An Roinn Talmhaíochta,
Bia agus Mara
Department of Agriculture,
Food and the Marine

Pesticide Usage in Ireland

Top Fruit Crops

Survey Report 2018

Pesticide Usage in Ireland

TOP FRUIT CROPS SURVEY REPORT 2018

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Executive summary

This is the second survey of pesticide* usage on top fruit crops in Ireland carried out by DAFM. Information on all aspects of pesticide usage was collected from 30 holdings across Ireland representing 88% of the total area of top fruit crops grown. Quantitative data have been adjusted to provide estimates of total pesticide usage.

In 2018 an estimated 723 hectares of top fruit crops were grown in Ireland with an estimated 9,919 kgs of active substance applied.

A total of 43 active substances were recorded in use on top fruit crops in the survey.

Fungicides were applied to 85% of the pesticide-treated area, representing 89% of the total weight of pesticides used. Herbicides were applied to 4% of the pesticide-treated area, accounting for 9% of the total weight of pesticides used. Insecticides were applied to 6% of the pesticide treated area, representing 1% of the weight of pesticides applied. Growth regulator usage accounted for 5% of the pesticide-treated area and 1% of the weight of active substance applied.

Bramley fruiting apples comprised 36% of the area of top fruit crops in Ireland 2018, accounting for 41% of the total pesticide treated area and 41% of the total weight of pesticides used on all top fruit crops. Bramley fruiting apples accounted for 39% of the area of top fruit crops treated with fungicide and received 40% of the total weight of fungicides applied.

Cider apples comprised 32% of the area of top fruit crops in Ireland 2018, accounting for 14% of the total pesticide treated area and 15% of the total weight of pesticides used on top fruit crops. Cider apples accounted for 15% of the area of crops treated with fungicide and received 15% of the weight of total fungicides applied.

Desert apples comprised 31% of the area of top fruit crops in Ireland 2018, accounting for 45% of the total pesticide treated area and 43% of the total weight of pesticides used on all top fruit crops.

**Pesticide is an over-arching term that includes both plant protection products (including, for the purpose of this report, fungicides, herbicides, insecticides and growth regulators) and biocides.*

Other top fruit crops accounted for 1% of the area of top fruit crops grown in Ireland in 2018, accounting for less than 1% of the total pesticide-treated area and less than 1% of the total weight of pesticides used on all top fruit crops.

Definitions & notes

- 'Basic area'; refers to the actual planted area of crop 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. This is measured in 'spray-hectares' (basic area x number of spray applications = spray hectares (spha)).

- 'Rounding'; due to rounding of figures there may be slight differences in totals both within and between tables and diagrams.

- 'Other top fruit crops'; collectively refers to plums, cherries and pears.

- 'Spray applications'; refers to the number of treatments of any pesticide type to the treated areas.

- 'PPP'; refers to plant protection product.

- 'Herbicides'; are defined as PPPs used to control and / or prevent unwanted vegetation

- 'Fungicides'; are defined as PPPs used to control and / or prevent harmful fungal disease

- 'Insecticides'; are defined as PPPs used to control and / or prevent harmful insects

- 'Growth regulators'; are defined as PPPs used and / or control physiological process within a plant

- 'Biocides'; are defined as chemicals that are used to control and / or prevent various types of harmful or unwanted organisms, including disinfectants, preservatives, insect repellents, rodenticides and insecticides

Background

The regulatory system for PPPs in Ireland is based directly on EU legislation which provides a very high level of protection for humans, animals and the environment. The hazard of an active substance is an inherent property which can cause a harmful effect and cannot be altered or mitigated.

Legislation has been put in place at both EU and national level to minimise the risks associated with the use of PPPs while ensuring necessary crop protection. The Sustainable Use of Pesticides Directive based on the EU 'Thematic strategy on the sustainable use of pesticides' aims to achieve a balance between ensuring human and environmental safety while maintaining continued viability of the farming and amenity sectors. This involves training and registration of advisers, distributors, operators and inspectors of pesticide application equipment, controls on storage, supply and use, adoption of the principles of IPM and improved statistics on PPP use. To address the requirement for improved statistics, Regulation (EC) No 1185/2009 concerning statistics on pesticides was adopted on 25 November 2009 which requires each member state to collect statistics on PPP use. It is the area identified above as "improved statistics on PPP use" that this survey and future surveys will be addressing.

While sales data can provide information on the overall quantity of PPPs used in the country, surveys at farm/grower/producer level are required to quantify the quantities used on different crops and to identify where and how they are being used. This type of information is required to clearly identify the risks involved and to develop and defend a strategy for the sustainable use of PPPs. Some of the specific outputs of a usage survey are as follows:

1. Provision of reliable factual data to inform policy makers.

2. Provision of information for the on-going review process of existing PPPs by providing data regarding national and regional usage of PPPs and use patterns for particular crops.

3. Monitoring farm practices to highlight areas where PPP use might be reduced by supplementation with or replacement by alternative pest control strategies e.g. use of resistant varieties, cultivation practices etc.

4. Provision of data to assess likely operator exposure to PPPs and to predict environmental impact of PPP use.

5. Monitoring changes in patterns of PPP use over time in response to government policy or economic factors.

6. Provision of information for residue monitoring programmes to assist with identifying particular areas of risk and to validate findings.

Methods

The sample of holdings to be surveyed was selected across the 26 counties, on the basis of the total area of top fruit crops grown, using data from the Department of Agriculture, Food and the Marine. For the purpose of the survey the country was

divided into three geographical regions namely the East, South and the North/West as per Table A. The sample was stratified into four size groups (as per Table B), according to the total area of top fruit crops grown in each region. Holdings were selected at random within each of the size groups and the number of holdings selected was proportional to the total area of crops grown.

Table A: Regions selected for survey and respective counties.

Regions	East	South	North/West
Counties	Louth	Wexford	Donegal
	Meath	Kilkenny	Leitrim
	Dublin	Waterford	Monaghan
	Kildare	Tipperary	Cavan
	Offaly	Limerick	Westmeath
	Laois	Cork	Longford
	Carlow	Kerry	Sligo
	Wicklow		Roscommon
			Mayo
			Galway
			Clare

The purpose of the survey was explained to the occupiers of selected holdings in preliminary correspondence. A total of 30 holdings were contacted during the period August to October 2019 and data collected by personal interview for top fruit crops grown in 2018. The data collected included the area of crops grown, area treated, target crop, pesticide used, rate of application and number of treatments applied. Holdings selected in the original sample which were unable to provide data were replaced with ones from the same county and size group held on a reserve list. The total number of farms sampled in each size group is shown in Table B. The collected data were entered using Oracle, a relational database programme. Validated data were downloaded for analysis using SPSS software.

Table B: The total number of farms sampled from each size group.

Region	<6ha Holdings sampled	6<9 ha Holdings sampled	9<14ha Holdings sampled	>14 ha Holdings sampled	Total Holdings sampled
Ireland	**5**	**6**	**3**	**16**	**30**

Crops

Information was collected for bramley fruiting apples, desert apples, cider apples and other top fruit crops.

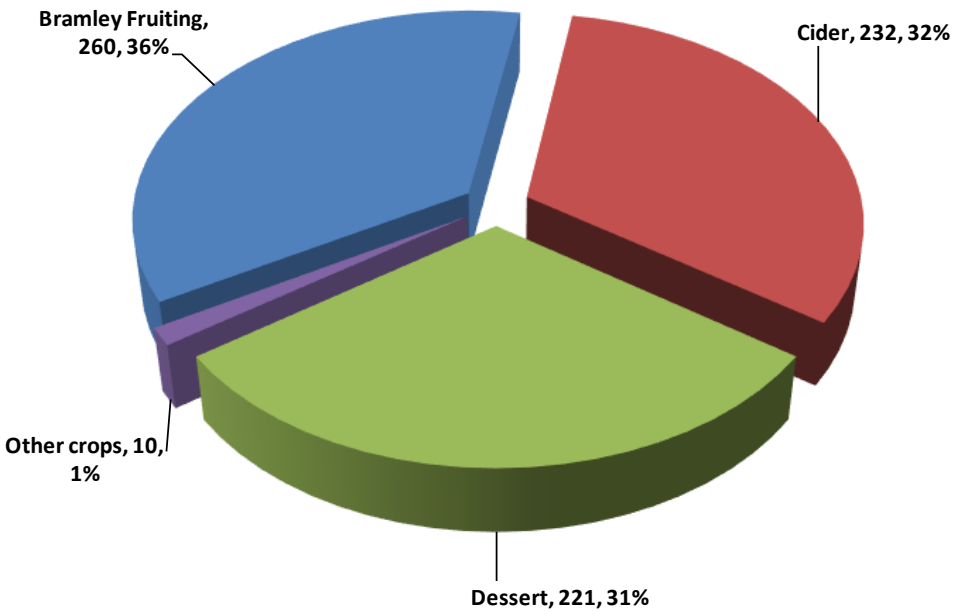
The number and areas of crops surveyed are shown in Table C. Data from 30 growers provided information on 88 examples across 4 crop types. The total area of crops sampled in the survey (638 ha) was representative of the area of top fruit crops grown in Ireland in 2018 (723 ha).

Table C: The total number and area (hectares) of crops sampled, estimated total area and the proportion (%) of the total area of top fruit crops surveyed in Ireland, 2018.

Crop	Number of crops surveyed	Survey area (ha)	Estimated area (ha)	Proportion of crops surveyed (%)
Bramley Fruiting	26	258	260	99%
Dessert	27	190	221	86%
Cider	21	185	232	80%
Other crop	14	5	10	48%
Total	***88***	***638***	***723***	***88%***

Bramley fruiting apples covered an estimated 36% of the total area of top fruit crops in 2018. Cider and desert apples accounted for 32% and 31% of the area of top fruit crops in 2018 respectively. Other crops accounted for 1% of the total area of top fruit crops in 2018.

Figure 1: Areas of individual top fruit crops grown in Ireland (ha), 2018.



Pesticide usage

Fungicides were applied to 85% of the pesticide-treated area accounting for 89% of the total weight of pesticides used. Herbicides were applied to 4% of the pesticide-treated area and accounted for 9% of the total weight of pesticides used. Insecticides were applied to 6% of the pesticide treated area of top fruit crops, accounting for 1% of the weight of pesticides applied. The use of growth regulators accounted for 5% of the pesticide-treated area and 1% of the weight of active substance applied.

Figure 2: Pesticide usage (spha) on top fruit crops treated in Ireland, 2018.

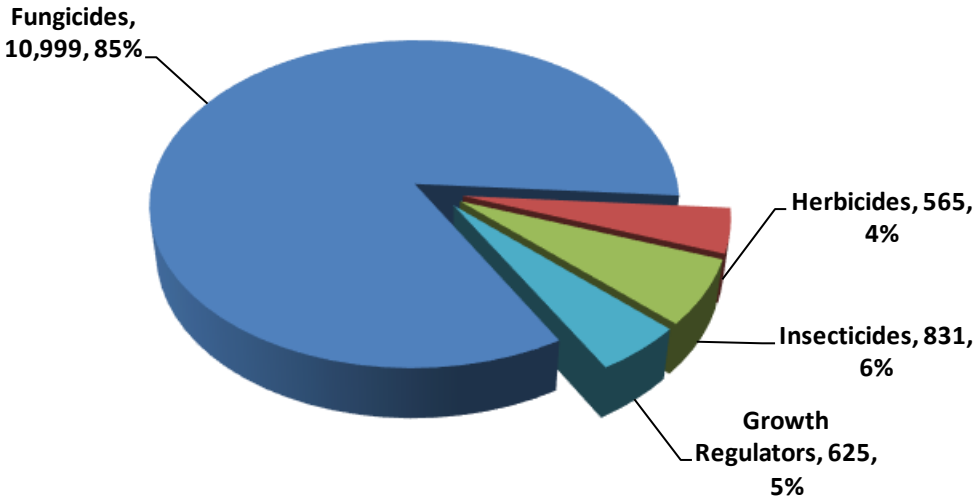
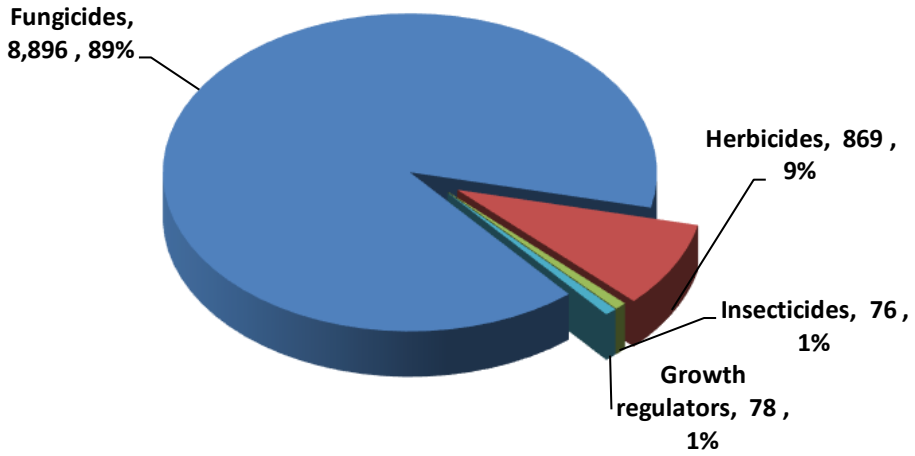


Figure 3: Weight (kgs) of pesticides applied to top fruit crops treated in Ireland, 2018.



Pesticide usage survey results 2018

Pesticide usage on bramley fruiting apples

260 ha of bramley fruiting apples in Ireland.

5,337 treated hectares.

4,054 kilogrammes applied.

Figure 4: Pesticide usage (spha) on bramley fruiting apple crops in Ireland, 2018.

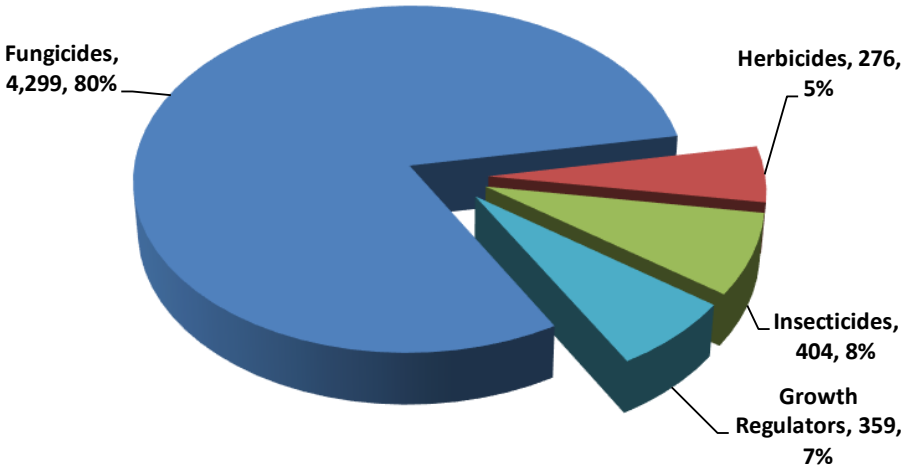


Figure 5: Weight of pesticides (kg) applied to bramley fruiting apple crops in Ireland, 2018.

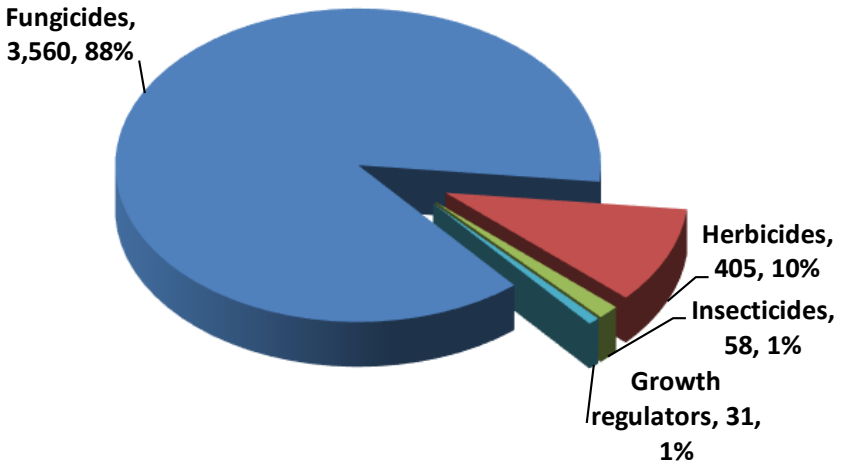


Figure 6: The top 10 active ingredients most extensively used on bramley fruiting apples in Ireland in 2018, ranked by area treated (spray-hectares).

Active substance	Treated area (spha)	Basic area treated (ha)	Quantity applied (kg)
Captan	1,184	239	1,262
Dithianon	893	223	329
Potassium phosphonates	671	156	873
Dodine	423	158	261
Boscalid	365	165	78
Pyraclostrobin	365	165	40
Mancozeb	347	95	417
Prohexadione-calcium	257	142	22
Thiacloprid	239	150	43
Difenoconazole	221	100	22

Figure 7: The top 10 active ingredients most extensively used on bramley fruiting apples in Ireland in 2018, ranked by weight (kg).

Active substance	Quantity applied (kg)	Treated area (spha)	Basic area treated (ha)
Captan	1,262	1,184	239
Potassium	873	671	156
Mancozeb	417	347	95
Glyphosate	334	188	106
Dithianon	329	893	223
Dodine	261	423	158
Copper oxychloride	152	141	60
Boscalid	78	365	165
Mecoprop-P	59	79	40
Thiacloprid	43	239	150

Pesticide usage on desert apples

221 ha of desert apples grown in Ireland.

5,802 treated hectares.

4,305 kilogrammes applied.

Figure 8: Pesticide usage (spha) on desert apple crops in Ireland, 2018.

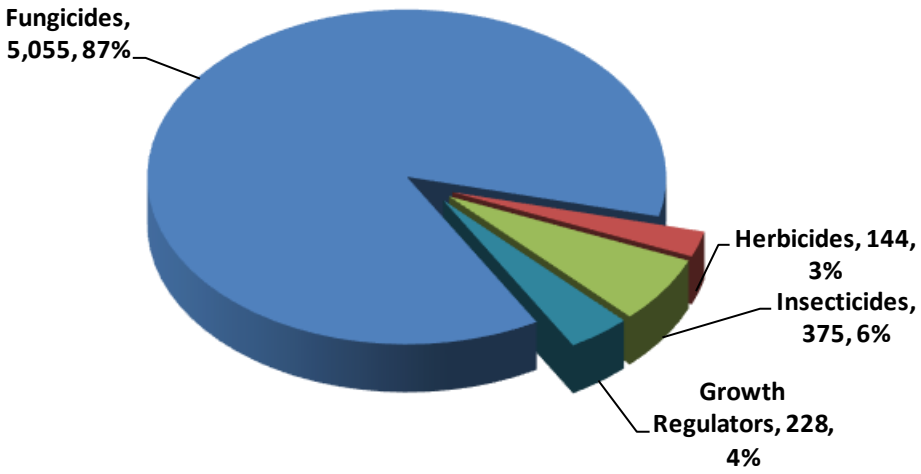


Figure 9: Weight of pesticides (kg) applied to desert apple crops in Ireland, 2018.

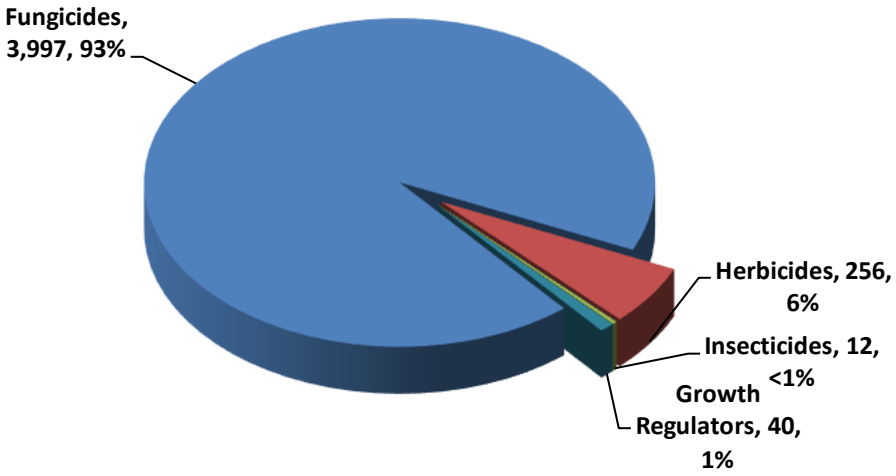


Figure 10: The top 10 active ingredients most extensively used on desert apple crops in Ireland in 2018, ranked by area treated (spray-hectares).

Active substance	Treated area (spha)	Basic area treated (ha)	Quantity applied (kg)
Dithianon	807	186	380
Captan	704	192	987
Dodine	587	159	456
Mancozeb	554	112	749
Myclobutanil	451	149	40
Pyrimethanil	410	134	128
Bupirimate	291	128	47
Deltamethrin	266	89	2
Potassium phosphonates	259	161	357
Boscalid	243	148	47

Figure 11: The top 10 active ingredients most extensively used on desert apple crops in Ireland in 2018, ranked by weight (kg).

Active substance	Quantity applied (kg)	Treated area (spha)	Basic area treated (ha)
Captan	987	704	192
Mancozeb	749	554	112
Sulphur	522	178	118
Dodine	456	587	159
Dithianon	380	807	186
Potassium phosphonates	357	259	161
Glyphosate	256	142	60
Copper oxychloride	163	161	66
Pyrimethanil	128	410	134
Bupirimate	47	291	128

Pesticide usage on cider apples

232 ha of cider apples grown in Ireland.

1,838 treated hectares.

1,517 kilogrammes applied.

Figure 12: Pesticide usage (spha) on cider apple crops in Ireland, 2018.

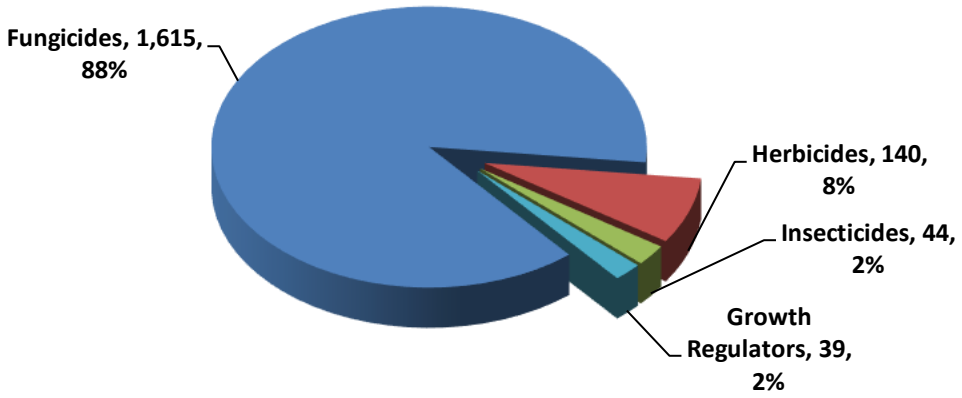


Figure 13: Weight of pesticides (kg) applied to cider apple crops in Ireland, 2018.

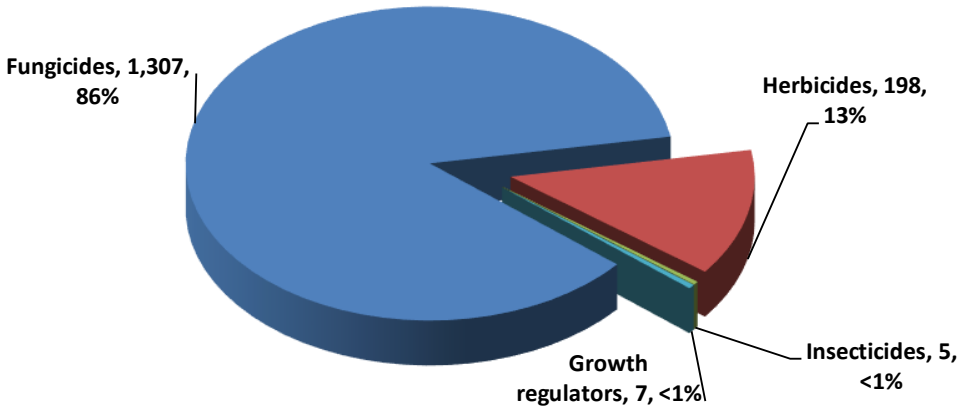


Figure 14: The top 10 active ingredients most extensively used on cider apple crops in Ireland in 2018, ranked by area treated (spray-hectares).

Active substance	Treated area (spha)	Basic area treated (ha)	Quantity applied (kg)
Captan	491	181	732
Myclobutanil	279	126	20
Dithianon	276	144	204
Pyrimethanil	163	124	52
Glyphosate	111	78	175
Dodine	106	46	74
Copper oxychloride	79	60	128
Proquinazid	61	47	3
Boscalid	47	28	9
Pyraclostrobin	47	28	5

Figure 15: The top 10 active ingredients most extensively used on cider apple crops in Ireland in 2014, ranked by weight (kg).

Active substance	Quantity applied (kg)	Treated area (spha)	Basic area treated (ha)
Captan	732	491	181
Dithianon	204	276	144
Glyphosate	175	111	78
Copper oxychloride	128	79	60
Dodine	74	106	46
Pyrimethanil	52	163	124
Potassium phosphonates	30	22	14
Mancozeb	28	23	23
Myclobutanil	20	279	126
Potassium hydrogen	15	7	7

Pesticide usage on other top fruit crops

10 ha of other top fruit crops in Ireland.

44 treated hectares.

42 kilogrammes applied.

Figure 16: Pesticide usage (spha) on other top fruit crops in Ireland, 2018.

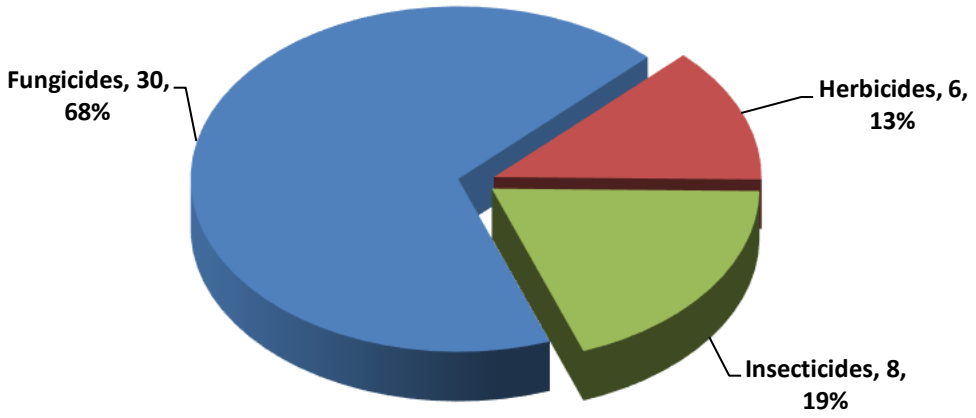


Figure 17: Weight of pesticides (kg) applied to other top fruit crops in Ireland, 2018.

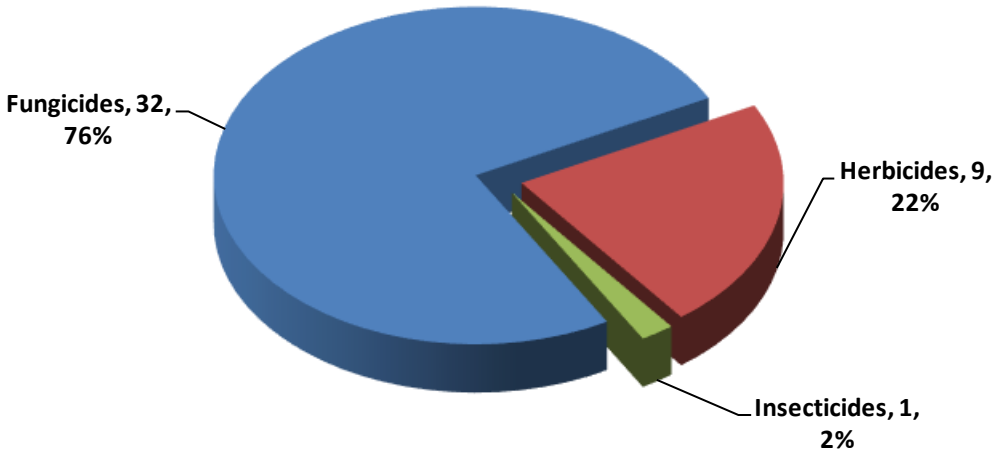


Figure 18: The top 10 active ingredients most extensively used on other top fruit crops in Ireland in 2018, ranked by area treated (spray-hectares).

Active substance	Treated area (spha)	Basic area treated (ha)	Quantity applied (kg)
Copper oxychloride	7	2	13
Mancozeb	7	2	11
Glyphosate	6	4	9
Dithianon	5	3	3
Boscalid	4	2	1
Myclobutanil	4	2	0
Pyraclostrobin	4	2	0
Pyrethrins	4	2	0
Thiacloprid	3	2	1
Captan	3	3	4

Figure 19: The top 10 active ingredients most extensively used on other top fruit crops in Ireland in 2018, ranked by weight (kg).

Active substance	Quantity applied (kg)	Treated area (spha)	Basic area treated (ha)
Copper oxychloride	13	7	2
Mancozeb	11	7	2
Glyphosate	9	6	4
Captan	4	3	3
Dithianon	3	5	3
Boscalid	1	4	2
Thiacloprid	1	3	2
Myclobutanil	0	4	2
Pyrethrins	0	4	2
Pyraclostrobin	0	4	2

Table 1: Estimated area (ha) of top fruit crops grown nationally in Ireland, 2018.

Crop	Ireland
Bramley	260
Desert	221
Cider	232
Other crops	10
Total	***723***

Table 2: Estimated area (spray-hectares) of top fruit crops treated nationally with each pesticide type in Ireland, 2018.

Pesticide type	Ireland
Fungicides	10,999
Herbicides	565
Insecticides	831
Growth Regulators	625
Total	***13,021***

Table 3: Estimated weight (kg) applied to top fruit crops treated nationally with each pesticide type in Ireland, 2018.

Pesticide type	Ireland
Fungicides	8,896
Herbicides	869
Insecticides	76
Growth Regulators	78
Total	***9,919***

Table 4: The total area (spray hectares) and the basic area (hectares), of top fruit crops in Ireland 2018 treated with each pesticide type.

	Pesticide Type										
	Fungicides		Herbicides		Insecticides		Growth regulators		All Pesticides		
Crop type	(sp ha)	(ha)	(sp ha)	(ha)	(sp ha)	(ha)	(sp ha)	(ha)	(sp ha)	(ha) treated	(ha) grown
Bramley Fruiting	4,299	260	276	114	404	153	359	168	5,337	260	260
Dessert	5,055	221	144	62	375	121	228	127	5,802	221	221
Cider	1,615	213	140	78	44	44	39	19	1,838	225	232
Other crop	30	5	6	4	8	2			44	7	10
Total	***10,999***	***699***	***565***	***259***	***831***	***321***	***625***	***315***	***13,021***	***713***	***723***

Table 5: The total quantities (kilograms) of each pesticide type used on top fruit crops in Ireland 2018.

	Pesticide type				
Crop	Fungicides	Herbicides	Insecticides	Growth regulators	Total weight applied (kg)
Bramley Fruiting	3,560	405	58	31	4,054
Dessert	3,997	256	12	40	4,305
Cider	1,307	198	5	7	1,517
Other crops	32	9	1		42
All crops	***8,896***	***869***	***76***	***78***	***9,919***

Table 6: Estimated area (spray-hectares) of top fruit crops treated with pesticide formulations in Ireland, 2018.

	Crop				
Pesticide type & formulation	Bramley Fruiting	Desert	Cider	Other	All crops
Fungicides					
Boscalid/pyraclostrobin	365	243	47	4	657
Bupirimate	93	291	15		399
Captan	1,184	704	491	3	2,381
Copper oxychloride	141	161	79	7	388
Cyprodinil/fludioxonil	76	20			96
Difenoconazole	221	168	36		426
Dithianon	222	548	254	5	1,029
Dithianon/potassium phosphonates	671	259	22		952
Dodine	423	587	106		1,115
Fenpropimorph			3		3
Fluopyram	26	3			29
Fluxapyroxad	104	225			328
Kresoxim-methyl	8	10	29		46
Mancozeb	347	554	23	7	932
Myclobutanil	214	451	279	4	948
Potassium hydrogen carbonate	3	14	7		24
Proquinazid	82	229	61		372
Pyrimethanil	108	410	163		681
Sulphur		178			178
Tebuconazole	10	3			14
All fungicides	***4,299***	***1,615***	***5,055***	***30***	***10,999***

Table 6 (cont.): Estimated area (spray-hectares) of top fruit crops treated with pesticide formulations in Ireland, 2018.

Pesticide type & formulation	Crop Bramley Fruiting	Desert	Cider	Other	All crops
Herbicides					
2,4-D			12		12
Aminopyralid/fluroxypyr			3		3
Dicamba/mecoprop-P	79				79
Diflufenican			7		7
Diquat	8	2			10
Glufosinate-ammonium			7		7
Glyphosate	188	142	111	6	447
All herbicides	***276***	***144***	***140***	***6***	***565***
Insecticides					
Acetamiprid				2	2
Chlorantraniliprole	18	30			49
Deltamethrin		266			266
Flonicamid	75				75
Indoxacarb	47	43	22		112
Pyrethrins				4	4
Spirotetramat	24	14			39
Thiacloprid	239	21	22	3	285
All Insecticides	***404***	***375***	***44***	***8***	***831***
Growth regulators					
2-chloroethylphosphonic acid		93			93
Gibberellins	50	53			103
Paclobutrazol	52	6			57
Prohexadione-calcium	257	76	39	0	371
All growth regulators	***359***	***228***	***39***	***0***	***625***
All pesticides	***5,337***	***5,802***	***1,838***	***44***	***13,021***

Table 7: Estimated quantities (kilograms) of pesticide formulations used on top fruit crops in Ireland, 2018.

Pesticide type & formulation	Crop: Bramley Fruiting	Desert	Cider	Other	All crops
Fungicides					
Boscalid/pyraclostrobin	118	71	14	1	204
Bupirimate	10	47	1		58
Captan	1,262	987	732	4	2,986
Copper oxychloride	152	163	128	13	456
Cyprodinil/fludioxonil	31	9			40
Difenoconazole	22	13	2		37
Dithianon	135	300	197	3	635
Dithianon/potassium phosphonates	1,067	436	37		1,541
Dodine	261	456	74		792
Fenpropimorph			1		1
Fluopyram	2	0			2
Fluxapyroxad	9	18			27
Kresoxim-methyl	1	1	3		5
Mancozeb	417	749	28	11	1,205
Myclobutanil	14	40	20	0	73
Potassium hydrogen carbonate	10	43	15		68
Proquinazid	4	12	3		19
Pyrimethanil	43	128	52		222
Sulphur		522			522
Tebuconazole	3	1			3
All fungicides	***3,560***	***3,997***	***1,307***	***32***	***8,896***
Herbicides					
2,4-D			15		15
Aminopyralid/fluroxypyr			1		1
Dicamba/mecoprop-P	67				67
Diflufenican			7		7
Diquat	3	1			4
Glufosinate-ammonium			1		1
Glyphosate	334	256	175	9	774
All herbicides	***405***	***256***	***198***	***9***	***869***

Table 7 (cont.): Estimated quantities (kilograms) of pesticide formulations used on top fruit crops in Ireland, 2018.

Pesticide type & formulation	Crop: Bramley Fruiting	Desert	Cider	Other	All crops
Insecticides					
Acetamiprid				0	0
Chlorantraniliprole	1	1			2
Deltamethrin		2			2
Flonicamid	6				6
Indoxacarb	3	3	2		8
Pyrethrins					
Spirotetramat	5	3			7
Thiacloprid	43	3	3	1	50
All Insecticides	***58***	***12***	***5***	***1***	***76***
Growth regulators					
2-chloroethylphosphonic acid		31			31
Gibberellins	0	0			0
Paclobutrazol	9	1			10
Prohexadione-calcium	22	8	7	0	37
All growth regulators	***31***	***40***	***7***	***0***	***78***
All pesticides	***4,054***	***4,305***	***1,517***	***42***	***9,919***

Table 8: The twenty active ingredients most extensively used on top fruit crops in Ireland in 2018, ranked by area treated (spray-hectares).

No.	Active ingredient	Treated area (sp ha)
1	Captan	2,381
2	Dithianon	1,981
3	Dodine	1,115
4	Potassium phosphonates	952
5	Myclobutanil	948
6	Mancozeb	932
7	Pyrimethanil	681
8	Boscalid	657
9	Pyraclostrobin	657
10	Glyphosate	447
11	Difenoconazole	426
12	Bupirimate	399
13	Copper oxychloride	388
14	Proquinazid	372
15	Prohexadione-calcium	371
16	Fluxapyroxad	328
17	Thiacloprid	285
18	Deltamethrin	266
19	Sulphur	178
20	Indoxacarb	112

Table 9: The twenty active ingredients most extensively used on top fruit crops in Ireland in 2014, ranked by weight (kilograms).

No.	Active ingredient	Quantity (kgs)
1	Captan	2,986
2	Potassium phosphonates	1,260
3	Mancozeb	1,205
4	Dithianon	916
5	Dodine	792
6	Glyphosate	774
7	Sulphur	522
8	Copper oxychloride	456
9	Pyrimethanil	222
10	Boscalid	135
11	Myclobutanil	73
12	Pyraclostrobin	68
13	Potassium hydrogen carbonate	68
14	Mecoprop-P	59
15	Bupirimate	58
16	Thiacloprid	50
17	Difenoconazole	37
18	Prohexadione-calcium	37
19	2-chloroethylphosphonic acid	31
20	Fluxapyroxad	27

Table 10: Estimated quantity (kg), spray area (spha) and basic area (ha) of active substance for bramley fruiting apples, 2018.

Crop	Active Substance	Quantity (kg) of Active Ingredient Total	Spray area (spha) of Active Ingredient Total	Basic area (ha) of Active Ingredient Total
Bramley fruiting	Herbicides			
	Dicamba	8	79	40
	Diquat	3	8	8
	Glyphosate	334	188	106
	Mecoprop-P	59	79	40
	Fungicides			
	Boscalid	78	365	165
	Bupirimate	10	93	45
	Captan	1262	1184	239
	Copper oxychloride	152	141	60
	Cyprodinil	19	76	50
	Difenoconazole	22	221	100
	Dithianon	329	893	223
	Dodine	261	423	158
	Fludioxonil	12	76	50
	Fluopyram	2	26	26
	Fluxapyroxad	9	104	56
	Kresoxim-methyl	1	8	8
	Mancozeb	417	347	95
	Myclobutanil	14	214	85
	Potassium hydrogen carbonate	10	3	3
	Potassium phosphonates	873	671	156
	Proquinazid	4	82	41
	Pyraclostrobin	40	365	165
	Pyrimethanil	43	108	61
	Tebuconazole	3	10	10
	Insecticides			
	Chlorantraniliprole	1	18	11
	Flonicamid	6	75	75
	Indoxacarb	3	47	24
	Spirotetramat	5	24	24
	Thiacloprid	43	239	150
	Growth regulators			
	Gibberellins	0	50	27
	Paclobutrazol	9	52	26
	Prohexadione-calcium	22	257	142

Table 11: Estimated quantity (kg), spray area (spha) and basic area (ha) of active substance for desert apples, 2018.

Crop	Active Substance	Quantity (kg) of Active Ingredient Total	Spray area (spha) of Active Ingredient Total	Basic area (ha) of Active Ingredient Total
Desert apples	Herbicides			
	Diquat	1	2	2
	Glyphosate	256	142	60
	Fungicides			
	Boscalid	47	243	148
	Bupirimate	47	291	128
	Captan	987	704	192
	Copper oxychloride	163	161	66
	Cyprodinil	6	20	17
	Difenoconazole	13	168	128
	Dithianon	380	807	186
	Dodine	456	587	159
	Fludioxonil	4	20	17
	Fluopyram	0	3	3
	Fluxapyroxad	18	225	111
	Kresoxim-methyl	1	10	10
	Mancozeb	749	554	112
	Myclobutanil	40	451	149
	Potassium hydrogen carbonate	43	14	14
	Potassium phosphonates	357	259	161
	Proquinazid	12	229	114
	Pyraclostrobin	24	243	148
	Pyrimethanil	128	410	134
	Sulphur	522	178	118
	Tebuconazole	1	3	3
	Insecticides			
	Chlorantraniliprole	1	30	21
	Deltamethrin	2	266	89
	Indoxacarb	3	43	14
	Spirotetramat	3	14	14
	Thiacloprid	3	21	21
	Growth regulators			
	2-chloroethylphosphonic acid	31	93	93
	Gibberellins	0	53	26
	Paclobutrazol	1	6	3
	Prohexadione-calcium	8	76	36

Table 12: Estimated quantity (kg), spray area (spha) and basic area (ha) of active substance for cider apples, 2018.

Crop	Active Substance	Quantity (kg) of Active Ingredient Total	Spray area (spha) of Active Ingredient Total	Basic area (ha) of Active Ingredient Total
Cider apples	Herbicides			
	2,4-D	15	12	6
	Aminopyralid	0	3	3
	Diflufenican	7	7	3
	Fluroxypyr	1	3	3
	Glufosinate-ammonium	1	7	7
	Glyphosate	175	111	78
	Fungicides			
	Boscalid	9	47	28
	Bupirimate	1	15	8
	Captan	732	491	181
	Copper oxychloride	128	79	60
	Difenoconazole	2	36	22
	Dithianon	204	276	144
	Dodine	74	106	46
	Fenpropimorph	1	3	3
	Kresoxim-methyl	3	29	15
	Mancozeb	28	23	23
	Myclobutanil	20	279	126
	Potassium hydrogen carbonate	15	7	7
	Potassium phosphonates	30	22	14
	Proquinazid	3	61	47
	Pyraclostrobin	5	47	28
	Pyrimethanil	52	163	124
	Insecticides			
	Indoxacarb	2	22	22
	Thiacloprid	3	22	22
	Growth regulators			
	Prohexadione-calcium	7	39	19

Table 13: Estimated quantity (kg), spray area (spha) and basic area (ha) of active substance for other crops, 2018.

Crop	Active Substance	Quantity (kg) of Active Ingredient Total	Spray area (spha) of Active Ingredient Total	Basic area (ha) of Active Ingredient Total
Other crops	Herbicides			
	Glyphosate	9	6	4
	Fungicides			
	Boscalid	1	4	2
	Captan	4	3	3
	Copper oxychloride	13	7	2
	Dithianon	3	5	3
	Mancozeb	11	7	2
	Myclobutanil	0	4	2
	Pyraclostrobin	0	4	2
	Insecticides			
	Acetamiprid	0	2	2
	Pyrethrins	0	4	2
	Thiacloprid	1	3	2

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