

PESTICIDE USAGE IN NORTHERN IRELAND  
SURVEY REPORT 218

## **NORTHERN IRELAND SOFT FRUIT CROPS 2006**



Agriculture, Fishing and Forestry

# PESTICIDE USAGE SURVEY REPORT 218

## Northern Ireland Soft Fruit Crops 2006

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## The County Regions of Northern Ireland



## SUMMARY

This report presents information from a survey of pesticide usage practices on soft fruit crops in Northern Ireland in 2006. It is the third pesticide survey to be conducted on soft fruit crops in the region. Data was collected from 28 growers representing 82% of all soft fruit holdings in Northern Ireland. The data has been raised to give estimates of regional pesticide usage.

Compared with the previous survey in 1998, the total area of soft fruit crops grown has decreased by 45% to an estimated 27 hectares (ha). The quantity of pesticide used decreased accordingly (57%), with the area treated with pesticides decreasing by 25% between 1998 and 2006.

A total of 188 kilograms of pesticides were applied to 211 spray hectares of soft fruit crops in 2006.

Fungicide usage decreased by 12% compared to 1998. Fungicides were applied to 64% of the total pesticide-treated area representing 52% of the total weight of pesticides used in 2006. Iprodione and myclobutanil were the most commonly used fungicides.

Herbicide usage decreased by an estimated 59% compared with 1998. Herbicide active ingredients were applied to 12% of the total pesticide-treated area (15% of the total weight of pesticides used). In common with 1998, paraquat was the most commonly used herbicide.

Insecticide usage decreased by 9% compared with 1998, despite the 45% decrease in area of soft fruit grown. Insecticide active ingredients accounted for 18% of the total pesticide-treated area and 4% of the total weight of pesticides applied in 2006. Pyrethroids replaced organophosphates as the most commonly used insecticide type with the active ingredient bifenthrin being the most frequently applied.

Biopesticides (including macro-organisms and natural products) were applied to 5% of the treated area in 2006, compared with 1% in 1998. Applications were principally to control vine weevil and two-spotted spider mite (*Tetranychus urticae*).

The three most frequently used active ingredients were the fungicides Iprodione, myclobutanil and tolylfluanid. The area treated with myclobutanil in 2006 remained similar to 1998, with approximately 29 hectares treated in 2006 and 27 hectares treated in 1998.

## 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, including all repeated applications to the basic area.
- ‘Reasons for use’; the reasons reported for the use of pesticides are the growers stated reason for use and may sometimes not reflect label recommendations.
- Some treatments to soft fruit are restricted to the plants themselves or to the ground between them. For the purposes of this report where a field or crop is referred to, it is assumed the entire field / area was treated with the exception of herbicide usage where 40% of the total area treated for strawberries and 50% of the area treated of cane fruit is accounted for by will the inter-row area within these crops
- ‘Rounding’ due to rounding of figures, there may be slight differences in totals both within and between tables.
- ‘Other’ in pesticide formulations refers to soil fumigants.

## INTRODUCTION

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

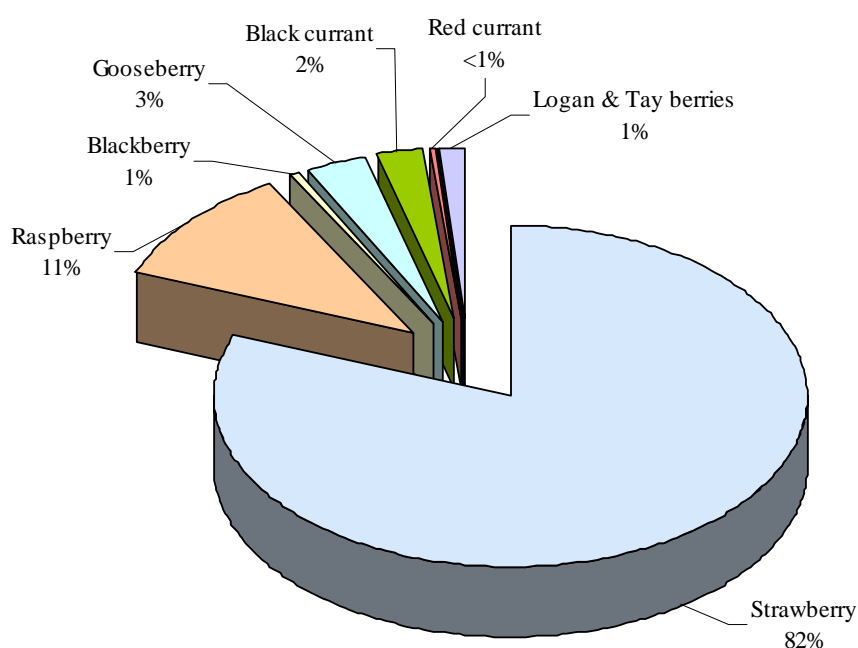
This is the third survey of pesticide usage on soft fruit crops in Northern Ireland. Results from the previous surveys reported on pesticide usage practices on soft fruit crops in 1990 (Kidd *et al.*, 1994) and 1998 (Kearns *et al.*, 2002) are included in the report for comparative purposes. A list of published Northern Ireland Pesticide Usage Survey reports is shown in Appendix 1.

The soft fruit industry in Northern Ireland has continually decreased in size from an estimated 75 hectares in 1990 to 27 hectares in 2006. Of the 27 ha grown, 49% (13.23 ha) were protected crops grown under protection and the remaining 51% (13.69ha) were grown in field conditions.

The crop types recorded in this survey and their area grown in hectares (ha) were strawberries (21.58ha), raspberries (2.91ha), black currants (0.66ha), red currants (0.05ha), blackberries (0.20ha), gooseberries (0.89ha), blueberries (0.01ha), and loganberries/tayberries (0.36ha). The crop types and corresponding area surveyed are shown in Table 3 and Figure 1.

Soft fruit grown in the field and under permanent protection (glasshouse, polytunnel etc.) were recorded in this survey. The principal pests and diseases recorded were aphids, mites, vine weevil, *Botrytis* and mildew.

**Figure 1:** Distribution of the soft fruit area grown in Northern Ireland, 2006.

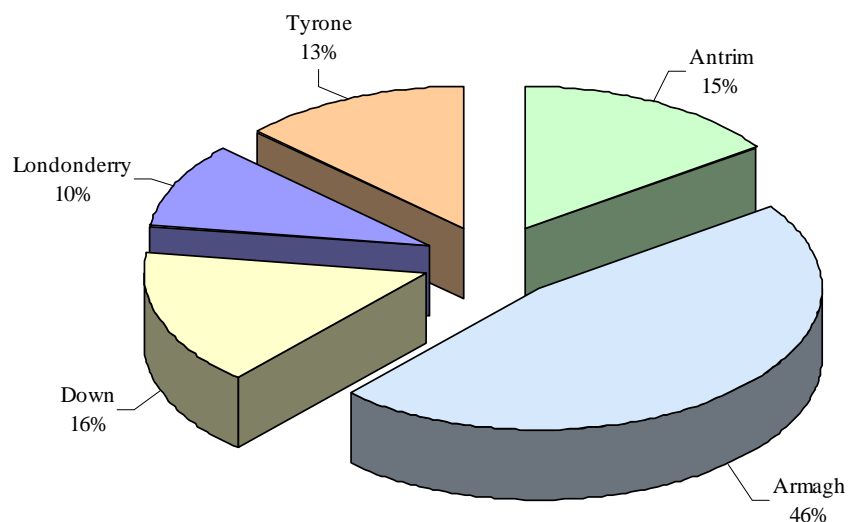


## METHODS

Using the Northern Ireland Agricultural Census, June 2005 (Anon., 2006), and a list of growers from the Department of Agriculture Northern Ireland the population of soft fruit growers were established and selected. A preliminary letter was sent to growers explaining the purpose of the survey. Of a possible population of 34 growers, 28 holdings participated in the survey. Growers were visited during January 2007 and data relating to pesticide usage were collected by personal interview. This survey covers the period from September 2005 to September 2006. The grower's stated reasons for pesticide use were also included, but may not always seem appropriate. The sample data were raised to the population and the collected data were analysed using SPSS software. (Table 1, Figure 2).



**Figure 2:** The regional distribution of soft fruit crops grown in Northern Ireland, 2006.



## PESTICIDE USAGE ON CROPS

### STRAWBERRIES

Strawberries were grown on 16.25 hectares, however 33% of the area had two crops grown on it during the survey period giving an overall basic area of 21.59ha. An estimated 43% of all strawberry crops were field grown and 57% were grown under protection.

Pesticide applications to strawberries represented 91% of the total pesticide treated area (60% of the weight of pesticides used). Fungicides accounted for 63% (73%), herbicides 11% (20%), insecticides 18% (6%), molluscicides 1% (1%) and biopesticides 6% (Tables 4 & 5).

Overall, 74% of fruiting strawberry crops and all non-fruiting strawberry crops received a pesticide application. Fungicides were applied to 84% of fruiting crops with an average of seven spray applications. An estimated 72% of fruiting strawberry crops received insecticide treatment with an average of three applications (Table 6)

#### *Outdoor strawberries (Table 11)*

This crop accounted for 35% of all soft fruit grown in the province in 2006 (Table 3).

Fungicides accounted for 47% of the pesticide-treated area, 52% of the weight of pesticide applied (Tables 4 & 5). Pesticides applied to control fruit rot (*Botrytis*) accounted for 72% of the fungicide-treated area. Tolyfluanid the most commonly used active ingredient was applied to 48% of the fungicide-treated area. Myclobutanil was also commonly used.

Herbicides accounted for 32% of the pesticide-treated area, 41% of the weight of pesticide applied (Tables 4 & 5). Paraquat was the active ingredient most extensively used, applied to 28% of the herbicide-treated area. Simazine (14%) and lenacil (14%) were also frequently used.

Insecticides accounted for 14% of the pesticide-treated area and 4% of the weight of pesticide applied (Tables 4 & 5). An estimated 37% of insecticides were applied to control aphids, with a further 33% of applications to control two-spotted spider mite. The most extensively used active ingredient was bifenthrin, accounting for 60% of the insecticide-treated area but only 5% of the weight of pesticide applied. Conversely, chlorpyrifos accounted for 89% of the weight of pesticide applied and 35% of applications to the insecticide-treated area.

Molluscicides accounted for 3% of both the pesticide-treated area and the weight of pesticide applied. Metaldehyde was the only molluscicide recorded in use.

Biopesticides accounted for 4% of applications to the treated area of this crop. The predatory mite *Phytoseiulus persimilis*, applied to control two-spotted spider mite and the entomopathogenic nematode *Steinernema feltiae* were the two biological controls recorded, with the latter applied solely to control vine weevil, accounting for 63% of the area treated with biopesticides.

### *Protected strawberries (Table 12)*

Protected strawberries accounted for 46% of all soft fruit crops recorded in Northern Ireland in 2006.

Fungicides accounted for 71% of the pesticide-treated area, 87% of the weight of pesticides applied. Fungicides used to control mildews and *Botrytis* were applied to 90% of the fungicide-treated area. The active ingredient bupirimate was the principal fungicide used to control mildew. Iprodione, principally applied to control *Botrytis*, was the fungicide active ingredient most extensively used overall.

Herbicides accounted for 2% of the pesticide-treated area, 3% of the weight of pesticides applied. In common with 1998, paraquat remained the most frequently used herbicide active ingredient.

Insecticides accounted for 20% of the pesticide-treated area, 8% of the weight of pesticides applied. Aphids (52%) and two-spotted spider mites (37%) were the main reasons given for application of insecticides. The carbamate pirimicarb was the most extensively used insecticide active ingredient, accounting for 35% of the insecticide-treated area and 40% of the weight of insecticides applied. The active ingredient bifenthrin was also extensively used.

Biopesticides accounted for 7% of applications to the pesticide-treated area. *Phytoseiulus persimilis* were applied to 48% of the area treated with biopesticides, to control two-spotted spider mites.

## RASPBERRIES

Raspberries accounted for 14% of the total area of soft fruit grown, with 90% of the crop grown in the field and 10% under permanent protection.

Pesticide applications to raspberries represented 6% of the total pesticide-treated area and 36% of the weight of pesticides used. The use of the soil fumigant dazomet accounted for 78% of the weight of pesticides used, this should be taken into consideration when comparing quantity and usage figures for raspberry crops.

Overall, fungicides were applied to 69% of the pesticide-treated area (17% of the weight of pesticides applied), herbicides 21% (4%), insecticides 8% (<1%) and biological controls were applied to <1% (Tables 4 & 5).

Fungicides were applied to 72% of raspberry crops on average over three spray applications, with 33% of crops receiving a single insecticide application. Approximately 19% of the area grown received a herbicide application to control weeds (Table 6).

### *Outdoor raspberries (Table 13)*

Fungicides accounted for 69% of the pesticide-treated area, 78% of the weight of pesticides applied (Table 4 & 5). Tolyfluanid, the most commonly used fungicide active ingredient, was applied to 71% of the fungicide-treated area. Pesticides applied to control *Botrytis* accounted for 97% of fungicide applications.

Herbicides accounted for 22% of the pesticide-treated area, 18% of the weight of pesticide applied (Tables 4 & 5). An estimated 29% of all herbicide applications to outdoor raspberries were applied to eliminate weeds prior to planting the crop.

Insecticides accounted for 9% of the pesticide-treated area and 4% of the weight of pesticide applied (Tables 4 & 5). The only insecticide active ingredient used was chlorpyrifos, applied to control raspberry cane midge.

No molluscicides or biopesticides were recorded in use on outdoor raspberries.

### *Protected raspberries (Table 14)*

The use of the soil fumigant dazomet accounted for 11% of the pesticide-treated area but 99% of the weight of pesticides applied to this crop and has a significant influence on the total weight of pesticides used.

Fungicides accounted for 76% of the pesticide-treated area, 1% of the weight of pesticides applied (Tables 4 & 5). Fungicides used to control *Botrytis* were applied to 63% of the fungicide-treated area, with a further 25% of fungicide applications for control of leaf rust.

Herbicides accounted for 13% of the pesticide-treated area and <1% of the weight of pesticides applied. Paraquat and simazine were the only herbicides recorded used to control weeds.

No insecticides were recorded use on protected raspberry crops.

Biopesticides accounted for 1% of applications to the pesticide-treated area. The plant-derived active ingredient azadirachtin was applied to control vine weevil.

## GOOSEBERRIES

Gooseberries were grown on approximately 4% of the soft fruit crop area, with 24% of the crop grown under protection and the remaining 76% grown outdoors.

Pesticide applications to gooseberries represented 1% of both the total pesticide-treated area and the weight of pesticides applied. Fungicides were applied to 57% of the pesticide-treated area (50% of the weight of pesticides applied), herbicides 12% (39%) and insecticides 31% (10%), (Tables 4 & 5).

Overall, 52% of gooseberry crops received a pesticide treatment, with 38% of crops getting a fungicide and 78% of crops receiving a single insecticide application. Herbicide treatments were applied to 14% of the crop area, generally over two spray applications (Table 6).

### *Outdoor gooseberries (Table 15)*

Fungicides accounted for 53% of the pesticide-treated area, 28% of the weight of pesticides applied (Table 4 & 5). Tolyfluanid, the most commonly used fungicide active ingredient, was applied to 56% of the fungicide-treated area.

Herbicides accounted for 16% of the pesticide-treated area, 58% of the weight of pesticides applied (Tables 4 & 5). An estimated 33% of all herbicide applications were applied pre-planting for ground preparation.

Insecticides accounted for 31% of the pesticide-treated area and 14% of the weight of pesticide applied (Tables 4 & 5). The only insecticide active ingredient applied was chlorpyrifos, to control gooseberry sawfly (*Nematus ribesii*).

No molluscicides or biopesticides were recorded used on outdoor gooseberries.

### *Protected gooseberries. (Table 16)*

Fungicides accounted for 67% of the pesticide-treated area, 98% of the weight of pesticides applied (Tables 4 & 5). The only fungicide active ingredient applied was copper oxychloride to control mildew.

Insecticides accounted for the remaining 33% of applications to the pesticide-treated area, 2% of the weight of pesticides applied. Tebufenpyrad was the only insecticide active ingredient recorded used.

No herbicides or biopesticides were recorded use on protected gooseberries.

## **OTHER SOFT FRUIT CROPS (TABLES 17-22)**

Other soft fruit crops comprised blackberries, black and red currants, blueberries, loganberries and tayberries and collectively accounted for 6% of the area of soft fruit crops grown in 2006.

Fungicides accounted for 81% of the pesticide-treated area for these crops collectively, 66% of the weight of pesticides applied, herbicides 11% (33%), insecticides 4% (<1%) and biopesticides applied only to protected blackberries only accounted for 4% of the pesticide-treated area.

All crops in this group received fungicides. The active ingredient tolylfluanid was applied to all crops, principally for the control of botrytis. Chlorothalonil and

copper oxychloride were the two other fungicides used, the latter to control mildew in protected blackberry crops.

The herbicide active ingredient paraquat applied to all crops, with the exception of protected blackberry crops which received no herbicide treatment and accounted for 21% of the herbicide-treated area of these crops collectively. Glyphosate, applied only to black currant crops accounted for 57% of the herbicide-treated area (Table 7).

Tebufenpyrad was the only insecticide active ingredient used, on protected blackberry crops only.

The biological control agent *Phytoseiulus persimilis* was applied to protected blackberry crops only, to control two-spotted spider mite.

## COMPARISON WITH PREVIOUS SURVEYS

Comparative information on pesticide usage on soft fruit crops grown in Northern Ireland in 1990, 1998 and 2006 are shown in Table 23.

The total area of soft fruit in Northern Ireland declined from 49 hectares in 1998 to 27 hectares in 2006. The area grown of blackberries, loganberries and tayberries remained similar to 1998, with all other crops decreasing in area grown. The area of strawberries grown decreased by 56% and raspberries by 67%, compared to 1998. This was reflected in the pesticide usage, which saw the quantity of fungicides decrease by 48%, herbicides by 71%, insecticides by 54% and molluscicides by 87%. However, the area treated with biological controls increased 8-fold from 1.5 hectares treated in 1998 to 11.4 hectares treated in 2006.

The area of strawberries grown in 2006 reduced by 56% compared with 1998 and this is reflected in the quantities of fungicide and insecticide used, decreasing by 48% and 47% respectively. However, the area treated with fungicides and insecticides reduced only marginally by 8% and 5% respectively when compared with 1998 (Table 24).

## ACKNOWLEDGEMENTS

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Kidd, S.L.B., Jess, S., McCallion, T. (1994) Soft Fruit Crops 1990. *Pesticide Usage Survey Report 106* Belfast: HMSO.

Kearns, C.A., Jess, S., Matthews, D., McCallion, T. (2002) Soft Fruit Crops 1998. *Pesticide Usage Survey Report 167* Belfast: Textflow Astron.

**Table 1:** Number of holdings in each region and area of soft fruit crops sampled in Northern Ireland, 2006 (hectares).

County	Total number of holdings	Number of holdings sampled	Area of holding sampled (ha)	Raised area of population (ha)
Antrim	6	3	2.77	3.37
Armagh	17	14	7.30	8.87
Down	3	3	2.81	3.41
Fermanagh	.	.	.	.
Londonderry	2	2	2.12	2.57
Tyrone	6	6	2.56	3.11
<i>Northern Ireland</i>	34	28	17.57	21.33

**Table 2:** Number and area of Soft fruit crops surveyed (hectares) in Northern Ireland, 2006.

Crop & Location	No. of crops Surveyed	Surveyed area (ha)
Strawberries Outdoor	14	7.58
Strawberries Protected	29	10.19
Raspberry Outdoor	5	2.15
Raspberry Protected	5	0.25
Blackberry Outdoor	1	0.10
Blackberry Protected	2	0.07
Gooseberry Outdoor	3	0.56
Gooseberry Protected	1	0.18
Black currant	5	0.54
Red currant Outdoor	2	0.03
Red currant Protected	1	0.01
Blueberry	1	0.01
Loganberry & Tayberry	2	0.30
<i>All crops</i>	71	21.97

**Table 3:** Estimated area (hectares) of soft fruit crops grown in Northern Ireland, 2006.

Crop Type	Location		Total
	Protected	Outdoor	
Strawberries (fruiting)	12.22	9.21	21.43
Strawberries (non-fruiting)	0.16	.	0.16
Raspberry	0.31	2.61	2.91
Blackberry	0.08	0.12	0.20
Gooseberry	0.22	0.68	0.89
Black currant	.	0.66	0.66
Red currant	0.01	0.04	0.05
Blueberry	.	0.01	0.01
Loganberry & Tayberry	.	0.36	0.36
<i>All crops</i>	12.99	13.69	26.67



**Table 4:** Total area (spray hectares) and the basic area treated (hectares), of soft fruit crops in Northern Ireland 2006 treated with each pesticide type.

Crop & location	Fungicides		Herbicides		Insecticides		Molluscicides		Biopesticides		Other		All pesticides	
	(sp ha)	(ha)	(sp ha)	(ha)	(sp ha)	(ha)	(sp ha)	(ha)	(sp ha)	(ha)	(sp ha)	(ha)	(sp ha)	(ha)
<i>Protected</i>														
Strawberries (fruiting)	90.41	9.61	2.33	1.85	26.52	10.48	.	.	8.17	4.28	.	.	127.43	10.88
Strawberries (non-fruiting)	1.74	0.16	.	.	0.16	0.16	.	.	0.47	0.16	.	.	2.37	0.16
Raspberry	0.79	0.18	0.13	0.07	.	.	.	.	0.01	0.01	0.11	0.11	1.04	0.18
Gooseberry	0.44	0.22	.	.	0.22	0.22	.	.	.	.	.	.	0.66	0.22
Blackberry	0.15	0.07	.	.	0.07	0.07	.	.	0.07	0.07	.	.	0.29	0.07
<i>All Protected</i>	<b>93.52</b>	<b>10.25</b>	<b>2.46</b>	<b>1.91</b>	<b>26.97</b>	<b>10.93</b>	<b>.</b>	<b>.</b>	<b>8.72</b>	<b>4.52</b>	<b>0.11</b>	<b>0.11</b>	<b>131.78</b>	<b>11.51</b>
<i>Outdoor</i>														
Strawberries (fruiting)	29.39	8.21	19.67	3.50	8.94	5.01	1.72	0.86	2.67	1.70	.	.	62.39	4.96
Raspberry	7.49	1.91	2.43	0.50	0.97	0.97	.	.	.	.	.	.	10.89	0.70
Blueberry	0.07	0.01	<0.01	<0.01	.	.	.	.	.	.	.	.	0.08	<0.01
Gooseberry	0.85	0.12	0.26	0.13	0.49	0.49	.	.	.	.	.	.	1.60	0.25
Black currant	2.25	0.43	0.55	0.20	.	.	.	.	.	.	.	.	2.80	0.20
Red currant	0.22	0.04	0.02	0.01	.	.	.	.	.	.	.	.	0.24	0.01
Blackberry	0.36	0.12	0.05	0.05	.	.	.	.	.	.	.	.	0.41	0.05
Loganberry & Tayberry	0.73	0.12	0.13	0.13	.	.	.	.	.	.	.	.	0.86	0.13
<i>All Outdoor</i>	<b>41.36</b>	<b>10.95</b>	<b>23.11</b>	<b>4.52</b>	<b>10.40</b>	<b>6.46</b>	<b>1.72</b>	<b>0.86</b>	<b>2.67</b>	<b>1.70</b>	<b>.</b>	<b>.</b>	<b>79.27</b>	<b>6.31</b>
<i>All locations</i>														
Strawberries (fruiting)	119.80	17.82	22.00	5.34	35.46	15.49	1.72	0.86	10.84	5.98	.	.	189.82	15.84
Strawberries (non-fruiting)	1.74	0.16	.	.	0.16	0.16	.	.	0.47	0.16	.	.	2.37	0.16
Raspberry	8.28	2.09	2.56	0.56	0.97	0.97	.	.	0.01	0.01	0.11	0.11	11.93	0.88
Blueberry	0.07	0.01	<0.01	<0.01	.	.	.	.	.	.	.	.	0.08	<0.01
Gooseberry	1.29	0.34	0.26	0.13	0.70	0.70	.	.	.	.	.	.	2.26	0.47
Black currant	2.25	0.43	0.55	0.20	.	.	.	.	.	.	.	.	2.80	0.20
Red currant	0.22	0.04	0.02	0.01	.	.	.	.	.	.	.	.	0.24	0.01
Blackberry	0.51	0.19	0.05	0.05	0.07	0.07	.	.	0.07	0.07	.	.	0.70	0.12
Loganberry & Tayberry	0.73	0.12	0.13	0.13	.	.	.	.	.	.	.	.	0.86	0.13
<i>Total</i>	<b>134.88</b>	<b>21.20</b>	<b>25.57</b>	<b>6.43</b>	<b>37.37</b>	<b>17.39</b>	<b>1.72</b>	<b>0.86</b>	<b>11.40</b>	<b>6.22</b>	<b>0.11</b>	<b>0.11</b>	<b>211.05</b>	<b>17.82</b>

**Table 5:** Total quantity (kilograms) of pesticide type applied to soft fruit crops in Northern Ireland, 2006.

Crop & location	Fungicides	Herbicides	Insecticides	Molluscicides	Other	All pesticides
<i>Protected</i>						
Strawberries (fruiting)	55.08	2.20	4.86	.	.	62.15
Strawberries (non-fruiting)	0.77	.	0.09	.	.	0.86
Raspberry	0.60	0.12	.	.	53.02	53.75
Gooseberry	0.86	.	0.02	.	.	0.88
Blackberry	0.29	.	0.01	.	.	0.29
<i>All Protected</i>	<b>57.61</b>	<b>2.32</b>	<b>4.98</b>	<b>.</b>	<b>53.02</b>	<b>117.93</b>
<i>Outdoor</i>						
Strawberries (fruiting)	25.57	20.04	1.88	1.29	.	48.79
Raspberry	11.24	2.65	0.52	.	.	14.41
Blueberry	0.09	<0.01	.	.	.	0.10
Gooseberry	0.51	1.07	0.26	.	.	1.85
Black currant	1.03	0.82	.	.	.	1.85
Red currant	0.27	0.02	.	.	.	0.29
Blackberry	0.41	0.04	.	.	.	0.45
Loganberry & Tayberry	0.91	0.64	.	.	.	1.55
<i>All Outdoor</i>	<b>40.04</b>	<b>25.28</b>	<b>2.67</b>	<b>1.29</b>	<b>.</b>	<b>69.28</b>
<i>All locations</i>						
Strawberries (fruiting)	80.65	22.25	6.75	1.29	.	110.94
Strawberries (non-fruiting)	0.77	.	0.09	.	.	0.86
Raspberry	11.84	2.77	0.52	.	53.02	68.16
Blueberry	0.09	<0.01	.	.	.	0.10
Gooseberry	1.37	1.07	0.28	.	.	2.73
Black currant	1.03	0.82	.	.	.	1.85
Red currant	0.27	0.02	.	.	.	0.29
Blackberry	0.70	0.04	0.01	.	.	0.75
Loganberry & Tayberry	0.91	0.64	.	.	.	1.55
<i>All crops</i>	<b>97.65</b>	<b>27.60</b>	<b>7.65</b>	<b>1.29</b>	<b>53.02</b>	<b>187.22</b>

**Table 6:** The proportional area (%) of each crop treated with pesticides and the mean number of spray applications.

Crop Type	Fungicides		Herbicides		Insecticides		Molluscicides		Biopesticides		All pesticides	
	%	sp app.	%	sp app.	%	sp app.	%	sp app.	%	sp app.	%	sp app.
Strawberries (fruiting)	83.18	6.63	24.94	2.88	72.28	2.58	4.02	2.00	27.91	1.57	73.91	3.94
Strawberries (non-fruiting)	100.00	11.00	.	.	100.00	1.00	.	.	100.00	3.00	100.00	5.00
Raspberry	71.67	3.00	19.38	3.00	33.33	1.00	.	.	0.42	1.00	30.33	2.69
Blueberry	100.00	6.00	40.00	1.00	.	.	.	.	.	.	40.00	3.50
Gooseberry	38.04	4.50	14.40	2.00	78.80	1.00	.	.	.	.	52.45	2.50
Black currant	64.70	5.50	29.94	1.75	.	.	.	.	.	.	29.94	3.00
Red currant	78.95	6.00	26.84	2.00	.	.	.	.	.	.	26.84	3.33
Blackberry	96.39	2.50	24.10	1.00	36.14	1.00	.	.	36.14	1.00	60.24	1.60
Loganberry & Tayberry	33.33	6.00	36.67	1.00	.	.	.	.	.	.	36.67	2.67
<i>All crops</i>	79.47	5.96	24.12	2.42	65.21	2.36	3.23	2.00	23.33	1.59	66.79	3.61

**Table 7:** Estimated area (spray hectares) of soft fruit crops treated with pesticide formulations in Northern Ireland 2006.

Pesticide Formulation	Strawberries (fruiting)	Strawberries (non-fruiting)	Raspberry	Blueberry	Gooseberry	Black currant	Red currant	Blackberry	Loganberry & Tayberry	All crops
<i>Fungicides</i>										
Azoxystrobin	6.33	0.32	0.12	.	.	.	.	.	.	6.76
Boscalid/pyraclostrobin	0.58	.	.	.	.	.	.	.	.	0.58
Bupirimate	6.57	0.32	.	.	.	.	.	.	.	6.88
Captan	0.25	.	.	.	.	.	.	.	.	0.25
Carbendazim	1.94	.	0.06	.	.	.	.	.	.	2.00
Chlorothalonil	0.42	.	1.94	0.02	.	1.76	0.07	.	0.24	4.46
Copper oxychloride	.	.	.	.	0.44	.	.	0.15	.	0.58
Fenhexamid	5.12	.	.	.	0.12	.	.	.	.	5.24
Fenhexamid/tolyfluanid	1.08	.	.	.	.	.	.	.	.	1.08
Fenpropimorph	1.35	.	0.12	.	0.12	.	.	.	.	1.59
Fluazinam	.	.	0.21	.	.	.	.	.	.	0.21
Fosetyl-aluminium	5.48	.	.	.	.	.	.	.	.	5.48
Iprodione	29.46	0.32	0.12	.	.	.	.	.	.	29.89
Mepanipyrim	4.19	0.16	.	.	.	.	.	.	.	4.35
Myclobutanil	28.54	0.32	.	.	0.12	.	.	.	.	28.98
Pyrimethanil	9.38	0.32	0.12	.	.	.	.	.	.	9.81
Quinoxifen	0.25	.	.	.	.	.	.	.	.	0.25
Thiram	1.62	.	.	.	.	.	.	.	.	1.62
Tolyfluanid	17.26	.	5.59	0.05	0.49	0.49	0.15	0.36	0.49	24.86
<i>All fungicides</i>	119.80	1.74	8.28	0.07	1.29	2.25	0.22	0.51	0.73	134.88
<i>Herbicides</i>										
Clopyralid	0.49	.	.	.	.	.	.	.	.	0.49
Cycloxydim	.	.	0.61	.	.	.	.	.	.	0.61
Dichlobenil	.	.	.	.	0.12	0.02	.	.	0.09	0.23

Table 7 (cont): Estimated area (spray hectares) of soft fruit crops treated with pesticide formulations in Northern Ireland 2006.

	Strawberries (fruiting)	Strawberries (non-fruiting)	Raspberry	Blueberry	Gooseberry	Black currant	Red currant	Blackberry	Loganberry & Tayberry	All crops
<i>Herbicides (cont.)</i>										
Diquat	0.97	.	.	.	.	.	.	.	.	0.97
Ethofumesate	0.86	.	.	.	.	.	.	.	.	0.86
Glufosinate-ammonium	0.04	.	.	.	.	.	.	.	.	0.04
Glyphosate	2.30	.	.	.	.	0.43	.	.	.	2.72
Isoxaben	1.17	.	0.05	.	.	.	.	.	.	1.21
Lenacil	2.50	.	.	.	.	.	.	.	.	2.50
Napropamide	0.24	.	.	.	.	.	.	.	.	0.24
Paraquat	6.85	.	0.52	<0.01	0.01	0.05	0.01	0.05	0.05	7.54
Pendimethalin	0.86	.	0.61	.	0.07	0.03	<0.01	.	.	1.57
Phenmedipham	0.49	.	.	.	.	.	.	.	.	0.49
Propyzamide	1.35	.	0.61	.	0.07	0.03	<0.01	.	.	2.05
Sethoxydim	0.73	.	.	.	.	.	.	.	.	0.73
Simazine	3.16	.	0.17	.	.	.	.	.	.	3.33
Triclopyr	<0.01	.	.	.	.	.	.	.	.	<0.01
<i>All herbicides</i>	22.00	.	2.56	<0.01	0.26	0.55	0.02	0.05	0.13	25.57
<i>Insecticides</i>										
Abamectin	1.71	.	.	.	.	.	.	.	.	1.71
Bifenthrin	12.89	.	.	.	.	.	.	.	.	12.89
Chlorpyrifos	5.00	0.16	0.97	.	0.49	.	.	.	.	6.62
Clofentezine	3.56	.	.	.	.	.	.	.	.	3.56
Cypermethrin	0.02	.	.	.	.	.	.	.	.	0.02
Dimethoate	0.02	.	.	.	.	.	.	.	.	0.02
Fenbutatin oxide	0.29	.	.	.	.	.	.	.	.	0.29
Nicotine	1.46	.	.	.	.	.	.	.	.	1.46

**Table 7 (cont):** Estimated area (spray hectares) of soft fruit crops treated with pesticide formulations in Northern Ireland 2006.

	Strawberries (fruiting)	Strawberries (non-fruiting)	Raspberry	Blueberry	Gooseberry	Black currant	Red currant	Blackberry	Loganberry & Tayberry	All crops
<i>Insecticides (cont)</i>										
Pirimicarb	9.97	.	.	.	.	.	.	.	.	9.97
Tebufenpyrad	0.53	.	.	.	0.22	.	.	0.07	.	0.83
<i>All insecticides</i>	<b>35.46</b>	<b>0.16</b>	<b>0.97</b>	<b>.</b>	<b>0.70</b>	<b>.</b>	<b>.</b>	<b>0.07</b>	<b>.</b>	<b>37.37</b>
<i>Molluscicides</i>										
Metaldehyde	1.72	.	.	.	.	.	.	.	.	1.72
<i>All molluscicides</i>	<b>1.72</b>	<b>.</b>	<b>.</b>	<b>.</b>	<b>.</b>	<b>.</b>	<b>.</b>	<b>.</b>	<b>.</b>	<b>1.72</b>
<i>Biopesticides</i>										
Azadirachtin	1.46	0.16	0.01	.	.	.	.	.	.	1.63
<i>Phytoseiulus persimilis</i>	4.86	0.32	.	.	.	.	.	0.07	.	5.25
<i>Steinernema feltiae</i>	4.52	.	.	.	.	.	.	.	.	4.52
<i>All biopesticides</i>	<b>10.84</b>	<b>0.47</b>	<b>0.01</b>	<b>.</b>	<b>.</b>	<b>.</b>	<b>.</b>	<b>0.07</b>	<b>.</b>	<b>11.40</b>
<i>Other</i>										
Dazomet	.	.	0.11	.	.	.	.	.	.	0.11
<i>All others</i>	<b>.</b>	<b>.</b>	<b>0.11</b>	<b>.</b>	<b>.</b>	<b>.</b>	<b>.</b>	<b>.</b>	<b>.</b>	<b>0.11</b>
<i>All pesticides</i>	<b>189.82</b>	<b>2.37</b>	<b>11.93</b>	<b>0.07</b>	<b>2.26</b>	<b>2.80</b>	<b>0.24</b>	<b>0.70</b>	<b>0.86</b>	<b>211.05</b>

**Table 8:** Estimated quantities (kilograms) of pesticide active ingredients applied to soft fruit crops in Northern Ireland 2006.

	Strawberries (fruiting)	Strawberries (non-fruiting)	Raspberry	Blueberry	Gooseberry	Black currant	Red currant	Blackberry	Loganberry & Tayberry	All crops
<b>Pesticide Formulation</b>										
<i>Fungicides</i>										
Azoxystrobin	4.65	0.24	0.09	.	.	.	.	.	.	4.98
Boscalid/pyraclostrobin	0.15	.	.	.	.	.	.	.	.	0.15
Bupirimate	2.23	0.08	.	.	.	.	.	.	.	2.31
Captan	0.99	.	.	.	.	.	.	.	.	0.99
Carbendazim	0.80	.	0.03	.	.	.	.	.	.	0.83
Chlorothalonil	0.39	.	4.37	0.05	.	0.66	0.16	.	0.55	6.19
Copper oxychloride	.	.	.	.	0.86	.	.	0.29	.	1.15
Fenhexamid	3.31	.	.	.	0.07	.	.	.	.	3.38
Fenhexamid/tolyfluanid	1.06	.	.	.	.	.	.	.	.	1.06
Fenpropimorph	0.92	.	0.07	.	0.07	.	.	.	.	1.06
Fluazinam	.	.	0.09	.	.	.	.	.	.	0.09
Fosetyl-aluminium	12.31	.	.	.	.	.	.	.	.	12.31
Iprodione	17.19	0.18	0.07	.	.	.	.	.	.	17.44
Mepanipyrim	1.58	0.06	.	.	.	.	.	.	.	1.64
Myclobutanil	1.97	0.02	.	.	0.01	.	.	.	.	2.00
Pyrimethanil	7.97	0.19	0.07	.	.	.	.	.	.	8.23
Quinoxifen	0.06	.	.	.	.	.	.	.	.	0.06
Thiram	4.10	.	.	.	.	.	.	.	.	4.10
Tolyfluanid	20.98	.	7.05	0.04	0.37	0.37	0.11	0.41	0.37	29.69
<i>All fungicides</i>	<b>80.65</b>	<b>0.77</b>	<b>11.84</b>	<b>0.09</b>	<b>1.37</b>	<b>1.03</b>	<b>0.27</b>	<b>0.70</b>	<b>0.91</b>	<b>97.65</b>
<i>Herbicides</i>										
Clopyralid	0.10	.	.	.	.	.	.	.	.	0.10
Cycloxydim	.	.	0.12	.	.	.	.	.	.	0.12
Dichlobenil	.	.	.	.	0.85	0.17	.	.	0.60	1.62

Table 8 (cont): Estimated quantities (kilograms) of pesticide active ingredients applied to soft fruit crops in Northern Ireland 2006.

	Strawberries (fruiting)	Strawberries (non-fruiting)	Raspberry	Blueberry	Gooseberry	Black currant	Red currant	Blackberry	Loganberry & Tayberry	All crops
<i>Herbicides (cont.)</i>										
Diquat	0.49	.	.	.	.	.	.	.	.	0.49
Ethofumesate	1.21	.	.	.	.	.	.	.	.	1.21
Glufosinate-ammonium	0.02	.	.	.	.	.	.	.	.	0.02
Glyphosate	2.37	.	.	.	.	0.52	.	.	.	2.90
Isoxaben	0.27	.	0.01	.	.	.	.	.	.	0.28
Lenacil	4.18	.	.	.	.	.	.	.	.	4.18
Napropamide	0.57	.	.	.	.	.	.	.	.	0.57
Paraquat	5.50	.	0.43	<0.01	0.01	0.04	0.01	0.04	0.04	6.07
Pendimethalin	1.71	.	1.20	.	0.13	0.05	<0.01	.	.	3.10
Phenmedipham	0.10	.	.	.	.	.	.	.	.	0.10
Propyzamide	1.71	.	0.73	.	0.08	0.03	<0.01	.	.	2.56
Sethoxydim	0.47	.	.	.	.	.	.	.	.	0.47
Simazine	3.55	.	0.28	.	.	.	.	.	.	3.83
Triclopyr	<0.01	.	.	.	.	.	.	.	.	<0.01
<i>All herbicides</i>	22.25	.	2.77	<0.01	1.07	0.82	0.02	0.04	0.64	27.60
<i>Insecticides</i>										
Abamectin	0.02	.	.	.	.	.	.	.	.	0.02
Bifenthrin	0.31	.	.	.	.	.	.	.	.	0.31
Chlorpyrifos	2.70	0.09	0.52	.	0.26	.	.	.	.	3.57
Clofentezine	0.69	.	.	.	.	.	.	.	.	0.69
Cypermethrin	<0.01	.	.	.	.	.	.	.	.	<0.01
Dimethoate	<0.01	.	.	.	.	.	.	.	.	<0.01
Fenbutatin oxide	0.07	.	.	.	.	.	.	.	.	0.07
Nicotine	0.77	.	.	.	.	.	.	.	.	0.77
Pirimicarb	2.12	.	.	.	.	.	.	.	.	2.12
Tebufenpyrad	0.07	.	.	.	0.02	.	.	0.01	.	0.10
<i>All insecticides</i>	6.75	0.09	0.52	.	0.28	.	.	0.01	.	7.65



Table 8 (cont): Estimated quantities (kilograms) of pesticide active ingredients applied to soft fruit crops in Northern Ireland 2006.

	Strawberries (fruiting)	Strawberries (non-fruiting)	Raspberry	Blueberry	Gooseberry	Black currant	Red currant	Blackberry	Loganberry & Tayberry	All crops
<i>Molluscicides</i>										
Metaldehyde	1.29	.	.	.	.	.	.	.	.	1.29
<i>All molluscicides</i>	1.29	.	.	.	.	.	.	.	.	1.29
<i>Other</i>										
Dazomet	.	.	53.02	.	.	.	.	.	.	53.02
<i>All others</i>	.	.	53.02	.	.	.	.	.	.	53.02
<b>All pesticides</b>	<b>110.94</b>	<b>0.86</b>	<b>68.16</b>	<b>0.09</b>	<b>2.73</b>	<b>1.85</b>	<b>0.29</b>	<b>0.75</b>	<b>1.55</b>	<b>187.22</b>

**Table 9:** The active ingredients used on soft fruit crops in Northern Ireland in 2006, ranked by area treated (spray-hectares).

	Active ingredient	Area treated (sp ha)
1 .	Iprodione	29.89
2 .	Myclobutanil	28.98
3 .	Tolylfluanid	24.86
4 .	Bifenthrin	12.89
5 .	Pirimicarb	9.97
6 .	Pyrimethanil	9.81
7 .	Paraquat	7.54
8 .	Bupirimate	6.88
9 .	Azoxystrobin	6.76
10 .	Chlorpyrifos	6.62
11 .	Fenhexamid	6.32
12 .	Fosetyl-aluminium	5.48
13 .	<i>Phytoseiulus persimilis</i>	5.25
14 .	<i>Steinernema feltiae</i>	4.52
15 .	Chlorothalonil	4.46
16 .	Mepanipyrim	4.35
17 .	Clofentezine	3.56
18 .	Simazine	3.33
19 .	Glyphosate	2.72
20 .	Lenacil	2.50
21 .	Propyzamide	2.05
22 .	Carbendazim	2.00
23 .	Metaldehyde	1.72
24 .	Abamectin	1.71
25 .	Azadirachtin	1.63
26 .	Thiram	1.62
27 .	Fenpropimorph	1.59
28 .	Pendimethalin	1.57
29 .	Nicotine	1.46
30 .	Isoxaben	1.21
31 .	Diquat	0.97
32 .	Ethofumesate	0.86
33 .	Tebufenpyrad	0.83
34 .	Sethoxydim	0.73
35 .	Cycloxydim	0.61
36 .	Copper oxychloride	0.58
37 .	Boscalid	0.58
38 .	Clopyralid	0.49
39 .	Phenmedipham	0.49
40 .	Coumaphos	0.29
41 .	Quinoxifen	0.25
42 .	Captan	0.25
43 .	Napropamide	0.24
44 .	Dichlobenil	0.23
45 .	Fluazinam	0.21
46 .	Glufosinate-ammonium	0.04
47 .	Dimethoate	0.02
48 .	Cypermethrin	0.02
49 .	Triclopyr	<0.01

**Table 10:** The active ingredients used on soft fruit crops in Northern Ireland in 2006, ranked by weight (kilograms).

	Active ingredient	Quantity used (kg)
1 .	Tolylfluanid	29.69
2 .	Iprodione	17.44
3 .	Fosetyl-aluminium	12.31
4 .	Pyrimethanil	8.23
5 .	Chlorothalonil	6.19
6 .	Paraquat	6.07
7 .	Azoxystrobin	4.98
8 .	Fenhexamid	4.44
9 .	Lenacil	4.18
10 .	Thiram	4.10
11 .	Simazine	3.83
12 .	Chlorpyrifos	3.57
13 .	Pendimethalin	3.10
14 .	Glyphosate	2.90
15 .	Propyzamide	2.56
16 .	Bupirimate	2.31
17 .	Pirimicarb	2.12
18 .	Myclobutanil	2.00
19 .	Mepanipyrim	1.64
20 .	Dichlobenil	1.62
21 .	Metaldehyde	1.29
22 .	Ethofumesate	1.21
23 .	Copper oxychloride	1.15
24 .	Fenpropimorph	1.06
25 .	Captan	0.99
26 .	Carbendazim	0.83
27 .	Nicotine	0.77
28 .	Clofentezine	0.69
29 .	Napropamide	0.57
30 .	Diquat	0.49
31 .	Sethoxydim	0.47
32 .	Bifenthrin	0.31
33 .	Isoxaben	0.28
34 .	Boscalid	0.15
35 .	Cycloxydim	0.12
36 .	Tebuufenpyrad	0.10
37 .	Clopyralid	0.10
38 .	Phenmedipham	0.10
39 .	Fluazinam	0.09
40 .	Coumaphos	0.07
41 .	Quinoxifen	0.06
42 .	Glufosinate-ammonium	0.02
43 .	Abamectin	0.02
44 .	Dimethoate	0.005
45 .	Triclopyr	0.001
46 .	Cypermethrin	0.001
47 .	<i>Phytoseiulus persimilis</i>	
48 .	<i>Steinernema feltiae</i>	
49 .	Azadirachtin	

**Table 11:** Strawberry Fruiting Outdoor: pesticide-treated area (spray hectares), basic area treated (hectares), quantities used (kilograms) and reasons for use.

Pesticide Formulation	<i>Botrytis</i>	Crown rot	General disease control	Mildew	All reasons	Basic area (ha) of treatment	Quantity (kgs)
<i>Fungicides</i>							
Carbendazim	.	.	1	.	1	1	0.4
Chlorothalonil	0.3	.	.	.	0.3	0.3	0.3
Fenhexamid/tolyfluanid	0.2	.	.	0.2	0.5	0.2	0.5
Fenpropimorph	.	.	.	0.9	0.9	0.9	0.6
Fosetyl-aluminium	.	1.6	.	.	1.6	1.6	3.6
Iprodione	3.4	.	.	.	3.4	2.4	2
Mepanipyrim	0.2	.	.	0.2	0.5	0.2	0.2
Myclobutanil	3.6	.	.	3.6	7.3	3.6	0.5
Tolyfluanid	13.3	.	.	0.7	14	7.4	17.4
<i>All fungicides</i>	21.1	1.6	1	5.7	29.4	17.7	25.6
Pesticide type & Formulation	Annual meadow grass	General weed control	Ground preparation	Nettle	All reasons	Basic area (ha) of treatment	Quantity (kgs)
<i>Herbicides</i>							
Clopyralid	.	0.5	.	.	0.5	0.5	0.1
Diquat	.	1	.	.	1	0.5	0.5
Ethofumesate	0.9	.	.	.	0.9	0.9	1.2
Glyphosate	.	1	0.7	.	1.7	0.6	1.8
Isoxaben	.	0.9	0.3	.	1.2	1.2	0.3
Lenacil	.	2.5	.	.	2.5	1.3	4.2
Napropamide	.	0.2	.	.	0.2	0.2	0.6
Paraquat	.	5.1	0.5	.	5.6	4.6	4.5

**Table 11 (cont):** Strawberry Fruiting Outside: pesticide-treated area (spray hectares), basic area treated (hectares), quantities used (kilograms) and

reasons for use.								
Pesticide type & Formulation	Annual meadow grass	General weed control	Ground preparation	Nettle	All reasons	Basic area (ha) of treatment	Quantity (kgs)	
<i>Herbicides (cont)</i>								
Pendimethalin	.	0.9	.	.	0.9	0.9	1.7	
Phenmedipham	.	0.5	.	.	0.5	0.5	0.1	
Propyzamide	0.9	0.5	.	.	1.3	1.3	1.7	
Sethoxydim	0.7	.	.	.	0.7	0.7	0.5	
Simazine	.	2.7	.	.	2.7	1.7	3	
Triclopyr	.	.	.	<0.1	<0.1	<0.1	<0.1	
<i>All herbicides</i>	2.5	15.7	1.5	<0.1	19.7	14.9	20	
Pesticide type & Formulation	Aphids	General insect control	Leather jackets	Two-spotted spider mite	Vine weevil	All reasons	Basic area (ha) of treatment	Quantity (kgs)
<i>Insecticides</i>								
Bifenthrin	2.4	.	.	2.9	.	5.3	3.9	0.1
Chlorpyrifos	0.4	1.5	1.2	.	<0.1	3.1	2.3	1.7
Cypermethrin	<0.1	.	.	.	.	<0.1	<0.1	<0.1
Dimethoate	.	.	.	<0.1	.	<0.1	<0.1	<0.1
Pirimicarb	0.5	.	.	.	.	0.5	0.2	0.1
<i>All insecticides</i>	3.3	1.5	1.2	2.9	<0.1	8.9	6.5	1.9

**Table 11 (cont):** Strawberry Fruiting Outside: pesticide-treated area (spray hectares), basic area treated (hectares), quantities used (kilograms) and

reasons for use.

Reasons for use:		Molluscicides			
Pesticide type & Formulation	Slugs	All reasons	Basic area (ha) of treatment	Quantity (kgs)	
Molluscicides					
Metaldehyde	1.7	1.7	0.9	1.3	
All molluscicides	1.7	1.7	0.9	1.3	
Reasons for use:		Biopesticides			
Pesticide type & Formulation	Two-spotted spider mite	Vine weevil	All reasons	Basic area (ha) of treatment	Quantity (kgs)
Biopesticides					
<i>Phytoseiulus persimilis</i>	1	.	1	1	.
<i>Steinernema feltiae</i>	.	1.7	1.7	1.7	.
All biopesticides	1	1.7	2.7	2.7	.

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

Pesticide Formulation	<i>Botrytis</i>	Crown rot	General disease control	Mildew	Red core	All reasons	Basic area (ha) of treatment	Quantity (kgs)
<i>Fungicides</i>								
Azoxystrobin	0.2	.	1.8	4.6	.	6.6	4.1	4.9
Boscalid/pyraclostrobin	.	.	.	0.6	.	0.6	0.3	0.1
Bupirimate	.	.	.	6.9	.	6.9	3.9	2.3
Captan	0.2	.	.	.	.	0.2	0.2	1
Carbendazim	.	.	1	.	.	1	1	0.4
Chlorothalonil	0.1	.	.	.	.	0.1	0.1	0.1
Fenhexamid	5.1	.	.	.	.	5.1	3.2	3.3
Fenhexamid/tolyfluanid	0.5	.	.	0.1	.	0.6	0.5	0.5
Fenpropimorph	0.2	.	0.2	.	.	0.5	0.4	0.3
Fosetyl-aluminium	.	1.5	.	.	2.4	3.9	3.9	8.7
Iprodione	26.1	.	.	0.3	.	26.4	9.5	15.4
Mepanipyrim	2.8	.	0.9	0.1	.	3.9	3.2	1.5
Myclobutanil	1.3	.	0.3	20	.	21.6	7.9	1.5
Pyrimethanil	9.7	.	.	.	.	9.7	4.9	8.2
Quinoxifen	.	.	.	0.2	.	0.2	0.2	0.1
Thiram	0.9	.	0.5	0.2	.	1.6	0.5	4.1
Tolyfluanid	3	.	.	0.3	.	3.3	2	3.6
<i>All fungicides</i>	50.1	1.5	4.7	33.3	2.4	92.2	45.8	56

**Table 12 (cont):** Strawberry Protected: pesticide-treated area (spray hectares), basic area treated (hectares), quantities used (kilograms) and

reasons for use.											
Pesticide Formulation	General weed control	All reasons	Basic area (ha) of treatment	Quantity (kgs)							
<i>Herbicides</i>											
Glufosinate-ammonium	<0.1	<0.1	<0.1	<0.1							
Glyphosate	0.6	0.6	0.6	0.6							
Paraquat	1.2	1.2	1.2	1							
Simazine	0.5	0.5	0.5	0.5							
<i>All herbicides</i>	2.3	2.3	2.3	2.2							
Pesticide Formulation	Aphids	Earwigs	General insect control	Two-spotted spider mite	Tarsonemid mite	Vine weevil	White fly	All reasons	Basic area (ha) of treatment	Quantity (kgs)	
<i>Insecticides</i>											
Abamectin	.	.	.	1.5	0.2	.	.	1.7	1.7	<0.1	
Bifenthrin	1.7	1.1	<0.1	4	.	.	0.8	7.6	6.4	0.2	
Chlorpyrifos	1.9	.	.	0.2	.	0.1	.	2.1	1.6	1.1	
Clofentezine	.	.	.	3.6	.	.	.	3.6	2.7	0.7	
Fenbutatin oxide	.	.	.	0.3	.	.	.	0.3	0.3	0.1	
Nicotine	1.5	.	.	.	.	.	.	1.5	1.5	0.8	
Pirimicarb	8.8	.	0.7	.	.	.	.	9.5	5.6	2	
Tebufenpyrad	.	.	0.3	0.2	.	.	.	0.5	0.5	0.1	
<i>All insecticides</i>	13.9	1.1	1	9.8	0.2	0.1	0.8	26.8	20.3	5	



Table 12 (cont): Strawberry Protected: pesticide-treated area (spray hectares), basic area treated (hectares), quantities used (kilograms) and

reasons for use.						
Pesticide Formulation	Two-spotted spider mite	Tarsonemid mite	Vine weevil	All reasons	Basic area (ha) of treatment	Quantity (kgs)
<i>Biopesticides</i>						
Azadirachtin	.	.	1.7	1.7	0.9	.
<i>Phytoseiulus persimilis</i>	3.4	0.9	.	4.2	3.4	.
<i>Steinernema feltiae</i>	.	.	2.8	2.8	2.8	.
<i>All biopesticides</i>	3.4	0.9	4.5	8.7	7.1	.

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

Pesticide Formulation	<i>Botrytis</i>	General weed control	Ground preparation	Phytophthora	Raspberry cane midge	Couch grass	All reasons	Basic area (ha) of treatment	Quantity (kgs)
<i>Fungicides</i>									
Chlorothalonil	1.9	.	.	.	.	.	1.9	1	4.4
Fluazinam	.	.	.	0.2	.	.	0.2	0.2	0.1
Tolyfluanid	5.3	.	.	.	.	.	5.3	1.7	6.8
<i>All fungicides</i>	<b>7.3</b>	<b>.</b>	<b>.</b>	<b>0.2</b>	<b>.</b>	<b>.</b>	<b>7.5</b>	<b>2.9</b>	<b>11.2</b>
<i>Herbicides</i>									
Cycloxydim	.	.	.	.	.	0.6	0.6	0.1	0.1
Isoxaben	.	.	<0.1	.	.	.	<0.1	<0.1	<0.1
Paraquat	.	0.4	.	.	.	.	0.4	0.4	0.4
Pendimethalin	.	0.6	.	.	.	.	0.6	0.6	1.2
Propyzamide	.	.	0.6	.	.	.	0.6	0.6	0.7
Simazine	.	0.1	<0.1	.	.	.	0.1	0.1	0.2
<i>All herbicides</i>	<b>.</b>	<b>1.1</b>	<b>0.7</b>	<b>.</b>	<b>.</b>	<b>0.6</b>	<b>2.4</b>	<b>1.9</b>	<b>2.65</b>
<i>Insecticides</i>									
Chlorpyrifos	.	.	.	.	1	.	1	1	0.5
<i>All insecticides</i>	<b>.</b>	<b>.</b>	<b>.</b>	<b>.</b>	<b>1</b>	<b>.</b>	<b>1</b>	<b>1</b>	<b>0.5</b>

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

Pesticide Formulation	<i>Botrytis</i>	disease control	General weed control	Leaf rust	Vine weevil	All reasons	Basic area (ha) of treatment	Quantity (kgs)
<i>Fungicides</i>	General							
Azoxystrobin	.	.	.	0.1	.	0.1	0.1	0.1
Carbendazim	.	0.1	.	.	.	0.1	0.1	0
Fenpropimorph	.	.	.	0.1	.	0.1	0.1	0.1
Iprodione	0.1	.	.	.	.	0.1	0.1	0.1
Pyrimethanil	0.1	.	.	.	.	0.1	0.1	0.1
Tolylfluanid	0.2	.	.	.	.	0.2	0.1	0.3
<i>All fungicides</i>	0.5	0.1	.	0.2	.	0.8	0.7	0.6
<i>Herbicides</i>								
Paraquat	.	.	0.1	.	.	0.1	0.1	0.1
Simazine	.	.	0.1	.	.	0.1	0.1	0.1
<i>All herbicides</i>	.	.	0.1	.	.	0.1	0.1	0.1
<i>Biopesticides</i>								
Azadirachtin	.	.	.	.	<0.1	<0.1	<0.1	.
<i>All biopesticides</i>	.	.	.	.	<0.1	<0.1	<0.1	.

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

Pesticide Formulation	<i>Botrytis</i>	General disease control	General weed control	Ground preparation	Mildew	Saw fly	All reasons	Basic area (ha) of treatment	Quantity (kgs)
<i>Fungicides</i>									
Fenhexamid	.	0.1	.	.	.	.	0.1	0.1	0.1
Fenpropimorph	.	.	.	.	0.1	.	0.1	0.1	0.1
Myclobutanil	.	.	.	.	0.1	.	0.1	0.1	0
Tolyfluanid	0.5	.	.	.	.	.	0.5	0.1	0.4
<i>All fungicides</i>	0.5	0.1	.	.	0.2	.	0.9	0.5	0.5
<i>Herbicides</i>									
Dichlobenil	.	.	0.1	.	.	.	0.1	0.1	0.9
Paraquat	.	.	<0.1	.	.	.	<0.1	<0.1	<0.1
Pendimethalin	.	.	0.1	.	.	.	0.1	0.1	0.1
Propyzamide	.	.	.	0.1	.	.	0.1	0.1	0.1
<i>All herbicides</i>	.	.	0.2	0.1	.	.	0.3	0.3	1.1
<i>Insecticides</i>									
Chlorpyrifos	.	.	.	.	.	0.5	0.5	0.5	0.3
<i>All insecticides</i>	.	.	.	.	.	0.5	0.5	0.5	0.3

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

Pesticide Formulation	insect control	Mildew	All reasons	Basic area (ha) of treatment	Quantity (kgs)
<i>Fungicides</i>					
Copper oxychloride	.	0.4	0.4	0.2	0.9
<i>All fungicides</i>	.	0.4	0.4	0.2	0.9
<i>Insecticides</i>					
Tebufenpyrad	0.2	.	0.2	0.2	<0.1
<i>All insecticides</i>	0.2	.	0.2	0.2	<0.1

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

Pesticide Formulation	<i>Botrytis</i>	General weed control	All reasons	Basic area (ha) of treatment	Quantity (kgs)
<i>Fungicides</i>					
Tolyfluanid	0.4	.	0.4	0.1	0.4
<i>All fungicides</i>	0.4	.	0.4	0.1	0.4
<i>Herbicides</i>					
Paraquat	.	<0.1	<0.1	<0.1	<0.1
<i>All herbicides</i>	.	<0.1	<0.1	<0.1	<0.1

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

Pesticide Formulation	insect control	Mildew	Two-spotted spider mite	All reasons	Basic area (ha) of treatment	Quantity (kgs)
<i>Fungicides</i>						
Copper oxychloride	.	0.2	.	0.2	0.1	0.3
<i>All fungicides</i>	.	0.2	.	0.2	0.1	0.3
<i>Insecticides</i>						
Tebufenpyrad	0.1	.	.	0.1	0.1	<0.1
<i>All insecticides</i>	0.1	.	.	0.1	0.1	<0.1
<i>General Biopesticides</i>						
<i>Phytoseiulus persimilis</i>	.	.	0.1	0.1	0.1	.
<i>All biopesticides</i>	.	.	0.1	0.1	0.1	.

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

Pesticide Formulation	<i>Botrytis</i>	General weed control	All reasons	Basic area (ha) of treatment	Quantity (kgs)
<i>Fungicides</i>					
Chlorothalonil	<0.1	.	<0.1	<0.1	0.1
Tolyfluanid	<0.1	.	<0.1	<0.1	<0.1
<i>All fungicides</i>	0.1	.	0.1	<0.1	0.1
<i>Herbicides</i>					
Paraquat	.	<0.1	<0.1	<0.1	<0.1
<i>All herbicides</i>	.	<0.1	<0.1	<0.1	<0.1

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

Pesticide Formulation	<i>Botrytis</i>	General weed control	Ground preparation	Leaf spot	All reasons	Basic area (ha) of treatment	Quantity (kgs)
<i>Fungicides</i>							
Chlorothalonil	0.2	.	.	1.5	1.8	0.4	0.7
Tolyfluanid	0.5	.	.	.	0.5	0.1	0.4
<i>All fungicides</i>	0.7	.	.	1.5	2.2	0.5	1.1
<i>Herbicides</i>							
Dichlobenil	.	<0.1	.	.	<0.1	<0.1	0.2
Glyphosate	.	0.4	.	.	0.4	0.2	0.5
Paraquat	.	0.1	.	.	0.1	0.1	<0.1
Pendimethalin	.	<0.1	.	.	<0.1	<0.1	0.1
Propyzamide	.	.	<0.1	.	<0.1	<0.1	<0.1
<i>All herbicides</i>	.	0.5	<0.1	.	0.6	<0.1	0.8



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

Pesticide Formulation	<i>Botrytis</i>	weed control	Ground preparation	All reasons	Basic area (ha) of treatment	Quantity (kgs)
<i>Fungicides</i>						
Chlorothalonil	0.1	.	.	0.1	<0.1	0.2
Tolyfluanid	0.1	.	.	0.1	<0.1	0.1
<i>All fungicides</i>	0.2	.	.	0.2	0.1	0.3
<i>Herbicides</i>						
Paraquat	.	<0.1	.	<0.1	<0.1	<0.1
Pendimethalin	.	<0.1	.	<0.1	<0.1	<0.1
Propyzamide	.	.	<0.1	<0.1	<0.1	<0.1
<i>All herbicides</i>	.	<0.1	<0.1	<0.1	<0.1	<0.1

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

Pesticide Formulation	<i>Botrytis</i>	General weed control	All reasons	Basic area (ha) of treatment	Quantity (kgs)
<i>Fungicides</i>					
Chlorothalonil	0.2	.	0.2	0.1	0.5
Tolyfluanid	0.5	.	0.5	0.1	0.4
<i>All fungicides</i>	0.7	.	0.7	0.2	0.9
<i>Herbicides</i>					
Dichlobenil	.	0.1	0.1	0.1	0.6
Paraquat	.	<0.1	<0.1	<0.1	<0.1
<i>All herbicides</i>	.	0.1	0.1	0.1	0.6

**Table 23:** Comparison of pesticide usage on soft fruit crops 1990-2006, spray hectares (sp ha) of formulation and quantities of active ingredient (kg) used.

	1990		1998		2006	
	(sp ha)	(kg)	(sp ha)	(kg)	(sp ha)	(kg)
<i>Fungicides</i>	171.37	277.61	154.09	189.1	134.88	97.65
<i>Herbicides</i>	159.4	199.54	61.8	95.6	25.57	27.6
<i>Insecticides</i>	33.71	19.61	41.25	16.7	37.37	7.65
<i>Molluscicides</i>	8.83	1.79	22.96	10	1.72	1.29
<i>Biopesticides</i>	.	.	1.5	.	11.4	.
<b>Total</b>	<b>373.31</b>	<b>498.55</b>	<b>281.6</b>	<b>311.4</b>	<b>210.94</b>	<b>134.19</b>
<i>Area grown (ha)</i>	74.99		48.73		26.67	

**Table 24:** Comparison of pesticide usage on strawberry crops 1990-2006, spray hectares (sp ha) of formulation and quantities of active ingredient (kg) used.

	1990		1998		2006	
	(sp ha)	(qty)	(sp ha)	(qty)	(sp ha)	(qty)
<i>Fungicides</i>	135.67	229.57	132.72	156.4	121.54	81.42
<i>Herbicides</i>	112.8	133.31	41.1	52.6	22	22.25
<i>Insecticides</i>	23.64	14.56	37.43	12.8	35.62	6.84
<i>Molluscicides</i>	8.42	1.7	22.5	9.9	1.72	1.29
<i>Biopesticides</i>	.	.	1.4	.	11.31	.
<b>Total</b>	<b>280.53</b>	<b>379.14</b>	<b>235.15</b>	<b>231.7</b>	<b>192.19</b>	<b>111.8</b>
<i>Area grown (ha)</i>	52		37.3		21.59	

**Note:** Biopesticides were not recorded in use in 1990

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
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139	Vegetable Crops 1995	1-855 27 346 2
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206	Arable Crops 2004	1-855 27 833 2
207	Vegetable crops 2004	1-855 27 869 3
208	Grassland and Fodder Crops 2005	1-855 27 998 8
209	Sheep Treatments 2005	1-855 27 999 5
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