PESTICIDE USAGE IN NORTHERN IRELAND

Survey Report 293

Northern Ireland Outdoor Vegetable Crops 2019

A National Statistics Publication

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PESTICIDE USAGE SURVEY REPORT 293

OUTDOOR VEGETABLE CROPS IN NORTHERN IRELAND 2019

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CONTENTS

The County Regions of Northern Ireland

SUMMARY

This is the tenth survey of pesticide usage on outdoor vegetable crops in Northern Ireland, providing comparative data to that obtained in the previous surveys in 1991 (Jess *et al*., 1993), 1995 (Kidd *et al*., 1998), 1999 (Kearns *et al*., 2002), 2004 (Kearns *et al*., 2005), 2007 (Withers *et al*., 2009), 2011 (Withers *et al*., 2012), 2013 (Withers *et al*., 2014), 2015 (Lavery *et al*., 2016) and 2017 (Kirbas *et al*., 2018). Information on all aspects of pesticide usage was collected from 40 holdings throughout the province, representing 45% of the total population of outdoor vegetable crop growers in Northern Ireland (Table 1). Quantitative data have been adjusted to provide estimates of total pesticide usage. The area of outdoor vegetable crops grown in Northern Ireland in 2019 was an estimated 1,092 hectares; a 7% decrease compared with 2017.

Totals of 88 products and 43 active substances were recorded in use in this survey. By comparison with 2017, the pesticide-treated area increased by 4%, to 12,713 spray hectares, while the quantity of pesticide (active substances) increased by 51% to approximately 6,315 kilograms, primarily due to increased herbicide applications. The fungicide-treated area increased by 35% and the quantity of fungicide active substances applied increased by 46%. The area treated with herbicides increased by 4% but the weight applied increased by 47%. The insecticide-treated area decreased by 8%, though the weight of insecticide active substances increased by 92%, primarily due to the high application rate of oxamyl used for nematode control on carrot and parsnip crops. The only molluscicide active substance used in 2019 was ferric phosphate, compared with 2017 when metaldehyde was the only molluscicide used. Treatments for slugs were more consistent with previous reporting periods in 2015 and 2013. Maleic hydrazide was the only growth regulator used in 2019, applied exclusively to 4 hectares of parsnip crops.

The area of vegetable crops grown from treated seed (direct sown or propagated and transplanted) decreased by 6% since 2017 and the weight of active substances used decreased by 66%, from 38 kilograms to 13 kilograms, mainly due to the withdrawal from use of thiamethoxam, which was used extensively as a seed treatment in 2017.

Fungicides, applied to 24% of the pesticide-treated area, accounted for 16% of the weight of pesticides applied. Herbicides accounted for 39% of the pesticide-treated area and 67% of the total quantity of pesticides used. Insecticides, applied to 24% of the pesticide-treated area, accounted for 16% of the total quantity of pesticides used. Growth regulators accounted for less than 1% of the pesticide treated area and the quantity applied. Molluscicides accounted for less than 1% of both the total pesticide-treated area and the quantity of pesticides applied. Seed treatments applied to outdoor vegetable crops grown in 2019 accounted for 12% of the pesticide-treated area representing less than 0.1% of the quantity of active ingredients applied.

Carrots and parsnips collectively accounted for 62% of the quantity of fungicide active ingredients applied, representing 61% of the area treated with fungicides, with the active substance prothioconazole being most frequently used on carrots and metalaxyl-M being most frequently used on parsnips. Brassica crops received 19% of the total weight of fungicides applied, representing 26% of the area of vegetable crops treated with fungicides. The two most commonly used fungicide active substances applied to brassicas were the curative triazole fungicides difenoconazole and prothioconazole, primarily for general fungal control.

Glyphosate, pendimethalin and clomazone were the herbicide active ingredients most commonly applied to outdoor vegetable crops, particularly to carrot and parsnip and onion and leek crops. Overall, 47% of all herbicide applications were applied to carrot and parsnip crops, with a further 28% applied to onions and leeks.

Carrots and parsnips collectively accounted for 69% of the insecticide-treated area, representing 96% of the quantity of insecticide active substances applied mainly due to the pyrethroid insecticide lambda-cyhalothrin being applied extensively to carrot, parsnip and brassica crops for control of aphids. Leafy and flowerhead brassicas accounted for 26% of the insecticide-treated area representing 4% of the weight of insecticides applied. With exception of the use of garlic oil in carrots for general insect control there were no records of biopesticides/biological controls in NI vegetable crops in 2019.

Crops which were propagated from seed and/or grown under glass or polythene for the duration of their life cycle are recorded in the Edible Protected Crops in Northern Ireland

2019 report (Lavery *et al*., 2020). These crops have previously been included in the totals for outdoor vegetable crops. The proportion of total treated area of vegetable crops attributed to propagation (edible protected) is estimated at <0.2%.

A number of new active substances and formulated mixtures, which were not recorded in the previous report have been used during this survey period. The fungicides fluopicolide/propamocarb hydrochloride and metconazole, the herbicides aclonifen, chloridazon, cycloxydim, desmedipham/ethofumesate/phenmedipham and diflufenican, the insecticide oxamyl and the molluscicide ferric phosphate were all recorded as used in 2019.

Conversely, a number of active substances and formulated mixtures which were used in 2017 have not been recorded during this survey period. These include the fungicides chlorothalonil, chlorothalonil/cyproconazole, cyprodinil/isopyrazam and epoxiconazole/metconazole, the herbicides bentazone, clopyralid, ethametsulfuron-methyl, fluroxypyr/halauxifen-methyl, metsulfuron-methyl/tribenuron-methyl, S-metolachlor and tepraloxydim, the insecticides acetamiprid, chlorpyrifos and spinosad and the molluscicide metaldehyde.

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 or appear similar to other reasons with the same meaning.
- ‘Rounding’: due to rounding of figures, there may be slight differences in totals both within and between tables.
- ‘Leafy and flowerhead brassica’: refers to Brussels sprouts, broccoli/calabrese, autumn, summer and winter cauliflower, all cabbage and kale. Cabbage refers to: Autumn, Chinese (pointed), hard, red, savoy, spring, summer, white and winter cabbage.
- ‘Onions and leeks’: refers to soup leeks, table leeks, salad onions, summer scallions and winter scallions. ‘Leeks’ refer to those crops which were not classified as either soup or table leeks.
- ‘Celery and parsley’: refers to soup celery and parsley.
- ‘Peas and beans’: refers to picking peas and broad beans.
- ‘Other vegetables’: refers to beetroot, courgette, chard, fennel, pumpkin, rhubarb, spinach and squash, which are grouped due to their small growing area.
- ‘Ground preparation’ herbicides are also known as pre-cultivation or pre-sowing herbicides.
- Pre-emergence weed control herbicides are also referred to as ‘Sealers’.
- ‘Leaf spot’ refers to leaf spot fungus.

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. In addition, regulation EC 1185/2009 also provides a statutory requirement for the collection of pesticide statistics. 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)

This is the tenth survey examining pesticide usage practices on vegetable crops grown in Northern Ireland. Summary results from the previous surveys conducted in 1991 (Jess *et al*., 1993), 1995 (Kidd *et al*., 1998), 1999 (Kearns *et al*., 2002), 2004 (Kearns *et al*., 2005), 2007 (Withers *et al*., 2009), 2011 (Withers *et al*., 2012), 2013 (Withers *et al*., 2014), 2015 (Lavery *et al*., 2016) and 2017 (Kirbas *et al*., 2018) are included in the report for comparative purposes.

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

METHODS

The sample of holdings to be surveyed was selected from each of the six counties, on the basis of the total area of vegetable crops grown, using a combination of data from the Northern Ireland Agricultural Census, June 2020 (*Anon*., 2019), farm level information from the Basic Farm Payment scheme (2019) and information from previous surveys. However, due to sampling procedures and the distribution of vegetable production in Northern Ireland, no holdings were selected from County Fermanagh.

The sample was stratified into five size groups, according to the total area of vegetable 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 vegetable crops grown. The growers were contacted to confirm if they had grown outdoor vegetable crops in 2019. This information was used to estimate the total number of Northern Ireland growers.

The purpose of the survey was explained to the occupiers of selected holdings in preliminary correspondence. Forty holdings, representing 45% of holdings growing outdoor vegetable crops, were visited during the period November 2019 to March 2020 and data collected by both personal interview and by telephone. These data 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. Holdings selected in the original sample unable to provide data were replaced with those from the same county and size group held on a reserve list. The total number of farms in each size group and the number of farms sampled are shown in Table 1. The collected data were entered using SQL, a relational database programme. Validated data were downloaded for analysis using IBM SPSS Statistics Version 22 software.

TRENDS

Figure 1: Comparison of the area of outdoor vegetable crops grown (ha) in Northern Ireland between 1991- 2019.

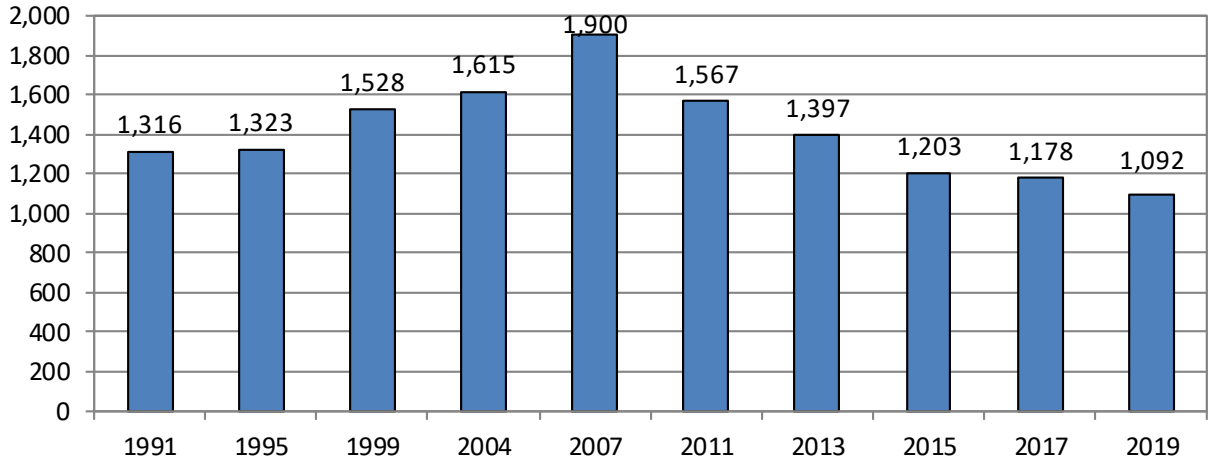


Figure 2: Comparison of the area of outdoor vegetable crops treated (spha) in Northern Ireland between 1991- 2019.

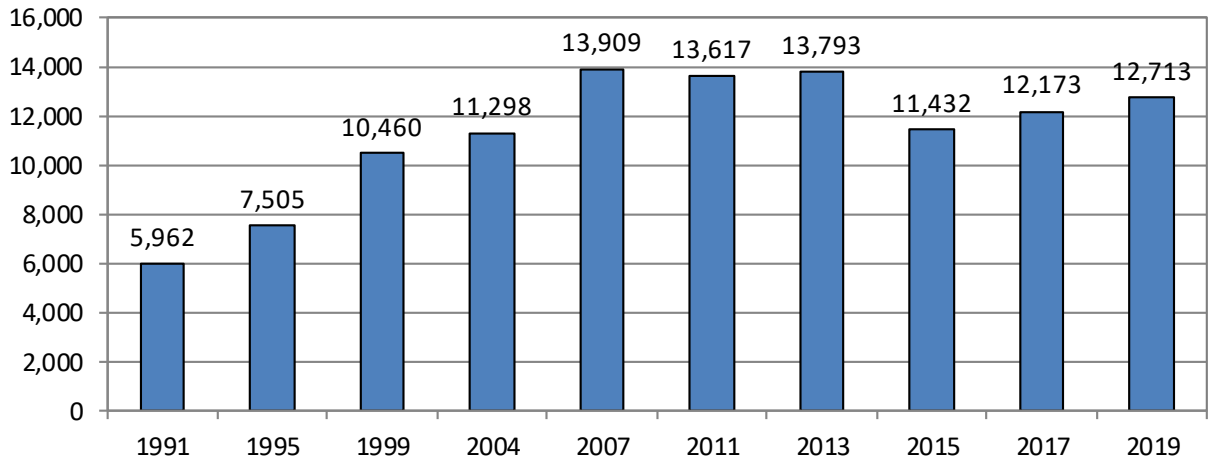


Figure 3: Comparison of the weight of pesticides applied (kg) to outdoor vegetable crops in Northern Ireland between 1991- 2019.

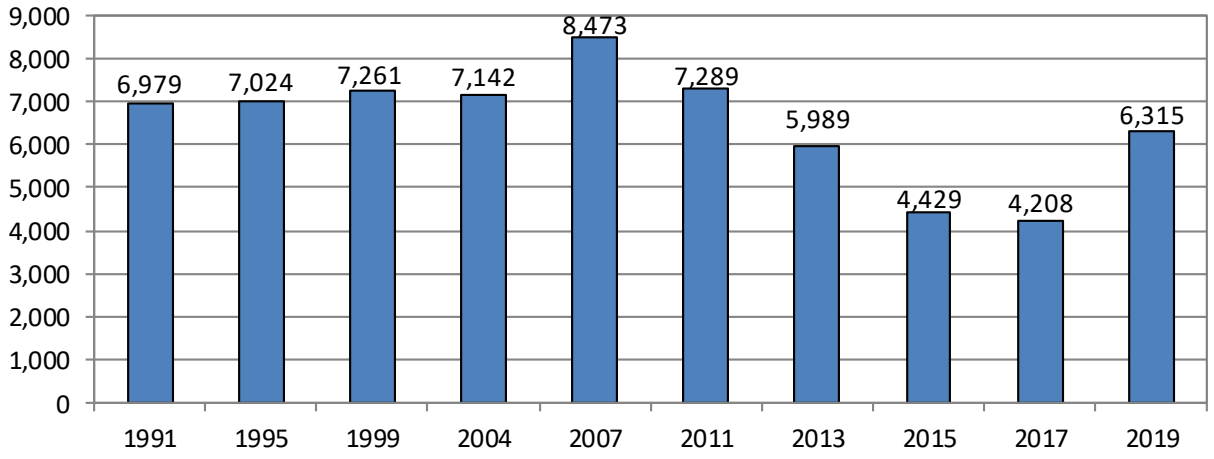


Figure 4: Changes in the area treated (spha) with the major pesticide groups applied to outdoor vegetable crops in Northern Ireland between 1991- 2019.

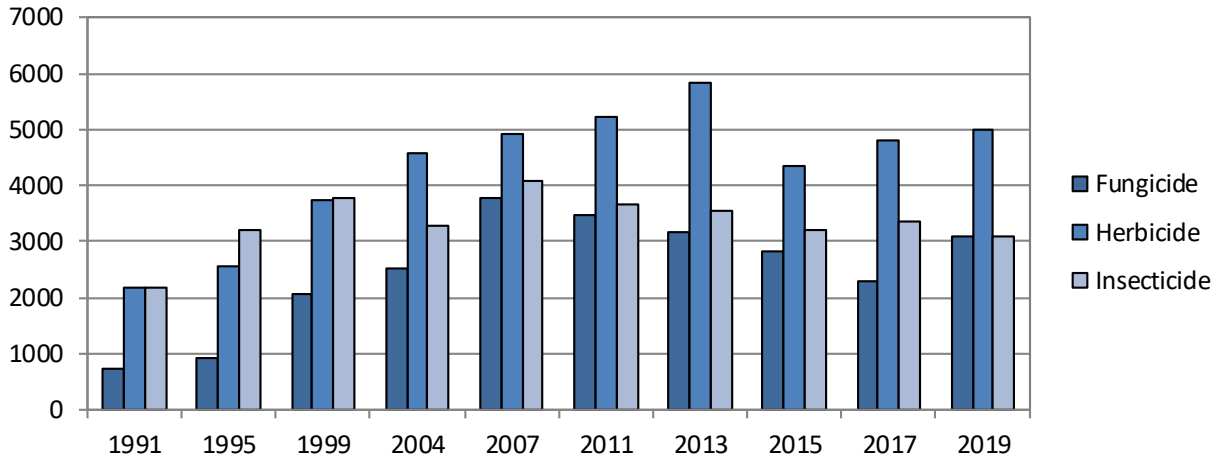
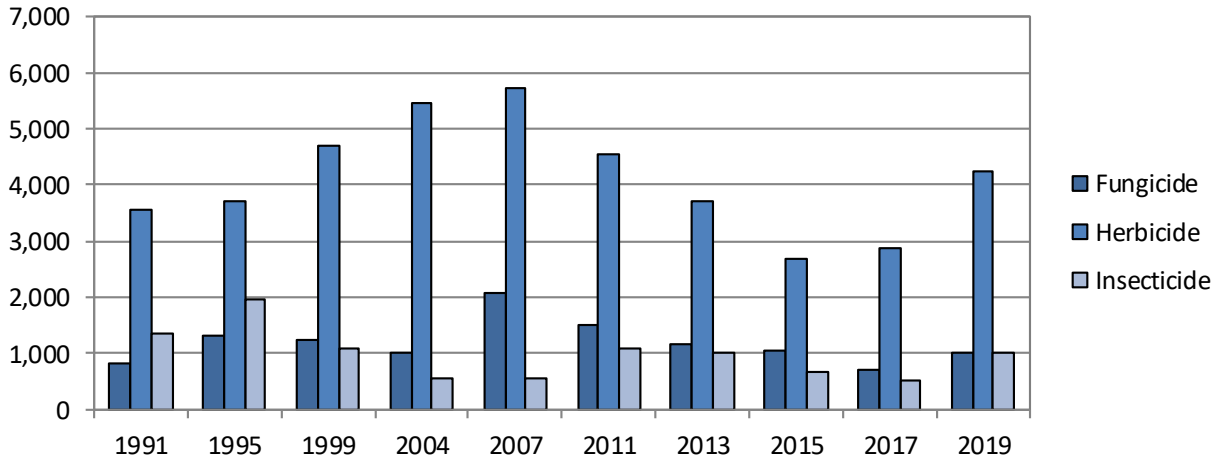


Figure 5: Changes in the weight (kg) of the major pesticide groups applied to outdoor vegetable crops in Northern Ireland between 1991- 2019.



RESULTS AND DISCUSSION

CROPS

The number and areas of crops surveyed are shown in Table 2 and figures 5 and 6. Data from 40 farms provided information on 199 examples of 41 crop types. Crops include beans, beetroot, Brussels sprouts, cabbage, carrots, cauliflower, celery, chard, fennel, kale, leeks, onions, parsnips, peas, pumpkins, rhubarb, squash, swede and turnips. The total area of crops sampled in the survey was representative of the area of vegetable crops grown in Northern Ireland in 2019. Crops have been grouped to aid reporting.

Since the first pesticide usage survey on vegetable crops in 1991 (Jess *et al*., 1993), carrots continue to be the most common outdoor vegetable crop grown in Northern Ireland. Carrots and parsnips collectively represented 42% of the total outdoor vegetable growing area and 58% of the weight of pesticides applied while turnips and swedes accounted for 7% of the area grown and 3% of the weight applied. Leafy and flowerhead brassicas were grown on an estimated 26% of the total area of outdoor vegetable crops, accounting for 11% of the weight of pesticides applied with cabbage accounting for 66% of the area of all brassicas grown and 67% of the weight applied. Alliums including leeks, scallions and onions, collectively accounted for 14% of the total grown area and 21% of the weight applied. Celery and parsley accounted for 6% of both the total area of outdoor vegetable crops grown and the weight of pesticides applied. Other vegetables accounted for 4% of the total area and less than 1% weight of pesticides applied.

In contrast with Great Britain, where peas and beans accounted for the majority of outdoor vegetable crops grown, 1% of the total area of outdoor vegetable crops grown in Northern Ireland in 2019 belonged to this crop group, accounting for less than 1% of the total weight of pesticides applied.

Figure 6a: Regional distribution of outdoor vegetable crops grown (ha) in Northern Ireland, 2019.

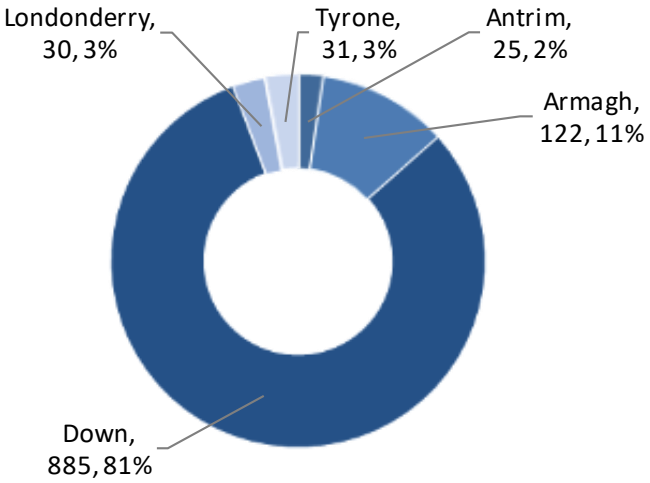


Figure 6b: Proportional areas of the different outdoor vegetable crops grown (ha) in Northern Ireland, 2019.

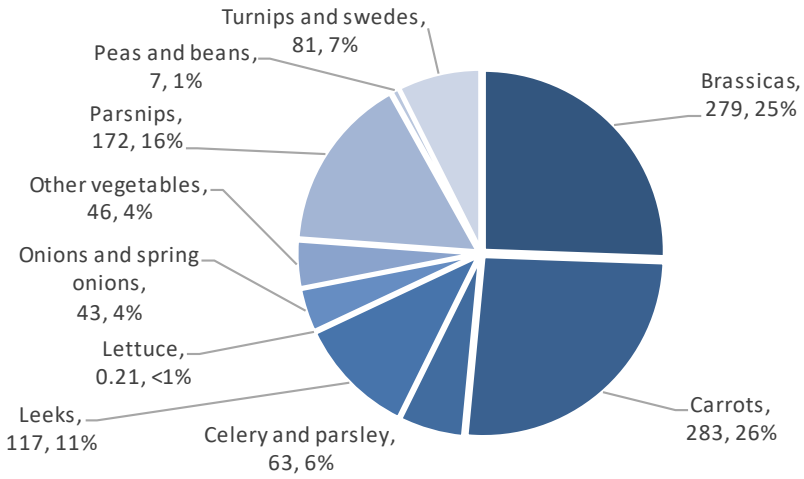


Figure 7a: Pesticide usage (spha) on outdoor vegetable crops in Northern Ireland, 2019.

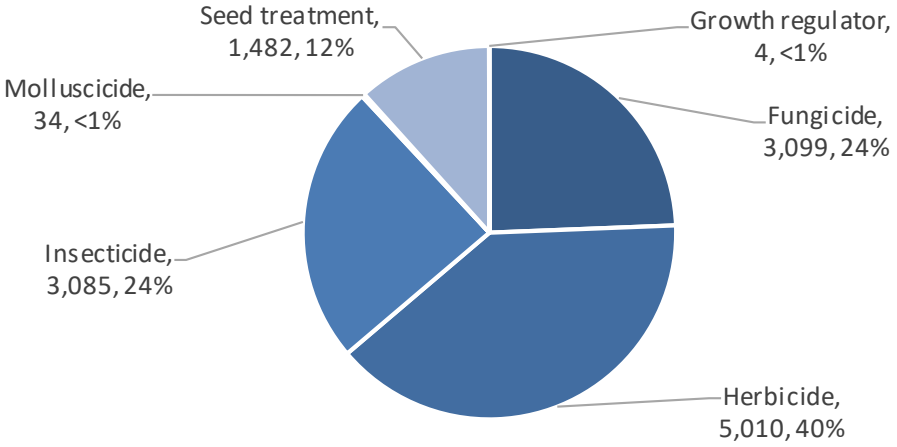


Figure 7b: Pesticide usage (kg) on outdoor vegetable crops in Northern Ireland, 2019.

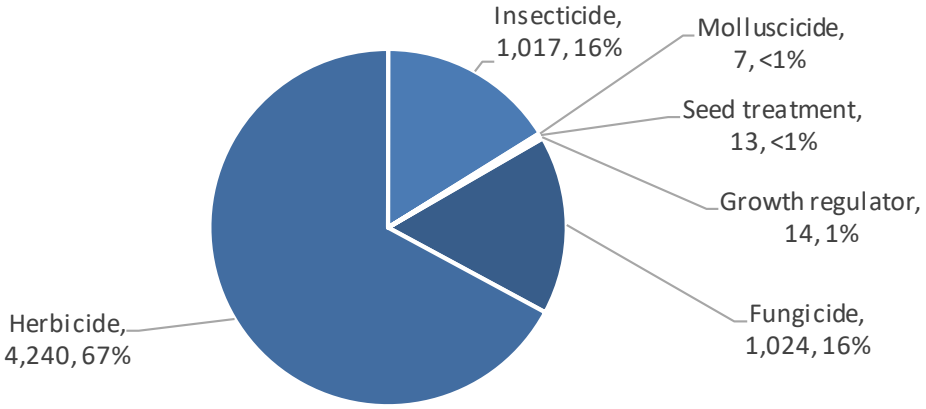


Figure 8: The ten most commonly used pesticide active substances by area treated (spha) in Northern Ireland, 2019.

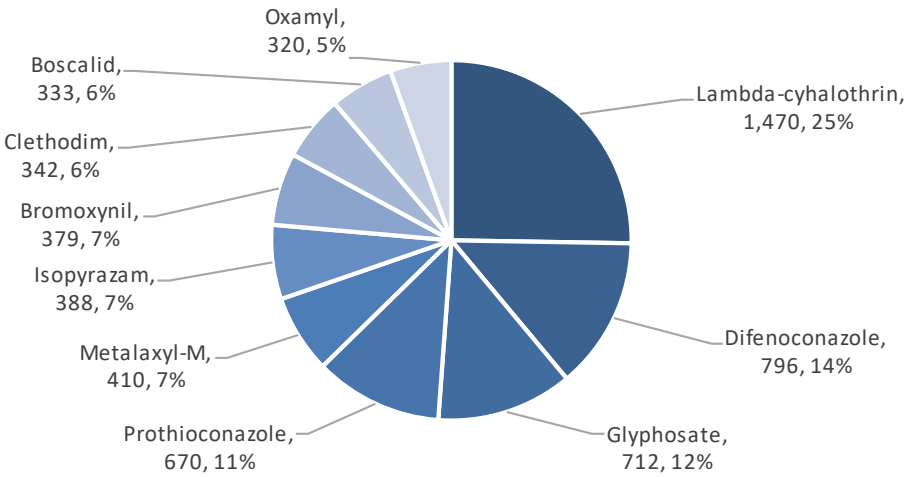


Figure 9: The ten most commonly used pesticide active substances by weight applied (kg) in Northern Ireland, 2019.

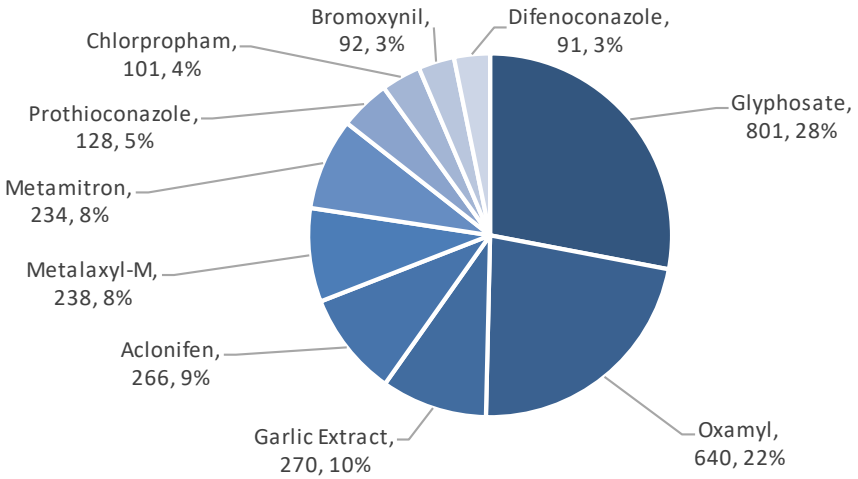


Figure 10: Comparison of the areas of outdoor vegetable crops treated (spha) with fungicides in Northern Ireland, 1991-2019.

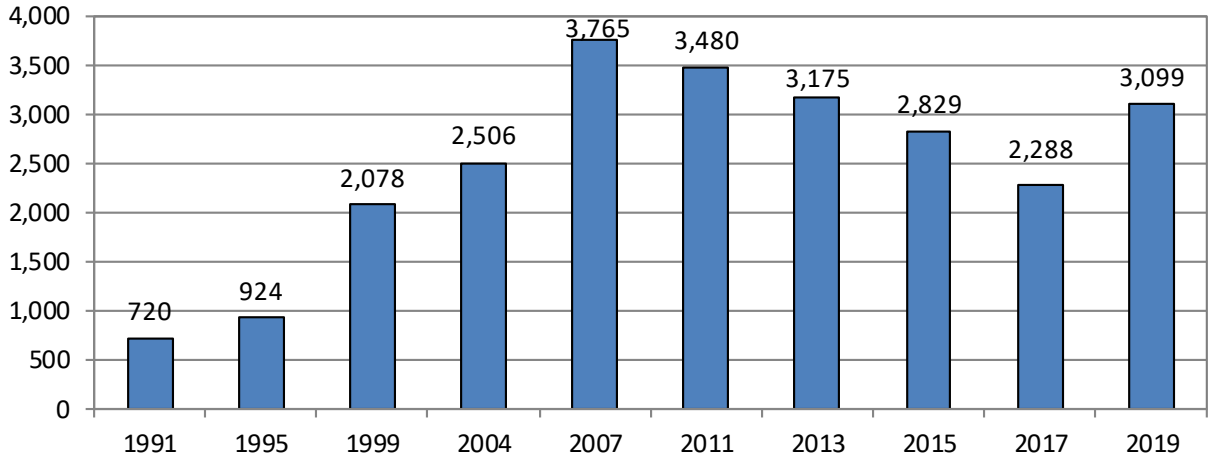


Figure 11: Comparison of the weight of fungicides applied (kg) to outdoor vegetable crops in Northern Ireland, 1991-2019.

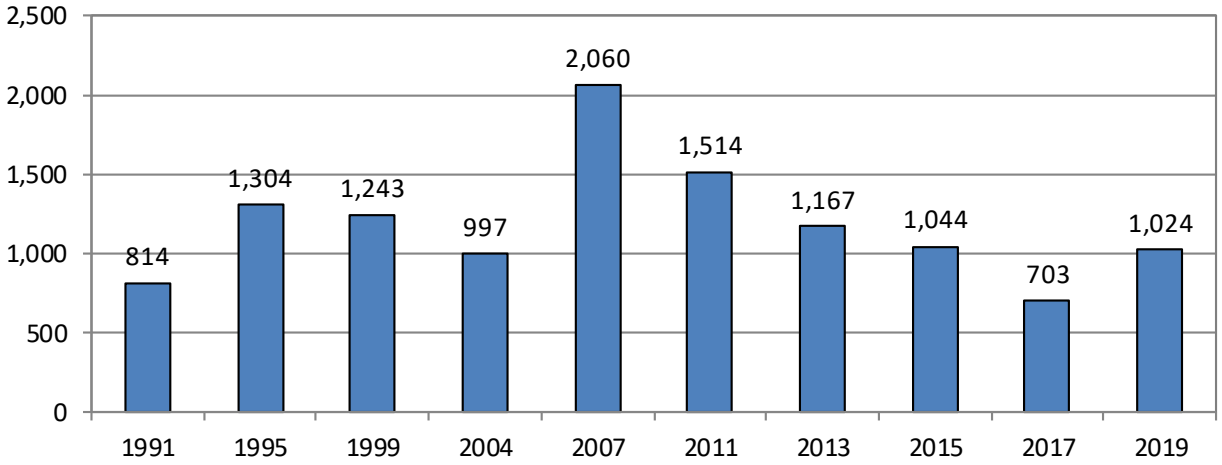


Figure 12: Comparison of the areas (spha) of outdoor vegetable crops treated with herbicides in Northern Ireland, 1991-2019.

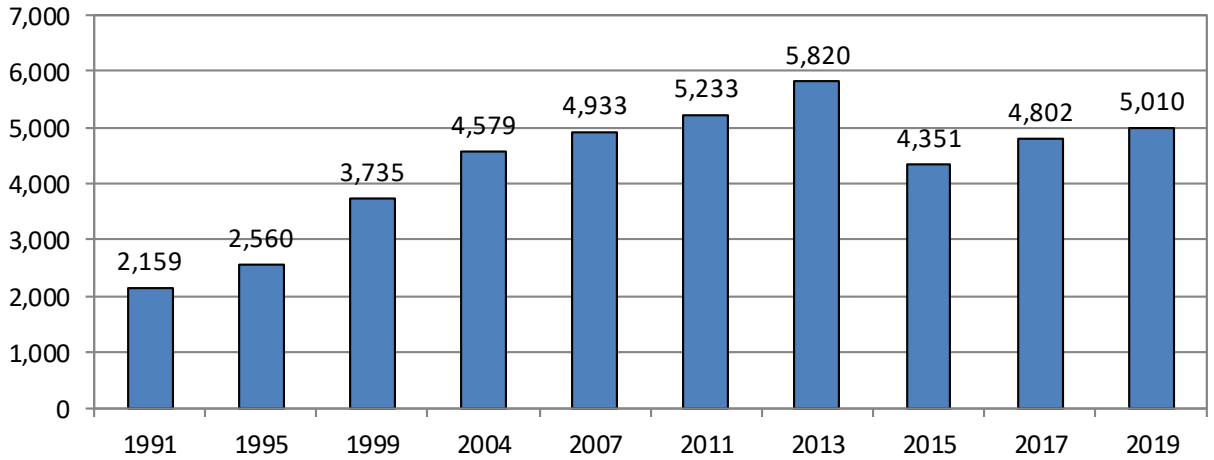


Figure 13: Comparison of the weight (kg) of herbicides applied to outdoor vegetable crops in Northern Ireland, 1991-2019.

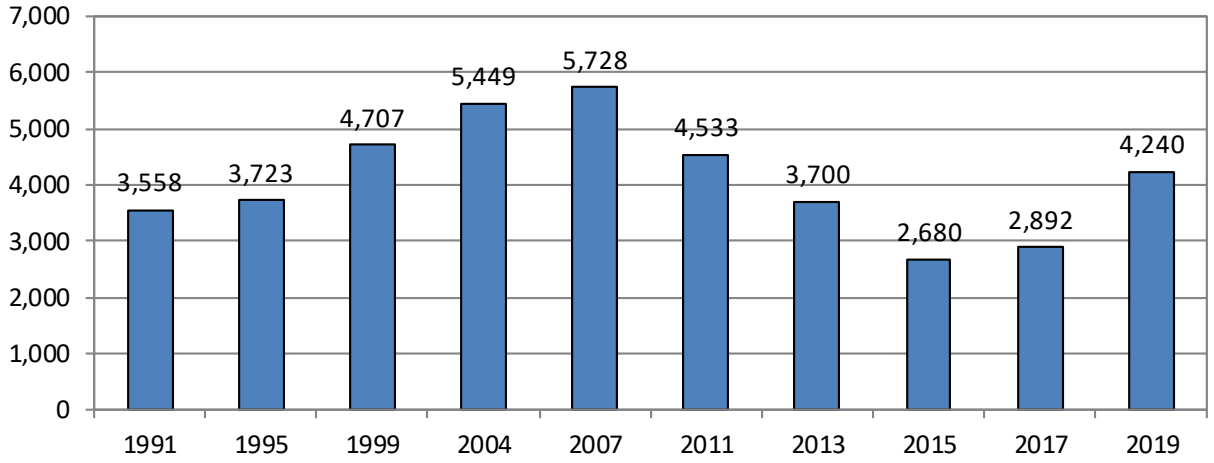


Figure 14: Comparison of the areas (spha) of outdoor vegetable crops treated with insecticides in Northern Ireland, 1991-2019.

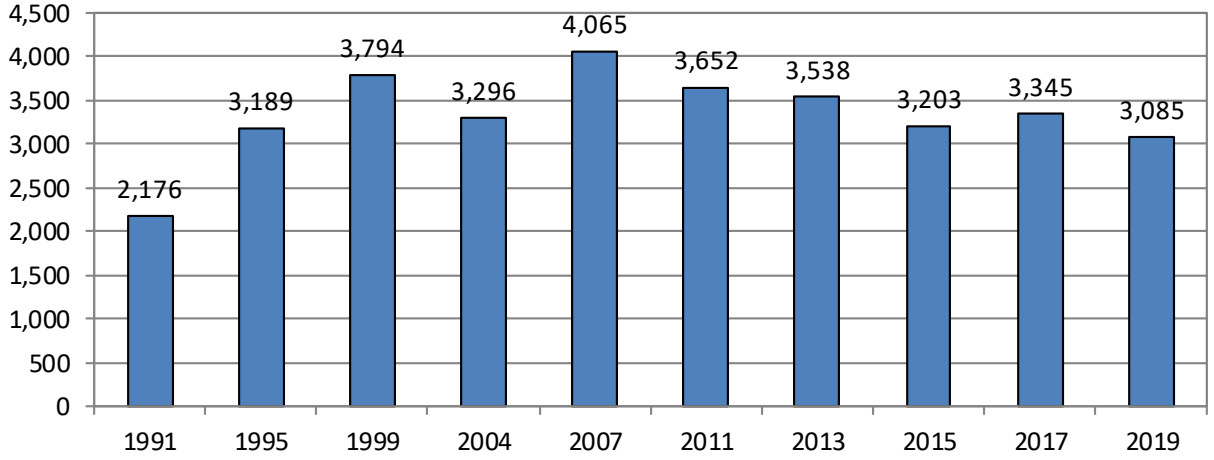


Figure 15: Comparison of the weight (kg) of insecticides applied to outdoor vegetable crops in Northern Ireland, 1991-2019.

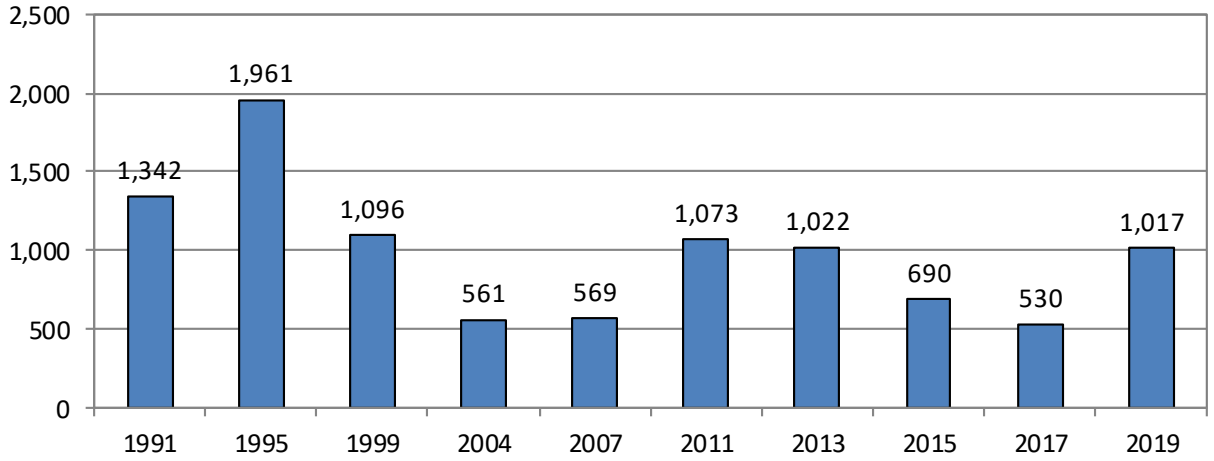


Figure 16: Comparison of the areas (spha) of outdoor vegetable crops treated with molluscicides in Northern Ireland, 1991-2019.

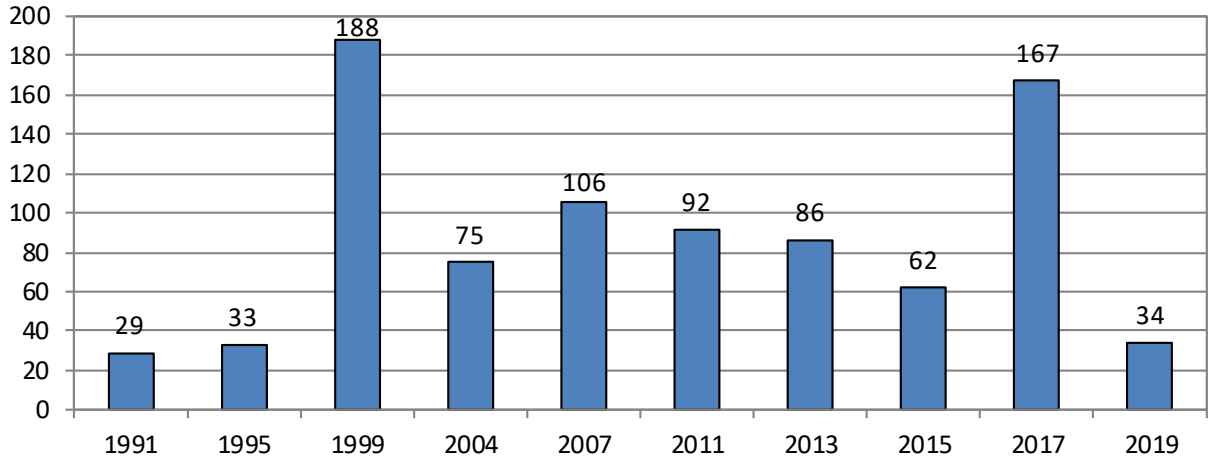


Figure 17: Comparison of the weight (kg) of molluscicides applied to outdoor vegetable crops in Northern Ireland, 1991-2019.

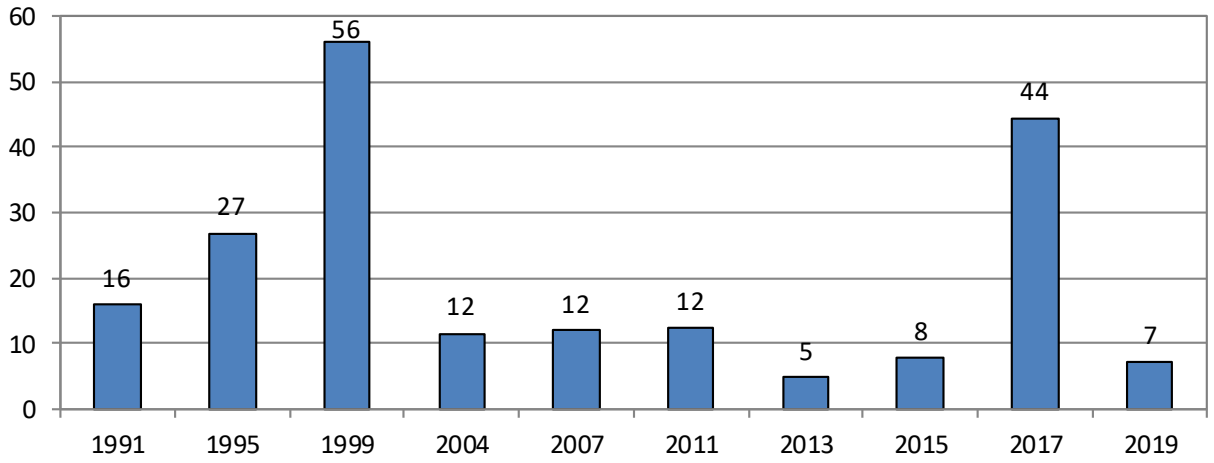


Figure 18: Comparison of the areas (spha) of outdoor vegetable crops with treated seed in Northern Ireland, 1991-2019.

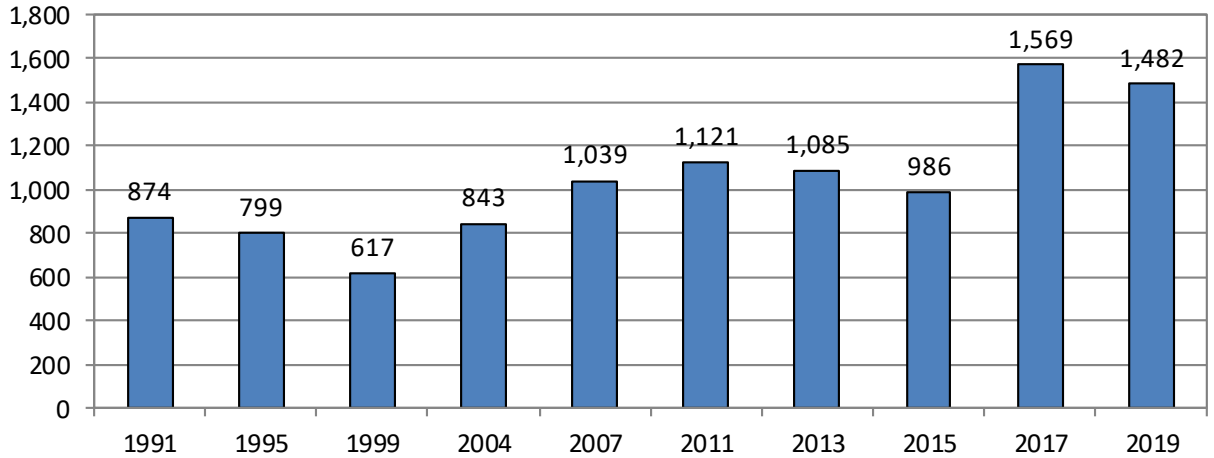
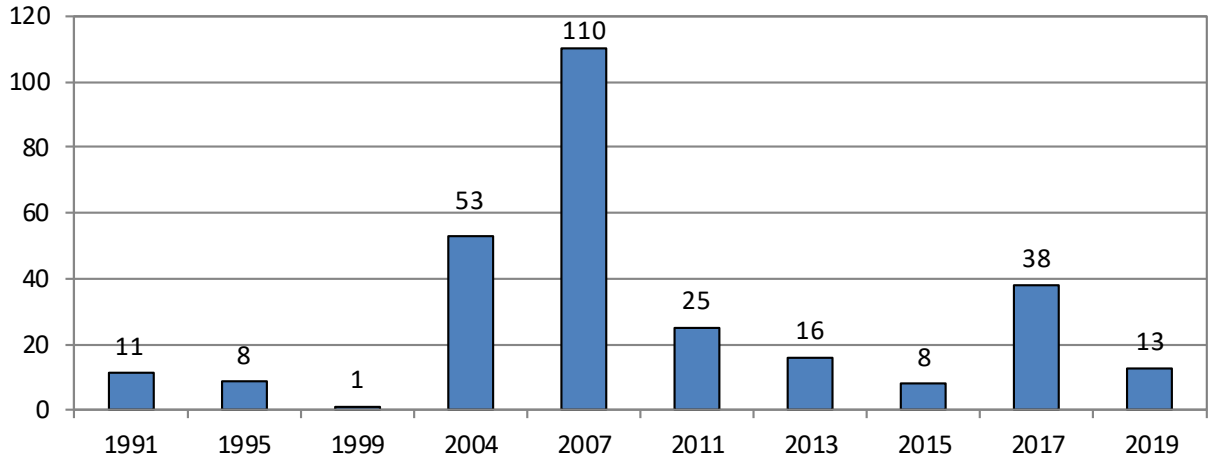


Figure 19: Comparison of the weight (kg) of seed treatments applied to outdoor vegetable crops in Northern Ireland, 1991-2019.



PESTICIDE USAGE ON CROPS (Tables 5 & 6)

An in-depth analysis of pesticide usage on the specific crops is contained on pages 19-55 and contains the following crop groupings: Carrots and parsnips, Turnips and swedes, Leafy and flowerhead brassicas, Onions and leeks, Celery and parsley, Peas and beans and Other vegetables (see Definitions and notes). Information relating to the basic grown area (ha), basic treated area (ha), total treated area (spha) and quantity applied (kg) of the three main pesticide types (fungicides, herbicides and insecticides) is included along with the reasons given for their use. Information relating to the use of molluscicides and seed treatments is included on pages 53-54.

PROPORTION OF CROPS TREATED (Table 7)

The proportional areas of crops treated with different pesticide groups, together with the number of spray applications (in parentheses) are shown in Table 7. Autumn cabbage, chard, courgettes, fennel, lettuce, onions, spinach and squash received no pesticide treatments during this survey period.

Beetroot, hard cabbage, kale, pumpkin, spring cabbage, swede and rhubarb received no fungicide treatments. All crops were treated with an average of 2.7 herbicide applications.

Kale, all leeks, rhubarb, salad onions and winter cauliflowers received no insecticide treatments with the remainder receiving on average 3.7 insecticide applications. All red cabbage received on average 7 insecticide applications, for aphid and caterpillar control. Carrots received 5.4 insecticide applications and 99% of winter cabbage received 5 applications.

Autumn cauliflower (13%), broccoli (5%), summer cabbage (38%), carrots (<1%), pointed cabbage (47%), savoy cabbage (10%) and summer cauliflower (25%) received a single molluscicide application with the exception of 8% of Brussels sprouts crops which received 1.3 applications.

TOTAL PESTICIDE USAGE (Tables 8 & 9)

An estimated 6,315 kilograms of pesticide active ingredients were applied to 12,713 spray hectares of outdoor vegetable crops grown in Northern Ireland in 2019.

An estimated 61% of all fungicide applications were made to carrot and parsnip crops, with a further 26% applied to brassica crops. The active substance prothioconazole was the most frequently used fungicide, mainly on carrot and brassica crops, accounting for 22% of the total fungicide-treated area and 13% of the weight of fungicides used. Conversely, the phenylamide systemic fungicide metalaxyl-M, applied exclusively to carrot and parsnip crops, accounted for 13% of the total fungicide-treated area and 23% of the total quantity used. The formulation azoxystrobin/difenoconazole was applied to 17% of the total fungicide-treated area, accounting for 16% of the quantity of fungicides used and was applied mainly to carrot, parsnip and brassica crops.

Carrot and parsnip crops collectively accounted for 47% of all herbicide applications, with a further 28% being applied to onions and leeks. Glyphosate accounted for 14% of the total herbicide-treated area and 19% of the weight of herbicides applied. Prosulfocarb, whilst accounting for 9% of the herbicide-treated area, accounted for 33% of the total weight of herbicides applied. Following the withdrawal of approval for use of linuron, the new active substance aclonifen has been used exclusively on carrot and parsnip crops for pre-emergence weed control. With the exception of four formulations, herbicides were applied as single active substances.

Lambda-cyhalothrin accounted for 47% of the total insecticide-treated area but less than 2% of the quantity of insecticides applied. An estimated 69% of all applications of this active ingredient were applied to carrot and parsnip crops, for general insect control, aphids and carrot fly. Oxamyl, a soil-applied carbamate nematicide and insecticide, accounted for only 10% of the total area treated with insecticides but 63% of the total weight applied, primarily for the control of nematodes on carrot and parsnip crops. This was due to the high application rates of these products.

Molluscicide treatments were applied to less than 1% of both the total pesticide-treated area and quantity of pesticides applied to vegetable crops. Leafy and flowerhead brassica crops received 97% of all molluscicide applications accounting for 96% of the weight of all molluscicides applied.

Seed treatments applied to outdoor vegetable crops grown in 2019, accounted for 12% of the total pesticide-treated area while representing less than 1% of the quantity of active ingredients applied. Seed treatments were mainly applied to carrot and parsnip seeds (54%) and brassica seeds (19%). The three most widely used active ingredients and formulations were cymoxanil/fludioxonil/metalaxyl-m (32%), tefluthrin (32%) and thiram (29%). Seed treatments were applied to 54% of carrot and parsnip crops accounting for 91% of the weight of seed treatment applications.

The forty most commonly used active ingredients, ranked by spray area (spha) and weight (kg), are shown in Tables 10 and 11, respectively.

PESTICIDE USAGE ON CARROTS AND PARSNIPS

- 456 hectares of carrot and parsnip crops grown in Northern Ireland.
- 455 basic treated area (ha)
- 7,188 total treated area (spha)
- 3,652 kg applied
- Refer to Table 7 for proportional area treated and number of spray applications applied and Tables 21 and 27 for reasons for use.

Figure 20: Pesticide usage on carrot and parsnip crops in Northern Ireland, 2019.

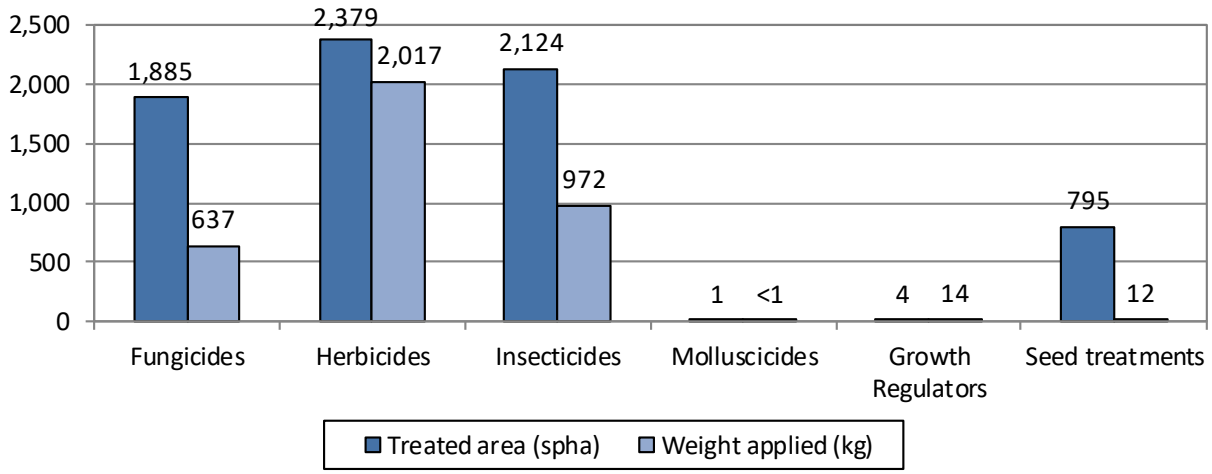


Figure 21: Regional distribution of carrot and parsnip crops grown (ha) in Northern Ireland, 2019.

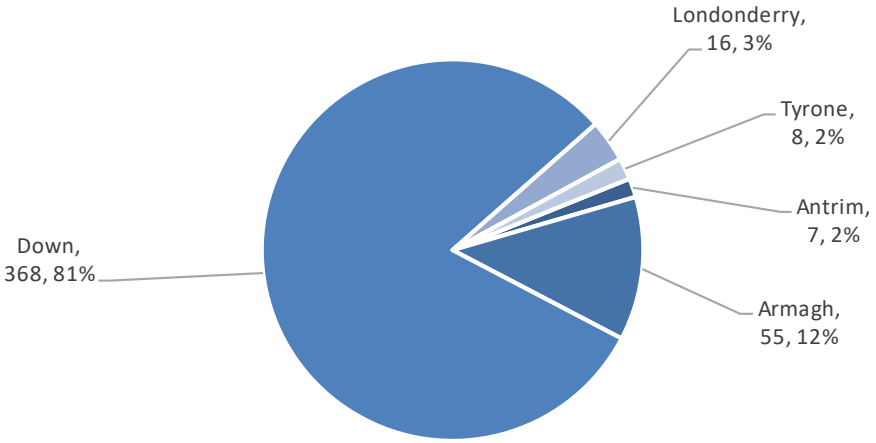


Figure 22: Pesticide usage (spha) on carrot and parsnip crops in Northern Ireland, 2019.

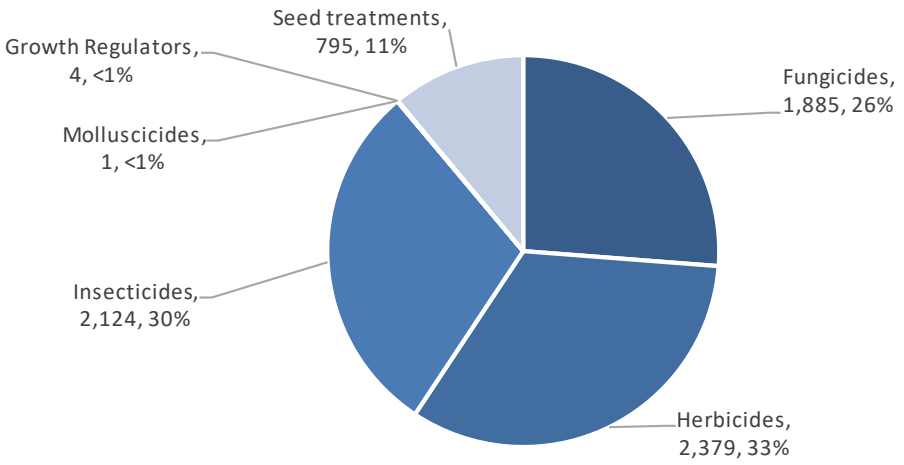
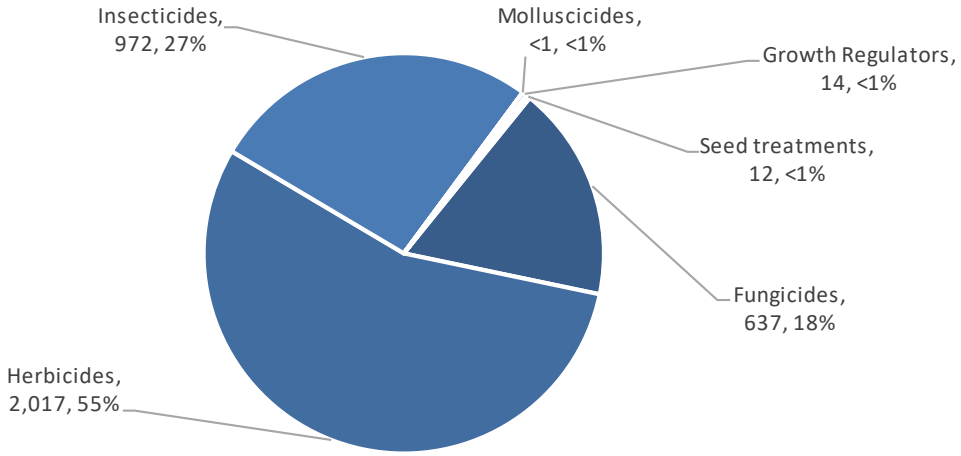


Figure 23: Weight of pesticides (kg) applied to carrot and parsnip crops in Northern Ireland, 2019.



Carrots and parsnips – Fungicides

- Basic treated area: 424 hectares
- Total treated area: 1,885 spray hectares
- Weight of active substances applied: 637 kg
- The five most commonly applied formulations and active substances were:

Active substance	**Total treated area (spha)**	**Basic treated area (ha)**	**Quantity applied (kg)**	**% of the treated area**
Metalaxyl-M	399	399	237	21
Isopyrazam	388	388	49	21
Prothioconazole	320	264	61	17
Boscalid/pyraclostrobin	278	250	92	15
Azoxystrobin/difenoconazole	245	217	80	13

Figure 24: Fungicide active substance usage (spha) on carrot and parsnip crops in Northern Ireland, 2019.

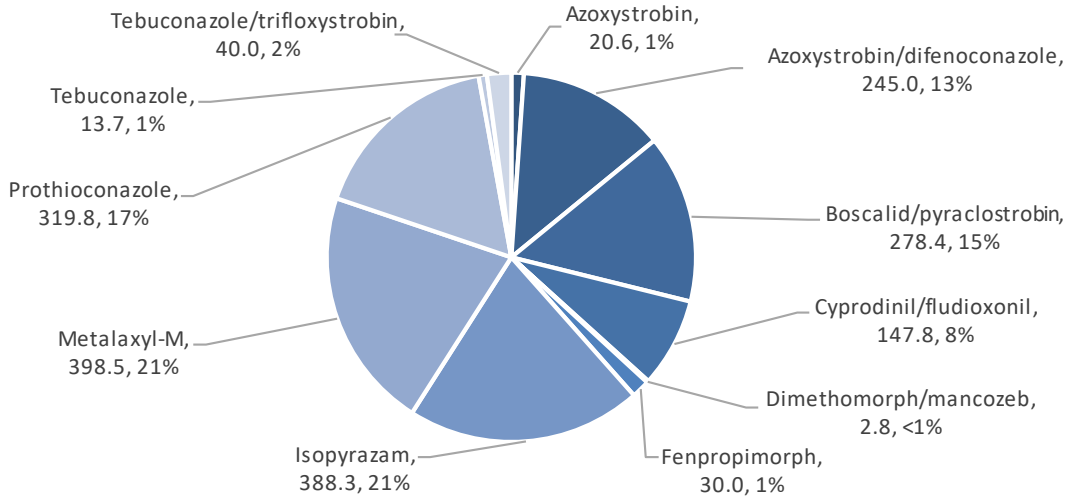


Figure 25: Weight of fungicide active substances (kg) applied to carrot and parsnip crops in Northern Ireland, 2019.

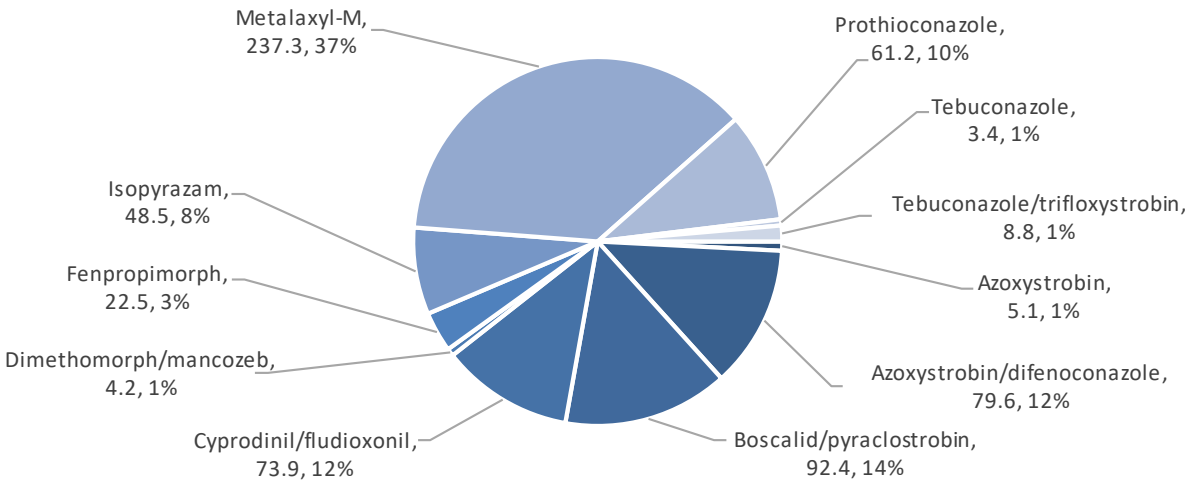
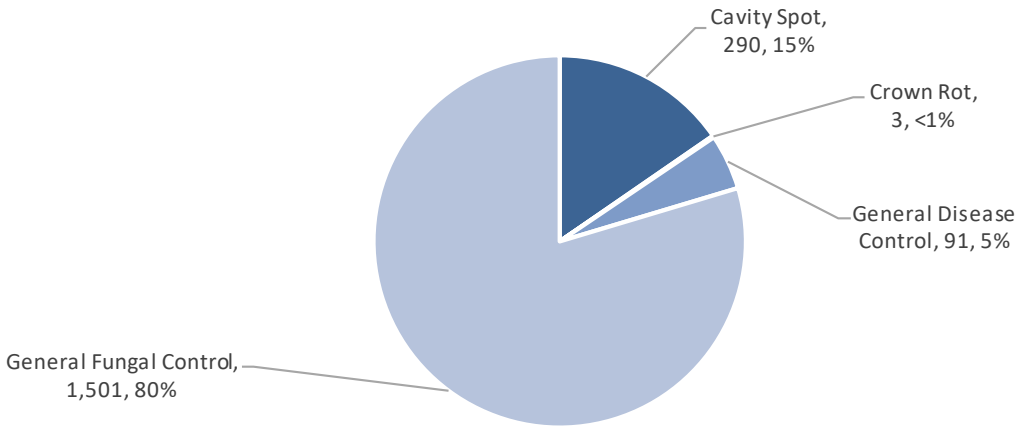


Figure 26: Carrot and parsnip crops NI 2019: reasons for fungicide use (spha).



Carrots and parsnips – Herbicides

- Basic treated area: 454 hectares
- Total treated area: 2,379 spray hectares
- Weight of active substances applied: 2,017 kg
- The active substances Diflufenican, Diquat, Metribuzin and Propaquizafop were only applied to carrot crops. Metamitron was only applied to parsnip crops.
- The five most commonly applied formulations and active substances were:

Active substance	Total treated area (spha)	Basic treated area (ha)	Quantity applied (kg)	% of the treated area
Glyphosate	470	325	454	20
Pendimethalin	452	452	585	19
Aclonifen	294	294	266	12
Metribuzin	289	258	85	12
Clomazone	276	276	23	12

Figure 27: Herbicide active substance usage (spha) on carrot and parsnip crops in Northern Ireland, 2019.

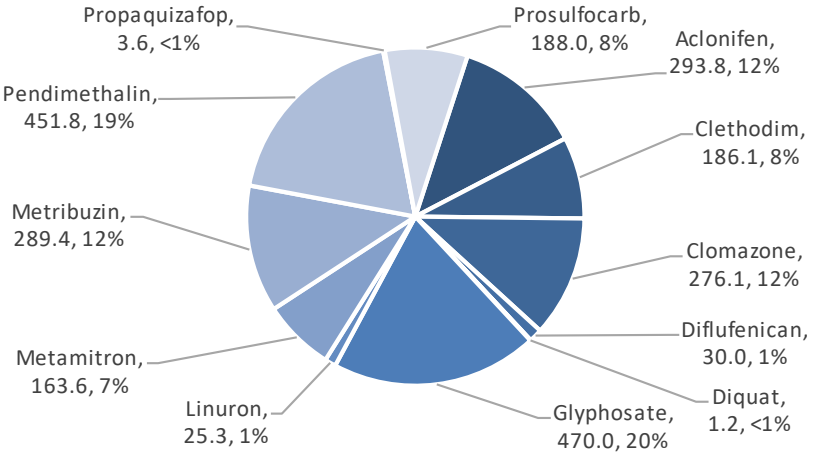


Figure 28: Weight of herbicide active substances (kg) applied to carrot and parsnip crops in Northern Ireland, 2019.

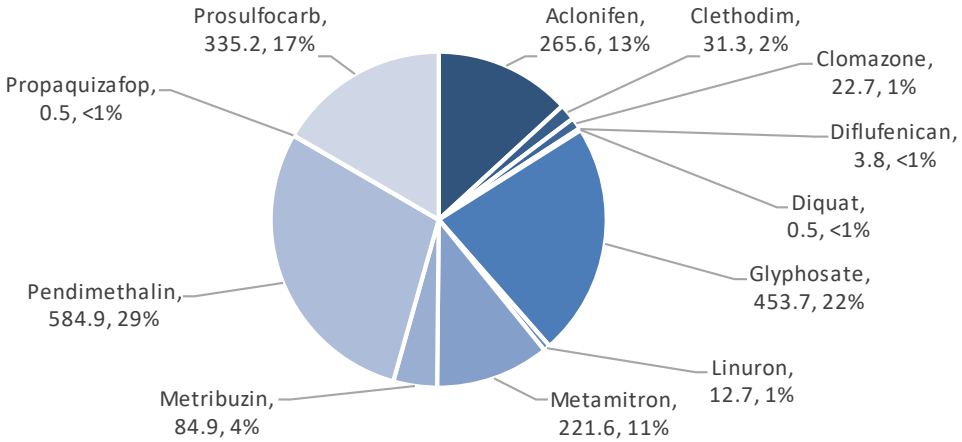
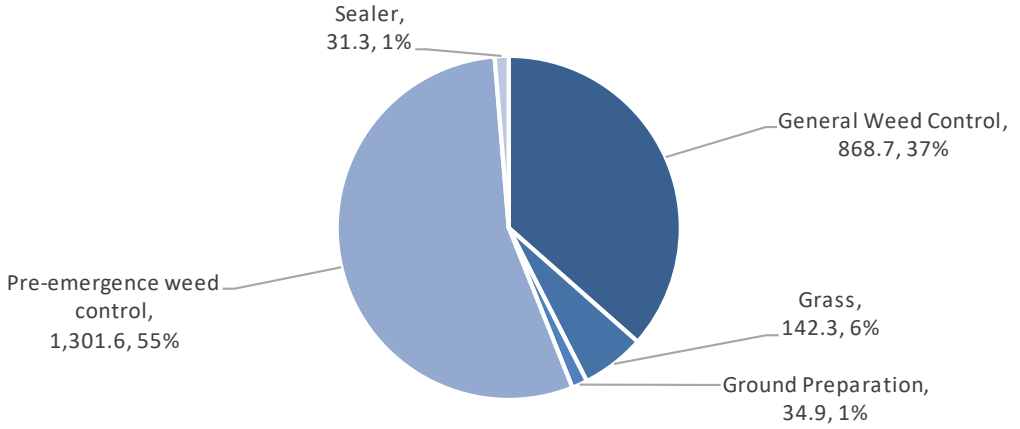


Figure 29: Carrot and parsnip crops NI 2019: reasons for herbicide use (spha).



Carrots and parsnips – Insecticides

- Basic treated area: 454 hectares
- Total treated area: 2,124 spray hectares
- Weight of active substances applied: 972 kg
- The five most commonly applied formulations and active substances were:

Active substance	**Total treated area (spha)**	**Basic treated area (ha)**	**Quantity applied (kg)**	**% of the treated area**
Lambda-cyhalothrin	992	444	12	47
Oxamyl	320	320	640	15
Cyantraniliprole	290	290	21	14
Thiacloprid	176	117	17	8
Deltamethrin	169	107	1	8

Figure 30: Insecticide active substance usage (spha) on carrot and parsnip crops in Northern Ireland, 2019.

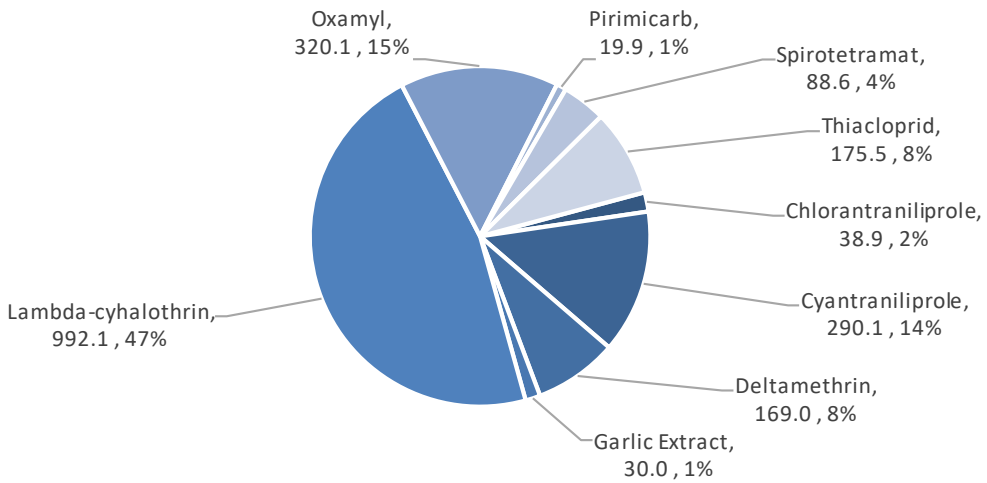


Figure 31: Weight of insecticide active substances (kg) applied to carrot and parsnip crops in Northern Ireland, 2019.

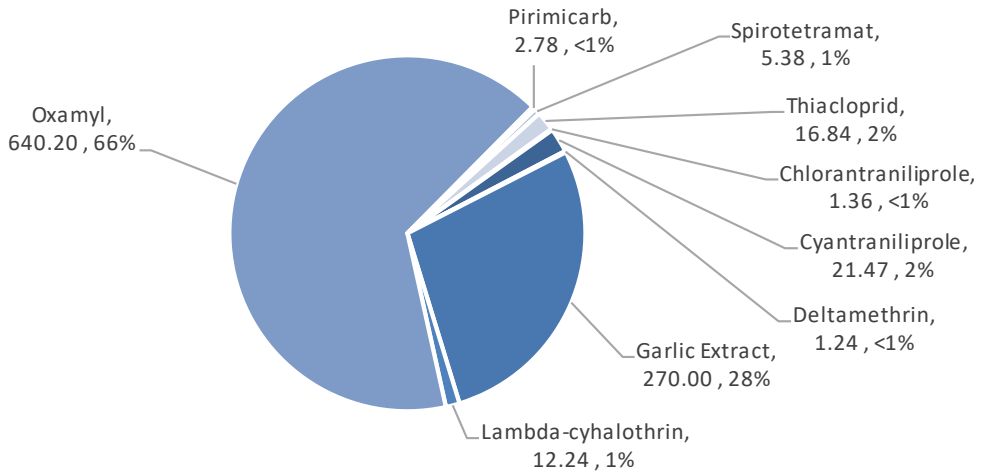
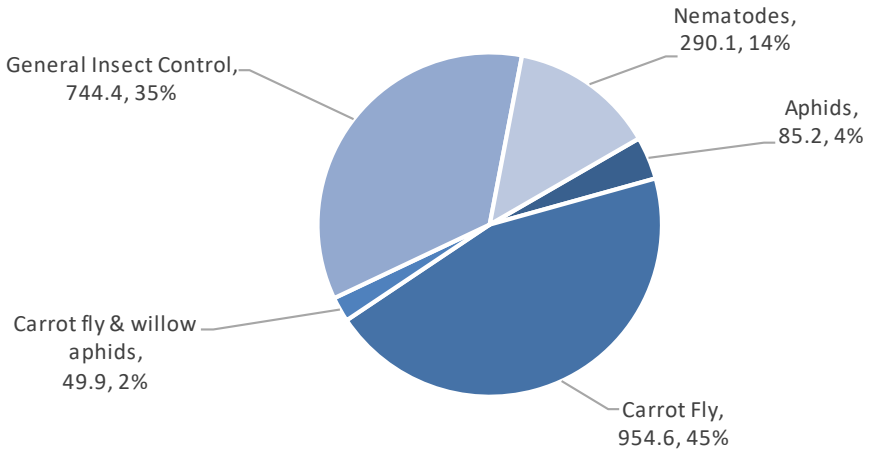


Figure 32: Carrot and parsnip crops NI 2019: reasons for insecticide use (spha).



PESTICIDE USAGE ON TURNIPS AND SWEDES

- 81 hectares of turnip and swede crops grown in Northern Ireland.
- 81 basic treated area (ha)
- 432 total treated area (spha)
- 179 kg applied
- Refer to Table 7 for proportional area treated and number of spray applications applied and Tables 37 and 39 for reasons for use.

Figure 33: Pesticide usage on turnip and swede crops in Northern Ireland, 2019.

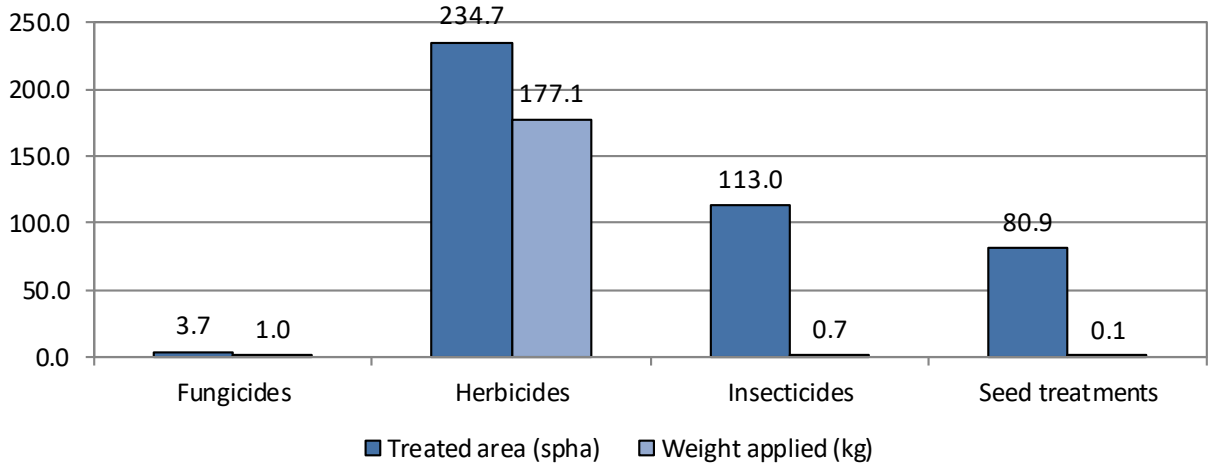


Figure 34: Regional distribution of turnip and swede crops grown (ha) in Northern Ireland, 2019.

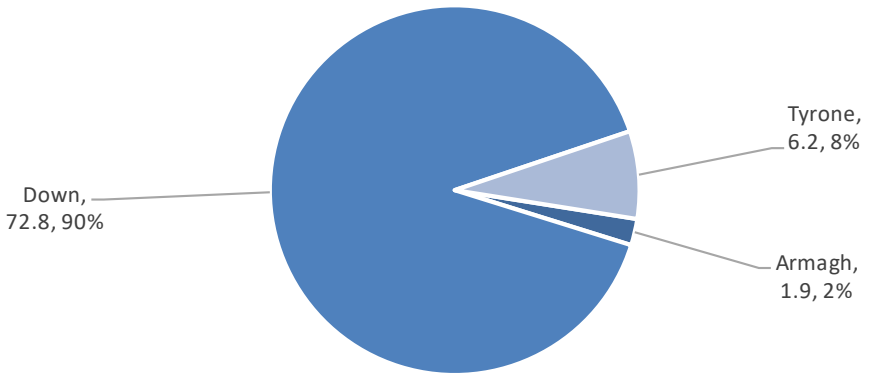


Figure 35: Pesticide usage (spha) on turnip and swede crops in Northern Ireland, 2019.

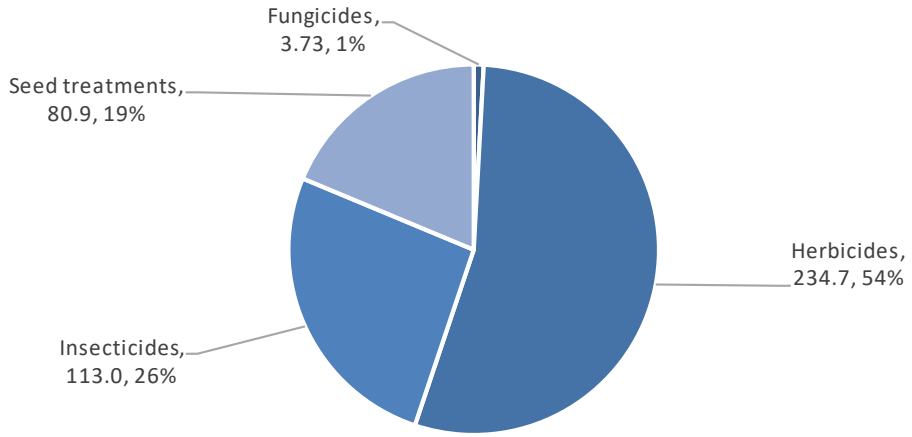
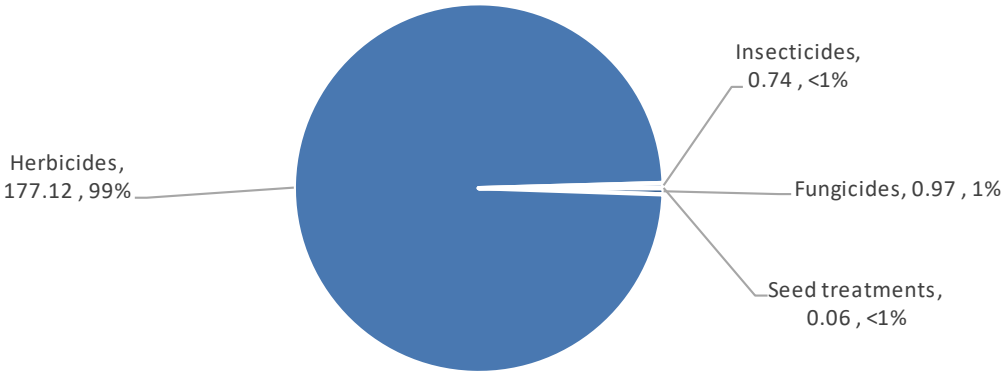


Figure 36: Weight of pesticides (kg) applied to turnip and swede crops in Northern Ireland, 2019.



Turnips and swedes – Fungicides

- Basic treated area: 2 hectares
- Total treated area: 4 spray hectares
- Weight of active substances applied: 1 kg
- The only fungicides applied were azoxystrobin/difenoconazole and prothioconazole

Figure 37: Fungicide active substance usage (spha) on turnip and swede crops in Northern Ireland, 2019.

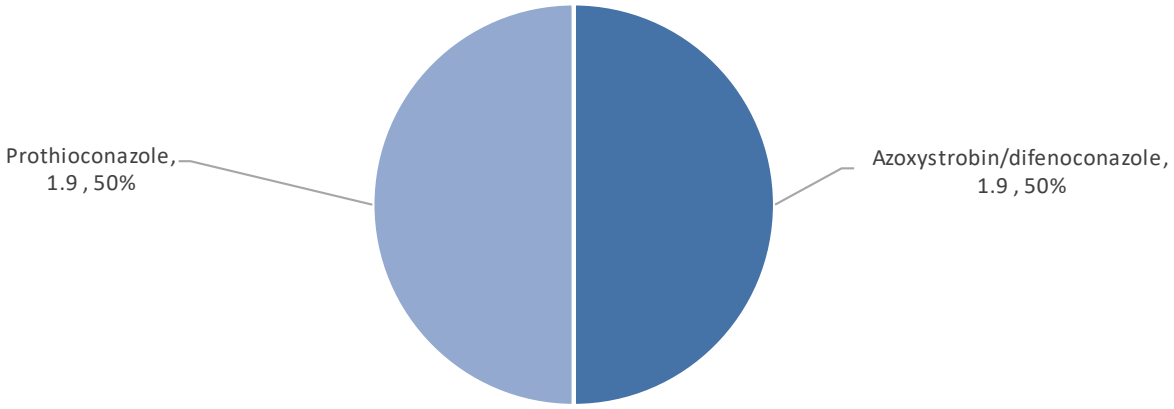
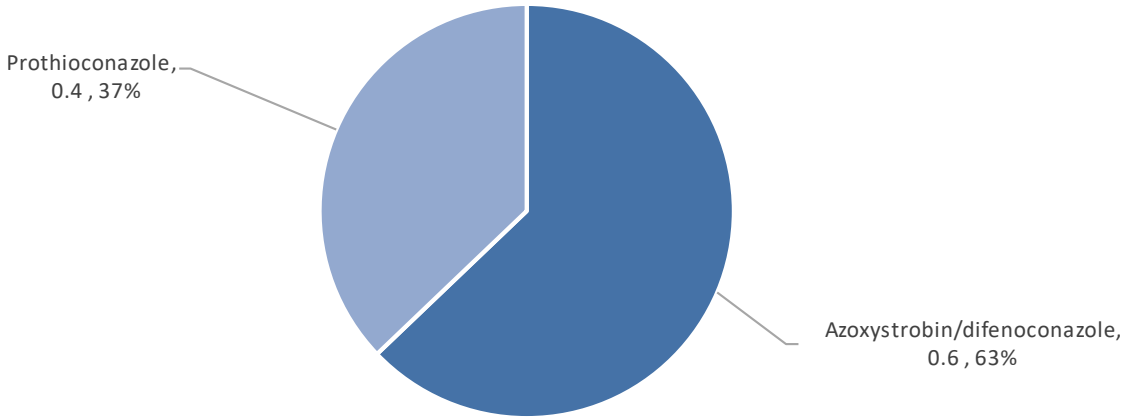


Figure 38: Weight of fungicide active substance usage (kg) on turnip and swede crops in Northern Ireland, 2019.



Turnips and swedes – Herbicides

- Basic treated area: 81 hectares
- Total treated area: 235 spray hectares
- Weight of active substances applied: 177 kg
- The herbicide active substances applied were:

Active substance	Total treated area (spha)	Basic treated area (ha)	Quantity applied (kg)	% of the treated area
Metazachlor	81	81	61	34
Glyphosate	79	79	112	34
Clomazone	75	75	5	32

Figure 39: Herbicide active substance usage (spha) on turnip and swede crops in Northern Ireland, 2019.

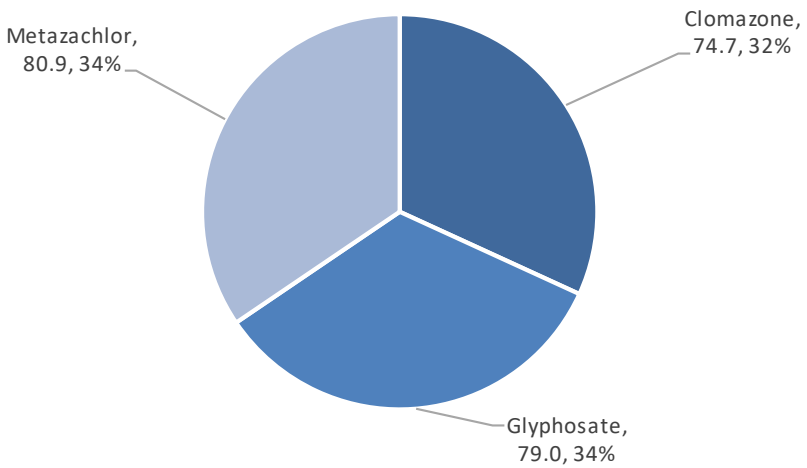


Figure 40: Weight of herbicide active substance usage (kg) on turnip and swede crops in Northern Ireland, 2019.

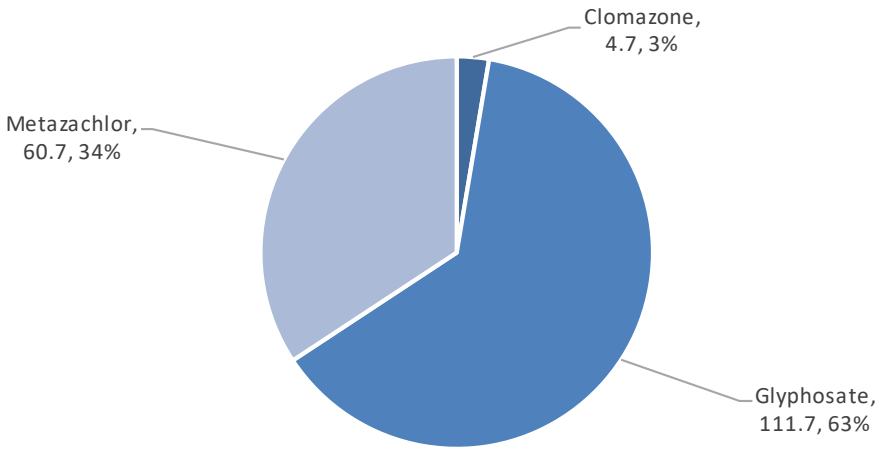
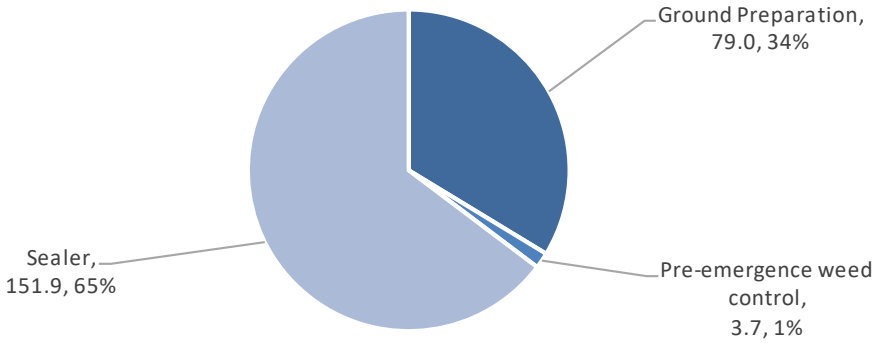


Figure 41: Turnip and swede crops NI 2019: reasons for herbicide use (spha).



Turnips and swedes – Insecticides

- Basic treated area: 38 hectares
- Total treated area: 113 spray hectares
- Weight of active substances applied: 0.7 kg
- The only insecticide active substances applied were lambda-cyhalothrin and thiacloprid

Figure 42: Insecticide active substance usage (spha) on turnip and swede crops in Northern Ireland, 2019.

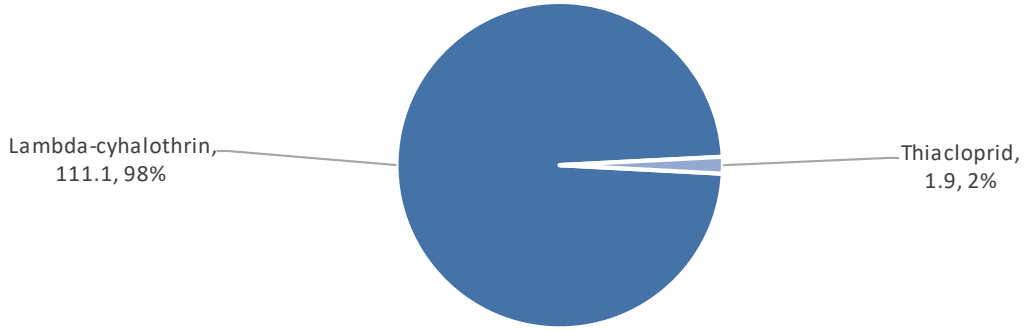


Figure 43: Weight of insecticide active substance usage (kg) on turnip and swede crops in Northern Ireland, 2019.

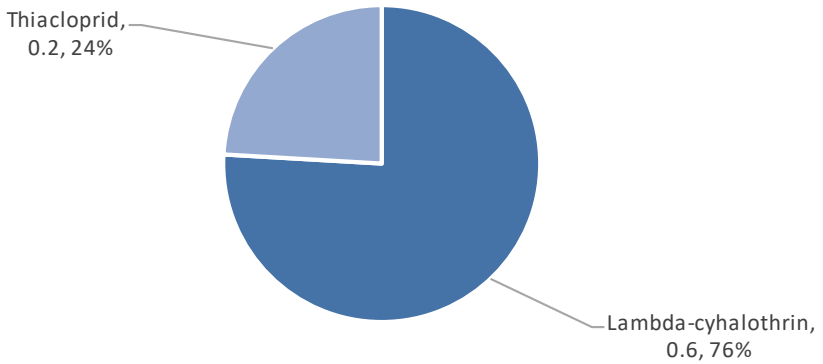
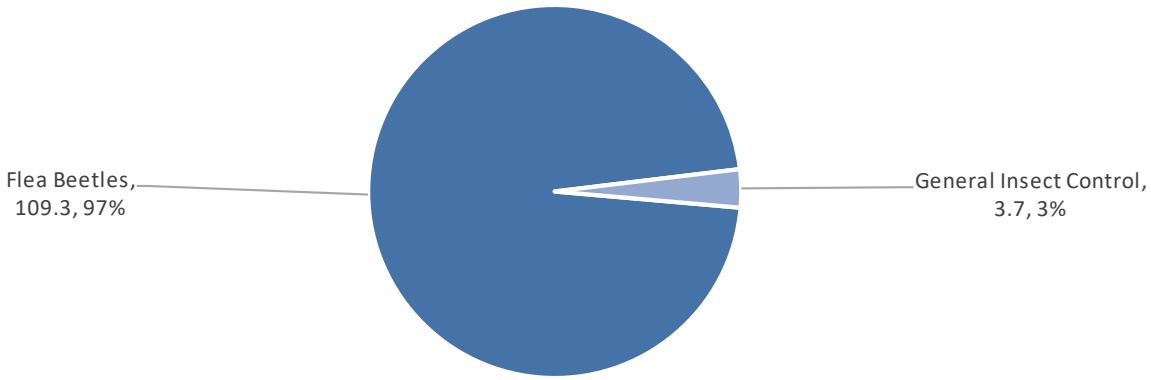


Figure 44: Turnip and swede crops NI 2019: reasons for insecticide use (spha).



PESTICIDE USAGE ON LEAFY AND FLOWERHEAD BRASSICAS

- 280 hectares of leafy and flowerhead brassica crops grown in Northern Ireland.
- 273 basic treated area (ha)
- 2,647 total treated area (spha)
- 738 kg applied
- 'Leafy and flowerhead brassica': refers to Brussels sprouts, broccoli/calabrese, autumn, summer and winter cauliflower, all cabbage and kale. 'Cabbage' consists of Chinese, hard, red, savoy, spring, summer, white and winter cabbage.
- Refer to Table 7 for proportional area treated and number of spray applications applied and Tables 16-24, 26-28 and 30 for reasons for use.

Figure 45: Pesticide usage on leafy and flowerhead brassica crops in Northern Ireland, 2019.

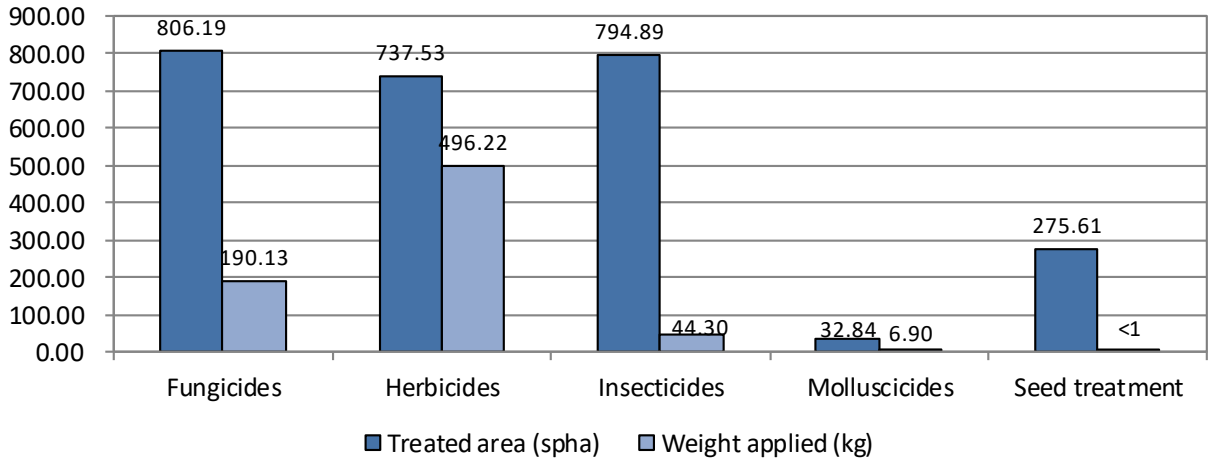


Figure 46: Regional distribution of leafy and flowerhead brassica crops grown (ha) in Northern Ireland, 2019.

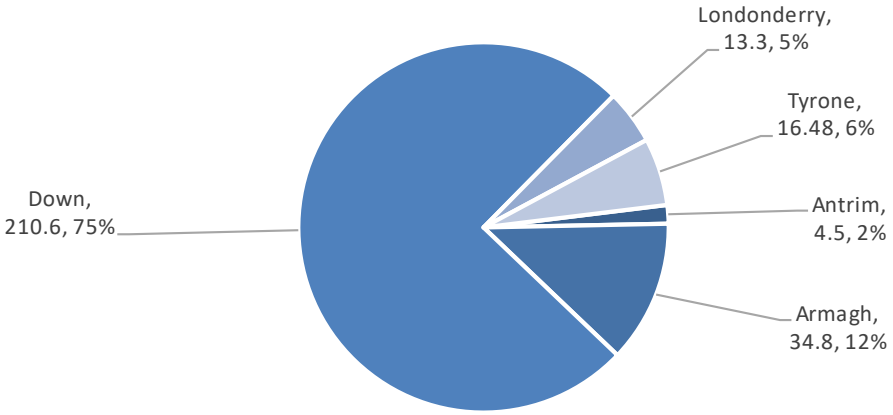


Figure 47: Pesticide usage (spha) on leafy and flowerhead brassica crops in Northern Ireland, 2019.

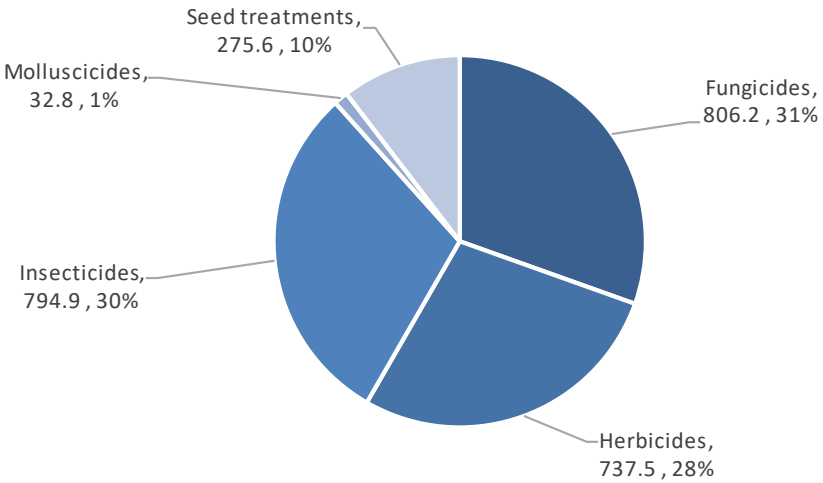
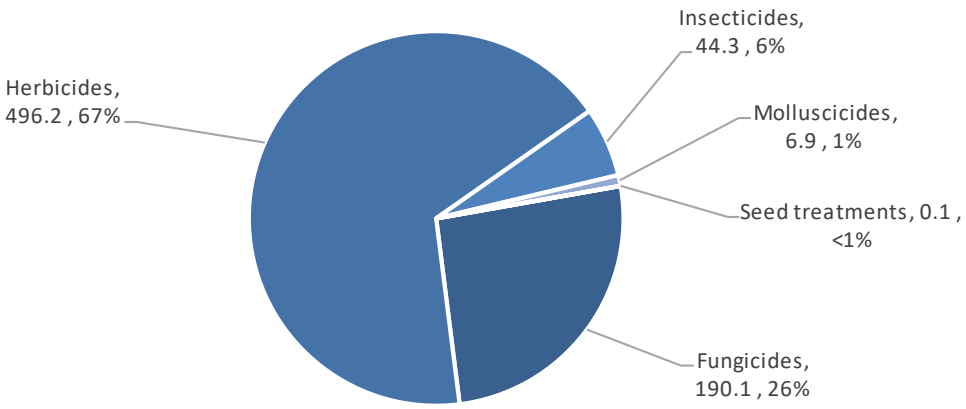


Figure 48: Weight of pesticides (kg) applied to leafy and flowerhead brassica crops in Northern Ireland, 2019.



Leafy and flowerhead brassicas – Fungicides

- Basic treated area: 247 hectares
- Total treated area: 806 spray hectares
- Weight of active substances applied: 190 kg
- The five most commonly applied fungicide active substances were:

Active substance	Total treated area (spha)	Basic treated area (ha)	Quantity applied (kg)	% of the treated area
Difenoconazole	256	114	26	32
Prothioconazole	217	163	41	27
Azoxystrobin/difenoconazole	174	161	57	22
Azoxystrobin	64	63	16	8
Boscalid/pyraclostrobin	49	49	16	6

Figure 49: Fungicide active substance usage (spha) on leafy and flowerhead brassica crops in Northern Ireland, 2019.

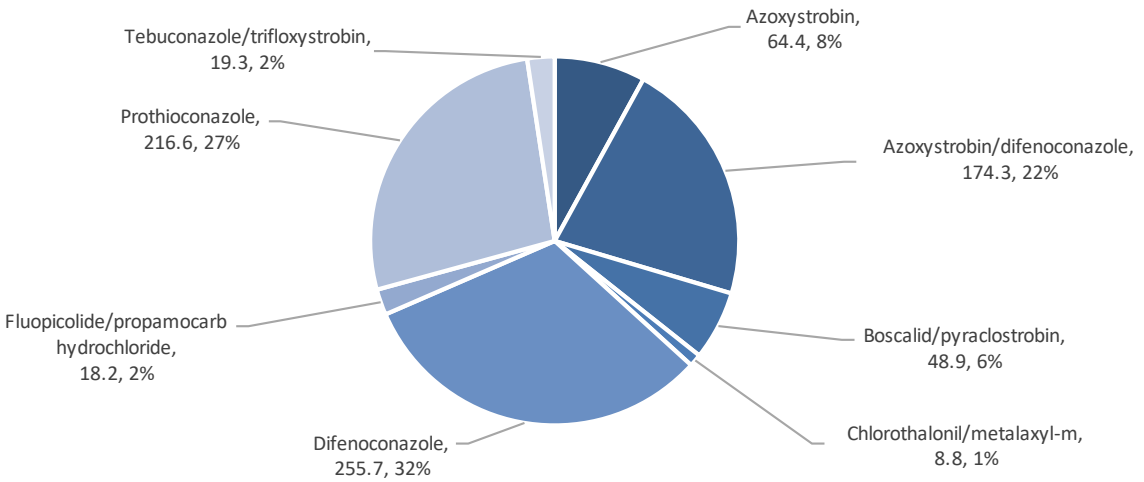


Figure 50: Weight of fungicide active substances (kg) applied to leafy and flowerhead brassica crops in Northern Ireland, 2019.

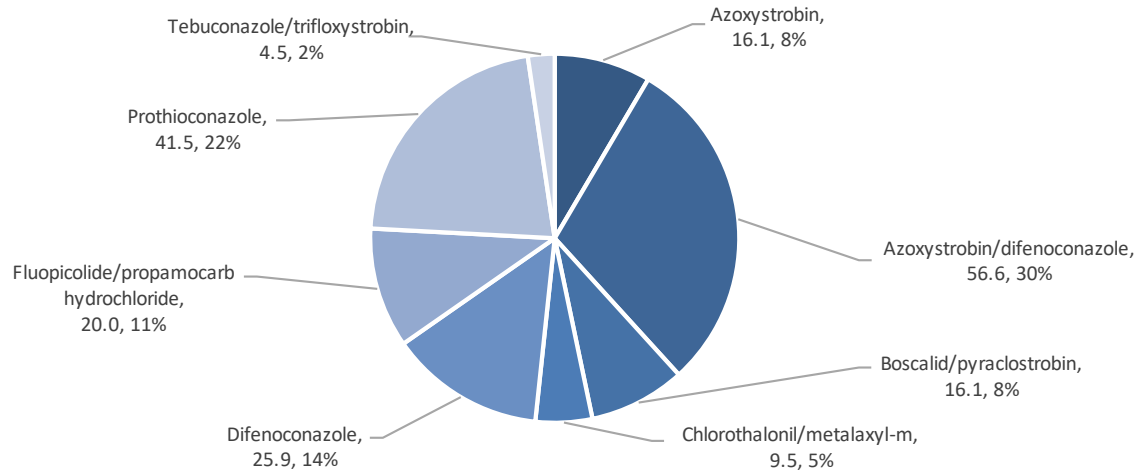
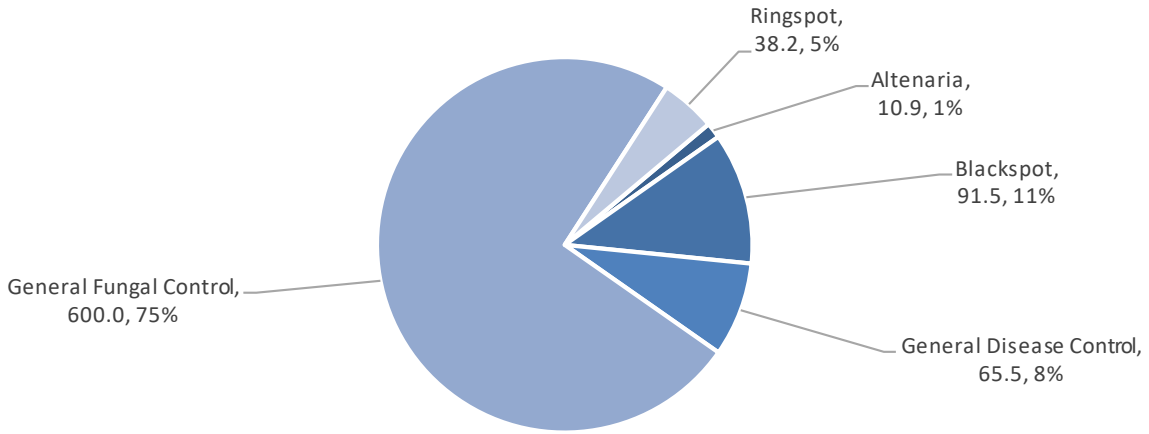


Figure 51: Leafy and flowerhead brassica crops NI 2019: reasons for fungicide use (spha).



Leafy and flowerhead brassicas – Herbicides

- Basic treated area: 271 hectares
- Total treated area: 738 spray hectares
- Weight of active substances applied: 496 kg
- The five most commonly applied herbicide active substances were:

Active substance	Total treated area (spha)	Basic treated area (ha)	Quantity applied (kg)	% of the treated area
Metazachlor	309	254	231	42
Clomazone	222	167	18	30
Glyphosate	141	141	212	19
Pyridate	27	27	20	4
Clethodim	26	26	3	3

Figure 52: Herbicide active substance usage (spha) on leafy and flowerhead brassica crops in Northern Ireland, 2019.

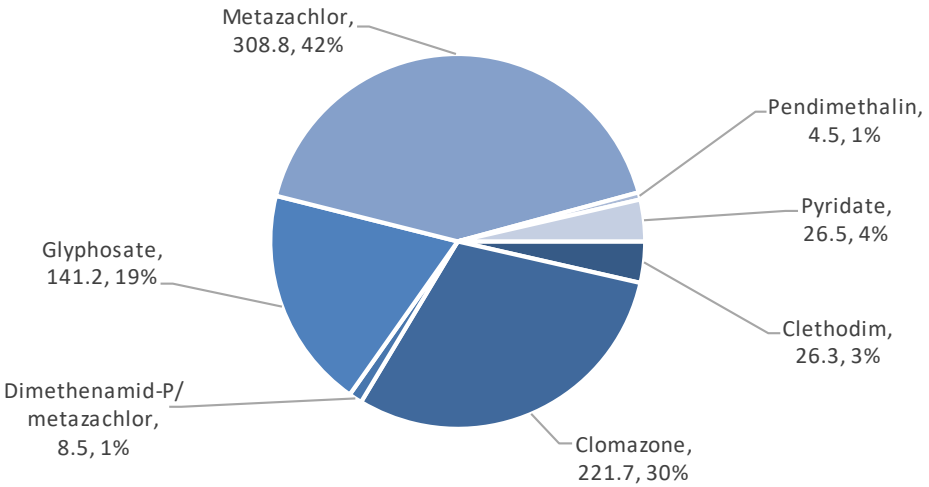


Figure 53: Weight of herbicide active substance usage (kg) on leafy and flowerhead brassica crops in Northern Ireland, 2019.

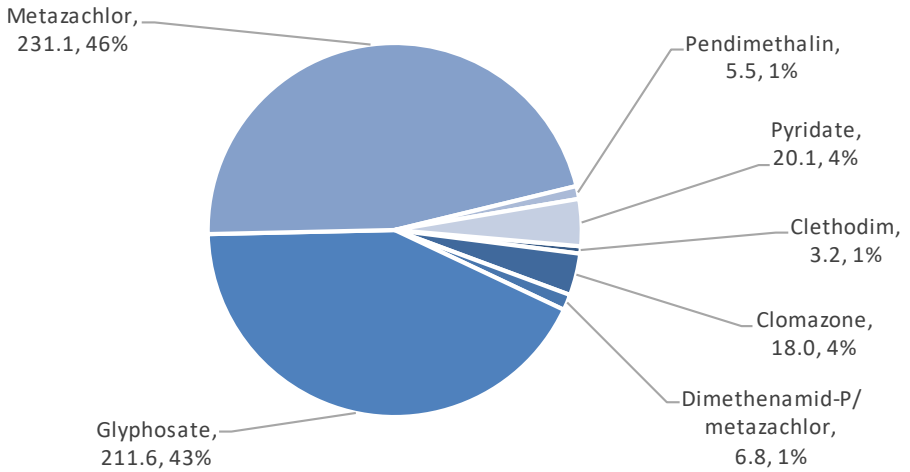
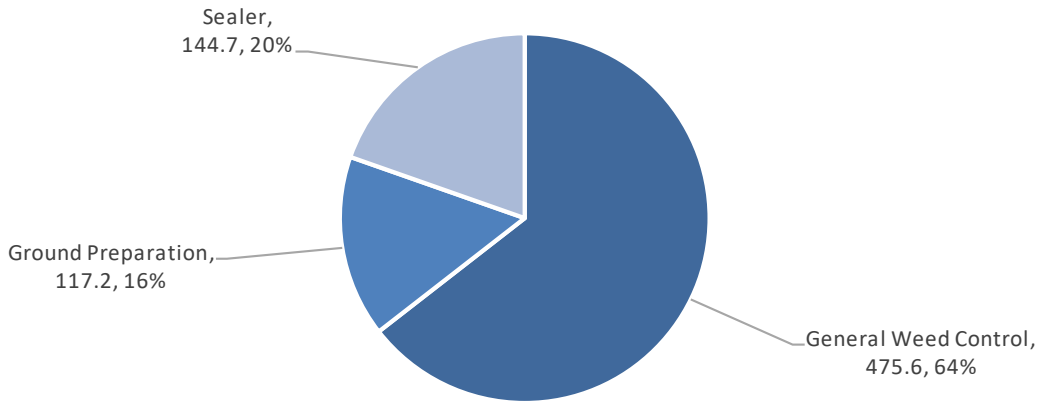


Figure 54: Leafy and flowerhead brassica crops NI 2019: reasons for herbicide use (spha).



Leafy and flowerhead brassicas – Insecticides

- Basic treated area: 215 hectares
- Total treated area: 795 spray hectares
- Weight of active substances applied: 44 kg
- The five most commonly applied insecticide active substances were:

Active substance	Total treated area (spha)	Basic treated area (ha)	Quantity applied (kg)	% of the treated area
Lambda-cyhalothrin	285	196	2	36
Spirotetramat	113	110	8	14
Pymetrozine	102	102	20	13
Thiacloprid	102	102	10	13
Deltamethrin	96	48	1	12

Figure 55: Insecticide active substance usage (spha) on leafy and flowerhead brassica crops in Northern Ireland, 2019.

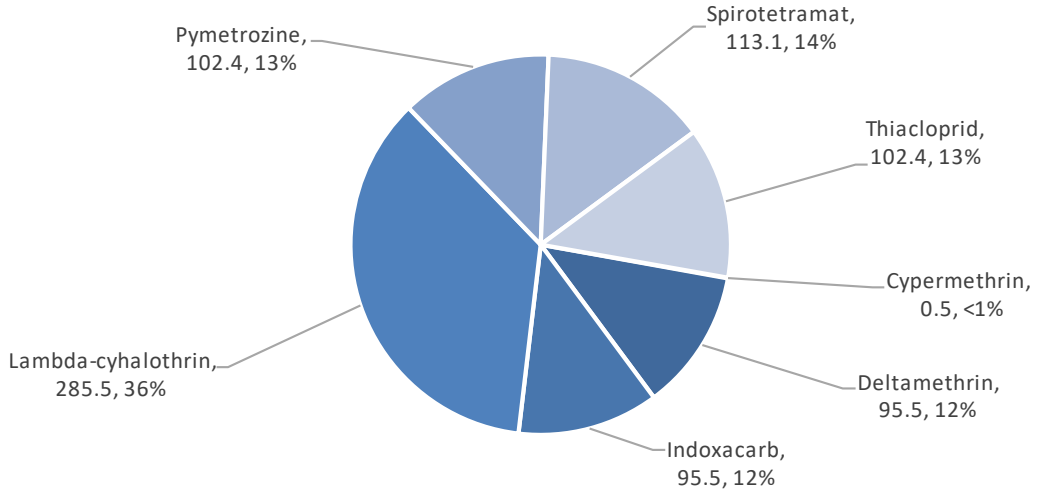


Figure 56: Weight of insecticide active substance usage (kg) on leafy and flowerhead brassica crops in Northern Ireland, 2019.

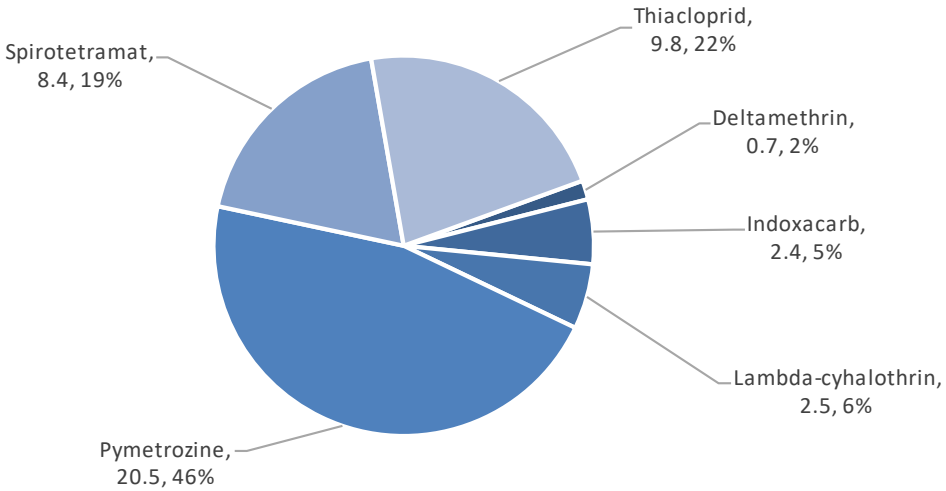
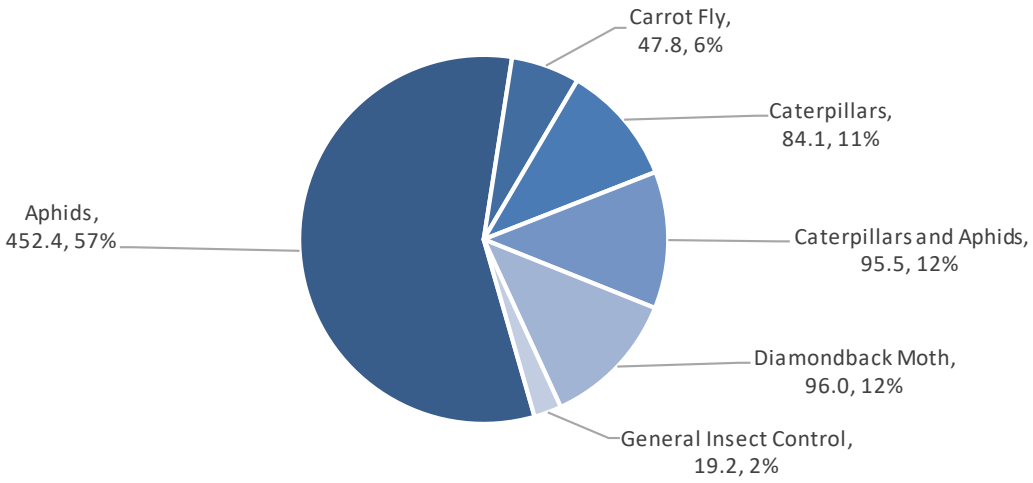


Figure 57: Leafy and flowerhead brassica crops NI 2019: reasons for insecticide use (spha).



PESTICIDE USAGE ON ONIONS AND LEEKS

- 160 hectares of onion and leek crops grown in Northern Ireland
- 153 basic treated area (ha)
- 1,861 total treated area (spha)
- 1,316 kg applied
- 'Onions and leeks': refers to summer salad onions and winter salad onions, leeks, soup leeks and table leeks. 'Leeks' refer to those crops which were not classified as either soup or table leeks.
- Refer to Table 7 for proportional area treated and number of spray applications applied and Tables 31-33 and 39-49 for reasons for use.

Figure 58: Pesticide usage on onion and leek crops in Northern Ireland, 2019.

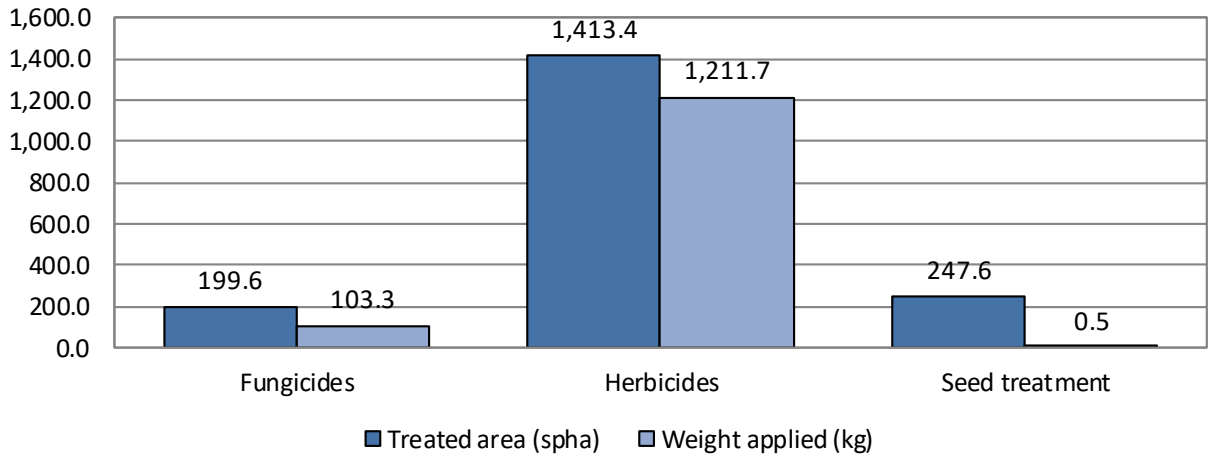


Figure 59: Regional distribution of onion and leek crops grown (ha) in Northern Ireland, 2019.

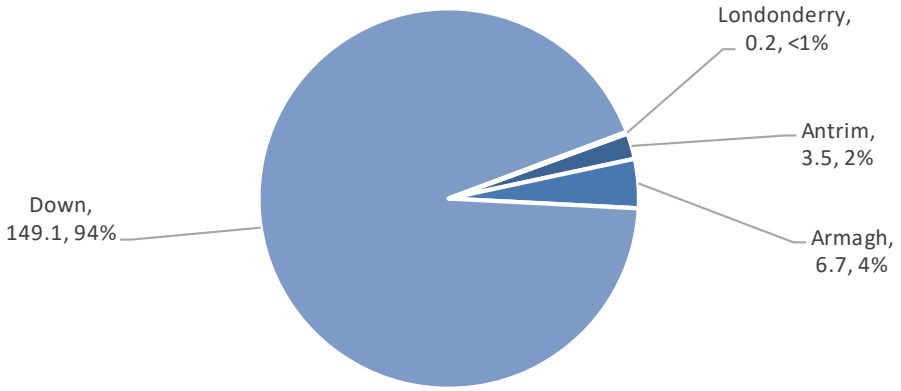


Figure 60: Pesticide usage (spha) on onion and leek crops in Northern Ireland, 2019.

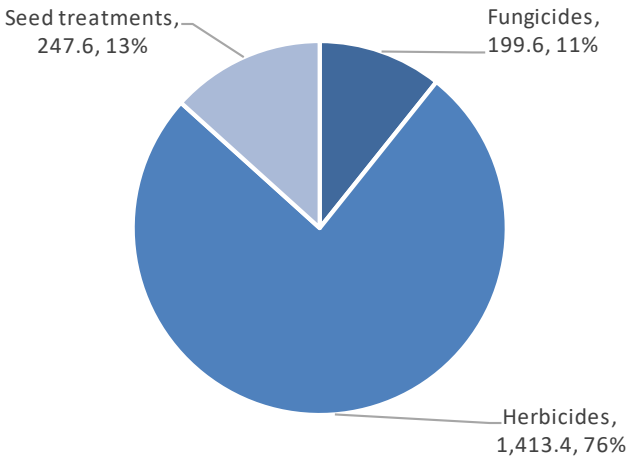
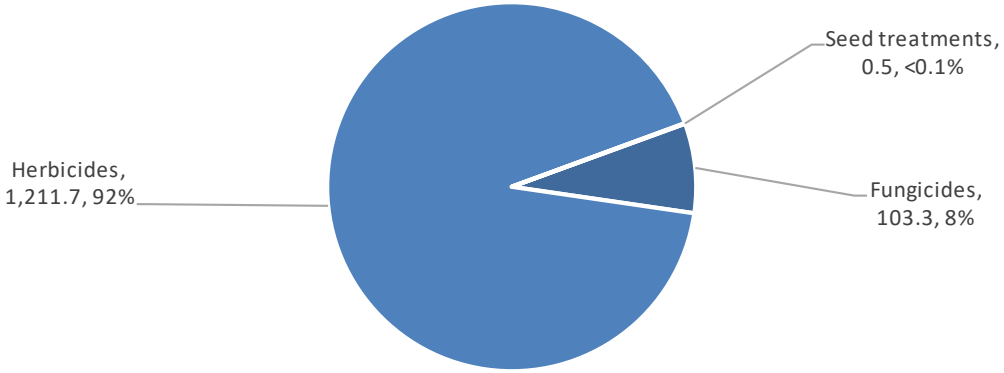


Figure 61: Weight of pesticides (kg) applied to onion and leek crops in Northern Ireland, 2019.



Onions and leeks – Fungicides

- Basic treated area: 114 hectares
- Total treated area: 200 spray hectares
- Weight of active substances applied: 103 kg
- The five fungicide active substances applied were:

Active substance	**Total treated area (spha)**	**Basic treated area (ha)**	**Quantity applied (kg)**	**% of the treated area**
Prothioconazole	132	70	25	66
Dimethomorph/mancozeb	54	51	72	27
Azoxystrobin/difenoconazole	6	6	2	3
Fluopicolide/propamocarb hydrochloride	6	6	4	3
Azoxystrobin	1	1	0	1

Figure 62: Fungicide active substance usage (spha) on onion and leek crops in Northern Ireland, 2019.

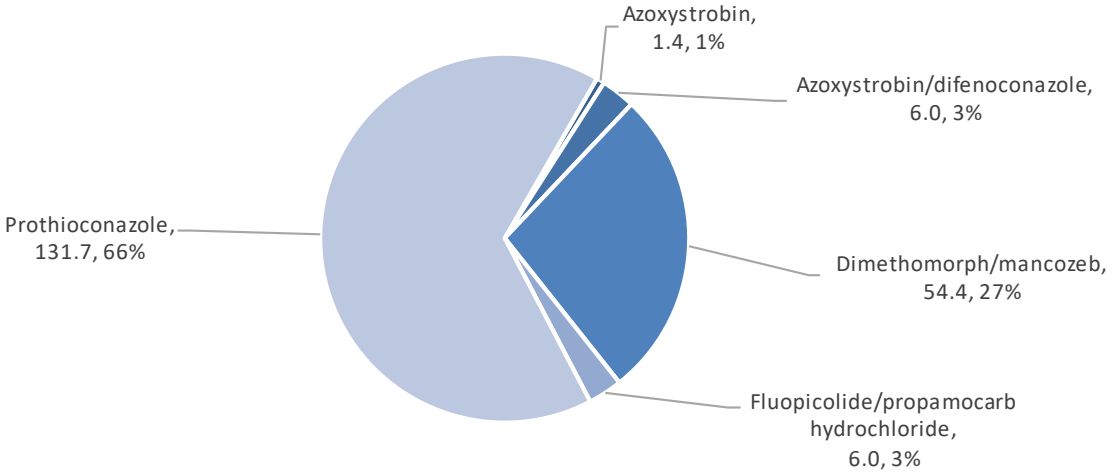


Figure 63: Weight of fungicide active substances (kg) applied to onion and leek crops in Northern Ireland, 2019.

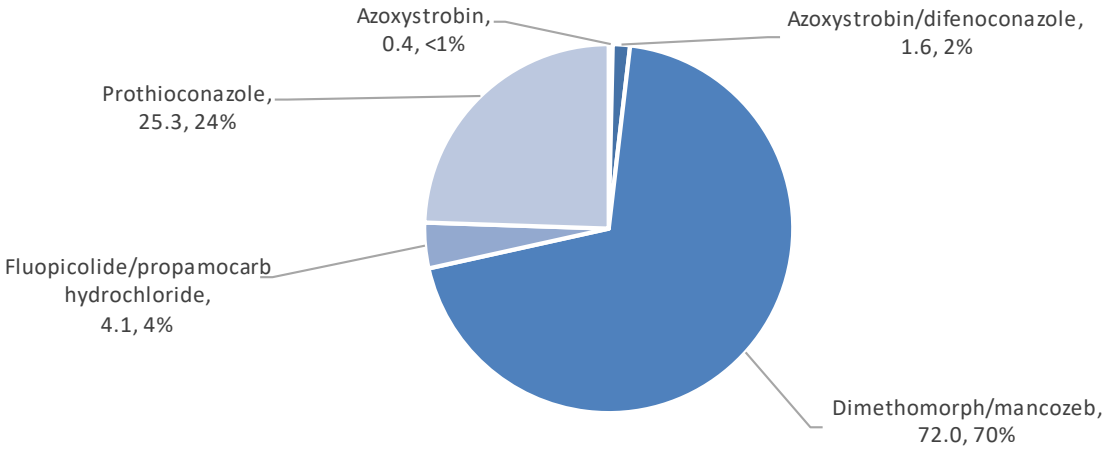
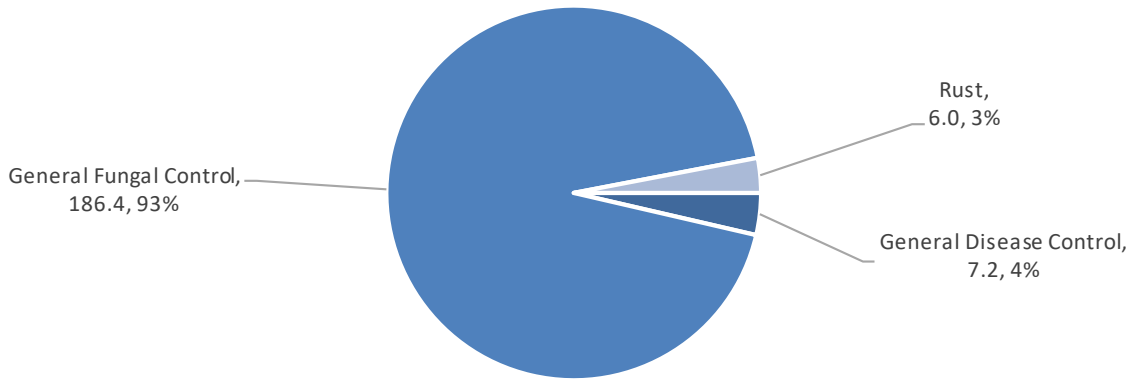


Figure 64: Onion and leek crops NI 2019: reasons for fungicide use (spha).



Onions and leeks – Herbicides

- Basic treated area: 147 hectares
- Total treated area: 1,413 spray hectares
- Weight of active substances applied: 1,212 kg
- The most commonly applied herbicide active substances were:

Active substance	Total treated area (spha)	Basic treated area (ha)	Quantity applied (kg)	% of the treated area
Bromoxynil	379	143	92	27
Fluroxypyr	274	142	38	20
Prosulfocarb	208	108	812	15
Chlorpropham	202	101	81	14
Pendimethalin	104	104	71	8

Figure 65: Herbicide active substance usage (spha) on onion and leek crops in Northern Ireland, 2019.

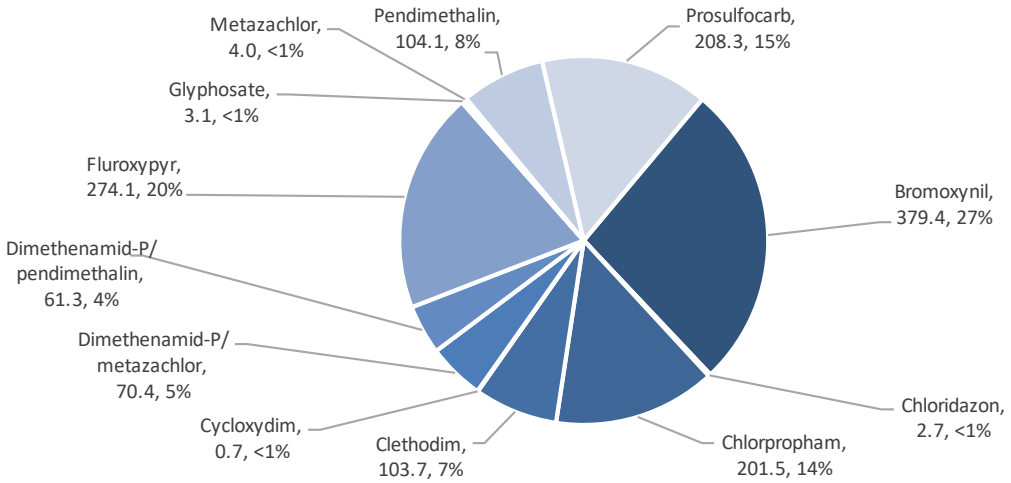


Figure 66: Weight of herbicide active substance usage (kg) on onion and leek crops in Northern Ireland, 2019.

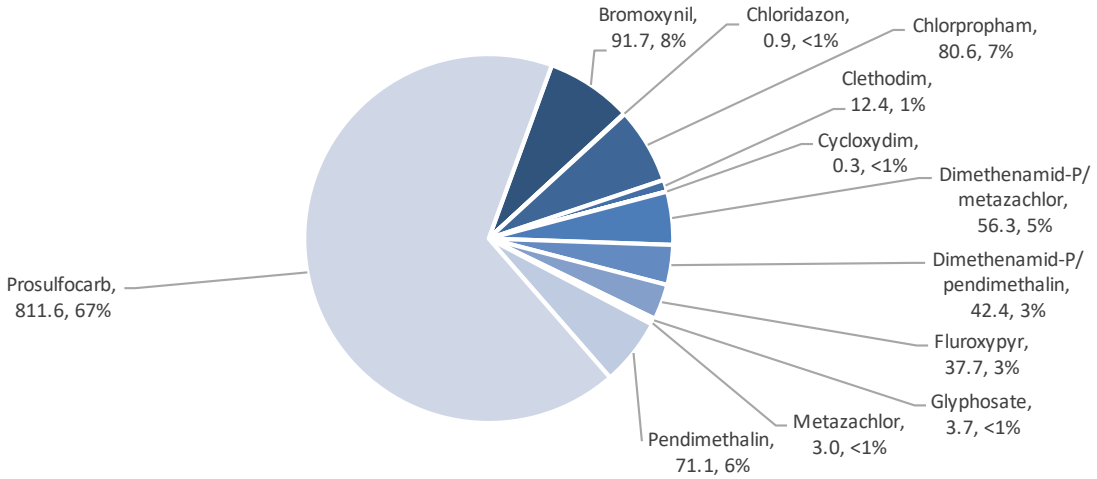
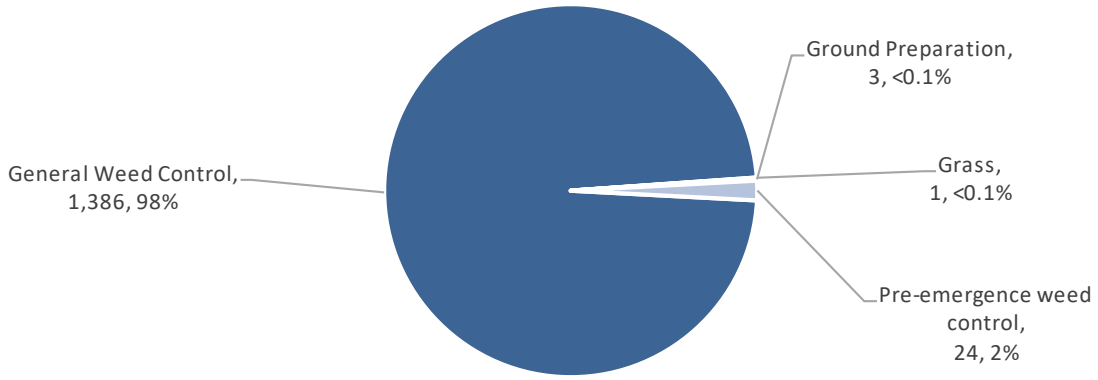


Figure 67: Onion and leek crops NI 2019: reasons for herbicide use (spha).



PESTICIDE USAGE ON CELERY AND PARSLEY

- 63 hectares of celery and parsley crops grown in Northern Ireland
- 63 basic treated area (ha)
- 460 total treated area (spha)
- 377 kg applied
- Celery and parsley crops were grown primarily in County Down
- 'Celery and parsley' refers to soup celery and parsley.
- Refer to Table 7 for proportional area treated and number of spray applications applied and Tables 29 and 34 for reasons for use.

Figure 68: Pesticide usage on celery and parsley crops in Northern Ireland, 2019.

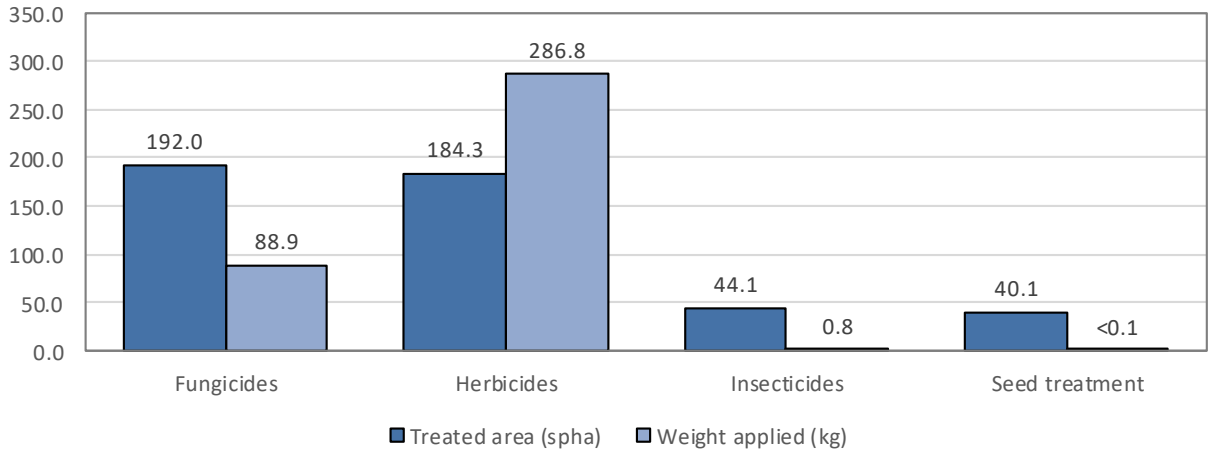


Figure 69: Pesticide usage (spha) on celery and parsley crops in Northern Ireland, 2019.

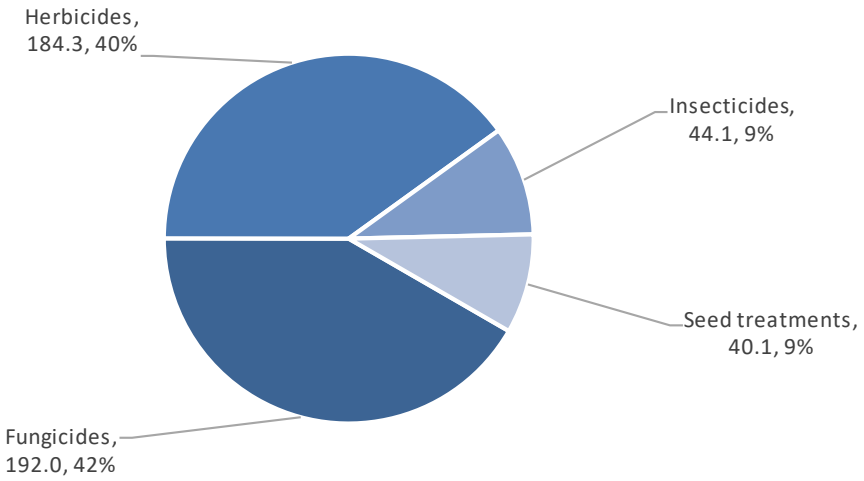
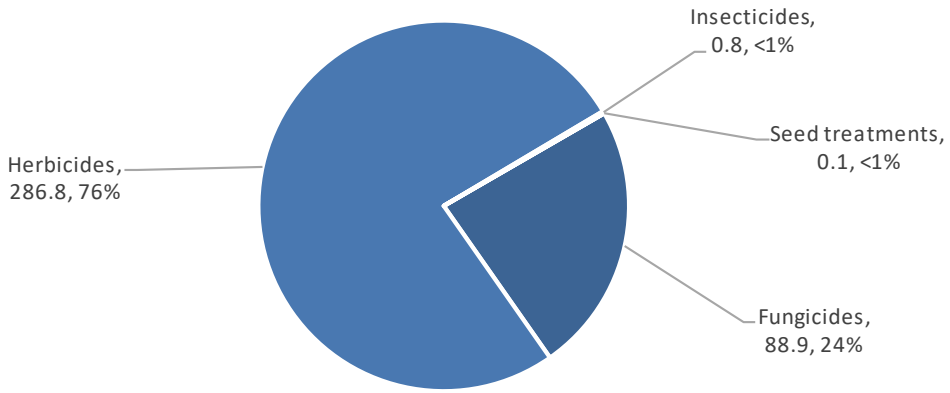


Figure 70: Weight of pesticides (kg) applied to celery and parsley crops in Northern Ireland, 2019.



Celery and parsley – Fungicides

- Basic treated area: 62 hectares
- Total treated area: 192 spray hectares
- Weight of active substances applied: 89 kg
- General disease/fungal control were the only reasons given for use
- The fungicide active substances most commonly applied were:

Active substance	**Total treated area (spha)**	**Basic treated area (ha)**	**Quantity applied (kg)**	**% of the treated area**
Azoxystrobin/difenoconazole	89	59	27	46
Fluopicolide/propamocarb hydrochloride	55	29	46	29
Difenoconazole	24	15	2	12
Dimethomorph/mancozeb	15	15	11	8
Azoxystrobin	4	2	1	2

Figure 71: Fungicide active substance usage (spha) on celery and parsley crops in Northern Ireland, 2019.

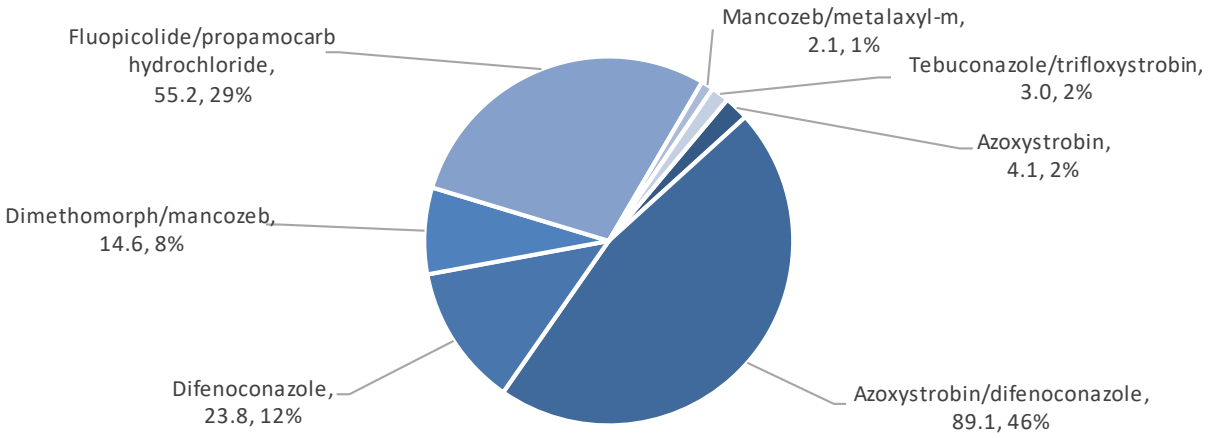
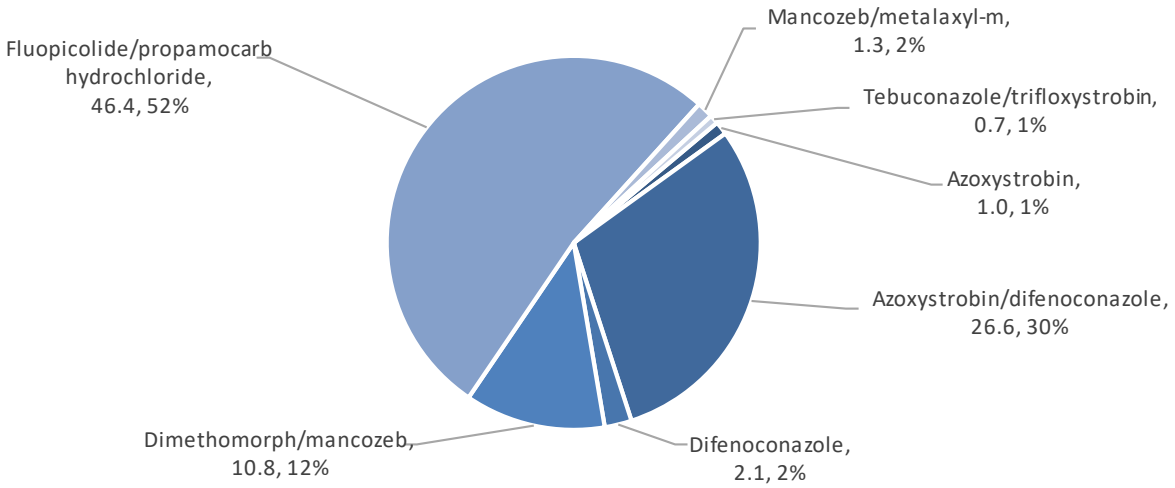


Figure 72: Weight of fungicide active substances (kg) applied to celery and parsley crops in Northern Ireland, 2019.



Celery and parsley – Herbicides

- Basic treated area: 37 hectares
- Total treated area: 184 spray hectares
- Weight of active substances applied: 287 kg
- The most commonly applied herbicide active substances were:

Active substance	Total treated area (spha)	Basic treated area (ha)	Quantity applied (kg)	% of the treated area
Prosulfocarb	68	34	238	37
Chlorpropham	51	25	20	28
Clethodim	25	25	3	14
Pendimethalin	25	25	17	14
Glyphosate	10	5	6	5

Figure 73: Herbicide active substance usage (spha) on celery and parsley crops in Northern Ireland, 2019.

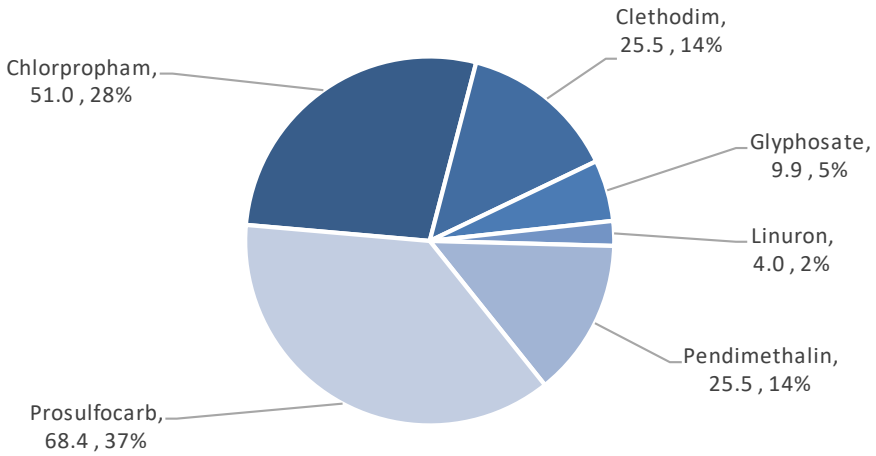


Figure 74: Weight of herbicide active substance usage (kg) on celery and parsley crops in Northern Ireland, 2019.

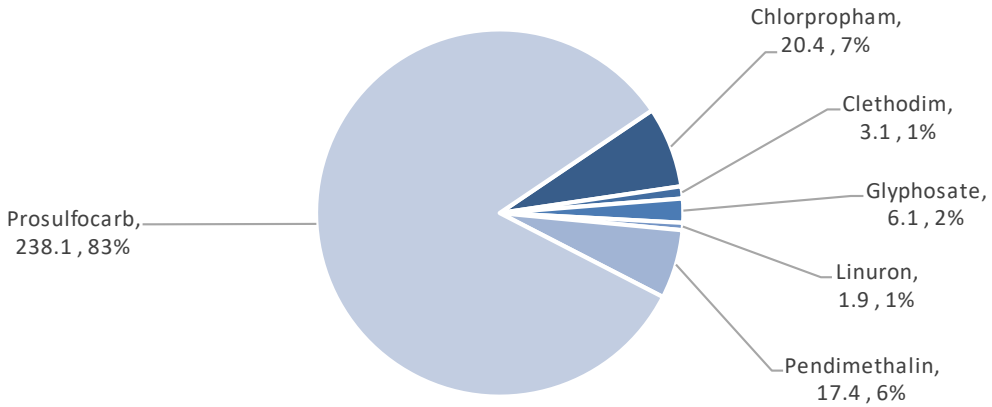
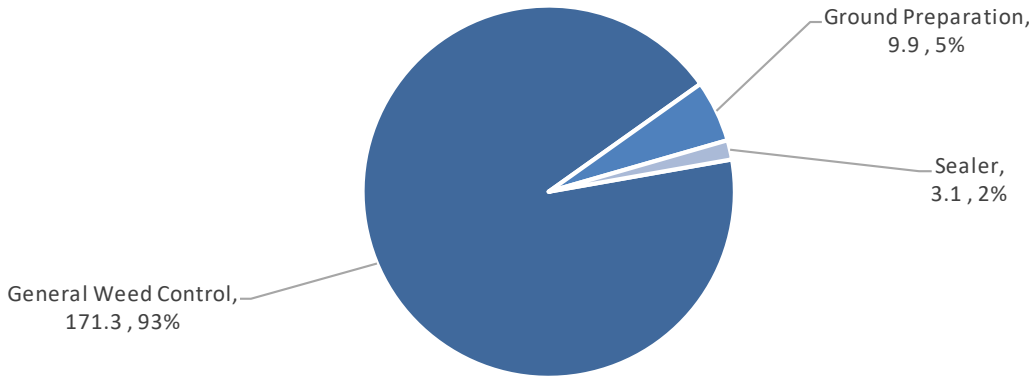


Figure 75: Celery and parsley crops NI 2019: reasons for herbicide use (spha).



Celery and parsley – Insecticides

- Basic treated area: 25 hectares
- Total treated area: 44 spray hectares
- Weight of active substances applied: <1 kg
- The only insecticide active substances applied were lambda-cyhalothrin and pirimicarb.

Figure 76: Insecticide active substance usage (spha) on celery and parsley crops in Northern Ireland, 2019.

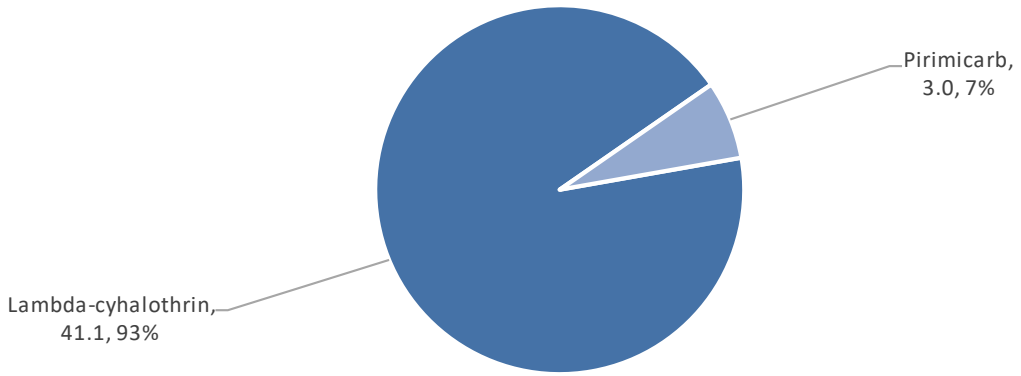


Figure 77: Weight of insecticide active substance usage (kg) on celery and parsley crops in Northern Ireland, 2019.

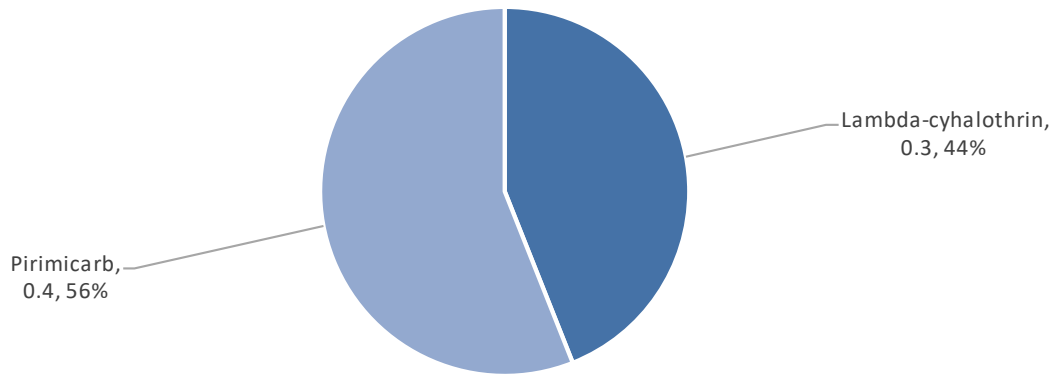
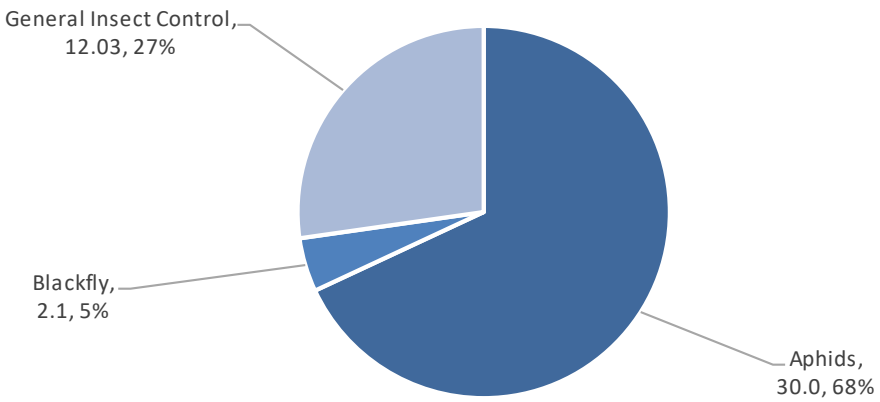


Figure 78: Celery and parsley crops NI 2019: reasons for insecticide use (spha).



PESTICIDE USAGE ON PEAS AND BEANS

- 7 hectares of pea and bean crops grown in Northern Ireland
- 7 basic treated area (ha)
- 31 total treated area (spha)
- Weight of active substances applied: 12 kg
- 'Peas and beans' refers to peas and broad beans.
- Refer to Table 7 for proportional area treated and number of spray applications applied and Tables 12 and 36 for reasons for use.

Figure 79: Pesticide usage on pea and bean crops in Northern Ireland, 2019.

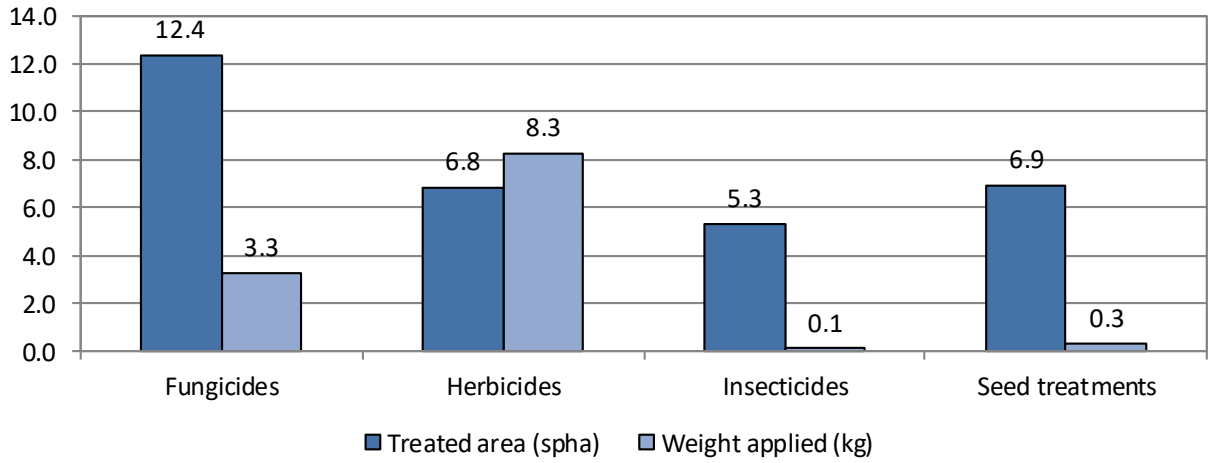


Figure 80: Pesticide usage (spha) on pea and bean crops in Northern Ireland, 2019.

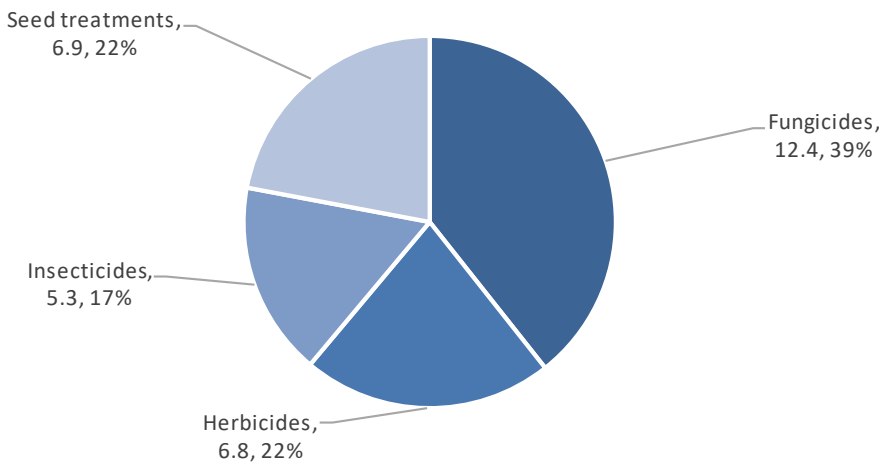
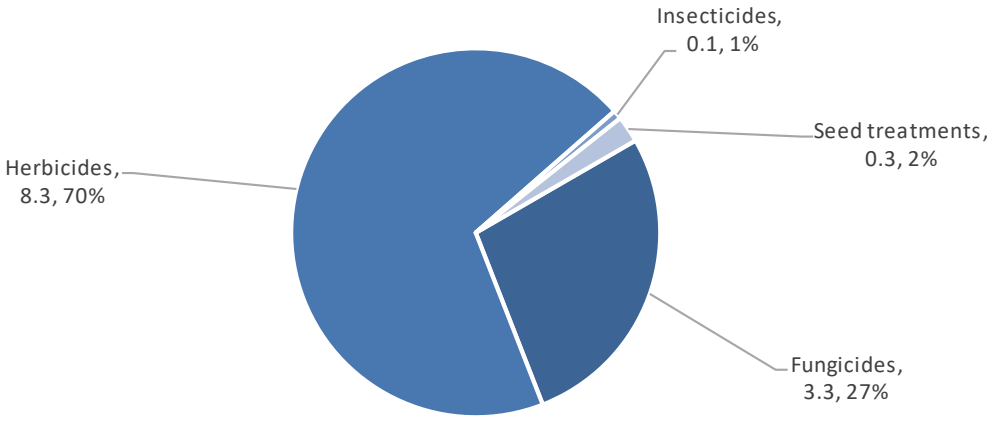


Figure 81: Weight of pesticides (kg) applied to pea and bean crops in Northern Ireland, 2019.



Peas and beans – Fungicides

- Basic treated area: 6 hectares
- Total treated area: 12 spray hectares
- Weight of active substances applied: 3 kg
- The only reason given for fungicide use was general fungal control
- The fungicide active substances applied were:

Active substance	Total treated area (spha)	Basic treated area (ha)	Quantity applied (kg)	% of the treated area
Boscalid/pyraclostrobin	6	6	2	49
Azoxystrobin	3	3	1	24
Metconazole	3	3	<1	25
Chlorothalonil/metalaxyl-m	<1	<1	<1	2

Figure 82: Fungicide active substance usage (spha) on pea and bean crops in Northern Ireland, 2019.

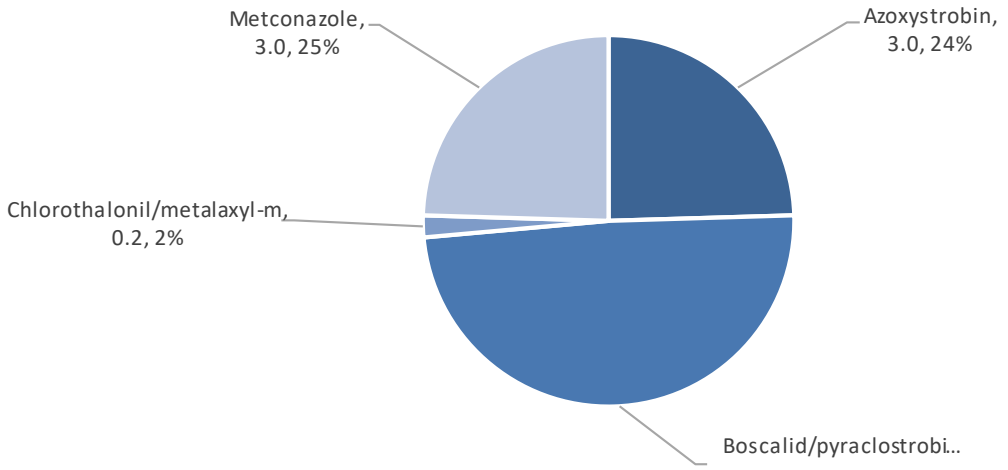
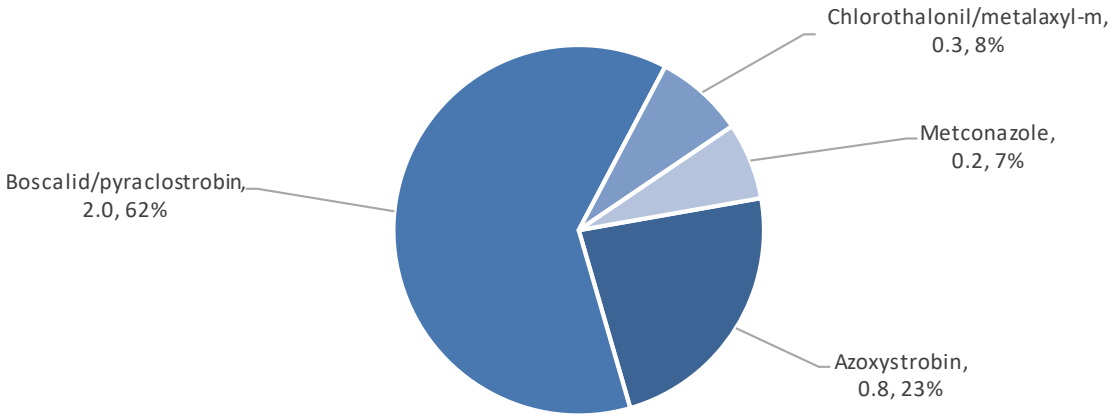


Figure 83: Weight of fungicide active substances (kg) applied to pea and bean crops in Northern Ireland, 2019.



Peas and beans – Herbicides

- Basic treated area: 7 hectares
- Total treated area: 7 spray hectares
- Weight of active substances applied: 8 kg
- The two herbicide active substances/formulations applied were glyphosate and Imazamox/pendimethalin

Figure 84: Herbicide active substance usage (spha) on pea and bean crops in Northern Ireland, 2019.

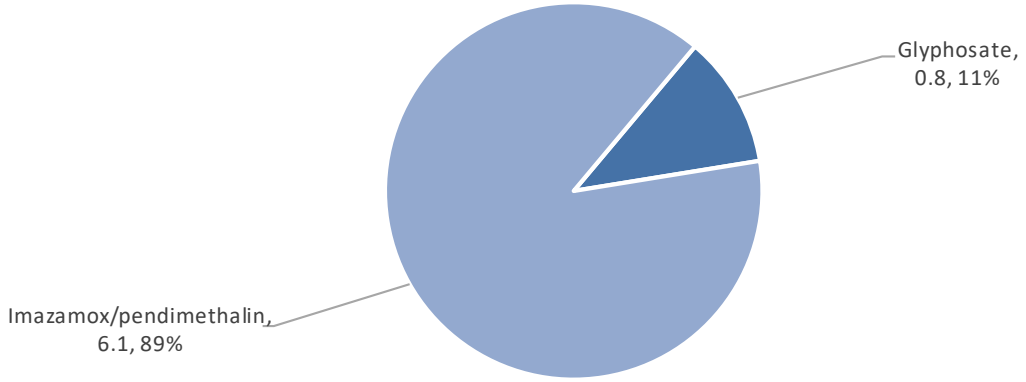


Figure 85: Weight of herbicide active substance usage (kg) on pea and bean crops in Northern Ireland, 2019.

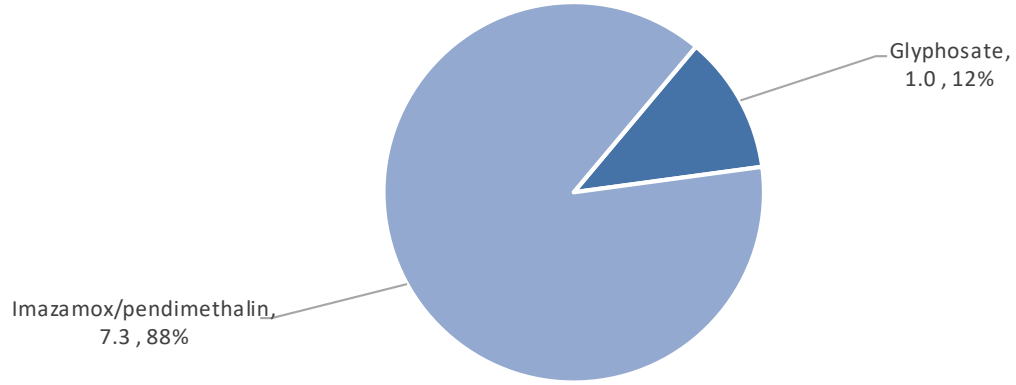
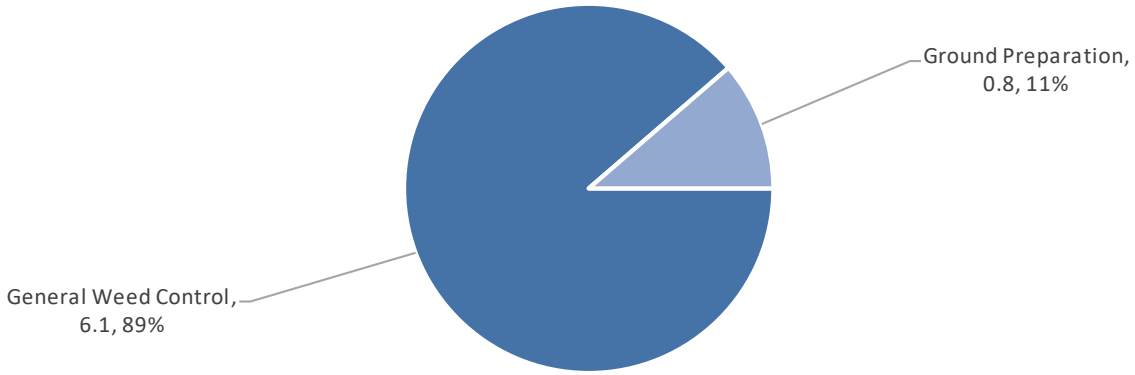


Figure 86: Pea and bean crops NI 2019: reasons for herbicide use (spha).



Peas and beans – Insecticides

- Basic treated area: 4 hectares
- Total treated area: 5 spray hectares
- Weight of active substances applied: <1 kg
- The two insecticide active substances applied were lambda-cyhalothrin and spirotetramat

Figure 87: Insecticide active substance usage (spha) on pea and bean crops in Northern Ireland, 2019.

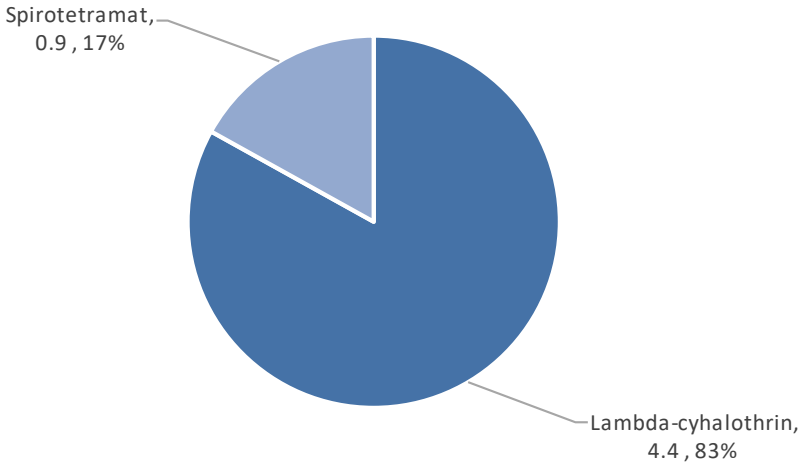


Figure 88: Weight of insecticide active substance usage (kg) on pea and bean crops in Northern Ireland, 2019.

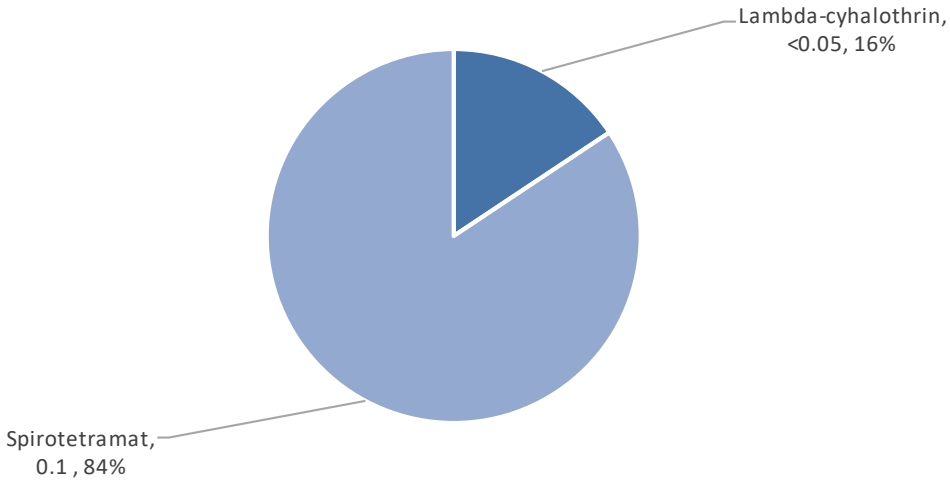
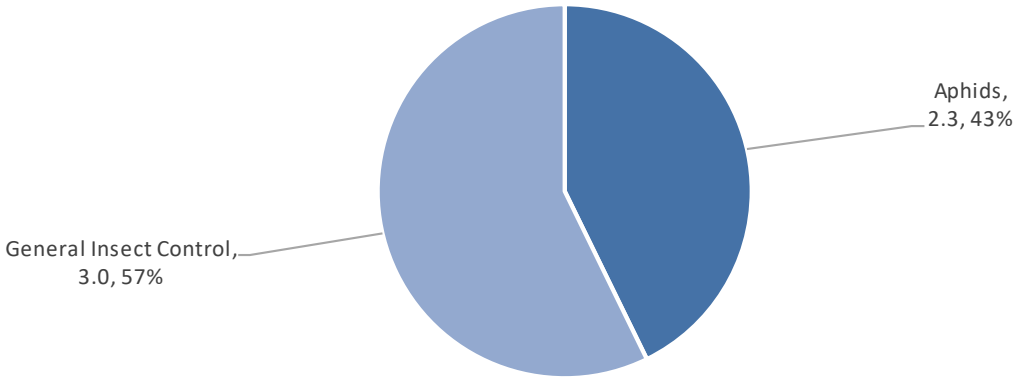


Figure 89: Pea and bean crops NI 2019: reasons for insectcide use (spha).



PESTICIDE USAGE ON OTHER VEGETABLES

- 46 hectares of other vegetable crops grown in Northern Ireland
- 42 basic treated area (ha)
- 36 total treated area (spha)
- 43 kg applied
- Courgette, chard, fennel, spinach and squash received no pesticide treatments
- There were no fungicide applications to other vegetable crops which we treated
- 'Other vegetables': refers to beetroot, courgette, chard, fennel, pumpkin, rhubarb, spinach and squash, which are grouped due to their small growing area.
- Refer to Table 7 for proportional area treated and number of spray applications applied and Tables 13 and 37-38 for reasons for use.

Figure 90: Pesticide usage on other vegetable crops in Northern Ireland, 2019.

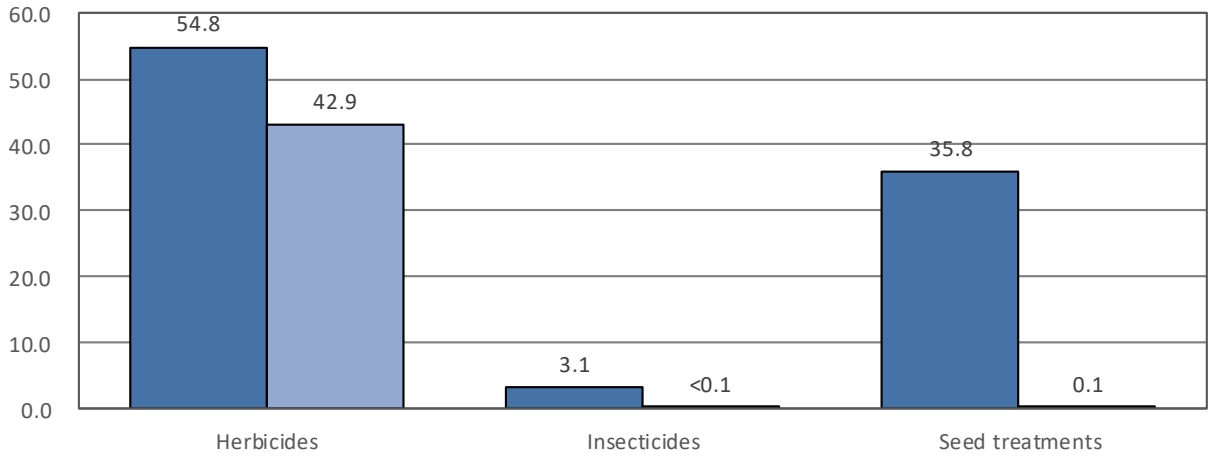


Figure 91: Regional distribution of other vegetable crops grown (ha) in Northern Ireland, 2019.

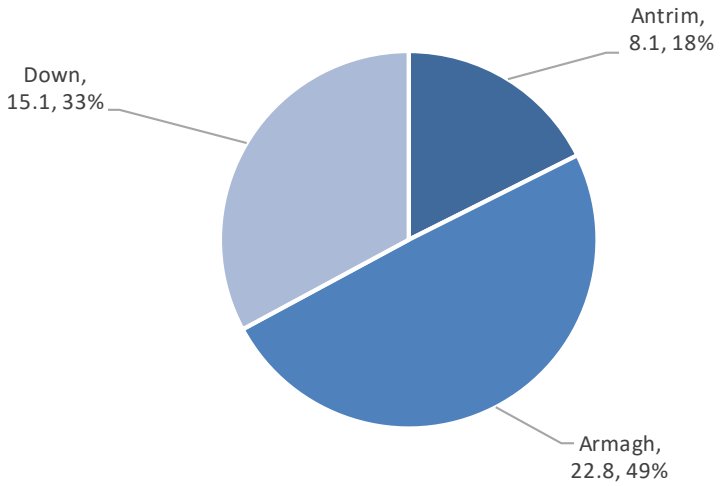


Figure 92: Pesticide usage (spha) on other vegetable crops in Northern Ireland, 2019.

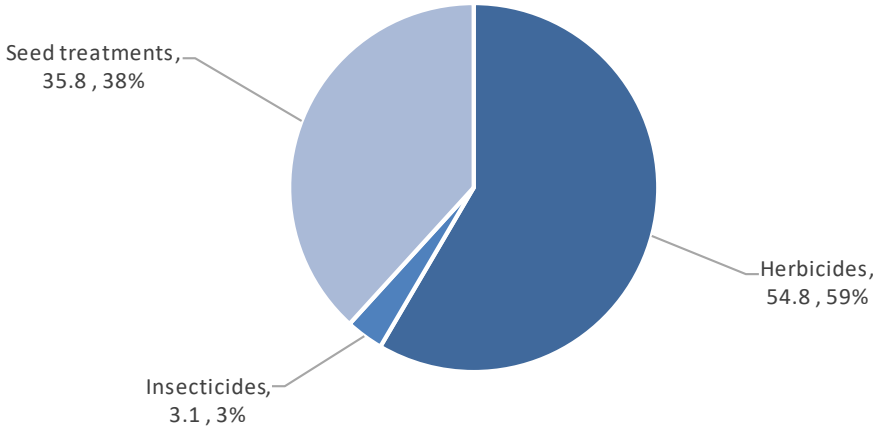
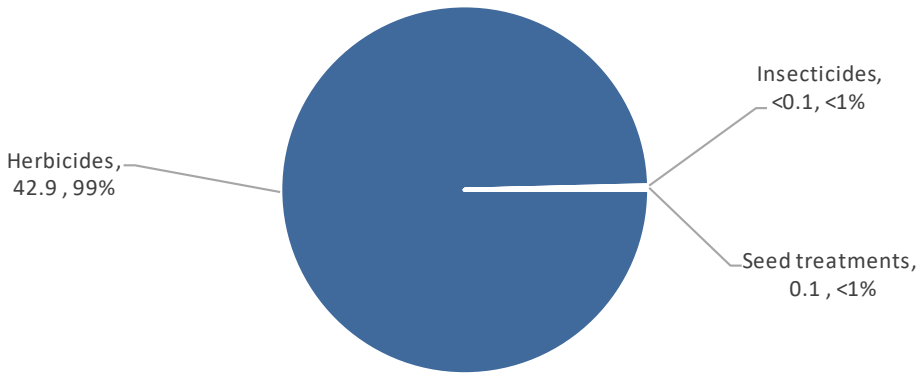


Figure 93: Weight of pesticides (kg) applied to other vegetable crops in Northern Ireland, 2019



Other vegetables – Herbicides

- Basic treated area: 42 hectares
- Total treated area: 55 spray hectares
- Weight of active substances applied: 43 kg
- The herbicide active substances most commonly applied were:

Active substance	Total treated area (spha)	Basic treated area (ha)	Quantity applied (kg)	% of the treated area
Propyzamide	20	20	14	36
Metamitron	11	11	12	20
Phenmedipham	11	11	2	20
Glyphosate	8	8	13	15
Lenacil	3	3	1	6

Figure 94: Herbicide active substance usage (spha) on other vegetable crops in Northern Ireland, 2019.

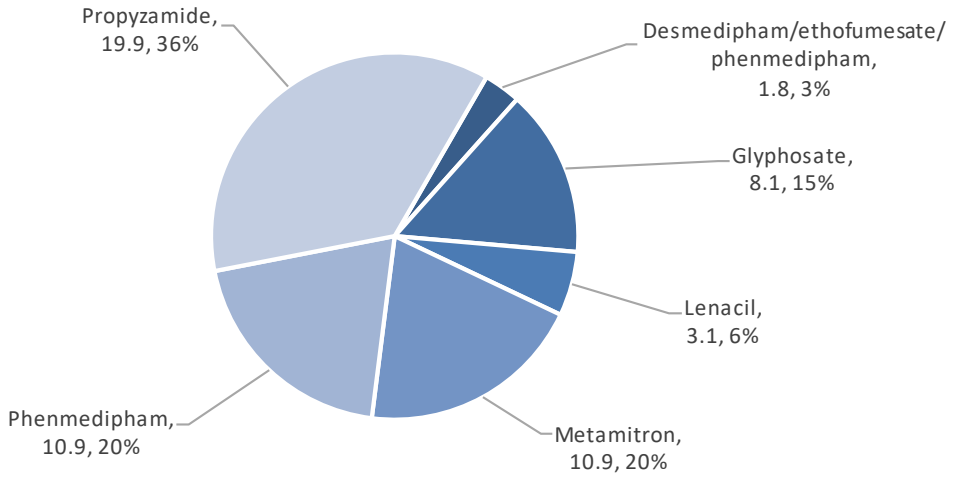


Figure 95: Weight of herbicide active substance usage (kg) on other vegetable crops in Northern Ireland, 2019.

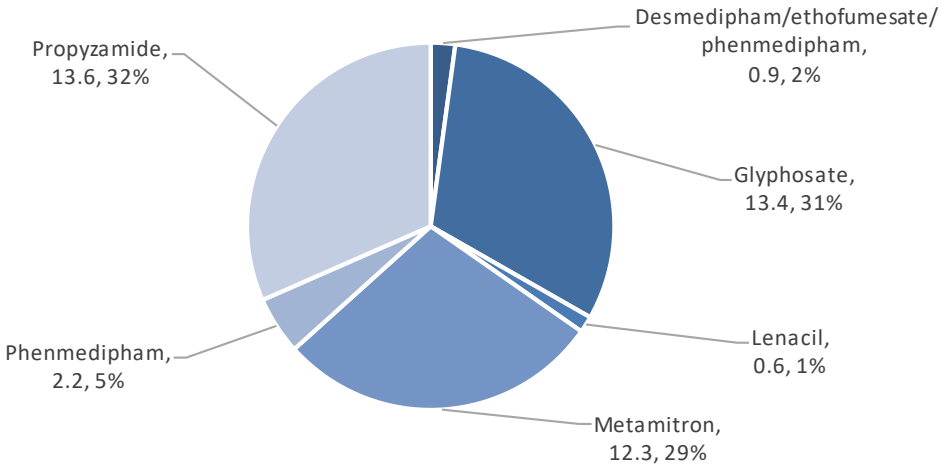
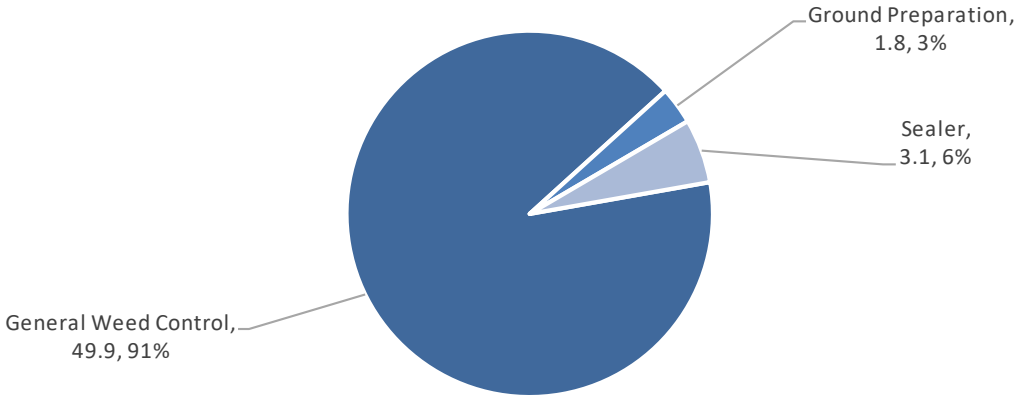


Figure 96: Other vegetables: reasons for herbicide use (spha).



MOLLUSCICIDE USE ON OUTDOOR VEGETABLE CROPS

- 33 basic treated area (ha)
- 34 total treated area (spha)
- 7 kg applied
- The only molluscicide active substance applied was ferric phosphate

Figure 97: Area of outdoor vegetable crops treated (spha) with molluscicides in Northern Ireland, 2019.

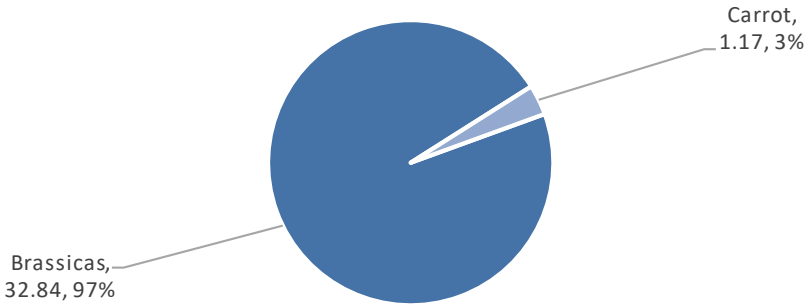
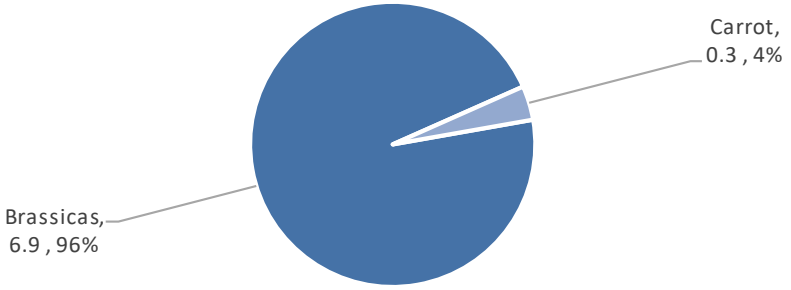


Figure 98: Weight of molluscicides applied (kg) to outdoor vegetable crops in Northern Ireland, 2019.



SEED TREATMENT USE ON OUTDOOR VEGETABLE CROPS

- 1,038 basic treated area (ha)
- 1,482 total treated area (spha)
- 13 kg applied
- Refer to Table 7 for proportional area treated and number of spray applications applied.
- The seed treatment active substances and formulations applied were cymoxanil/fludioxonil/metalaxyl-m (32%), tefluthrin (32%), thiram (29%), metalaxyl-M (6%) and fludioxonil (1%)

Figure 99: Area of outdoor vegetable crops (spha) with treated seed in Northern Ireland, 2019.

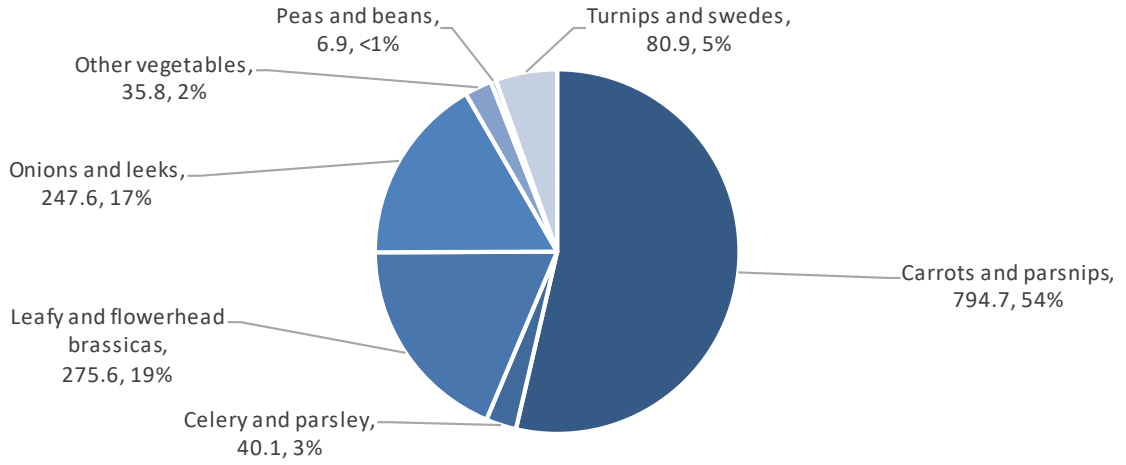


Figure 100: Weight of seed treatments applied (kg) to outdoor vegetable crops in Northern Ireland, 2019.

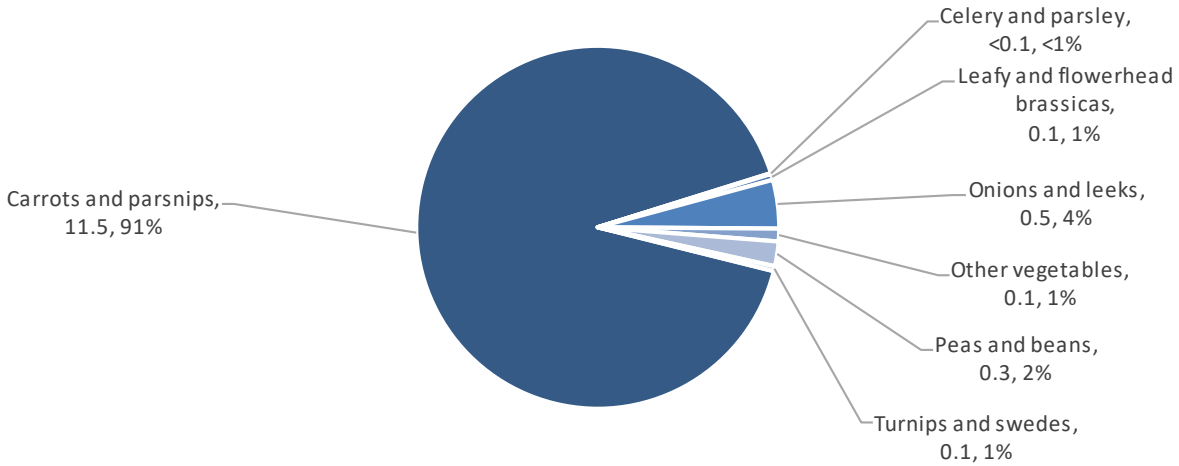


Figure 101: Type of seed treatment applied (spha) to outdoor vegetable crops in Northern Ireland, 2019.

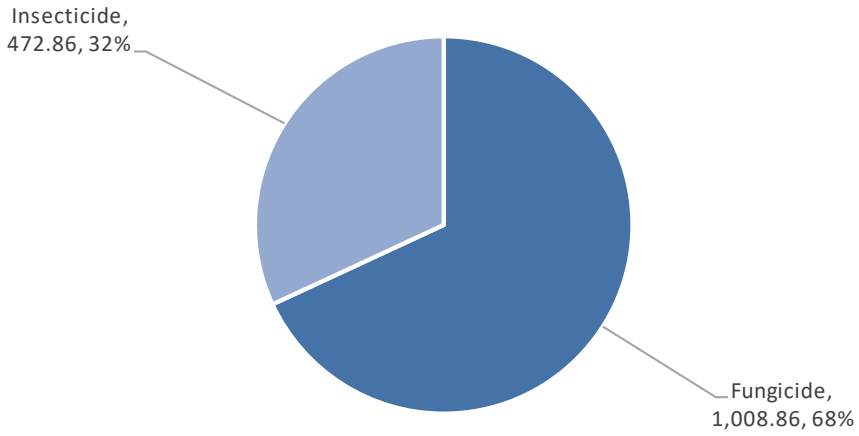


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Table 1: **The total number of farms in each size group with vegetable crops in the June 2019 census and number of samples from each size group.**

	Size group (hectares)											
	<2		2<5		5<15		15<40		40+		Total	
Region	A	B	A	B	A	B	A	B	A	B	A	B
Northern Ireland	28	12	20	9	23	9	12	8	6	2	89	40

Legend

A = Total number of holdings in strata

B = Number of holdings surveyed

Table 2: **Total number and area of crops surveyed (ha) in Northern Ireland, 2019.**

Crop type	Number of Crops Surveyed	Surveyed area (ha)
Carrots	28.0	283.47
Parsnips	14.0	172.09
Table leeks	9.0	86.61
Savoy cabbage	18.0	79.35
Turnips	3.0	44.49
Summer scallions	5.0	40.99
Parsley	6.0	36.82
Swede	1.0	36.42
White cabbage	10.0	35.01
Brussels sprouts	11.0	34.17
Broccoli	14.0	30.23
Soup celery	6.0	26.39
Pointed cabbage	6.0	24.30
Soup leeks	10.0	24.26
Pumpkin	4.0	20.17
Beetroot	6.0	16.10
Winter cabbage	2.0	15.38
Summer cabbage	4.0	12.23
Red cabbage	2.0	11.94
Autumn cauliflower	4.0	11.69
Rhubarb	3.0	9.13
Calabrese	1.0	9.11
Summer cauliflower	4.0	6.31
Leeks	1.0	6.00
Winter cauliflower	1.0	4.14
Broad beans	6.0	4.02
Peas	3.0	3.43
Autumn cabbage	2.0	3.28
Winter scallions	2.0	1.37
Spring cabbage	1.0	0.90
Hard cabbage	1.0	0.90
Kale	2.0	0.50
Cauliflowers	1.0	0.30
Onions	1.0	0.24
Lettuce	1.0	0.21
Chard	1.0	<0.10
Squash	1.0	<0.10
Courgette	1.0	<0.10
Spinach	1.0	<0.10
Fennel	1.0	<0.10
Salad onion	1.0	<0.10
All crops	**199**	**1,092.33**

Table 3: **Estimated area (ha) of vegetable crops grown regionally in Northern Ireland, 2019.**

	County					
Crop type	**Antrim**	**Armagh**	**Down**	**Londonderry**	**Tyrone**	**Northern Ireland**
Carrots	0.90	54.03	208.23	14.11	6.20	283.47
Parsnips	6.43	1.41	160.02	2.17	2.07	172.09
Table leeks	0.14	.	86.47	.	.	86.61
Savoy cabbage	0.90	9.36	63.17	1.45	4.47	79.35
Turnips	.	1.87	36.42	.	6.20	44.49
Summer scallions	1.09	.	39.90	.	.	40.99
Parsley	0.90	.	35.92	.	.	36.82
Swede	.	.	36.42	.	.	36.42
White cabbage	.	.	30.86	4.15	.	35.01
Brussels sprouts	0.94	0.71	23.94	7.74	0.84	34.17
Broccoli	0.90	15.94	12.55	.	0.84	30.23
Soup celery	.	.	26.39	.	.	26.39
Pointed cabbage	.	5.23	12.92	.	6.14	24.30
Soup leeks	0.90	6.67	16.45	0.24	.	24.26
Pumpkin	.	19.93	0.24	.	.	20.17
Beetroot	1.80	.	14.30	.	.	16.10
Winter cabbage	.	.	15.38	.	.	15.38
Summer cabbage	.	2.14	7.58	.	2.51	12.23
Red cabbage	.	.	11.94	.	.	11.94
Autumn cauliflower	.	0.71	10.14	.	0.84	11.69
Rhubarb	6.30	2.83	.	.	.	9.13
Calabrese	.	.	9.11	.	.	9.11
Summer cauliflower	.	0.71	4.76	.	0.84	6.31
Leeks	.	.	6.00	.	.	6.00
Winter cauliflower	.	.	4.14	.	.	4.14
Broad beans	0.61	.	3.40	.	.	4.02
Peas	0.16	.	3.27	.	.	3.43
Autumn cabbage	.	.	3.28	.	.	3.28
Winter scallions	1.37	.	.	.	.	1.37
Spring cabbage	0.90	.	.	.	.	0.90
Hard cabbage	0.90	.	.	.	.	0.90
Kale	.	.	0.50	.	.	0.50
Cauliflowers	.	.	0.30	.	.	0.30
Onions	.	.	0.24	.	.	0.24
Lettuce	.	.	0.21	.	.	0.21
Chard	.	.	<0.10	.	.	<0.10
Squash	.	.	<0.10	.	.	<0.10
Courgette	.	.	<0.10	.	.	<0.10
Spinach	.	.	<0.10	.	.	<0.10
Fennel	.	.	<0.10	.	.	<0.10
Salad onion	.	.	<0.10	.	.	<0.10
All crops	**25.14**	**121.55**	**884.82**	**29.86**	**30.96**	**1,092.33**

Table 4a: **Estimated area (spha) of vegetable crops treated regionally in Northern Ireland, 2019 with each pesticide type.**

	County					
Pesticide type	**Antrim**	**Armagh**	**Down**	**Londonderry**	**Tyrone**	**Northern Ireland**
Fungicide	21.22	410.19	2,597.25	51.95	18.15	3,098.76
Herbicide	56.33	312.67	4,509.92	77.75	53.71	5,010.37
Insecticide	47.35	533.47	2,406.14	31.61	66.05	3,084.62
Growth regulator	3.73	.	.	.	.	3.73
Molluscicide	.	14.03	3.50	.	16.48	34.01
Seed treatment	19.92	184.38	1,209.36	37.10	30.96	1,481.72
All pesticides	**148.55**	**1,454.74**	**10,726.17**	**198.41**	**185.34**	**12,713.21**

Table 4b: **Estimated weight (kg) of pesticide applied regionally in Northern Ireland, 2019 with each pesticide type.**

	County					
Pesticide type	**Antrim**	**Armagh**	**Down**	**Londonderry**	**Tyrone**	**Northern Ireland**
Fungicide	5.84	121.53	881.58	11.32	3.49	1,023.75
Herbicide	67.27	176.28	3,834.80	103.59	58.42	4,240.35
Insecticide	1.68	17.17	993.98	2.96	1.65	1,017.43
Growth regulator	14.00	.	.	.	.	14.00
Molluscicide	.	2.92	0.83	.	3.43	7.17
Seed treatment	0.13	2.66	9.52	0.31	0.02	12.64
All pesticides	**88.91**	**320.55**	**5,720.71**	**118.18**	**67.00**	**6,315.36**

Table 5: The total area (spha) and the basic area (ha) of vegetable crops treated with each pesticide type in Northern Ireland, 2019.

	Pesticide Type													
	Fungicides		Herbicides & desiccants		Insecticides		Growth regulators		Molluscicides		Seed treatments		All pesticides	
Crop type	(spha)	(ha)	(spha)	(ha)	(spha)	(ha)	(spha)	(ha)	(spha)	(ha)	(spha)	(ha)	(spha)	(ha)
Carrots and parsnips	1,884.91	424.07	2,378.88	453.65	2,124.19	454.36	3.73	3.73	1.17	1.17	794.72	455.45	7,187.60	455.45
Celery and parsley	191.98	62.23	184.31	37.03	44.13	25.07	.	.	.	.	40.07	40.07	460.49	63.13
Leafy and flowerhead brassicas	806.19	246.74	737.53	271.32	794.89	215.09	.	.	32.84	31.68	275.61	265.38	2,647.08	272.83
Onions and leeks	199.57	113.93	1,413.36	146.49	.	.	.	.	.	.	247.63	152.89	1,860.56	152.89
Other vegetables	.	.	54.78	42.06	3.10	3.10	.	.	.	.	35.84	35.84	93.73	42.14
Peas and beans	12.37	6.30	6.84	6.84	5.30	3.95	.	.	.	.	6.93	6.93	31.45	7.38
Turnips and swedes	3.73	1.87	234.67	80.91	113.00	38.29	.	.	.	.	80.91	80.91	432.32	80.91
All crops	**3,098.76**	**855.14**	**5,010.37**	**1,038.31**	**3,084.62**	**739.86**	**3.73**	**3.73**	**34.01**	**32.84**	**1,481.72**	**1,037.48**	**12,713.21**	**1,074.00**

Table 6: The total quantities (kg) of each pesticide type used on vegetable crops in Northern Ireland 2019.

	Pesticide Type						
Crop type	Fungicides	Herbicides	Insecticides	Growth regulators	Molluscicides	Seed treatments	Total quantity (kg)
Carrots and parsnips	637.16	2,017.31	971.51	14.00	0.28	11.54	3,651.80
Celery and parsley	88.90	286.85	0.76	.	.	0.01	376.52
Leafy and flowerhead brassicas	190.13	496.22	44.30	.	6.90	0.07	737.62
Onions and leeks	103.34	1,211.67	.	.	.	0.55	1,315.55
Other vegetables	.	42.93	0.02	.	.	0.14	43.09
Peas and beans	3.26	8.25	0.09	.	.	0.28	11.88
Turnips and swedes	0.97	177.12	0.74	.	.	0.06	178.88
All pesticides	**1,023.75**	**4,240.35**	**1,017.43**	**14.00**	**7.17**	**12.64**	**6,315.36**

Table 7: **The proportional area (%) of each crop treated with pesticides and the number of spray applications in Northern Ireland, 2019.**

	Pestcide type													
	Fungicides		Herbicides		Insecticides		Growth Regulators		Molluscicides		Seed treatments		All Pesticides	
Crop type	%	sp apps	%	sp apps	%	sp apps	%	sp apps	%	sp apps	%	sp apps	%	sp apps
Carrots and parsnips	93%	4.12	100%	3.77	100%	4.84	1%	1.00	<1%	1.00	100%	1.65	100%	3.48
Celery and parsley	98%	2.93	59%	3.71	40%	1.49	.	.	.	.	63%	1.00	100%	2.43
Leafy and flowerhead brassicas	88%	2.76	97%	1.98	77%	3.40	.	.	11%	1.06	95%	1.05	98%	2.10
Onions and leeks	71%	1.70	92%	4.73	.	.	.	.	.	.	96%	1.49	96%	2.63
Other vegetables	.	.	91%	1.30	7%	1.00	.	.	.	.	78%	1.00	92%	1.14
Peas and beans	85%	1.56	92%	1.00	53%	1.79	.	.	.	.	93%	1.00	99%	1.25
Turnips and swedes	2%	2.00	100%	2.38	47%	2.39	.	.	.	.	100%	1.00	100%	1.85
Total	**78%**	**2.97**	**95%**	**2.74**	**68%**	**3.73**	**1%**	**1.00**	**3%**	**1.06**	**95%**	**1.25**	**98%**	**2.46**

Table 8: **Estimated area (spha) of outdoor vegetable crops treated with pesticide formulations in Northern Ireland, 2019.**

	Crop type										
Pesticide group & active substance	**Brassicas**	**Carrot**	**Celery**	**Leek**	**Onions & Spring Onions**	**Other Vegetables**	**Parsley**	**Parsnip**	**Peas & beans**	**Turnip & Swede**	**Total Area (spha)**
Fungicides											
Azoxystrobin	64.38	18.65	.	0.78	0.66	.	4.13	1.94	3.03	.	93.57
Azoxystrobin/difenoconazole	174.26	100.80	36.06	6.00	.	.	53.06	144.22	.	1.87	516.27
Boscalid/pyraclostrobin	48.93	270.91	.	.	.	.	.	7.47	6.07	.	333.37
Chlorothalonil/metalaxyl-m	8.79	.	.	.	.	.	.	.	0.24	.	9.03
Cyprodinil/fludioxonil	.	147.75	.	.	.	.	.	.	.	.	147.75
Difenoconazole	255.74	.	23.81	.	.	.	.	.	.	.	279.55
Dimethomorph/mancozeb	.	1.89	.	13.67	40.74	.	14.57	0.94	.	.	71.81
Fenpropimorph	.	30.00	.	.	.	.	.	.	.	.	30.00
Fluopicolide/propamocarb hydrochloride	18.21	.	26.10	6.00	.	.	29.14	.	.	.	79.45
Isopyrazam	.	245.98	.	.	.	.	.	142.35	.	.	388.33
Mancozeb/metalaxyl-m	.	.	.	.	.	.	2.07	.	.	.	2.07
Metalaxyl-M	.	252.43	.	.	.	.	.	146.08	.	.	398.52
Metconazole	.	.	.	.	.	.	.	.	3.03	.	3.03
Prothioconazole	216.56	315.12	.	131.72	.	.	.	4.67	.	1.87	669.93
Tebuconazole	.	8.00	.	.	.	.	.	5.67	.	.	13.67
Tebuconazole/trifloxystrobin	19.33	40.05	3.03	.	.	.	.	.	.	.	62.41
All fungicides	**806.19**	**1,431.58**	**89.01**	**158.17**	**41.40**	**.**	**102.97**	**453.33**	**12.37**	**3.73**	**3,098.76**

Table 8 (cont): **Estimated area (spha) of outdoor vegetable crops treated with pesticide formulations in Northern Ireland, 2019.**

Pesticide group & active substance	Brassicas	Carrot	Celery	Leek	Onions & Spring Onions	Other Vegetables	Parsley	Parsnip	Peas & beans	Turnip & Swede	Total Area (spha)
Herbicides											
Aclonifen	.	147.75	.	.	.	.	.	146.08	.	.	293.83
Bromoxynil	.	.	.	262.14	117.21	.	.	.	.	.	379.36
Chloridazon	.	.	.	0.90	1.80	.	.	.	.	.	2.70
Chlorpropham	.	.	17.00	123.83	77.70	.	34.00	.	.	.	252.53
Clethodim	26.25	43.80	8.50	64.81	38.85	.	17.00	142.35	.	.	341.55
Clomazone	221.70	273.95	.	.	.	.	.	2.17	.	74.71	572.54
Cycloxydim	.	.	.	.	0.66	.	.	.	.	.	0.66
Desmedipham/ethofumesate/phenmedipham	.	.	.	.	.	1.80	.	.	.	.	1.80
Diflufenican	.	30.00	.	.	.	.	.	.	.	.	30.00
Dimethenamid-P/metazachlor	8.50	.	.	70.42	.	.	.	.	.	.	78.91
Dimethenamid-P/pendimethalin	.	.	.	20.03	41.31	.	.	.	.	.	61.34
Diquat	.	1.17	.	.	.	.	.	.	.	.	1.17
Fluroxypyr	.	.	.	196.45	77.70	.	.	.	.	.	274.15
Glyphosate	141.20	249.10	4.50	1.28	1.80	8.09	5.40	220.95	0.78	79.05	712.15
Imazamox/pendimethalin	.	.	.	.	.	.	.	.	6.07	.	6.07
Lenacil	.	.	.	.	.	3.10	.	.	.	.	3.10
Linuron	.	6.68	1.03	.	.	.	2.97	18.60	.	.	29.28
Metamitron	.	.	.	.	.	10.93	.	163.55	.	.	174.48
Metazachlor	308.79	.	.	4.02	.	.	.	.	.	80.91	393.73
Metribuzin	.	289.38	.	.	.	.	.	.	.	.	289.38
Pendimethalin	4.54	281.51	8.50	62.82	41.31	.	17.00	170.25	.	.	585.93
Phenmedipham	.	.	.	.	.	10.93	.	.	.	.	10.93
Propaquizafop	.	3.56	.	.	.	.	.	.	.	.	3.56
Propyzamide	.	.	.	.	.	19.93	.	.	.	.	19.93
Prosulfocarb	.	41.94	26.78	130.61	77.70	.	41.64	146.08	.	.	464.76
Pyridate	26.54	.	.	.	.	.	.	.	.	.	26.54
All herbicides	**737.53**	**1,368.84**	**66.31**	**937.31**	**476.04**	**54.78**	**13.98**	**1,010.04**	**6.84**	**234.67**	**5,010.37**

Table 8 (cont): **Estimated area (spha) of outdoor vegetable crops treated with pesticide formulations in Northern Ireland, 2019.**

Pesticide group & active substance	Brassicas	Carrot	Celery	Leek	Onions & Spring Onions	Other Vegetables	Parsley	Parsnip	Peas & beans	Turnip & Swede	Total Area (spha)
Insecticides											
Chlorantraniliprole	.	38.88	.	.	.	.	.	.	.	.	38.88
Cyantraniliprole	.	147.75	.	.	.	.	.	142.35	.	.	290.10
Cypermethrin	0.47	.	.	.	.	.	.	.	.	.	0.47
Deltamethrin	95.52	151.50	.	.	.	.	.	17.47	.	.	264.49
Garlic Extract	.	30.00	.	.	.	.	.	.	.	.	30.00
Indoxacarb	95.52	.	.	.	.	.	.	.	.	.	95.52
Lambda-cyhalothrin	285.45	643.13	4.50	.	.	3.10	36.60	348.98	4.40	111.13	1,437.29
Oxamyl	.	177.75	.	.	.	.	.	142.35	.	.	320.10
Pirimicarb	.	16.01	3.03	.	.	.	.	3.87	.	.	22.91
Pymetrozine	102.39	.	.	.	.	.	.	.	.	.	102.39
Spirotetramat	113.15	82.06	.	.	.	.	.	6.57	0.90	.	202.67
Thiacloprid	102.39	169.93	.	.	.	.	.	5.60	.	1.87	279.79
All insecticides	**794.89**	**1,457.00**	**7.53**	**.**	**.**	**.**	**.**	**667.18**	**5.30**	**113.00**	**3,084.62**
Molluscicides											
Ferric phosphate	32.84	1.17	.	.	.	.	.	.	.	.	34.01
All molluscicides	**32.84**	**1.17**	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**34.01**
Growth Regulators											
Maleic hydrazide	.	.	.	.	.	.	.	3.73	.	.	3.73
All growth regulators	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**3.73**	**.**	**.**	**3.73**
Seed Treatments											
Cymoxanil/fludioxonil/metalaxyl-m	.	283.36	.	.	.	.	15.47	172.09	3.43	.	474.35
Fludioxonil	10.22	.	.	.	.	.	.	.	.	.	10.22
Metalaxyl-M	73.58	.	.	.	.	15.91	.	.	.	.	89.49
Tefluthrin	.	190.05	.	91.22	42.36	.	.	149.22	.	.	472.86
Thiram	191.80	.	3.28	110.53	3.51	19.93	21.31	.	3.50	80.91	434.79
All seed treatments	**275.61**	**473.41**	**3.28**	**201.75**	**45.88**	**35.84**	**36.78**	**321.32**	**6.93**	**80.91**	**1,481.72**

Table 9: Estimated quantities (kg) of pesticide formulations used on outdoor vegetable crops in Northern Ireland, 2019.

	Crop type										
Pesticide group & active substance	**Brassicas**	**Carrot**	**Celery**	**Leek**	**Onions & Spring Onions**	**Other Vegetables**	**Parsley**	**Parsnip**	**Peas & beans**	**Turnip & Swede**	**Total Quantity (kg)**
Fungicides											
Azoxystrobin	16.09	4.66	.	0.19	0.17	.	1.03	0.48	0.76	.	23.39
Azoxystrobin/difenoconazole	56.63	32.76	10.55	1.56	.	.	16.08	46.87	.	0.61	165.06
Boscalid/pyraclostrobin	16.09	90.48	.	.	.	.	.	1.95	2.03	.	110.55
Chlorothalonil/metalaxyl-m	9.45	.	.	.	.	.	.	.	0.25	.	9.70
Cyprodinil/fludioxonil	.	73.88	.	.	.	.	.	.	.	.	73.88
Difenoconazole	25.91	.	2.08	.	.	.	.	.	.	.	27.99
Dimethomorph/mancozeb	.	2.80	.	11.54	60.46	.	10.81	1.40	.	.	87.01
Fenpropimorph	.	22.50	.	.	.	.	.	.	.	.	22.50
Fluopicolide/propamocarb	20.03	.	22.37	4.13	.	.	24.04	.	.	.	70.56
Isopyrazam	.	30.75	.	.	.	.	.	17.79	.	.	48.54
Mancozeb/metalaxyl-m	.	.	.	.	.	.	1.26	.	.	.	1.26
Metalaxyl-M	.	149.49	.	.	.	.	.	87.82	.	.	237.31
Metconazole	.	.	.	.	.	.	.	.	0.22	.	0.22
Prothioconazole	41.47	60.39	.	25.29	.	.	.	0.85	.	0.36	128.36
Tebuconazole	.	2.00	.	.	.	.	.	1.45	.	.	3.45
Tebuconazole/trifloxystrobin	4.45	8.84	0.68	.	.	.	.	.	.	.	13.97
All fungicides	**190.13**	**478.54**	**35.68**	**42.71**	**60.62**	**.**	**.**	**158.62**	**3.26**	**0.97**	**1,023.75**

Table 9 (cont): **Estimated quantities (kg) of outdoor vegetable crops treated with pesticide formulations in Northern Ireland, 2019.**

Pesticide group & active substance	Brassicas	Carrot	Celery	Leek	Onions & Spring Onions	Other Vegetables	Parsley	Parsnip	Peas & beans	Turnip & Swede	Total Quantity (kg)
Herbicides											
Aclonifen	.	132.97	.	.	.	.	.	132.59	.	.	265.57
Bromoxynil	.	.	.	65.35	26.37	.	.	.	.	.	91.72
Chloridazon	.	.	.	0.29	0.58	.	.	.	.	.	0.88
Chlorpropham	.	.	6.80	49.53	31.08	.	13.60	.	.	.	101.01
Clethodim	3.15	5.67	1.02	7.78	4.66	.	2.04	25.62	.	.	49.94
Clomazone	17.98	22.51	.	.	.	.	.	0.18	.	4.69	45.37
Cycloxydim	.	.	.	.	0.30	.	.	.	.	.	0.30
Desmedipham/ethofumesate/phenmedip	.	.	.	.	.	0.92	.	.	.	.	0.92
Diflufenican	.	3.75	.	.	.	.	.	.	.	.	3.75
Dimethenamid-P/metazachlor	6.80	.	.	56.33	.	.	.	.	.	.	63.13
Dimethenamid-P/pendimethalin	.	.	.	16.68	25.74	.	.	.	.	.	42.42
Diquat	.	0.47	.	.	.	.	.	.	.	.	0.47
Fluroxypyr	.	.	.	24.85	12.82	.	.	.	.	.	37.67
Glyphosate	211.56	249.60	2.53	1.65	2.02	13.35	3.54	204.10	0.97	111.74	801.07
Imazamox/pendimethalin	.	.	.	.	.	.	.	.	7.28	.	7.28
Lenacil	.	.	.	.	.	0.62	.	.	.	.	0.62
Linuron	.	2.17	0.63	.	.	.	1.23	10.57	.	.	14.59
Metamitron	.	.	.	.	.	12.29	.	221.55	.	.	233.84
Metazachlor	231.08	.	.	3.02	.	.	.	.	.	60.69	294.79
Metribuzin	.	84.92	.	.	.	.	.	.	.	.	84.92
Pendimethalin	5.51	362.97	5.80	42.87	28.18	.	11.60	221.95	.	.	678.89
Phenmedipham	.	.	.	.	.	2.19	.	.	.	.	2.19
Propaquizafop	.	0.53	.	.	.	.	.	.	.	.	0.53
Propyzamide	.	.	.	.	.	13.55	.	.	.	.	13.55
Prosulfocarb	.	153.60	90.92	500.76	310.80	.	147.14	181.57	.	.	1,384.79
Pyridate	20.14	.	.	.	.	.	.	.	.	.	20.14
All herbicides	**496.22**	**1,019.17**	**107.70**	**769.11**	**442.56**	**42.93**	**179.15**	**998.15**	**8.25**	**177.12**	**4,240.35**

Table 9 (cont): **Estimated quantities (kg) of outdoor vegetable crops treated with pesticide formulations in Northern Ireland, 2019.**

Pesticide group & active substance	Brassicas	Carrot	Celery	Leek	Onions & Spring Onions	Other Vegetables	Parsley	Parsnip	Peas & beans	Turnip & Swede	Total Quantity (kg)
Insecticides											
Chlorantraniliprole	.	1.36	.	.	.	.	.	.	.	.	1.36
Cyantraniliprole	.	10.93	.	.	.	.	.	10.53	.	.	21.47
Cypermethrin	<0.05	.	.	.	.	.	.	.	.	.	<0.05
Deltamethrin	0.72	1.13	.	.	.	.	.	0.11	.	.	1.96
Garlic Extract	.	270.00	.	.	.	.	.	.	.	.	270.00
Indoxacarb	2.44	.	.	.	.	.	.	.	.	.	2.44
Lambda-cyhalothrin	2.45	7.15	<0.05	.	.	<0.05	0.29	5.09	<0.05	0.56	15.66
Oxamyl	.	355.50	.	.	.	.	.	284.70	.	.	640.20
Pirimicarb	.	2.24	0.42	.	.	.	.	0.54	.	.	3.21
Pymetrozine	20.48	.	.	.	.	.	.	.	.	.	20.48
Spirotetramat	8.38	4.97	.	.	.	.	.	0.40	0.05	.	13.81
Thiacloprid	9.83	16.31	.	.	.	.	.	0.53	.	0.18	26.85
All insecticides	**44.29**	**669.60**	**0.42**	**.**	**.**	**.**	**.**	**301.90**	**0.05**	**0.74**	**1,017.42**
Molluscicides											
Ferric phosphate	6.90	0.28	.	.	.	.	.	.	.	.	7.17
All molluscicides	**6.90**	**0.28**	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**7.17**
Growth Regulators											
Maleic hydrazide	.	.	.	.	.	.	.	14.00	.	.	14.00
All growth regulators	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**14.00**	**.**	**.**	**14.00**
Seed Treatments											
Cymoxanil/fludioxonil/metalaxyl-m	.	0.44	.	.	.	.	<0.05	0.07	0.06	.	0.57
Fludioxonil	<0.05	.	.	.	.	.	.	.	.	.	<0.05
Metalaxyl-M	<0.05	.	.	.	.	<0.05	.	.	.	.	<0.05
Tefluthrin	.	9.11	.	0.40	0.06	.	.	1.93	.	.	11.49
Thiram	0.06	.	<0.05	0.08	<0.05	0.12	<0.05	.	0.22	0.06	0.56
All seed treatments	**0.07**	**9.54**	**0.05**	**0.48**	**0.07**	**0.14**	**0.05**	**2.00**	**0.28**	**0.06**	**12.62**

Table 10 **The forty active ingredients most extensively used on vegetable crops in Northern Ireland, 2019 ranked by treated area (spha).**

No.	Active substance	Treated area (spha)
1	Lambda-cyhalothrin	1,470
2	Difenoconazole	796
3	Glyphosate	712
4	Prothioconazole	670
5	Metalaxyl-M	410
6	Isopyrazam	388
7	Bromoxynil	379
8	Clethodim	342
9	Boscalid	333
10	Oxamyl	320
11	Aclonifen	294
12	Cyantraniliprole	290
13	Metribuzin	289
14	Thiacloprid	280
15	Deltamethrin	264
16	Chlorpropham	253
17	Metamitron	174
18	Cyprodinil	148
19	Pymetrozine	102
20	Indoxacarb	96
21	Fluopicolide	79
22	Propamocarb hydrochloride	79
23	Tebuconazole	76
24	Mancozeb	74
25	Dimethomorph	72
26	Chlorantraniliprole	39
27	Garlic Extract	30
28	Fenpropimorph	30
29	Diflufenican	30
30	Pyridate	27
31	Pirimicarb	23
32	Propyzamide	20
33	Phenmedipham	13
34	Imazamox	6
35	Propaquizafop	4
36	Metconazole	3
37	Chloridazon	3
38	Desmedipham	2
39	Ethofumesate	2
40	Diquat	1

Table 11 **The forty active ingredients most extensively used on vegetable crops in Northern Ireland, 2019 ranked by weight (kg).**

No.	Active substance	Quantity applied (kg)
1	Glyphosate	801
2	Oxamyl	640
3	Garlic Extract	270
4	Aclonifen	266
5	Metalaxyl-M	238
6	Metamitron	234
7	Prothioconazole	128
8	Chlorpropham	101
9	Bromoxynil	92
10	Difenoconazole	91
11	Boscalid	88
12	Metribuzin	85
13	Mancozeb	79
14	Propamocarb hydrochloride	64
15	Clethodim	50
16	Isopyrazam	49
17	Cyprodinil	44
18	Thiacloprid	27
19	Fenpropimorph	23
20	Cyantraniliprole	21
21	Pymetrozine	20
22	Pyridate	20
23	Lambda-cyhalothrin	16
24	Propyzamide	14
25	Tebuconazole	13
26	Tefluthrin	11
27	Dimethomorph	9
28	Fluopicolide	6
29	Diflufenican	4
30	Pirimicarb	3
31	Phenmedipham	3
32	Indoxacarb	2
33	Deltamethrin	2
34	Chlorantraniliprole	1
35	Chloridazon	1
36	Thiram	1
37	Propaquizafop	1
38	Ethofumesate	1
39	Diquat	<1
40	Imazamox	<1

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

	Reasons for treatment								
Pesticide group and active substance	**Aphids**	**General Fungal Control**	**General Insect Control**	**General Weed Control**	**Ground Preparation**	**Seed Treatment**	**Total treated area (spha)**	**Basic treated area (ha)**	**Quantity applied (kg)**
Fungicides									
Boscalid/pyraclostrobin	.	3.03	.	.	.	.	3.03	3.03	1.01
Metconazole	.	3.03	.	.	.	.	3.03	3.03	0.22
All fungicides	**.**	**6.07**	**.**	**.**	**.**	**.**	**6.07**	**.**	**1.23**
Herbicides									
Glyphosate	.	.	.	.	0.61	.	0.61	0.61	0.73
Imazamox/pendimethalin	.	.	.	3.03	.	.	3.03	3.03	3.64
All herbicides	**.**	**.**	**.**	**3.03**	**0.61**	**.**	**3.65**	**.**	**4.38**
Insecticides									
Lambda-cyhalothrin	1.13	.	3.03	.	.	.	4.17	3.72	<0.05
Spirotetramat	0.90	.	.	.	.	.	0.90	0.45	0.05
All insecticides	**2.03**	**.**	**3.03**	**.**	**.**	**.**	**5.07**	**.**	**0.09**
Seed treatments									
Thiram	.	.	.	.	.	3.50	3.50	3.50	0.22
All seed treatments	**.**	**.**	**.**	**.**	**.**	**3.50**	**3.50**	**.**	**0.22**

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

	Reasons for treatment							
Pesticide group and active substance	**Aphids**	**General Weed Control**	**Ground Preparation**	**Sealer**	**Seed Treatment**	**Total treated area (spha)**	**Basic treated area (ha)**	**Quantity applied (kg)**
Herbicides								
Desmedipham/ethofumesate/phenmedipham	.	1.80	.	.	.	1.80	1.80	0.92
Glyphosate	.	.	1.80	.	.	1.80	1.80	2.02
Lenacil	.	.	.	3.10	.	3.10	3.10	0.62
Metamitron	.	10.93	.	.	.	10.93	10.93	12.29
Phenmedipham	.	10.93	.	.	.	10.93	10.93	2.19
All herbicides	**.**	**23.65**	**1.80**	**3.10**	**.**	**28.55**	**.**	**18.04**
Insecticides								
Lambda-cyhalothrin	3.10	.	.	.	.	3.10	3.10	<0.05
All insecticides	**3.10**	**.**	**.**	**.**	**.**	**3.10**	**.**	**<0.05**
Seed treatments								
Metalaxyl-M	.	.	.	.	15.91	15.91	15.91	<0.05
All seed treatments	**.**	**.**	**.**	**.**	**15.91**	**15.91**	**.**	**<0.05**

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

	Reasons for treatment											
Pesticide group and active substance	**Aphids**	**Caterpillars**	**General Fungal Control**	**General Insect Control**	**General Weed Control**	**Ground Preparation**	**Sealer**	**Seed Treatment**	**Slugs**	**Total treated area (spha)**	**Basic treated area (ha)**	**Quantity applied (kg)**
Fungicides												
Azoxystrobin/difenoconazole	.	.	12.05	.	.	.	.	.	.	12.05	12.05	3.92
Fluopicolide/propamocarb hydrochloride	.	.	4.55	.	.	.	.	.	.	4.55	4.55	5.01
Prothioconazole	.	.	13.81	.	.	.	.	.	.	13.81	13.81	2.65
All fungicides	**.**	**.**	**30.41**	**.**	**.**	**.**	**.**	**.**	**.**	**30.41**	**.**	**11.58**
Herbicides												
Clethodim	.	.	.	.	7.50	.	.	.	.	7.50	7.50	0.90
Clomazone	.	.	.	.	9.55	.	7.50	.	.	17.05	17.05	0.95
Glyphosate	.	.	.	.	.	1.10	.	.	.	1.10	1.10	1.27
Metazachlor	.	.	.	.	19.77	.	9.05	.	.	28.83	28.83	21.11
Pendimethalin	.	.	.	.	.	.	0.90	.	.	0.90	0.90	1.02
Pyridate	.	.	.	.	8.44	.	.	.	.	8.44	8.44	5.85
All herbicides	**.**	**.**	**.**	**.**	**45.27**	**1.10**	**17.45**	**.**	**.**	**63.82**	**.**	**31.10**
Insecticides												
Lambda-cyhalothrin	1.80	9.05	.	.	.	.	.	.	.	10.85	9.95	0.12
Spirotetramat	10.85	.	.	4.55	.	.	.	.	.	15.40	14.50	1.13
All insecticides	**12.65**	**9.05**	**.**	**4.55**	**.**	**.**	**.**	**.**	**.**	**26.25**	**.**	**1.25**
Molluscicides												
Ferric phosphate	.	.	.	.	.	.	.	.	1.55	1.55	1.55	0.32
All molluscicides	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**1.55**	**1.55**	**.**	**0.32**
Seed treatments												
Fludioxonil	.	.	.	.	.	.	.	10.22	.	10.22	10.22	<0.05
Metalaxyl-M	.	.	.	.	.	.	.	29.03	.	29.03	29.03	<0.05
All seed treatments	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**39.25**	**.**	**39.25**	**.**	**<0.05**

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

	Reasons for treatment											
Pesticide group and active substance	**Altenaria**	**Aphids**	**Blackspot**	**General Disease Control**	**General Fungal Control**	**General Weed Control**	**Ground Preparation**	**Ringspot**	**Sealer**	**Total treated area (spha)**	**Basic treated area (ha)**	**Quantity applied (kg)**
Fungicides												
Azoxystrobin	.	.	.	0.94	10.07	.	.	.	.	11.01	9.85	2.75
Azoxystrobin/difenoconazole	.	.	.	.	16.93	.	.	.	.	16.93	16.93	5.50
Boscalid/pyraclostrobin	.	.	.	.	1.17	.	.	.	.	1.17	1.17	0.14
Difenoconazole	10.93	.	15.51	0.94	31.92	.	.	.	.	59.30	25.94	5.95
Prothioconazole	.	.	.	.	14.36	.	.	10.93	.	25.28	19.85	4.74
Tebuconazole/trifloxystrobin	.	.	.	.	2.33	.	.	.	.	2.33	1.17	0.63
All fungicides	**10.93**	**.**	**15.51**	**1.89**	**76.77**	**.**	**.**	**10.93**	**.**	**116.03**	**.**	**19.72**
Herbicides												
Clethodim	.	.	.	.	.	6.00	.	.	.	6.00	6.00	0.72
Clomazone	.	.	.	.	.	21.85	.	.	7.17	29.02	18.09	2.27
Glyphosate	.	.	.	.	.	.	24.03	.	.	24.03	24.03	43.17
Metazachlor	.	.	.	.	.	21.85	.	.	21.62	43.48	32.55	32.61
Pendimethalin	.	.	.	.	.	.	.	.	0.94	0.94	0.94	1.42
All herbicides	**.**	**.**	**.**	**.**	**.**	**49.71**	**24.03**	**.**	**29.74**	**103.48**	**.**	**80.18**

Table 15 (contd): **Brussels sprouts pesticide-treated area (spha), basic treated area (ha), quantity applied (kg) and reasons for use.**

	Reasons for treatment								
Pesticide group and active substance	**Aphids**	**Caterpillars**	**Diamondback Moth**	**General Insect Control**	**Seed Treatment**	**Slugs**	**Total treated area (spha)**	**Basic treated area (ha)**	**Quantity applied (kg)**
Insecticides									
Cypermethrin	.	.	0.47	.	.	.	0.47	0.47	<0.05
Lambda-cyhalothrin	31.69	7.55	.	0.94	.	.	40.19	25.76	0.36
Pymetrozine	10.93	.	.	.	.	.	10.93	10.93	2.19
Spirotetramat	13.19	.	.	.	.	.	13.19	13.19	0.99
Thiacloprid	10.93	.	.	.	.	.	10.93	10.93	1.05
All insecticides	**66.74**	**7.55**	**0.47**	**0.94**	**.**	**.**	**75.70**	**.**	**4.60**
Molluscicides									
Ferric phosphate	.	.	.	.	.	3.89	3.89	2.72	0.88
All molluscicides	**.**	**.**	**.**	**.**	**.**	**3.89**	**3.89**	**.**	**0.88**
Seed treatments									
Metalaxyl-M	.	.	.	.	33.22	.	33.22	33.22	<0.05
All seed treatments	**.**	**.**	**.**	**.**	**33.22**	**.**	**33.22**	**.**	**<0.05**

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

	Reasons for treatment							
Pesticide group and active substance	**General Disease Control**	**General Fungal Control**	**General Weed Control**	**Ground Preparation**	**Sealer**	**Total treated area (spha)**	**Basic treated area (ha)**	**Quantity applied (kg)**
Fungicides								
Azoxystrobin	.	11.94	.	.	.	11.94	11.94	2.99
Azoxystrobin/difenoconazole	1.55	11.94	.	.	.	13.49	12.72	4.38
Boscalid/pyraclostrobin	.	11.94	.	.	.	11.94	11.94	3.99
Difenoconazole	1.55	.	.	.	.	1.55	0.78	0.12
Prothioconazole	.	35.46	.	.	.	35.46	23.52	6.81
All fungicides	**3.10**	**71.28**	**.**	**.**	**.**	**74.38**	**.**	**18.28**
Herbicides								
Clomazone	.	.	11.94	.	.	11.94	11.94	1.07
Glyphosate	.	.	6.00	0.98	.	6.98	6.98	4.39
Metazachlor	.	.	11.94	.	12.15	24.09	24.09	18.07
All herbicides	**.**	**.**	**29.88**	**0.98**	**12.15**	**43.01**	**.**	**23.53**

Table 16 (contd): **Cabbage (chinese) pesticide-treated area (spha), basic treated area (ha), quantity applied (kg) and reasons for use.**

	Reasons for treatment									
Pesticide group and active substance	**Aphids**	**Carrot Fly**	**Caterpillars**	**Caterpillars and Aphids**	**Diamondback Moth**	**Seed Treatment**	**Slugs**	**Total treated area (spha)**	**Basic treated area (ha)**	**Quantity applied (kg)**
Insecticides										
Deltamethrin	.	.	.	23.88	.	.	.	23.88	11.94	0.18
Indoxacarb	.	.	.	.	23.88	.	.	23.88	11.94	0.61
Lambda-cyhalothrin	.	11.94	11.38	.	.	.	.	23.32	23.32	0.17
Pymetrozine	11.94	.	.	.	.	.	.	11.94	11.94	2.39
Spirotetramat	11.38	.	.	.	.	.	.	11.38	11.38	0.85
Thiacloprid	11.94	.	.	.	.	.	.	11.94	11.94	1.15
All insecticides	**35.26**	**11.94**	**11.38**	**23.88**	**23.88**	**.**	**.**	**106.34**	**.**	**5.35**
Molluscicides										
Ferric phosphate	.	.	.	.	.	.	11.38	11.38	11.38	2.37
All molluscicides	**.**	**.**	**.**	**.**	**.**	**.**	**11.38**	**11.38**	**.**	**2.37**
Seed treatments										
Thiram	.	.	.	.	.	24.30	.	24.30	24.30	<0.05
All seed treatments	**.**	**.**	**.**	**.**	**.**	**24.30**	**.**	**24.30**	**.**	**<0.05**

Table 17: **Cabbage (hard) pesticide-treated area (spha), basic treated area (ha), quantity applied (kg) and reasons for use.**

	Reasons for treatment					
Pesticide group and active substance	**Aphids**	**Ground Preparation**	**Sealer**	**Total treated area (spha)**	**Basic treated area (ha)**	**Quantity applied (kg)**
Herbicides						
Glyphosate	.	0.90	.	0.90	0.90	1.00
Pendimethalin	.	.	0.90	0.90	0.90	1.02
All herbicides	**.**	**0.90**	**0.90**	**1.80**	**.**	**2.02**
Insecticides						
Lambda-cyhalothrin	1.80	.	.	1.80	0.90	<0.05
Spirotetramat	1.80	.	.	1.80	0.90	0.11
All insecticides	**3.60**	**.**	**.**	**3.60**	**.**	**0.13**

Table 18: **Cabbage (red) pesticide-treated area (spha), basic treated area (ha), quantity applied (kg) and reasons for use.**

	Reasons for treatment									
Pesticide group and active substance	**Aphids**	**Carrot Fly**	**Caterpillars and Aphids**	**Diamondback Moth**	**General Fungal Control**	**General Weed Control**	**Seed Treatment**	**Total treated area (spha)**	**Basic treated area (ha)**	**Quantity applied (kg)**
Fungicides										
Azoxystrobin	.	.	.	.	11.94	.	.	11.94	11.94	2.99
Azoxystrobin/difenoconazole	.	.	.	.	11.94	.	.	11.94	11.94	3.88
Boscalid/pyraclostrobin	.	.	.	.	11.94	.	.	11.94	11.94	3.99
Prothioconazole	.	.	.	.	23.88	.	.	23.88	11.94	4.58
All fungicides	**.**	**.**	**.**	**.**	**59.70**	**.**	**.**	**59.70**	**.**	**15.44**
Herbicides										
Clomazone	.	.	.	.	.	11.94	.	11.94	11.94	1.07
Glyphosate	.	.	.	.	.	6.00	.	6.00	6.00	3.24
Metazachlor	.	.	.	.	.	11.94	.	11.94	11.94	8.95
All herbicides	**.**	**.**	**.**	**.**	**.**	**29.88**	**.**	**29.88**	**.**	**13.27**
Insecticides										
Deltamethrin	.	.	23.88	.	.	.	.	23.88	11.94	0.18
Indoxacarb	.	.	.	23.88	.	.	.	23.88	11.94	0.61
Lambda-cyhalothrin	.	11.94	.	.	.	.	.	11.94	11.94	0.06
Pymetrozine	11.94	.	.	.	.	.	.	11.94	11.94	2.39
Thiacloprid	11.94	.	.	.	.	.	.	11.94	11.94	1.15
All insecticides	**23.88**	**11.94**	**23.88**	**23.88**	**.**	**.**	**.**	**83.58**	**.**	**4.38**
Seed treatments										
Thiram	.	.	.	.	.	.	11.94	11.94	11.94	<0.05
All seed treatments	**.**	**.**	**.**	**.**	**.**	**.**	**11.94**	**11.94**	**.**	**<0.05**

Table 19: **Cabbage (savoy) pesticide-treated area (spha), basic treated area (ha), quantity applied (kg) and reasons for use.**

Pesticide group and active substance	Blackspot	General Disease Control	General Fungal Control	General Weed Control	Ground Preparation	Ringspot	Sealer	Total treated area (spha)	Basic treated area (ha)	Quantity applied (kg)
Fungicides										
Azoxystrobin	.	.	13.39	.	.	.	.	13.39	13.39	3.35
Azoxystrobin/difenoconazole	.	9.31	33.13	.	.	.	.	42.44	37.79	13.79
Boscalid/pyraclostrobin	.	.	11.94	.	.	.	.	11.94	11.94	3.99
Chlorothalonil/metalaxyl-m	.	4.65	.	.	.	.	.	4.65	4.65	5.00
Difenoconazole	68.26	9.31	25.73	.	.	.	.	103.30	41.00	9.55
Fluopicolide/propamocarb hydrochloride	.	.	4.55	.	.	.	.	4.55	4.55	5.01
Prothioconazole	.	.	41.41	.	.	12.14	.	53.55	41.61	10.28
All fungicides	**68.26**	**23.27**	**130.16**	**.**	**.**	**12.14**	**.**	**233.83**	**.**	**50.97**
Herbicides										
Clethodim	.	.	.	4.50	.	.	.	4.50	4.50	0.54
Clomazone	.	.	.	46.33	.	.	4.50	50.83	38.69	4.13
Glyphosate	.	.	.	6.00	42.10	.	.	48.10	48.10	75.17
Metazachlor	.	.	.	46.33	.	.	41.63	87.96	75.82	65.97
Pendimethalin	.	.	.	.	.	.	0.90	0.90	0.90	1.02
Pyridate	.	.	.	9.00	.	.	.	9.00	9.00	6.10
All herbicides	**.**	**.**	**.**	**112.15**	**42.10**	**.**	**47.03**	**201.29**	**.**	**152.94**

Table 19 (contd): **Cabbage (savoy) pesticide-treated area (spha), basic treated area (ha), quantity applied (kg) and reasons for use.**

	Reasons for treatment										
Pesticide group and active substance	**Aphids**	**Carrot Fly**	**Caterpillars**	**Caterpillars and Aphids**	**Diamondback Moth**	**General Insect Control**	**Seed Treatment**	**Slugs**	**Total treated area (spha)**	**Basic treated area (ha)**	**Quantity applied (kg)**
Insecticides											
Deltamethrin	.	.	.	23.88	.	.	.	.	23.88	11.94	0.18
Indoxacarb	.	.	.	.	23.88	.	.	.	23.88	11.94	0.61
Lambda-cyhalothrin	48.83	11.94	24.91	.	.	.	.	.	85.69	60.51	0.66
Pymetrozine	24.08	.	.	.	.	.	.	.	24.08	24.08	4.82
Spirotetramat	37.33	.	.	.	.	4.55	.	.	41.88	40.98	3.11
Thiacloprid	24.08	.	.	.	.	.	.	.	24.08	24.08	2.31
All insecticides	**134.32**	**11.94**	**24.91**	**23.88**	**23.88**	**4.55**	**.**	**.**	**223.49**	**.**	**11.69**
Molluscicides											
Ferric phosphate	.	.	.	.	.	.	.	8.27	8.27	8.27	1.72
All molluscicides	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**8.27**	**8.27**	**.**	**1.72**
Seed treatments											
Metalaxyl-M	.	.	.	.	.	.	2.22	.	2.22	2.22	<0.05
Thiram	.	.	.	.	.	.	73.80	.	73.80	73.80	<0.05
All seed treatments	**.**	**.**	**.**	**.**	**.**	**.**	**76.02**	**.**	**76.02**	**.**	**<0.05**

Table 20: **Cabbage (spring) pesticide-treated area (spha), basic treated area (ha), quantity applied (kg) and reasons for use.**

	Reasons for treatment					
Pesticide group and active substance	**Aphids**	**Ground Preparation**	**Sealer**	**Total treated area (spha)**	**Basic treated area (ha)**	**Quantity applied (kg)**
Herbicides						
Glyphosate	.	0.90	.	0.90	0.90	1.00
Pendimethalin	.	.	0.90	0.90	0.90	1.02
All herbicides	**.**	**0.90**	**0.90**	**1.80**	**.**	**2.02**
Insecticides						
Lambda-cyhalothrin	1.80	.	.	1.80	0.90	<0.05
Spirotetramat	1.80	.	.	1.80	0.90	0.11
All insecticides	**3.60**	**.**	**.**	**3.60**	**.**	**0.13**

Table 21: **Cabbage (summer) pesticide-treated area (spha), basic treated area (ha), quantity applied (kg) and reasons for use.**

	Reasons for treatment										
Pesticide group and active substance	**Aphids**	**Caterpillars**	**General Fungal Control**	**General Weed Control**	**Ground Preparation**	**Sealer**	**Seed Treatment**	**Slugs**	**Total treated area (spha)**	**Basic treated area (ha)**	**Quantity applied (kg)**
Fungicides											
Azoxystrobin/difenoconazole	.	.	7.28	.	.	.	.	.	7.28	7.28	2.37
Difenoconazole	.	.	14.57	.	.	.	.	.	14.57	7.28	1.82
Prothioconazole	.	.	4.65	.	.	.	.	.	4.65	4.65	0.89
All fungicides	**.**	**.**	**26.51**	**.**	**.**	**.**	**.**	**.**	**26.51**	**.**	**5.08**
Herbicides											
Clomazone	.	.	.	14.57	.	.	.	.	14.57	7.28	1.31
Glyphosate	.	.	.	.	7.28	.	.	.	7.28	7.28	13.11
Metazachlor	.	.	.	14.57	.	4.65	.	.	19.22	11.94	14.42
All herbicides	**.**	**.**	**.**	**29.14**	**7.28**	**4.65**	**.**	**.**	**41.08**	**.**	**28.84**
Insecticides											
Lambda-cyhalothrin	14.57	4.65	.	.	.	.	.	.	19.22	11.94	0.19
Pymetrozine	7.28	.	.	.	.	.	.	.	7.28	7.28	1.46
Spirotetramat	4.65	.	.	.	.	.	.	.	4.65	4.65	0.35
Thiacloprid	7.28	.	.	.	.	.	.	.	7.28	7.28	0.70
All insecticides	**33.79**	**4.65**	**.**	**.**	**.**	**.**	**.**	**.**	**38.44**	**.**	**2.70**
Molluscicides											
Ferric phosphate	.	.	.	.	.	.	.	4.65	4.65	4.65	0.97
All molluscicides	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**4.65**	**4.65**	**.**	**0.97**
Seed treatments											
Thiram	.	.	.	.	.	.	11.94	.	11.94	11.94	<0.05
All seed treatments	**.**	**.**	**.**	**.**	**.**	**.**	**11.94**	**.**	**11.94**	**.**	**<0.05**

Table 22: **Cabbage (white) pesticide-treated area (spha), basic treated area (ha), quantity applied (kg) and reasons for use.**

Pesticide group and active substance	Blackspot	General Fungal Control	General Weed Control	Ground Preparation	Sealer	Total treated area (spha)	Basic treated area (ha)	Quantity applied (kg)
Fungicides								
Azoxystrobin	.	16.09	.	.	.	16.09	16.09	4.02
Azoxystrobin/difenoconazole	.	18.74	.	.	.	18.74	18.74	6.09
Boscalid/pyraclostrobin	.	11.94	.	.	.	11.94	11.94	3.99
Difenoconazole	7.76	4.15	.	.	.	11.91	6.74	1.16
Fluopicolide/propamocarb hydrochloride	.	4.55	.	.	.	4.55	4.55	5.01
Prothioconazole	.	30.68	.	.	.	30.68	18.74	5.89
Tebuconazole/trifloxystrobin	.	17.00	.	.	.	17.00	8.50	3.82
All fungicides	**7.76**	**103.16**	**.**	**.**	**.**	**110.91**	**.**	**29.98**
Herbicides								
Clethodim	.	.	2.25	.	.	2.25	2.25	0.27
Clomazone	.	.	24.99	.	2.25	27.24	27.24	2.18
Dimethenamid-P/metazachlor	.	.	8.50	.	.	8.50	8.50	6.80
Glyphosate	.	.	6.00	6.74	.	12.74	12.74	15.37
Metazachlor	.	.	16.49	.	6.29	22.78	22.78	17.09
Pyridate	.	.	4.55	.	.	4.55	4.55	4.10
All herbicides	**.**	**.**	**62.79**	**6.74**	**8.54**	**78.06**	**.**	**45.80**

Table 22 (contd): **Cabbage (white) pesticide-treated area (spha), basic treated area (ha), quantity applied (kg) and reasons for use.**

	Reasons for treatment									
Pesticide group and active substance	**Aphids**	**Carrot Fly**	**Caterpillars**	**Caterpillars and Aphids**	**Diamondback Moth**	**General Insect Control**	**Seed Treatment**	**Total treated area (spha)**	**Basic treated area (ha)**	**Quantity applied (kg)**
Insecticides										
Deltamethrin	.	.	.	23.88	.	.	.	23.88	11.94	0.18
Indoxacarb	.	.	.	.	23.88	.	.	23.88	11.94	0.61
Lambda-cyhalothrin	3.62	11.94	2.25	.	.	.	.	17.81	17.81	0.10
Pymetrozine	11.94	.	.	.	.	.	.	11.94	11.94	2.39
Spirotetramat	4.84	.	.	.	.	4.55	.	9.39	9.39	0.70
Thiacloprid	11.94	.	.	.	.	.	.	11.94	11.94	1.15
All insecticides	**32.34**	**11.94**	**2.25**	**23.88**	**23.88**	**4.55**	**.**	**98.84**	**.**	**5.13**
Seed treatments										
Thiram	.	.	.	.	.	.	32.32	32.32	32.32	<0.05
All seed treatments	**.**	**.**	**.**	**.**	**.**	**.**	**32.32**	**32.32**	**.**	**<0.05**

Table 23: **Cabbage (winter) pesticide-treated area (spha), basic treated area (ha), quantity applied (kg) and reasons for use.**

	Reasons for treatment									
Pesticide group and active substance	**Aphids**	**Caterpillars**	**General Fungal Control**	**General Weed Control**	**Ground Preparation**	**Ringspot**	**Seed Treatment**	**Total treated area (spha)**	**Basic treated area (ha)**	**Quantity applied (kg)**
Fungicides										
Azoxystrobin/difenoconazole	.	.	15.18	.	.	.	.	15.18	15.18	4.93
Difenoconazole	.	.	30.35	.	.	.	.	30.35	15.18	3.79
Prothioconazole	.	.	0.20	.	.	15.18	.	15.38	15.38	2.95
All fungicides	**.**	**.**	**45.73**	**.**	**.**	**15.18**	**.**	**60.90**	**.**	**11.68**
Herbicides										
Clomazone	.	.	.	30.35	.	.	.	30.35	15.18	2.73
Glyphosate	.	.	.	.	15.38	.	.	15.38	15.38	27.59
Metazachlor	.	.	.	30.35	.	.	.	30.35	15.18	22.76
All herbicides	**.**	**.**	**.**	**60.70**	**15.38**	**.**	**.**	**76.08**	**.**	**53.08**
Insecticides										
Lambda-cyhalothrin	30.35	15.18	.	.	.	.	.	45.53	15.18	0.46
Pymetrozine	15.18	.	.	.	.	.	.	15.18	15.18	3.04
Thiacloprid	15.18	.	.	.	.	.	.	15.18	15.18	1.46
All insecticides	**60.70**	**15.18**	**.**	**.**	**.**	**.**	**.**	**75.88**	**.**	**4.95**
Seed treatments										
Thiram	.	.	.	.	.	.	15.38	15.38	15.38	<0.05
All seed treatments	**.**	**.**	**.**	**.**	**.**	**.**	**15.38**	**15.38**	**.**	**<0.05**

Table 24: **Calabrese pesticide-treated area (spha), basic treated area (ha), quantity applied (kg) and reasons for use.**

	Reasons for treatment							
Pesticide group and active substance	**Aphids**	**General Fungal Control**	**General Weed Control**	**Ground Preparation**	**Seed Treatment**	**Total treated area (spha)**	**Basic treated area (ha)**	**Quantity applied (kg)**
Fungicides								
Azoxystrobin/difenoconazole	.	9.11	.	.	.	9.11	9.11	2.96
Difenoconazole	.	18.21	.	.	.	18.21	9.11	2.28
All fungicides	**.**	**27.32**	**.**	**.**	**.**	**27.32**	**.**	**5.24**
Herbicides								
Clomazone	.	.	18.21	.	.	18.21	9.11	1.64
Glyphosate	.	.	.	9.11	.	9.11	9.11	16.39
Metazachlor	.	.	18.21	.	.	18.21	9.11	13.66
All herbicides	**.**	**.**	**36.42**	**9.11**	**.**	**45.53**	**.**	**31.69**
Insecticides								
Lambda-cyhalothrin	18.21	.	.	.	.	18.21	9.11	0.18
Pymetrozine	9.11	.	.	.	.	9.11	9.11	1.82
Thiacloprid	9.11	.	.	.	.	9.11	9.11	0.87
All insecticides	**36.42**	**.**	**.**	**.**	**.**	**36.42**	**.**	**2.88**
Seed treatments								
Metalaxyl-M	.	.	.	.	9.11	9.11	9.11	<0.05
All seed treatments	**.**	**.**	**.**	**.**	**9.11**	**9.11**	**.**	**<0.05**

Table 25: **Carrots pesticide-treated area (spha), basic treated area (ha), quantity applied (kg) and reasons for use.**

	Reasons for treatment										
Pesticide group and active substance	**Cavity Spot**	**Crown Rot**	**General Disease Control**	**General Fungal Control**	**General Weed Control**	**Ground Preparation**	**Pre-emergence weed control**	**Sealer**	**Total treated area (spha)**	**Basic treated area (ha)**	**Quantity applied (kg)**
Fungicides											
Azoxystrobin	.	.	.	18.65	.	.	.	.	18.65	18.65	4.66
Azoxystrobin/difenoconazole	.	.	.	100.80	.	.	.	.	100.80	74.09	32.76
Boscalid/pyraclostrobin	.	.	22.75	248.16	.	.	.	.	270.91	245.83	90.48
Cyprodinil/fludioxonil	.	.	.	147.75	.	.	.	.	147.75	147.75	73.88
Dimethomorph/mancozeb	.	1.89	.	.	.	.	.	.	1.89	0.47	2.80
Fenpropimorph	.	.	.	30.00	.	.	.	.	30.00	30.00	22.50
Isopyrazam	.	.	22.75	223.23	.	.	.	.	245.98	245.98	30.75
Metalaxyl-M	147.75	.	22.75	81.93	.	.	.	.	252.43	252.43	149.49
Prothioconazole	.	.	22.75	292.37	.	.	.	.	315.12	259.21	60.39
Tebuconazole	.	.	.	8.00	.	.	.	.	8.00	8.00	2.00
Tebuconazole/trifloxystrobin	.	.	.	40.05	.	.	.	.	40.05	40.05	8.84
All fungicides	**147.75**	**1.89**	**91.01**	**1,190.93**	**.**	**.**	**.**	**.**	**1,431.58**	**.**	**478.54**
Herbicides											
Aclonifen	.	.	.	.	.	.	147.75	.	147.75	147.75	132.97
Clethodim	.	.	.	.	43.80	.	.	.	43.80	43.80	5.67
Clomazone	.	.	.	.	20.53	.	253.43	.	273.95	273.95	22.51
Diflufenican	.	.	.	.	.	.	30.00	.	30.00	30.00	3.75
Diquat	.	.	.	.	.	.	1.17	.	1.17	1.17	0.47
Glyphosate	.	.	.	.	221.64	27.46	.	.	249.10	175.21	249.60
Linuron	.	.	.	.	0.47	.	.	6.20	6.68	6.68	2.17
Metribuzin	.	.	.	.	141.63	.	147.75	.	289.38	257.63	84.92
Pendimethalin	.	.	.	.	15.13	.	259.28	7.10	281.51	281.51	362.97
Propaquizafop	.	.	.	.	3.56	.	.	.	3.56	3.56	0.53
Prosulfocarb	.	.	.	.	41.94	.	.	.	41.94	39.72	153.60
All herbicides	**.**	**.**	**.**	**.**	**488.70**	**27.46**	**839.37**	**13.31**	**1,368.84**	**.**	**1,019.17**

Table 25 (contd): **Carrots pesticide-treated area (spha), basic treated area (ha), quantity applied (kg) and reasons for use.**

	Reasons for treatment									
Pesticide group and active substance	**Aphids**	**Carrot Fly**	**Carrot fly & willow aphids**	**General Insect Control**	**Nematodes**	**Seed Treatment**	**Slugs**	**Total treated area (spha)**	**Basic treated area (ha)**	**Quantity applied (kg)**
Insecticides										
Chlorantraniliprole	.	.	.	38.88	.	.	.	38.88	38.88	1.36
Cyantraniliprole	.	147.75	.	.	.	.	.	147.75	147.75	10.93
Deltamethrin	.	.	.	151.50	.	.	.	151.50	89.34	1.13
Garlic Extract	.	.	.	30.00	.	.	.	30.00	30.00	270.00
Lambda-cyhalothrin	17.97	368.89	.	256.26	.	.	.	643.13	275.16	7.15
Oxamyl	.	.	.	30.00	147.75	.	.	177.75	177.75	355.50
Pirimicarb	16.01	.	.	.	.	.	.	16.01	8.00	2.24
Spirotetramat	2.27	.	22.75	57.03	.	.	.	82.06	78.93	4.97
Thiacloprid	.	.	24.39	145.55	.	.	.	169.93	112.09	16.31
All insecticides	**36.25**	**516.64**	**47.14**	**709.22**	**147.75**	**.**	**.**	**1,457.00**	**.**	**669.60**
Molluscicides										
Ferric phosphate	.	.	.	.	.	.	1.17	1.17	1.17	0.28
All molluscicides	**.**	**.**	**.**	**.**	**.**	**.**	**1.17**	**1.17**	**.**	**0.28**
Seed treatments										
Cymoxanil/fludioxonil/metalaxyl-m	.	.	.	.	.	283.36	.	283.36	283.36	0.44
Tefluthrin	.	.	.	.	.	190.05	.	190.05	190.05	9.11
All seed treatments	**.**	**.**	**.**	**.**	**.**	**473.41**	**.**	**473.41**	**.**	**9.54**

Table 26: **Caulifower (autumn) pesticide-treated area (spha), basic treated area (ha), quantity applied (kg) and reasons for use.**

	Reasons for treatment											
Pesticide group and active substance	**Aphids**	**Caterpillars**	**General Disease Control**	**General Fungal Control**	**General Weed Control**	**Ground Preparation**	**Sealer**	**Seed Treatment**	**Slugs**	**Total treated area (spha)**	**Basic treated area (ha)**	**Quantity applied (kg)**
Fungicides												
Azoxystrobin/difenoconazole	.	.	8.28	6.00	.	.	.	.	.	14.28	10.14	4.64
Difenoconazole	.	.	8.28	.	.	.	.	.	.	8.28	4.14	0.62
Prothioconazole	.	.	.	7.55	.	.	.	.	.	7.55	7.55	1.45
All fungicides	**.**	**.**	**16.55**	**13.55**	**.**	**.**	**.**	**.**	**.**	**30.10**	**.**	**6.71**
Herbicides												
Clethodim	.	.	.	.	6.00	.	.	.	.	6.00	6.00	0.72
Clomazone	.	.	.	.	.	.	6.00	.	.	6.00	6.00	0.22
Glyphosate	.	.	.	.	.	4.14	.	.	.	4.14	4.14	4.65
Metazachlor	.	.	.	.	.	.	11.69	.	.	11.69	11.69	8.77
All herbicides	**.**	**.**	**.**	**.**	**6.00**	**4.14**	**17.69**	**.**	**.**	**27.83**	**.**	**14.36**
Insecticides												
Lambda-cyhalothrin	.	7.55	.	.	.	.	.	.	.	7.55	7.55	0.08
Spirotetramat	7.55	.	.	.	.	.	.	.	.	7.55	7.55	0.57
All insecticides	**7.55**	**7.55**	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**15.10**	**.**	**0.64**
Molluscicides												
Ferric phosphate	.	.	.	.	.	.	.	.	1.55	1.55	1.55	0.32
All molluscicides	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**1.55**	**1.55**	**.**	**0.32**
Seed treatments												
Thiram	.	.	.	.	.	.	.	11.69	.	11.69	11.69	<0.05
All seed treatments	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**11.69**	**.**	**11.69**	**.**	**<0.05**

Table 27: **Cauliflower (summer) pesticide-treated area (spha), basic treated area (ha), quantity applied (kg) and reasons for use.**

	Reasons for treatment											
Pesticide group and active substance	**Aphids**	**Caterpillars**	**General Fungal Control**	**General Insect Control**	**General Weed Control**	**Ground Preparation**	**Sealer**	**Seed Treatment**	**Slugs**	**Total treated area (spha)**	**Basic treated area (ha)**	**Quantity applied (kg)**
Fungicides												
Azoxystrobin/difenoconazole	.	.	4.55	.	.	.	.	.	.	4.55	4.55	1.48
Fluopicolide/propamocarb hydrochloride	.	.	4.55	.	.	.	.	.	.	4.55	4.55	5.01
Prothioconazole	.	.	6.31	.	.	.	.	.	.	6.31	6.31	1.21
All fungicides	**.**	**.**	**15.41**	**.**	**.**	**.**	**.**	**.**	**.**	**15.41**	**.**	**7.70**
Herbicides												
Clomazone	.	.	.	.	4.55	.	.	.	.	4.55	4.55	0.41
Glyphosate	.	.	.	.	.	0.20	.	.	.	0.20	0.20	0.27
Metazachlor	.	.	.	.	4.55	.	1.55	.	.	6.10	6.10	4.58
Pyridate	.	.	.	.	4.55	.	.	.	.	4.55	4.55	4.10
All herbicides	**.**	**.**	**.**	**.**	**13.66**	**0.20**	**1.55**	**.**	**.**	**15.41**	**.**	**9.36**
Insecticides												
Lambda-cyhalothrin	.	1.55	.	.	.	.	.	.	.	1.55	1.55	<0.05
Spirotetramat	1.55	.	.	4.55	.	.	.	.	.	6.10	6.10	0.46
All insecticides	**1.55**	**1.55**	**.**	**4.55**	**.**	**.**	**.**	**.**	**.**	**7.66**	**.**	**0.47**
Molluscicides												
Ferric phosphate	.	.	.	.	.	.	.	.	1.55	1.55	1.55	0.32
All molluscicides	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**1.55**	**1.55**	**.**	**0.32**
Seed treatments												
Thiram	.	.	.	.	.	.	.	6.31	.	6.31	6.31	<0.05
All seed treatments	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**6.31**	**.**	**6.31**	**.**	**<0.05**

Table 28: **Cauliflower (winter) pesticide-treated area (spha), basic treated area (ha), quantity applied (kg) and reasons for use.**

	Reasons for treatment						
Pesticide group and active substance	**General Disease Control**	**Ground Preparation**	**Sealer**	**Seed Treatment**	**Total treated area (spha)**	**Basic treated area (ha)**	**Quantity applied (kg)**
Fungicides							
Azoxystrobin/difenoconazole	8.28	.	.	.	8.28	4.14	2.69
Chlorothalonil/metalaxyl-m	4.14	.	.	.	4.14	4.14	4.45
Difenoconazole	8.28	.	.	.	8.28	4.14	0.62
All fungicides	**20.69**	**.**	**.**	**.**	**20.69**	**.**	**7.76**
Herbicides							
Glyphosate	.	4.14	.	.	4.14	4.14	4.65
Metazachlor	.	.	4.14	.	4.14	4.14	3.10
All herbicides	**.**	**4.14**	**4.14**	**.**	**8.28**	**.**	**7.76**
Seed treatments							
Thiram	.	.	.	4.14	4.14	4.14	<0.05
All seed treatments	**.**	**.**	**.**	**4.14**	**4.14**	**.**	**<0.05**

Table 29: **Celery (soup) pesticide-treated area (spha), basic treated area (ha), quantity applied (kg) and reasons for use.**

	Reasons for treatment									
Pesticide group and active substance	**General Disease Control**	**General Fungal Control**	**General Insect Control**	**General Weed Control**	**Ground Preparation**	**Sealer**	**Seed Treatment**	**Total treated area (spha)**	**Basic treated area (ha)**	**Quantity applied (kg)**
Fungicides										
Azoxystrobin/difenoconazole	.	36.06	.	.	.	.	.	36.06	25.32	10.55
Difenoconazole	1.03	22.78	.	.	.	.	.	23.81	14.82	2.08
Fluopicolide/propamocarb hydrochloride	.	26.10	.	.	.	.	.	26.10	14.57	22.37
Tebuconazole/trifloxystrobin	.	3.03	.	.	.	.	.	3.03	3.03	0.68
All fungicides	**1.03**	**87.98**	**.**	**.**	**.**	**.**	**.**	**89.01**	**.**	**35.68**
Herbicides										
Chlorpropham	.	.	.	17.00	.	.	.	17.00	8.50	6.80
Clethodim	.	.	.	8.50	.	.	.	8.50	8.50	1.02
Glyphosate	.	.	.	.	4.50	.	.	4.50	2.25	2.53
Linuron	.	.	.	.	.	1.03	.	1.03	1.03	0.63
Pendimethalin	.	.	.	8.50	.	.	.	8.50	8.50	5.80
Prosulfocarb	.	.	.	26.78	.	.	.	26.78	13.78	90.92
All herbicides	**.**	**.**	**.**	**60.78**	**4.50**	**1.03**	**.**	**66.31**	**.**	**107.70**
Insecticides										
Lambda-cyhalothrin	.	.	4.50	.	.	.	.	4.50	2.25	<0.05
Pirimicarb	.	.	3.03	.	.	.	.	3.03	3.03	0.42
All insecticides	**.**	**.**	**7.53**	**.**	**.**	**.**	**.**	**7.53**	**.**	**0.47**
Seed treatments										
Thiram	.	.	.	.	.	.	3.28	3.28	3.28	<0.05
All seed treatments	**.**	**.**	**.**	**.**	**.**	**.**	**3.28**	**3.28**	**.**	**<0.05**

Table 30: **Kale pesticide-treated area (spha), basic treated area (ha), quantity applied (kg) and reasons for use.**

	Reason for treatment			
Pesticide group and active substance	**Ground Preparation**	**Total treated area (spha)**	**Basic treated area (ha)**	**Quantity applied (kg)**
Herbicides				
Glyphosate	0.20	0.20	0.20	0.27
All herbicides	**0.20**	**0.20**	**.**	**0.27**

Table 31 : **Leeks pesticide-treated area (spha), basic treated area (ha), quantity applied (kg) and reasons for use.**

	Reasons for treatment						
Pesticide group and active substance	**General Fungal Control**	**General Weed Control**	**Rust**	**Seed Treatment**	**Total treated area (spha)**	**Basic treated area (ha)**	**Quantity applied (kg)**
Fungicides							
Azoxystrobin/difenoconazole	.	.	6.00	.	6.00	6.00	1.56
Dimethomorph/mancozeb	6.00	.	.	.	6.00	6.00	4.45
Fluopicolide/propamocarb hydrochloride	6.00	.	.	.	6.00	6.00	4.13
Prothioconazole	6.00	.	.	.	6.00	6.00	1.15
All fungicides	**18.00**	**.**	**6.00**	**.**	**24.00**	**.**	**11.29**
Herbicides							
Bromoxynil	.	6.00	.	.	6.00	6.00	1.62
Fluroxypyr	.	6.00	.	.	6.00	6.00	0.20
Prosulfocarb	.	6.00	.	.	6.00	6.00	4.80
All herbicides	**.**	**18.00**	**.**	**.**	**18.00**	**.**	**6.62**
Seed treatments							
Thiram	.	.	.	6.00	6.00	6.00	<0.05
All seed treatments	**.**	**.**	**.**	**6.00**	**6.00**	**.**	**<0.05**

Table 32: **Leeks (soup) pesticide-treated area (spha), basic treated area (ha), quantity applied (kg) and reasons for use.**

	Reasons for treatment								
Pesticide group and active substance	**General Disease Control**	**General Fungal Control**	**General Weed Control**	**Ground Preparation**	**Pre-emergence weed control**	**Seed Treatment**	**Total treated area (spha)**	**Basic treated area (ha)**	**Quantity applied (kg)**
Fungicides									
Azoxystrobin	0.78	.	.	.	.	.	0.78	0.78	0.19
Dimethomorph/mancozeb	5.78	0.94	.	.	.	.	6.72	3.83	5.69
Prothioconazole	.	0.94	.	.	.	.	0.94	0.94	0.18
All fungicides	**6.55**	**1.89**	**.**	**.**	**.**	**.**	**8.44**	**.**	**6.06**
Herbicides									
Bromoxynil	.	.	41.86	.	.	.	41.86	20.93	12.31
Chloridazon	.	.	0.90	.	.	.	0.90	0.90	0.29
Clethodim	.	.	2.89	.	.	.	2.89	2.89	0.35
Dimethenamid-P/metazachlor	.	.	4.25	.	.	.	4.25	4.25	3.40
Dimethenamid-P/pendimethalin	.	.	.	.	10.02	.	10.02	10.02	8.34
Fluroxypyr	.	.	38.09	.	.	.	38.09	20.93	2.51
Glyphosate	.	.	.	1.14	.	.	1.14	1.14	1.45
Metazachlor	.	.	4.02	.	.	.	4.02	4.02	3.02
Pendimethalin	.	.	0.90	.	.	.	0.90	0.90	0.61
Prosulfocarb	.	.	.	.	0.78	.	0.78	0.78	0.62
All herbicides	**.**	**.**	**92.91**	**1.14**	**10.79**	**.**	**104.84**	**.**	**32.89**
Seed treatments									
Tefluthrin	.	.	.	.	.	15.04	15.04	15.04	<0.05
Thiram	.	.	.	.	.	24.26	24.26	24.26	<0.05
All seed treatments	**.**	**.**	**.**	**.**	**.**	**39.30**	**39.30**	**.**	**<0.05**

Table 33: **Leeks (table) pesticide-treated area (spha), basic treated area (ha), quantity applied (kg) and reasons for use.**

	Reasons for treatment							
Pesticide group and active substance	**General Fungal Control**	**General Weed Control**	**Ground Preparation**	**Pre-emergence weed control**	**Seed Treatment**	**Total treated area (spha)**	**Basic treated area (ha)**	**Quantity applied (kg)**
Fungicides								
Dimethomorph/mancozeb	0.94	.	.	.	.	0.94	0.94	1.40
Prothioconazole	124.78	.	.	.	.	124.78	62.86	23.96
All fungicides	**125.72**	**.**	**.**	**.**	**.**	**125.72**	**.**	**25.36**
Herbicides								
Bromoxynil	.	214.28	.	.	.	214.28	76.18	51.42
Chlorpropham	.	123.83	.	.	.	123.83	61.92	49.53
Clethodim	.	61.92	.	.	.	61.92	61.92	7.43
Dimethenamid-P/metazachlor	.	66.17	.	.	.	66.17	66.17	52.93
Dimethenamid-P/pendimethalin	.	.	.	10.02	.	10.02	10.02	8.34
Fluroxypyr	.	152.36	.	.	.	152.36	76.18	22.14
Glyphosate	.	.	0.14	.	.	0.14	0.14	0.20
Pendimethalin	.	61.92	.	.	.	61.92	61.92	42.26
Prosulfocarb	.	123.83	.	.	.	123.83	61.92	495.34
All herbicides	**.**	**804.31**	**0.14**	**10.02**	**.**	**814.47**	**.**	**729.60**
Seed treatments								
Tefluthrin	.	.	.	.	76.18	76.18	76.18	0.39
Thiram	.	.	.	.	80.27	80.27	80.27	0.06
All seed treatments	**.**	**.**	**.**	**.**	**156.45**	**156.45**	**.**	**0.45**

Table 34: **Parsley pesticide-treated area (spha), basic treated area (ha), quantity applied (kg) and reasons for use.**

	Reasons for treatment											
Pesticide group and active substance	**Aphids**	**Blackfly**	**General Disease Control**	**General Fungal Control**	**General Insect Control**	**General Weed Control**	**Ground Preparation**	**Sealer**	**Seed Treatment**	**Total treated area (spha)**	**Basic treated area (ha)**	**Quantity applied (kg)**
Fungicides												
Azoxystrobin	.	.	4.13	.	.	.	.	.	.	4.13	2.07	1.03
Azoxystrobin/difenoconazole	.	.	.	53.06	.	.	.	.	.	53.06	33.82	16.08
Dimethomorph/mancozeb	.	.	.	14.57	.	.	.	.	.	14.57	14.57	10.81
Fluopicolide/propamocarb hydrochloride	.	.	.	29.14	.	.	.	.	.	29.14	14.57	24.04
Mancozeb/metalaxyl-m	.	.	.	2.07	.	.	.	.	.	2.07	2.07	1.26
All fungicides	**.**	**.**	**4.13**	**98.84**	**.**	**.**	**.**	**.**	**.**	**102.97**	**.**	**53.22**
Herbicides												
Chlorpropham	.	.	.	.	.	34.00	.	.	.	34.00	17.00	13.60
Clethodim	.	.	.	.	.	17.00	.	.	.	17.00	17.00	2.04
Glyphosate	.	.	.	.	.	.	5.40	.	.	5.40	3.15	3.54
Linuron	.	.	.	.	.	0.90	.	2.07	.	2.97	2.97	1.23
Pendimethalin	.	.	.	.	.	17.00	.	.	.	17.00	17.00	11.60
Prosulfocarb	.	.	.	.	.	41.64	.	.	.	41.64	20.15	147.14
All herbicides	**.**	**.**	**.**	**.**	**.**	**110.53**	**5.40**	**2.07**	**.**	**118.00**	**.**	**179.15**
Insecticides												
Lambda-cyhalothrin	30.04	2.07	.	.	4.50	.	.	.	.	36.60	19.78	0.29
All insecticides	**30.04**	**2.07**	**.**	**.**	**4.50**	**.**	**.**	**.**	**.**	**36.60**	**.**	**0.29**
Seed treatments												
Cymoxanil/fludioxonil/metalaxyl-m	.	.	.	.	.	.	.	.	15.47	15.47	15.47	<0.05
Thiram	.	.	.	.	.	.	.	.	21.31	21.31	21.31	<0.05
All seed treatments	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**36.78**	**36.78**	**.**	**<0.05**

Table 35: **Parsnips pesticide-treated area (spha), basic treated area (ha), quantity applied (kg) and reasons for use.**

	Reasons for treatment										
Pesticide group and active substance	**Cavity Spot**	**Crown Rot**	**General Fungal Control**	**General Weed Control**	**Grass**	**Ground Preparation**	**Pre-emergence weed control**	**Sealer**	**Total treated area (spha)**	**Basic treated area (ha)**	**Quantity applied (kg)**
Fungicides											
Azoxystrobin	.	.	1.94	.	.	.	.	.	1.94	1.94	0.48
Azoxystrobin/difenoconazole	.	.	144.22	.	.	.	.	.	144.22	143.28	46.87
Boscalid/pyraclostrobin	.	.	7.47	.	.	.	.	.	7.47	3.73	1.95
Dimethomorph/mancozeb	.	0.94	.	.	.	.	.	.	0.94	0.24	1.40
Isopyrazam	.	.	142.35	.	.	.	.	.	142.35	142.35	17.79
Metalaxyl-M	142.35	.	3.73	.	.	.	.	.	146.08	146.08	87.82
Prothioconazole	.	.	4.67	.	.	.	.	.	4.67	4.67	0.85
Tebuconazole	.	.	5.67	.	.	.	.	.	5.67	5.67	1.45
All fungicides	**142.35**	**0.94**	**310.04**	**.**	**.**	**.**	**.**	**.**	**453.33**	**.**	**158.62**
Herbicides											
Aclonifen	.	.	.	.	.	.	142.35	3.73	146.08	146.08	132.59
Clethodim	.	.	.	.	142.35	.	.	.	142.35	142.35	25.62
Clomazone	.	.	.	1.94	.	.	0.24	.	2.17	2.17	0.18
Glyphosate	.	.	.	213.54	.	7.41	.	.	220.95	149.76	204.10
Linuron	.	.	.	.	.	.	16.53	2.07	18.60	18.60	10.57
Metamitron	.	.	.	16.53	.	.	143.28	3.73	163.55	163.55	221.55
Pendimethalin	.	.	.	1.94	.	.	159.82	8.50	170.25	170.25	221.95
Prosulfocarb	.	.	.	146.08	.	.	.	.	146.08	146.08	181.57
All herbicides	**.**	**.**	**.**	**380.03**	**142.35**	**7.41**	**462.22**	**18.03**	**1,010.04**	**.**	**998.15**

Table 35 (contd): **Parsnips pesticide-treated area (spha), basic treated area (ha), quantity applied (kg) and reasons for use.**

	Reasons for treatment									
Pesticide group and active substance	**Aphids**	**Carrot Fly**	**Carrot fly & willow aphids**	**General Insect Control**	**Growth Regulation**	**Nematodes**	**Seed Treatment**	**Total treated area (spha)**	**Basic treated area (ha)**	**Quantity applied (kg)**
Growth Regulators										
Maleic hydrazide	.	.	.	.	3.73	.	.	3.73	3.73	14.00
All growth regulators	**.**	**.**	**.**	**.**	**3.73**	**.**	**.**	**3.73**	**.**	**14.00**
Insecticides										
Cyantraniliprole	.	142.35	.	.	.	.	.	142.35	142.35	10.53
Deltamethrin	.	.	.	17.47	.	.	.	17.47	17.47	0.11
Lambda-cyhalothrin	39.41	295.57	.	14.00	.	.	.	348.98	169.26	5.09
Oxamyl	.	.	.	.	.	142.35	.	142.35	142.35	284.70
Pirimicarb	3.87	.	.	.	.	.	.	3.87	1.94	0.54
Spirotetramat	5.63	.	0.93	.	.	.	.	6.57	3.87	0.40
Thiacloprid	.	.	1.87	3.73	.	.	.	5.60	4.67	0.53
All insecticides	**48.91**	**437.92**	**2.80**	**35.20**	**.**	**142.35**	**.**	**667.18**	**.**	**301.90**
Seed treatments										
Cymoxanil/fludioxonil/metalaxyl-m	.	.	.	.	.	.	172.09	172.09	172.09	0.07
Tefluthrin	.	.	.	.	.	.	149.22	149.22	149.22	1.93
All seed treatments	**.**	**.**	**.**	**.**	**.**	**.**	**321.32**	**321.32**	**.**	**2.00**

Table 36: **Peas (picking) pesticide-treated area (spha), basic treated area (ha), quantity applied (kg) and reasons for use.**

	Reasons for treatment							
Pesticide group and active substance	**Aphids**	**General Fungal Control**	**General Weed Control**	**Ground Preparation**	**Seed Treatment**	**Total treated area (spha)**	**Basic treated area (ha)**	**Quantity applied (kg)**
Fungicides								
Azoxystrobin	.	3.03	.	.	.	3.03	3.03	0.76
Boscalid/pyraclostrobin	.	3.03	.	.	.	3.03	3.03	1.01
Chlorothalonil/metalaxyl-m	.	0.24	.	.	.	0.24	0.24	0.25
All fungicides	**.**	**6.30**	**.**	**.**	**.**	**6.30**	**.**	**2.03**
Herbicides								
Glyphosate	.	.	.	0.16	.	0.16	0.16	0.24
Imazamox/pendimethalin	.	.	3.03	.	.	3.03	3.03	3.64
All herbicides	**.**	**.**	**3.03**	**0.16**	**.**	**3.20**	**.**	**3.88**
Insecticides								
Lambda-cyhalothrin	0.24	.	.	.	.	0.24	0.24	<0.05
All insecticides	**0.24**	**.**	**.**	**.**	**.**	**0.24**	**.**	**<0.05**
Seed treatments								
Cymoxanil/fludioxonil/metalaxyl-m	.	.	.	.	3.43	3.43	3.43	0.06
All seed treatments	**.**	**.**	**.**	**.**	**3.43**	**3.43**	**.**	**0.06**

Table 37: **Pumpkin pesticide-treated area (spha), basic treated area (ha), quantity applied (kg) and reasons for use.**

	Reasons for treatment				
Pesticide group and active substance	**General Weed Control**	**Seed Treatment**	**Total treated area (spha)**	**Basic treated area (ha)**	**Quantity applied (kg)**
Herbicides					
Propyzamide	19.93	.	19.93	19.93	13.55
All herbicides	**19.93**	**.**	**19.93**	**.**	**13.55**
Seed treatments					
Thiram	.	19.93	19.93	19.93	0.12
All seed treatments	**.**	**19.93**	**19.93**	**.**	**0.12**

Table 38: **Rhubarb pesticide-treated area (spha), basic treated area (ha), quantity applied (kg) and reasons for use.**

	Reason for treatment			
Pesticide group and active substance	**General Weed Control**	**Total treated area (spha)**	**Basic treated area (ha)**	**Quantity applied (kg)**
Herbicides				
Glyphosate	6.30	6.30	6.30	11.33
All herbicides	**6.30**	**6.30**	**.**	**11.33**

Table 39: **Salad onions (summer) pesticide-treated area (spha), basic treated area (ha), quantity applied (kg) and reasons for use.**

	Reasons for treatment									
Pesticide group and active substance	**General Disease Control**	**General Fungal Control**	**General Weed Control**	**Grass**	**Ground Preparation**	**Pre-emergence weed control**	**Seed Treatment**	**Total treated area (spha)**	**Basic treated area (ha)**	**Quantity applied (kg)**
Fungicides										
Azoxystrobin	0.19	.	.	.	.	.	.	0.19	0.19	<0.05
Dimethomorph/mancozeb	.	40.74	.	.	.	.	.	40.74	39.79	60.46
All fungicides	**0.19**	**40.74**	**.**	**.**	**.**	**.**	**.**	**40.93**	**.**	**60.51**
Herbicides										
Bromoxynil	.	.	116.74	.	.	.	.	116.74	39.04	26.27
Chloridazon	.	.	0.90	.	.	.	.	0.90	0.90	0.29
Chlorpropham	.	.	77.70	.	.	.	.	77.70	38.85	31.08
Clethodim	.	.	38.85	.	.	.	.	38.85	38.85	4.66
Cycloxydim	.	.	.	0.19	.	.	.	0.19	0.19	0.09
Dimethenamid-P/pendimethalin	.	.	38.85	.	.	1.09	.	39.94	39.94	23.84
Fluroxypyr	.	.	77.70	.	.	.	.	77.70	38.85	12.82
Glyphosate	.	.	.	.	0.90	.	.	0.90	0.90	1.01
Pendimethalin	.	.	39.75	.	.	0.19	.	39.94	39.94	27.26
Prosulfocarb	.	.	77.70	.	.	.	.	77.70	38.85	310.80
All herbicides	**.**	**.**	**468.18**	**0.19**	**0.90**	**1.28**	**.**	**470.56**	**.**	**438.11**
Seed treatments										
Tefluthrin	.	.	.	.	.	.	40.99	40.99	40.99	0.05
Thiram	.	.	.	.	.	.	2.14	2.14	2.14	<0.05
All seed treatments	**.**	**.**	**.**	**.**	**.**	**.**	**43.14**	**43.14**	**.**	**0.06**

Table 40: Salad onions (winter) pesticide-treated area (spha), basic treated area (ha), quantity applied (kg) and reasons for use.

	Reasons for treatment								
Pesticide group and active substance	**General Disease Control**	**General Weed Control**	**Grass**	**Ground Preparation**	**Pre-emergence weed control**	**Seed Treatment**	**Total treated area (spha)**	**Basic treated area (ha)**	**Quantity applied (kg)**
Fungicides									
Azoxystrobin	0.47	.	.	.	.	.	0.47	0.47	0.12
All fungicides	**0.47**	**.**	**.**	**.**	**.**	**.**	**0.47**	**.**	**0.12**
Herbicides									
Bromoxynil	.	0.47	.	.	.	.	0.47	0.47	0.11
Chloridazon	.	0.90	.	.	.	.	0.90	0.90	0.29
Cycloxydim	.	.	0.47	.	.	.	0.47	0.47	0.21
Dimethenamid-P/pendimethalin	.	.	.	.	1.37	.	1.37	1.37	1.90
Glyphosate	.	.	.	0.90	.	.	0.90	0.90	1.01
Pendimethalin	.	0.90	.	.	0.47	.	1.37	1.37	0.93
All herbicides	**.**	**2.27**	**0.47**	**0.90**	**1.84**	**.**	**5.49**	**.**	**4.45**
Seed treatments									
Tefluthrin	.	.	.	.	.	1.37	1.37	1.37	<0.05
Thiram	.	.	.	.	.	1.37	1.37	1.37	<0.05
All seed treatments	**.**	**.**	**.**	**.**	**.**	**2.74**	**2.74**	**.**	**<0.05**

Table 41: **Swede pesticide-treated area (spha), basic treated area (ha), quantity applied (kg) and reasons for use.**

	Reasons for treatment						
Pesticide group and active substance	**Flea Beetles**	**Ground Preparation**	**Sealer**	**Seed Treatment**	**Total treated area (spha)**	**Basic treated area (ha)**	**Quantity applied (kg)**
Herbicides							
Clomazone	.	.	36.42	.	36.42	36.42	2.62
Glyphosate	.	36.42	.	.	36.42	36.42	40.97
Metazachlor	.	.	36.42	.	36.42	36.42	27.32
All herbicides	**.**	**36.42**	**72.84**	**.**	**109.26**	**.**	**70.91**
Insecticides							
Lambda-cyhalothrin	109.26	.	.	.	109.26	36.42	0.55
All insecticides	**109.26**	**.**	**.**	**.**	**109.26**	**.**	**0.55**
Seed treatments							
Thiram	.	.	.	36.42	36.42	36.42	<0.05
All seed treatments	**.**	**.**	**.**	**36.42**	**36.42**	**.**	**<0.05**

Table 42: **Turnips pesticide-treated area (spha), basic treated area (ha), quantity applied (kg) and reasons for use.**

	Reasons for treatment								
Pesticide group and active substance	**General Fungal Control**	**General Insect Control**	**Ground Preparation**	**Pre-emergence weed control**	**Sealer**	**Seed Treatment**	**Total treated area (spha)**	**Basic treated area (ha)**	**Quantity applied (kg)**
Fungicides									
Azoxystrobin/difenoconazole	1.87	.	.	.	.	.	1.87	1.87	0.61
Prothioconazole	1.87	.	.	.	.	.	1.87	1.87	0.36
All fungicides	**3.73**	**.**	**.**	**.**	**.**	**.**	**3.73**	**.**	**0.97**
Herbicides									
Clomazone	.	.	.	1.87	36.42	.	38.29	38.29	2.07
Glyphosate	.	.	42.63	.	.	.	42.63	42.63	70.77
Metazachlor	.	.	.	1.87	42.63	.	44.49	44.49	33.37
All herbicides	**.**	**.**	**42.63**	**3.73**	**79.05**	**.**	**125.41**	**.**	**106.20**
Insecticides									
Lambda-cyhalothrin	.	1.87	.	.	.	.	1.87	1.87	<0.05
Thiacloprid	.	1.87	.	.	.	.	1.87	1.87	0.18
All insecticides	**.**	**3.73**	**.**	**.**	**.**	**.**	**3.73**	**.**	**0.20**
Seed treatments									
Thiram	.	.	.	.	.	44.49	44.49	44.49	<0.05
All seed treatments	**.**	**.**	**.**	**.**	**.**	**44.49**	**44.49**	**.**	**<0.05**

Table 43: **Comparison of the area of vegetable crops grown (hectares) in Northern Ireland and the proportional differences (%) between 1991-2019.**

	Survey year										
Crop type	1991 (ha)	1995 (ha)	1999 (ha)	2004 (ha)	2007 (ha)	2011 (ha)	2013 (ha)	2015 (ha)	2017 (ha)	2019 (ha)	% change in area 2017/2019
Brassicas											
Brussels sprouts	121.60	85.68	114.50	29.77	43.60	54.87	29.47	23.08	17.21	34.17	99%
Cabbage (summer/autumn)	118.60	61.01	120.70	76.63	110.81	69.47	18.49	7.42	1.80	15.51	762%
Cabbage (other)*	168.60	202.79	175.30	156.03	241.77	173.01	158.95	126.31	114.08	167.78	47%
Calabrese/broccoli	50.60	55.78	60.60	147.54	159.50	96.32	55.43	37.58	77.48	39.33	-49%
Cauliflower	166.80	228.80	181.40	171.36	188.10	86.17	50.80	24.86	29.19	22.43	-23%
All leafy and flowerhead brassicas	**626.20**	**634.06**	**652.50**	**581.33**	**743.80**	**479.84**	**313.14**	**219.25**	**239.76**	**279.72**	**17%**
Turnip and swede											
Turnip and swede	127.60	121.87	121.50	280.76	223.50	253.35	248.46	248.86	272.06	80.91	-70%
All turnip and swede	**127.60**	**121.87**	**121.50**	**280.76**	**223.50**	**253.35**	**248.46**	**248.86**	**272.06**	**80.91**	**-70%**
Peas and beans											
Beans	11.80	11.71	9.40	6.60	5.00	2.02	26.23	2.43	3.22	4.02	25%
Peas	13.20	6.91	5.50	2.43	2.70	15.75	5.01	2.43	3.20	3.43	7%
All peas and beans	**25.00**	**18.62**	**14.90**	**9.03**	**7.70**	**17.78**	**31.24**	**4.86**	**6.43**	**7.45**	**16%**
Leeks and onions											
Leeks	39.30	63.48	68.10	89.85	109.30	104.19	109.94	91.09	76.53	116.87	53%
Onions	6.40	.	14.50	13.28	10.70	17.39	7.84	7.30	9.11	0.24	-97%
Spring onions	51.90	42.03	58.90	61.75	39.40	28.82	11.79	16.40	16.70	42.36	154%
All leeks and onions	**97.60**	**105.51**	**141.50**	**164.88**	**159.40**	**150.41**	**129.57**	**114.79**	**102.33**	**159.47**	**56%**

* Cabbage (other) includes: savoy cabbage, spring cabbage, winter cabbage, white cabbage, red cabbage

Table 43 (contd): **Comparison of the area of vegetable crops grown (hectares) in Northern Ireland and the proportional differences (%) between 1991-2019.**

	Survey year										
Crop type	1991 (ha)	1995 (ha)	1999 (ha)	2004 (ha)	2007 (ha)	2011 (ha)	2013 (ha)	2015 (ha)	2017 (ha)	2019 (ha)	% change in area 2017/2019
Carrots and parsnips											
Carrots	269.90	261.04	360.80	347.78	436.30	353.13	335.39	312.88	335.30	283.47	-15%
Parsnips	80.90	73.84	109.80	99.61	185.90	166.41	184.10	164.07	121.43	172.09	42%
All carrots and parsnips	**350.80**	**334.88**	**470.60**	**447.39**	**622.20**	**519.53**	**519.49**	**476.95**	**456.72**	**455.57**	**0%**
Celery, lettuce and parsley											
Celery	24.50	27.14	45.50	32.23	57.80	44.09	57.57	43.92	26.12	26.39	1%
Lettuce	26.60	38.42	27.00	42.84	24.30	59.35	54.71	39.46	38.79	.	-100%
Parsley	20.10	31.37	40.00	41.85	47.80	33.35	23.78	29.57	12.67	36.82	191%
All celery, lettuce and parsely	**71.20**	**96.93**	**112.50**	**116.92**	**129.90**	**136.80**	**136.06**	**112.95**	**77.57**	**63.20**	**-19%**
Other vegetables											
Cucurbits*	0.14	1.46	1.80	.	1.80	.	.	4.00	0.57	20.24	3451%
Beetroot	3.59	3.13	6.90	3.80	6.70	8.16	12.93	12.28	9.46	16.10	70%
Rhubarb	13.73	6.75	6.10	10.78	4.90	.	5.48	4.05	10.82	9.13	-16%
Kale	.	.	.	.	.	0.87	.	4.73	2.59	0.50	-81%
Celeriac	.	.	.	.	.	0.01	0.08	0.53	.	.	.
All other vegetables	**17.46**	**11.34**	**14.80**	**14.58**	**13.40**	**9.05**	**18.48**	**25.59**	**23.44**	**45.97**	**96%**
Total vegetable crops	**1,315.86**	**1,323.21**	**1,528.30**	**1,614.89**	**1,899.90**	**1,566.75**	**1,396.45**	**1,203.25**	**1,178.43**	**1,092.30**	**-7%**

Northern Ireland Pesticide Usage Survey Published Reports Appendix 1

Report No.	Report title	ISBN
99	Grassland & Fodder Crops 1989	1-855 27 079 X
105	Arable Crops 1990	1-855 27 130 3
106	Soft Fruit Crops 1990	1-855 27 149 4
109	Vegetable Crops 1991	1-855 27 137 0
110	Protected Crops 1991 (edible & ornamental)	1-855 27 283 0
111	Mushroom Crops 1991	1-855 27 150 8
117	Arable Crops 1992	1-855 27 193 1
118	Top Fruit Crops 1992	1-855 27 194 X
124	Grassland & Fodder crops 1993	1-855 27 221 0
131	Forestry 1993	1-855 27 282 2
132	Arable Crops 1994	1-855 27 314 4
139	Vegetable Crops 1995	1-855 27 346 2
140	Mushroom Crops 1995	1-855 27 347 0
146	Arable Crops 1996	1-855 27 469 8
147	Top fruit 1996	1-855 27 470 1
156	Grassland & 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
267	Edible Protected Crops 2015	1-84807-684-6
268	Vegetable Crops 2015	1-84807-685-3
275	Arable crops 2016	1-84807-808-6
276	Soft Fruit Crops 2016	1-84807-809-3
277	Top Fruit Crops 2016	1-84807-810-9
280	Edible Protected Crops 2017	1-84807-918-2
281	Outdoor Vegetable Crops 2017	1-84807-917-5
282	Grassland & Fodder Crops 2017	1-84807-916-8

288	Arable Crops 2018	1-83887-064-5
289	Soft Fruit Crops 2018	1-83887-065-2
290	Top Fruit Crops 2018	1-83887-066-9

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