

PESTICIDE USAGE IN NORTHERN IRELAND

Survey Report 306

Northern Ireland Outdoor Vegetable Crops 2021

A National Statistics Publication



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PESTICIDE USAGE SURVEY REPORT

OUTDOOR VEGETABLE CROPS IN NORTHERN IRELAND 2021

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The County Regions of Northern Ireland



SUMMARY

This is the eleventh 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), 2017 (Kirbas *et al.*, 2018) and 2019 (Lavery *et al.*, 2020). Information on all aspects of pesticide usage was collected from 37 holdings throughout the province, representing 40% 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 2021 was an estimated 1,049 hectares; a 4% decrease compared with 2019.

Totals of 64 products and 50 active substances were recorded in use in this survey. By comparison with 2019, the pesticide-treated area increased by 18%, to 15,100 spray hectares and the quantity of pesticide (active substances) decreased by 30% to 4,423 kilograms. The fungicide-treated area increased by 62% and the quantity of fungicide active substances applied increased by 41%. The area treated with herbicides decreased by 10% and the weight applied decreased by 33%. The insecticide-treated area increased by 43%, though the weight of insecticide active substances decreased by 89%, primarily due to the withdrawal of oxamyl, pymetrozine and thiacloprid since 2019. The only molluscicide active substance used in 2021 was ferric phosphate. Maleic hydrazide was the only growth regulator used in 2021, applied exclusively to 2 hectares of parsnip crops.

The area of vegetable crops grown from treated seed (direct sown or propagated and transplanted) decreased by 24% since 2019 and the weight of active substances used decreased by 13%, from 13 kilograms to 11 kilograms, mainly due to the withdrawal from use of thiram which was used extensively as a seed treatment in 2019.

Fungicides, applied to 33% of the pesticide-treated area, accounted for 33% of the weight of pesticides applied. Herbicides accounted for 30% of the pesticide-treated area and 64% of the total quantity of pesticides used. Insecticides, applied to 29% of the pesticide-treated area, accounted for only 2% 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 2021 accounted for 7% of the pesticide-treated area, representing less than 0.1% of the quantity of active ingredients applied.

Carrots and parsnips collectively accounted for 85% of the quantity of fungicide active ingredients applied, representing 90% of the area treated with fungicides, with the active substance prothioconazole being most frequently used. Brassica crops received 10% of the total weight of fungicides applied, representing 7% 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 prothioconazole and broad-spectrum fungicide mixture azoxystrobin/difenoconazole, primarily for general disease control.

Alconifen, clomazone, metribuzin and pendimethalin were the herbicide active ingredients most commonly applied to outdoor vegetable crops, particularly to carrot and parsnip crops. Overall, 81% of all herbicide applications were applied to carrot and parsnip crops.

Carrots and parsnips collectively accounted for 83% of both the insecticide-treated area and the quantity of insecticide active substances applied, mainly due to the pyrethroid insecticide lambda-cyhalothrin being applied extensively to carrots and parsnip crops for control of carrot fly. Turnip and swede accounted for 10% of the insecticide-treated area representing 2% of the weight of insecticides used. Leafy and flowerhead brassicas accounted for 6% of the insecticide-treated area representing 14% of the weight of insecticides applied. With exception of the use of garlic in carrots for general insect control there were no records of biopesticides/biological controls in NI vegetable crops in 2021.

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 2021 report (Kirbas *et al.*, 2022). 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 <1%.

A number of new active substances and formulated mixtures, which were not recorded in the previous report have been used during this survey period. These include the SDHI fungicide fluopyram, used as a nematicide in carrot and parsnip crops and the herbicide actives clopyralid, ethofumesate, isoxaben and s-metolachlor.

Conversely, a number of active substances and formulated mixtures which were used in 2019 have not been recorded during this survey period. These include the fungicide actives mancozeb/metalaxyl-m and the herbicide actives diflufenican, imazamox/pendimethalin, desmedipham/ethofumesate/phenmedipham, lenacil, phenmedipham, and propaquizafop. There are also a number of actives for which approvals have since expired from the 2019 survey period which were not recorded in

this survey period. These include the fungicide actives chlorothalonil/metalaxyl-m and fenpropimorph; the insecticide actives oxamyl, pymetrozine and thiacloprid; the herbicide actives chloridazon, chlorpropham and diquat and the seed treatment active thiram.

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, autumn and summer 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, table celery and parsley.
- ‘Peas and beans’: refers to picking peas and broad beans.
- ‘Other vegetables’: refers to beetroot, courgette, pumpkin, rhubarb 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.’

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 eleventh 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), 2017 (Kirbas *et al.*, 2018) and 2019 (Lavery *et al.*, 2020) 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 2021 (*Anon.*, 2022), farm level information from the Basic Farm Payment scheme (*Anon.*, 2021) 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 2021. 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. Thirty-seven holdings, representing 40% of holdings growing outdoor vegetable crops, were contacted during the period March 2022 to May 2022 and data collected by telephone and email. 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.

The Covid pandemic and resulting restrictions have severely impacted our capability to conduct the survey programme. In particular, we have been unable to complete personal interviews, relying on telephone or email correspondence, which is not always convenient to participants. Due to the changes in our data collection method we were increasingly faced with incomplete or missing data. However, we are pleased that despite these drawbacks, we can present the report in a timely manner. We anticipate that this situation will improve as the pandemic restrictions decrease over time.

TRENDS

Figure 1: Comparison of the area of outdoor vegetable crops grown (ha) in Northern Ireland between 1991- 2021.

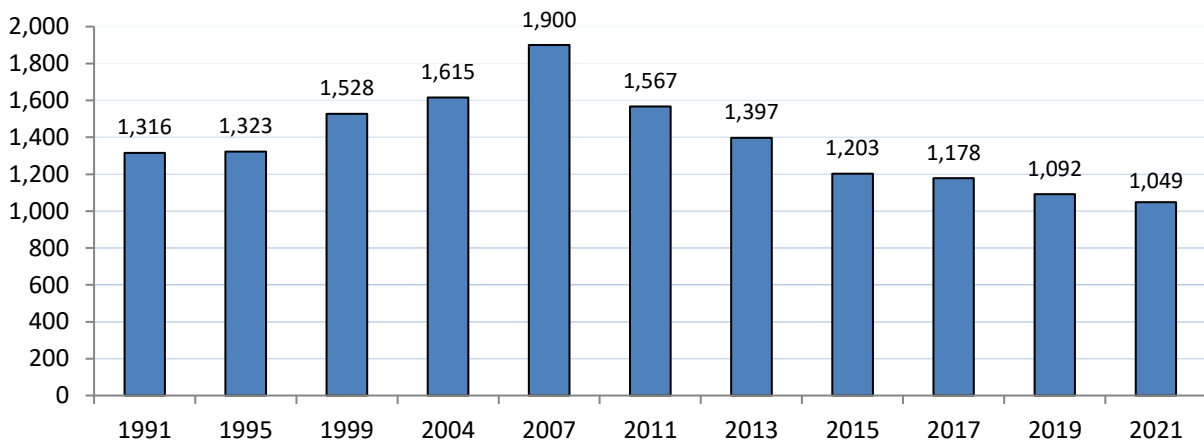


Figure 2: Comparison of the area of outdoor vegetable crops treated (spha) in Northern Ireland between 1991- 2021.

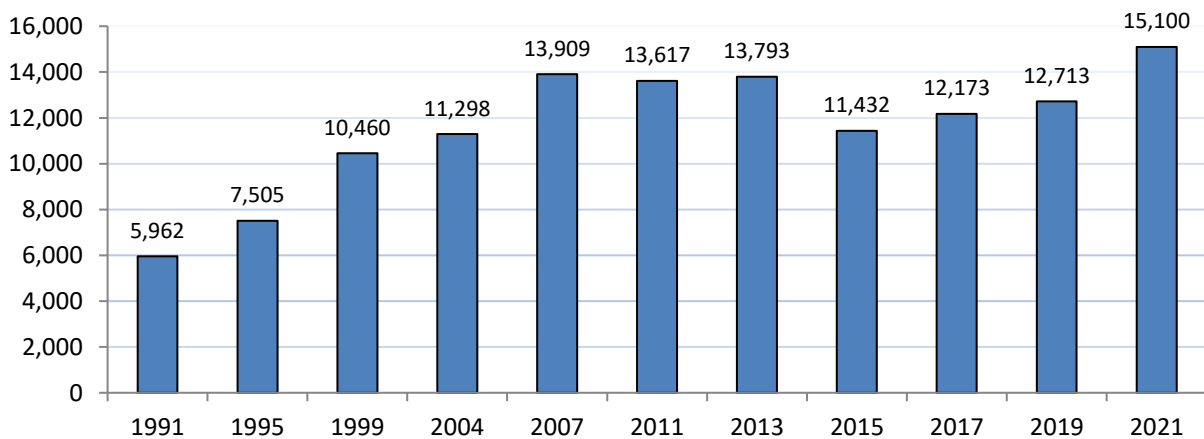


Figure 3: Comparison of the weight of pesticides applied (kg) to outdoor vegetable crops in Northern Ireland between 1991- 2021.

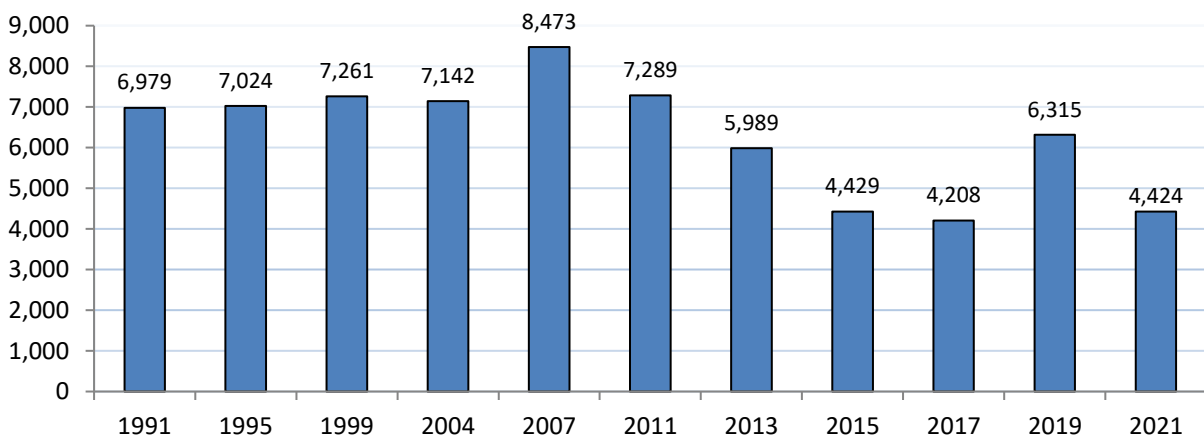


Figure 4: Changes in the area treated (spha) with the major pesticide groups applied to outdoor vegetable crops in Northern Ireland between 1991- 2021.

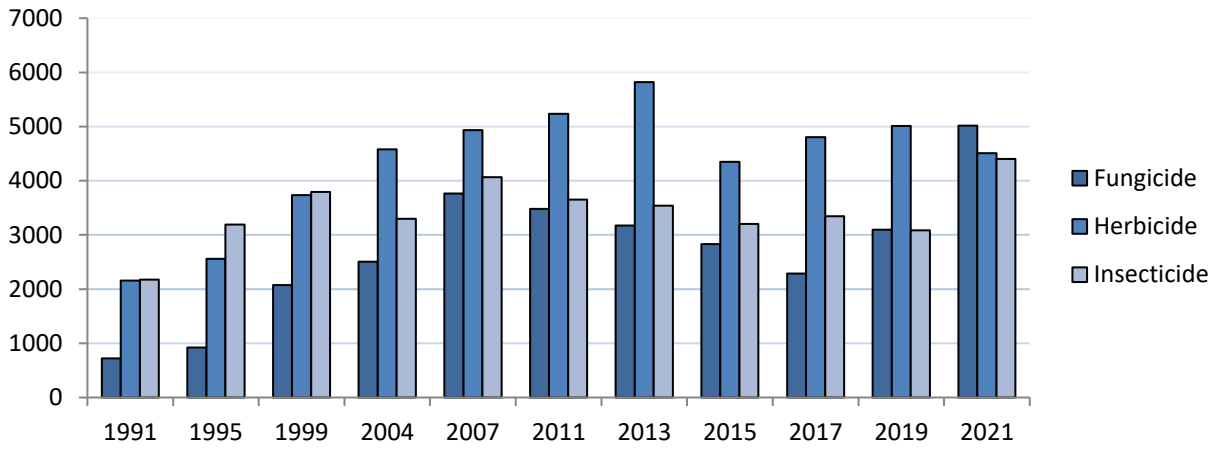
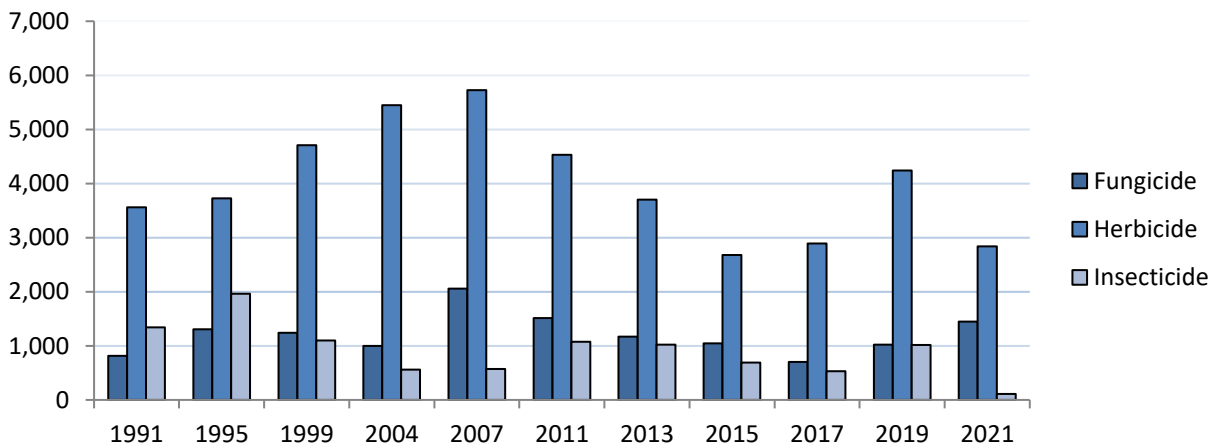


Figure 5: Changes in the weight (kg) of the major pesticide groups applied to outdoor vegetable crops in Northern Ireland between 1991- 2021.



RESULTS AND DISCUSSION

CROPS

The number and areas of crops surveyed are shown in [table 2](#) and [figure 6a](#) and [6b](#). Data from 37 farms provided information on 155 examples of 34 crop types. Crops include beans, beetroot, Brussels sprouts, cabbage, carrots, cauliflower, celery, kale, leeks, lettuce, 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 2021. Crops have been grouped to assist 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 40% of the total outdoor vegetable growing area and 81% of the weight of pesticides applied while turnips and swedes accounted for 14% of the area grown and 3% of the weight applied. Leafy and flowerhead brassicas were grown on an estimated 18% of the total area of outdoor vegetable crops, accounting for 10% of the weight of pesticides applied with cabbage accounting for 65% of the area of all brassicas grown and 61% of the weight applied. Alliums including leeks, scallions and onions, collectively accounted for 3% of the total grown area and 2% of the weight applied. Celery and parsley accounted for 2% of both the total area of outdoor vegetable crops grown and the weight of pesticides applied. Other vegetables accounted for 2% 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, 2% of the total area of outdoor vegetable crops grown in Northern Ireland in 2021 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, 2021.

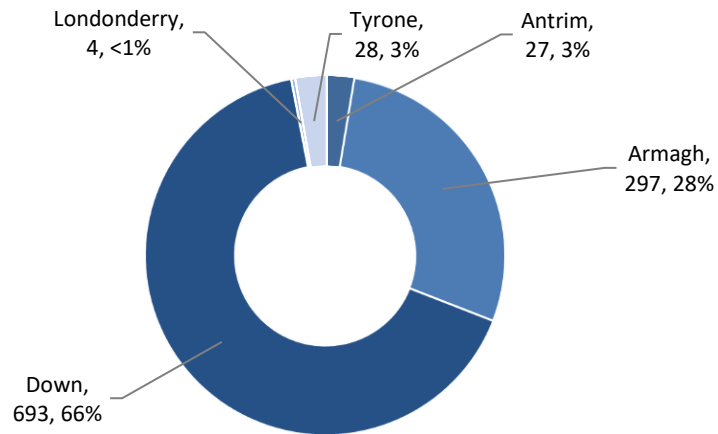


Figure 6b: Proportional areas of the different outdoor vegetable crops grown (ha) in Northern Ireland, 2021.

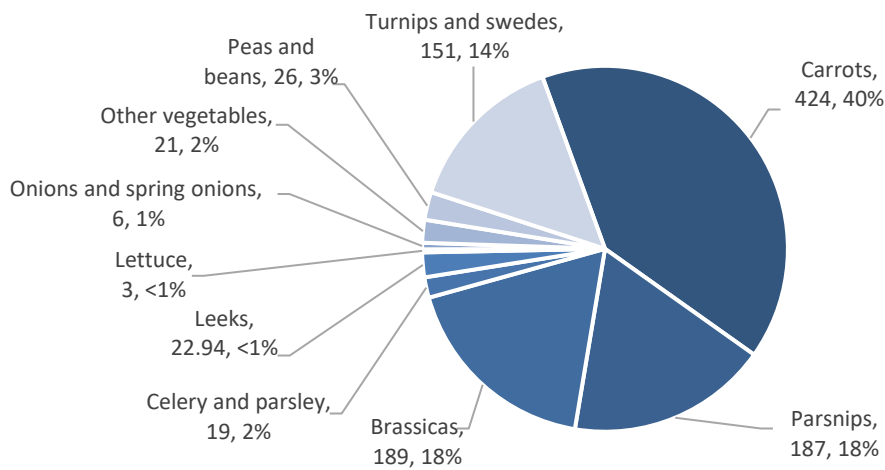


Figure 7a: Pesticide usage (spha) on outdoor vegetable crops in Northern Ireland, 2021.

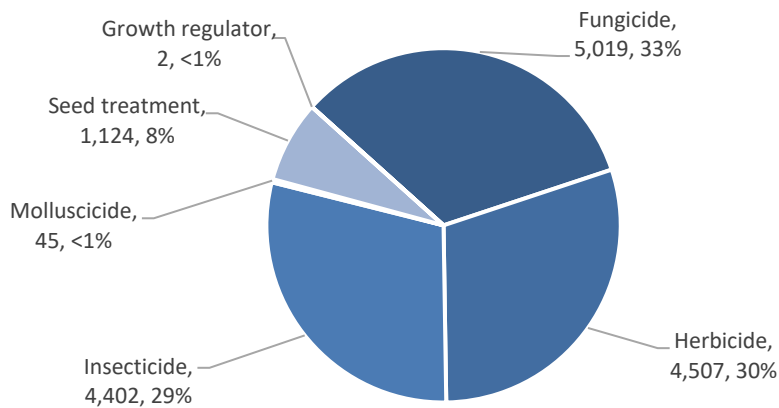


Figure 7b: Pesticide usage (kg) on outdoor vegetable crops in Northern Ireland, 2021.

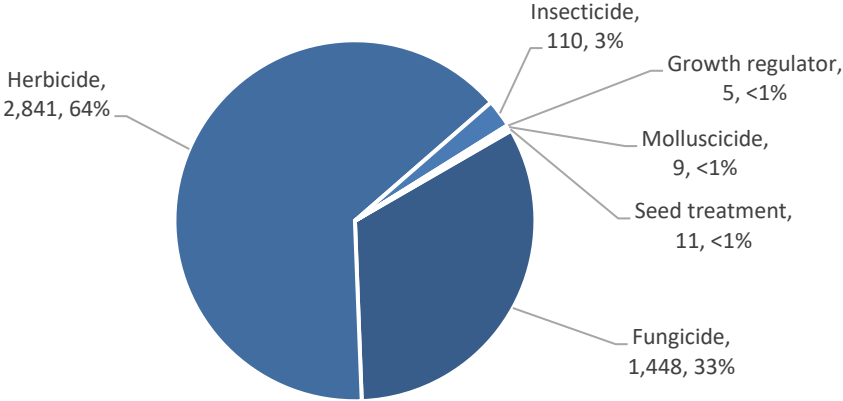


Figure 8: The ten most commonly used pesticide active substances by area treated (spha) in Northern Ireland, 2021.

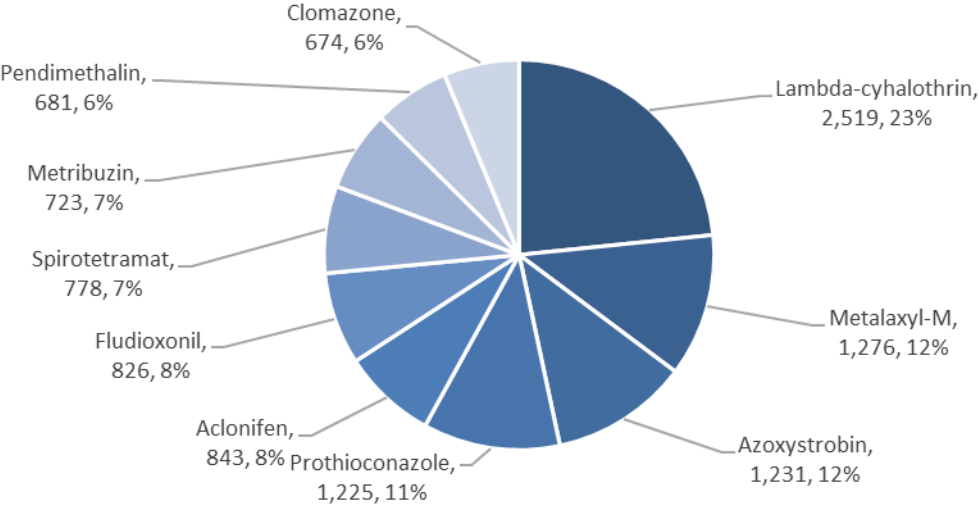


Figure 9: The ten most commonly used pesticide active substances by weight applied (kg) in Northern Ireland, 2021.

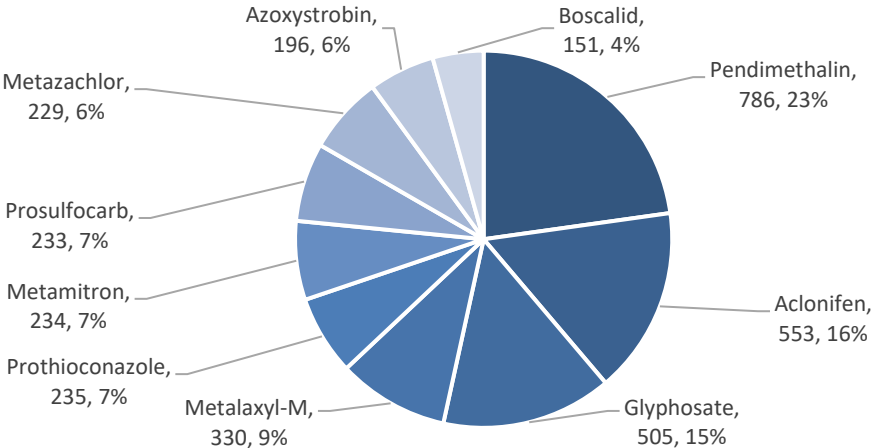


Figure 10: Comparison of the areas of outdoor vegetable crops treated (spha) with fungicides in Northern Ireland, 1991-2021.

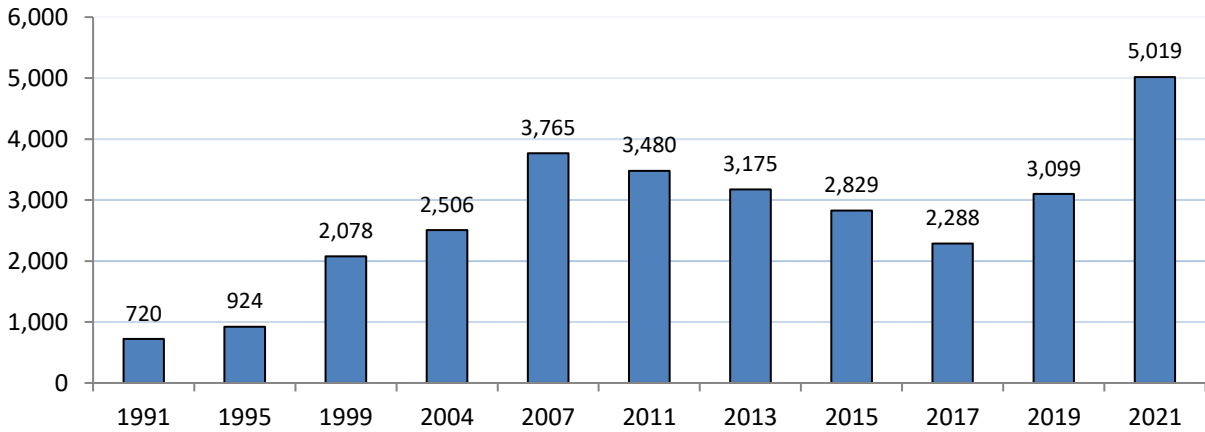


Figure 11: Comparison of the weight of fungicides applied (kg) to outdoor vegetable crops in Northern Ireland, 1991-2021.

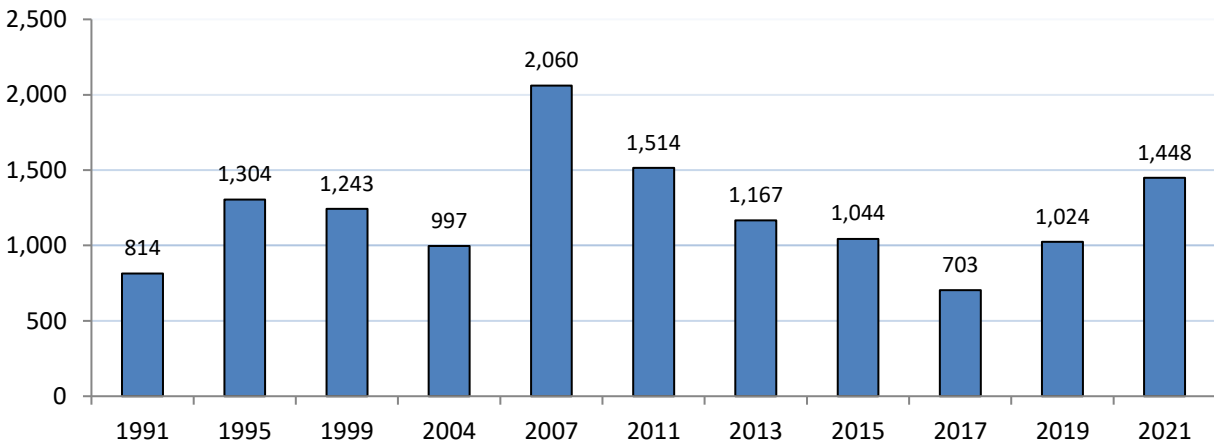


Figure 12: Comparison of the areas (spha) of outdoor vegetable crops treated with herbicides in Northern Ireland, 1991-2021.

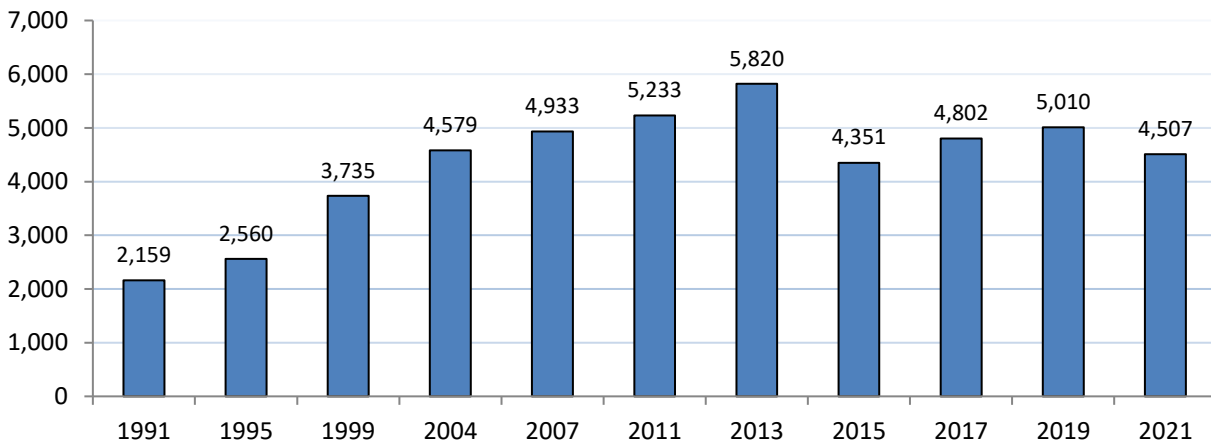


Figure 13: Comparison of the weight (kg) of herbicides applied to outdoor vegetable crops in Northern Ireland, 1991-2021.

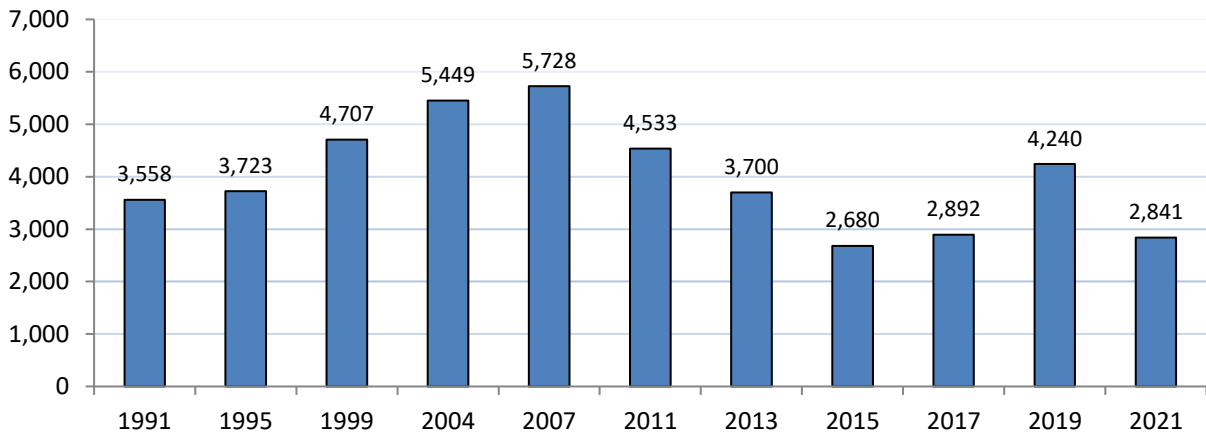


Figure 14: Comparison of the areas (spha) of outdoor vegetable crops treated with insecticides in Northern Ireland, 1991-2021.

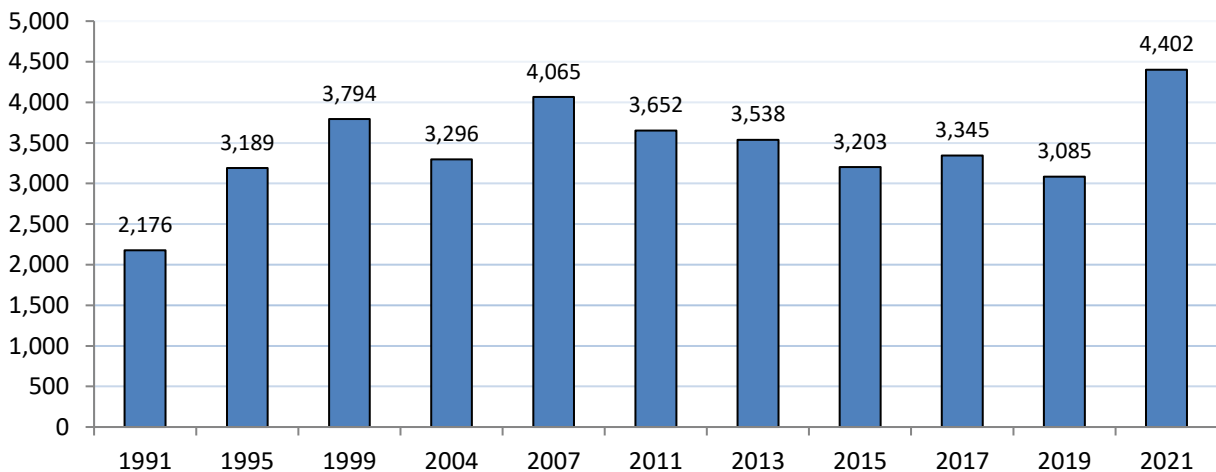


Figure 15: Comparison of the weight (kg) of insecticides applied to outdoor vegetable crops in Northern Ireland, 1991-2021.

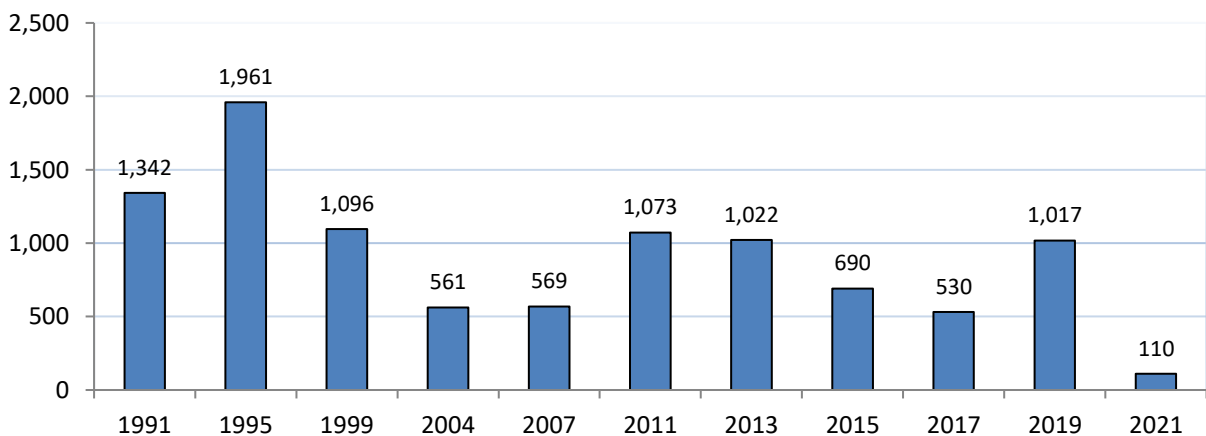


Figure 16: Comparison of the areas (spha) of outdoor vegetable crops treated with molluscicides in Northern Ireland, 1991-2021.

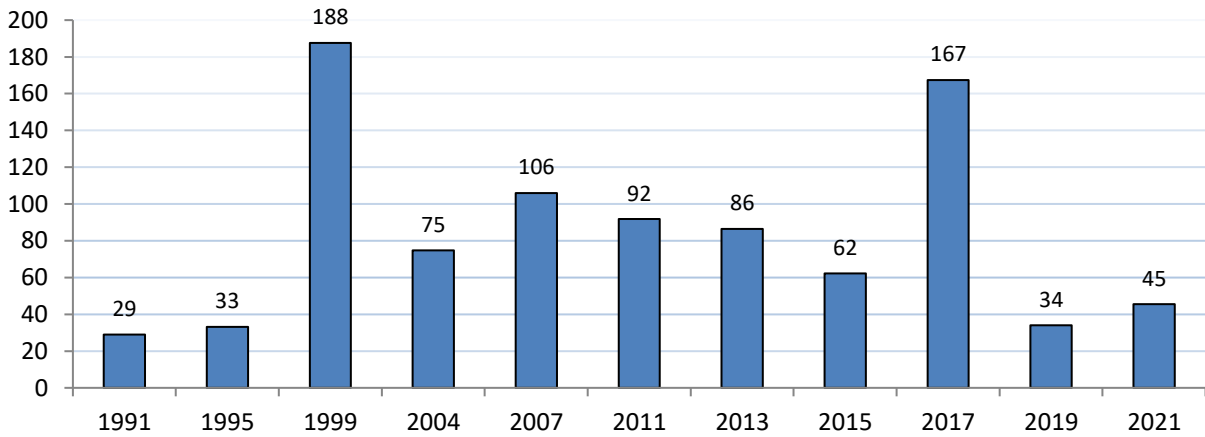


Figure 17: Comparison of the weight (kg) of molluscicides applied to outdoor vegetable crops in Northern Ireland, 1991-2021.

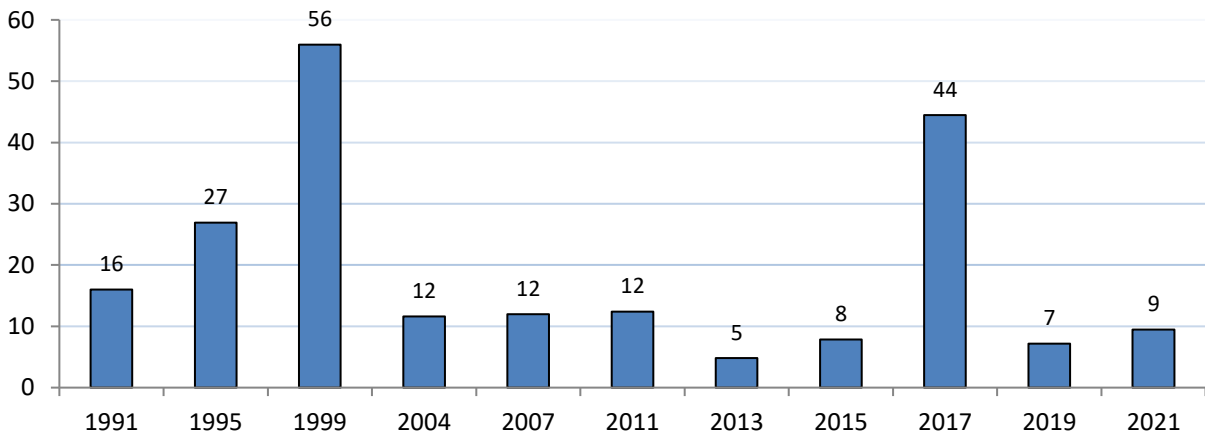


Figure 18: Comparison of the areas (spha) of outdoor vegetable crops with treated seed in Northern Ireland, 1991-2021.

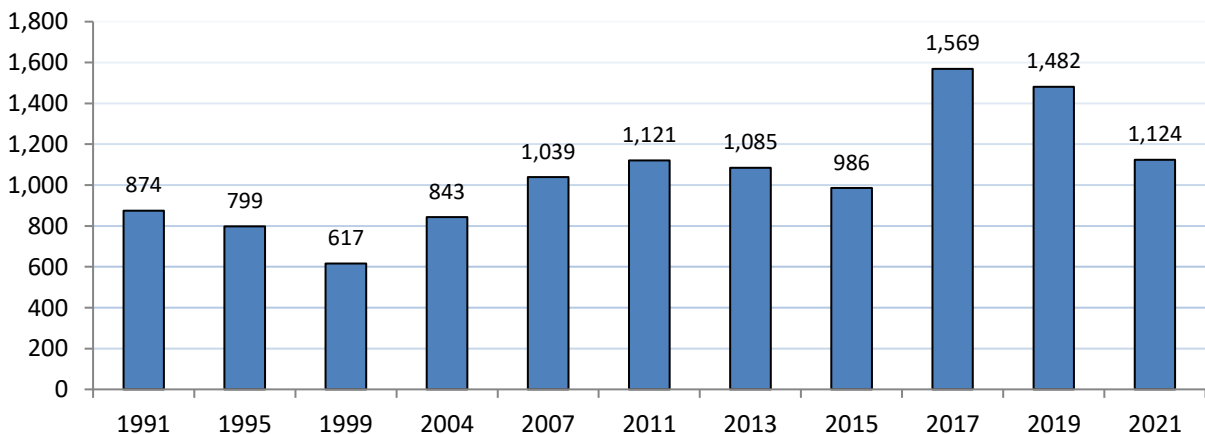
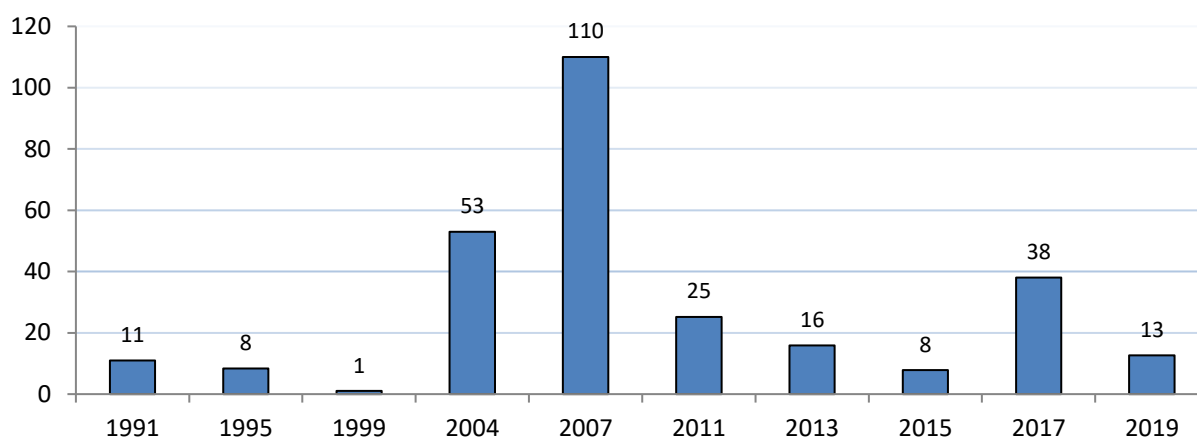


Figure 19: Comparison of the weight (kg) of seed treatments applied to outdoor vegetable crops in Northern Ireland, 1991-2021.



PESTICIDE USAGE ON CROPS (Tables 5 & 6)

An in-depth analysis of pesticide usage on the specific crops is contained on pages [17-53](#) 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](#). Courgette, rhubarb and squash received no pesticide treatments during this survey period.

Beetroot, spring cabbage, hard cabbage, kale, parsley, pumpkin, red cabbage and salad onions received no fungicide treatments. All crops were treated with an average of 2.4 herbicide applications.

Beetroot, kale, all leeks, pumpkin and salad onions received no insecticide treatments with the remainder receiving on average 2.5 insecticide applications. All hard cabbage

received on average 4 insecticide applications, for aphid control. Carrots received 5.0 insecticide applications and 84% of Savoy cabbage received 2.2 applications.

Autumn cauliflower (100%), broccoli (6%), summer cabbage (62%), pointed cabbage (47%), savoy cabbage (19%) and summer cauliflower (9%) received a single molluscicide application with the exception of 78% of Brussels sprouts crops which received 1.4 applications.

TOTAL PESTICIDE USAGE (Tables [8](#) & [9](#))

An estimated 4,424 kilograms of pesticide active ingredients were applied to 15,100 spray hectares of outdoor vegetable crops grown in Northern Ireland in 2021.

An estimated 90% of all fungicide applications were made to carrot and parsnip crops, with a further 7% 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 16% of the weight of fungicides used. The phenylamide systemic fungicide metalaxyl-M, applied exclusively to carrot and parsnip crops, accounted for 11% of the total fungicide-treated area and 23% of the total quantity used. The active substance azoxystrobin was applied to 16% of the total fungicide-treated area, accounting for 7% of the quantity of fungicides used and was applied mainly to carrot, parsnip crops.

Carrot and parsnip crops collectively accounted for 81% of all herbicide applications, with a further 29% being applied to brassica crops. Aclonifen accounted for 19% of both the total herbicide-treated area and the weight of herbicides applied. Pendamethalin, whilst accounting for 14% of the herbicide-treated area, accounted for 26% of the total weight of herbicides applied. With the exception of three formulations, herbicides were applied as single active substances.

Lambda-cyhalothrin accounted for 57% of the total insecticide-treated area and 23% of the quantity of insecticides applied. An estimated 45% of all applications of this active ingredient were applied to carrot and parsnip crops, for general insect control, aphids and carrot fly. Spirotetramat accounted for 18% of the total insecticide-treated area and 37% of the quantity of insecticides applied.

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 99% of all molluscicide applications accounting for 97% of the weight of all molluscicides applied.

Seed treatments applied to outdoor vegetable crops grown in 2021, accounted for 7% 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 (85%) and brassica seeds (10%). The three most widely used active ingredients and formulations were cymoxanil/fludioxonil/metalaxyl-m (56%), tefluthrin (33%) and fludioxinil (4%) and metalaxyl-m (7%). Seed treatments were applied to 85% of carrot and parsnip crops accounting for 98% 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

- 610 hectares of carrot and parsnip crops grown in Northern Ireland.
- 610 basic treated area (ha)
- 12,750 total treated area (spha)
- 3,597 kg applied
- Refer to Table 7 for proportional area treated and number of spray applications applied and Table 12 for reasons for use.

Figure 20: Pesticide usage on carrot and parsnip crops in Northern Ireland, 2021.

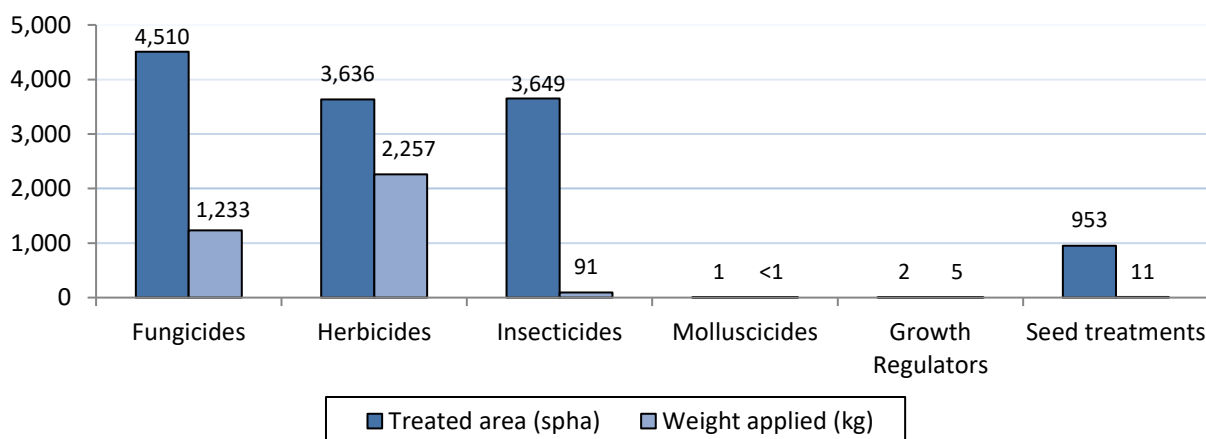


Figure 21: Regional distribution of carrot and parsnip crops grown (ha) in Northern Ireland, 2021.

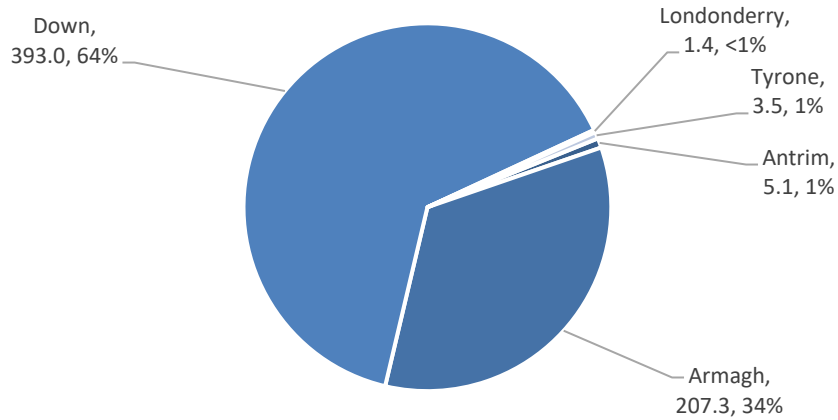


Figure 22: Pesticide usage (spha) on carrot and parsnip crops in Northern Ireland, 2021.

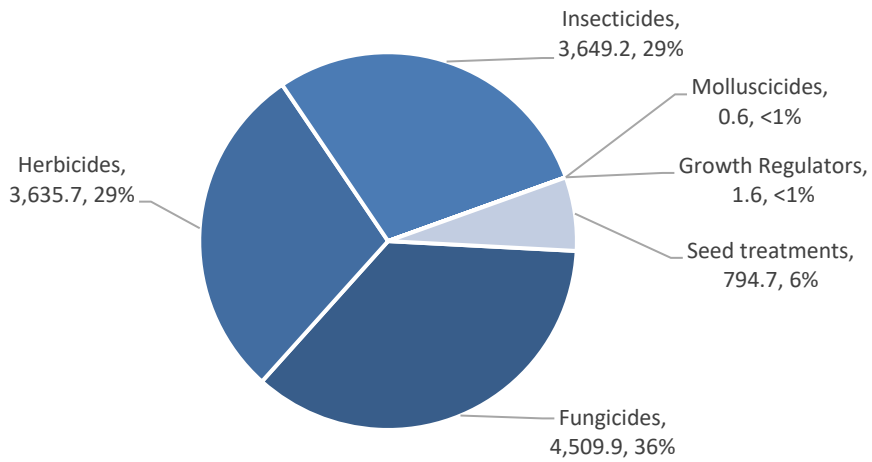
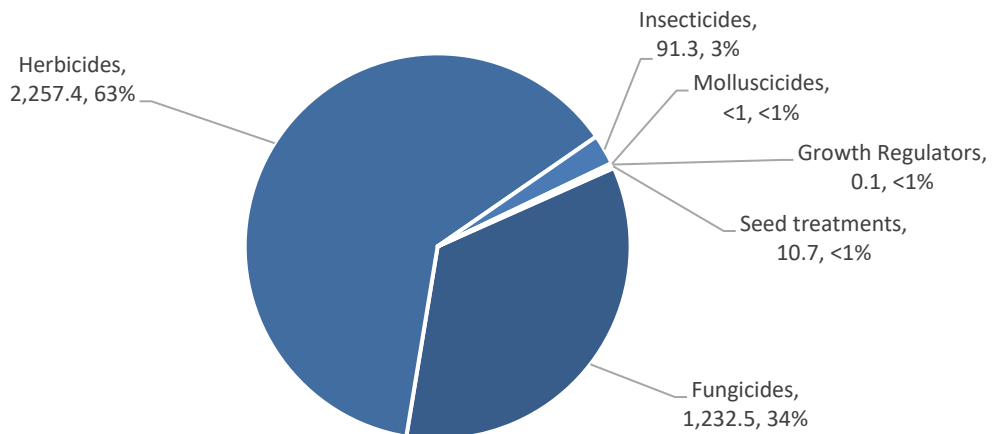


Figure 23: Weight of pesticides (kg) applied to carrot and parsnip crops in Northern Ireland, 2021.



Carrots and parsnips – Fungicides

- Basic treated area: 584 hectares
- Total treated area: 4,510 spray hectares
- Weight of active substances applied: 1,233 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
Prothioconazole	1,049.89	546.98	201.58	23
Azoxystrobin	728.94	370.51	92.63	16
Metalaxyl-M	565.37	565.37	329.33	13
Boscalid/pyraclostrobin	560.83	382.36	180.50	12
Tebuconazole/trifloxystrobin	400.97	398.44	90.22	9

Figure 24: Fungicide active substance usage (spha) on carrot and parsnip crops in Northern Ireland, 2021.

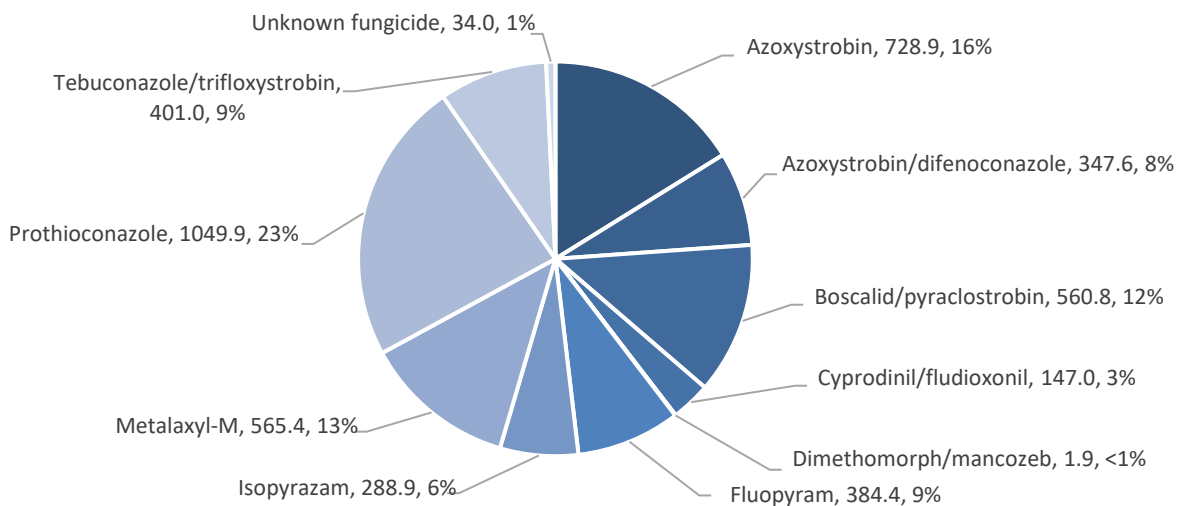


Figure 25: Weight of fungicide active substances (kg) applied to carrot and parsnip crops in Northern Ireland, 2021.

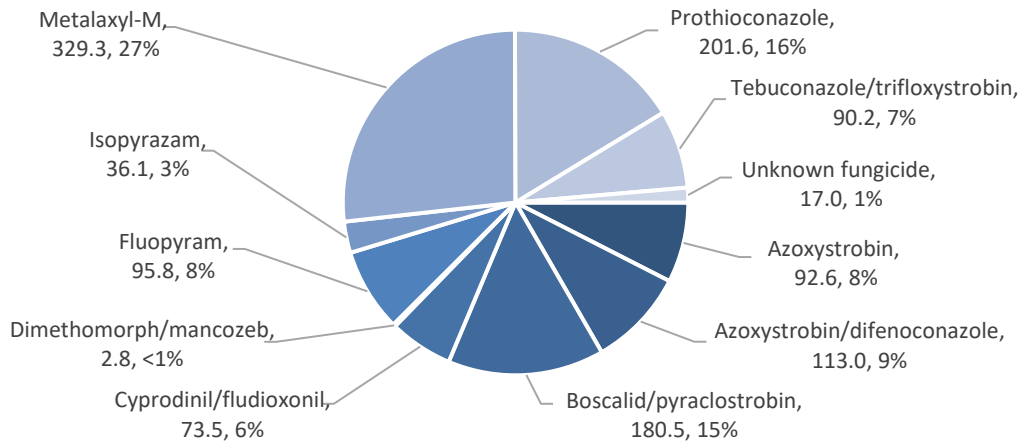
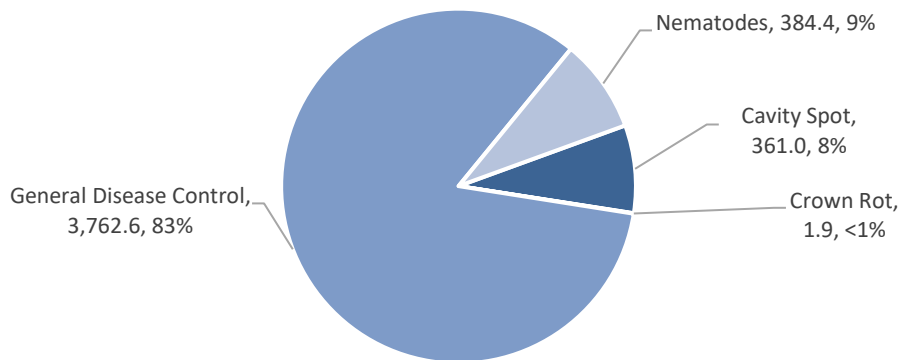


Figure 26: Carrot and parsnip crops NI 2021: reasons for fungicide use (spha).



Carrots and parsnips – Herbicides

- Basic treated area: 609 hectares
- Total treated area: 3,636 spray hectares
- Weight of active substances applied: 2,257 kg
- The active substances metribuzin was 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
Aclonifen	819.28	600.00	546.91	23
Metribuzin	723.29	374.00	101.36	20
Pendimethalin	606.46	606.27	722.49	17
Clomazone	413.54	413.54	29.72	11
Glyphosate	383.76	383.76	429.41	11

Figure 27: Herbicide active substance usage (spha) on carrot and parsnip crops in Northern Ireland, 2021.

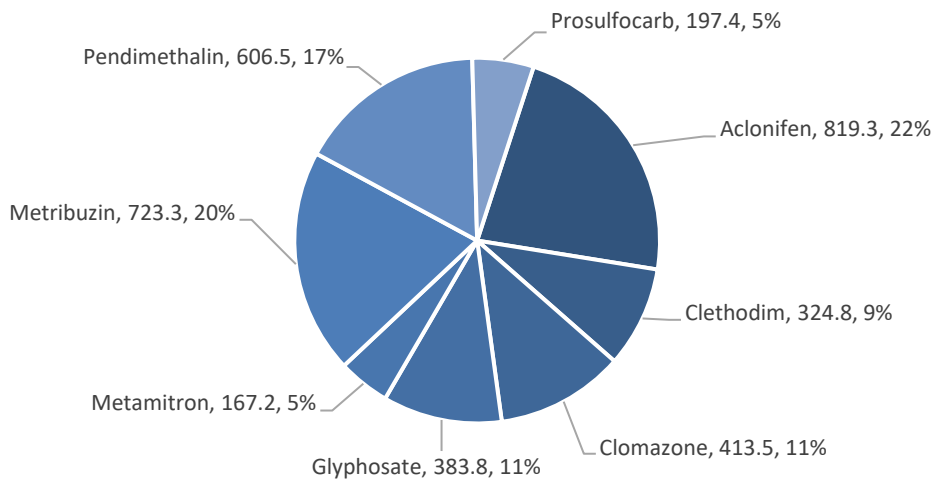


Figure 28: Weight of herbicide active substances (kg) applied to carrot and parsnip crops in Northern Ireland, 2021.

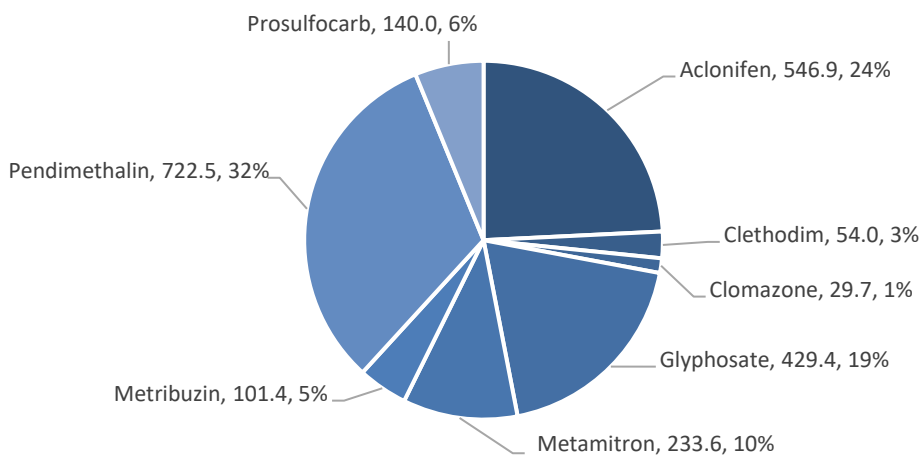
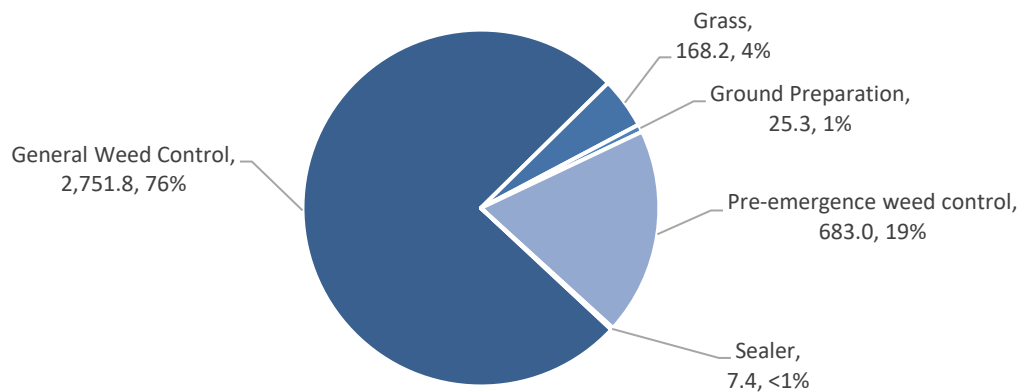


Figure 29: Carrot and parsnip crops NI 2021: reasons for herbicide use (spha).



Carrots and parsnips – Insecticides

- Basic treated area: 588 hectares
- Total treated area: 3,649 spray hectares
- Weight of active substances applied: 91 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	1,998.37	584.10	22.96	55
Spirotetramat	597.36	582.95	26.95	16
Deltamethrin	490.36	345.89	3.67	13
Cyantraniliprole	418.38	418.38	29.75	11
Chlorantraniliprole	144.47	144.47	5.06	4

Figure 30: Insecticide active substance usage (spha) on carrot and parsnip crops in Northern Ireland, 2021.

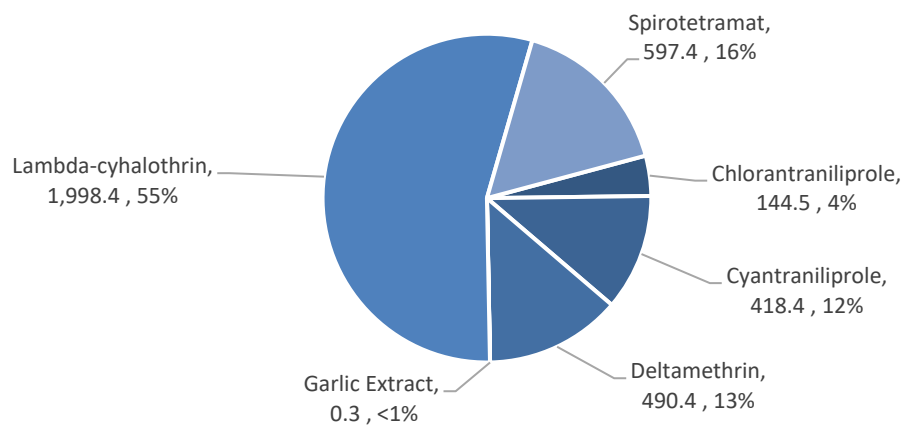


Figure 31: Weight of insecticide active substances (kg) applied to carrot and parsnip crops in Northern Ireland, 2021.

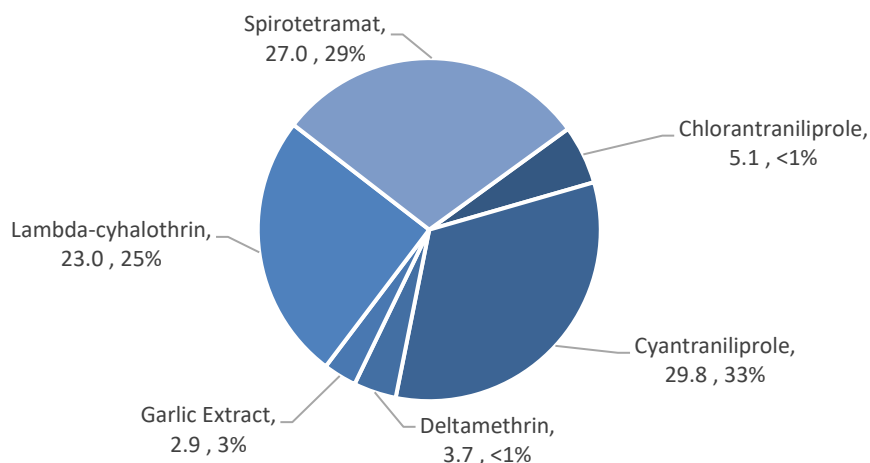
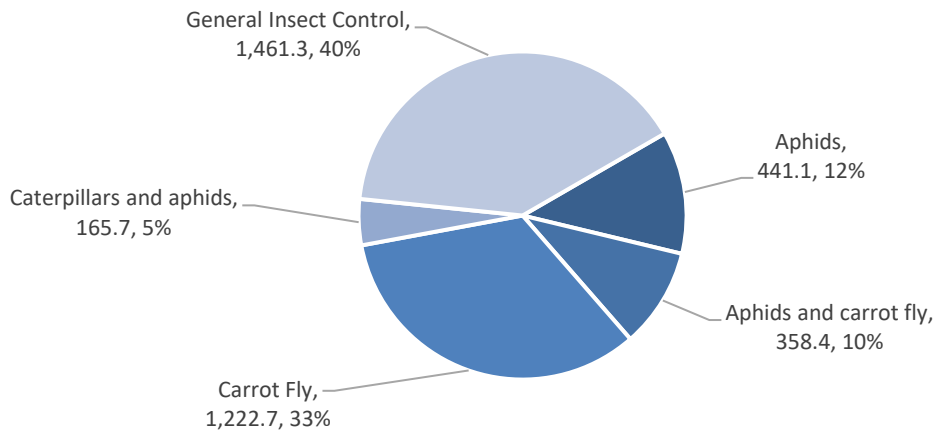


Figure 32: Carrot and parsnip crops NI 2021: reasons for insecticide use (spha).



PESTICIDE USAGE ON TURNIPS AND SWEDES

- 151 hectares of turnip and swede crops grown in Northern Ireland.
- 151 basic treated area (ha)
- 750 total treated area (spha)
- 128 kg applied
- Refer to Table 7 for proportional area treated and number of spray applications applied and Table 13 for reasons for use.

Figure 33: Pesticide usage on turnip and swede crops in Northern Ireland, 2021.

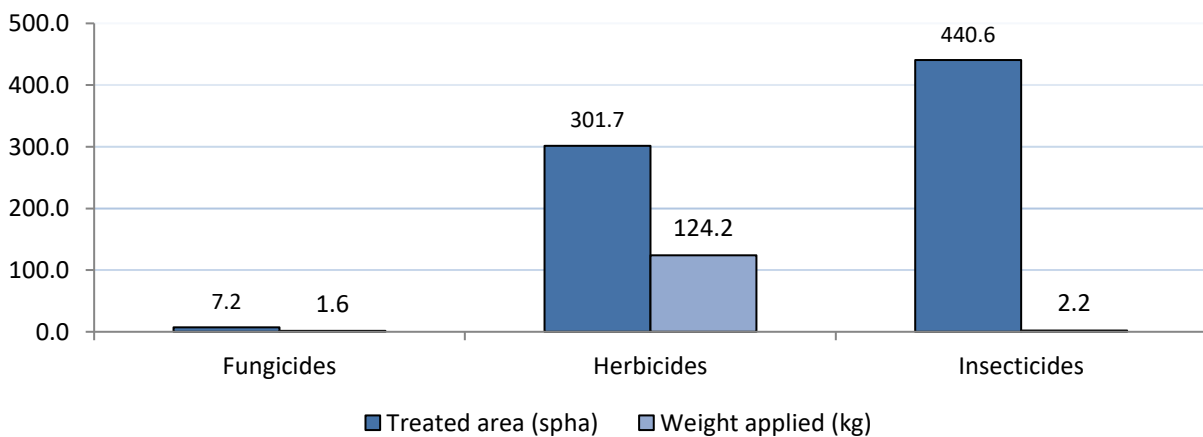


Figure 34: Regional distribution of turnip and swede crops grown (ha) in Northern Ireland, 2021.

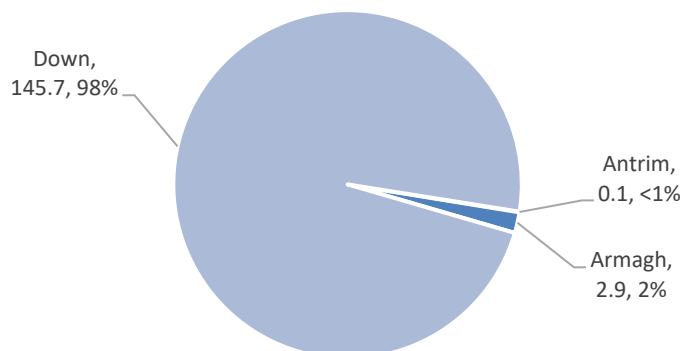


Figure 35: Pesticide usage (spha) on turnip and swede crops in Northern Ireland, 2021.

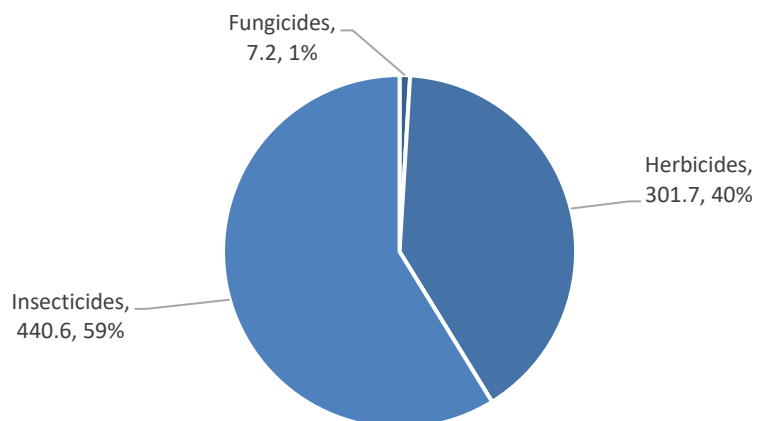
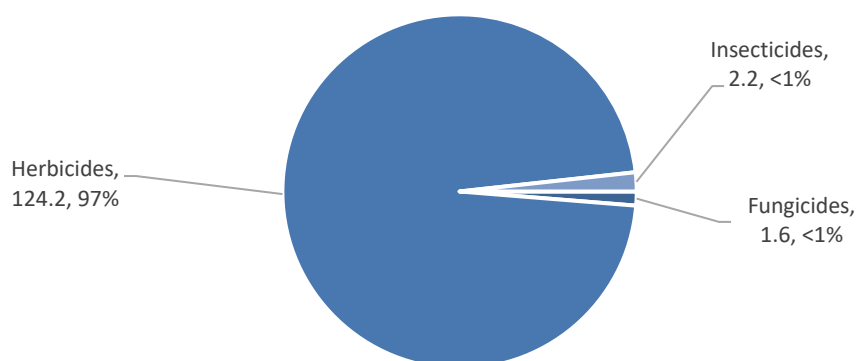


Figure 36: Weight of pesticides (kg) applied to turnip and swede crops in Northern Ireland, 2021.



Turnips and swedes – Fungicides

- Basic treated area: 4 hectares
- Total treated area: 7 spray hectares
- Weight of active substances applied: 2 kg
- The three formulations and active substances applied were:

Active substance	Total treated area (spha)	Basic treated area (ha)	Quantity applied (kg)	% of the treated area
Azoxystrobin	1.3	1.3	0.3	18
Prothioconazole	3.6	3.6	0.7	50
Tebuconazole/trifloxystrobin	2.3	2.3	0.6	32

Figure 37: Fungicide active substance usage (spha) on turnip and swede crops in Northern Ireland, 2021.

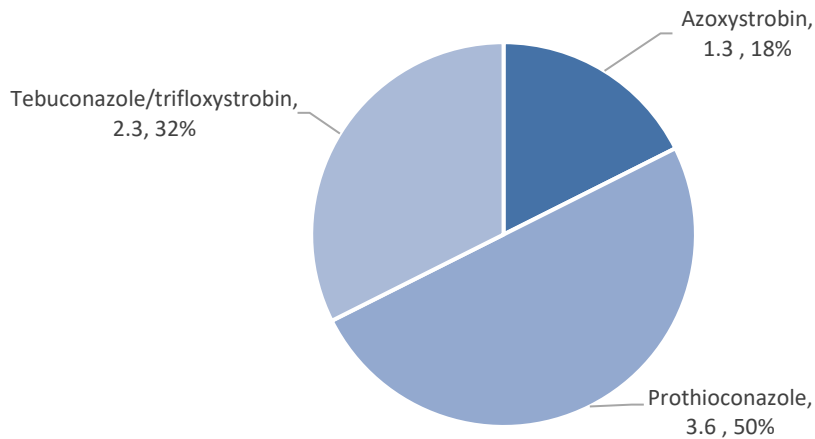
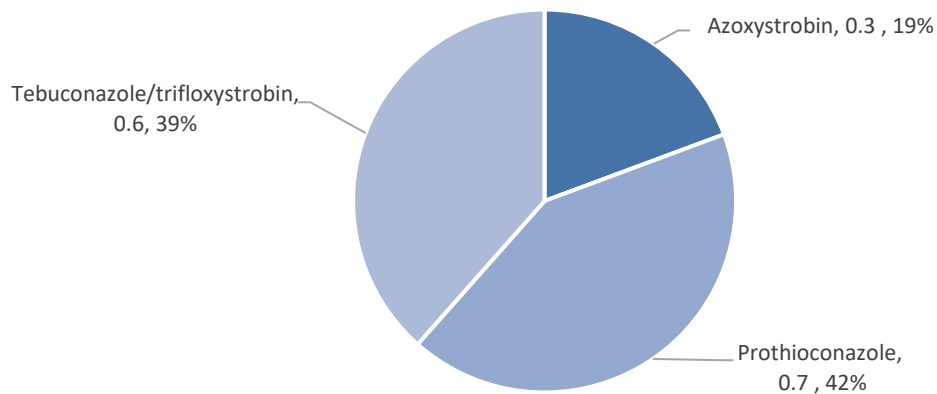


Figure 38: Weight of fungicide active substance usage (kg) on turnip and swede crops in Northern Ireland, 2021.



Turnips and swedes – Herbicides

- Basic treated area: 151 hectares
- Total treated area: 302 spray hectares
- Weight of active substances applied: 124 kg
- The herbicide active substances applied were:

Active substance	Total treated area (spha)	Basic treated area (ha)	Quantity applied (kg)	% of the treated area
Clomazone	150.8	150.8	10.7	50
Metazachlor	149.3	149.3	111.4	49
S-metolachlor	1.6	1.6	2.1	1

Figure 39: Herbicide active substance usage (spha) on turnip and swede crops in Northern Ireland, 2021.

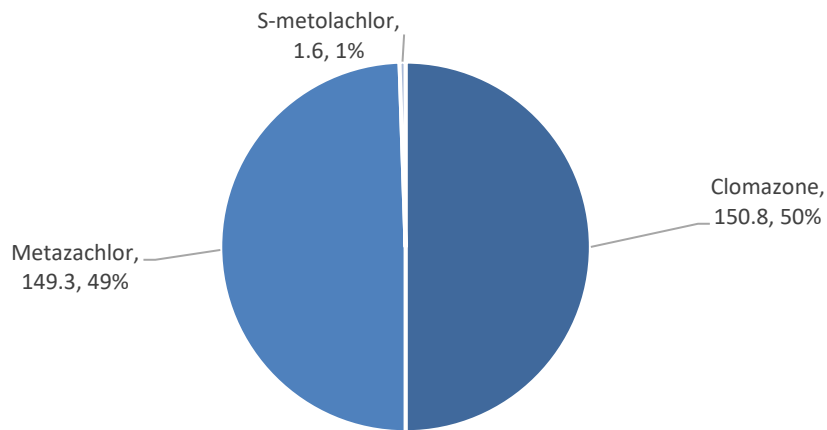


Figure 40: Weight of herbicide active substance usage (kg) on turnip and swede crops in Northern Ireland, 2021.

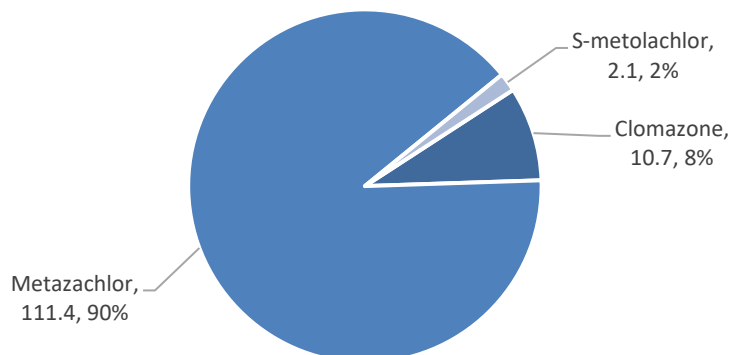
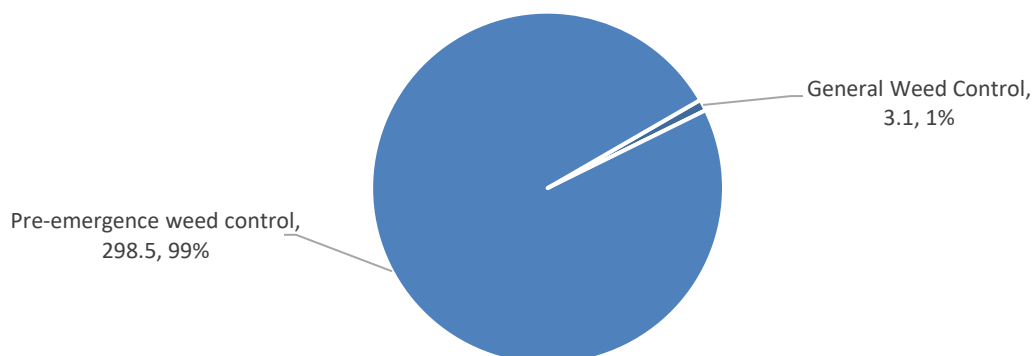


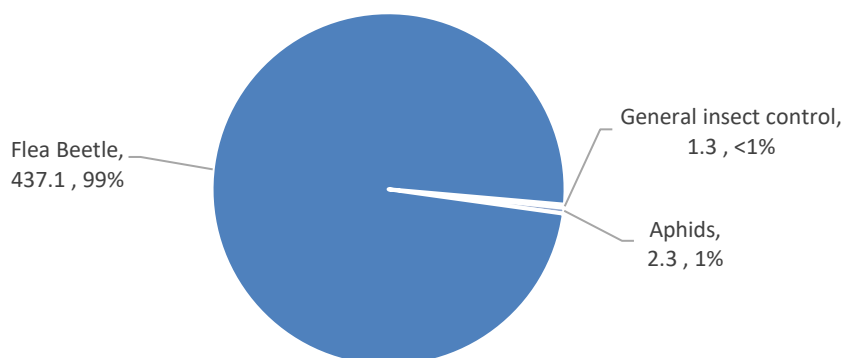
Figure 41: Turnip and swede crops NI 2021: reasons for herbicide use (spha).



Turnips and swedes – Insecticides

- Basic treated area: 149 hectares
- Total treated area: 440 spray hectares
- Weight of active substances applied: 2.2 kg
- The only insecticide active substance applied were lambda-cyhalothrin.

Figure 42: Turnip and swede crops NI 2021: reasons for insecticide use (spha).



PESTICIDE USAGE ON LEAFY AND FLOWERHEAD BRASSICAS

- 189 hectares of leafy and flowerhead brassica crops grown in Northern Ireland.
- 188 basic treated area (ha)
- 1,169 total treated area (spha)
- 433 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 Table 14 for reasons for use.

Figure 43: Pesticide usage on leafy and flowerhead brassica crops in Northern Ireland, 2021.

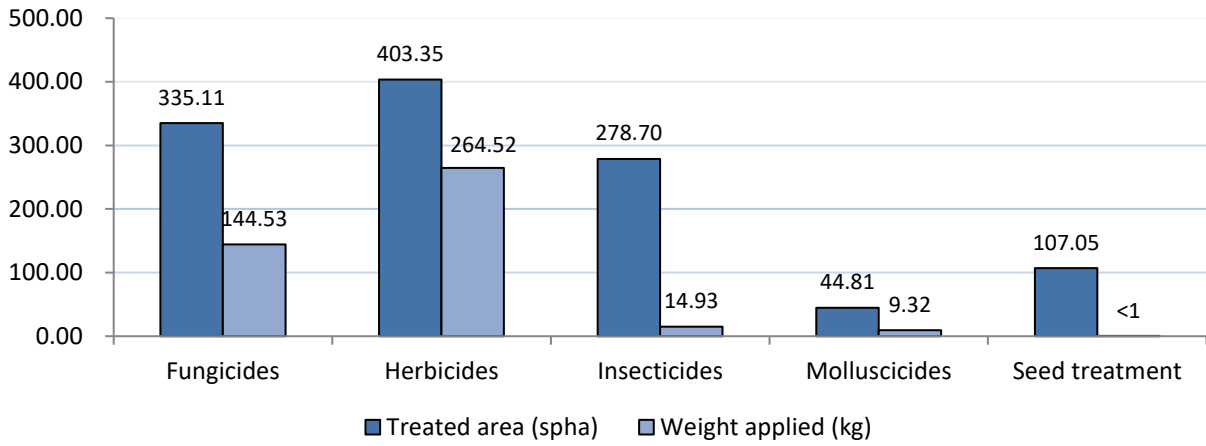


Figure 44: Regional distribution of leafy and flowerhead brassica crops grown (ha) in Northern Ireland, 2021.

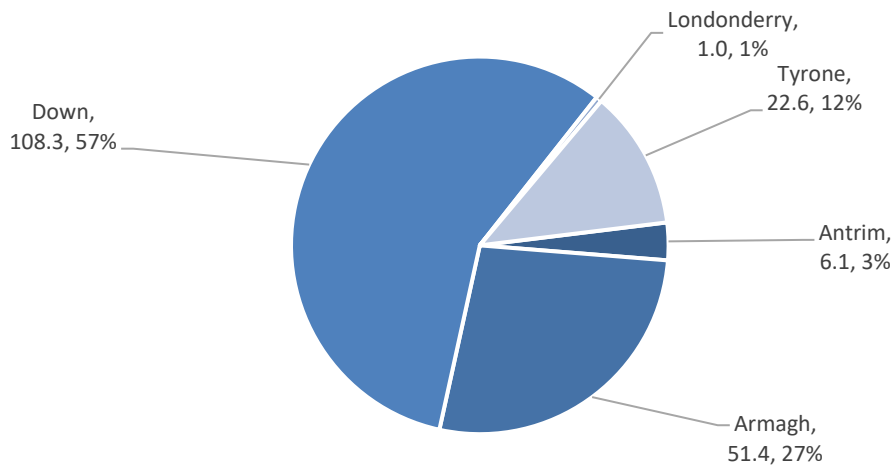


Figure 45: Pesticide usage (spha) on leafy and flowerhead brassica crops in Northern Ireland, 2021.

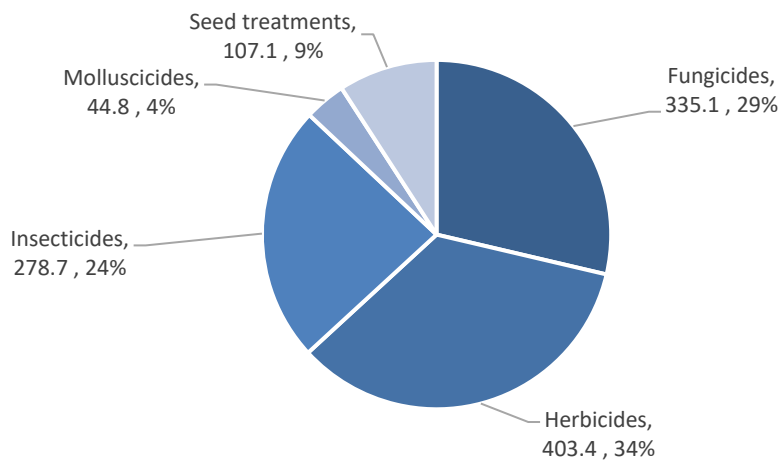
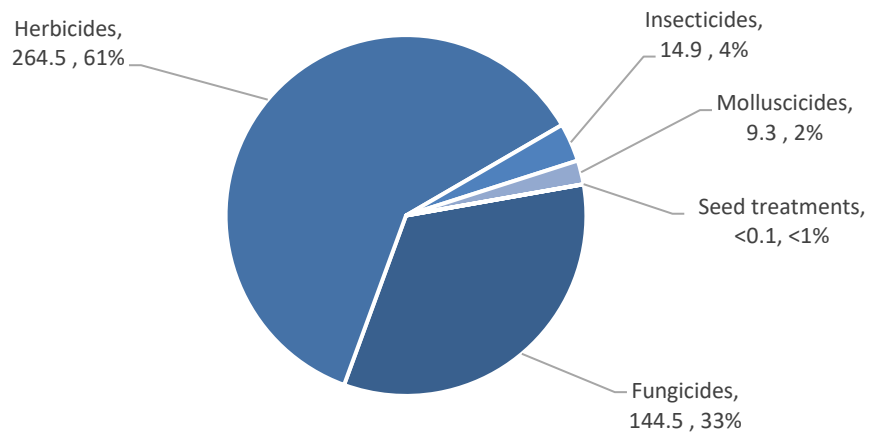


Figure 46: Weight of pesticides (kg) applied to leafy and flowerhead brassica crops in Northern Ireland, 2021.



Leafy and flowerhead brassicas – Fungicides

- Basic treated area: 163 hectares
- Total treated area: 335 spray hectares
- Weight of active substances applied: 145 kg
- The only reason for use was general disease control
- 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
Prothioconazole	1,049.89	546.98	201.58	23
Azoxystrobin	728.94	370.51	92.63	16
Metalaxyl-M	565.37	565.37	329.33	13
Boscalid/pyraclostrobin	560.83	382.36	180.50	12
Tebuconazole/trifloxystrobin	400.97	398.44	90.22	9

Figure 47: Fungicide active substance usage (spha) on leafy and flowerhead brassica crops in Northern Ireland, 2021.

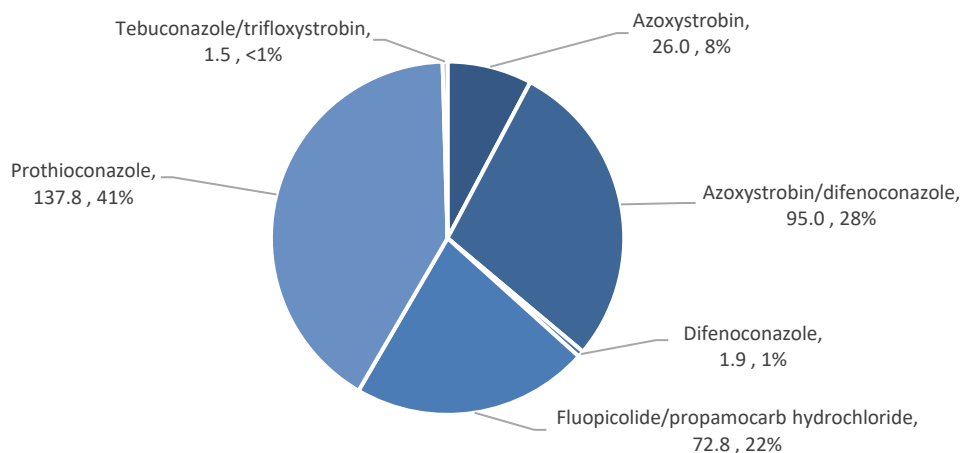
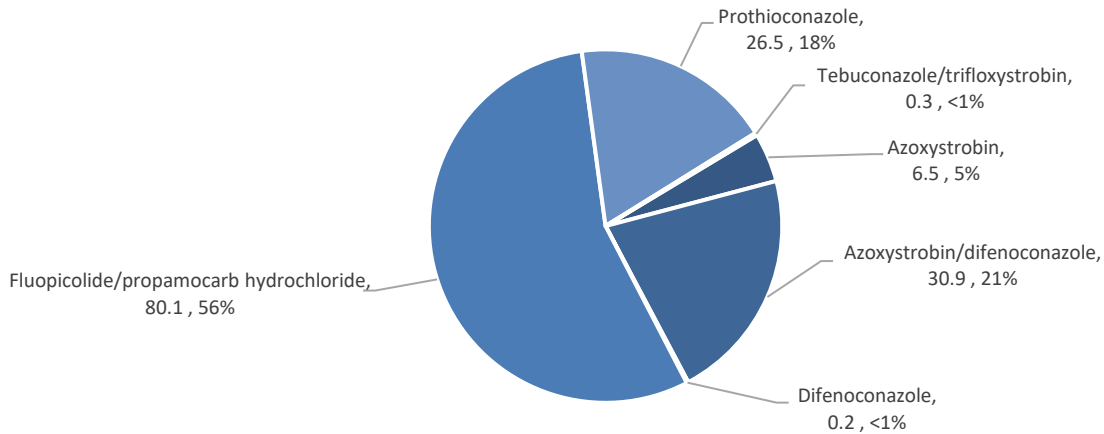


Figure 48: Weight of fungicide active substances (kg) applied to leafy and flowerhead brassica crops in Northern Ireland, 2021.



Leafy and flowerhead brassicas – Herbicides

- Basic treated area: 186 hectares
- Total treated area: 403 spray hectares
- Weight of active substances applied: 265 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	157.0	157.0	117.8	38.9
Clomazone	109.3	109.3	8.4	27.1
Pyridate	79.0	79.0	68.3	19.6
Glyphosate	45.6	45.6	57.5	11.3
Pendimethalin	12.5	12.5	12.6	3.1

Figure 49: Herbicide active substance usage (spha) on leafy and flowerhead brassica crops in Northern Ireland, 2021.

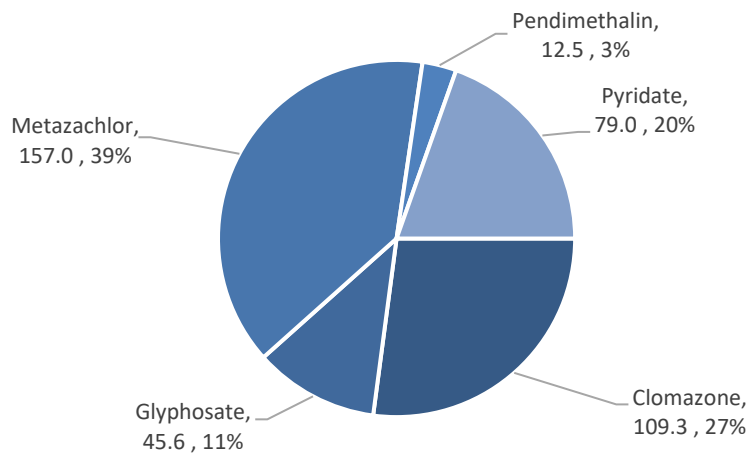


Figure 50: Weight of herbicide active substance usage (kg) on leafy and flowerhead brassica crops in Northern Ireland, 2021.

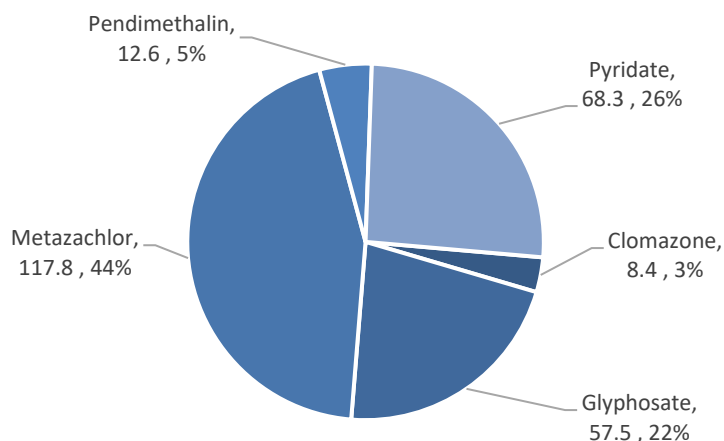
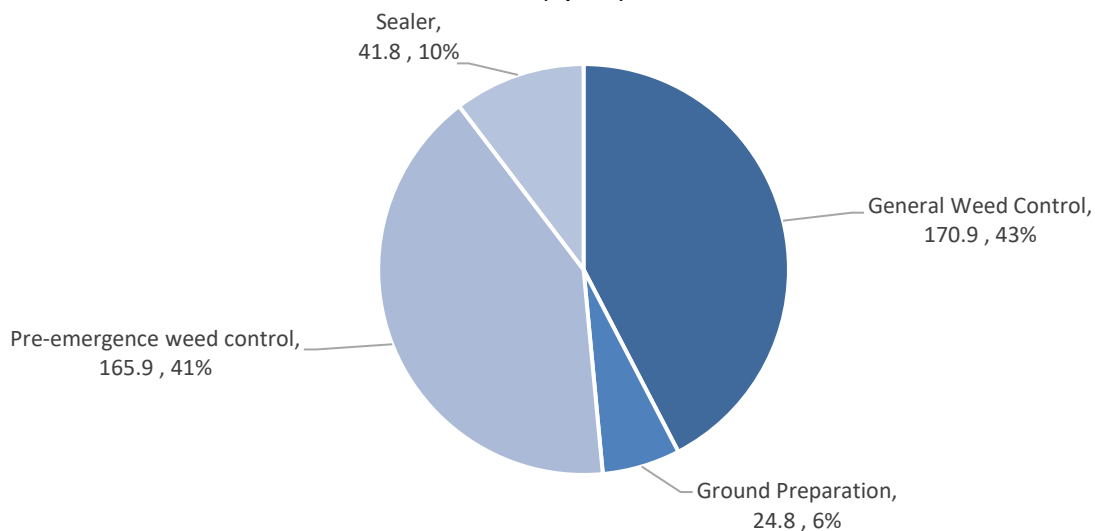


Figure 51: Leafy and flowerhead brassica crops NI 2021: reasons for herbicide use (spha)



Leafy and flowerhead brassicas – Insecticides

- Basic treated area: 170 hectares
- Total treated area: 279 spray hectares
- Weight of active substances applied: 15kg
- 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
Spirotetramat	179.9	156.6	13.4	64.5
Lambda-cyhalothrin	59.2	53.2	0.6	21.2
Indoxacarb	31.5	24.5	0.8	11.3
Deltamethrin	5.8	5.8	0.0	2.1
Cyantraniliprole	1.5	1.5	0.1	0.5

Figure 52: Insecticide active substance usage (spha) on leafy and flowerhead brassica crops in Northern Ireland, 2021.

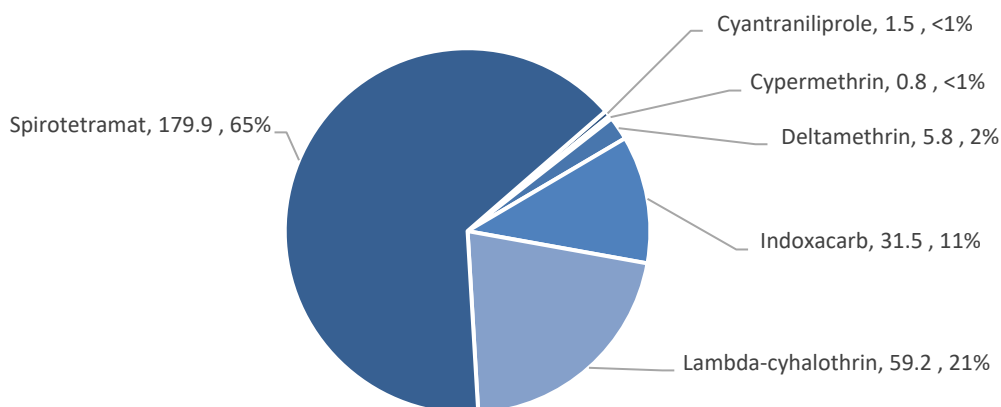


Figure 53: Weight of insecticide active substance usage (kg) on leafy and flowerhead brassica crops in Northern Ireland, 2021.

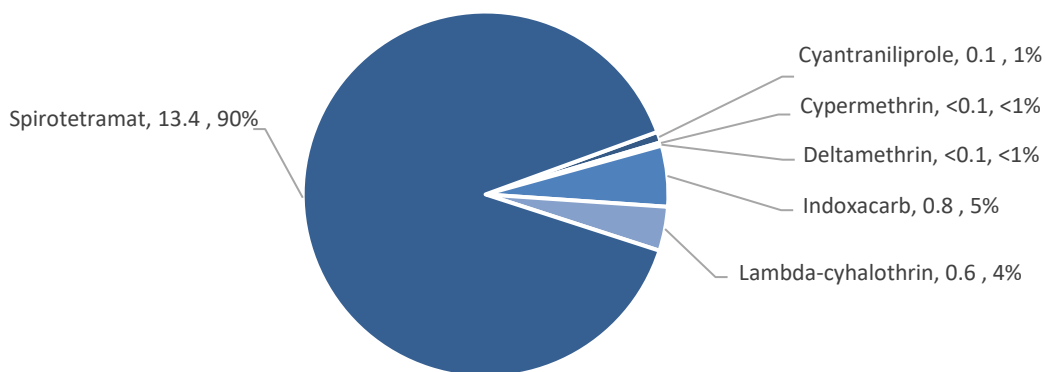
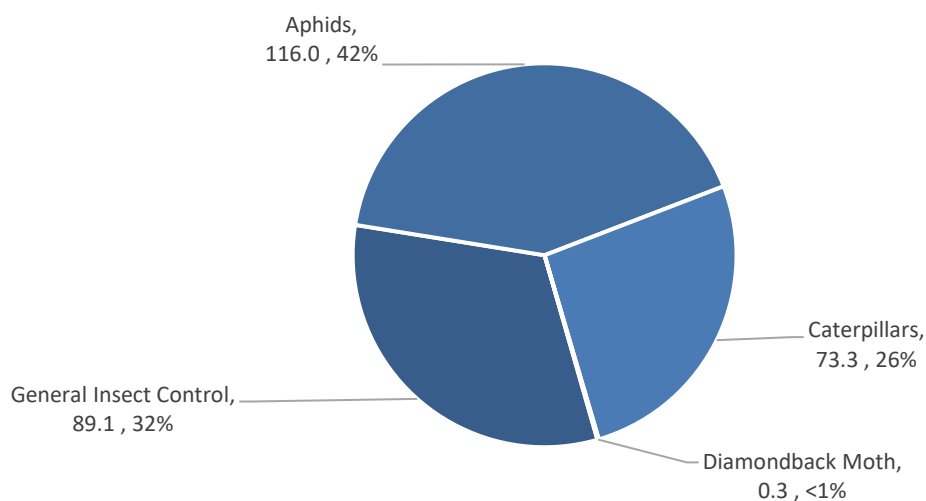


Figure 54: Leafy and flowerhead brassica crops NI 2021: reasons for insecticide use (spha).



PESTICIDE USAGE ON ONIONS AND LEEKS

- 29 hectares of onion and leek crops grown in Northern Ireland
- 29 basic treated area (ha)
- 188 total treated area (spha)
- 110 kg applied
- ‘Onions and leeks’: refers to summer salad onions and winter salad onions, summer scallions and winter scallions, 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 Table 15 for reasons for use.

Figure 55: Pesticide usage on onion and leek crops in Northern Ireland, 2021.

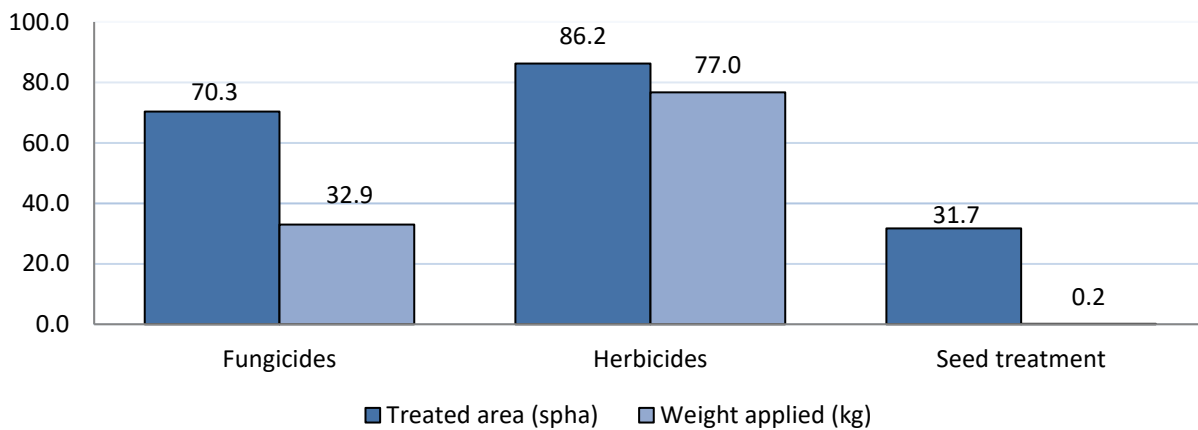


Figure 56: Regional distribution of onion and leek crops grown (ha) in Northern Ireland, 2021.

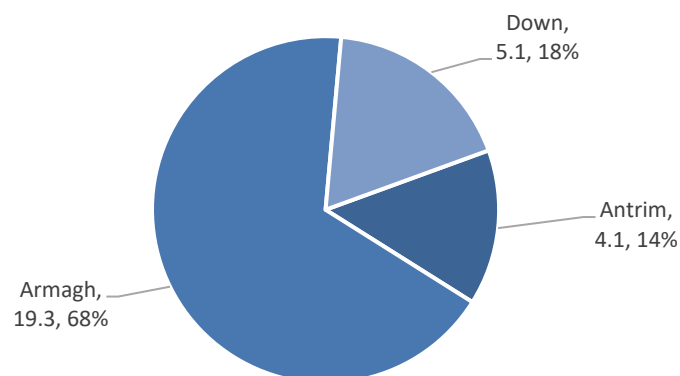


Figure 57: Pesticide usage (spha) on onion and leek crops in Northern Ireland, 2021.

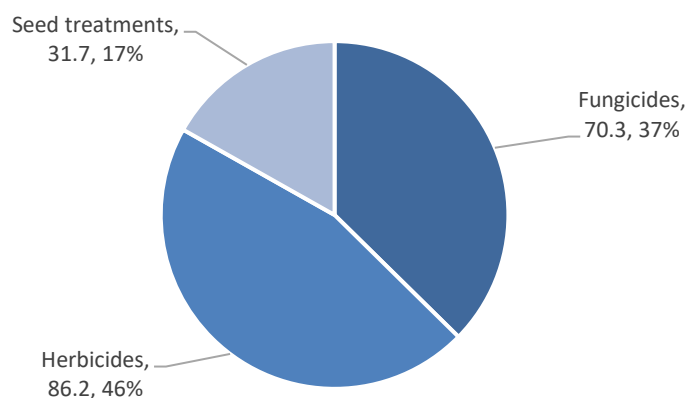
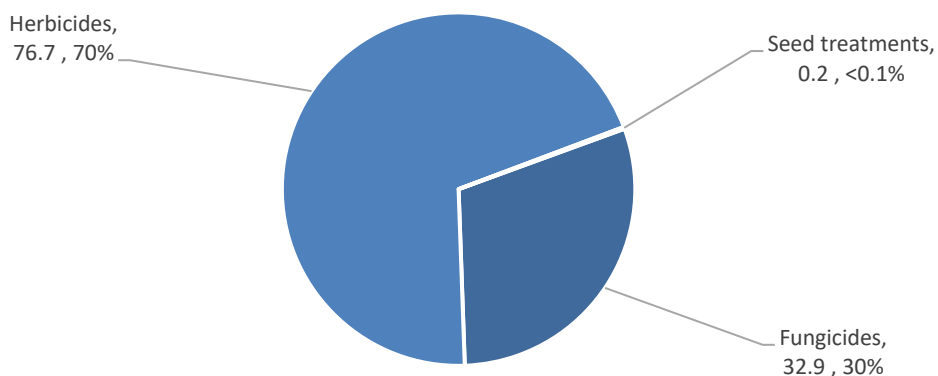


Figure 58: Weight of pesticides (kg) applied to onion and leek crops in Northern Ireland, 2021.



Onions and leeks – Fungicides

- Basic treated area: 21 hectares
- Total treated area: 70 spray hectares
- Weight of active substances applied: 33 kg
- The reason for use was only general disease control
- 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	33.6	18.0	6.5	47.8
Fluopicolide/propamocarb hydrochloride	16.7	16.7	18.0	23.8
Tebuconazole/trifloxystrobin	15.6	15.6	4.2	22.1
Dimethomorph/mancozeb	2.6	1.9	3.8	3.6
Azoxystrobin	1.9	1.9	0.5	2.6

Figure 59: Fungicide active substance usage (spha) on onion and leek crops in Northern Ireland, 2021.

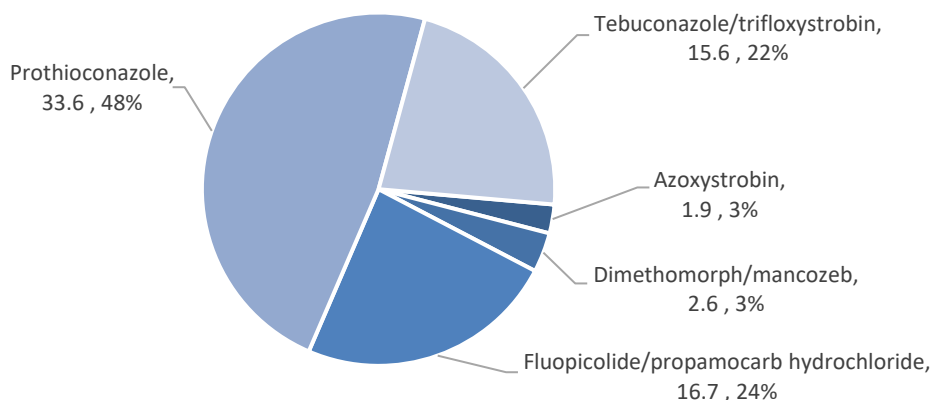
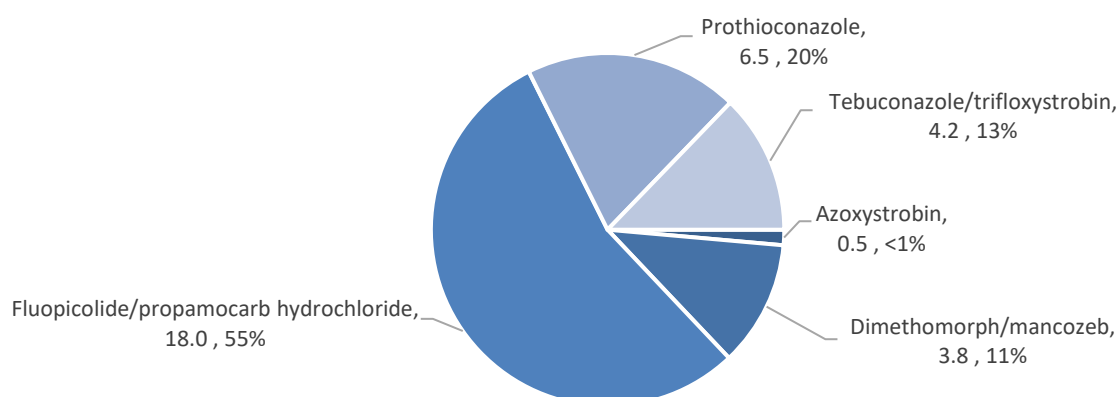


Figure 60: Weight of fungicide active substances (kg) applied to onion and leek crops in Northern Ireland, 2021.



Onions and leeks – Herbicides

- Basic treated area: 26 hectares
- Total treated area: 86 spray hectares
- Weight of active substances applied: 77 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
Dimethenamid-P/pendimethalin	23.4	23.4	25.0	27.2
Prosulfocarb	21.0	18.2	37.4	24.3
Aclonifen	16.7	16.7	3.0	19.4
Pendimethalin	8.8	8.8	5.4	10.2
Bromoxynil	5.8	2.9	0.5	6.7

Figure 61: Herbicide active substance usage (spha) on onion and leek crops in Northern Ireland, 2021.

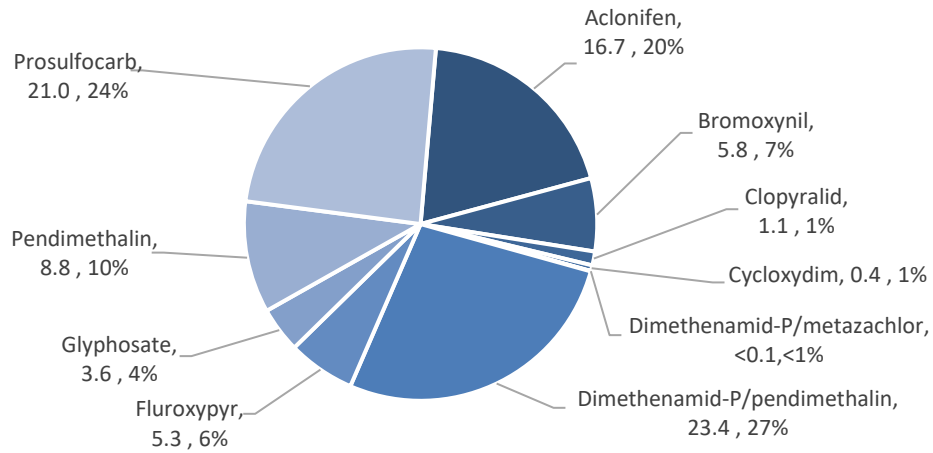


Figure 62: Weight of herbicide active substance usage (kg) on onion and leek crops in Northern Ireland, 2021.

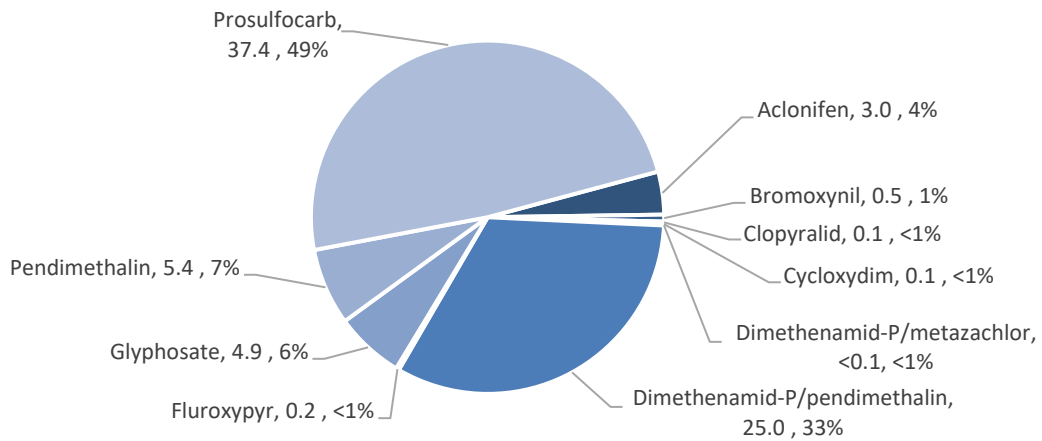
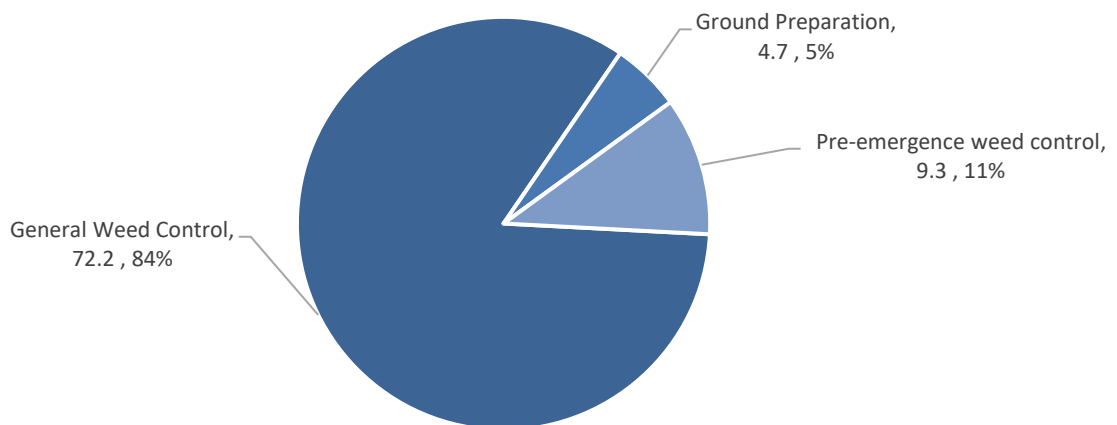


Figure 63: Onion and leek crops NI 2021: reasons for herbicide use (spha).



PESTICIDE USAGE ON CELERY AND PARSLEY

- 19 hectares of celery and parsley crops grown in Northern Ireland
- 19 basic treated area (ha)
- 92 total treated area (spha)
- 91 kg applied
- Celery and parsley crops were grown primarily in County Down
- ‘Celery and parsley’ refers to soup celery, table celery and parsley.
- Refer to Table 7 for proportional area treated and number of spray applications applied and Table 16 for reasons for use.

Figure 64: Pesticide usage on celery and parsley crops in Northern Ireland, 2021.

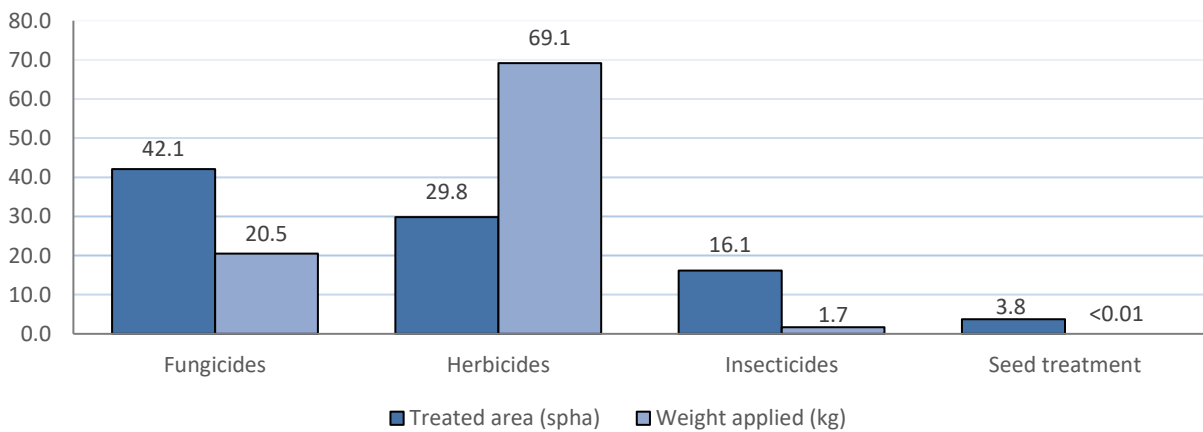


Figure 65: Pesticide usage (spha) on celery and parsley crops in Northern Ireland, 2021.

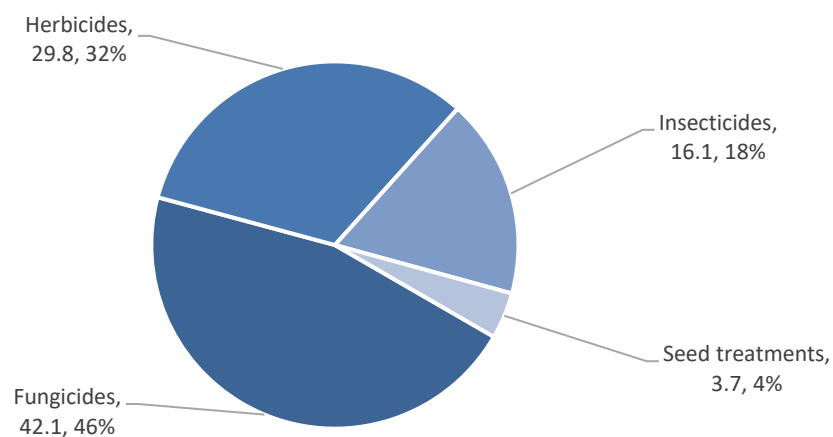
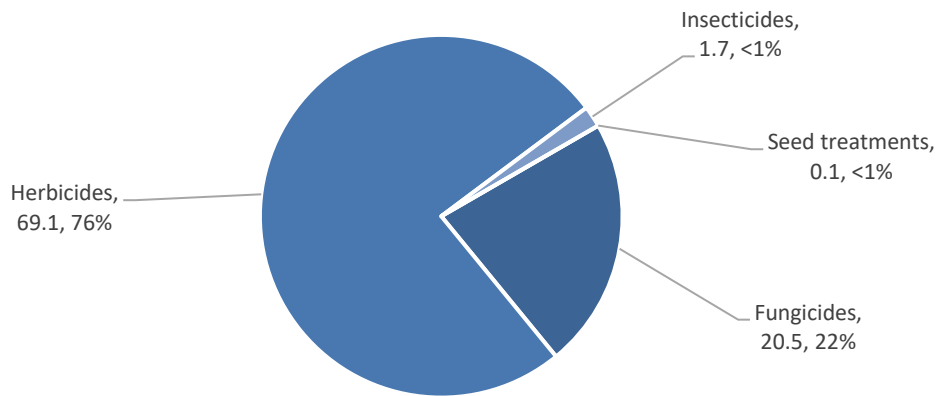


Figure 66: Weight of pesticides (kg) applied to celery and parsley crops in Northern Ireland, 2021.



Celery and parsley – Fungicides

- Basic treated area: 15 hectares
- Total treated area: 42 spray hectares
- Weight of active substances applied: 20 kg
- General disease control were the only reasons given for use
- The fungicide active substances applied were:

Active substance	Total treated area (spha)	Basic treated area (ha)	Quantity applied (kg)	% of the treated area
Azoxystrobin	14.98	14.98	3.74	36
Tebuconazole/trifloxystrobin	14.98	14.98	3.37	36
Fluopicolide/propamocarb hydrochloride	12.14	12.14	13.35	29

Figure 67: Fungicide active substance usage (spha) on celery and parsley crops in Northern Ireland, 2021.

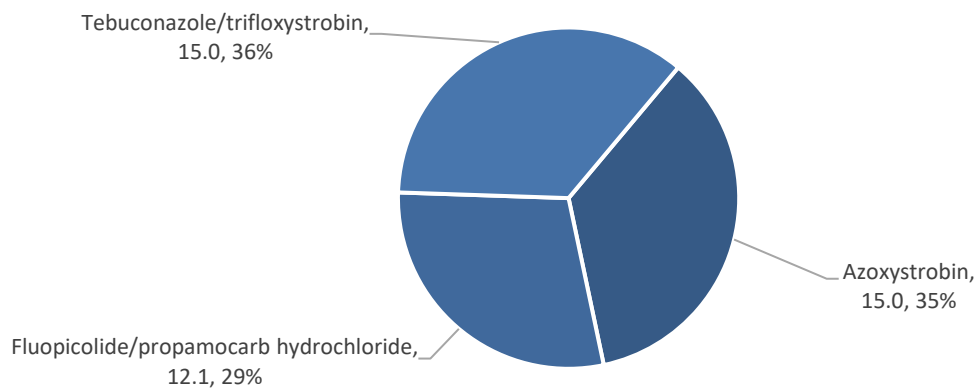
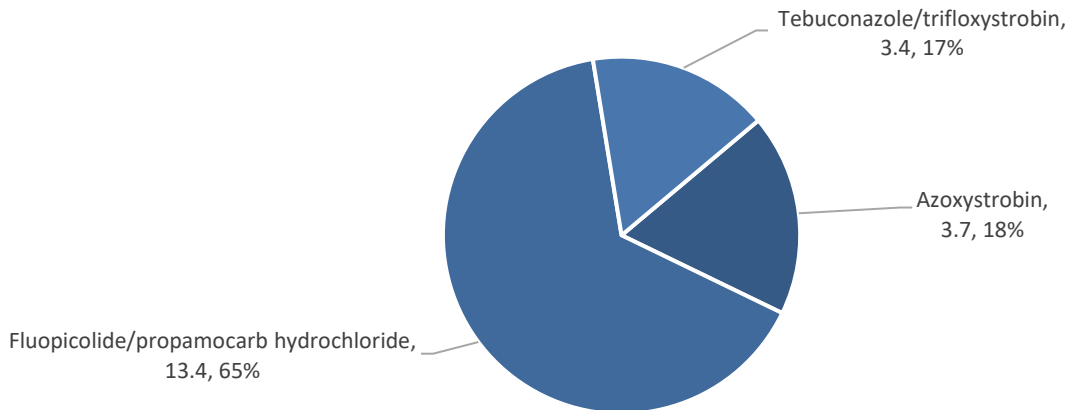


Figure 68: Weight of fungicide active substances (kg) applied to celery and parsley crops in Northern Ireland, 2021.



Celery and parsley – Herbicides

- Basic treated area: 19 hectares
- Total treated area: 30 spray hectares
- Weight of active substances applied: 269 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	16.1	16.1	55.8	54.2
Aclonifen	6.8	6.8	3.1	22.9
Glyphosate	4.0	4.0	7.2	13.4
Pendimethalin	2.8	2.8	3.0	9.5

Figure 69: Herbicide active substance usage (spha) on celery and parsley crops in Northern Ireland, 2021.

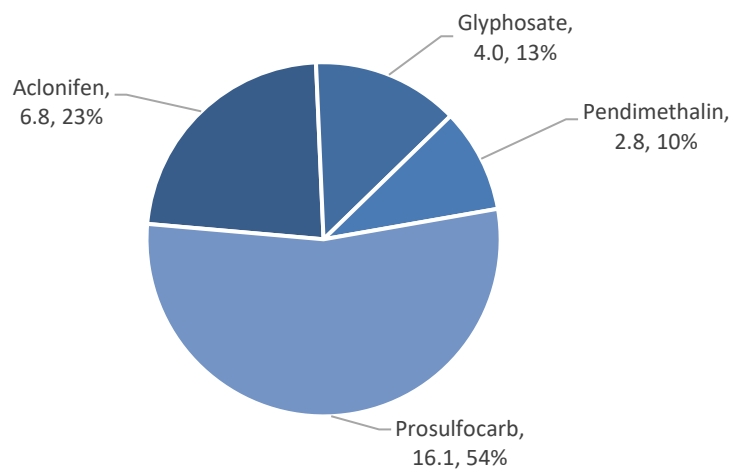


Figure 70: Weight of herbicide active substance usage (kg) on celery and parsley crops in Northern Ireland, 2021.

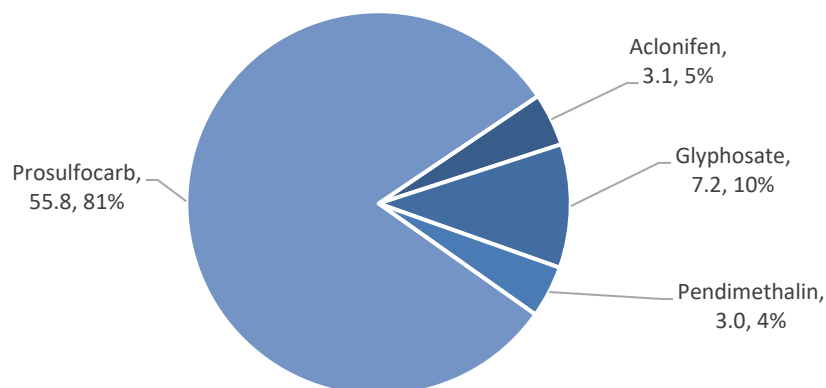
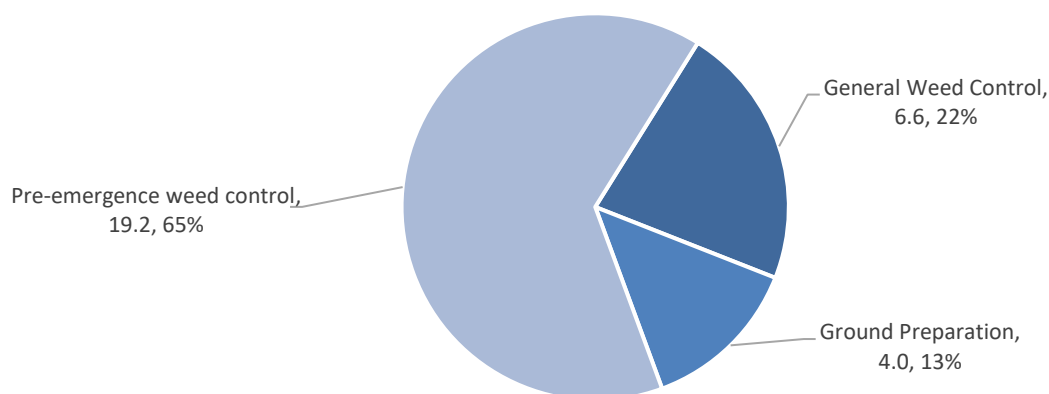


Figure 71: Celery and parsley crops NI 2021: reasons for herbicide use (spha).



Celery and parsley – Insecticides

- Basic treated area: 16 hectares
- Total treated area: 16 spray hectares
- Weight of active substances applied: 2 kg
- The only insecticide active substances applied were lambda-cyhalothrin and pirimicarb:

Active substance	Total treated area (spha)	Basic treated area (ha)	Quantity applied (kg)	% of the treated area
Pirimicarb	12.1	12.1	1.7	75.2
Lambda-cyhalothrin	4.0	4.0	<0.1	24.8

Figure 72: Insecticide active substance usage (spha) on celery and parsley crops in Northern Ireland, 2021.

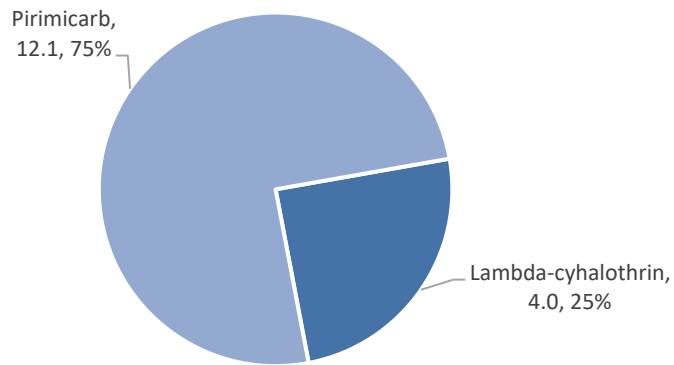


Figure 73: Weight of insecticide active substance usage (kg) on celery and parsley crops in Northern Ireland, 2021.

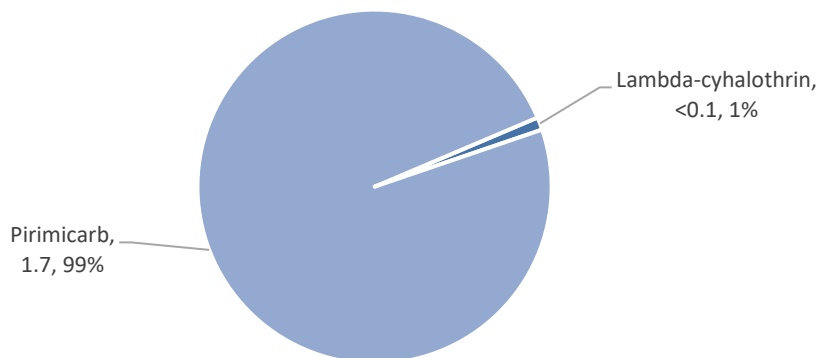
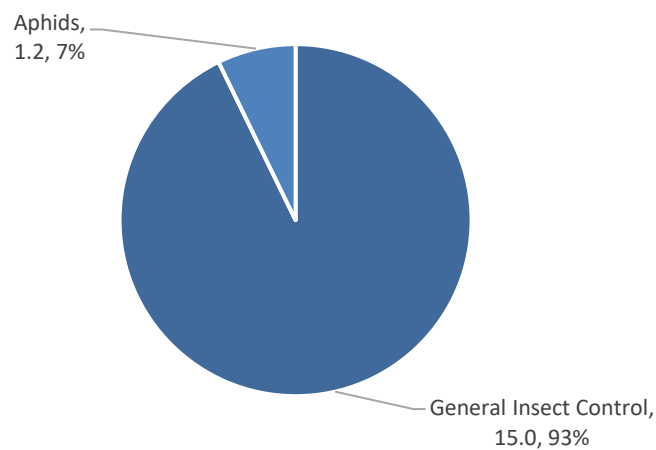


Figure 74: Celery and parsley crops NI 2021: reasons for insecticide use (spha).



PESTICIDE USAGE ON LETTUCE

- 3 hectares of lettuce crops grown in Northern Ireland
- 3 basic treated area (ha)
- 14 total treated area (spha)
- Weight of active substances applied: 10 kg
- Refer to Table 7 for proportional area treated and number of spray applications applied and Table 17 for reasons for use.

Figure 75: Pesticide usage on lettuce crops in Northern Ireland, 2021.

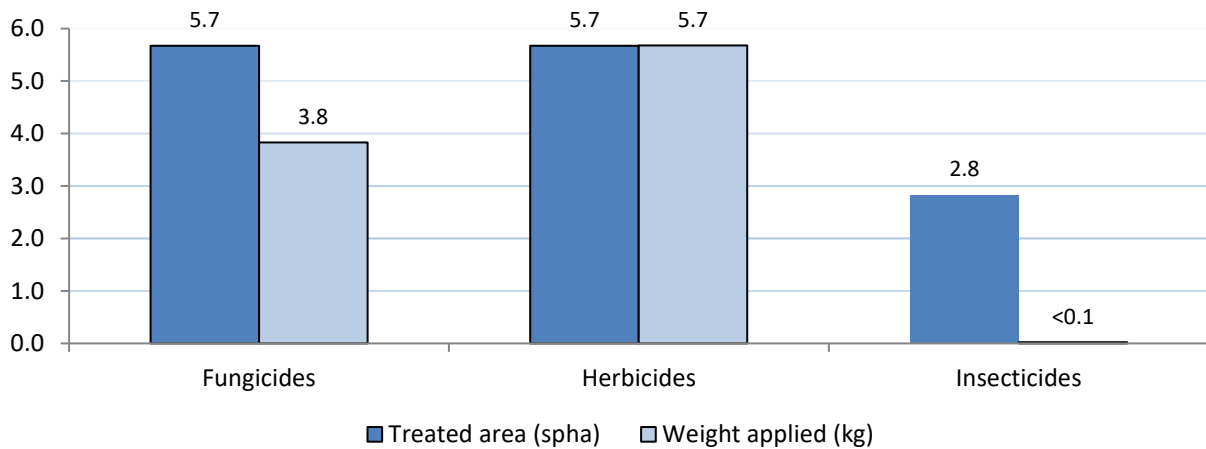


Figure 76: Pesticide usage (spha) on lettuce crops in Northern Ireland, 2021.

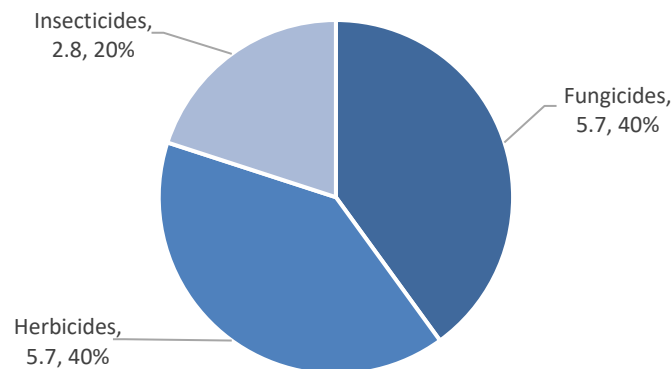
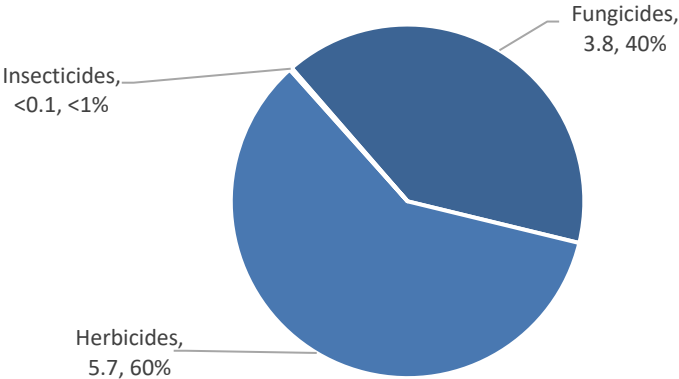


Figure 77: Weight of pesticides (kg) applied to lettuce crops in Northern Ireland, 2021.



Lettuce – Fungicides

- Basic treated area: 3 hectares
- Total treated area: 6 spray hectares
- Weight of active substances applied: 4 kg
- The only reason given for fungicide use was general disease control
- The two fungicide active substances applied were azoxystrobin and fluopicolide/propamocarb hydrochloride

Figure 78: Fungicide active substance usage (spha) on lettuce crops in Northern Ireland, 2021.

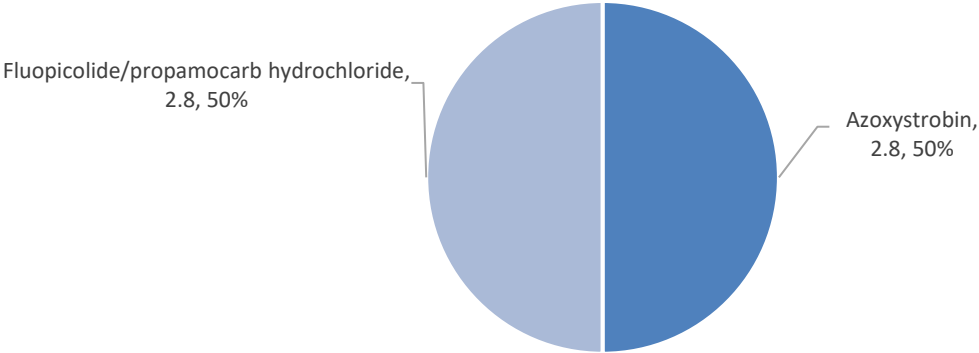
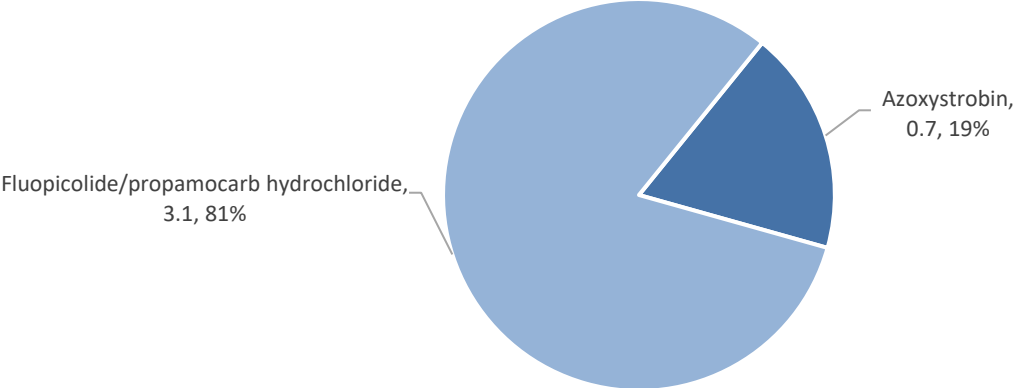


Figure 79: Weight of fungicide active substances (kg) applied to lettuce crops in Northern Ireland, 2021.



Lettuce – Herbicides

- Basic treated area: 3 hectares
- Total treated area: 6 spray hectares
- Weight of active substances applied: 6 kg
- The reasons for herbicide usage were pre-emergence weed control and ground preparation.
- The herbicide active substances applied were pendimethalin and propyzamide

Figure 80: Herbicide active substance usage (spha) on lettuce crops in Northern Ireland, 2021.

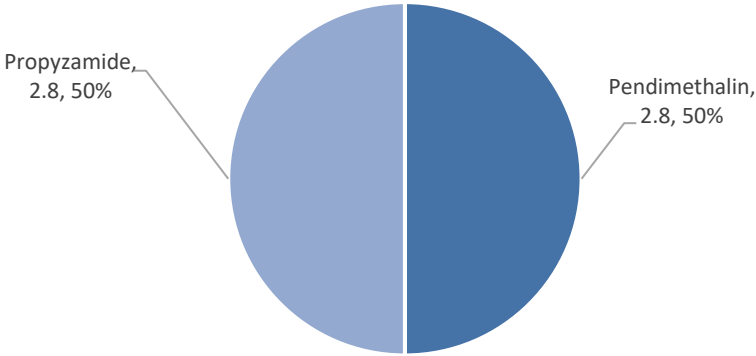
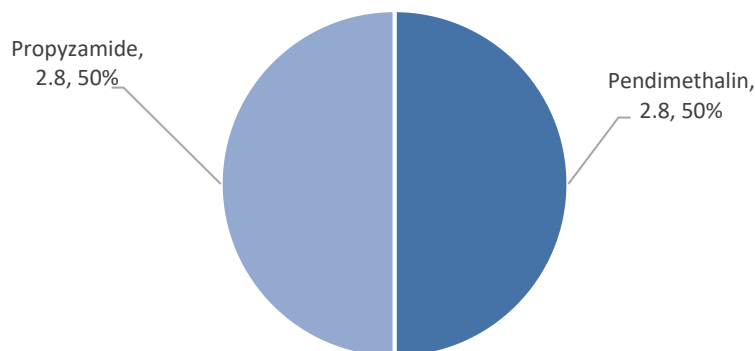


Figure 81: Weight of herbicide active substances (kg) applied to lettuce crops in Northern Ireland, 2021.



Lettuce – Insecticides

- Basic treated area: 3 hectares
- Total treated area: 3 spray hectares
- Weight of active substances applied: 0.02 kg
- The only reason given for insecticide usage was general insect control
- The only insecticide active substance applied was lambda-cyhalothrin

PESTICIDE USAGE ON PEAS AND BEANS

- 26 hectares of pea and bean crops grown in Northern Ireland
- 26 basic treated area (ha)
- 114 total treated area (spha)
- Weight of active substances applied: 43 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 18 for reasons for use.

Figure 82: Pesticide usage on pea and bean crops in Northern Ireland, 2021.

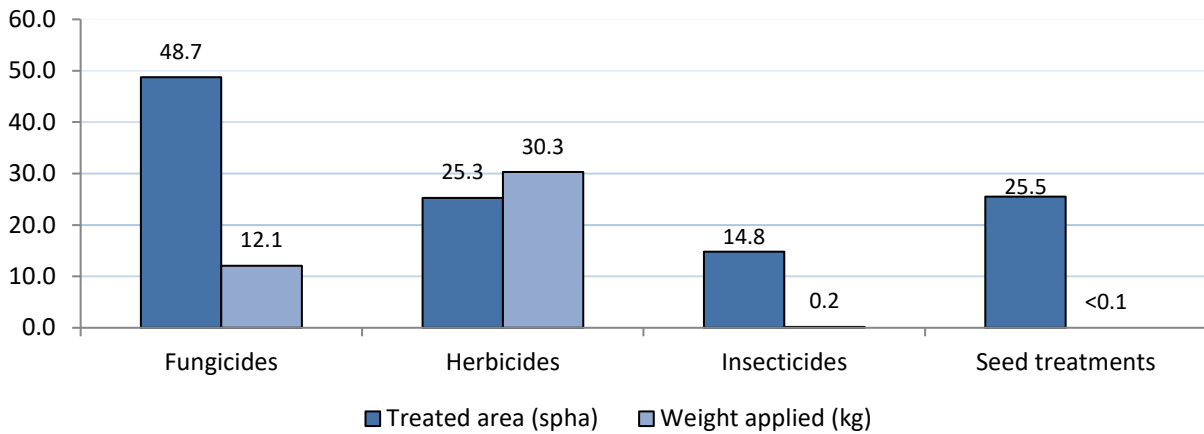


Figure 83: Pesticide usage (spha) on pea and bean crops in Northern Ireland, 2021.

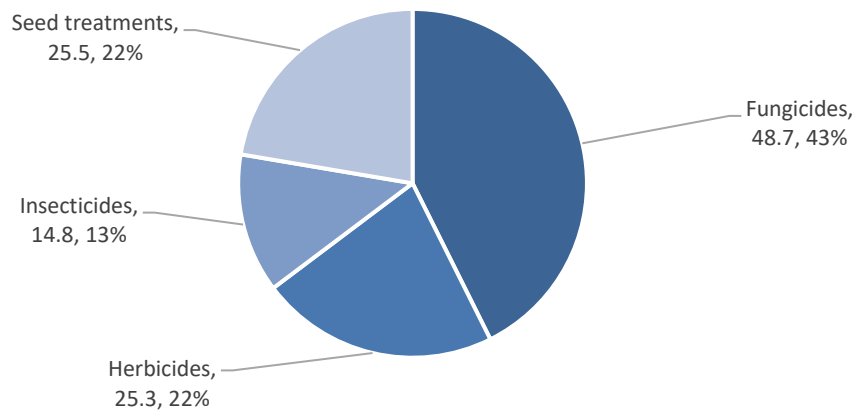


Figure 84 : Weight of pesticides (kg) applied to pea and bean crops in Northern Ireland, 2021.

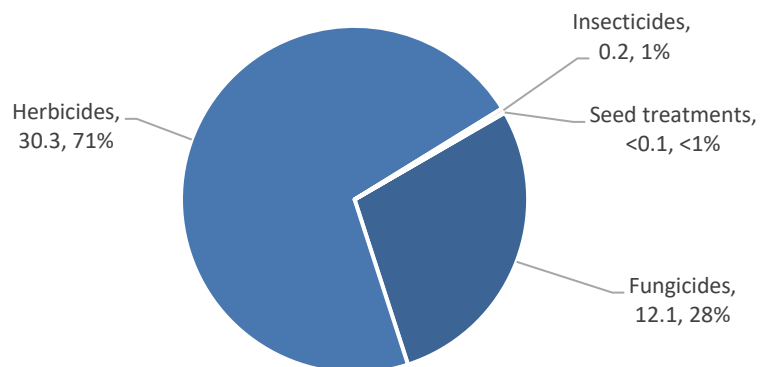
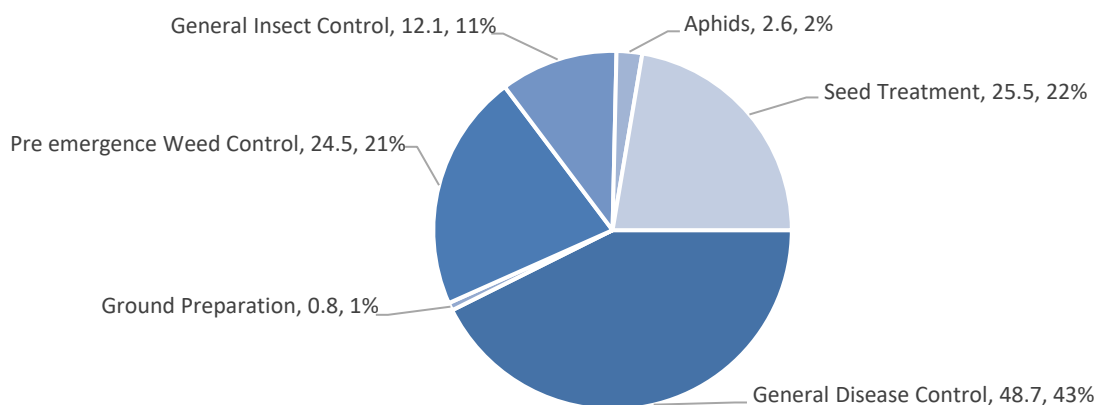


Figure 85: Peas and Beans NI 2021: reasons for use (spha).



Peas and beans – Fungicides

- Basic treated area: 24 hectares
- Total treated area: 49 spray hectares
- Weight of active substances applied: 12 kg
- The only reason given for fungicide use was general disease 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	24.3	24.3	8.1	49.8
Azoxystrobin	12.3	12.3	3.1	25.3
Metconazole	12.1	12.1	0.9	24.9

Figure 86 : Fungicide active substance usage (spha) on pea and bean crops in Northern Ireland, 2021.

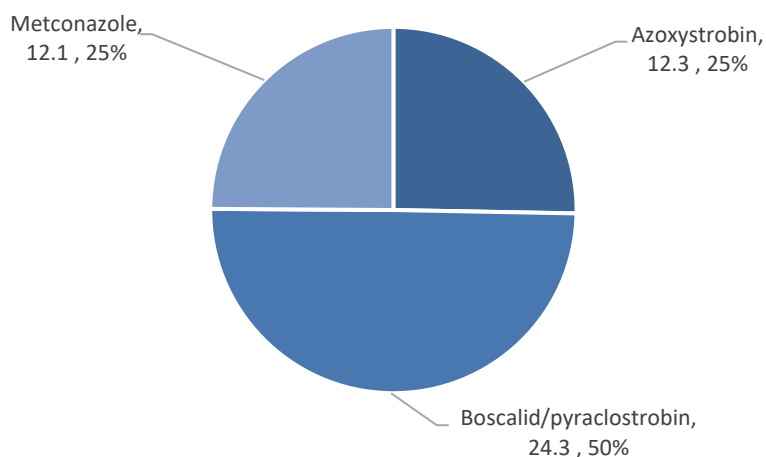
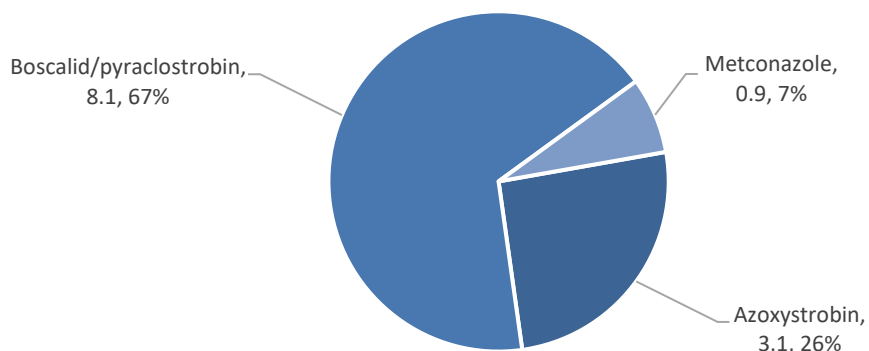


Figure 87 : Weight of fungicide active substances (kg) applied to pea and bean crops in Northern Ireland, 2021.



Peas and beans – Herbicides

- Basic treated area: 25 hectares
- Total treated area: 25 spray hectares
- Weight of active substances applied: 30 kg
- The herbicide active substances applied were:

Active substance	Total treated area (spha)	Basic treated area (ha)	Quantity applied (kg)	% of the treated area
Imazamox/pendimethalin	24.3	24.3	29.1	96.1
Glyphosate	0.8	0.8	1.0	3.2
Pendimethalin	0.2	0.2	0.2	0.8

Figure 88: Herbicide active substance usage (spha) on pea and bean crops in Northern Ireland, 2021.

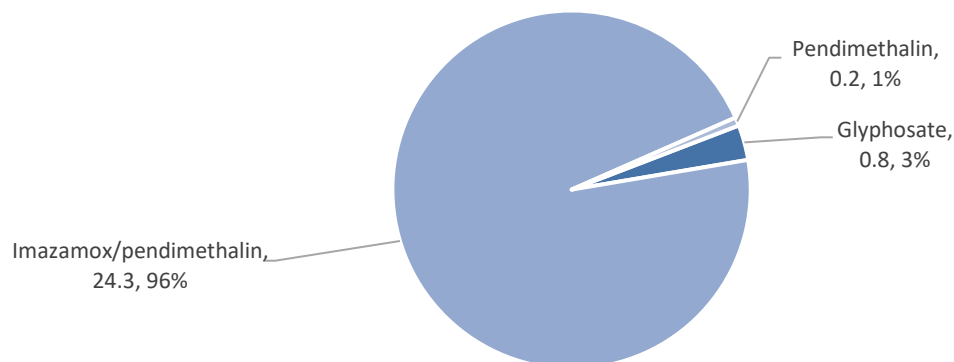
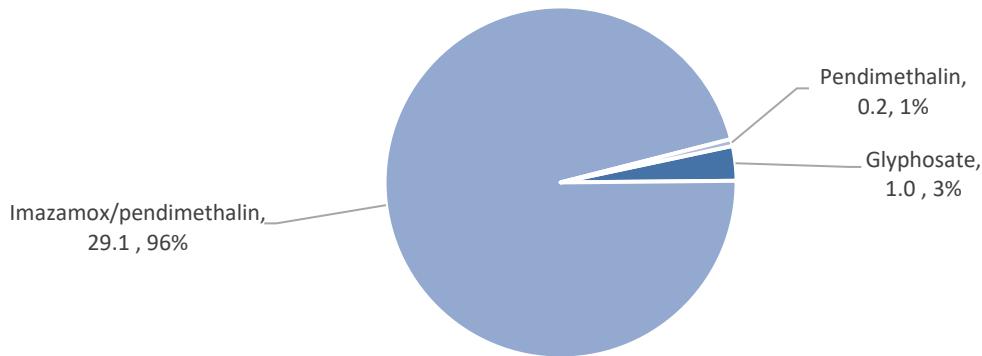


Figure 89: Weight of herbicide active substance usage (kg) on pea and bean crops in Northern Ireland, 2021.



Peas and beans – Insecticides

- Basic treated area: 13 hectares
- Total treated area: 15 spray hectares
- Weight of active substances applied: <1 kg
- The two insecticide active substances applied were lambda-cyhalothrin and spirotetramat

Active substance	Total treated area (spha)	Basic treated area (ha)	Quantity applied (kg)	% of the treated area
Lambda-cyhalothrin	13.6	13.0	0.1	92.1
Spirotetramat	1.2	0.6	0.1	7.9

Figure 90: Insecticide active substance usage (spha) on pea and bean crops in Northern Ireland, 2021.

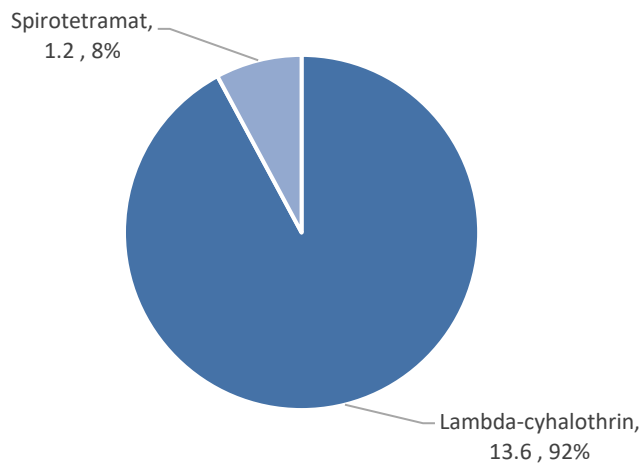


Figure 91: Weight of insecticide active substance usage (kg) on pea and bean crops in Northern Ireland, 2021.

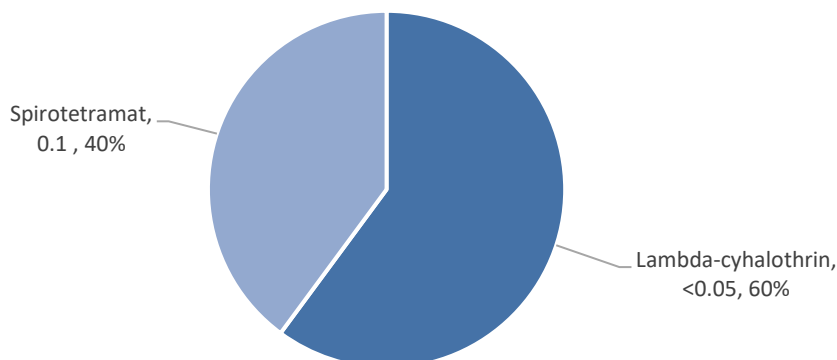
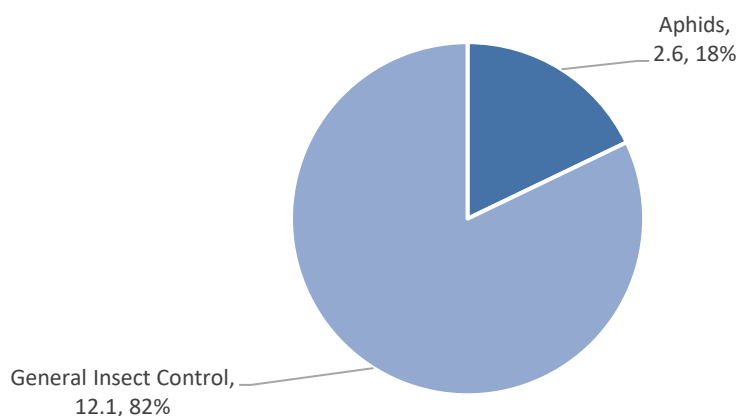


Figure 92: Pea and bean crops NI 2021: reasons for insecticide use (spha).



PESTICIDE USAGE ON OTHER VEGETABLES

- 21 hectares of other vegetable crops grown in Northern Ireland
- 11 basic treated area (ha)
- 23 total treated area (spha)
- 13 kg applied
- ‘Other vegetables’: refers to beetroot, courgette, pumpkin, rhubarb, and squash, which are grouped due to their small growing area.
- Courgette, rhubarb and squash received no pesticide treatments
- Only beetroot and pumpkin crops received pesticide treatments
- There were only herbicide and seed treatments applied to other vegetable crops
- Refer to Table 7 for proportional area treated and number of spray applications applied and Tables 19 for reasons for use.

Figure 93: Pesticide usage on other vegetable crops in Northern Ireland, 2021.

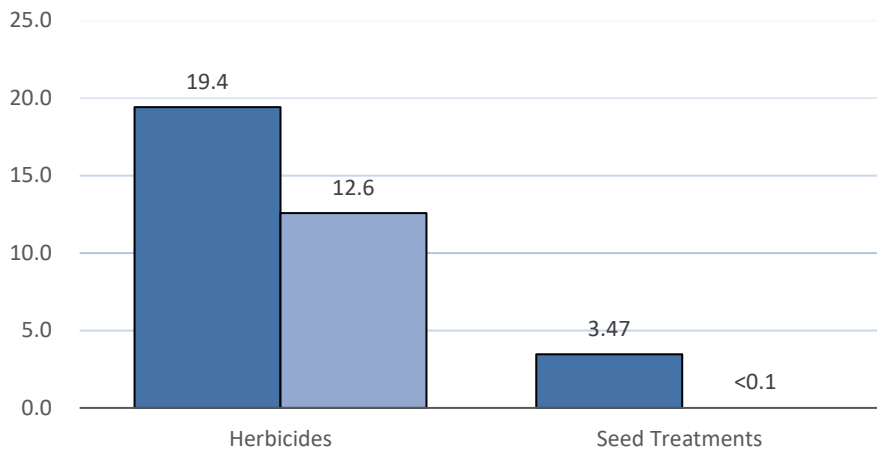


Figure 94: Regional distribution of other vegetable crops grown (ha) in Northern Ireland, 2021.

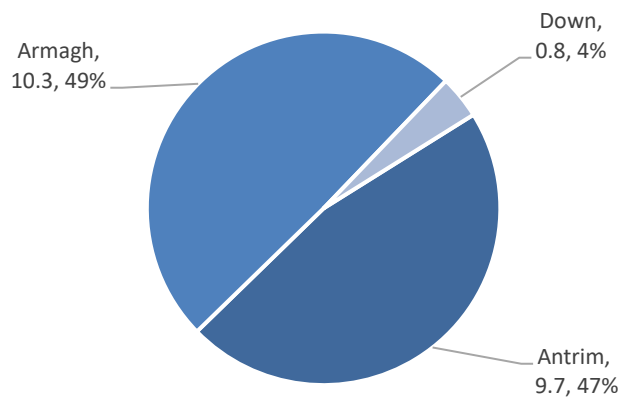


Figure 95: Pesticide usage (spha) on other vegetable crops in Northern Ireland, 2021.

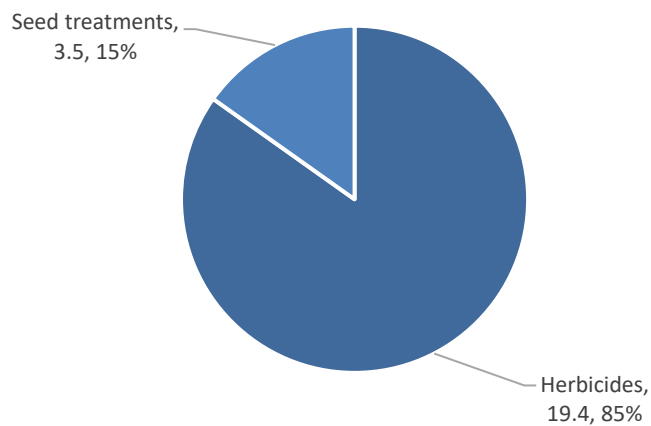
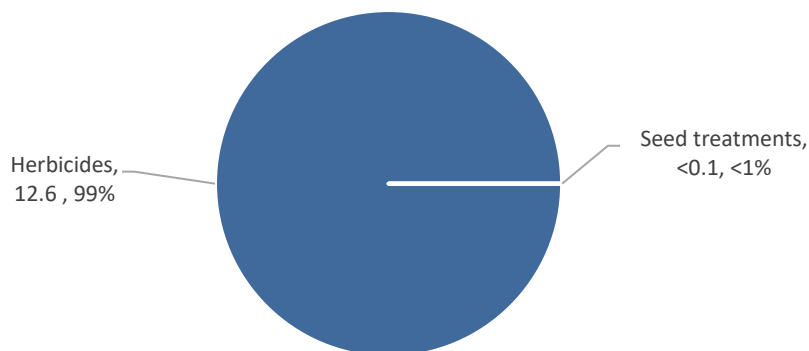


Figure 96: Weight of pesticides (kg) applied to other vegetable crops in Northern Ireland, 2021



Other vegetables – Herbicides

- Basic treated area: 11 hectares
- Total treated area: 19 spray hectares
- Weight of active substances applied: 13 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
Isoxaben	7.8	7.8	1.0	40.2
Propyzamide	7.8	7.8	5.8	40.2
Glyphosate	3.0	3.0	5.5	15.6
Ethofumesate	0.7	0.7	0.4	3.6
Clomazone	0.1	0.1	<0.01	0.3

Figure 97: Herbicide active substance usage (spha) on other vegetable crops in Northern Ireland, 2021.

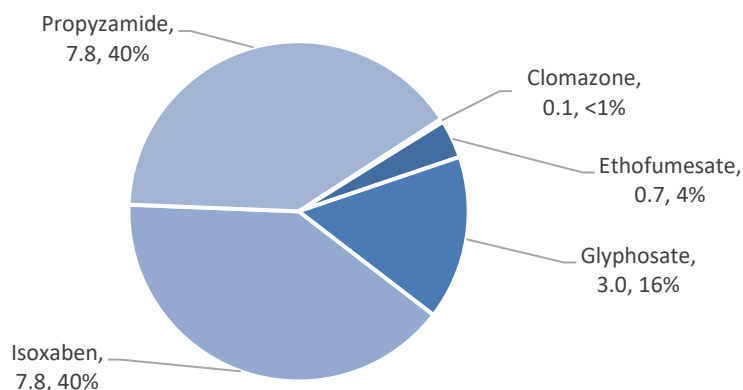


Figure 98: Weight of herbicide active substance usage (kg) on other vegetable crops in Northern Ireland, 2021.

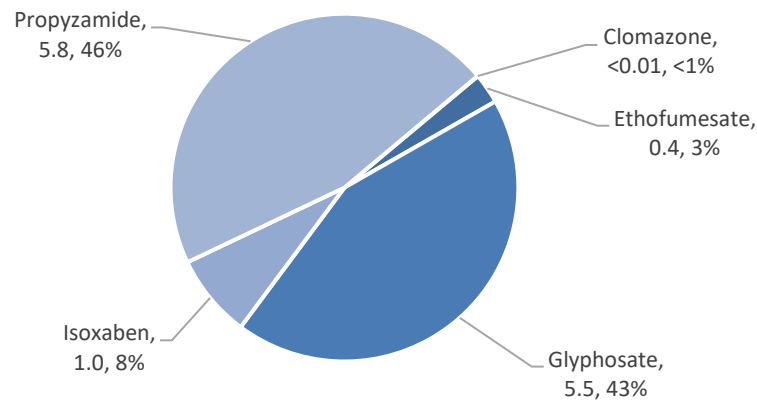
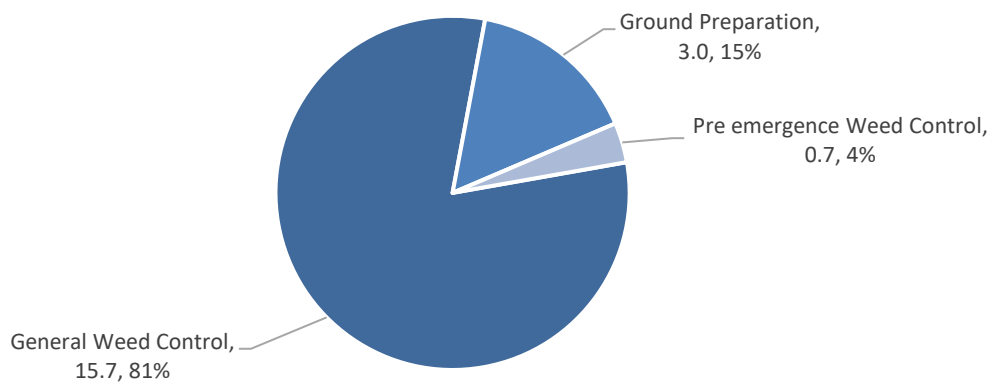


Figure 99: Other vegetables: reasons for herbicide use (spha).



MOLLUSCIDICIDE USE ON OUTDOOR VEGETABLE CROPS

- 44 basic treated area (ha)
- 45 total treated area (spha)
- 9 kg applied
- Refer to Table 7 for proportional area treated and number of spray applications applied.
- The only molluscicide active substance applied was ferric phosphate

Figure 100: Area of outdoor vegetable crops treated (spha) with molluscicides in Northern Ireland, 2021.

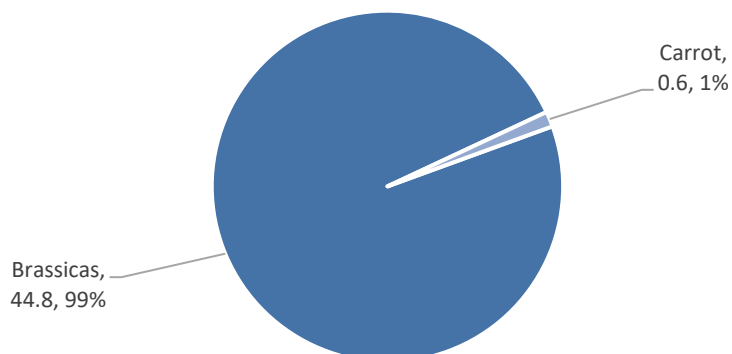
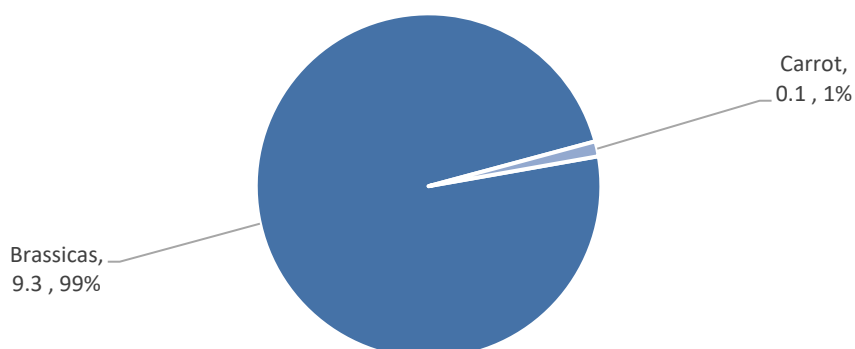


Figure 101: Weight of molluscicides applied (kg) to outdoor vegetable crops in Northern Ireland, 2021.



SEED TREATMENT USE ON OUTDOOR VEGETABLE CROPS

- 776 basic treated area (ha)
- 1,124 total treated area (spha)
- 11 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 (56%), tefluthrin (33%), metalaxyl-M (7%) and fludioxonil (4%)

Figure 102: Area of outdoor vegetable crops (spha) with treated seed in Northern Ireland, 2021.

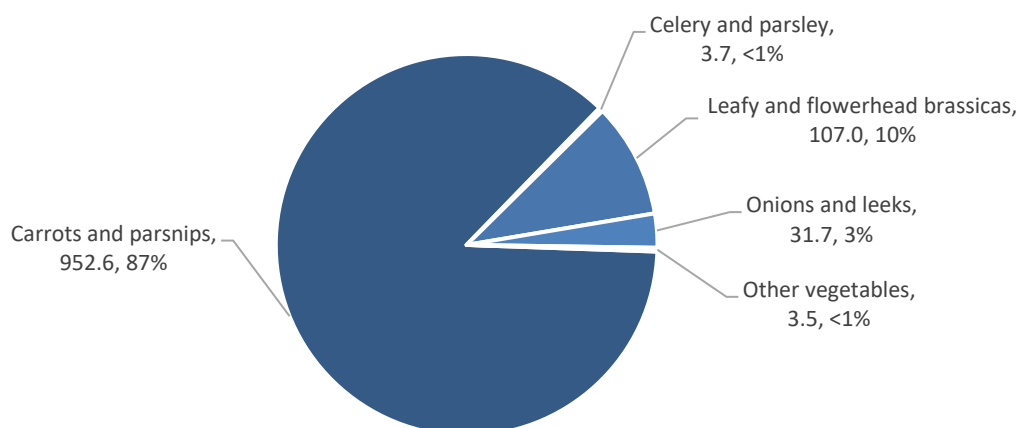


Figure 103: Weight of seed treatments applied (kg) to outdoor vegetable crops in Northern Ireland, 2021.

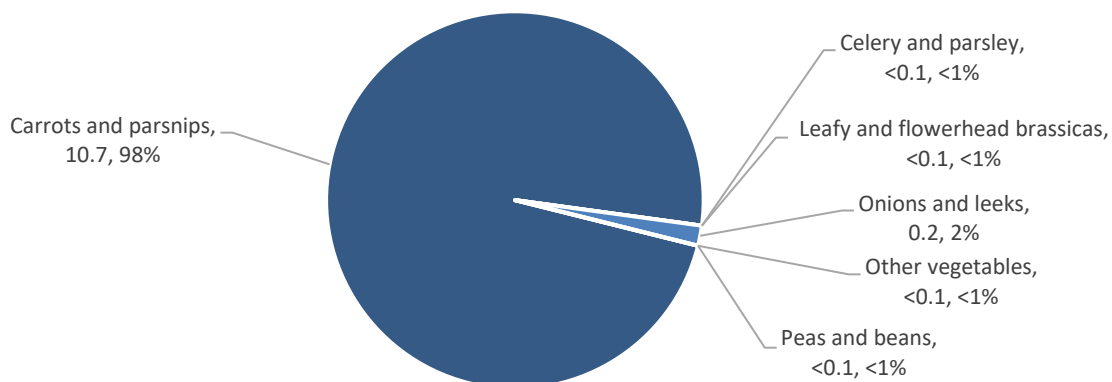
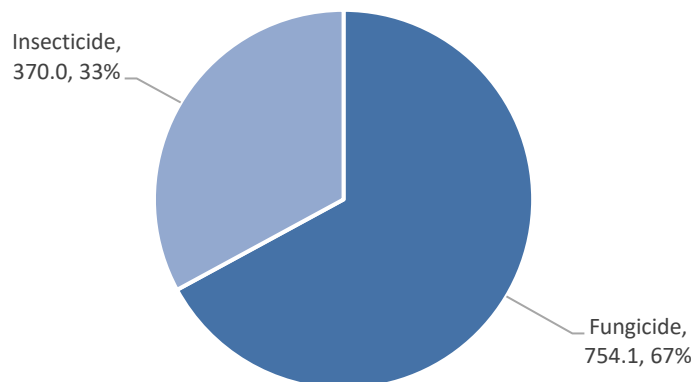


Figure 104: Type of seed treatment applied (spha) to outdoor vegetable crops in Northern Ireland, 2021.



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Table 1: The total number of farms in each size group with vegetable crops in the June 2021 census and number of samples from each size group.

Region	Size group (hectares)										Total	
	<2		2<5		5<15		15<40		40+		A	B
	A	B	A	B	A	B	A	B	A	B	A	B
Northern Ireland	30	19	23	8	21	6	12	2	7	2	93	37

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, 2021.

Crop type	Number of Crops Surveyed	Surveyed area (ha)
Carrots	20.0	423.56
Parsnips	13.0	186.82
Swede	4.0	149.97
Savoys	10.0	58.69
Broccoli	12.0	33.54
Pointed cabbage	4.0	33.22
Summer Cauliflower	10.0	23.86
White Cabbage	1.0	18.21
Soup Leeks	5.0	17.26
Pumpkin	5.0	15.09
Soup Celery	2.0	13.56
Broad Beans	8.0	13.42
Peas	3.0	12.41
Cabbage (Summer)	5.0	10.29
Brussel Sprouts	7.0	4.64
Beetroot	6.0	3.89
Scallions (Summer)	5.0	3.42
Leeks	4.0	2.99
Celery (Table)	1.0	2.84
Lettuce	1.0	2.84
Table Leeks	3.0	2.69
Parsley	2.0	2.58
Autumn Cauliflower	2.0	2.12
Cabbage (Spring)	3.0	1.76
Kale	4.0	1.61
Rhubarb	1.0	1.60
Scallions (Winter)	2.0	1.48
Turnips	3.0	1.40
Hard Cabbage	1.0	1.16
Salad Onion	1.0	1.09
Squash	3.0	0.41
Courgette	1.0	0.23
Cabbage (Winter)	2.0	0.18
Red Cabbage	1.0	<0.10
All crops	155	1,048.88

Table 3: Estimated area (ha) of vegetable crops grown regionally in Northern Ireland, 2021.

<i>Crop type</i>	<i>County</i>					<i>Northern Ireland</i>
	<i>Antrim</i>	<i>Armagh</i>	<i>Down</i>	<i>Londonderry</i>	<i>Tyrone</i>	
Carrots	1.46	204.76	212.99	0.86	3.49	423.56
Parsnips	3.69	2.53	180.05	0.54	.	186.82
Swede	.	1.57	145.69	0.38	2.33	149.97
Savoys	1.16	20.39	31.01	.	6.12	58.69
Broccoli	1.46	8.77	21.85	0.32	1.15	33.54
Pointed cabbage	.	7.17	17.64	.	8.41	33.22
Summer Cauliflower	0.29	3.75	18.35	0.32	1.15	23.86
White Cabbage	.	.	18.21	.	.	18.21
Soup Leeks	1.36	15.58	0.32	.	.	17.26
Pumpkin	7.09	8.00	.	.	.	15.09
Soup Celery	.	.	13.56	.	.	13.56
Broad Beans	0.95	0.13	12.34	.	.	13.42
Peas	0.11	0.00	12.30	.	.	12.41
Summer Cabbage	0.10	6.42	.	0.32	3.44	10.29
Brussel Sprouts	0.64	1.90	0.96	.	1.15	4.64
Beetroot	2.43	0.32	0.76	0.38	.	3.89
Summer Scallions	1.29	.	2.13	.	.	3.42
Leeks	.	1.20	1.42	0.38	.	2.99
Lettuce	.	2.84	.	.	.	2.84
Table Celery	.	2.84	.	.	.	2.84
Table Leeks	.	1.41	1.28	.	.	2.69
Parsley	1.16	.	1.42	.	.	2.58
Autumn Cauliflower	.	0.98	.	.	1.15	2.12
Spring Cabbage	1.16	0.59	.	.	.	1.76
Kale	0.10	1.37	0.14	.	.	1.61
Rhubarb	.	1.60	.	.	.	1.60
Winter Scallions	1.48	.	.	.	.	1.48
Turnips	0.10	1.29	.	.	.	1.40
Hard Cabbage	1.16	.	.	.	.	1.16
Salad Onion	.	1.09	.	.	.	1.09
Squash	0.19	0.16	0.06	.	.	0.41
Courgette	.	0.23	.	.	.	0.23
Winter Cabbage	.	0.05	0.14	.	.	0.18
Red Cabbage	.	0.05	.	.	.	0.05
All crops	27.41	296.98	692.59	3.51	28.38	1,048.88

Table 4a: Estimated area (spha) of vegetable crops treated regionally in Northern Ireland, 2021 with each pesticide type.

<i>Pesticide type</i>	<i>County</i>					Northern Ireland
	Antrim	Armagh	Down	Londonderry	Tyrone	
Fungicide	12.66	1,744.42	3,225.42	.	36.49	5,018.99
Herbicide	49.86	1,292.03	3,126.31	1.28	37.69	4,507.16
Insecticide	39.64	1,677.56	2,633.56	0.64	50.95	4,402.35
Growth regulator	1.58	.	.	.	.	1.58
Molluscicide	.	20.97	1.92	.	22.56	45.45
Seed treatment	27.24	305.54	757.83	3.90	29.55	1,124.05
All pesticides	130.99	5,040.51	9,745.03	5.82	177.23	15,099.58

Table 4b: Estimated weight (kg) of pesticide applied regionally in Northern Ireland, 2021 with each pesticide type.

<i>Pesticide type</i>	<i>County</i>					Northern Ireland
	Antrim	Armagh	Down	Londonderry	Tyrone	
Fungicide	4.45	546.23	889.99	.	7.30	1,447.98
Herbicide	52.99	594.16	2,163.66	0.37	29.35	2,840.52
Insecticide	1.21	35.98	71.02	0.01	2.11	110.33
Growth regulator	4.74	.	.	.	.	4.74
Molluscicide	.	4.36	0.40	.	4.69	9.45
Seed treatment	0.13	2.09	8.53	0.05	0.17	10.97
All pesticides	63.52	1,182.82	3,133.60	0.43	43.62	4,423.99

Table 5: The total area (spha) and the basic area (ha) of vegetable crops treated with each pesticide type in Northern Ireland, 2021.

Crop type	Pesticide Type													
	Fungicides		Herbicides & desiccants		Insecticides		Growth regulators		Molluscicides		Seed treatments		All pesticides	
	(spha)	(ha)	(spha)	(ha)	(spha)	(ha)	(spha)	(ha)	(spha)	(ha)	(spha)	(ha)	(spha)	(ha)
Carrots and parsnips	4,509.85	583.98	3,635.72	608.51	3,649.24	587.91	1.58	1.58	0.64	0.64	952.55	610.08	12,749.58	610.08
Celery and parsley	42.09	14.98	29.80	18.97	16.14	16.14	.	.	.	.	3.75	2.58	91.78	18.97
Leafy and flowerhead brassicas	335.11	162.91	403.35	186.47	278.70	169.70	.	.	44.81	43.30	107.05	107.05	1,169.02	188.22
Lettuce	5.67	2.84	5.67	2.84	2.84	2.84	.	.	.	.	.	.	14.18	2.84
Onions and leeks	70.34	20.52	86.23	26.15	.	.	.	.	.	.	31.69	27.43	188.27	28.84
Other vegetables	.	.	19.41	10.90	.	.	.	.	.	.	3.47	3.47	22.89	11.34
Peas and beans	48.75	24.47	25.27	25.27	14.78	13.04	.	.	.	.	25.54	25.54	114.34	25.76
Turnips and swedes	7.18	3.59	301.70	150.85	440.65	149.27	.	.	.	.	.	.	749.52	150.85
All crops	5,018.99	813.28	4,507.16	1,029.96	4,402.35	938.89	1.58	1.58	45.45	43.94	1,124	776.15	15,099.58	1,036.91

Table 6: The total quantities (kg) of each pesticide type used on vegetable crops in Northern Ireland 2021.

Crop type	Pesticide Type							Total quantity (kg)
	Fungicides	Herbicides	Insecticides	Growth regulators	Molluscicides	Seed treatments		
Carrots and parsnips	1,232.52	2,257.41	91.26	4.74	0.13	10.74	3,596.81	
Celery and parsley	20.47	69.14	1.72	.	.	<0.01	91.32	
Leafy and flowerhead brassicas	144.53	264.52	14.93	.	9.32	0.01	433.29	
Lettuce	3.83	5.68	0.02	.	.	.	9.53	
Onions and leeks	32.94	76.69	.	.	.	0.19	109.82	
Other vegetables	.	12.57	.	.	.	<0.01	12.57	
Peas and beans	12.07	30.29	0.17	.	.	0.02	42.56	
Turnips and swedes	1.63	124.23	2.23	.	.	.	128.09	
All pesticides	1,447.98	2,840.52	110.33	4.74	9.45	10.97	4,423.99	

Table 7: The proportional area (%) of each crop treated with pesticides and the number of spray applications in Northern Ireland, 2021.

Crop type	Pesticide type													
	Fungicides		Herbicides		Insecticides		Growth Regulators		Molluscicides		Seed treatments		All Pesticides	
	%	sp apps	%	sp apps	%	sp apps	%	sp apps	%	sp apps	%	sp apps	%	sp apps
Carrots and parsnips	96%	4.92	100%	4.16	96%	4.34	<1%	1.00	<1%	1.00	100%	1.72	100%	3.57
Celery and parsley	79%	2.63	100%	2.38	85%	1.00	.	.	.	.	14%	1.45	100%	1.95
Leafy and flowerhead brassicas	86%	1.73	98%	1.83	90%	1.88	.	.	23%	1.09	57%	1.00	99%	1.57
Lettuce	100%	2.00	100%	2.00	100%	1.00	.	.	.	.	.	.	100%	1.67
Onions and leeks	71%	2.06	90%	3.28	.	.	.	.	.	.	95%	1.34	100%	2.20
Other vegetables	.	.	51%	1.61	.	.	.	.	.	.	16%	1.00	53%	1.33
Peas and beans	95%	1.88	98%	1.00	50%	1.72	.	.	.	.	99%	1.00	100%	1.30
Turnips and swedes	2%	2.00	100%	2.00	99%	2.15	.	.	.	.	.	.	100%	2.05
Total	78%	2.53	98%	2.42	90%	2.46	4%	1.09	0%	1.00	74%	1.25	99%	2.08

Table 8: Estimated area (spha) of outdoor vegetable crops treated with pesticide formulations in Northern Ireland, 2021.

Pesticide group & active substance	Crop type											Total Area (spha)
	Brassic	Carrot	Celery	Leek	Lettuce	Onions & Spring Onions	Other Vegetables	Parsley	Parsnip	Peas & beans	Turnip & Swede	
Fungicides												
Azoxystrobin	26.01	397.56	14.98	1.41	2.84	0.45	.	.	331.38	12.33	1.26	788.22
Azoxystrobin/difenoconazole	94.98	180.67	.	.	.	.	.	.	166.95	.	.	442.60
Boscalid/pyraclostrobin	.	393.55	.	.	.	.	.	.	167.27	24.28	.	585.11
Cyprodinil/fludioxonil	.	144.47	.	.	.	.	.	.	2.53	.	.	147.00
Difenoconazole	1.92	.	.	.	.	.	.	.	.	.	.	1.92
Dimethomorph/mancozeb	.	1.28	.	1.28	.	1.28	.	.	0.64	.	.	4.47
Fluopicolide/propamocarb hydrochloride	72.84	.	12.14	16.74	2.84	.	.	.	.	.	.	104.56
Fluopyram	.	217.14	.	.	.	.	.	.	167.24	.	.	384.38
Isopyrazam	.	288.94	.	.	.	.	.	.	.	.	.	288.94
Metalaxyl-M	.	395.60	.	.	.	.	.	.	169.77	.	.	565.37
Metconazole	.	.	.	.	.	.	.	.	.	12.14	.	12.14
Prothioconazole	137.85	716.29	.	33.60	.	.	.	.	333.60	.	3.59	1,224.93
Tebuconazole/trifloxystrobin	1.51	230.23	14.98	15.58	.	.	.	.	170.74	.	2.33	435.37
Unknown fungicide	.	33.99	.	.	.	.	.	.	.	.	.	33.99
All fungicides	335.11	2,999.73	42.09	68.61	5.67	1.73	.	.	1,510.12	48.75	7.18	5,018.99

Table 8 (cont): Estimated area (spha) of outdoor vegetable crops treated with pesticide formulations in Northern Ireland, 2021.

<i>Pesticide group & active substance</i>	Brassicas	Carrot	Celery	Leek		Onions & Spring Onions	Other Vegetables	Parsley	Parsnip	Peas & beans	Turnip & Swede	Total Area (spha)
Herbicides												
Aclonifen	.	464.74	4.25	16.74	.	.	.	2.58	354.54	.	.	842.86
Bromoxynil	.	.	.	4.23	.	1.54	.	.	.	.	.	5.77
Clethodim	.	156.54	.	.	.	.	.	.	168.22	.	.	324.76
Clomazone	109.30	412.75	.	.	.	.	0.06	.	0.79	.	150.85	673.76
Clopyralid	.	.	.	.	.	1.09	.	.	.	.	.	1.09
Cycloxydim	.	.	.	.	.	0.45	.	.	.	.	.	0.45
Dimethenamid-P/metazachlor	.	.	.	<0.05	.	.	.	.	.	.	.	<0.05
Dimethenamid-P/pendimethalin	.	.	.	18.16	.	5.29	.	.	.	.	.	23.45
Ethofumesate	.	.	.	.	.	.	0.71	.	.	.	.	0.71
Fluroxypyr	.	.	.	4.23	.	1.09	.	.	.	.	.	5.32
Glyphosate	45.60	202.43	1.42	1.26	.	2.33	3.03	2.58	181.33	0.80	.	440.78
Imazamox/pendimethalin	.	.	.	.	.	.	.	.	.	24.28	.	24.28
Isoxaben	.	.	.	.	.	.	7.81	.	.	.	.	7.81
Metamitron	.	.	.	.	.	.	.	.	167.24	.	.	167.24
Metazachlor	157.03	.	.	.	.	.	.	.	.	.	149.27	306.31
Metribuzin	.	723.29	.	.	.	.	.	.	.	.	.	723.29
Pendimethalin	12.45	420.83	1.42	3.99	2.84	4.84	.	1.42	185.63	0.19	.	633.60
Propyzamide	.	.	.	.	2.84	.	7.81	.	.	.	.	10.64
Prosulfocarb	.	12.00	13.56	20.97	.	.	.	2.58	185.37	.	.	234.48
Pyridate	78.97	.	.	.	.	.	.	.	.	.	.	78.97
S-metolachlor	.	.	.	.	.	.	.	.	.	.	1.57	1.57
All herbicides	403.35	2,392.59	20.65	69.61	5.67	16.63	19.41	9.16	1,243.13	25.27	301.70	4,507.16

Table 8 (cont): Estimated area (spha) of outdoor vegetable crops treated with pesticide formulations in Northern Ireland, 2021.

<i>Pesticide group & active substance</i>	Brassicas	Carrot	Celery	Leek		Onions & Spring Onions	Other Vegetables	Parsley	Parsnip	Peas & beans	Turnip & Swede	Total Area (spha)
<i>Insecticides</i>												
Chlorantraniliprole	.	144.47	.	.	.	.	.	.	.	.	.	144.47
Cyantraniliprole	1.51	251.13	.	.	.	.	.	.	167.24	.	.	419.89
Cypermethrin	0.80	.	.	.	.	.	.	.	.	.	.	0.80
Deltamethrin	5.82	324.04	.	.	.	.	.	.	166.32	.	.	496.17
Garlic Extract	.	0.32	.	.	.	.	.	.	.	.	.	0.32
Indoxacarb	31.50	.	.	.	.	.	.	.	.	.	.	31.50
Lambda-cyhalothrin	59.17	1,485.52	2.84	.	2.84	.	.	1.16	512.85	13.62	440.65	2,518.63
Pirimicarb	.	.	12.14	.	.	.	.	.	.	.	.	12.14
Spirotetramat	179.90	426.99	.	.	.	.	.	.	170.36	1.16	.	778.42
All insecticides	278.70	2,632.47	14.98	.	2.84	.	.	1.16	1,016.77	14.78	440.65	4,402.35
<i>Molluscicides</i>												
Ferric phosphate	44.81	0.64	.	.	.	.	.	.	.	.	.	45.45
All molluscicides	44.81	0.64	.	.	.	.	.	.	.	.	.	45.45
<i>Growth Regulators</i>												
Maleic hydrazide	.	.	.	.	.	.	.	.	1.58	.	.	1.58
All growth regulators	.	.	.	.	.	.	.	.	1.58	.	.	1.58
<i>Seed Treatments</i>												
Cymoxanil/fludioxonil/metalaxyl-m	.	422.63	.	.	.	.	.	.	186.82	25.54	.	634.99
Fludioxonil	37.56	0.64	.	.	.	5.36	.	.	.	.	.	43.55
Metalaxyl-M	69.49	.	.	.	.	.	3.47	2.58	.	.	.	75.55
Tefluthrin	.	157.39	.	21.43	.	4.91	.	1.16	185.08	.	.	369.97
All seed treatments	107.05	580.66	.	21.43	.	10.26	3.47	3.75	371.89	25.54	.	1,124.05

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

<i>Pesticide group & active substance</i>	<i>Crop type</i>										<i>Total Quantity (kg)</i>
	<i>Brassic</i>	<i>Carrot</i>	<i>Celery</i>	<i>Leek</i>	<i>Onions & Spring Onions</i>	<i>Other Vegetables</i>	<i>Parsley</i>	<i>Parsnip</i>	<i>Peas & beans</i>	<i>Turnip & Swede</i>	
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, 2021.

<i>Pesticide group & active substance</i>	Brassicas	Carrot	Celery	Leek	Lettuce	Onions & Spring Onions	Other Vegetables	Parsley	Parsnip	Peas & beans	Turnip & Swede	Total Quantity (kg)
Herbicides												
Aclonifen	.	376.90	1.53	3.01	.	.	.	1.55	170.02	.	.	553.01
Bromoxynil	.	.	.	0.39	.	0.09	.	.	.	.	.	0.48
Clethodim	.	23.84	.	.	.	.	.	.	30.13	.	.	53.97
Clomazone	8.37	29.67	.	.	.	.	<0.05	.	<0.05	.	10.74	48.84
Clopyralid	.	.	.	.	.	0.11	.	.	.	.	.	0.11
Cycloxydim	.	.	.	.	.	0.13	.	.	.	.	.	0.13
Dimethenamid-P/metazachlor	.	.	.	<0.05	.	.	.	.	.	.	.	<0.05
Dimethenamid-P/pendimethalin	.	.	.	18.11	.	6.92	.	.	.	.	.	25.03
Ethofumesate	.	.	.	.	.	.	0.35	.	.	.	.	0.35
Fluroxypyr	.	.	.	0.20	.	<0.05	.	.	.	.	.	0.22
Glyphosate	57.49	223.31	2.55	2.23	.	2.62	5.46	4.65	206.09	0.96	.	505.36
Imazamox/pendimethalin	.	.	.	.	.	.	.	.	.	29.14	.	29.14
Isoxaben	.	.	.	.	.	.	0.98	.	.	.	.	0.98
Metamitron	.	.	.	.	.	.	.	.	233.60	.	.	233.60
Metazachlor	117.77	.	.	.	.	.	.	.	.	.	111.37	229.15
Metribuzin	.	101.36	.	.	.	.	.	.	.	.	.	101.36
Pendimethalin	12.57	485.18	1.61	2.18	1.93	3.22	.	1.42	237.31	0.19	.	745.61
Propyzamide	.	.	.	.	3.74	.	5.78	.	.	.	.	9.52
Prosulfocarb	.	26.70	51.96	37.43	.	.	.	3.87	113.27	.	.	233.22
Pyridate	68.31	.	.	.	.	.	.	.	.	.	.	68.31
S-metolachlor	.	.	.	.	.	.	.	.	.	.	2.12	2.12
All herbicides	264.52	1,266.96	57.66	63.58	5.68	13.11	12.57	11.48	990.45	30.29	124.23	2,840.52

Table 9 (cont): Estimated quantities (kg) of outdoor vegetable crops treated with pesticide formulations in Northern Ireland, 2021.

<i>Pesticide group & active substance</i>	Brassicas	Carrot	Celery	Leek	Lettuce	Onions & Spring Onions	Other Vegetables	Parsley	Parsnip	Peas & beans	Turnip & Swede	Total Quantity (kg)
<i>Insecticides</i>												
Chlorantraniliprole	.	5.06	.	.	.	.	.	.	.	.	.	5.06
Cyantraniliprole	0.14	17.38	.	.	.	.	.	.	12.37	.	.	29.89
Cypermethrin	<0.05	.	.	.	.	.	.	.	.	.	.	<0.05
Deltamethrin	<0.05	2.43	.	.	.	.	.	.	1.25	.	.	3.70
Garlic Extract	.	2.87	.	.	.	.	.	.	.	.	.	2.87
Indoxacarb	0.80	.	.	.	.	.	.	.	.	.	.	0.80
Lambda-cyhalothrin	0.58	16.92	<0.05	.	<0.05	.	.	<0.05	6.03	0.11	2.23	25.91
Pirimicarb	.	.	1.70	.	.	.	.	.	.	.	.	1.70
Spirotetramat	13.35	19.25	.	.	.	.	.	.	7.70	0.07	.	40.37
All insecticides	14.93	63.91	1.71	.	<0.05	.	.	<0.05	27.35	0.17	2.23	110.33
<i>Molluscicides</i>												
Ferric phosphate	9.32	0.13	.	.	.	.	.	.	.	.	.	9.45
All molluscicides	9.32	0.13	.	.	.	.	.	.	.	.	.	9.45
<i>Growth Regulators</i>												
Maleic hydrazide	.	.	.	.	.	.	.	.	4.74	.	.	4.74
All growth regulators	.	.	.	.	.	.	.	.	4.74	.	.	4.74
<i>Seed Treatments</i>												
Cymoxanil/fludioxonil/metalaxyl-m	.	0.68	.	.	.	.	.	.	0.08	<0.05	.	0.78
Fludioxonil	<0.05	<0.05	.	.	.	<0.05	.	.	.	.	.	<0.05
Metalaxyl-M	<0.05	.	.	.	.	.	<0.05	<0.05	.	.	.	<0.05
Tefluthrin	.	7.51	.	0.17	.	<0.05	.	<0.05	2.48	.	.	10.17
All seed treatments	<0.05	8.18	.	0.17	.	<0.05	<0.05	<0.05	2.56	<0.05	.	10.97

Table 10 The fifty one active ingredients used on vegetable crops in Northern Ireland, 2021 ranked by treated area (spha).

No.	Active substance	Treated area (spha)
1	Lambda-cyhalothrin	2,518.63
2	Metalaxyl-M	1,275.90
3	Azoxystrobin	1,230.82
4	Prothioconazole	1,224.93
5	Aclonifen	842.86
6	Fludioxonil	825.54
7	Spirotetramat	778.42
8	Metribuzin	723.29
9	Pendimethalin	681.33
10	Clomazone	673.76
11	Cymoxanil	634.99
12	Boscalid	585.11
13	Pyraclostrobin	585.11
14	Deltamethrin	496.17
15	Difenoconazole	444.52
16	Glyphosate	440.78
17	Tebuconazole	435.37
18	Trifloxystrobin	435.37
19	Cyantraniliprole	419.89
20	Fluopyram	384.38
21	Tefluthrin	369.97
22	Clethodim	324.76
23	Metazachlor	306.34
24	Isopyrazam	288.94
25	Prosulfocarb	234.48
26	Metamitron	167.24
27	Cyprodinil	147.00
28	Chlorantraniliprole	144.47
29	Fluopicolide	104.56
30	Propamocarb hydrochloride	104.56
31	Pyridate	78.97
32	Ferric phosphate	45.45
33	Unknown fungicide	33.99
34	Indoxacarb	31.50
35	Imazamox	24.28
36	Dimethenamid-P	23.48
37	Pirimicarb	12.14
38	Metconazole	12.14
39	Propyzamide	10.64
40	Isoxaben	7.81
41	Bromoxynil	5.77
42	Fluroxypyr	5.32
43	Mancozeb	4.47
44	Dimethomorph	4.47
45	Maleic hydrazide	1.58
46	S-metolachlor	1.57
47	Clopyralid	1.09
48	Cypermethrin	0.80
49	Ethofumesate	0.71
50	Cycloxydim	0.45
51	Garlic Extract	0.32

Table 11 The fifty one active ingredients used on vegetable crops in Northern Ireland, 2021 ranked by weight (kg).

No.	Active substance	Quantity applied (kg)
1	Pendimethalin	786.45
2	Aclonifen	553.01
3	Glyphosate	505.36
4	Metalaxyl-M	329.76
5	Prothioconazole	235.19
6	Metamitron	233.60
7	Prosulfocarb	233.22
8	Metazachlor	229.16
9	Azoxystrobin	195.97
10	Boscalid	150.78
11	Propamocarb hydrochloride	104.20
12	Metribuzin	101.36
13	Fluopyram	95.84
14	Pyridate	68.31
15	Tebuconazole	65.84
16	Difenoconazole	55.55
17	Clethodim	53.97
18	Clomazone	48.84
19	Cyprodinil	44.10
20	Spirotetramat	40.37
21	Pyraclostrobin	37.84
22	Isopyrazam	36.12
23	Trifloxystrobin	32.92
24	Cyantraniliprole	29.89
25	Fludioxonil	29.52
26	Lambda-cyhalothrin	25.91
27	Unknown fungicide	17.00
28	Dimethenamid-P	11.51
29	Fluopicolide	10.42
30	Tefluthrin	10.17
31	Propyzamide	9.52
32	Ferric phosphate	9.45
33	Mancozeb	5.97
34	Chlorantraniliprole	5.06
35	Maleic hydrazide	4.74
36	Deltamethrin	3.70
37	Garlic Extract	2.87
38	S-metolachlor	2.12
39	Imazamox	1.82
40	Pirimicarb	1.70
41	Isoxaben	0.98
42	Metconazole	0.87
43	Indoxacarb	0.80
44	Dimethomorph	0.67
45	Bromoxynil	0.48
46	Ethofumesate	0.35
47	Cymoxanil	0.24
48	Fluroxypyr	0.22
49	Cycloxydim	0.13
50	Clopyralid	0.11
51	Cypermethrin	0.02

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

Pesticide group and active substance	Reasons for treatment									Total treated area (spha)	Basic treated area (ha)	Quantity applied (kg)	
	Cavity Spot	Crown Rot	General Disease Control	Nematodes	General Weed Control	Grass	Ground Preparation	Pre-emergence weed control	Sealer				
Fungicides													
Azoxystrobin	.	.	728.94	.	.	.	.	.	.	.	728.94	370.51	92.63
Azoxystrobin/difenoconazole	.	.	347.63	.	.	.	.	.	.	.	347.63	345.89	112.98
Boscalid/pyraclostrobin	.	.	560.83	.	.	.	.	.	.	.	560.83	382.36	180.50
Cyprodinil/fludioxonil	.	.	147.00	.	.	.	.	.	.	.	147.00	147.00	73.50
Dimethomorph/mancozeb	.	1.91	.	.	.	.	.	.	.	.	1.91	0.48	2.84
Fluopyram	.	.	.	384.38	.	.	.	.	.	.	384.38	384.38	95.84
Isopyrazam	.	.	288.94	.	.	.	.	.	.	.	288.94	144.47	36.12
Metalaxyl-M	360.96	.	204.41	.	.	.	.	.	.	.	565.37	565.37	329.33
Prothioconazole	.	.	1,049.89	.	.	.	.	.	.	.	1,049.89	546.98	201.58
Tebuconazole/trifloxystrobin	.	.	400.97	.	.	.	.	.	.	.	400.97	398.44	90.22
Unknown fungicide	.	.	33.99	.	.	.	.	.	.	.	33.99	33.99	17.00
All fungicides	360.96	1.91	3,762.59	384.38	.	.	.	.	.	.	4,509.85	.	1,232.52
Herbicides													
Aclonifen	578.04	.	.	238.72	2.53	.	819.28	600.00	546.91
Clethodim	156.54	168.22	.	.	.	.	324.76	324.76	53.97
Clomazone	192.74	.	.	220.80	.	.	413.54	413.54	29.72
Glyphosate	358.43	.	25.33	.	.	.	383.76	383.76	429.41
Metamitron	165.69	.	.	1.55	.	.	167.24	167.24	233.60
Metribuzin	723.29	.	.	.	.	.	723.29	374.00	101.36
Pendimethalin	379.71	.	.	221.90	4.85	.	606.46	606.27	722.49
Prosulfocarb	197.37	.	.	.	.	.	197.37	194.84	139.96
All herbicides	2,751.83	168.22	25.33	682.97	7.38	.	3,635.72	.	2,257.41

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

Pesticide group and active substance	Reasons for treatment							Total treated area (spha)	Basic treated area (ha)	Quantity applied (kg)	
	Aphids	Aphids and carrot fly	Carrot Fly	Caterpillars and aphids	General Insect Control	Growth suppressant	Slugs				Seed treatment
Insecticides											
Chlorantraniliprole	.	.	.	.	144.47	.	.	.	144.47	144.47	5.06
Cyantraniliprole	33.99	358.43	.	.	25.95	.	.	.	418.38	418.38	29.75
Deltamethrin	.	.	33.99	165.69	290.68	.	.	.	490.36	345.89	3.67
Garlic Extract	.	.	.	.	0.32	.	.	.	0.32	0.32	2.87
Lambda-cyhalothrin	6.09	.	1,188.69	.	803.58	.	.	.	1,998.37	584.10	22.96
Spirotetramat	401.05	.	.	.	196.30	.	.	.	597.36	582.95	26.95
All insecticides	441.14	358.43	1,222.68	165.69	1,461.30	.	.	.	3,649.24	.	91.26
Growth regulators											
Maleic hydrazide	.	.	.	.	.	1.58	.	.	1.58	1.58	4.74
All molluscicides	.	.	.	.	.	1.58	.	.	1.58	.	4.74
Molluscicides											
Ferric phosphate	.	.	.	.	.	.	0.64	.	0.64	0.64	0.13
All molluscicides	.	.	.	.	.	.	0.64	.	0.64	.	0.13
Seed treatments											
Cymoxanil/fludioxonil/metalaxyl-m	.	.	.	.	.	.	609.45	.	609.45	609.45	0.76
Fludioxonil	.	.	.	.	.	.	0.64	.	0.64	0.64	<0.01
Tefluthrin	.	.	.	.	.	.	342.47	.	342.47	342.47	9.99
All seed treatments	.	.	.	.	.	.	952.55	.	952.55	.	10.74

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

Pesticide group and active substance	Reasons for treatment						Total treated area (spha)	Basic treated area (ha)	Quantity applied (kg)
	General Disease Control	General Weed Control	Pre-emergence weed control	General insect control	Aphids	Flea Beetle			
Fungicides									
Azoxystrobin	1.26	.	.	.	.	.	1.26	1.26	0.32
Prothioconazole	3.59	.	.	.	.	.	3.59	3.59	0.69
Tebuconazole/trifloxystrobin	2.33	.	.	.	.	.	2.33	2.33	0.63
All fungicides	7.18	.	.	.	.	.	7.18	.	1.63
Herbicides									
Clomazone	.	1.57	149.27	.	.	.	150.85	150.85	10.74
Metazachlor	.	.	149.27	.	.	.	149.27	149.27	111.37
S-metolachlor	.	1.57	.	.	.	.	1.57	1.57	2.12
All herbicides	.	3.15	298.55	.	.	.	301.70	.	124.23
Insecticides									
Lambda-cyhalothrin	.	.	.	1.26	2.33	437.06	440.65	149.27	2.23
All insecticides	.	.	.	1.26	2.33	437.06	440.65	.	2.23

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

Pesticide group and active substance	Reasons for treatment												Total treated area (spha)	Basic treated area (ha)	Quantity applied (kg)
	General Disease Control	General Weed Control	Ground Preparation	Pre-emergence weed control	Sealer	Ground Preparation	General Insect Control	Aphids	Caterpillars	Diamondback Moth	Slugs	Seed Treatment			
Fungicides															
Azoxystrobin	26.01	.	.	.	.	.	.	.	.	.	.	.	26.01	26.01	6.50
Azoxystrobin/difenoconazole	94.98	.	.	.	.	.	.	.	.	.	.	.	94.98	94.98	30.87
Difenoconazole	1.92	.	.	.	.	.	.	.	.	.	.	.	1.92	1.28	0.22
Fluopicolide/propamocarb hydrochloride	72.84	.	.	.	.	.	.	.	.	.	.	.	72.84	72.84	80.12
Prothioconazole	137.85	.	.	.	.	.	.	.	.	.	.	.	137.85	134.91	26.47
Tebuconazole/trifloxystrobin	1.51	.	.	.	.	.	.	.	.	.	.	.	1.51	1.51	0.34
All fungicides	335.11	.	.	.	.	.	.	.	.	.	.	.	335.11	.	144.53
Herbicides															
Clomazone	.	28.66	.	80.64	.	.	.	.	.	.	.	.	109.30	109.30	8.37
Glyphosate	.	28.00	17.60	.	.	.	.	.	.	.	.	.	45.60	45.60	57.49
Metazachlor	.	34.61	.	80.64	41.78	.	.	.	.	.	.	.	157.03	157.03	117.77
Pendimethalin	.	0.64	7.16	4.66	.	.	.	.	.	.	.	.	12.45	12.45	12.57
Pyridate	.	78.97	.	.	.	.	.	.	.	.	.	.	78.97	78.97	68.31
All herbicides	.	170.88	24.76	165.93	41.78	.	.	.	.	.	.	.	403.35	.	264.52
Insecticides															
Cyantraniliprole	.	.	.	.	.	.	1.51	.	.	.	.	.	1.51	1.51	0.14
Cypermethrin	.	.	.	.	.	.	.	0.48	.	0.32	.	.	0.80	0.80	0.02
Deltamethrin	.	.	.	.	.	.	5.82	.	.	.	.	.	5.82	5.82	0.03
Indoxacarb	.	.	.	.	.	.	.	.	31.50	.	.	.	31.50	24.50	0.80
Lambda-cyhalothrin	.	.	.	.	.	.	8.07	9.31	41.78	.	.	.	59.17	53.23	0.58
Spirotetramat	.	.	.	.	.	.	73.72	106.19	.	.	.	.	179.90	156.61	13.35
All insecticides	.	.	.	.	.	.	89.12	115.98	73.28	0.32	.	.	278.70	.	14.93
Molluscicides															
Ferric phosphate	.	.	.	.	.	.	.	.	.	.	44.81	.	44.81	43.30	9.32
All molluscicides	.	.	.	.	.	.	.	.	.	.	44.81	.	44.81	.	9.32
Seed treatments															
Fludioxonil	.	.	.	.	.	.	.	.	.	.	.	37.56	37.56	37.56	<0.01
Metalaxyl-M	.	.	.	.	.	.	.	.	.	.	.	69.49	69.49	69.49	0.01
All seed treatments	.	.	.	.	.	.	.	.	.	.	.	107.05	107.05	.	0.01

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

Pesticide group and active substance	Reasons for treatment					Total treated area (spha)	Basic treated area (ha)	Quantity applied (kg)
	General Disease Control	General Weed Control	Ground Preparation	Pre-emergence weed control	Seed Treatment			
Fungicides								
Azoxystrobin	1.86	.	.	.	.	1.86	1.86	0.46
Dimethomorph/mancozeb	2.56	.	.	.	.	2.56	1.92	3.80
Fluopicolide/propamocarb hydrochloride	16.74	.	.	.	.	16.74	16.74	18.02
Prothioconazole	33.60	.	.	.	.	33.60	18.02	6.45
Tebuconazole/trifloxystrobin	15.58	.	.	.	.	15.58	15.58	4.21
All fungicides	70.34	.	.	.	.	70.34	.	32.94
Herbicides								
Aclonifen	.	16.74	.	.	.	16.74	16.74	3.01
Bromoxynil	.	5.77	.	.	.	5.77	2.95	0.48
Clopyralid	.	1.09	.	.	.	1.09	1.09	0.11
Cycloxydim	.	0.45	.	.	.	0.45	0.45	0.13
Dimethenamid-P/metazachlor	.	0.03	.	.	.	0.03	0.03	0.03
Dimethenamid-P/pendimethalin	.	16.74	1.09	5.61	.	23.45	23.45	25.03
Fluroxypyr	.	5.32	.	.	.	5.32	2.50	0.22
Glyphosate	.	.	3.59	.	.	3.59	3.59	4.85
Pendimethalin	.	5.09	.	3.74	.	8.83	8.83	5.40
Prosulfocarb	.	20.97	.	.	.	20.97	18.15	37.43
All herbicides	.	72.21	4.68	9.35	.	86.23	.	76.69
Seed treatments								
Fludioxonil	.	.	.	.	5.36	5.36	5.36	0.00
Tefluthrin	.	.	.	.	26.33	26.33	26.33	0.19
All seed treatments	.	.	.	.	31.69	31.69	.	0.19

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

Pesticide group and active substance	Reasons for treatment							Total treated area (spha)	Basic treated area (ha)	Quantity applied (kg)
	General Disease Control	General Weed Control	Ground Preparation	Pre-emergence weed control	General Insect Control	Aphids	Seed Treatment			
Fungicides										
Azoxystrobin	14.98	.	.	.	.	.	.	14.98	14.98	3.74
Fluopicolide/propamocarb hydrochloride	12.14	.	.	.	.	.	.	12.14	12.14	13.35
Tebuconazole/trifloxystrobin	14.98	.	.	.	.	.	.	14.98	14.98	3.37
All fungicides	42.09	.	.	.	.	.	.	42.09	.	20.47
Herbicides										
Aclonifen	.	1.16	.	5.67	.	.	.	6.83	6.83	3.08
Glyphosate	.	.	4.00	.	.	.	.	4.00	4.00	7.20
Pendimethalin	.	2.83	.	.	.	.	.	2.83	2.83	3.03
Prosulfocarb	.	2.58	.	13.56	.	.	.	16.14	16.14	55.83
All herbicides	.	6.58	4.00	19.23	.	.	.	29.80	.	69.14
Insecticides										
Lambda-cyhalothrin	.	.	.	.	2.84	1.16	.	4.00	4.00	0.02
Pirimicarb	.	.	.	.	12.14	.	.	12.14	12.14	1.70
All insecticides	.	.	.	.	14.98	1.16	.	16.14	.	1.72
Seed treatments										
Metalaxyl-M	.	.	.	.	.	.	2.58	2.58	2.58	<0.01
Tefluthrin	.	.	.	.	.	.	1.16	1.16	1.16	<0.01
All seed treatments	.	.	.	.	.	.	3.75	3.75	.	<0.01

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

Pesticide group and active substance	Reasons for treatment			General Insect Control	Total treated area (spha)	Basic treated area (ha)	Quantity applied (kg)
	General Disease Control	Pre emergence Weed Control	Ground Preparation				
Fungicides							
Azoxystrobin	2.84				2.84	2.84	0.71
Fluopicolide/propamocarb hydrochloride	2.84				2.84	2.84	3.12
All fungicides	5.67				5.67	.	3.83
Herbicides							
Pendimethalin			2.84		2.84	2.84	1.93
Propyzamide		2.84			2.84	2.84	3.74
All herbicides		2.84	2.84		5.67	.	5.68
Insecticides							
Lambda-cyhalothrin				2.84	2.84	2.84	0.02
All herbicides				2.84	2.84	.	0.02

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

Pesticide group and active substance	Reasons for treatment						Total treated area (spha)	Basic treated area (ha)	Quantity applied (kg)
	General Disease Control	Ground Preparation	Pre emergence Weed Control	General Insect Control	Aphids	Seed Treatment			
Fungicides									
Azoxystrobin	12.33	.	.	.	.	.	12.33	12.33	3.08
Boscalid/pyraclostrobin	24.28	.	.	.	.	.	24.28	24.28	8.11
Metconazole	12.14	.	.	.	.	.	12.14	12.14	0.87
All fungicides	48.75	.	.	.	.	.	48.75		
Herbicides									
Glyphosate	.	0.80	.	.	.	.	0.80	0.80	0.96
Imazamox/pendimethalin	.	.	24.28	.	.	.	24.28	24.28	29.14
Pendimethalin	.	.	0.19	.	.	.	0.19	0.19	0.19
All herbicides	.	0.80	24.47	.	.	.	25.27		30.29
Insecticides									
Lambda-cyhalothrin	.	.	.	12.14	1.48	.	13.62	13.04	0.11
Spirotetramat	.	.	.	.	1.16	.	1.16	0.58	0.07
All insecticides	.	.	.	12.14	2.64	.	14.78	.	0.17
Seed treatments									
Cymoxanil/fludioxonil/metalaxyl-m						25.54	25.54	25.54	0.02
All seed treatments						25.54	25.54		0.02

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

Pesticide group and active substance	Reasons for treatment				Total treated area (spha)	Basic treated area (ha)	Quantity applied (kg)
	General Weed Control	Ground Preparation	Pre emergence Weed Control	Seed Treatment			
Herbicides							
Clomazone	0.06	.	.	.	0.06	0.06	0.01
Ethofumesate	.	.	0.71	.	0.71	0.71	0.35
Glyphosate	.	3.03	.	.	3.03	3.03	5.46
Isoxaben	7.81	.	.	.	7.81	7.81	0.98
Propyzamide	7.81	.	.	.	7.81	7.81	5.78
All herbicides	15.67	3.03	0.71		19.41		12.57
Seed treatments							
Metalaxyl-M	.	.	.	3.47	3.47	.	<0.01
All seed treatments	.	.	.	3.47	3.47	.	<0.01

Table 20: Comparison of the area of vegetable crops grown (hectares) in Northern Ireland and the proportional differences (%) between 1991-2021.

Crop type	Survey year											% change in area 2019/2021
	1991 (ha)	1995 (ha)	1999 (ha)	2004 (ha)	2007 (ha)	2011 (ha)	2013 (ha)	2015 (ha)	2017 (ha)	2019 (ha)	2021 (ha)	
Brassicas												
Brussels sprouts	121.60	85.68	114.50	29.77	43.60	54.87	29.47	23.08	17.21	34.17	4.64	-86%
Cabbage (summer/autumn/winter)	118.60	61.01	120.70	76.63	110.81	69.47	18.49	7.42	1.80	15.51	12.23	-21%
Cabbage (other)*	168.60	202.79	175.30	156.03	241.77	173.01	158.95	126.31	114.08	167.78	111.33	-34%
Calabrese/broccoli	50.60	55.78	60.60	147.54	159.50	96.32	55.43	37.58	77.48	39.33	33.54	-15%
Cauliflower	166.80	228.80	181.40	171.36	188.10	86.17	50.80	24.86	29.19	22.43	25.98	16%
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	187.73	-33%
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	151.37	87%
All turnip and swede	127.60	121.87	121.50	280.76	223.50	253.35	248.46	248.86	272.06	80.91	151.37	87%
Peas and beans												
Beans	11.80	11.71	9.40	6.60	5.00	2.02	26.23	2.43	3.22	4.02	13.42	234%
Peas	13.20	6.91	5.50	2.43	2.70	15.75	5.01	2.43	3.20	3.43	12.41	261%
All peas and beans	25.00	18.62	14.90	9.03	7.70	17.78	31.24	4.86	6.43	7.45	25.83	247%
Leeks and onions												
Leeks	39.30	63.48	68.10	89.85	109.30	104.19	109.94	91.09	76.53	116.87	22.94	-80%
Onions	6.40	.	14.50	13.28	10.70	17.39	7.84	7.30	9.11	0.24	.	-100%
Spring onions	51.90	42.03	58.90	61.75	39.40	28.82	11.79	16.40	16.70	42.36	6.00	-86%
All leeks and onions	97.60	105.51	141.50	164.88	159.40	150.41	129.57	114.79	102.33	159.47	28.94	56%

Table 20 (contd): Comparison of the area of vegetable crops grown (hectares) in Northern Ireland and the proportional differences (%) between 1991-2021.

<i>Crop type</i>	<i>Survey year</i>											<i>% change in area 2019/2021</i>
	<i>1991 (ha)</i>	<i>1995 (ha)</i>	<i>1999 (ha)</i>	<i>2004 (ha)</i>	<i>2007 (ha)</i>	<i>2011 (ha)</i>	<i>2013 (ha)</i>	<i>2015 (ha)</i>	<i>2017 (ha)</i>	<i>2019 (ha)</i>	<i>2021 (ha)</i>	
<i>Carrots and parsnips</i>												
Carrots	269.90	261.04	360.80	347.78	436.30	353.13	335.39	312.88	335.30	283.47	423.56	49%
Parsnips	80.90	73.84	109.80	99.61	185.90	166.41	184.10	164.07	121.43	172.09	186.82	9%
All carrots and parsnips	350.80	334.88	470.60	447.39	622.20	519.53	519.49	476.95	456.72	455.57	610.38	34%
<i>Celery, lettuce and parsley</i>												
Celery	24.50	27.14	45.50	32.23	57.80	44.09	57.57	43.92	26.12	26.39	16.39	-38%
Lettuce	26.60	38.42	27.00	42.84	24.30	59.35	54.71	39.46	38.79	.	2.84	.
Parsley	20.10	31.37	40.00	41.85	47.80	33.35	23.78	29.57	12.67	36.82	2.58	-93%
All celery, lettuce and parsley	71.20	96.93	112.50	116.92	129.90	136.80	136.06	112.95	77.57	63.20	21.81	-19%
<i>Other vegetables</i>												
Cucurbits	0.14	1.46	1.80	.	1.80	.	.	4.00	0.57	20.24	15.09	-25%
Beetroot	3.59	3.13	6.90	3.80	6.70	8.16	12.93	12.28	9.46	16.10	3.89	-76%
Rhubarb	13.73	6.75	6.10	10.78	4.90	.	5.48	4.05	10.82	9.13	1.60	-82%
Kale	.	.	.	.	.	0.87	.	4.73	2.59	0.50	1.61	222%
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	22.19	-52%
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	1,048.88	-4%

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
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

Report No.	Report title	ISBN
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
293	Outdoor Vegetable Crops 2019	1-908471-15-4
294	Edible Protected Crops 2019	1-908471-16-1
299	Arable Crops 2020	1-908471-19-2
300	Soft Fruit Crops 2020	1-908471-21-5
301	Top Fruit Crops 2020	1-908471-20-8

Report No.	Report title	ISBN
299	Arable Crops 2020	1-908471-19-2
300	Soft Fruit Crops 2020	1-908471-21-5
301	Top Fruit Crops 2020	1-908471-20-8
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