top Fruit Crops 1996	1-85527 470 1
156	Grassland and Fodder Crops 1997	1-85527 506 6
157	Sheep Treatments 1997	1-85527 425 6
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178	Top Fruit Crops 2002	1-85527 618 6
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201	Protected Ornamental Crops 2003	1-85527 739 5
206	Arable Crops 2004	1-85527 833 2

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