

PESTICIDE USAGE IN NORTHERN IRELAND
SURVEY REPORT 267

**NORTHERN IRELAND
EDIBLE PROTECTED CROPS
2015**



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PESTICIDE USAGE SURVEY REPORT 267

EDIBLE PROTECTED CROPS IN NORTHERN IRELAND 2015

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The County Regions of Northern Ireland



SUMMARY

This is the first survey of pesticide usage exclusively on edible protected crops (excluding soft fruit) grown under permanent protection in Northern Ireland. A previous report in 1991, Protected Crops (edible and ornamental), (Kidd, S. L. B., *et al* 1993), included information on pesticide use on vegetable crops, strawberries and protected ornamental crops. For this survey, a number of different vegetable crops and tomatoes, which were propagated and/or grown under permanent cover of glass or polythene until harvested, were included. Information relating to pesticide use on soft fruit crops is recorded in the pesticide usage report Soft Fruit Crops, 2014 (Lavery, M. K., *et al* 2015).

Protected crop cultivation is a very minor sector of agricultural production in Northern Ireland and includes a range of crops grown on relatively small areas, which receive varying degrees of pesticide application. These factors lead to greater statistical uncertainty associated with the estimates produced and, whilst these data give an indication of pesticide use in this sector, they are less statistically robust than the estimates from the other reports in this series and should be interpreted accordingly. Data were collected from nine holdings, which represented 20% of the total census area of edible protected crops. Holdings were selected from information contained in the Northern Ireland Agricultural Census, June 2014 (*Anon.*, 2015) and raising factors have been applied to estimate national pesticide usage from sampled data. Data relating to individual crop types have not been published due to the small cultivation and sample areas and the possibility of identifying growers.

A total of seven fungicide active substances including formulated fungicide mixtures were recorded in use on edible protected crops in Northern Ireland in 2015. The carbamate fungicide propamocarb hydrochloride represented 18% of the fungicide-treated area but accounted for 65% of the weight of fungicides applied, exclusively on brassica crops for disease prevention and “damping off in propagation”. The strobilurin fungicide azoxystrobin was the only fungicide active substance applied to lettuce and tomato crops, exclusively for general fungal disease control.

The only herbicide recorded in use on edible protected crops was the dinitroaniline herbicide pendimethalin, which was applied to parsley, soup celery, soup leeks, spring onions and lettuce crops for general weed control, representing 4% of the total pesticide-treated area and 1% of the total weight of pesticides applied.

Chlorpyrifos, an organophosphorus insecticide and acaricide, was applied exclusively to brassica crops for control of cabbage root fly (*Delia radicum*). The area treated with this active substance accounted for 30% of the insecticide-treated area but represented 99% of the total weight of insecticides applied. This was due to the high rate of application as a drench treatment to brassicas during the propagation stage when the plants were still in module trays. A formulation of lambda-cyhalothrin/pirimicarb, applied to lettuce crops for general insect control, accounted for 39% of the insecticide-treated area but less than 1% of the weight of insecticides applied.

The soil fungus biopesticide, *Gliocladium catenulatum*, applied as a drench to the compost in module trays containing brassica plant seeds exclusively for general fungal control, represented 5% of the total pesticide-treated area and less than 1% of the weight of pesticides applied. Some minor use of the predatory mite *Neoseiulus californicus* on tomato plants was also recorded but the information provided was deemed unreliable and as such has not been included in the total area treated.

Seed treatments, which accounted for 34% of the total pesticide-treated area but only 1% of the weight of pesticides applied, were applied to all crops with tomatoes being the only exception. Thiram and thiamethoxam accounted for 39% and 38% of the seed-treated area, representing 31% and 45% of the weight of seed treatments applied, respectively. Brassica crops accounted for 43% of the seed-treated area but 88% of the total weight of seed treatments applied. Lettuce crops, which represented 46% of the seed-treated area, accounted for 5% of the total weight applied. Thiamethoxam was applied to 82% of all treated lettuce seeds.

Tomatoes received the fewest number of pesticide applications of all edible protected crops, consisting of one fungicide and one insecticide application and no seed treatments. Seeds were germinated in rockwool and were sown from early spring to allow for summer and autumn cropping.

Lettuce crops received one application each of fungicide, herbicide, insecticide and a seed treatment. They received the second fewest number of all pesticide applications made to edible protected crops.

Crops which were grown outdoors for part of or all of their life cycle are recorded in the Outdoor Vegetable Crops in Northern Ireland 2015 report (Lavery, M. K. *et al.*, 2016). Pesticide use on edible protected crops has previously been included in this report category.

DEFINITIONS AND NOTES

- ‘Grown area’ refers to the actual planted area of crop, and is referred to in hectares (ha).
- ‘Basic area’ refers to the actual planted area of crop which received at least one pesticide application and is referred to in hectares (ha).
- ‘Treated area’ refers to the total area treated with a pesticide, including all repeated applications to the basic area, and is referred to in spray hectares (spha).
- ‘Quantity applied’ refers to the weight of pesticides applied, including all repeated applications, and is referred to in kilograms (kg).
- ‘Reasons for use’: the reasons reported for the use of pesticides are the growers stated reason for use and may sometimes seem inappropriate.
- ‘Rounding’: due to rounding of figures, there may be slight differences in totals both within and between tables.
- ‘All brassicas’: refers to all broccoli (broccoli and purple flowering broccoli), Brussels sprouts, all cabbage (cabbage, pointed cabbage and savoy cabbage), all cauliflower (cauliflower and summer cauliflower) and swedes.
- ‘Celery and parsley’: refers to celeriac, celery and parsley.
- ‘Onions and leeks’: refers to leeks, spring onions and chives.
- ‘Tomatoes’: refers to all tomatoes (tomatoes, cherry tomatoes and plum tomatoes).
- ‘Other crops’: refers to beetroot, courgettes, pumpkin, squash and thyme. Pumpkin and squash received no pesticide treatments.
- Crop-specific regional information has not been included due to the small number of businesses in the population.

INTRODUCTION

As a participant of the UK Working Party on Pesticide Usage Surveys, the Agri-Food and Biosciences Institute (AFBI), on behalf of the Department of Agriculture, Environment and Rural Affairs (DAERA), 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 UK Expert Committee on Pesticides. In addition, the information may be used by those involved in residue testing, environmental impact studies, public information and for the evaluation and regulation of trends in pesticide usage. Pesticide usage monitoring forms part of an obligation under the Food and Environment Act (1985) for post-registration monitoring of pesticides approved for use. The programme forms an integral part of the government's pesticide safety control arrangements, in providing quantitative and qualitative data on the usage of pesticides in agriculture, horticulture, food storage and associated industries.

This work is also undertaken in England and Wales by FERA Science Ltd (FERA) and in Scotland by Science and Advice for Scottish Agriculture (SASA). Pesticide usage reports from these regions may be obtained at the following sites:

(<https://secure.fera.defra.gov.uk/pusstats/surveys/>)

(<https://www.sasa.gov.uk/pesticides/pesticide-usage/pesticide-usage-survey-reports>)

A list of published Northern Ireland Pesticide Usage Survey reports is included in Appendix 1.

Due to the very small area of protected edible crops grown in Northern Ireland, the limited pesticide input and the issues associated with estimating pesticide use, this report will not be produced in subsequent years unless crop area or pesticide input increases. Data will continue to be collected and submitted to the UK reports.

METHODS

The holdings to be surveyed were selected on the basis of the total area of edible protected crops grown (excluding soft fruit), using data from the Northern Ireland Agricultural Census, June 2014 (*Anon.*, 2015).

The purpose of the survey was explained to the occupiers of selected holdings in preliminary correspondence. A total of nine holdings, representing 20% of the total number of edible protected growers, were visited during the period February to March 2016 and data collected by personal interview. The data collected included: the area of crops grown, area treated, target crop, pesticide group, active substance used and number of treatments applied. The growers' stated reasons for pesticide use were also included but may not always seem appropriate. The collected data were entered using SQL, a relational database programme. Validated data were downloaded for analysis using IBM SPSS Statistics Version 22 software.

RESULTS AND DISCUSSION

CROPS

The number and areas of crops surveyed are shown in Table 1 as combined crop groups. Data from nine farms provided information on 27 crop types. Crops include beetroot, broccoli, Brussels sprouts, cabbage, cauliflower, celeriac, celery, chives, courgettes, leeks, lettuce, parsley, pumpkin, squash, spring onions, swedes, thyme and tomatoes. The total area of crops sampled in the survey was representative of the area of edible protected crops grown in Northern Ireland in 2015. Pumpkins and squash were the only crops not to receive pesticide treatments.

Tomatoes were the most extensively grown edible protected crop in Northern Ireland in 2015, accounting for 56% of the total grown area but only 8% of the pesticide-treated area and less than 1% of the weight of pesticides applied. Lettuce crops accounted for a further 27% of the total grown area and 33% of the pesticide-treated area, but represented less than 1% of the quantity of pesticides applied.

Brassica crops, whilst accounting for only 9% of the grown area, represented 49% of the total pesticide-treated area and 99% of the weight of pesticides applied. This was due to the use of an insecticide drench treatment applied at a high volume during the propagation phase.

Both celery and parsley crops and onion and leek crops accounted for 4% of the area of edible protected crops grown and 1% of the weight of pesticides applied. Celery and parsley crops represented 4% of the pesticide-treated area and onion and leeks accounted for a further 6%.

Other crops, which include beetroot, courgettes, pumpkin, squash and thyme, were grown on less than 1% of the total area of edible protected crops and accounted for less than 1% of both the pesticide-treated area and weight of pesticides applied. Pumpkin and squash were the only crops not to receive pesticide treatments.

Refer to Table 6 for information relating to number of spray applications applied to each crop type.

Figure 1: Proportional (%) areas of the different edible protected crops grown (ha) in Northern Ireland, 2015.

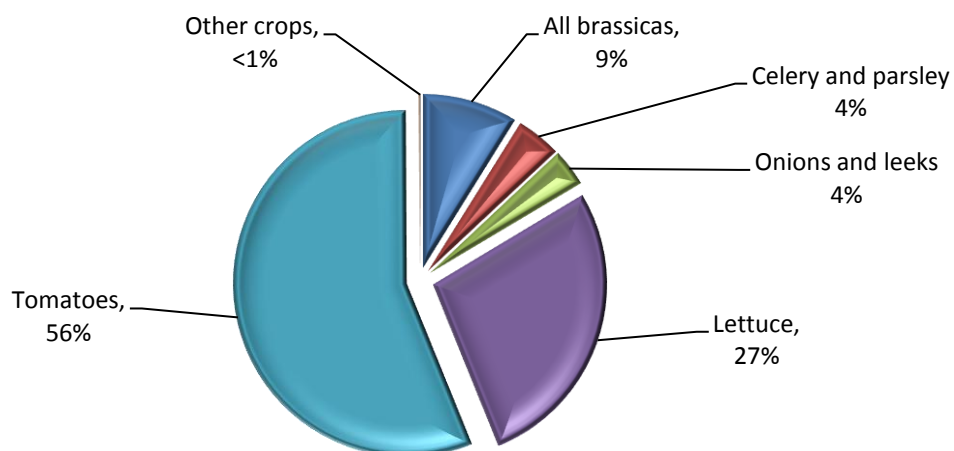


Figure 2: Pesticide usage (spha) on edible protected crops in Northern Ireland, 2015.

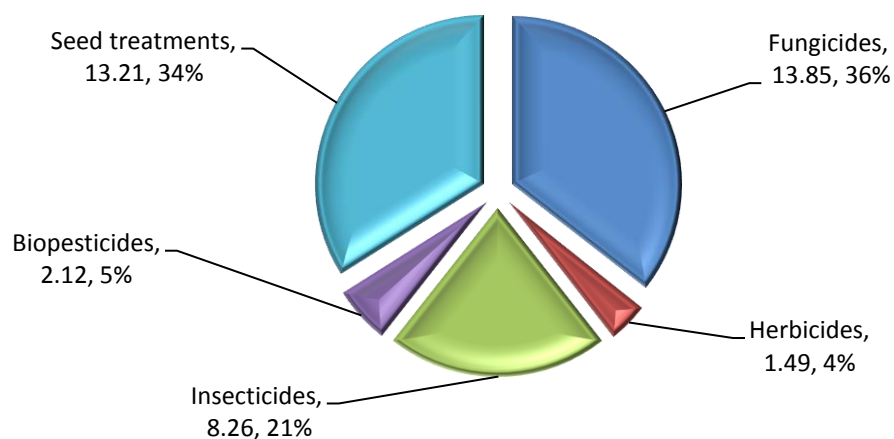


Figure 3: Pesticide usage (kg) on edible protected crops in Northern Ireland, 2015.

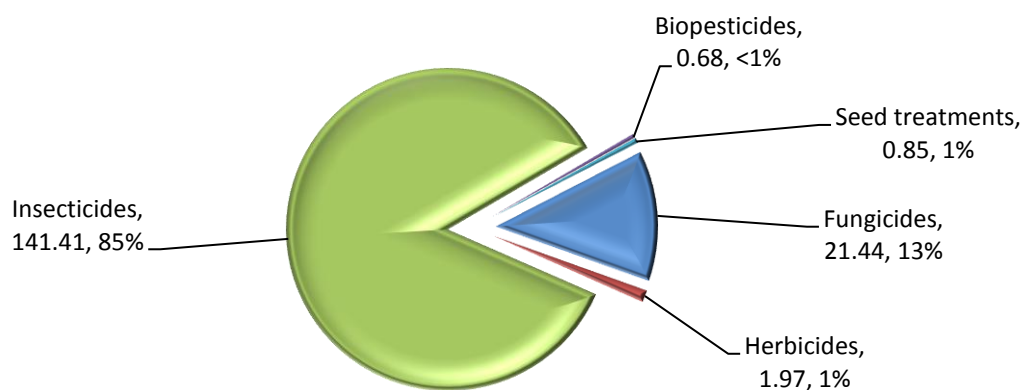


Figure 4: The most commonly used pesticide active substances by area treated (spha) in Northern Ireland, 2015.

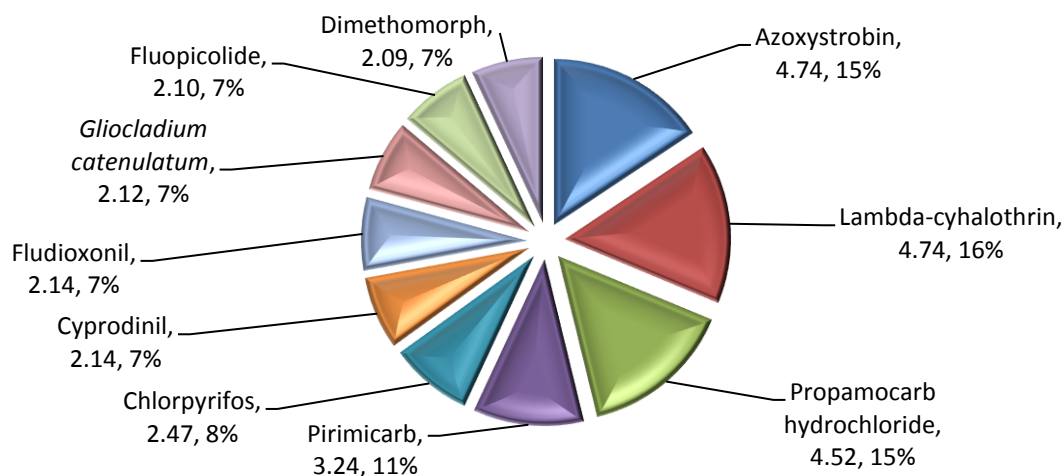


Figure 5: The most commonly used pesticide active substances by weight applied (kg) in Northern Ireland, 2015.

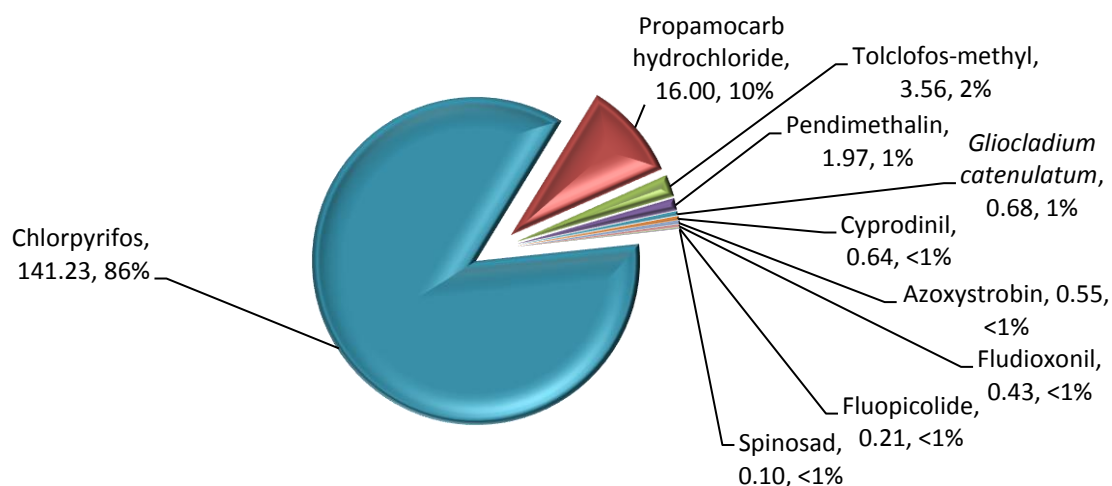
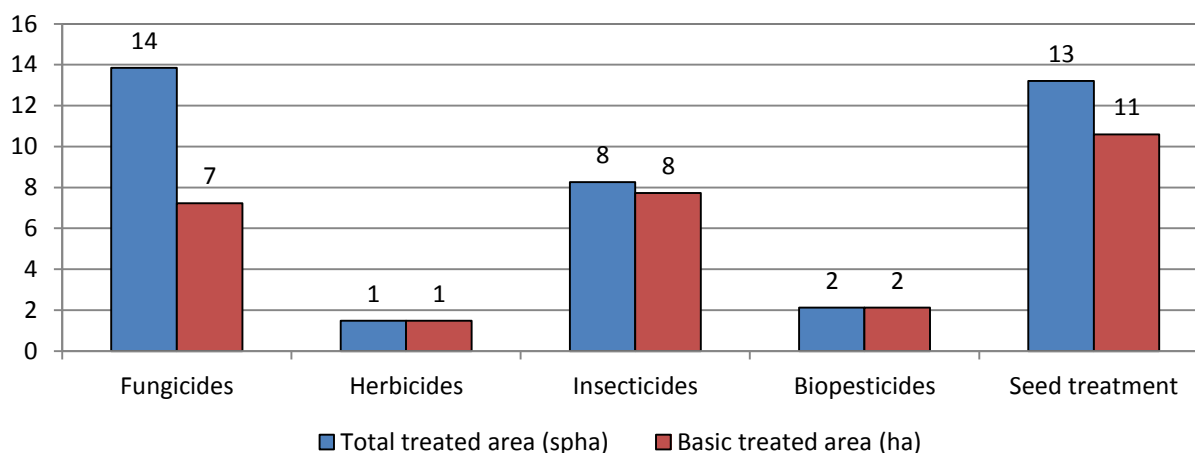


Figure 6: Total treated area (spha) and basic treated area (ha) of edible protected crops in Northern Ireland, 2015.



TOTAL PESTICIDE USAGE (Tables 7 & 8)

An estimated 166 kilograms of pesticide active ingredients were applied to 39 spray hectares of edible protected crops grown in Northern Ireland in 2015.

An estimated 65% of all fungicide applications were made to brassica crops, with a further 24% applied to lettuce crops and 11% applied to tomatoes. The fungicide active substance azoxystrobin accounted for 34% of all fungicides applied, 68% of which was applied to lettuce crops with the remaining 32% being applied to tomatoes.

The only herbicide, pendimethalin, was applied to 40% of both celery and parsley crops and onion and leek crops and 20% of lettuce crops representing less than 1% of the total weight of pesticides applied.

Approximately 39% of all insecticides were applied to lettuce crops with a further 30% applied to brassica crops and 18% to tomatoes. Onions and leeks received an estimated 13% of all insecticide treatments. Lambda-cyhalothrin/pirimicarb and chlorpyrifos were applied to 39% and 30% of the insecticide-treated area, respectively, with the latter accounting for 99% of the total weight of insecticides applied.

Treated brassica seed accounted for an estimated 43% of the seed-treated area with both thiram and iprodione accounting for 46% of all fungicides applied, respectively. Treated lettuce seed represented approximately 46% of the seed-treated area with thiamethoxam accounting for 82% of all treatments applied to lettuce seeds.

The reasons given for pesticide use on edible protected crops are included in Tables 11 to 16.

ACKNOWLEDGEMENTS

We, the authors, wish to thank all of the growers who participated in this survey and without whose co-operation the completion of this report would not have been possible. We are also grateful for the invaluable assistance of Mr David Williams who worked tirelessly on this report. Also, staff at the Science & Advice for Scottish Agriculture (SASA), Edinburgh and Fera Science Limited (FERA), York for their invaluable advice on many aspects of this report.

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Lavery, M.K., Jess, S., Matthews, D., Patton, A. (2016). Outdoor Vegetable Crops in Northern Ireland 2015. *Pesticide Usage Survey Report 268*. Belfast: AFBINI.

Table 1: Total number and area of crops surveyed (ha) in Northern Ireland, 2015.

<i>Crop group</i>	Number of crops surveyed	Sampled area (ha)
All brassicas	12	2.20
Celery and parsley	10	0.27
Onions and leeks	6	0.58
Lettuce	7	0.65
Tomatoes	7	1.33
Other crops	6	0.03
All crops	48	5.06

Table 2: Estimated area (ha) of edible protected crops grown regionally in Northern Ireland, 2015.

	<i>County</i>			
<i>Crop group</i>	Antrim	Armagh	Down	Northern Ireland
All brassicas	.	0.59	2.49	3.08
Celery and parsley	0.61	0.66	0.18	1.45
Onions and leeks	0.68	.	0.53	1.21
Lettuce	3.54	6.07	.	9.61
Tomatoes	12.55	.	7.07	19.62
Other crops	.	.	0.03	0.03
All crops	17.38	7.32	10.31	35.00

Table 3a: Estimated area (spha) of edible protected crops treated regionally in Northern Ireland, 2015 with each pesticide type.

	<i>County</i>			
<i>Pesticide type</i>	Antrim	Armagh	Down	Northern Ireland
Fungicides	4.74	.	9.11	13.85
Herbicides	1.49	.	.	1.49
Insecticides	4.74	.	3.52	8.26
Biopesticides	.	.	2.12	2.12
Seed treatments	0.09	7.52	5.59	13.21
Total	11.05	7.52	20.35	38.92

Table 3b: Estimated weight (kg) of pesticide applied regionally in Northern Ireland, 2015 with each pesticide type.

	County			
<i>Pesticide type</i>	Antrim	Armagh	Down	Northern Ireland
Fungicides	0.55	.	20.89	21.44
Herbicides	1.97	.	.	1.97
Insecticides	0.09	.	141.33	141.41
Biopesticides	.	.	0.68	0.68
Seed treatments	0.01	0.08	0.76	0.85
Total	2.61	0.08	163.65	166.34

Table 4: The total area (spha) and the basic area (ha) of edible protected crops treated with each pesticide type in Northern Ireland, 2015.

	Pesticide Type											
Crop group	Fungicides		Herbicides		Insecticides		Biopesticides		Seed treatments		All pesticides	
	(spha)	(ha)	(spha)	(ha)	(spha)	(ha)	(spha)	(ha)	(spha)	(ha)	(spha)	(ha)
All brassicas	9.04	2.45	.	.	2.46	2.46	2.12	2.12	5.70	3.09	19.32	3.09
Celery and parsley	0.03	0.02	0.60	0.60	.	.	.	.	0.82	0.82	1.45	0.82
Onions and leeks	<0.01	<0.01	0.60	0.60	1.06	0.53	.	.	0.61	0.61	2.27	0.61
Lettuce	3.24	3.24	0.30	0.30	3.24	3.24	.	.	6.07	6.07	12.85	6.07
Tomatoes	1.49	1.49	.	.	1.49	1.49	.	.	.	.	2.98	1.49
Other crops	0.03	0.02	.	.	.	.	.	.	<0.01	<0.01	0.04	0.02
All crops	13.85	7.23	1.49	1.49	8.26	7.73	2.12	2.12	13.21	10.60	38.92	12.10

Table 5: The total quantities (kg) of each pesticide type used on edible protected crops in Northern Ireland, 2015.

Crop group	Pesticide type					Total quantity (kg)
	Fungicides	Herbicides	Insecticides	Biopesticides	Seed treatments	
All brassicas	20.85	.	141.23	0.68	0.75	163.50
Celery and parsley	0.02	0.79	.	.	<0.01	0.82
Onions and leeks	<0.01	0.79	0.10	.	0.04	0.93
Lettuce	0.18	0.39	0.07	.	0.04	0.69
Tomatoes	0.37	.	0.01	.	.	0.38
Other crops	0.02	.	.	.	<0.01	0.02
All crops	21.44	1.97	141.41	0.68	0.85	166.34

Table 6: Number of spray applications applied to edible protected crops in Northern Ireland, 2015.

<i>Crop group</i>	<i>Pesticide type</i>					<i>All pesticides</i>
	<i>Fungicides</i>	<i>Herbicides</i>	<i>Insecticides</i>	<i>Biopesticides</i>	<i>Seed treatments</i>	
All brassicas	13	.	5	5	15	38
Celery and parsley	4	2	.	.	5	11
Onions and leeks	2	2	2	.	3	9
Lettuce	1	1	1	.	1	4
Tomatoes	1	.	1	.	.	2
Other crops	3	.	.	.	2	5
All crops	24	5	9	5	26	69

Table 7: Estimated area (spha) of edible protected crops treated with pesticide formulations in Northern Ireland, 2015.

	Crop group						
Pesticide group & active substance	All brassicas	Celery and parsley	Onions and leeks	Lettuce	Tomatoes	Other crops	Total treated area (spha)
Fungicides							
Azoxystrobin	.	.	.	3.24	1.49	.	4.74
Chlorothalonil	.	0.01	.	.	.	.	0.01
Cyprodinil/fludioxonil	2.08	0.02	<0.01	.	.	0.03	2.13
Dimethomorph	2.09	.	.	.	.	.	2.09
Fluopicolide/propamocarb hydrochloride	2.10	.	.	.	.	.	2.10
Propamocarb hydrochloride	2.42	.	.	.	.	.	2.42
Tolclofos-methyl	0.36	.	.	.	.	.	0.36
All fungicides	9.04	0.03	<0.01	3.24	1.49	0.03	13.85
Herbicides							
Pendimethalin	.	0.60	0.60	0.30	.	.	1.49
All herbicides	.	0.60	0.60	0.30	.	.	1.49
Insecticides							
Chlorpyrifos	2.46	.	.	.	.	.	2.46
Lambda-cyhalothrin	.	.	.	.	1.49	.	1.49
Lambda-cyhalothrin/pirimicarb	.	.	.	3.24	.	.	3.24
Spinosad	.	.	1.06	.	.	.	1.06
All insecticides	2.46	.	1.06	3.24	1.49	.	8.26

Table 7 (contd): Estimated area (spha) of edible protected crops treated with pesticide formulations in Northern Ireland, 2015.

	Crop group						
Pesticide group & active substance	All brassicas	Celery and parsley	Onions and leeks	Lettuce	Tomatoes	Other crops	Total treated area (spha)
Biopesticides							
Gliocladium catenulatum	2.12	.	.	.	.	.	2.12
All biopesticides	2.12	.	.	.	.	.	2.12
Seed treatments							
Cymoxanil/fludioxonil/metalaxyl-M	.	.	.	.	.	<0.01	<0.01
Iprodione	2.62	.	.	.	.	.	2.62
Metalaxyl-M	0.38	0.01	.	.	.	.	0.39
Thiamethoxam	0.09	.	.	5.00	.	.	5.09
Thiram	2.61	0.81	0.61	1.07	.	<0.01	5.10
All seed treatments	5.70	0.82	0.61	6.07	.	<0.01	13.21

Table 8: Estimated quantities (kg) of pesticide formulations used on edible protected crops in Northern Ireland 2015.

	Crop group						
Pesticide group & active substance	All brassicas	Celery and parsley	Onions and leeks	Lettuce	Tomatoes	Other crops	Total quantity (kg)
Fungicides							
Azoxystrobin	.	.	.	0.18	0.37	.	0.55
Chlorothalonil	.	0.01	.	.	.	.	0.01
Cyprodinil/fludioxonil	1.04	<0.01	<0.01	.	.	0.02	1.07
Dimethomorph	0.04	.	.	.	.	.	0.04
Fluopicolide/propamocarb hydrochloride	2.31	.	.	.	.	.	2.31
Propamocarb hydrochloride	13.90	.	.	.	.	.	13.90
Tolclofos-methyl	3.56	.	.	.	.	.	3.56
All fungicides	20.85	0.02	<0.01	0.18	0.37	0.02	21.44
Herbicides							
Pendimethalin	.	0.79	0.79	0.39	.	.	1.97
All herbicides	.	0.79	0.79	0.39	.	.	1.97
Insecticides							
Chlorpyrifos	141.23	.	.	.	.	.	141.23
Lambda-cyhalothrin	.	.	.	.	0.01	.	0.01
Lambda-cyhalothrin/pirimicarb	.	.	.	0.07	.	.	0.07
Spinosad	.	.	0.10	.	.	.	0.10
All insecticides	141.23	.	0.10	0.07	0.01	.	141.41

Table 8 (contd): Estimated quantities (kg) of pesticide formulations used on edible protected crops in Northern Ireland 2015.

	Crop group						
Pesticide group & active substance	All brassicas	Celery and parsley	Onions and leeks	Lettuce	Tomatoes	Other crops	Total quantity (kg)
Biopesticides							
Gliocladium catenulatum	0.68	.	.	.	.	.	0.68
All biopesticides	0.68	.	.	.	.	.	0.68
Seed treatments							
Cymoxanil/fludioxonil/metalaxyl-M	.	.	.	.	.	<0.01	<0.01
Iprodione	0.19	.	.	.	.	.	0.19
Metalaxyl-M	<0.01	<0.01	.	.	.	.	<0.01
Thiamethoxam	0.37	.	.	0.01	.	.	0.39
Thiram	0.19	0.01	0.04	0.03	.	<0.01	0.27
All seed treatments	0.75	0.01	0.04	0.04	.	<0.01	0.85

Table 9 The active ingredients most extensively used on edible protected crops in Northern Ireland, 2015 ranked by treated area (spha).

No.	Active substance	Treated area (spha)
1	Azoxystrobin	4.74
2	Lambda-cyhalothrin	4.74
3	Propamocarb hydrochloride	4.52
4	Pirimicarb	3.24
5	Chlorpyrifos	2.47
6	Cyprodinil	2.14
7	Fludioxonil	2.14
8	Gliocladium catenulatum	2.12
9	Fluopicolide	2.10
10	Dimethomorph	2.09

Table 10 The active ingredients most extensively used on edible protected crops in Northern Ireland, 2015 ranked by weight (kg).

No.	Active substance	Quantity applied (kg)
1	Chlorpyrifos	141.23
2	Propamocarb hydrochloride	16.00
3	Tolclofos-methyl	3.56
4	Pendimethalin	1.97
5	Gliocladium catenulatum	0.68
6	Cyprodinil	0.64
7	Azoxystrobin	0.55
8	Fludioxonil	0.43
9	Fluopicolide	0.21
10	Spinosad	0.10

Table 11: All brassicas pesticide-treated area (spha), basic treated area (ha), quantity applied (kg) and reasons for use.

<i>Pesticide group and active substance</i>	<i>Botrytis</i>	<i>Cabbage root fly</i>	<i>Disease prevention</i>	<i>Downy mildew</i>	<i>General fungal control</i>	<i>Propagation damping off</i>	<i>Seed treatment</i>	<i>Total treated area (spha)</i>	<i>Quantity applied (kg)</i>
Fungicides									
Cyprodinil/fludioxonil	2.08	.	.	.	.	.	.	2.08	1.04
Dimethomorph	.	.	.	2.09	.	.	.	2.09	0.04
Fluopicolide/propamocarb hydrochloride	.	.	2.10	.	.	.	.	2.10	2.31
Propamocarb hydrochloride	.	.	2.07	.	.	0.36	.	2.42	13.90
Tolclofos-methyl	0.36	.	0.36	3.56
All fungicides	2.08	.	4.17	2.09	.	0.71	.	9.04	20.85
Insecticides									
Chlorpyrifos	.	2.46	.	.	.	.	.	2.46	141.23
All insecticides	.	2.46	.	.	.	.	.	2.46	141.23
Biopesticides									
<i>Gliocladium catenulatum</i>	2.12	.	.	2.12	0.68
All biological controls	2.12	.	.	2.12	0.68
Seed Treatments									
Iprodione	2.62	2.62	0.19
Metalaxyl-M	0.38	0.38	<0.01
Thiamethoxam	0.09	0.09	0.37
Thiram	2.61	2.61	0.19
All seed treatments	5.70	5.70	0.75

Table 12: Celery and parsley pesticide-treated area (spha), basic treated area (ha), quantity applied (kg) and reasons for use.

<i>Pesticide group and active substance</i>	<i>Botrytis</i>	General fungal control	General weed control	Seed treatment	Total treated area (spha)	Quantity applied (kg)
Fungicides						
Chlorothalonil	.	0.01	.	.	0.01	0.01
Cyprodinil/fludioxonil	0.02	.	.	.	0.02	<0.01
All fungicides	0.02	0.01	.	.	0.03	0.02
Herbicides						
Pendimethalin	.	.	0.60	.	0.60	0.79
All insecticides	.	.	0.60	.	0.60	0.79
Seed Treatments						
Metalaxyl-M	.	.	.	<0.01	<0.01	<0.01
Thiram	.	.	.	0.81	0.81	<0.01
All seed treatments	.	.	.	0.81	0.81	<0.01

Table 13: Onions and leeks pesticide-treated area (spha), basic treated area (ha), quantity applied (kg) and reasons for use.

<i>Pesticide group and active substance</i>	<i>Botrytis</i>	<i>General insect control</i>	<i>General weed control</i>	<i>Seed treatment</i>	<i>Total treated area (spha)</i>	<i>Quantity applied (kg)</i>
Fungicides						
Cyprodinil/fludioxonil	<0.01	.	.	.	<0.01	<0.01
All fungicides	<0.01	.	.	.	<0.01	<0.01
Herbicides						
Pendimethalin	.	.	0.60	.	0.60	0.79
All herbicides	.	.	0.60	.	0.60	0.79
Insecticides						
Spinosad	.	1.06	.	.	1.06	0.10
All insecticides	.	1.06	.	.	1.06	0.10
Seed Treatments						
Thiram	.	.	.	0.61	0.61	0.04
All seed treatments	.	.	.	0.61	0.61	0.04

Table 14: Lettuce pesticide-treated area (spha), basic treated area (ha), quantity applied (kg) and reasons for use.

<i>Pesticide group and active substance</i>	General fungal control	General insect control	General weed control	Seed treatment	Total treated area (spha)	Quantity applied (kg)
<i>Fungicides</i>						
Azoxystrobin	3.24	.	.	.	3.24	0.18
All fungicides	3.24	.	.	.	3.24	0.18
<i>Herbicides</i>						
Pendimethalin	.	.	0.30	.	0.30	0.39
All herbicides	.	.	0.30	.	0.30	0.39
<i>Insecticides</i>						
Lambda-cyhalothrin/pirimicarb	.	3.24	.	.	3.24	0.07
All insecticides	.	3.24	.	.	3.24	0.07
<i>Seed Treatments</i>						
Thiamethoxam	.	.	.	5.00	5.00	0.01
Thiram	.	.	.	1.07	1.07	0.03
All seed treatments	.	.	.	6.07	6.07	0.04

Table 15 Tomatoes pesticide-treated area (spha), basic treated area (ha), quantity applied (kg) and reasons for use.

<i>Pesticide group and active substance</i>	General fungal control	General insect control	Total treated area (spha)	Quantity applied (kg)
Fungicides				
Azoxystrobin	1.49	.	1.49	0.37
All fungicides	1.49	.	1.49	0.37
Insecticides				
Lambda-cyhalothrin	.	1.49	1.49	0.01
All insecticides	.	1.49	1.49	0.01

Table 16: Other crops pesticide-treated area (spha), basic treated area (ha), quantity applied (kg) and reasons for use.

<i>Pesticide group and active substance</i>	<i>Botrytis</i>	Seed treatment	Total treated area (spha)	Quantity applied (kg)
Fungicides				
Cyprodinil/fludioxonil	0.03	.	0.03	0.02
All fungicides	0.03	.	0.03	0.02
Seed Treatments				
Cymoxanil/fludioxonil/metalaxyl-M	.	<0.01	<0.01	<0.01
Thiram	.	<0.01	<0.01	<0.01
All seed treatments	.	<0.01	<0.01	<0.01

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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 & Fodder Crops 1997	1-855 27 506 6
157	Sheep Treatments 1997	1-855 27 425 6
167	Soft Fruit 1998	1-855 27 540 6
168	Arable Crops 1998	1-855 27 536 8
169	Vegetable Crops 1999	1-855 27 561 9
170	Mushroom Crops 1999	1-855 27 549 X
177	Arable Crops 2000	1-855 27 670 4
178	Top Fruit Crops 2002	1-855 27 618 6
194	Arable Crops 2002	1-855 27 674 7
198	Grassland & Fodder Crops 2003	1-855 27 797 2
199	Hardy Nursery Stock Crops 2003	1-855 27 789 1
201	Protected Ornamental Crops 2003	1-855 27 739 5
206	Arable Crops 2004	1-855 27 833 2
207	Vegetable crops 2004	1-855 27 869 3

Report No.	Report title	ISBN
208	Grassland & Fodder Crops 2005	1-855 27 998 8
209	Sheep Treatments 2005	1-855 27 999 5
216	Arable Crops 2006	1-848 07 035 6
217	Top Fruit Crops 2006	1-848 07 019 6
218	Soft Fruit Crops 2006	1-848 07 036 3
222	Vegetable Crops 2007	1-848 07 062 2
223	Mushroom Crops 2007	1 848 07 061 5
230	Arable Crops 2008	1 848 07 135 3
231	Top Fruit Crops 2008	1-848 07 134 6
238	Grassland & Fodder Crops 2009	1-848 07 186 5
239	Hardy Nursery Stock Crops 2009	1-848 07 187 2
240	Soft Fruit Crops 2010	1-848 07 251 0
241	Top Fruit Crops 2010	1-848 07 250 3
242	Arable Crops 2010	1-848 07 252 7
245	Mushroom crops 2011	1-84807-308-1
246	Vegetable Crops 2011	1-848 07 309 8
247	Arable Crops 2012	1-848 07 404 3
248	Soft Fruit Crops 2012	1-848 07 402 6
249	Top Fruit Crops 2012	1-848 07 403 3
258	Grassland & Fodder Crops 2013	1-84807-485-9
259	Vegetable Crops 2013	1-84807-486-6
260	Arable Crops 2014	1-84807-552-8
261	Top Fruit Crops 2014	1-84807-553-5
262	Soft Fruit Crops 2014	1-84807-571-9
268	Outdoor Vegetable Crops 2015	1-84807-685-3

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