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PESTICIDE USAGE IN NORTHERN IRELAND

SURVEY REPORT 199

Hardy Nursery Stock Crops

2003



Agriculture, Fishing & Forestry

PESTICIDE USAGE SURVEY REPORT 199

NORTHERN IRELAND HARDY NURSERY STOCK CROPS

2003

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The County Regions Of Northern Ireland



SUMMARY

This report presents information from a survey of the pesticide usage practices on hardy nursery stock crops grown in Northern Ireland in 2003.

The total area of hardy nursery stock crops grown was 1,018,358 m² (102ha), with an estimated 44% of all hardy nursery stock crops grown in County Down. Field-grown Christmas and native trees accounted for 66% of the area grown. Data collected from 111 growers estimated that 527kg of pesticide active ingredients were applied to 2,292,748 treated m² (229 spha).

Herbicides accounted for 47% of the pesticide-treated area, representing 25% of the weight of pesticides applied. Glyphosate was the herbicide active ingredient most frequently used, mainly around field-grown tree areas.

Fungicides, applied to 33% of the total pesticide-treated area, accounted for 69% of the weight of pesticides applied. Carbendazim, mainly used on field-grown cut flowers, was the most frequently used fungicide active ingredient.

Insecticide and acaricides were applied to 17% of the pesticide-treated area, representing only 1% of the total weight of pesticides applied. Bifenthrin was the insecticide/acaricide active ingredient most extensively used, mainly on shrubs.

The only molluscicide recorded was metaldehyde and this active ingredient was applied to less than 1% of both the pesticide-treated area and the quantity of total pesticides used.

Growth regulators were applied to less than 1% of both the total pesticide-treated area and the weight of pesticides used. Paclobutrazol was the only growth regulator recorded.

The biological control agent *Bacillus subtilis* (principally applied when the crops were inside during the propagation and liner stages) was used on 2,710spm² of mixed crop areas.

Mixed formulations, containing fungicide/insecticide mixtures and phenolic derivatives, accounted for 2% of the total pesticide-treated area but represented 4% of the total weight of pesticide used.

INTRODUCTION

As a participant in the UK Working Party on Pesticide Usage Surveys, the Department of Agriculture and Rural Development (DARD), conducts a programme of cyclical surveys to examine pesticide usage in all sectors of the agricultural and horticultural industries. The data collected provides information for consideration by the Advisory Committee on Pesticides. The information may also be used by those involved in residue testing, for public information, provision of data for research and evaluation of trends in pesticide usage.

This is the first survey of pesticide usage on hardy nursery stock crops (including field grown Christmas and native trees) in Northern Ireland.

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

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.
- ‘Spm²’ refers to the treated area in square metres (‘Spha’ refers to the treated area in hectares). This is an estimated figure throughout the report, as some growers only knew the total spray usage and their holding area, but the sprays may / may not have been applied to whole or part of the area, therefore the area may be an over-estimate on this basis.
- ‘Reasons for use’; the reasons reported for the use of pesticides are the growers stated reasons and may sometimes be inappropriate.
- ‘Rounding’; due to rounding of figures, there may be slight differences in totals both within and between tables.
- Spot treatments were taken as 25% of the area.

METHODS

The total population of nursery stock growers in Northern Ireland was determined from the Northern Ireland Agricultural Census, June 2003 (Anon., 2004), and a comprehensive list of growers held by DARD advisory staff. A total of 151 growers, representing 65% of the estimated population of general (includes hardy nursery stock and protected ornamental crops) nursery stock growers were sampled. As there was no information to identify which holding had protected or non-protected crops, this was determined following data entry. Of the 151 growers sampled 111 grew hardy nursery stock crops. The sample was stratified into the six county regions of Northern Ireland. The total number of holdings in each county, together with the numbers surveyed are shown in Table 1 (Figure 1). The estimated total area of hardy nursery stock crops grown in Northern Ireland is shown in Table 2.

This survey represents the period from September 2002 to September 2003 inclusive.

The purpose of the survey was explained to selected growers in preliminary correspondence. Holdings were then visited and data collected by personal interview. The collected data were analysed using SPSS software.

RESULTS AND DISCUSSION

REGIONAL PESTICIDE USAGE

Regionally, 44% of the area grown and 40% of the total pesticide treated-area was attributed to County Down, accounting for 32% of the total quantity of pesticides used. County Tyrone accounting for only 4% of the area grown and 12% of the total pesticide-treated area represented 50% of the total quantity of pesticide usage. An estimated 26% of all insecticides and 17% of fungicides were applied to hardy nursery stock crops grown in County Tyrone. A further 26% of the total pesticide-treated area was in County Antrim accounting for 10% of the total quantity of pesticides applied. (Tables 3 & 4, Figure 3).

PESTICIDE USAGE ON CROPS

The estimated quantities of pesticide active ingredients used and the area of crop types treated with pesticides are shown in Table 5 & 6. Hardy nursery stock crops were grouped into the following categories; Shrubs, which had the highest pesticide usage (accounted for 25% of the total pesticide-treated area and 61% of the total quantity of pesticides applied), mixed areas (13% and 10%, respectively), ornamental trees (1% of both the treated area and quantity used), roses (<1% of both the treated area and quantity used), bulbs (4% and 1.5%, respectively), cut flowers (19% and 9% respectively), mixed field crops (7% and 3%, respectively), and trees (accounting for 30% of the treated area and 15% of the quantity of pesticides applied).

TOTAL PESTICIDE USAGE

A total of 527 kilograms of pesticide active ingredients were applied to 2,292,748 spray m² (229 spha) of hardy nursery stock crops grown in Northern Ireland in 2003. (Tables 3 and 4, fig.2). Fungicides were applied to 33% of the pesticide-treated area, representing 69% of the weight of pesticides applied. Herbicides were applied to 47% of the area treated with pesticides, accounting for 25% of the total weight of pesticides used.

Insecticides/acaricides, applied to 17% of the pesticide-treated area, represented 1% of the total pesticide usage by weight. Biological controls, molluscicides and growth regulators accounted for less than 1% of both the total pesticide-treated area and weight of active ingredients used, respectively.

Mixed formulations were applied to 2% of the pesticide-treated area and accounted for 4% of the quantity of pesticides used.

The systemic fungicide carbendazim was the most frequently used fungicide, applied to 28% of the total fungicide-treated area, accounting for 2% of the weight of fungicides used. Fosetyl-aluminium, applied to only 8% of the fungicide-treated area, represented 79% of the weight of fungicides applied. Collectively 61% of all fungicide applications were applied to shrub (31%) and cut flower (30%) crops.

The pyrethroid insecticide/acaricide, bifenthrin, accounted for 35% of the insecticide/acaricide-treated area and represented 4% of the quantity of insecticides/acaricides applied. An estimated 61% of all insecticide/acaricides applications were to shrub crops.

Glyphosate was the active ingredient most extensively used on the herbicide-treated area (60%) and accounted for 52% of the weight of herbicides used. Herbicide applications to field grown Christmas and native tree areas, accounted for 94% of the glyphosate applications.

Metaldehyde was the only molluscicide recorded used on approximately 1 hectare of hardy nursery stock crops.

The biological control *Bacillus subtilis* was recorded applied to 2710m² (0.27spha) of mixed area crops to control disease.

Paclobutrazol was the only growth regulator recorded used on hardy nursery stock crops with 58% of applications to shrub crops and the remaining 42% of applications on mixed area crops.

The phenolic derivative cresylic acid accounted for 63% of the mixed formulation area and 86% of the quantity of mixed formulations applied.

A total of 84 products comprising of 65 active ingredients (not including mixed formulation active ingredients and products) were recorded used in this survey. The top fifty active ingredients recorded ranked by application area and quantity applied, are shown in Tables 9 & 10, respectively.

SHRUBS (Table 11)

Shrubs (container-grown plants including conifers and hedging) were grown on 14% (approximately 14ha) of the total area of hardy nursery stock crops grown in Northern Ireland in 2003. A total of 581,295 spray m² (58.1spha) of shrubs were treated with pesticides, and an estimated 319kg of pesticides were applied to the treated area.

An estimated 40% of crop area receiving pesticide applications was treated with fungicides (92% of the weight of pesticides applied). The principal reason given for 91% of fungicide applications was 'general disease control'. Myclobutanil was the most frequently used fungicide, applied to 30% of the fungicide-treated area, but accounting for less than 1% of the weight of fungicides applied. Fosetyl-aluminium, applied to 16% of the fungicide-treated area, accounted for 98% of the weight of fungicides used.

The residual and contact herbicide oxadiazon was applied to 51% of the herbicide-treated area and accounted for 75% of the weight of herbicides applied to shrubs. An estimated 90% of all herbicides applied to the treated area were for 'general weed control', with the remaining 10% of applications for control of liverworts and mosses.

The pyrethroid active ingredient bifenthrin accounted for 43% of the insecticide/acaricide-treated area and 6% of the weight applied. Aphid control was the reason given for 59% of all bifenthrin applications (34% of all insecticides/acaricides applications), with a further 40% of applications of this active ingredient being applied to control red spider mite (*Tetranychus urticae*).

Metaldehyde was the only molluscicide active ingredient used. It was applied to 6,292 spray m² (0.6spha) of shrubs. The growth regulator paclobutrazol was applied to 1,760 spray m² (0.2spha) of shrub crops. An estimated 2% of the pesticide-treated area of shrub crops had applications of mixed formulations. Cresylic acid accounted for 59% of the mixed formulation-treated area and 98% of the quantity of mixed formulations used, with 68% of applications of this active ingredient applied for general disease control.

MIXED CROPS (Table 12)

An estimated 7 hectares of mixed crops (alpines, heathers, herbaceous and ornamental container-grown plants) were grown in Northern Ireland in 2003, representing 7% of the area of hardy nursery stock crops grown.

Fungicides were applied to 60% of the pesticide-treated area representing 68% of the weight of pesticides applied. Collectively, the fungicides carbendazim (15%) and iprodione (16%) accounted for 31% of applications to the fungicide-treated area of these crops, with propamocarb hydrochloride representing 86% of the quantity of fungicides used.

An estimated 4ha (13%) of mixed crops received herbicide treatments, accounting for 8% of the quantity of active ingredients used, with oxadiazon applied to 77% of the herbicide-treated area and accounting for 49% of the quantity of herbicides used.

Insecticides/acaricides accounted for approximately 15% of the pesticide-treated area of mixed crops. The pyrethroid bifenthrin was the most commonly used on 71% of the insecticide/acaricides-treated area and accounting for 14% of the quantity of insecticides/acaricides used. An estimated 81% of all insecticide/acaricides applications were as a general insect control.

The biological control *Bacillus subtilis* was applied to 0.3ha as a general disease control. Paclobutrazol was used on 0.1ha of mixed crops. An estimated 10% of the pesticide-treated area of these crops had applications of mixed formulations and similar to shrubs, cresylic acid principally used to control blackspot, was most commonly used accounting for 91% of the mixed formulation-treated area and 99% of the quantity applied.

ORNAMENTAL TREES (Table 13)

The area of ornamental trees recorded grown in Northern Ireland in 2003 was estimated at 4585m² (0.5ha). A total of 2.4spha were treated with pesticides and approximately 4kg of pesticides were applied to the treated area.

Fungicides were applied to 44% of the pesticide-treated area of ornamental trees. Carbendazim (33%), chlorothalonil (33%) and iprodione (33%) collectively accounted for 99% of the active ingredients applied to the fungicide-treated area. Overall, less than 1kg of fungicides was applied to ornamental trees during the period of this survey.

Almost one quarter (22%) of all pesticides applied to ornamental trees were herbicides, accounting for 25% of the weight of pesticides used. Isoxaben (34%) and oxadiazon (32%) collectively accounted for 66% of the herbicide-treated area and were applied for general weed control. The only other herbicide active ingredient recorded was quinclamine, used to control moss and liverwort, which accounted for 34% of the herbicide-treated area and 23% of the quantity of herbicides applied.

Insecticide/acaricides accounted for 29% of the pesticide-treated area but less than 1% of the quantity of pesticides applied to ornamental trees. With the exception of permethrin, insecticide/acaricides usage was evenly distributed between bifenthrin (98% of applications to control aphids), chlorpyrifos, cypermethrin and deltamethrin.

An estimated 4.8% of all applications to the pesticide-treated area (55% of the quantity of pesticides applied) of ornamental trees were other products and mixed formulations. The fungicide/insecticide mix, bupirimate/pirimicarb/triforine accounted for 81% of the mixed formulation area, 1% of the quantity applied, with 68% of applications to control aphids.

ROSES (Table 14)

The area of roses grown in Northern Ireland in 2003 was estimated at 2357m² (0.2ha).

The active ingredient myclobutanil was the most frequently used fungicide accounting for 93% of the fungicide-treated area and 50% of the quantity of fungicides applied. The principal reason (86%) cited by growers for fungicide usage on roses was to control blackspot (*Marssonina rosae*).

The only herbicide recorded in use on roses was oxadiazon applied to 93spm².

Insecticides/acaricides accounted for 20% of the total pesticide-treated area of roses and 6% of the quantity of pesticides used. The pyrethroid insecticide cypermethrin, used to control aphids, accounted for 71% of the insecticide/acaricide-treated area and 17% of the quantity used. An estimated 79% of all insecticide/acaricide applications were to control aphids.

Mixed formulations were applied to 59% of the pesticide-treated area, 82% of the quantity of pesticides applied. The fungicide/insecticide mix bupirimate/pirimicarb/triforine applied principally to control blackspot and aphids, accounted for 76% of the mixed formulation-treated area and 38% of the weight of active ingredients used.

The molluscicide metaldehyde was applied to 371spm² of roses.

BULBS (Table 15)

An estimated 1.4ha of field-grown bulbs were recorded grown during this survey period.

All fungicides applied to bulbs were as a 'general disease control'. Carbendazim was the fungicide active ingredient most frequently used, accounting for 93% of the fungicide-treated area and 50% of the quantity of fungicides used. Overall, fungicides accounted for 44% of the pesticide-treated area and 23% of the quantity of pesticides used on bulbs.

All herbicides applied to the treated area were for 'general weed control'. Glyphosate was the most commonly applied herbicide, accounting for 43% of the herbicide-treated area and 27% of the weight of herbicides applied to field grown bulbs.

Insecticide/acaricides, applied solely to control the large narcissus fly (*Merodon equestris*), accounted for 9% of the total pesticide-treated area and 3% of the quantity of pesticides used on bulbs. The organophosphates dimethoate and chlorpyrifos were the two insecticide/acaricides active ingredients recorded.

Metaldehyde was the only molluscicide recorded and was used on 0.6 spha of field-grown bulbs.

CUT FLOWERS: FIELD AND CONTAINER GROWN (Table 16)

Cut flower crops (including a range of cut flower crops grown in pots/beds outside and field-grown crops e.g. wallflowers) were recorded grown on 11% of the hardy nursery stock crops area. A total of 59spha were recorded treated with pesticides and an estimated 66kg of pesticides were applied to the treated area.

An estimated 51% of the pesticide-treated area of this crop received fungicide applications. Chlorothlonil, applied to 47% of the fungicide-treated area, accounted for 60% of the quantity of fungicides applied to cut flower crops.

Herbicide applications accounted for 49% of the weight of pesticides applied to this crop and accounted for 36% of the pesticide-treated area. Simazine was the herbicide active ingredient most frequently used, accounting for 29% of both the herbicide-treated area and the weight of herbicides applied.

Of the pesticide applications to cut flower crops, insecticides /acaricides accounted for 14% of the pesticide-treated area and 4% of the quantity used. Gamma-HCH applied to control the large narcissus fly (*Merodon equestris*), was the most frequently used insecticide/acaricide active ingredient applied to 71% of the insecticide/acaricide-treated area and accounting for 77% of the quantity of insecticide/acaricides applied. It should be noted however that this active ingredient has been revoked since 2001. Malathion and cypermethrin were the two other insecticide/acaricide active ingredients recorded in use to control aphids.

No other products were recorded in use on cut flower crops during this survey period.

TREES (Table 17)

Trees (including field-grown native species and Christmas trees) were grown on 66% (67ha) of the area of hardy nursery stock crops grown in Northern Ireland in 2003.

Over 99% of all pesticide applications to trees were herbicides applied as a 'general weed control'. Glyphosate was the herbicide most frequently used, accounting for 87% of the herbicide-treated area and 84% of the quantity of herbicides used.

The organophosphorus insecticide/acaricide chlorpyrifos was applied to 0.7ha of trees for 'general insect control' and was the only other pesticide type recorded used on trees during this survey period.

PESTICIDE APPLICATIONS TO COMPOST AND SITE (Tables 18 & 19)

The survey indicated that it is common practice for growers to purchase compost with pesticides incorporated. This compost may subsequently be mixed with other types before planting occurs and it is extremely difficult to accurately estimate total pesticide use in compost. Consequently, the following data refers only to compost treatments applied by the grower or those composts for which the application rate could be verified precisely.

The herbicide active ingredient glyphosate applied to pathways, car parks and around the site of general nursery holdings for general weed control, accounted for 51% of the total herbicide-treated area of nursery site applications and 45% of the weight of herbicides applied (Table 18). Paraquat and oxadiazon collectively accounted for a further 23% of applications and 24% of the weight applied.

The only molluscicide active ingredient recorded in use on nursery sites was metaldehyde, applied to 124,274 spm^2 to control slugs.

An estimated 933 spm^2 received applications of the mixed formulation bupirimate/pirimicarb/triforine, to control whitefly (*Trialeurodes vaporariorum*).

A total of 351kg of insecticides were applied to approximately 5000m³ of compost to control vine weevil (*Otiorhynchus sulcatus*). The organophosphorus insecticide chlorpyrifos accounted for 75% of the treated area and over 99% of the weight of pesticides applied to compost. Fipronil was the only other insecticide active ingredient recorded in use on compost.

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Figure 1 The proportional distribution of hardy nurserystock crops grown in Northern Ireland, 2003

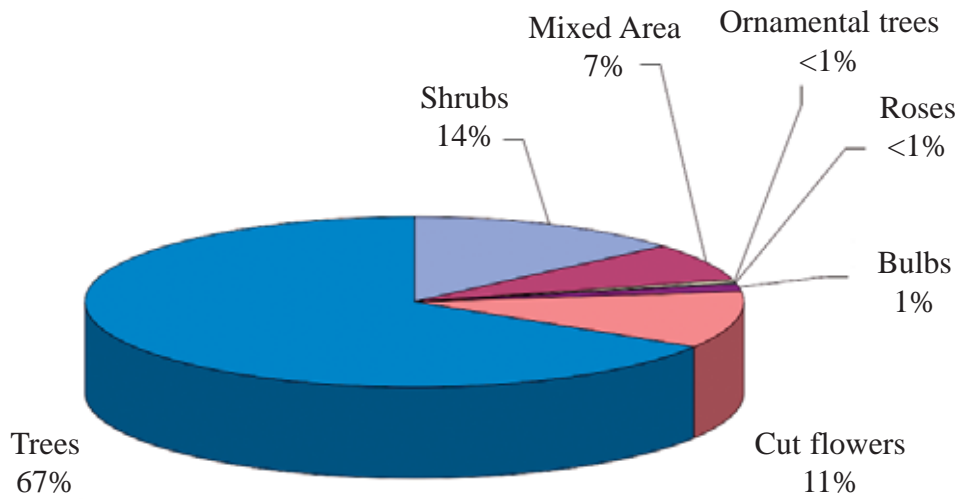


Figure 2 The regional distribution of hardy nurserystock crops grown in Northern Ireland, 2003

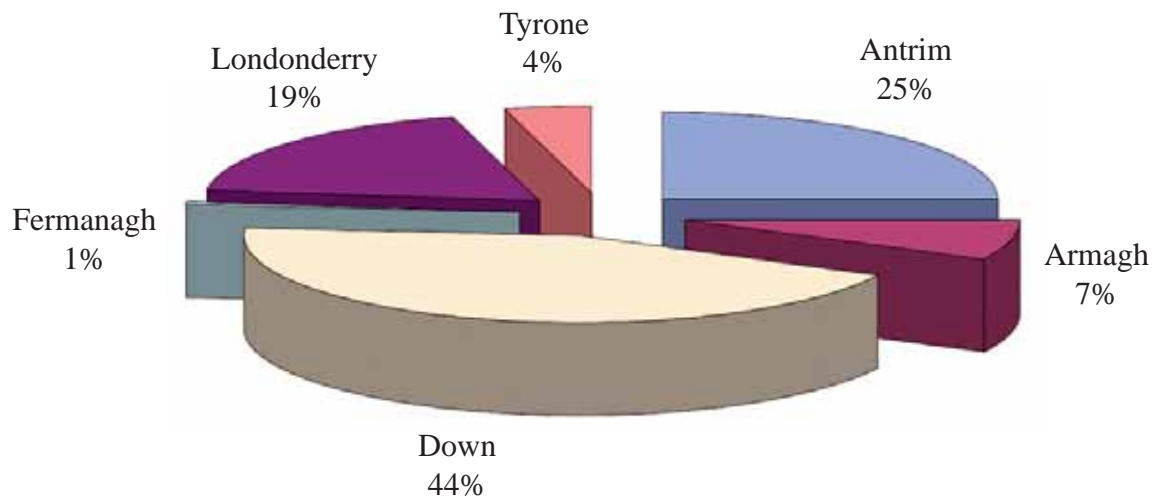


Figure 3 The area of hardy nurserystock crops treated with each pesticide type in the county regions of Northern Ireland, 2003

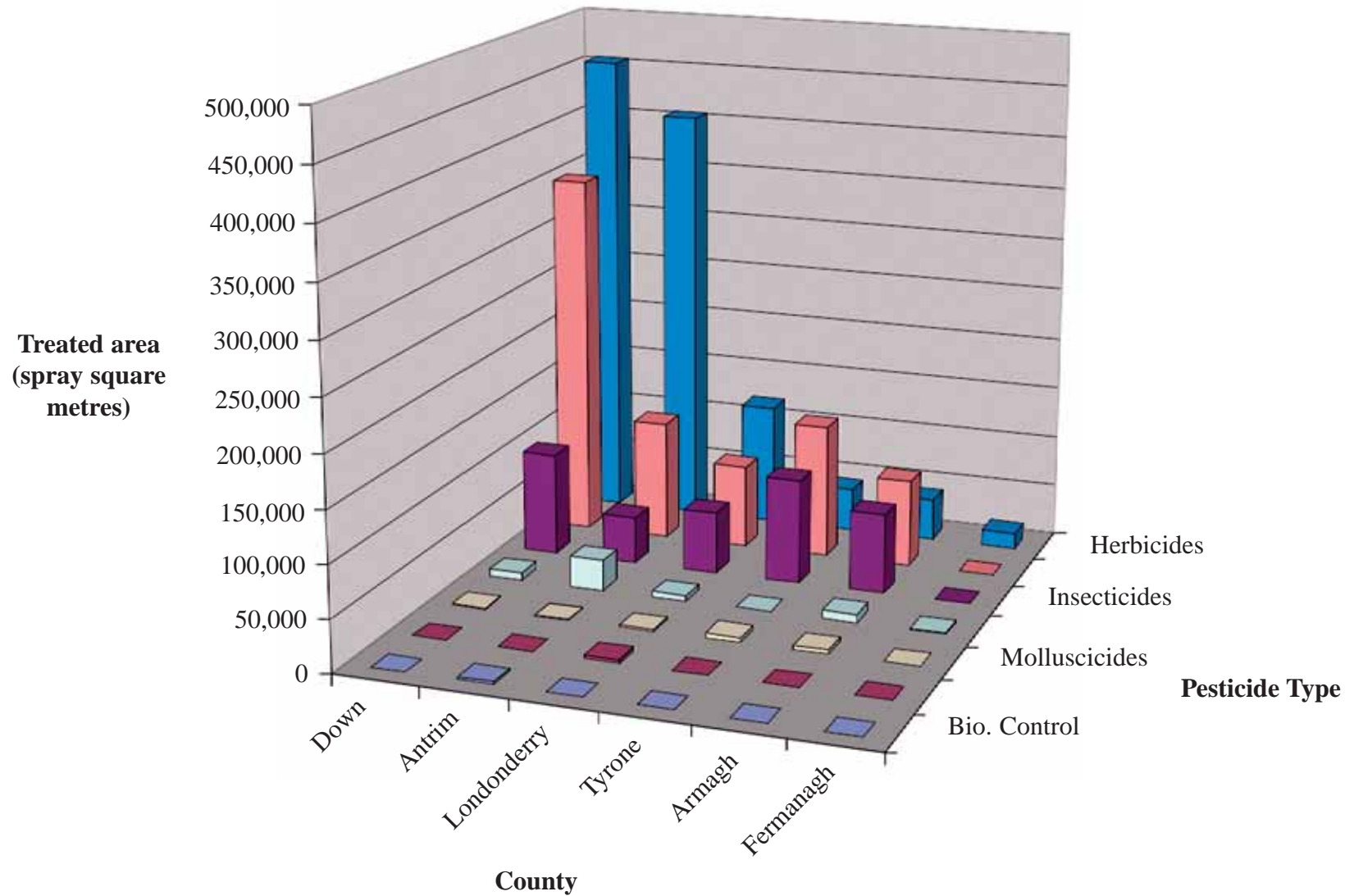


Table 1 The total number of protected and hardy nursery stock growers and the number of growers sampled in Northern Ireland in 2003.

<i>County</i>	Total number of growers	Number of growers sampled	(%)
Antrim	52	35	67
Armagh	36	23	64
Down	85	57	67
Fermanagh	12	5	42
Londonderry	33	23	70
Tyrone	15	8	53
Northern Ireland	233	151	65

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Table 2 Estimated area (m²) of hardy nursery stock crops grown regionally in Northern Ireland 2003.

<i>Crop type</i>	County						Northern Ireland
	Antrim	Armagh	Down	Fermanagh	Londonderry	Tyrone	
Shrubs	25,312	44,572	12,872	3,750	43,762	8,809	139,077
Mixed area	52,458	4,364	11,886	2,277	2,522	.	73,506
Ornamental trees	601	1,928	259	.	1,796	.	4,585
Roses	487	546	606	118	546	54	2,357
Bulbs field grown	8,496	1,333	.	.	.	4,667	14,496
Cut flowers (field & container)	.	.	98,008	.	.	12,800	110,808
Trees	166,926	22,545	324,791	.	143,267	16,000	673,529
All crops	254,280	75,289	448,422	6,145	191,893	42,329	1,018,358

Table 3 Estimated area (spm²) of hardy nursery stock crops treated regionally with each pesticide type in Northern Ireland 2003.

<i>County</i>	<i>Pesticide type</i>							<i>Northern Ireland</i>
	<i>Fungicides</i>	<i>Herbicides</i>	<i>Insecticides</i>	<i>Molluscicides</i>	<i>Biological control</i>	<i>Growth regulators</i>	<i>Mixed Formulations</i>	
Antrim	115,597	405,504	45,591	622	2,710	.	29,884	599,909
Armagh	84,576	40,162	77,537	4,302	.	.	8,189	214,767
Down	351,984	455,561	99,319	960	.	.	7,467	915,292
Fermanagh	73	15,000	.	.	.	.	1,296	16,369
Londonderry	80,769	117,673	59,776	1,925	.	3,010	5,562	268,714
Tyrone	129,420	41,822	101,040	4,853	.	.	562	277,697
All pesticides	762,419	1,075,722	383,263	12,663	2,710	3,010	52,960	2,292,748

Table 4 Estimated quantity (kg) of pesticide active ingredients applied to protected ornamental crops treated regionally with each pesticide type in Northern Ireland 2003.

<i>County</i>	<i>Pesticide type</i>							<i>Northern Ireland</i>
	<i>Fungicides</i>	<i>Herbicides</i>	<i>Insecticides</i>	<i>Molluscicides</i>	<i>Biological control</i>	<i>Growth regulators</i>	<i>Mixed Formulations</i>	
Antrim	7.10	38.26	0.26	0.17	0.56	.	8.52	54.86
Armagh	2.78	7.93	1.25	0.38	.	.	3.75	16.09
Down	90.74	65.50	3.41	.	.	.	6.80	166.48
Fermanagh	<0.01	1.24	.	.	.	.	0.23	1.47
Londonderry	3.69	13.84	1.49	0.50	.	0.01	3.36	22.89
Tyrone	257.95	6.25	0.32	0.28	.	.	0.02	264.83
All pesticides	362.26	133.03	6.73	1.36	0.56	0.01	22.67	526.62

Table 5 Estimated area (spm²) of pesticide active ingredients applied to hardy nursery stock crops treated with each pesticide type in Northern Ireland 2003.

<i>Crop Type</i>	<i>Pesticide type</i>						<i>Northern Ireland</i>	
	<i>Fungicides</i>	<i>Herbicides</i>	<i>Insecticides</i>	<i>Molluscicides</i>	<i>Biological control</i>	<i>Growth regulators</i>		<i>Mixed Formulations</i>
Shrubs	233,787	96,622	232,726	6,292	.	1,760	10,108	581,295
Mixed area	181,567	39,775	45,478	.	2,710	1,250	30,002	300,782
Ornamental trees	10,664	5,464	7,091	.	.	.	1,174	24,393
Roses	3,528	93	4,032	371	.	.	11,676	19,699
Bulbs field grown	36,667	33,659	7,333	6,000	.	.	.	83,659
Cut flowers(field &container)	296,208	210,631	79,666	.	.	.	.	586,504
Trees	.	689,479	6,938	.	.	.	.	696,416
All crops	762,419	1,075,722	383,263	12,663	2,710	3,010	52,960	2,292,748

Table 6 Estimated quantity (kg) of pesticide active ingredients applied to hardy nursery stock crops treated with each pesticide type in Northern Ireland 2003.

<i>Crop Type</i>	<i>Pesticide type</i>						<i>Northern Ireland</i>	
	<i>Fungicides</i>	<i>Herbicides</i>	<i>Insecticides</i>	<i>Molluscicides</i>	<i>Biological control</i>	<i>Growth regulators</i>		<i>Mixed Formulations</i>
Shrubs	293.37	13.82	2.79	.	.	0.01	8.17	319.28
Mixed area	35.42	4.16	0.35	.	0.56	<0.01	11.49	51.98
Ornamental trees	0.70	0.99	0.10	.	.	.	2.22	4.00
Roses	0.04	0.04	0.06	0.03	.	.	0.79	0.96
Bulbs field grown	1.77	5.46	0.25	0.22	.	.	.	7.69
Cut flowers(field &container)	30.95	32.06	2.93	.	.	.	.	65.94
Trees	.	76.50	0.25	.	.	.	.	76.75
All crops	362.26	133.03	6.73	1.36	0.56	0.01	22.67	526.62

Table 7 Estimated area (spm²) of hardy nursery stock crops treated with pesticide formulations in Northern Ireland 2003.

Pesticide type & formulation	Crop type							Total area (sp m ²)
	Shrubs	Mixed area	Ornamental trees	Roses	Bulbs field grown	Cut flowers field&container	Trees	
<i>Fungicides</i>								
Azoxystrobin	.	.	.	.	1,333	.	.	1,333
Benomyl	6	13,109	.	.	.	.	.	13,116
Bupirimate	64	344	.	.	.	.	.	408
Bupirimate/triforine	.	10,171	.	125	.	.	.	10,295
Carbendazim	33,415	26,962	3,520	.	34,000	112,388	.	210,284
Chlorothalonil	5,288	3,227	3,520	.	.	137,740	.	149,775
Chlorothalonil/metalaxyl	4,048	.	.	.	.	.	.	4,048
Copper-ammonium carbonate	2,135	194	.	.	.	.	.	2,329
Etridiazole	.	3,884	.	.	.	.	.	3,884
Fenbuconazole	134	.	.	.	.	.	.	134
Fosetyl-aluminium	36,449	21,821	.	.	.	.	.	58,269
Furalaxyl	112	869	.	.	.	.	.	981
Iprodione	44,894	28,908	3,520	.	.	23,040	.	100,363
Mancozeb	231	17,337	48	.	.	.	.	17,615
Metalaxyl/thiram	161	.	.	115	.	.	.	276
Myclobutanil	70,463	355	56	3,288	.	.	.	74,162
Oxycarboxin	.	194	.	.	.	.	.	194
Penconazole	995	.	.	.	.	.	.	995
Prochloraz	24,240	219	.	.	.	.	.	24,459
Propamocarb hydrochloride	.	.	.	.	.	11,520	.	41,555
Propiconazole	10,883	.	.	.	.	.	.	10,883
Pyrifenox	.	22,560	.	.	.	.	.	22,560
Sulphur	.	.	.	.	1,333	.	.	1,333
Thiram	.	1,376	.	.	.	.	.	1,376
Tolclofos-methyl	.	2	.	.	.	11,520	.	11,522
Zineb	269	.	.	.	.	.	.	269
All fungicides	233,787	181,567	10,664	3,528	36,667	296,208	.	762,419

Table 7 (cont.) Estimated area (spm²) of hardy nursery stock crops treated with pesticide formulations in Northern Ireland 2003.

Pesticide type & formulation	Crop type							Total area (sp m ²)
	Shrubs	Mixed area	Ornamental trees	Roses	Bulbs field grown	Cut flowers field&container	Trees	
<i>Herbicides</i>								
Herbicides								
Chlorpropham/linuron	.	.	.	.	10,667	.	.	10,667
Clopyralid/triclopyr	.	.	.	.	.	.	12,000	12,000
Diquat	.	.	.	.	.	56,194	.	56,194
Glyphosate	.	8,750	.	.	14,496	17,425	602,414	643,085
Isoxaben	34,152	176	1,852	.	.	.	.	36,180
Metazachlor	.	.	.	.	.	13,991	.	13,991
Oryzalin	.	176	.	.	.	.	.	176
Oxadiazon	49,238	30,498	1,760	93	.	9,366	778	91,732
Paraquat	.	.	.	.	8,496	36,534	6,747	51,776
Paraquat/diquat/amitrole/simazine	2,153	.	.	.	.	.	.	2,153
Propachlor	.	.	.	.	.	16,303	.	16,303
Propyzamide	.	.	.	.	.	.	67,541	67,541
Quinoclamine	9,429	176	1,852	.	.	.	.	11,456
Simazine	.	.	.	.	.	60,819	.	60,819
Trifluralin	1,650	.	.	.	.	.	.	1,650
All herbicides	96,622	39,775	5,464	93	33,659	210,631	689,479	1,075,722

Table 7 (cont.) Estimated area (spm²) of hardy nursery stock crops treated with pesticide formulations in Northern Ireland 2003.

Pesticide type & formulation	Crop type							Total area (sp m ²)
	Shrubs	Mixed area	Ornamental trees	Roses	Bulbs field grown	Cut flowers field&container	Trees	
<i>Insecticides</i>								
Abamectin	1,382	230	.	.	.	.	.	1,613
Bifenthrin	100,707	32,135	1,786	549	.	.	.	135,177
Buprofezin	.	389	.	.	.	.	.	389
Chlorpyrifos	21,170	1,272	1,760	.	1,333	.	6,938	32,473
Cypermethrin	80,417	1,440	1,760	2,880	.	9,366	.	95,863
Deltamethrin	2,963	1,820	1,773	73	.	.	.	6,629
Dichlorvos	.	180	.	.	.	.	.	180
Dimethoate	3,203	.	.	.	6,000	.	.	9,203
Fatty acids	.	50	.	.	.	.	.	50
Fenbutatin oxide	.	1,123	.	.	.	.	.	1,123
Gamma-HCH	64	13	.	.	.	56,194	.	56,271
Imidacloprid	1,019	739	.	417	.	.	.	2,175
Malathion	890	1,808	.	77	.	14,106	.	16,881
Nicotine	1,920	.	.	.	.	.	.	1,920
Permethrin	18,457	2,714	13	37	.	.	.	21,220
Pirimicarb	533	.	.	.	.	.	.	533
Pymetrozine	.	240	.	.	.	.	.	240
Spinosad	.	29	.	.	.	.	.	29
Teflubenzuron	.	170	.	.	.	.	.	170
Tetradifon	.	1,123	.	.	.	.	.	1,123
All insecticides	232,726	45,478	7,091	4,032	7,333	79,666	6,938	383,263

Table 7 (cont.) Estimated area (spm²) of hardy nursery stock crops treated with pesticide formulations in Northern Ireland 2003.

Pesticide type & formulation	Crop type							Total area (sp m ²)
	Shrubs	Mixed area	Ornamental trees	Roses	Bulbs field grown	Cut flowers field&container	Trees	
<i>Molluscicides</i>								
Metaldehyde	6,292	.	.	371	6,000	.	.	12,663
All molluscicides	6,292	.	.	371	6,000	.	.	12,663
<i>Biological controls</i>								
Bacillus subtilis	.	2,710	.	.	.	.	.	2,710
All biological controls	.	2,710	.	.	.	.	.	2,710
<i>Growth regulators</i>								
Paclobutrazol	1,760	1,250	.	.	.	.	.	3,010
All growth regulators	1,760	1,250	.	.	.	.	.	3,010
<i>Other products & mixed formulations</i>								
Copper sulphate	2	.	.	.	.	.	.	2
Bupirimate/pirimicarb/triforine	4,103	2,618	956	8,840	.	.	.	16,517
Cresylic acid	6,004	27,383	80	.	.	.	.	33,468
Permethrin/sulphur/triforine	.	.	.	2,836	.	.	.	2,836
Tar oil	.	.	138	.	.	.	.	138
All other products & mixed formulations	10,108	30,002	1,174	11,676	.	.	.	52,960
All pesticides	581,295	300,782	24,393	19,699	83,659	586,504	696,416	2,292,748

Table 8 Estimated quantities (kg) of hardy nursery stock crops treated with pesticide formulations in Northern Ireland 2003.

Pesticide type & formulation	Crop type							Total quantity (kg)
	Shrubs	Mixed area	Ornamental trees	Roses	Bulbs field grown	Cut flowers field&container	Trees	
<i>Fungicides</i>								
Azoxystrobin	.	.	.	.	0.03	.	.	0.03
Benomyl	<0.01	0.28	.	.	.	.	.	0.28
Bupirimate	<0.01	0.01	.	.	.	.	.	0.01
Bupirimate/triforine	.	0.25	.	0.01	.	.	.	0.27
Carbendazim	1.17	0.63	0.07	.	0.88	5.62	.	8.38
Chlorothalonil	0.76	0.39	0.55	.	.	18.69	.	20.39
Chlorothalonil/metalaxyl	0.05	.	.	.	.	.	.	0.05
Copper-ammonium carbonate	0.01	<0.01	.	.	.	.	.	0.02
Etridiazole	.	0.12	.	.	.	.	.	0.12
Fenbuconazole	<0.01	.	.	.	.	.	.	<0.01
Fosetyl-aluminium	286.51	0.74	.	.	.	.	.	287.25
Furalaxyl	0.01	0.04	.	.	.	.	.	0.04
Iprodione	1.04	0.99	0.07	.	.	0.35	.	2.45
Mancozeb	0.01	1.14	<0.01	.	.	.	.	1.16
Metalaxyl/thiram	0.01	.	.	0.01	.	.	.	0.02
Myclobutanil	0.98	<0.01	<0.01	0.02	.	.	.	0.99
Oxycarboxin	.	<0.01	.	.	.	.	.	<0.01
Penconazole	0.04	.	.	.	.	.	.	0.04
Prochloraz	2.76	.	.	.	.	.	.	2.89
Propamocarb hydrochloride	.	30.48	.	.	.	5.53	.	36.01
Propiconazole	0.01	.	.	.	.	.	.	0.01
Pyrifenox	.	0.01	.	.	.	.	.	0.01
Sulphur	.	.	.	.	0.85	.	.	0.85
Thiram	.	0.18	.	.	.	.	.	0.18
Tolclofos-methyl	.	0.02	.	.	.	0.77	.	0.79
Zineb	0.02	.	.	.	.	.	.	0.02
All fungicides	293.37	35.42	0.70	0.04	1.77	30.95	.	362.26

Table 8 (cont.) Estimated quantities (kg) of hardy nursery stock crops treated with pesticide formulations in Northern Ireland 2003.

Pesticide type & formulation	Crop type							Total quantity (kg)
	Shrubs	Mixed area	Ornamental trees	Roses	Bulbs field grown	Cut flowers field&container	Trees	
<i>Herbicides</i>								
Chlorpropham/linuron	.	.	.	.	3.20	.	.	3.20
Clopyralid/triclopyr	.	.	.	.	.	.	0.14	0.14
Diquat	.	.	.	.	.	3.37	.	3.37
Glyphosate	.	0.92	.	.	1.49	1.88	64.64	68.94
Isoxaben	1.11	0.02	0.05	.	.	.	.	1.17
Metazachlor	.	.	.	.	.	2.45	.	2.45
Oryzalin	.	0.73	.	.	.	.	.	0.73
Oxadiazon	10.44	2.04	0.70	0.04	.	1.85	0.31	15.38
Paraquat	.	.	.	.	0.77	2.19	0.41	3.36
Paraquat/diquat/amitrole/simazine	0.94	.	.	.	.	.	.	0.94
Propachlor	.	.	.	.	.	11.08	.	11.08
Propyzamide	.	.	.	.	.	.	11.01	11.01
Quinoclamine	1.29	0.45	0.23	.	.	.	.	1.98
Simazine	.	.	.	.	.	9.24	.	9.24
Trifluralin	0.05	.	.	.	.	.	.	0.05
All herbicides	13.82	4.16	0.99	0.04	5.46	32.06	76.50	133.03

Table 8 (cont.) Estimated quantities (kg) of hardy nursery stock crops treated with pesticide formulations in Northern Ireland 2003.

Pesticide type & formulation	Crop type							Total quantity (kg)
	Shrubs	Mixed area	Ornamental trees	Roses	Bulbs field grown	Cut flowers field&container	Trees	
<i>Insecticides</i>								
Abamectin	<0.01	.	.	.	.	.	.	<0.01
Bifenthrin	0.18	0.05	<0.01	<0.01	.	.	.	0.24
Buprofezin	.	<0.01	.	.	.	.	.	<0.01
Chlorpyrifos	0.99	0.06	0.09	.	0.06	.	0.25	1.45
Cypermethrin	0.41	0.01	0.01	0.01	.	.	.	0.45
Deltamethrin	<0.01	<0.01	<0.01	.	.	.	.	0.01
Dichlorvos	.	0.02	.	.	.	.	.	0.02
Dimethoate	0.04	.	.	.	0.18	.	.	0.22
Fatty acids	.	0.02	.	.	.	.	.	0.02
Fenbutatin oxide	.	0.01	.	.	.	.	.	0.01
Gamma-HCH	<0.01	<0.01	.	.	.	2.25	.	2.25
Imidacloprid	1.03	<0.01	.	0.04	.	.	.	1.07
Malathion	0.05	0.10	.	0.01	.	0.68	.	0.84
Nicotine	0.05	.	.	.	.	.	.	0.05
Permethrin	0.03	0.06	.	.	.	.	.	0.09
Pirimicarb	0.01	.	.	.	.	.	.	0.01
Pymetrozine	.	<0.01	.	.	.	.	.	<0.01
Spinosad	.	<0.01	.	.	.	.	.	<0.01
Teflubenzuron	.	<0.01	.	.	.	.	.	<0.01
Tetradifon	.	<0.01	.	.	.	.	.	<0.01
All insecticides	2.79	0.35	0.10	0.06	0.25	2.93	0.25	6.73

Table 8 (cont.) Estimated quantities (kg) of hardy nursery stock crops treated with pesticide formulations in Northern Ireland 2003.

Pesticide type & formulation	Crop type							Total quantity (kg)
	Shrubs	Mixed area	Ornamental trees	Roses	Bulbs field grown	Cut flowers field&container	Trees	
<i>Molluscicides</i>								
Metaldehyde	1.11	.	.	0.03	0.22	.	.	1.36
All molluscicides	1.11	.	.	0.03	0.22	.	.	1.36
<i>Biological controls</i>								
Bacillus subtilis	.	0.56	.	.	.	.	.	0.56
All biological controls	.	0.56	.	.	.	.	.	0.56
<i>Growth regulators</i>								
Paclobutrazol	0.01	.	.	.	.	.	.	0.01
All growth regulators	0.01	.	.	.	.	.	.	0.01
<i>Other products & mixed formulations</i>								
Copper sulphate	0.01	.	.	.	.	.	.	0.01
Bupirimate/pirimicarb/triforine	0.14	0.09	0.03	0.30	.	.	.	0.55
Cresylic acid	8.02	11.40	0.12	.	.	.	.	19.54
Permethrin/sulphur/triforine	.	.	.	0.50	.	.	.	0.50
Tar oil	.	.	2.07	.	.	.	.	2.07
All other products & mixed formulations	8.17	11.49	2.22	0.79	.	.	.	22.67
All pesticides	319.28	51.98	4.00	0.96	7.69	65.95	76.75	526.62

Table 9 The fifty active ingredients most extensively used on hardy nursery stock crops in Northern Ireland 2003 prioritised by treated area (spha).

	Active ingredient	Treated area (spha)
1	Glyphosate	64.3089
2	Carbendazim	21.0287
3	Chlorothalonil	15.3825
4	Bifenthrin	13.5178
5	Iprodione	10.0364
6	Cypermethrin	9.5864
7	Oxadiazon	9.1732
8	Myclobutanil	7.4161
9	Propyzamide	6.7541
10	Simazine	6.2972
11	Diquat	5.8347
12	Fosetyl-aluminium	5.8269
13	Gamma-HCH	5.627
14	Paraquat	5.393
15	Propamocarb hydrochloride	4.1555
16	Isoxaben	3.6181
17	Cresylic acid	3.3468
18	Chlorpyrifos	3.2474
19	Triforine	2.9653
20	Bupirimate	2.7224
21	Prochloraz	2.4459
22	Permethrin	2.4057
23	Pyrifenox	2.256
24	Mancozeb	1.7615
25	Pirimicarb	1.7057
26	Malathion	1.688
27	Propachlor	1.6304
28	Metazachlor	1.3991
29	Benomyl	1.3116
30	Metaldehyde	1.2663
31	Clopyralid	1.2
32	Triclopyr	1.2
33	Tolclofos-methyl	1.1522
34	Quinoclamine	1.1457
35	Propiconazole	1.0884
36	Linuron	1.0667
37	Chlorpropham	1.0667
38	Dimethoate	0.9204
39	Deltamethrin	0.663
40	Metalaxyl	0.4325
41	Sulphur	0.4169
42	Etridiazole	0.3884
43	Paclobutrazol	0.301
44	<i>Bacillus subtilis</i>	0.2712
45	Copper-ammonium carbonate	0.233
46	Imidacloprid	0.2175
47	Amitrole	0.2153
48	Nicotine	0.192
49	Thiram	0.1651
50	Trifluralin	0.165

Table 10 The fifty active ingredients most extensively used on ornamental crops in Northern Ireland 2003 prioritised by weight (kilograms).

	Active ingredient	Quantity applied (kg)
1	Fosetyl-aluminium	287.25
2	Glyphosate	68.94
3	Propamocarb hydrochloride	36.01
4	Chlorothalonil	20.43
5	Cresylic acid	19.54
6	Oxadiazon	15.38
7	Propachlor	11.08
8	Propyzamide	11.01
9	Simazine	9.60
10	Carbendazim	8.38
11	Diquat	3.55
12	Paraquat	3.54
13	Prochloraz	2.89
14	Iprodione	2.45
15	Metazachlor	2.45
16	Gamma-HCH	2.25
17	Chlorpropham	2.13
19	Quinoclamine	1.98
20	Chlorpyrifos	1.45
21	Metaldehyde	1.36
22	Isoxaben	1.17
23	Mancozeb	1.16
24	Imidacloprid	1.07
25	Linuron	1.07
26	Myclobutanil	0.99
27	Sulphur	0.97
28	Malathion	0.84
29	Tolclofos-methyl	0.79
31	Triforine	0.66
32	<i>Bacillus subtilis</i>	0.56
33	Cypermethrin	0.45
34	Bupirimate	0.34
35	Benomyl	0.28
36	Bifenthrin	0.24
37	Dimethoate	0.22
38	Amitrole	0.22
39	Thiram	0.20
40	Pirimicarb	0.17
41	Permethrin	0.14
42	Etridiazole	0.12
43	Triclopyr	0.12
44	Trifluralin	0.05
45	Nicotine	0.05
46	Furalaxyl	0.04
47	Penconazole	0.04
48	Azoxystrobin	0.03
49	Clopyralid	0.03
50	Zineb	0.02

Table 11 Shrubs: pesticide-treated area (spm²), quantities used (kg) and reasons for use.

Pesticide type & formulation	Black spot	Botrytis	Rust	Disease Control	Mildew	Liverwort/ Moss	General Weed Control	Total area treated (sp m ²)	Total quantity applied (kg)
<i>Fungicides</i>									
Benomyl	6	.	.	6	<0.01
Bupirimate	.	.	.	64	.	.	.	64	<0.01
Carbendazim	.	.	.	33,415	.	.	.	33,415	1.17
Chlorothalonil	.	.	.	5,288	.	.	.	5,288	0.76
Chlorothalonil/metalaxyl	.	.	.	4,048	.	.	.	4,048	0.05
Copper-ammonium carbonate	2,135	.	.	2,135	0.01
Fenbuconazole	.	.	.	134	.	.	.	134	<0.01
Fosetyl-aluminium	.	.	.	32,864	3,585	.	.	36,449	286.51
Furalaxyl	.	.	.	112	.	.	.	112	0.01
Iprodione	.	1,008	.	43,703	183	.	.	44,894	1.04
Mancozeb	.	.	231	.	.	.	.	231	0.01
Metalaxyl/thiram	.	.	.	161	.	.	.	161	0.01
Myclobutanil	107	.	.	56,516	13,840	.	.	70,463	0.98
Penconazole	.	.	.	623	372	.	.	995	0.04
Prochloraz	.	.	.	24,240	.	.	.	24,240	2.76
Propiconazole	.	.	.	10,883	.	.	.	10,883	0.01
Zineb	269	.	.	269	0.02
All fungicides	107	1,008	231	212,050	20,391	.	.	233,787	293.37
<i>Herbicides & desiccants</i>									
Isoxaben	27	34,126	34,152	1.11
Oxadiazon	49,238	49,238	10.44
Paraquat/diquat/amtrole/simazine	2,153	2,153	0.94
Quinoclamine	9,429	.	9,429	1.29
Trifluralin	1,650	1,650	0.05
All herbicides	9,455	87,166	96,622	13.82

Table 11 (cont.) Shrubs: pesticide-treated area (spm²), quantities used (kg) and reasons for use.

Pesticide type & formulation	Aphids	Red spider mite	Vine weevil	Whitefly	Insect Control	Slugs	Growth regulation	Total area treated (sp m ²)	Total quantity applied (kg)
<i>Insecticides</i>									
Abamectin	.	1,382	.	.	.	.	.	1,382	<0.01
Bifenthrin	59,701	40,262	.	.	744	.	.	100,707	0.18
Chlorpyrifos	.	.	534	.	20,636	.	.	21,170	0.99
Cypermethrin	7	.	.	3,361	77,049	.	.	80,417	0.41
Deltamethrin	550	.	.	.	2,413	.	.	2,963	<0.01
Dimethoate	.	.	.	.	3,203	.	.	3,203	0.04
Gamma-HCH	.	.	.	.	64	.	.	64	<0.01
Imidacloprid	.	.	1,019	.	.	.	.	1,019	1.03
Malathion	516	.	.	.	374	.	.	890	0.05
Nicotine	.	.	.	.	1,920	.	.	1,920	0.05
Permethrin	18,457	.	.	.	.	.	.	18,457	0.03
Pirimicarb	533	.	.	.	.	.	.	533	0.01
All insecticides	79,765	41,645	1,553	3,361	106,402	.	.	232,726	2.79
<i>Molluscicides</i>									
Metaldehyde	.	.	.	.	.	6,292	.	6,292	1.11
All molluscicides	.	.	.	.	.	6,292	.	6,292	1.11
<i>Growth regulators</i>									
Paclbutrazol	.	.	.	.	.	.	1,760	1,760	0.01
All growth regulators	.	.	.	.	.	.	1,760	1,760	0.01

Table 11 (cont.) Shrubs: pesticide-treated area (spm²), quantities used (kg) and reasons for use.

Pesticide type & formulation	Aphids	Blackspot & Aphids	Liverwort/ Moss	Insect Control	Disease Control	Total area treated (sp m²)	Total quantity applied (kg)
<i>Mixed formulations</i>							
Copper sulphate	.	.	.	2	.	2	0.01
Bupirimate/pirimicarb/triforine	623	3,480	.	.	.	4,103	0.14
Cresylic acid	.	.	1,920	.	4,084	6,004	8.02
All mixed formulations	623	3,480	1,920	2	4,084	10,108	8.17

Table 12 Mixed areas: pesticide-treated area (spm²), quantities used (kg) and reasons for use.

Pesticide type & formulation	<i>Botrytis</i>	Rust	Damping Off	Disease control	Mildew	Liverwort/ Moss	General Weed control	Total area treated (sp m ²)	Total quantity applied (kg)
<i>Fungicides</i>									
Benomyl	.	.	.	13,109	.	.	.	13,109	0.28
Bupirimate	.	.	.	13	331	.	.	344	0.01
Bupirimate/triforine	10,171	.	.	10,171	0.25
Carbendazim	17,630	.	.	9,328	4	.	.	26,962	0.63
Chlorothalonil	.	194	.	3,033	.	.	.	3,227	0.39
Copper-ammonium carbonate	.	.	194	.	.	.	.	194	<0.01
Etridiazole	.	.	3,884	.	.	.	.	3,884	0.12
Fosetyl-aluminium	.	.	2	21,818	.	.	.	21,821	0.74
Furalaxyl	.	.	869	.	.	.	.	869	0.04
Iprodione	230	.	.	28,678	.	.	.	28,908	0.99
Mancozeb	.	.	.	17,337	.	.	.	17,337	1.14
Myclobutanil	.	355	.	.	.	.	.	355	<0.01
Oxycarboxin	.	194	.	.	.	.	.	194	<0.01
Prochloraz	.	.	.	219	.	.	.	219	0.13
Propamocarb hydrochloride	.	.	12	30,023	.	.	.	30,035	30.48
Pyrifenox	22,560	.	.	22,560	0.01
Thiram	.	.	.	176	1,200	.	.	1,376	0.18
Tolclofos-methyl	.	.	.	2	.	.	.	2	0.02
All fungicides	17,861	744	4,962	123,735	34,266	.	.	181,567	35.42
<i>Herbicides & desiccants</i>									
Glyphosate	8,750	8,750	0.92
Isoxaben	176	176	0.02
Oryzalin	176	.	176	0.73
Oxadiazon	30,498	30,498	2.04
Quinoclamine	176	.	176	0.45
All herbicides	351	39,424	39,775	4.16

Table 12 (cont.) Mixed areas: pesticide-treated area (spm²), quantities used (kg) and reasons for use.

Pesticide type & formulation	Aphids	Vine weevil	Insect control	Disease control	Growth regulation	Blackspot & Aphids	Liverwort/ Moss	Whitefly	Total area treated (sp m ²)	Total quantity applied (kg)
<i>Insecticides</i>										
Abamectin	.	.	230	.	.	.	.	.	230	<0.01
Bifenthrin	4,752	1,250	26,133	.	.	.	.	.	32,135	<0.01
Buprofezin	389	.	.	.	.	.	.	.	389	<0.01
Chlorpyrifos	.	.	1,272	.	.	.	.	.	1,272	0.1
Cypermethrin	.	.	1,440	.	.	.	.	.	1,440	<0.01
Deltamethrin	548	.	1,272	.	.	.	.	.	1,820	<0.01
Dichlorvos	.	.	180	.	.	.	.	.	180	<0.01
Fatty acids	50	.	.	.	.	.	.	.	50	<0.01
Fenbutatin oxide	.	.	1,123	.	.	.	.	.	1,123	<0.01
Gamma-HCH	.	.	13	.	.	.	.	.	13	<0.01
Imidacloprid	432	48	259	.	.	.	.	.	739	<0.01
Malathion	488	.	1,320	.	.	.	.	.	1,808	0.1
Permethrin	4	.	2,710	.	.	.	.	.	2,714	0.1
Pymetrozine	240	.	.	.	.	.	.	.	240	<0.01
Spinosad	.	.	29	.	.	.	.	.	29	<0.01
Teflubenzuron	.	.	170	.	.	.	.	.	170	<0.01
Tetradifon	.	.	1,123	.	.	.	.	.	1,123	<0.01
All insecticides	6,903	1,298	37,277	.	.	.	.	.	45,478	0.3
<i>Biological control</i>										
Bacillus subtilis	.	.	.	2,710	.	.	.	.	2,710	0.6
All biological controls	.	.	.	2,710	.	.	.	.	2,710	0.6
<i>Growth regulators</i>										
Paclobutrazol	.	.	.	.	1,250	.	.	.	1,250	<0.01
All growth regulators	.	.	.	.	1,250	.	.	.	1,250	<0.01
<i>Mixed formulations</i>										
Bupirimate/pirimicarb/triforine	.	.	.	.	.	2,618	.	.	2,618	0.1
Cresylic acid	.	.	.	.	.	26,133	1,250	.	27,383	11.4
All mixed formulations	.	.	.	.	.	28,751	1,250	.	30,002	11.5

Table 13 Ornamental trees: pesticide-treated area (spm²), quantities used (kg) and reasons for use.

Pesticide type & formulation	Disease control	Liverwort/ Moss	General weed control	Aphids	Insect control	Blackspot & Aphids	Total area treated (sp m ²)	Total quantity applied (kg)
<i>Fungicides</i>								
Carbendazim	3,520	.	.	.	.	.	3,520	0.07
Chlorothalonil	3,520	.	.	.	.	.	3,520	0.55
Iprodione	3,520	.	.	.	.	.	3,520	0.07
Mancozeb	48	.	.	.	.	.	48	<0.01
Myclobutanil	56	.	.	.	.	.	56	<0.01
All fungicides	10,664	.	.	.	.	.	10,664	0.70
<i>Herbicides & desiccants</i>								
Isoxaben	.	.	1,852	.	.	.	1,852	0.05
Oxadiazon	.	.	1,760	.	.	.	1,760	0.70
Quinoclamine	.	1,852	.	.	.	.	1,852	0.23
All herbicides	.	1,852	3,612	.	.	.	5,464	0.99
<i>Insecticides</i>								
Bifenthrin	.	.	.	1,557	229	.	1,786	<0.01
Chlorpyrifos	.	.	.	.	1,760	.	1,760	0.09
Cypermethrin	.	.	.	.	1,760	.	1,760	0.01
Deltamethrin	.	.	.	13	1,760	.	1,773	<0.01
Permethrin	.	.	.	13	.	.	13	<0.01
All insecticides	.	.	.	1,582	5,509	.	7,091	0.10
<i>Mixed formulations</i>								
Bupirimate/pirimicarb/triforine	229	.	.	648	.	79	956	0.03
Cresylic acid	80	.	.	.	.	.	80	0.12
Tar oil	138	.	.	.	.	.	138	2.07
All mixed formulations	448	.	.	648	.	79	1,174	2.22

Table 14 Roses: pesticide-treated area (spm²), quantities used (kg) and reasons for use.

Pesticide type & formulation	Blackspot	Disease control	General weed control	Aphids	Vine weevil	Insect control	Slugs	Blackspot & Aphids	Total area treated (sp m ²)	Total quantity applied (kg)
<i>Fungicides</i>										
Bupirimate/triforine	51	73	.	.	.	.	.	.	125	0.01
Metalaxyl/thiram	115	.	.	.	.	.	.	.	115	0.01
Myclobutanil	2,880	408	.	.	.	.	.	.	3,288	0.02
All fungicides	3,047	481	.	.	.	.	.	.	3,528	0.04
<i>Herbicides & desiccants</i>										
Oxadiazon	.	.	93	.	.	.	.	.	93	0.04
All herbicides	.	.	93	.	.	.	.	.	93	0.04
<i>Insecticides</i>										
Bifenthrin	.	.	.	183	.	365	.	.	549	<0.01
Cypermethrin	.	.	.	2,880	.	.	.	.	2,880	0.01
Deltamethrin	.	.	.	73	.	.	.	.	73	<0.01
Imidacloprid	.	.	.	.	417	.	.	.	417	0.04
Malathion	.	.	.	.	.	77	.	.	77	0.01
Permethrin	.	.	.	37	.	.	.	.	37	<0.01
All insecticides	.	.	.	3,173	417	442	.	.	4,032	0.06
<i>Molluscicides</i>										
Metaldehyde	.	.	.	.	.	.	371	.	371	0.03
All molluscicides	.	.	.	.	.	.	371	.	371	0.03
<i>Mixed formulations</i>										
Bupirimate/pirimicarb/triforine	276	365	.	653	.	.	.	7,546	8,840	0.30
Permethrin/sulphur/triforine	.	.	.	.	.	.	.	2,836	2,836	0.50
All mixed formulations	276	365	.	653	.	.	.	10,382	11,676	0.79

Table 15 Field grown bulbs: pesticide-treated area (spm²), quantities used (kg) and reasons for use.

Pesticide type & formulation	Disease control	General weed control	Narcissi fly	Slugs	Total area treated (sp m ²)	Total quantity applied (kg)
<i>Fungicides</i>						
Azoxystrobin	1,333	.	.	.	1,333	0.03
Carbendazim	34,000	.	.	.	34,000	0.88
Sulphur	1,333	.	.	.	1,333	0.85
All fungicides	36,667	.	.	.	36,667	1.77
<i>Herbicides & desiccants</i>						
Chlorpropham/linuron	.	10,667	.	.	10,667	3.20
Glyphosate	.	14,496	.	.	14,496	1.49
Paraquat	.	8,496	.	.	8,496	0.77
All herbicides	.	33,659	.	.	33,659	5.46
<i>Insecticides</i>						
Chlorpyrifos	.	.	1,333	.	1,333	0.06
Dimethoate	.	.	6,000	.	6,000	0.18
All insecticides	.	.	7,333	.	7,333	0.25
<i>Molluscicides</i>						
Metaldehyde	.	.	.	6,000	6,000	0.22
All molluscicides	.	.	.	6,000	6,000	0.22

Table 16 Cut flowers field and container grown: pesticide-treated area (spm²), quantities used (kg) and reasons for use.

Pesticide type & formulation	Damping off	Disease control	General weed control	Aphids	Narcissi fly	Total area treated (sp m ²)	Total quantity applied (kg)
<i>Fungicides</i>							
Carbendazim	.	112,388	.	.	.	112,388	5.62
Chlorothalonil	.	137,740	.	.	.	137,740	18.69
Iprodione	.	23,040	.	.	.	23,040	0.35
Propamocarb hydrochloride	.	11,520	.	.	.	11,520	5.53
Tolclofos-methyl	11,520	.	.	.	.	11,520	0.77
All fungicides	11,520	284,688	.	.	.	296,208	30.95
<i>Herbicides & desiccants</i>							
Diquat	.	.	56,194	.	.	56,194	3.37
Propachlor	.	.	16,303	.	.	16,303	11.08
Simazine	.	.	60,819	.	.	60,819	9.24
Glyphosate	.	.	17,425	.	.	17,425	1.88
Metazachlor	.	.	13,991	.	.	13,991	2.45
Oxadiazon	.	.	9,366	.	.	9,366	1.85
Paraquat	.	.	36,534	.	.	36,534	2.19
All herbicides	.	.	210,632	.	.	210,632	32.06
<i>Insecticides</i>							
Gamma-HCH	56,194	56,194	2.25
Malathion	.	.	.	14,106	.	14,106	0.68
Cypermethrin	.	.	.	9,366	.	9,366	0.01
All insecticides	.	.	.	23,472	56,194	79,666	2.93

Table 17 Trees: pesticide-treated area (spm²), quantities used (kg) and reasons for use.

Pesticide type & formulation	General weed control	General Insect control	Total area treated (sp m²)	Total quantity applied (kg)
<i>Herbicides & desiccants</i>				
Clopyralid/triclopyr	12,000	.	12,000	0.144
Glyphosate	602,414	.	602,414	64.637
Oxadiazon	778	.	778	0.31
Paraquat	6,747	.	6,747	0.405
Propyzamide	67,541	.	67,541	11.008
All herbicides	689,479	.	689,479	76.504
<i>Insecticides</i>				
Chlorpyrifos	.	6,938	6,938	0.25
All insecticides	.	6,938	6,938	0.25

Table 18 Nursery site: pesticide-treated area (spm²), quantities used (kg) and reasons for use.

Pesticide type & formulation	Weeds on site		Slugs		Bulbs		Total quantity applied (kg)	Total area treated (sp m ²)
	(kg)	(sp m ²)	(kg)	(sp m ²)	(kg)	(sp m ²)		
<i>Herbicides & desiccants</i>								
Chlorthal-dimethyl	0.43	4,625	.	.	.	.	0.43	4,625
Clopyralid/triclopyr	0.17	1,920	.	.	.	.	0.17	1,920
Dichlobenil	12.50	22,383	.	.	.	.	12.50	22,383
Diquat/paraquat	1.90	16,393	.	.	.	.	1.90	16,393
Glufosinate-ammonium	14.61	108,067	.	.	.	.	14.61	108,067
Glyphosate	67.41	550,194	.	.	.	.	67.41	550,194
Isoxaben	0.50	19,777	.	.	.	.	0.50	19,777
Oxadiazon	24.27	125,504	.	.	.	.	24.27	125,504
Paraquat	11.08	125,649	.	.	.	.	11.08	125,649
Paraquat/diquat/amitrole/simazine	6.12	15,559	.	.	.	.	6.12	15,559
Propyzamide	1.51	23,143	.	.	.	.	1.51	23,143
Quinoclamine	1.59	8,209	.	.	.	.	1.59	8,209
Simazine	7.78	49,886	.	.	.	.	7.78	49,886
All herbicides	149.85	1,071,310	.	.	.	.	149.85	1,071,310
<i>Molluscicides</i>								
Metaldehyde	.	.	6.44	124,274	.	.	6.44	124,274
All molluscicides	.	.	6.44	124,274	.	.	6.44	124,274
<i>Mixed formulations</i>								
Bupirimate/pirimicarb/triforine	.	.	.	.	<0.1	933	<0.1	933
All mixed formulations	.	.	.	.	<0.1	933	<0.1	933

Table 19 Compost: pesticide-treated area (cubic metres), quantities used (kg) and reasons for use.

Pesticide type & formulation	Vine weevil		Total quantity applied (kg)	Total area treated cubic metres
	(kg)	cubic metres		
<i>Insecticides/acaricides</i>				
Chlorpyrifos	349.52	3744	349.52	3744
Fipronil	1.54	1254	1.54	1254
All insecticides/acaricides	351.06	4997	351.06	4997

Northern Ireland Pesticide Usage Survey Published Reports Appendix 1

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105	Arable Crops 1990	1-855 27 130 3
106	Soft Fruit Crops 1990	1-855 27 149 4
109	Vegetable Crops 1991	1-855 27 137 0
110	Protected Crops 1991 (edible & ornamental)	1-855 27 283 0
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117	Arable Crops 1992	1-855 27 193 1
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