

PESTICIDE USAGE IN NORTHERN IRELAND

SURVEY REPORT 199 Hardy Nursery Stock Crops 2003



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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 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 m^2 (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. Fosetylaluminium, 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/acaricidetreated 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 m^2 (0.6spha) of shrubs. The growth regulator paclobutrazol was applied to 1,760 spray m^2 (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 $4585m^2$ (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 quinoclamine, 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 fieldgrown 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 spm² to control slugs.

An estimated 933 spm² 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 1The total number of protected and hardy nursery stock growers and the number of
growers sampled in Northern Ireland in 2003.

	Total number of	Number of	
County	growers	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

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

	County								
Crop type	Antrim Armagh Down Fermanagh Londonderry Ty								
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 3Estimated area (spm²) of hardy nursery stock crops treated regionally with each pesticide type in Northern Ireland 2003.

				Pesticide type				
County	Fungicides	Herbicides	Insecticides	Molluscicides	Biological control	Growth regulators	Mixed Formulations	Northern Ireland
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 4Estimated quantity (kg) of pesticide active ingredients applied to protected ornamental crops treated regionally with each pesticide type
in Northern Ireland 2003.

				Pesticide type				
County	Fungicides	Herbicides	Insecticides	Molluscicides	Biological control	Growth regulators	Mixed Formulations	Northern Ireland
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 5Estimated area (spm2) of pesticide active ingredients applied to hardy nursery stock crops treated with each pesticide type
in Northern Ireland 2003.

	Pesticide type										
Crop Type	Fungicides	Herbicides	Insecticides	Molluscicides	Biological control	Growth regulators	Mixed Formulations	Northern Ireland			
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 6Estimated quantity (kg) of pesticide active ingredients applied to hardy nursery stock crops treated with each pesticide type
in Northern Ireland 2003.

	Pesticide type									
Crop Type	Fungicides	Herbicides	Insecticides	Molluscicides	Biological control	Growth regulators	Mixed Formulations	Northern Ireland		
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 7Estimated area (spm²) of hardy nursery stock crops treated with pesticide formulations in Northern Ireland 2003.

	Crop type								
			Ornamental		Bulbs	Cut flowers		Total area	
Pesticide type & formulation	Shrubs	Mixed area	trees	Roses	field grown	field&container	Trees	(sp m ²)	
Fungicides									
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.

				Crop type				
			Ornamental		Bulbs	Cut flowers		Total area
Pesticide type & formulation	Shrubs	Mixed area	trees	Roses	field grown	field&container	Trees	(sp m ²)
Herbicides								
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

				Crop type				
			Ornamental		Bulbs	Cut flowers		Total area
Pesticide type & formulation	Shrubs	Mixed area	trees	Roses	field grown	field&container	Trees	(sp m ²)
Insecticides								
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.

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

				Crop type				
Pesticide type & formulation	Shrubs	Mixed area	Ornamental trees	Roses	Bulbs field grown	Cut flowers field&container	Trees	Total area (sp m ²)
<i>Molluscicides</i> Metaldehyde	6,292			371	6,000			12,663
All molluscicides	6,292			371	6,000			12,663
Biological controls		2 710						2 710
Dacinus subinis	·	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 formulat</i> Copper sulphate	<i>ions</i> 2		056	8 840				2
Cresulic acid	4,103	2,018	956 80	8,840		•	•	10,517
Permethrin/sulphur/triforine Tar oil			. 138	2,836	· · ·	· ·		2,836 138
All other products & mixed forulation	ons 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 8Estimated quantities (kg) of hardy nursery stock crops treated with pesticide formulations in Northern Ireland 2003.

Crop type								
			Ornamental		Bulbs	Cut flowers		Total
Pesticide type & formulation	Shrubs	Mixed area	trees	Roses	field grown	field&container	Trees	quantity (kg)
Fungicides								
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.

Crop type									
			Ornamental		Bulbs	Cut flowers		Total	
Pesticide type & formulation	Shrubs	Mixed area	trees	Roses	field grown	field&container	Trees	quantity (kg)	
Herbicides									
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	

				Crop type				
			Ornamental		Bulbs	Cut flowers		Total
Pesticide type & formulation	Shrubs	Mixed area	trees	Roses	field grown	field&container	Trees	quantity (kg)
Insecticides								
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.

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

				Crop type				
			Ornamental	D	Bulbs	Cut flowers		Total
Pesticide type & formulation	Shrubs	Mixed area	trees	Roses	neid grown	neid&container	Irees	quantity (kg)
Molluscicides								
Metaldehyde	1.11			0.03	0.22			1.36
All molluscicides	1.11			0.03	0.22			1.36
Biological controls								
Bacillus subtilis		0.56						0.56
All biological controls	•	0.56	•					0.56
C .								
Country Internet								
Paclobutrazol	0.01							0.01
All growth regulators	0.01	•	•	•	•	•	•	0.01
Other products & mixed formulations	5							
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 formulation	s 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 9The fifty active ingredients most extensively used on hardy nursery stock crops in
Northern Ireland 2003 prioritised by 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 2.0653 20 Bupirimate 2.7224 21 Prochloraz 2.4459 22 Permethrin 2.4057 23 </th <th></th> <th>Active ingredient</th> <th>Treated area (spha)</th>		Active ingredient	Treated area (spha)
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 5.8269 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	1	Glyphosate	64.3089
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 6.2972 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 1.63	2	Carbendazim	21.0287
4 Bifenthrin 13.5178 5 Iprotione 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 1.6304 28	3	Chlorothalonil	15.3825
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 1.6384 27 Propachlor 1.6304 28 Metazachlor 1.3991 </td <td>4</td> <td>Bifenthrin</td> <td>13.5178</td>	4	Bifenthrin	13.5178
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 1.7015 25 Pirimicarb 1.7057 26 Malathion 1.688 27 Propachlor 1.6304 28	5	Iprodione	10.0364
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 1.6304 28 Metazachlor 1.3991 29 Benomyl 1.3116 30 Metaldehyde 1.2663 31 Clopyralid 1.2	6	Cypermethrin	9.5864
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 1.3116 30 Metaldehyde 1.2663 31	7	Oxadiazon	9.1732
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 1.6304 28 Metazachlor 1.3991 29 Benomyl 1.3116 30 Metaldehyde 1.2663 31 Clopyralid 1.2 33 Tolclofos-methyl 1.1457 35	8	Myclobutanil	7.4161
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 35 <t< td=""><td>9</td><td>Propyzamide</td><td>6.7541</td></t<>	9	Propyzamide	6.7541
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 1.1457 35 Propiconazole 1.0884	10	Simazine	6.2972
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 33 Tolclofos-methyl 1.1522 34 Quinoclamine 1.0667 37 Chlorpropham 1.0667 38 Dimethoate	11	Diquat	5.8347
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 33 Tolclofos-methyl 1.1457 35 Propiconazole 1.0884 36 Linuron 1.0667 38 Dimethoate 0.9204 39 Deltamethrin 0.663<	12	Fosetyl-aluminium	5.8269
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 33 Tolclofos-methyl 1.1457 35 Propiconazole 1.0884 36 Linuron 1.0667 37 Chlopropham 1.0667 38 Dimethoate 0.9204 39 Deltamethrin 0.4	13	Gamma-HCH	5.627
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 1.1457 35 Propiconazole 1.0884 36 Linuron 1.0667 37 Chlorpropham 1.0667 38 Dimethoate 0.9204 39 Deltamethrin 0.6	14	Paraquat	5.393
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 1.0667 37 Chlorpropham 1.0667 38 Dimethoate 0.9204 39 Deltamethrin 0.663 40 Metalaxyl 0.4169 41 Sulphur 0.4169	15	Propamocarb hydrochloride	4.1555
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 1.0667 37 Chlorpropham 1.0667 38 Dimethoate 0.9204 39 Deltamethrin 0.663 40 Metalaxyl 0.4325 41 Sulphur 0.4169 42 Etridiazole 0.3844 </td <td>16</td> <td>Isoxaben</td> <td>3.6181</td>	16	Isoxaben	3.6181
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 1.0667 35 Propiconazole 1.0884 36 Linuron 1.0667 37 Chlorpropham 0.663 40 Metalaxyl 0.4325 41 Sulphur 0.4169 42 Etridiazole 0.384 43 Pac	17	Cresylic acid	3.3468
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 0.663 40 Metalaxyl 0.4325 41 Sulphur 0.4169 42 Etridiazole 0.384 43 Paclobutrazol 0.301 44 Baciillus subtilis 0.2712	18	Chlorpyrifos	3.2474
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 1.457 35 Propiconazole 1.0884 36 Linuron 1.0667 37 Chlorpropham 1.0667 38 Dimethoate 0.9204 39 Deltamethrin 0.663 40 Metalaxyl 0.4169 42 Etridiazole 0.3884 43 Paclobutrazol 0.301 44 Bacillus subtilis 0.2175	19	Triforine	2.9653
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 1.1522 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 0.4169 42 Etridiazole 0.3884 43 Paclobutrazol 0.301 44 Bacillus subtilis 0.2712 45 Copper-ammonium carbonate 0.233 46 Imidacloprid <	20	Bupirimate	2.7224
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 Bacillus subtilis 0.2712 45 Copper-ammonium carbonate <t< td=""><td>21</td><td>Prochloraz</td><td>2.4459</td></t<>	21	Prochloraz	2.4459
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 0.384 43 Paclobutrazol 0.301 44 Bacillus subtilis 0.2712 45 Copper-ammonium carbonate 0.233 46 Imidacloprid <t< td=""><td>22</td><td>Permethrin</td><td>2.4057</td></t<>	22	Permethrin	2.4057
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 0.301 44 Bacillus subtilis 0.2712 45 Copper-ammonium carbonate 0.233 46 Imidacloprid 0.2153 48 Nicotine 0.192 49 Thiram 0.165	23	Pyrifenox	2.256
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 0.301 44 Bacillus subtilis 0.2712 45 Copper-ammonium carbonate 0.233 46 Imidacloprid 0.2153 48 Nicotine 0.192 49 Thiram 0.1651	24	Mancozeb	1.7615
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 Bacillus subtilis 0.2712 45 Copper-ammonium carbonate 0.233 46 Imidacloprid 0.2175 47 Amitrole 0.2153 48 Nicotine 0.1651 50 Trifluralin	25	Pirimicarb	1.7057
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 0.301 44 Bacillus subtilis 0.2712 45 Copper-ammonium carbonate 0.233 46 Imidacloprid 0.2175 47 Amitrole 0.2153 48 Nicotine 0.192 49 Thiram 0.1651	26	Malathion	1.688
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 0.301 44 Bacillus subtilis 0.2712 45 Copper-ammonium carbonate 0.233 46 Imidacloprid 0.2175 47 Amitrole 0.2153 48 Nicotine 0.1651 50 Trifluralin 0.1651	27	Propachlor	1.6304
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 0.301 44 Bacillus subtilis 0.2712 45 Copper-ammonium carbonate 0.233 46 Imidacloprid 0.2175 47 Amitrole 0.2153 48 Nicotine 0.1651 50 Trifluralin 0.1651	28	Metazachlor	1.3991
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 0.301 44 Bacillus subtilis 0.2712 45 Copper-ammonium carbonate 0.233 46 Imidacloprid 0.2175 47 Amitrole 0.2153 48 Nicotine 0.192 49 Thiram 0.1651	29	Benomyl	1.3116
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 0.301 44 Bacillus subtilis 0.2712 45 Copper-ammonium carbonate 0.233 46 Imidacloprid 0.2175 47 Amitrole 0.2153 48 Nicotine 0.192 49 Thiram 0.1651	30	Metaldehyde	1.2663
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 Bacillus subtilis 0.2712 45 Copper-ammonium carbonate 0.2175 46 Imidacloprid 0.2175 47 Amitrole 0.2153 48 Nicotine 0.192 49 Thiram 0.1651	31	Clopyralid	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 Bacillus subtilis 0.2712 45 Copper-ammonium carbonate 0.2175 47 Amitrole 0.2153 48 Nicotine 0.192 49 Thiram 0.1651	32	Triclopyr	1.2
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 Bacillus subtilis 0.2712 45 Copper-ammonium carbonate 0.233 46 Imidacloprid 0.2153 48 Nicotine 0.192 49 Thiram 0.1651	33	Tolclofos-methyl	1.1522
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 Bacillus subtilis 0.2712 45 Copper-ammonium carbonate 0.233 46 Imidacloprid 0.2175 47 Amitrole 0.2153 48 Nicotine 0.192 49 Thiram 0.1651	34	Quinoclamine	1.1457
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 Bacillus subtilis 0.2712 45 Copper-ammonium carbonate 0.233 46 Imidacloprid 0.2175 47 Amitrole 0.2153 48 Nicotine 0.192 49 Thiram 0.1651	35	Propiconazole	1.0884
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 Bacillus subtilis 0.2712 45 Copper-ammonium carbonate 0.233 46 Imidacloprid 0.2175 47 Amitrole 0.2153 48 Nicotine 0.192 49 Thiram 0.1651	36	Linuron	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 Bacillus subtilis 0.2712 45 Copper-ammonium carbonate 0.233 46 Imidacloprid 0.2175 47 Amitrole 0.2153 48 Nicotine 0.192 49 Thiram 0.1651	37	Chlorpropham	1.0667
39 Deltamethrin 0.663 40 Metalaxyl 0.4325 41 Sulphur 0.4169 42 Etridiazole 0.3884 43 Paclobutrazol 0.301 44 Bacillus subtilis 0.2712 45 Copper-ammonium carbonate 0.233 46 Imidacloprid 0.2175 47 Amitrole 0.2153 48 Nicotine 0.192 49 Thiram 0.1651	38	Dimethoate	0.9204
40 Metalaxyl 0.4325 41 Sulphur 0.4169 42 Etridiazole 0.3884 43 Paclobutrazol 0.301 44 Bacillus subtilis 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	39	Deltamethrin	0.663
41 Sulphur 0.4169 42 Etridiazole 0.3884 43 Paclobutrazol 0.301 44 Bacillus subtilis 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	40	Metalaxyl	0.4325
42 Etridiazole 0.3884 43 Paclobutrazol 0.301 44 Bacillus subtilis 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	41	Sulphur	0.4169
43 Paclobutrazol 0.301 44 Bacillus subtilis 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	42	Etridiazole	0.3884
44Bacillus subtilis0.271245Copper-ammonium carbonate0.23346Imidacloprid0.217547Amitrole0.215348Nicotine0.19249Thiram0.165150Trifluralin0.165	43	Paclobutrazol	0.301
45Copper-ammonium carbonate0.23346Imidacloprid0.217547Amitrole0.215348Nicotine0.19249Thiram0.165150Trifluralin0.165	44	Bacillus subtilis	0.2712
46Imidacloprid0.217547Amitrole0.215348Nicotine0.19249Thiram0.165150Trifluralin0.165	45	Copper-ammonium carbonate	0.233
47 Amitrole 0.2153 48 Nicotine 0.192 49 Thiram 0.1651 50 Trifluralin 0.165	46	Imidacloprid	0.2175
48 Nicotine 0.192 49 Thiram 0.1651 50 Trifluralin 0.165	47	Amitrole	0.2153
49 Thiram 0.1651 50 Trifluralin 0.165	48	Nicotine	0.192
50 Trifluralin 0.165	49	Thiram	0.1651
	50	Trifluralin	0.165

Table 10The 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	Bacillus subtilis	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.

	Black			Disease		Liverwort/	General Weed	Total area treated	Total quantity
Pesticide type & formulation	spot	Botrytis	Rust	Control	Mildew	Moss	Control	(sp m ²)	applied (kg)
Fungicides									
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
TI-L::: I - 0 J:									
Heroiciaes & aesiccants						27	24.100	24 150	1 11
		•				21	34,120	34,132	1.11
Oxadiazon		•	•				49,238	49,238	10.44
Paraquat/oiquat/amitrole/simazine			•	•	•		2,155	2,153	0.94
Quinociamine Trificantia			•	•	•	9,429		9,429	1.29
Irifluralin	•			•		•	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)
Insecticides									
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
Molluscicides									
Metaldehyde						6,292		6,292	1.11
All molluscicides				•		6,292	•	6,292	1.11
Growth regulators									
Paclobutrazol							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 m ²)	Total quantity applied (kg)
Mixed formulations							
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 12Mixed areas: pesticide-treated area (spm2), quantities used (kg) and reasons for use.

Pesticide type & formulation	Botrytis	Rust	Damping Off	Disease control	Mildew	Liverwort/ Moss	General Weed control	Total area treated (sp m ²)	Total quantity applied (kg)
•••	·								
Fungicides									
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
Harhicidas & desiccants									
Glyphosate							8 750	8 750	0.92
Isovahen	·	•			·	•	176	176	0.92
Oryzalin	•	•		•	•	176	170	176	0.02
Oxadiazon	•	•	•	•	·	170	30 498	30 498	2.04
Quinoclamine	•	•	•	•	•	176	50,770	176	0.45
Quinocialillie	•	•	·	•	•	170	•	170	0.43
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)
Insecticides										
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
Piological control										
Bacillus subtilis				2 710					2 710	0.6
Daemus subtins	•	•	•	2,710	•	•	·	•	2,710	0.0
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 13Ornamental 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)	
Fungicides									
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	
Herbicides & desiccants									
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	
Insecticides									
Bifenthrin				1 557	229		1 786	<0.01	
Chlorpyrifos		·	·	1,557	1 760		1,760	0.09	
Cypermethrin	•	•	•	·	1,760	•	1,760	0.01	
Deltamethrin		·	·	13	1,760		1,700	< 0.01	
Permethrin	•	•	•	13	1,700	•	13	< 0.01	
	•	·	·	15	•		15	(0.01	
All insecticides	•	•	•	1,582	5,509	•	7,091	0.10	
Mixed formulations									
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 14Roses: 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 Metalaxyl/thiram Myclobutanil	51 115 2,880	73 408							125 115 3,288	0.01 0.01 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 Cypermethrin Deltamethrin Imidacloprid Malathion Permethrin	- - - - -			183 2,880 73 37	417	365			549 2,880 73 417 77 37	<0.01 0.01 <0.01 0.04 0.01 <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 Permethrin/sulphur/triforine	276	365		653				7,546 2,836	8,840 2,836	0.30 0.50
All mixed formulations	276	365	•	653		•	•	10,382	11,676	0.79

Table 15Field 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)	
Fungicides							
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	
Herbicides & desiccants							
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	
Insecticides							
Chlorpyrifos			1,333		1,333	0.06	
Dimethoate			6,000		6,000	0.18	
All insecticides		•	7,333	•	7,333	0.25	
Molluscicides							
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.

			General			Total area	Total
	Damping	Disease	weed		Narcissi	treated	quantity
Pesticide type & formulation	off	control	control	Aphids	fly	(sp m ²)	applied (kg)
Fungicides							
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
Herbicides & desiccants							
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
Insecticides							
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 m ²)	Total quantity applied (kg)
Herbicides & desiccants				
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
Insecticides				
Chlorpyrifos		6,938	6,938	0.25
All insecticides		6,938	6,938	0.25

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

							Total quantity	Total area
	Wee	ds on site	S	lugs	Bu	lbs	applied	treated
Pesticide type & formulation	(kg)	(sp m ²)	(kg)	(sp m ²)	(kg)	(sp m ²)	(kg)	(sp m ²)
Herbicides & desiccants								
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
Molluscicides								
Metaldehyde			6.44	124,274			6.44	124,274
All molluscicides	•		6.44	124,274			6.44	124,274
Mixed formulations								
Bupirimate/pirimicarb/triforine					<0.1	933	< 0.1	933
All mixed formulations					<0.1	933	<0.1	933

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

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

Northern Ireland Pesticide Usage Survey Published Reports Appendix 1

Report No.	Report title	ISBN
99	Grassland & Fodder Crops 1989	1-855 27 079 X
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
111	Mushroom Crops 1991	1-855 27 150 8
117	Arable Crops 1992	1-855 27 193 1
118	Top Fruit Crops 1992	1-855 27 194 X
124	Grassland & Fodder crops 1993	1-855 27 221 0
131	Forestry 1993	1-855 27 282 2
132	Arable Crops 1994	1-855 27 314 4
139	Vegetable Crops 1995	1-855 27 346 2
140	Mushroom Crops 1995	1-855 27 347 0
146	Arable Crops 1996	1-855.27.469.8
147	Top fruit 1996	1-855.27.470.1
156	Grassland and Fodder Crops 1997	1-855.27.506.6
157	Sheep Treatments 1997	1-855.27.425.6
167	Soft Fruit 1998	1-85527.540.6
168	Arable Crops 1998	1-85527.536.8
169	Vegetable Crops 1999	1-85527.561.9
170	Mushroom Crops 1999	1-85527.549.X
177	Arable Crops 2000	1-85527.670.4
178	Top Fruit Crops 2002	1-855.27.618.6
194	Arable Crops 2002	1-85527.674.7
201	Protected Ornamental Crops	1-85527.739.5

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