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

Pesticide Usage in Ireland

Outdoor Vegetable Crops Survey Report 2021

Pesticide Usage in Ireland

OUTDOOR VEGETABLE CROPS

SURVEY REPORT 2021

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Outdoor Vegetable Crop Survey Report Summary

This is the third survey of pesticide[1] usage on outdoor vegetable crops of vegetable crops in Ireland carried out by DAFM. Information on all aspects of pesticide usage was collected from 58 outdoor vegetable holdings across Ireland representing 33% of the total area of outdoor vegetable crops grown. Quantitative data have been adjusted to provide estimates of total pesticide usage for the results.

In 2021, an estimated 4,728 hectares of outdoor vegetable crops were grown, which represents a 2% increase compared to total estimated area in 2015 and similarly, 6.3% increase compared to 2011. In 2021, an estimated 12,122 kgs of active substance was applied to outdoor vegetable crops which represents 39.1% decrease in weight of pesticide applied compared to 2015 and 43.9% decrease to 2011.

A total of 58 active substances were recorded in use on outdoor vegetable crops in the survey.

Herbicides were applied to 38% of the pesticide treated area, representing 64% of the total weight of pesticides used. Fungicides were applied to 31% of the pesticide treated area, accounting for 26% of the total weight of pesticides used. Insecticides were applied to 26% of the pesticide treated area, representing 6% of the weight of pesticides applied. Molluscicide treatments represented 4% of pesticide treated area and 2% of the weight of pesticides applied. Growth regulator usage accounted for less than 1% of the pesticide treated area and 2% of the weight of active substance applied. Seed treatments were applied to 1% of the pesticide treated area, representing less than less than 1% of the weight of active substances applied.

[1] *Pesticide is an over-arching term that includes both plant protection products (including, for the purpose of this report, fungicides, herbicides, insecticides, molluscicides, biological controls and seed treatments) and biocides.*

Beetroot comprised of 1% for the area of outdoor vegetable crops in Ireland 2021, accounting for 1% of the total pesticide treated area and 1% of the total weight of pesticides used on all outdoor vegetable crops.

Broccoli accounted for 11% for the area of outdoor vegetable crops in Ireland 2021, accounting for 13% of the total pesticide treated area and 10% of the total weight of pesticides used on all outdoor vegetable crops.

Brussels sprouts accounted for 3% for the area of outdoor vegetable crops in Ireland 2021, accounting for 3% of the total pesticide treated area and 3% of the total weight of pesticides used on all outdoor vegetable crops.

Cabbage crops had 12% for the area of outdoor vegetable crops in Ireland 2021, accounting for 11% of the total pesticide treated area and 7% of the total weight of pesticides used on all outdoor vegetable crops.

Carrots comprised of 20% for the area of outdoor vegetable crops in Ireland 2021, accounting for 21% of the total pesticide treated area and 29% of the total weight of pesticides used on all outdoor vegetable crops.

Cauliflower crops covered 8% for the area of outdoor vegetable crops in Ireland 2021, accounting for 9% of the total pesticide treated area and 4% of the total weight of pesticides used on all outdoor vegetable crops.

Celery comprised of 1% for the area of outdoor vegetable crops in Ireland 2021, accounting for 1% of the total pesticide treated area and 1% of the total weight of pesticides used on all outdoor vegetable crops.

Courgettes and others covered 3% for the area of outdoor vegetable crops in Ireland 2021, accounting for less than 1% of the total pesticide treated area and less than 1% of the total weight of pesticides used on all outdoor vegetable crops.

Kale comprised of 5% for the area of outdoor vegetable crops in Ireland 2021, accounting for 4% of the total pesticide treated area and 3% of the total weight of pesticides used on all outdoor vegetable crops.

Leafy greens, legumes and others accounted for 8% for the area of outdoor vegetable crops in Ireland 2021, accounting for 1% of the total pesticide treated area and 1% of the total weight of pesticides used on all outdoor vegetable crops.

Leeks had 2% for the area of outdoor vegetable crops in Ireland 2021, accounting for 9% of the total pesticide treated area and 3% of the total weight of pesticides used on all outdoor vegetable crops.

Onions and scallions comprised of 4% for the area of outdoor vegetable crops in Ireland 2021, accounting for 4% of the total pesticide treated area and 13% of the total weight of pesticides used on all outdoor vegetable crops.

Other herbs accounted for 1% for the area of outdoor vegetable crops in Ireland 2021, accounting for 1% of the total pesticide treated area and 1% of the total weight of pesticides used on all outdoor vegetable crops

Parsnips comprised of 8% for the area of outdoor vegetable crops in Ireland 2021, accounting for 9% of the total pesticide treated area and 15% of the total weight of pesticides used on all outdoor vegetable crops.

Turnips and swedes had 13% for the area of outdoor vegetable crops in Ireland 2021, accounting for 13% of the total pesticide treated area and 10% of the total weight of pesticides used on all outdoor vegetable crops.

Background

The regulatory system for PPPs in Ireland is based directly on EU legislation which provides a very high level of protection for humans, animals and the environment.

Legislation has been put in place at both EU and national level to minimise the risks associated with the use of PPPs while ensuring necessary crop protection. This legislation addresses the authorisation of PPPs for specific uses, residues of pesticides on food and feed and the sustainable use of pesticides. The Sustainable Use Directive (EU Directive (EC) No. 128/2009) aims to achieve a balance between ensuring human and environmental safety while maintaining continued viability of the farming and amenity sectors. This involves training and registration of advisors, distributors, operators and inspectors of pesticide application equipment, controls on storage, supply and use, adoption of the principles of IPM and improved statistics on PPP use. Regulation (EC) No. 1185/2009 was adopted on 25 November 2009 and requires each member state to collect statistics on PPP use.

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

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

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

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

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

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

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

Methods

The samples of holdings to be surveyed were selected from each of the 26 counties, on the basis of the total area of outdoor vegetable crops grown, using data from DAFM. For the purposes of the survey, the country was divided into three geographical regions namely the East, South and the North/West as per Table 1. The samples were categorised into five size groups, according to the total area of outdoor vegetable grown in each region. Holdings were selected at random within each of the size groups and the number of holdings selected was proportional to the total area of crops grown.

Table 1. Regions selected for survey and respective counties.

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

The purpose of the survey was explained to the occupiers of selected holdings in preliminary correspondence. A total of 58 outdoor vegetable holdings were contacted during the period February to April 2023 and data collected by phone and or physical interview for vegetable crops grown in 2021. The data collected included; the area of crops grown, area treated, target pests, pesticide used, rates applied and number of treatments applied. Holdings selected in the original sample which were unable to provide data were replaced with ones from the same county and size group held on a reserve list. The total number of farms sampled in each size group for outdoor vegetable crops are shown in

Table *2*. The data collected were entered using Oracle, a relational database programme. Validated data were downloaded for analysis using SPSS software.

Table 2. The total number of outdoor vegetable farms sampled from each size group.

Holding Size (Hectares)						
Region	**<2 ha**	**2<5 ha**	**5<15 ha**	**15<40 ha**	**40+ ha**	**Total**
Ireland	7	13	13	13	12	58

Definitions

- 'Basic area'; refers to the actual planted area of crops treated with a given pesticide.
- 'Biocides'; are defined as chemicals that are used to control and / or prevent various types of harmful or unwanted organisms, including disinfectants, preservatives, insect repellents, rodenticides and insecticides.
- 'Biological controls'; are defined as the use of biological organisms to control and / or prevent harmful insects, mites, weeds and plant diseases. Their usage is recorded by area treated (spha) only, as they are applied in units other than weight or volume (e.g. million/ha) and this does not translate readily into a conventional weight.
- 'Brassica crops' collectively refers to outdoor cabbages, cauliflower, brussels sprouts, broccoli and kale.
- 'Broccoli'; collectively refers to outdoor broccoli and calabrese.
- 'Cabbage' collectively refers to outdoor autumn, winter, summer, red, white and savoy cabbage.
- 'Cauliflower' collectively refers to outdoor autumn, winter and summer cauliflower.
- 'Courgettes and others' collectively refer to outdoor courgettes, cucumbers and pumpkins.
- 'Fungicides'; are defined as PPPs used to control and/or prevent harmful fungal disease.
- 'Growth regulators'; are defined as PPPs used to control/regulate the growth of the plant.
- 'Herbicides'; are defined as PPPs used to control and/ or prevent unwanted vegetation.
- 'Insecticides'; are defined as PPPs used to control and/or prevent harmful insects.
- 'Leafy greens, legumes and others' collectively refers to outdoor artichokes, broad beans, celeriac, chard, French beans, lettuce, peas, rhubarb, salad leaves, spinach, sweetcorn and tomatoes.
- 'Molluscicides'; are defined as PPPs used to control and/or prevent harmful slugs and snails.
- 'Onions and scallions' collectively refer to outdoor onions, shallots and scallions.
- 'Other herbs' collectively refer to outdoor coriander, garlic and parsley.
- 'PPP'; refers to plant protection product.

- 'Rounding'; due to rounding of figures there may be slight differences in totals both within and between tables.
- 'Seed treatments'; are defined as PPPs applied to seeds to provide protection and improve the establishment of healthy crops.
- 'Spray applications'; refers to the number of treatments of any pesticide type to the treated areas.
- 'Treated area'; refers to the total area treated with a pesticide, which includes all repeated applications to the basic area. This is measured in 'spray hectares' (basic area x number of spray applications) = spray hectares (spha).

Crops

Outdoor vegetable information was collected for the following crops for the purposes of this survey as per below in Table 3.

Table 3. List of individual outdoor vegetable crops surveyed in 2021.

Outdoor vegetable crops
Beetroot
Broccoli
Brussels sprouts
Cabbages
Carrots
Cauliflower
Celery
Courgettes and others
Kale
Leeks
Leafy greens, legumes and others
Onions and scallions
Other herbs
Parsnips
Turnips and swedes

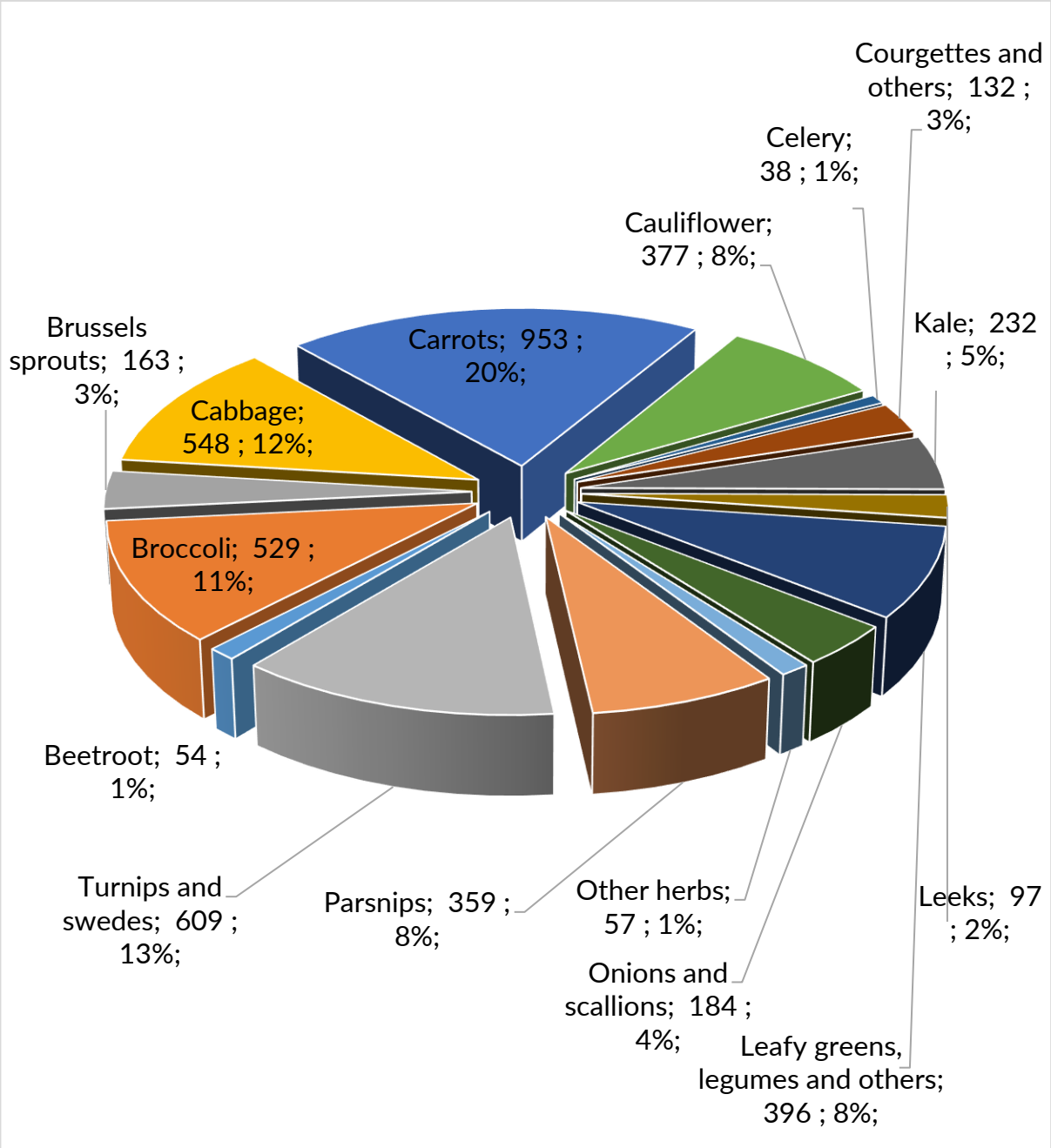
Data from 58 farms provided information on 327 examples of 15 crop types. The total area of crops sampled in the survey (1,547 ha) was representative of the area of outdoor vegetable crops grown in Ireland in 2021 (4,728 ha) as shown below in Table 4.

Table 4. The total number and area (hectares) of crops sampled, estimated total area and the proportion (%) of the total area of outdoor vegetable crops surveyed in Ireland, 2021.

Crop	Number of crops surveyed	Survey Area (ha)	Estimated Area (ha)	Proportion of crops surveyed (%)
Beetroot	18	28	54	52%
Broccoli	26	419	529	79%
Brussels sprouts	14	12	163	8%
Cabbages	78	192	548	35%
Carrots	32	179	953	19%
Cauliflower	24	94	377	25%
Celery	6	2	38	6%
Courgettes and others	12	9	132	7%
Kale	10	33	232	14%
Leeks	12	9	97	10%
Leafy greens, legumes and others	26	106	396	27%
Onions and scallions	16	25	184	13%
Other herbs	7	31	57	55%
Parsnips	24	199	359	56%
Turnips and swedes	22	209	609	34%
Total	***327***	***1,547***	***4,728***	***33%***

Carrots covered an estimated 20% of the total area of outdoor vegetable crops in 2021 as illustrated in Figure 1. Turnips and Swedes accounted for 13% while cabbage accounted for 12% respectively. Broccoli comprised 11% of the total share of the estimated area with parsnips, cauliflower and leafy greens, legumes and others and cauliflower at 8% respectively. It also shows that Kale made up 5% of the total area, while onions and scallions share 4% respectively. Brussels sprouts and courgettes and others accounted for 3%. Leeks shared 2% of the estimated area of outdoor vegetable crops with celery, beetroot and other herbs accounting for 1% of the total share.

Figure 1. Areas of individual outdoor vegetable crops grown in Ireland (ha), 2021.



Regional distribution of crops and pesticides

Figure 2. Regional distribution (ha) of outdoor vegetable crops grown in Ireland, 2021.

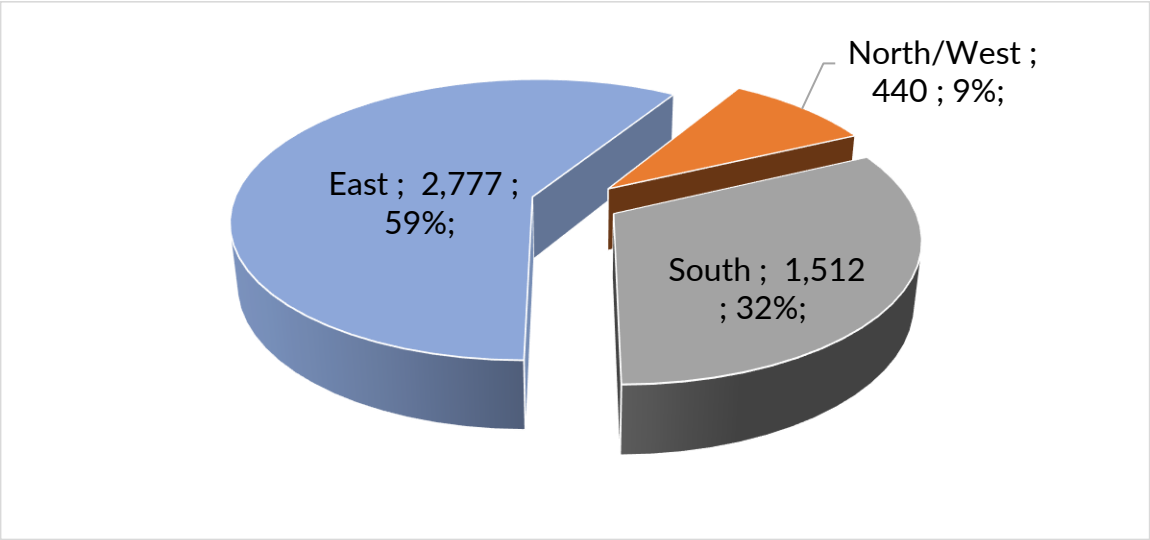
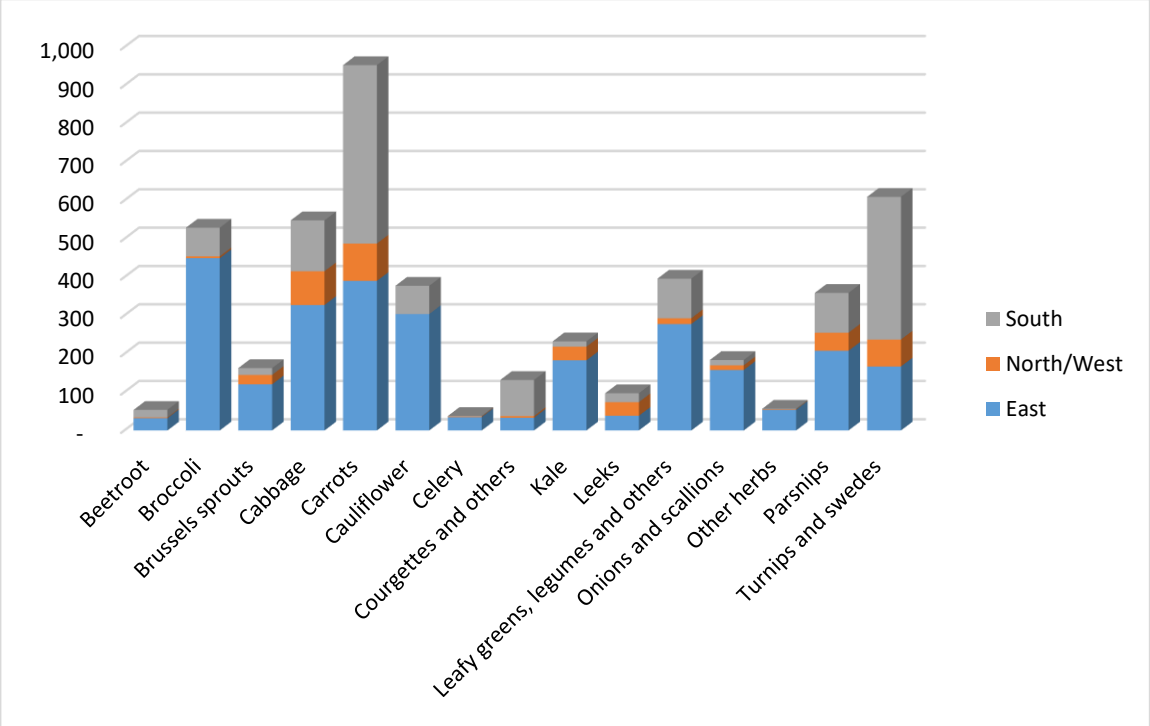


Figure 3. Regional distribution (ha) of individual outdoor vegetable crops grown in Ireland, 2021.



Pesticide usage

Herbicides were applied to 38% of the pesticide treated area accounting for 64% of the total weight of pesticides used. Fungicides were applied to 31% of the pesticide treated area and accounted for 26% of the total weight of pesticides used. Insecticides were applied to 26% of the pesticide treated area accounting for 6% of the weight of pesticides applied. Molluscicide treatments represented 4% of pesticide treated area and 2% of the weight of pesticides applied. Growth regulators were applied to less than 1% of the pesticide treated area and accounted for 2% of the weight of active substance applied. Seed treatment usage accounted for 1% of the pesticide treated area, representing less than 1% of the weight of active substances applied.

Figure 4. Pesticide usage (spha) on outdoor vegetable crops treated in Ireland, 2021.

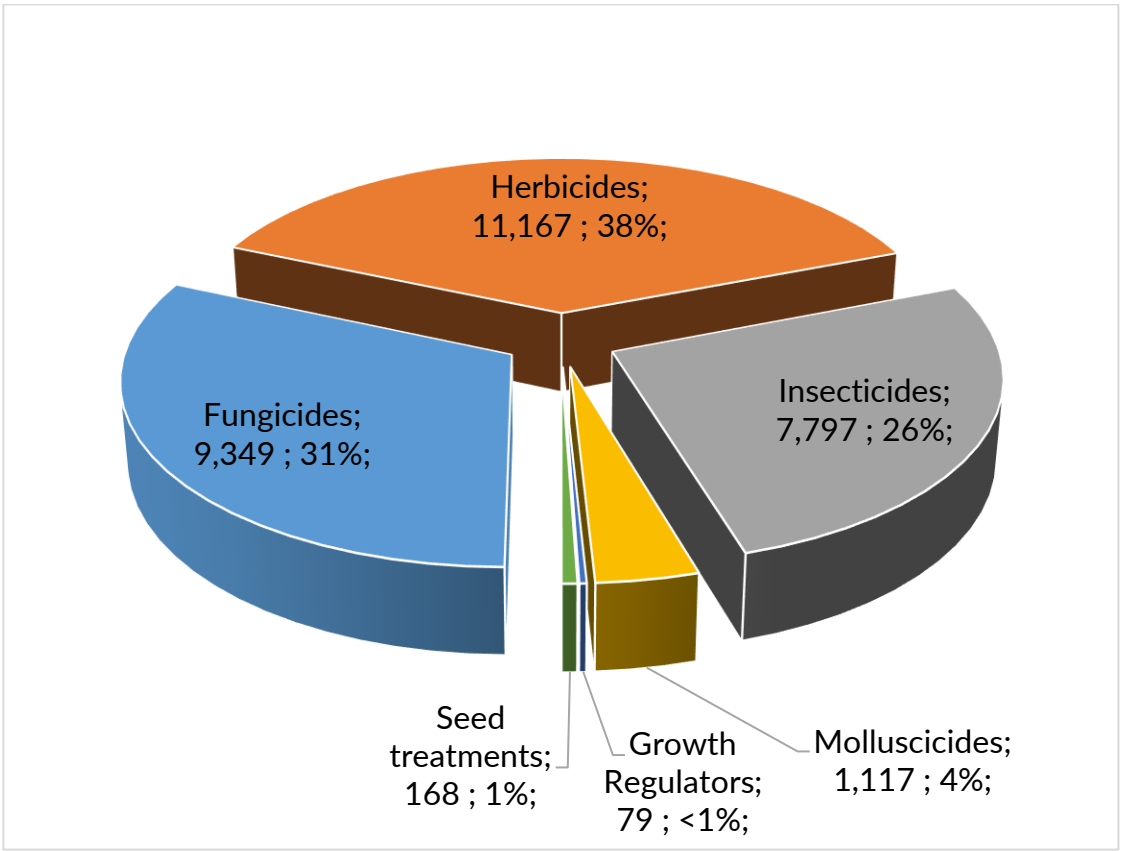
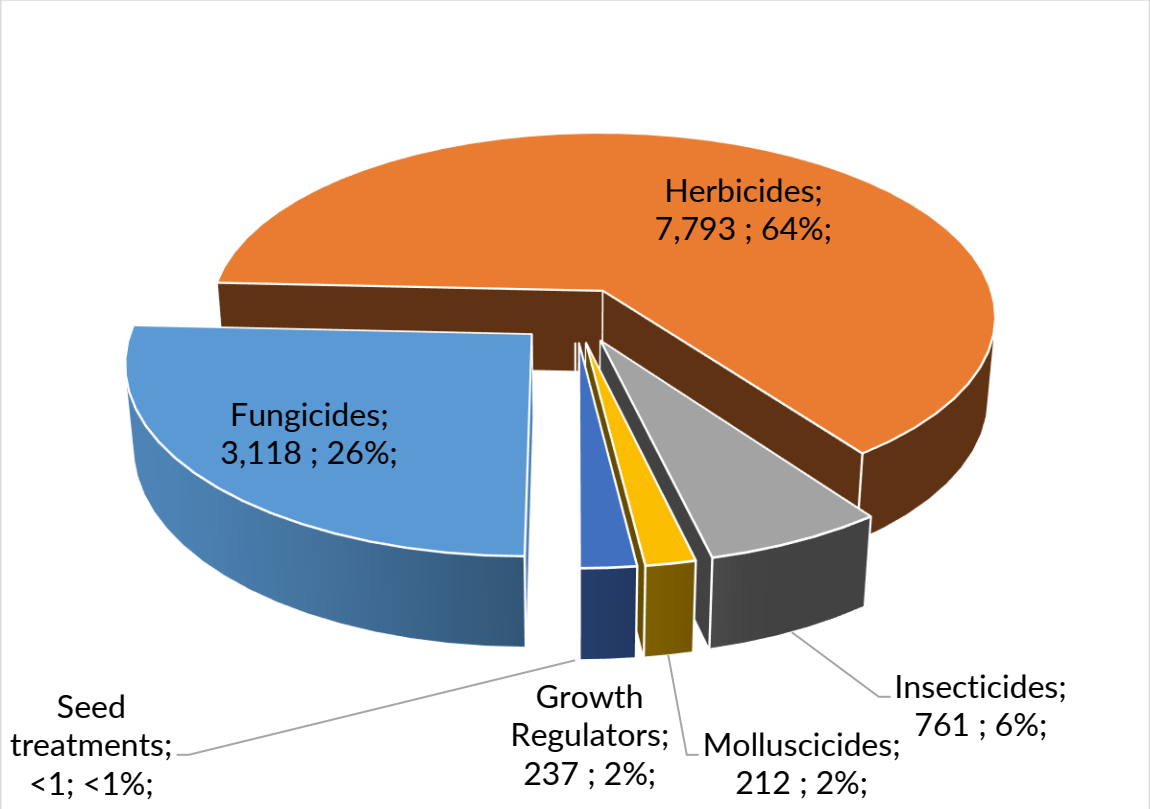


Figure 5. Weight (kgs) of pesticides applied on outdoor vegetable crops treated in Ireland, 2021.



Outdoor vegetable crop areas 2011, 2015 and 2021

Overall, the total area of outdoor vegetable crops has increased by 4% to 4,728 ha when compared to the average for years 2011 and 2015. In addition, the areas of some individual crops have changed. Areas under beetroot, carrots, kale, parsnips, turnips and swedes, leafy greens, legumes and others and courgettes and others, increased while all other areas decreased. Details of changes in outdoor vegetable crop areas between 2011, 2015 and 2021 are outlined in Table 5 below.

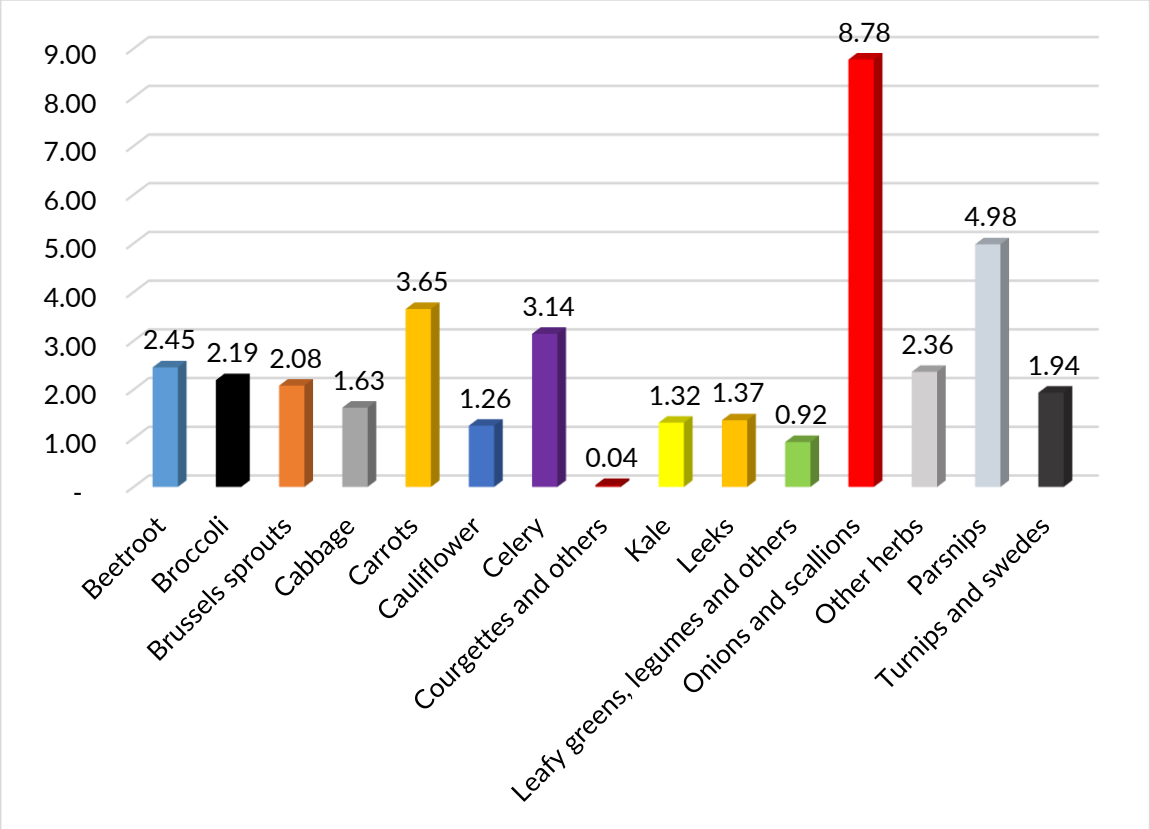
Table 5. Outdoor vegetable crop areas (ha) surveys in 2011, 2015 and 2021 and percentage (%) change in average areas grown from 2011 and 2015 compared to 2021.

Hectares Grown (Ha)				
Crop	**2011**	**2015**	**2021**	**Crop area change between 2011, 2015 and 2021 (%)**
Beetroot	8	64	54	49
Broccoli	596	580	529	-10
Brussels sprouts	177	170	163	-6
Cabbage	921	925	548	-41
Carrots	651	660	953	45
Cauliflower	423	426	377	-11
Celery	45	43	38	-14
Courgettes and others	72	21	132	183
Kale	2	57	232	688
Leeks	60	123	97	6
Leafy greens, legumes and others	238	459	396	14
Onions and scallions	278	268	184	-33
Other herbs	116	35	57	-25
Parsnips	343	298	359	12
Turnips and swedes	517	506	609	19
All crops	***4,447***	***4,635***	***4,728***	***4***

Quantity of pesticide applied per crop, 2011, 2015 and 2021

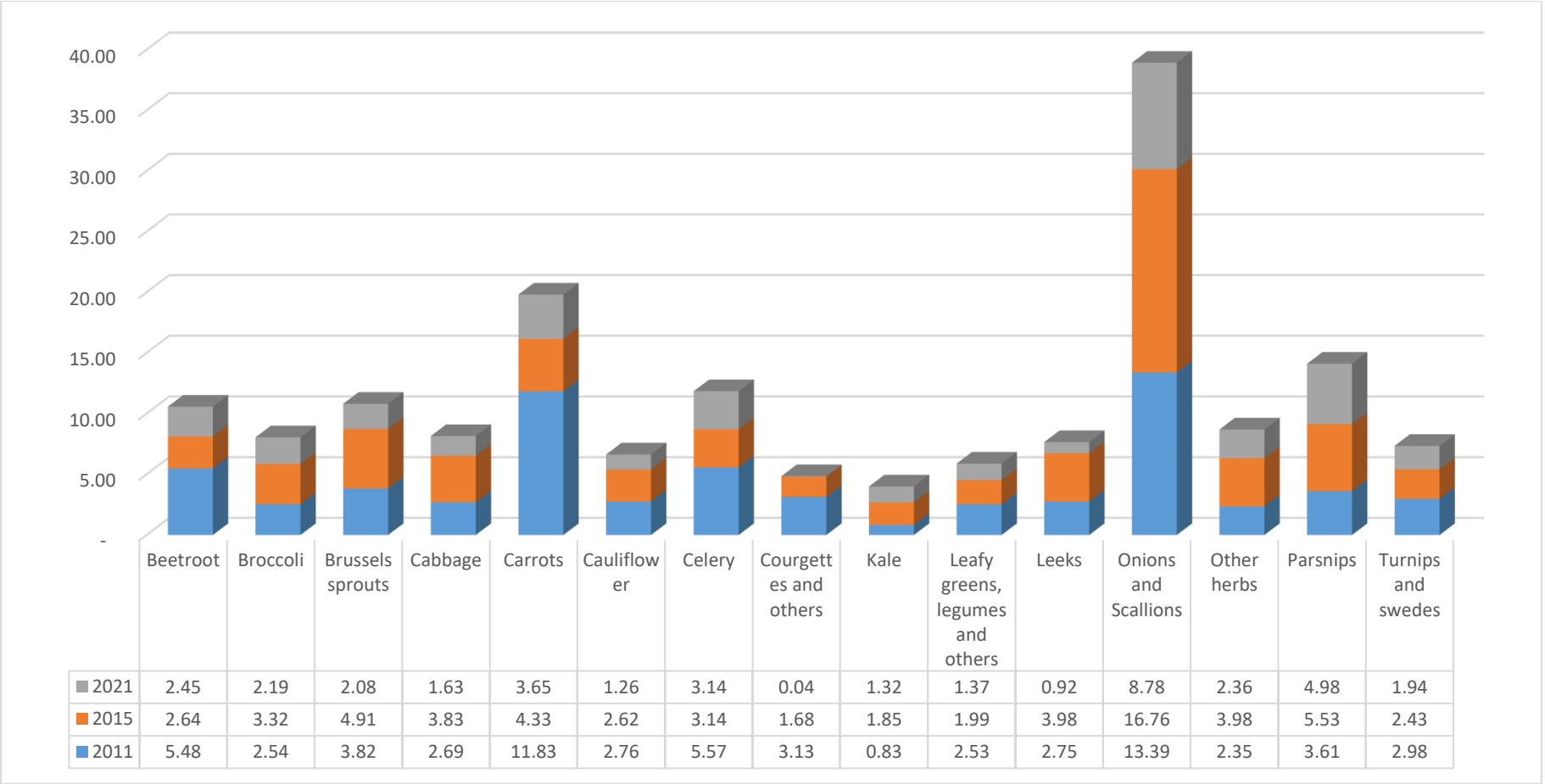
The average weight of pesticide applied per hectare of crop grown for each crop in 2021 is provided in Figure 6. Average weights were calculated as the total weight of pesticides applied divided by the total area of crop grown (whether treated or untreated).

Figure 6. Average weight of pesticides applied per hectare of outdoor vegetable crops grown in Ireland (kg/ha), 2021.



The highest weight of pesticides applied per hectare to a crop was on onions and scallions (8.78 kg/ha). Parsnips had the next highest levels of pesticide use (4.98 kg/ha) followed by carrots (3.65 kg/ha). The average weight of pesticide applied per hectare of crop grown is below in Figure 7 across the years 2011, 2015 and 2021.

Figure 7. Average weight of pesticides applied per hectare of crop grown in Ireland (kg/ha), in 2011, 2015 and 2021.



	Beetroot	Broccoli	Brussels sprouts	Cabbage	Carrots	Cauliflower	Celery	Courgettes and others	Kale	Leafy greens, legumes and others	Leeks	Onions and Scallions	Other herbs	Parsnips	Turnips and swedes
2021	2.45	2.19	2.08	1.63	3.65	1.26	3.14	0.04	1.32	1.37	0.92	8.78	2.36	4.98	1.94
2015	2.64	3.32	4.91	3.83	4.33	2.62	3.14	1.68	1.85	1.99	3.98	16.76	3.98	5.53	2.43
2011	5.48	2.54	3.82	2.69	11.83	2.76	5.57	3.13	0.83	2.53	2.75	13.39	2.35	3.61	2.98

The quantity of pesticides applied to the crops of onions and scallions decreased from (16.76 kg/ha) (2015) to (8.78 kg/ha) (2021). The quantity of pesticides applied to parsnips decreased from (5.53 kg/ha) (2015) and to (4.98 kg/ha) (2021). In addition, the quantity of pesticides applied to carrots decreased from (4.33 kg/ha) (2015) and to (3.65 kg/ha) (2021).

Pesticide applied on crop growing area, for years 2011, 2015 and 2021

The average weight of pesticide applied per hectare of crop grown for 2011, 2015 and 2021 including the different percentage changes over this period are summarised below for each outdoor vegetable crop type.

Brassica crops

Quantities (kg/ha) of fungicides and herbicides decreased by 49% and 41% respectively when comparing 2021 with 2015 and 2011. In addition, molluscicides increased by 88% over the same period. Insecticides increased by 61% when comparing 2021 with 2015 and 2011. Quantities (kg/ha) of seed treatments decreased by 100% when comparing 2021 with 2015 and 2011. No applications of growth regulators to brassica crops were noted during the survey. Overall, the quantity of pesticides applied to brassicas decreased by 29% over this time.

Table 6. Quantity of pesticide type (kg/ha) and percentage change (%) for brassica crops for surveys between 2021 and 2011-2015 average.

(kg/ha) on area grown				
Pesticide Type	**2011**	**2015**	**2021**	**Change (%)**
Fungicides	5.22	5.30	2.69	-49
Herbicides (incl. spot tr)	5.78	8.43	4.07	-41
Insecticides	1.32	2.16	2.64	61
Molluscicides	0.31	0.63	0.78	88
Growth regulators	-	-	-	-
Seed treatments	0.06	0.01	-	-100
All pesticides	***12.69***	***16.54***	***10.19***	***-29***

Onions, scallions and leeks crops

Quantities (kg/ha) of fungicides and herbicides decreased by 91% and 68% respectively when comparing 2021 with 2015 and 2011. In addition, molluscicides decreased by 100% over the same period. Insecticides increased by 143% respectively when comparing 2021

with 2015 and 2011. Overall, the quantity of pesticides applied to onion, scallions and leek crops decreased by 83% when comparing 2021 with 2015 and 2011.

Table 7. Quantity of pesticide type (kg/ha) and percentage change (%) for onions, scallions and leeks for surveys between 2021 and 2011-2015 average.

(kg/ha) on area grown				
Pesticide Type	**2011**	**2015**	**2021**	**Change (%)**
Fungicides	11.31	13.92	1.18	-91
Herbicides (incl. spot tr)	4.24	4.67	1.42	-68
Insecticides	0.32	0.10	0.38	143
Molluscicides	0.05	0.03	-	-100
Growth regulators	-	0.65	-	-
Seed treatments	-	-	0.05	-
All pesticides	***15.91***	***19.37***	***3.03***	***-83***

Celery and other herbs

Quantities (kg/ha) of fungicides and herbicides decreased by 39% and 68% respectively when comparing 2021 with 2015 and 2011. In addition, molluscicides decreased by 100% over the same period. Insecticides increased by 124% when comparing 2021 with 2015 and 2011. No applications of growth regulators and seed treatments to celery and other herbs were noted during the survey. Overall, the quantity of pesticides applied decreased by 50% when comparing 2021 with 2015 and 2011.

Table 8. Quantity of pesticide type (kg/ha) and percentage change (%) for celery and other herbs for surveys between 2021 and 2011-2015 average.

(kg/ha) on area grown				
Pesticide Type	**2011**	**2015**	**2021**	**Change (%)**
Fungicides	4.15	1.67	1.45	-39
Herbicides (incl. spot tr)	5.32	4.86	1.65	-68
Insecticides	0.43	0.51	1.04	124
Molluscicides	0.01	0.08		-100
Growth regulators	-	-	-	-
Seed treatments	-	-	-	-
All pesticides	***9.91***	***7.12***	***4.14***	***-50***

Carrots and parsnips

Quantities (kg/ha) of fungicides, herbicides and growth regulators decreased by 61%, 72% and 64% respectively when comparing 2021 with 2015 and 2011. Quantities (kg/ha) of insecticides and molluscicides increased by 298% and 952% when comparing 2021 with 2011 and 2015. Overall, there was a 56% decrease in the quantities (kg/ha) of pesticides applied to all carrots and parsnips when comparing 2021 with 2015 and 2011.

Table 9. Quantity of pesticide type (kg/ha) and percentage change (%) for carrots and parsnips for surveys between 2021 and 2011-2015 average.

(kg/ha) on area grown				
Pesticide Type	**2011**	**2015**	**2021**	**Change (%)**
Fungicides	7.77	2.42	1.45	-61
Herbicides (incl. spot tr)	6.18	6.64	1.79	-72
Insecticides	0.63	0.30	1.62	298
Molluscicides	0.01	0.02	0.18	952
Growth regulators	0.84	0.47	0.22	-64
Seed treatments	1.23	-	0.22	-
All pesticides	***16.66***	***9.86***	***5.48***	***-56***

Turnips and swedes

Quantities (kg/ha) of fungicides increased by 30% when comparing 2021 with 2015 and 2011. Quantities (kg/ha) of herbicides decreased by 41% when comparing 2021 with 2015 and 2011. Quantities (kg/ha) of insecticides and molluscicides also increased by 12% and 1200% respectively over this period. Overall, the quantity of pesticides applied to turnips and swedes decreased by 7% when comparing 2021 with 2015 and 2011.

Table 10. Quantity of pesticide type (kg/ha) and percentage change (%) for turnips and swedes for surveys between 2021 and 2011-2015 average.

(kg/ha) on area grown				
Pesticide Type	**2011**	**2015**	**2021**	**Change (%)**
Fungicides	0.36	0.55	0.57	30
Herbicides (incl. spot tr)	1.26	1.51	0.81	-41
Insecticides	1.33	0.32	0.58	12
Molluscicides	0.03	0.04	0.44	1200
Growth regulators	-	-	-	-
Seed treatments	0.11	-	0.13	-
All pesticides	***3.09***	***2.43***	***2.54***	***-7***

Leafy greens, legumes, courgettes, beetroot and other crops

Quantities (kg/ha) of fungicides and herbicides applied to leafy greens, legumes, courgettes, beetroot and other crops decreased by 81% and 76% respectively comparing 2021 with 2015 and 2011. Quantities (kg/ha) of insecticides and molluscicides increased by 140% and 381% respectively over the same period. Overall, the quantity of pesticides applied to other outdoor vegetable crops decreased by 66% when comparing 2021 with 2015 and 2011.

Table 11. Quantity of pesticide type (kg/ha) and percentage change (%) for leafy greens, legumes, courgettes, beetroot and other crops for surveys between 2021 and 2011-2015 average.

(kg/ha) on area grown				
Pesticide Type	**2011**	**2015**	**2021**	**Change (%)**
Fungicides	3.83	2.60	0.60	-81
Herbicides (incl. spot tr)	6.23	5.39	1.37	-76
Insecticides	1.21	0.26	1.03	140
Molluscicides	0.09	0.05	0.30	381
Growth regulators	-	0.0003	-	-
Seed treatments	-	-	-	-
All pesticides	***11.36***	***8.30***	***3.30***	***-66***

Pesticide Usage Survey Results 2021

Pesticide usage on beetroot

- 54 ha of beetroot in Ireland.
- 40 treated hectares (spha).
- 132 kilograms applied.
- 74% of the area of beetroot received a pesticide treatment.

Figure 8. Pesticide usage (spha) on beetroot in Ireland, 2021.

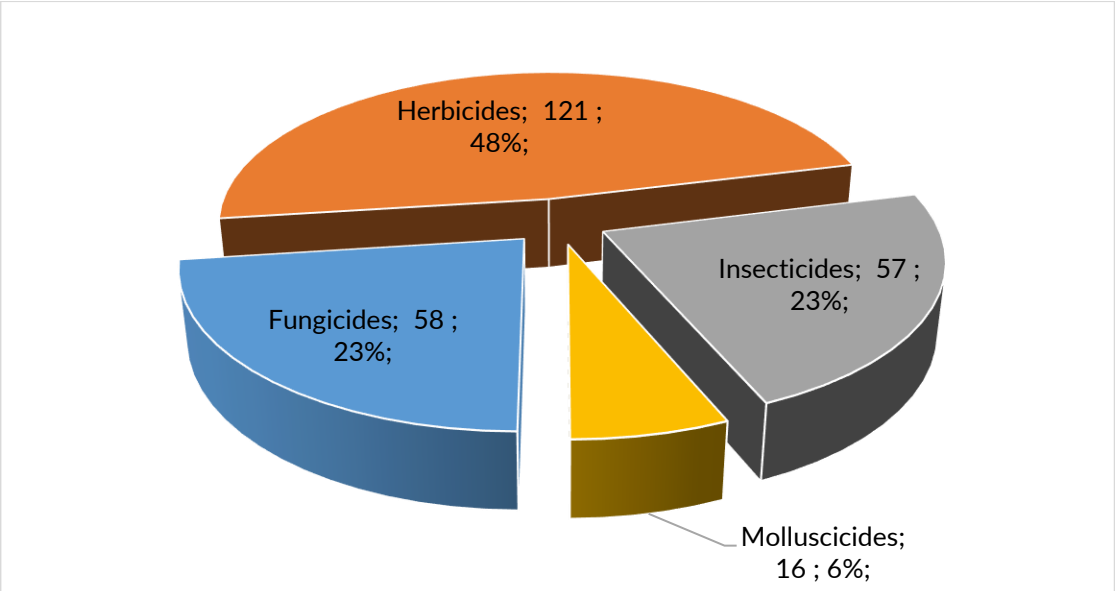


Figure 9. Weight of pesticides (kg) applied to beetroot in Ireland, 2021.

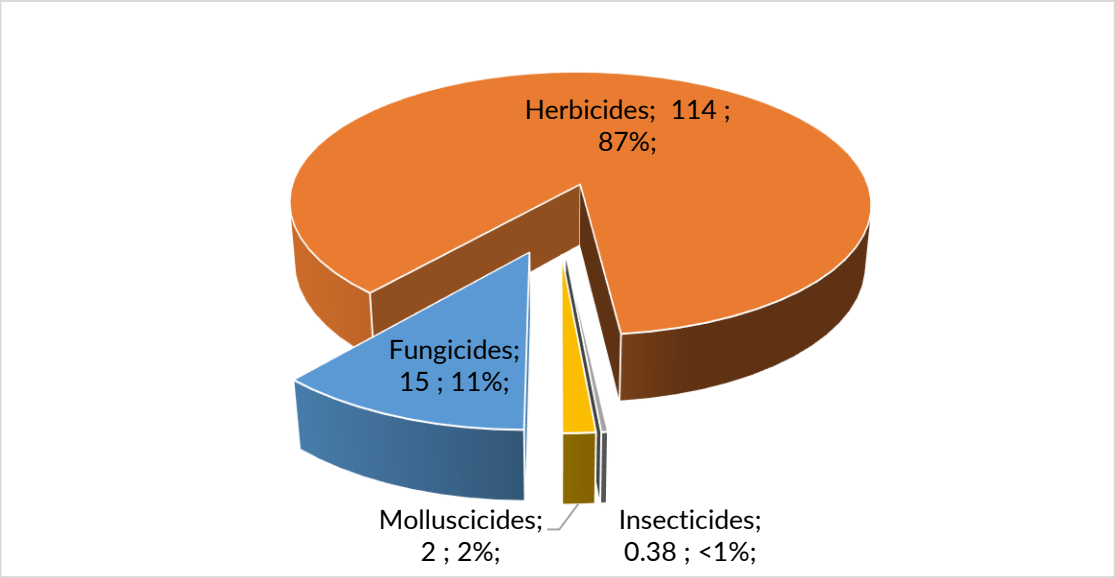


Figure 10. Proportional area of beetroot treated with each pesticide group in Ireland, 2021.

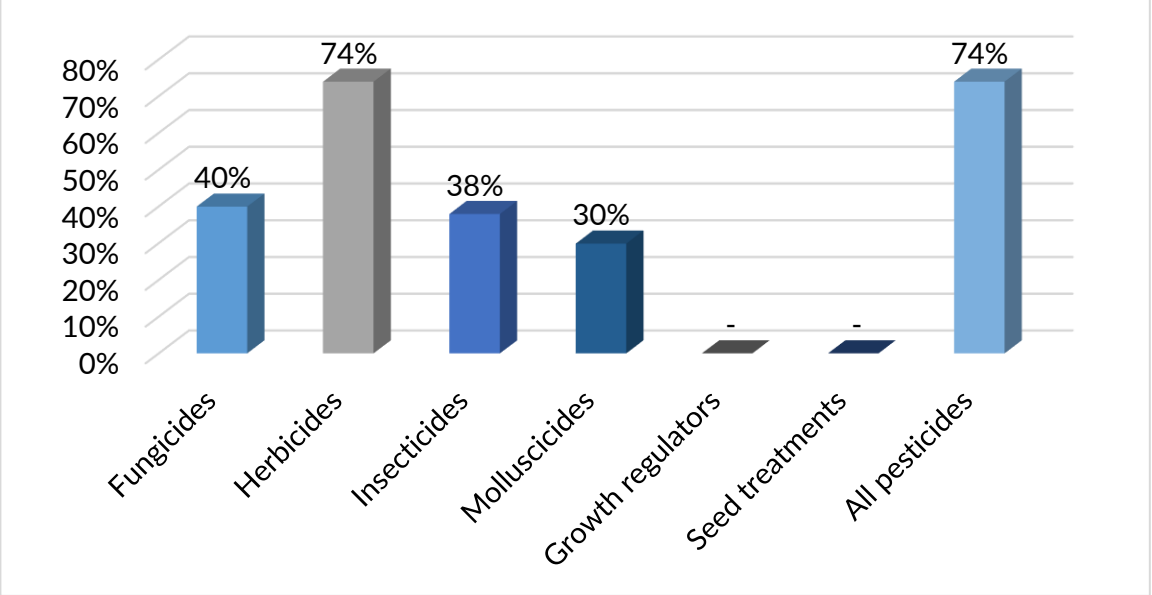


Table 12. The top 10 active ingredients most extensively used on beetroot in 2021, ranked by area treated (spray-hectares).

Active Substance	Treated area (spha)	Basic area treated (ha)	Quantity applied (kg)
Metamitron	42.25	37.05	56.94
Deltamethrin	39.51	20.36	0.30
Boscalid	36.30	19.14	9.69
Pyraclostrobin	36.30	19.14	2.43
Phenmedipham	20.85	18.85	7.70
Lenacil	19.45	19.45	3.89
S-metolachlor	18.37	18.37	24.69
Difenoconazole	17.15	17.15	2.14
Lambda-cyhalothrin	17.15	17.15	0.09
Ethofumesate	16.04	16.04	16.04

Table 13. The top 10 active ingredients most extensively used on beetroot in Ireland in 2021, ranked by weight (kg).

Active Substance	Quantity applied (kg)	Treated area (spha)	Basic area treated (ha)
Metamitron	56.94	42.25	37.05
S-metolachlor	24.69	18.37	18.37
Ethofumesate	16.04	16.04	16.04
Boscalid	9.69	36.30	19.14
Phenmedipham	7.70	20.85	18.85
Glyphosate	5.15	4.13	4.13
Lenacil	3.89	19.45	19.45
Pyraclostrobin	2.43	36.30	19.14
Difenoconazole	2.14	17.15	17.15
Metaldehyde	1.93	16.04	16.04

Pesticide usage on broccoli

- 529 ha of broccoli in Ireland.
- 488 treated hectares (spha).
- 1,160 kilograms applied.
- 92% of the area of broccoli received a pesticide treatment.

Figure 11. Pesticide usage (spha) on broccoli in Ireland, 2021.

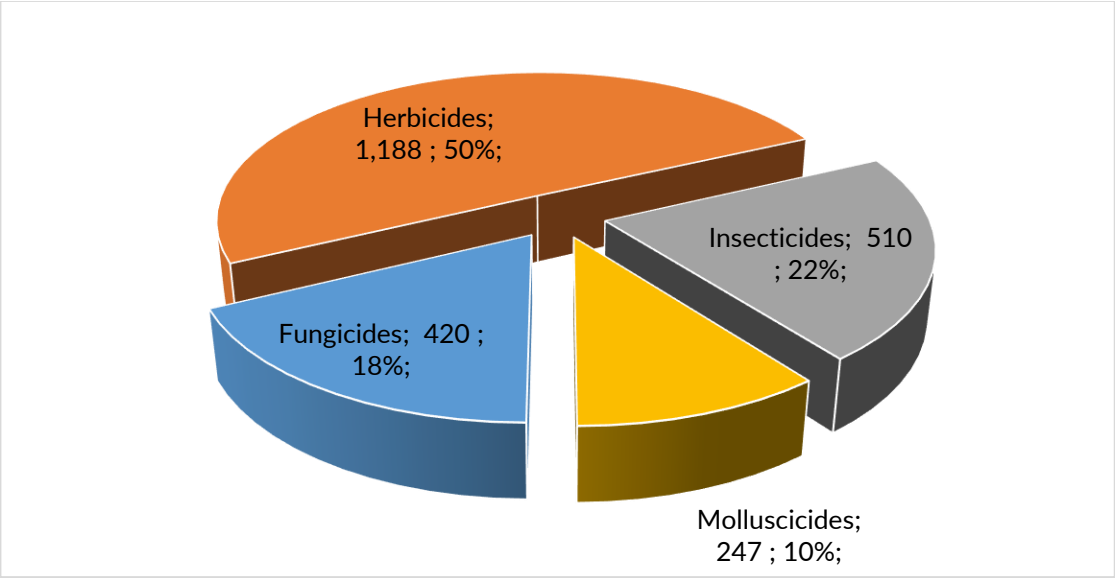


Figure 12. Weight of pesticides (kg) applied to broccoli in Ireland, 2021.

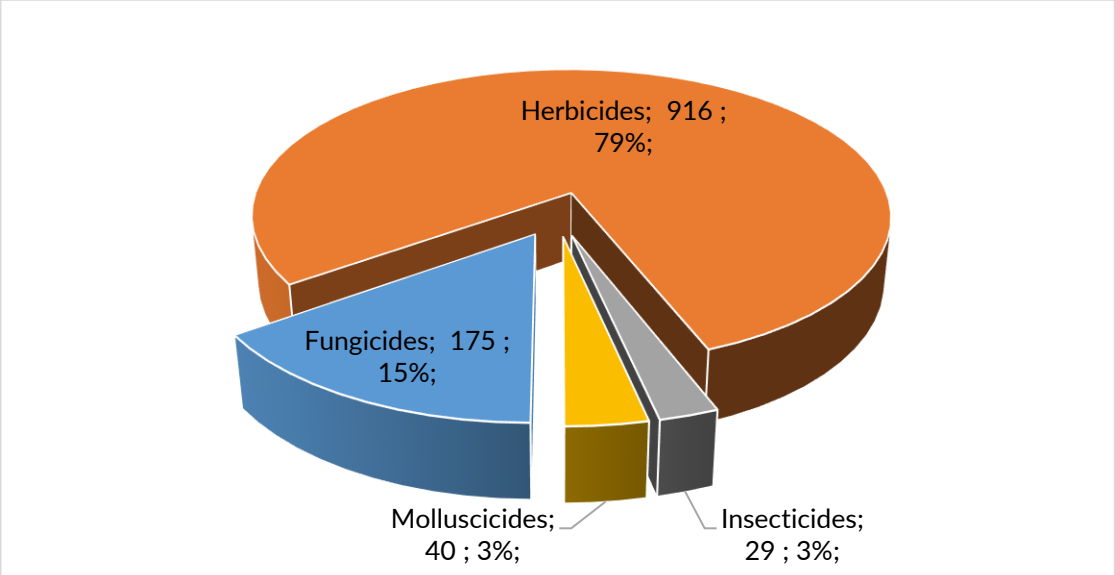


Figure 13. Proportional area of broccoli treated with each pesticide group in Ireland, 2021.

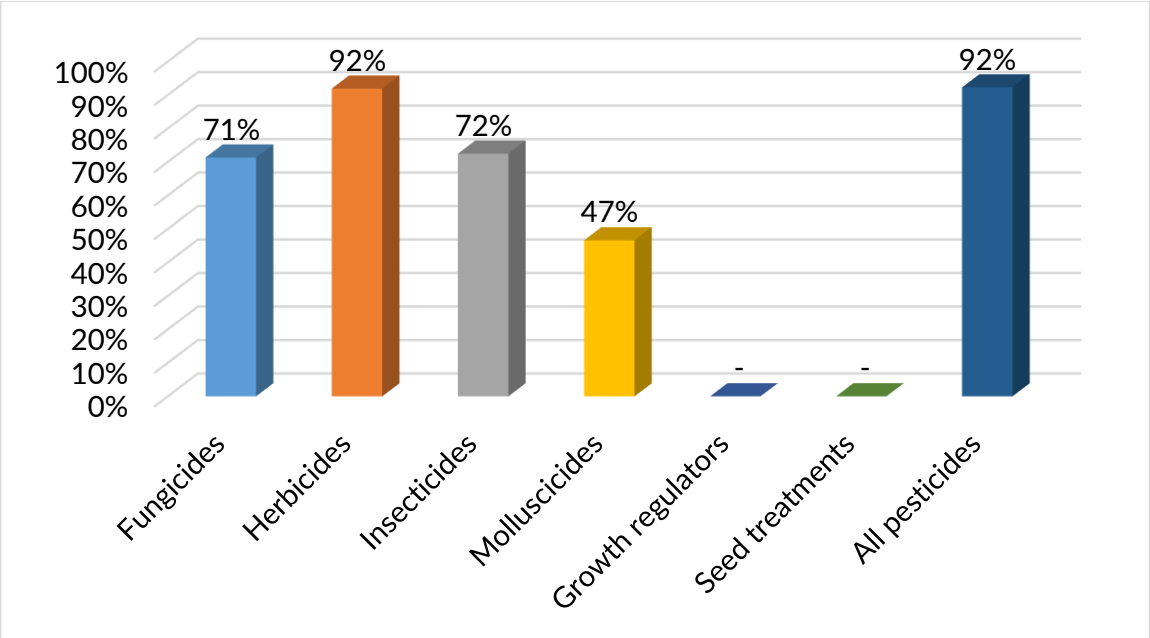


Table 14. The top 10 active ingredients most extensively used on broccoli in 2021, ranked by area treated (spray-hectares).

Active Substance	Treated area (spha)	Basic area treated (ha)	Quantity applied (kg)
Metazachlor	490.64	487.00	245.32
Pendimethalin	389.43	385.78	388.99
Spirotetramat	364.27	360.61	27.32
Azoxystrobin	254.45	254.45	27.95
Glyphosate	241.38	241.38	262.66
Metaldehyde	237.74	237.74	38.04
Cyantraniliprole	129.63	112.91	1.16
Propamocarb hydrochloride	95.43	95.43	94.82
Fluopicolide	94.81	94.81	9.48
Clomazone	45.92	45.92	3.79

Table 15. The top 10 active ingredients most extensively used on broccoli in Ireland in 2021, ranked by weight (kg).

Active Substance	Quantity applied (kg)	Treated area (spha)	Basic area treated (ha)
Pendimethalin	388.99	389.43	385.78
Glyphosate	262.66	241.38	241.38
Metazachlor	245.32	490.64	487.00
Propamocarb hydrochloride	94.82	95.43	95.43
Metaldehyde	38.04	237.74	237.74
Mancozeb	37.72	42.23	25.51
Azoxystrobin	27.95	254.45	254.45
Spirotetramat	27.32	364.27	360.61
Pyridate	14.96	20.95	17.31
Fluopicolide	9.48	94.81	94.81

Pesticide usage on brussels sprouts

- 163 ha of brussels sprouts in Ireland.
- 129 treated hectares (spha).
- 338 kilograms applied.
- 79% of the area of brussels sprouts received a pesticide treatment.

Figure 14. Pesticide usage (spha) on brussels sprouts in Ireland, 2021.

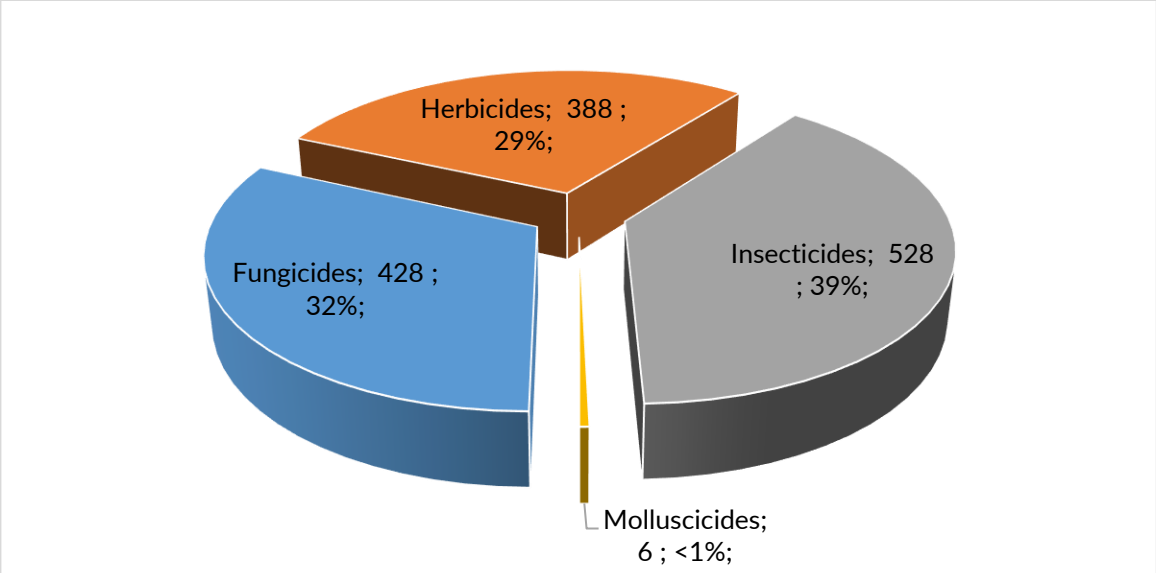


Figure 15. Weight of pesticides (kg) applied to brussels sprouts in Ireland, 2021.

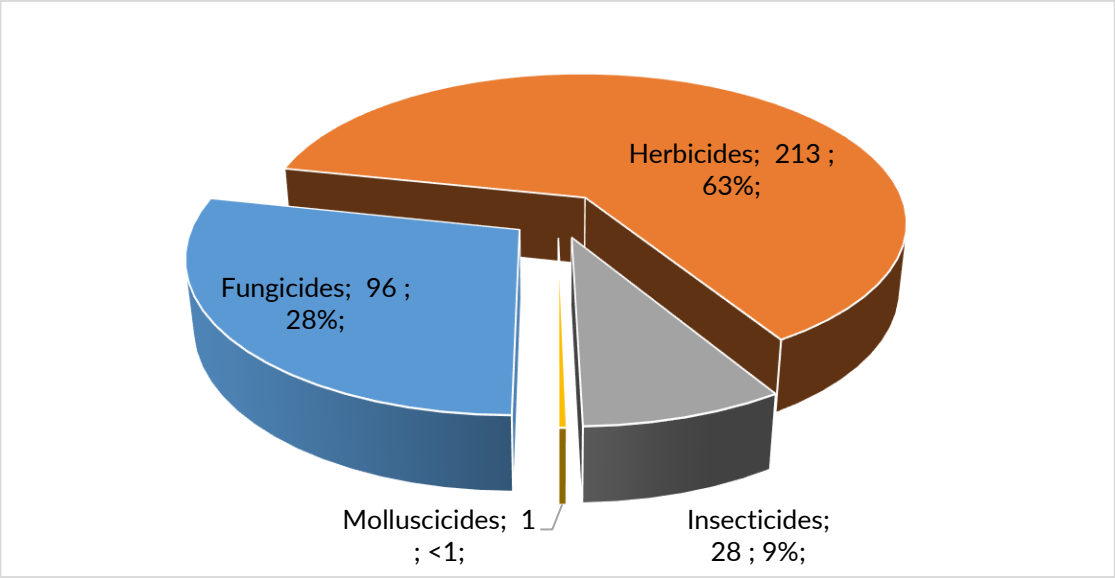


Figure 16. Proportional area of brussels sprouts treated with each pesticide group in Ireland, 2021.

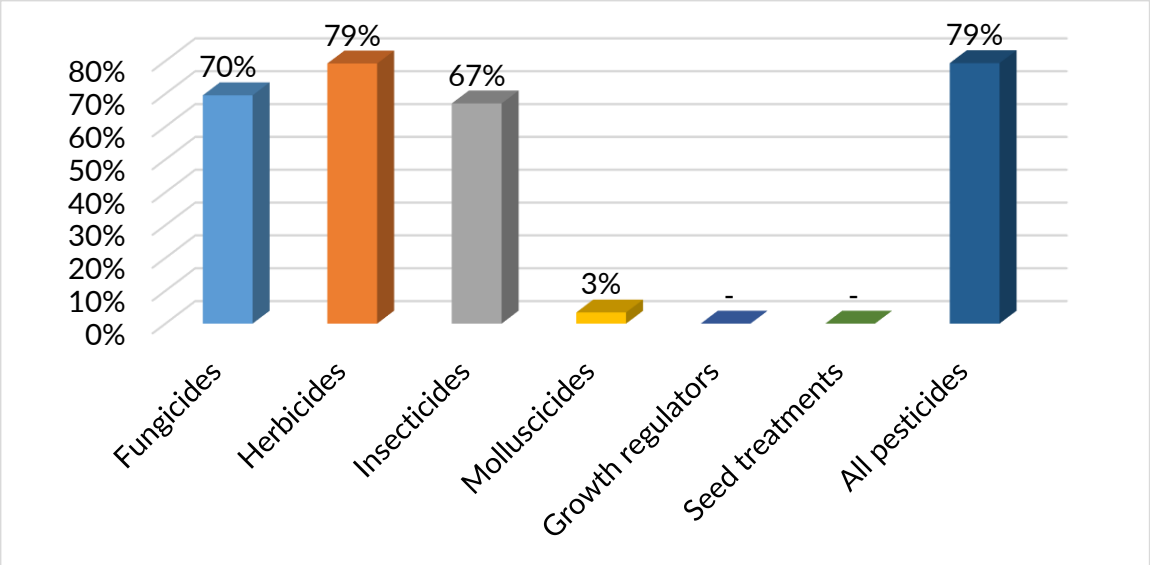


Table 16. The top 10 active ingredients most extensively used on brussels sprouts in 2021, ranked by area treated (spray-hectares).

Active Substance	Treated area (spha)	Basic area treated (ha)	Quantity applied (kg)
Azoxystrobin	106.83	105.11	26.71
Boscalid	103.39	103.39	27.60
Clomazone	112.25	112.25	8.08
Cyantraniliprole	103.58	103.58	0.31
Difenoconazole	111.43	111.43	13.80
Ferric phosphate	5.54	5.54	1.12
Flonicamid	103.39	103.39	7.24
Fosetyl-aluminium	0.004	0.004	-
Glyphosate	6.89	6.89	11.17
Indoxacarb	108.92	108.92	2.78

Table 17. The top 10 active ingredients most extensively used on brussels sprouts in Ireland in 2021, ranked by weight (kg).

Active Substance	Quantity applied (kg)	Treated area (spha)	Basic area treated (ha)
Azoxystrobin	26.71	106.83	105.11
Boscalid	27.60	103.39	103.39
Clomazone	8.08	112.25	112.25
Cyantraniliprole	0.31	103.58	103.58
Difenoconazole	13.80	111.43	111.43
Ferric phosphate	1.12	5.54	5.54
Flonicamid	7.24	103.39	103.39
Fosetyl-aluminium	-	0.004	0.004
Glyphosate	11.17	6.89	6.89
Indoxacarb	2.78	108.92	108.92

Pesticide usage on cabbage

- 548 ha of cabbage grown in Ireland.
- 442 treated hectares (spha).
- 892 kilograms applied.
- 81% of the area of cabbage received a pesticide treatment.

Figure 17. Pesticide usage (spha) on cabbage in Ireland, 2021.

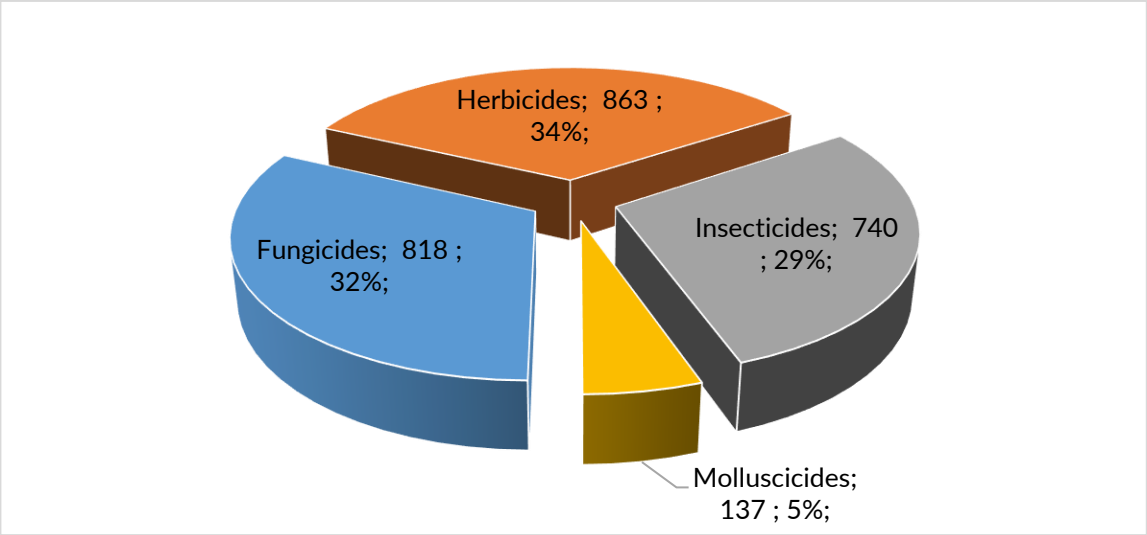


Figure 18. Weight of pesticides (kg) applied to cabbage in Ireland, 2021.

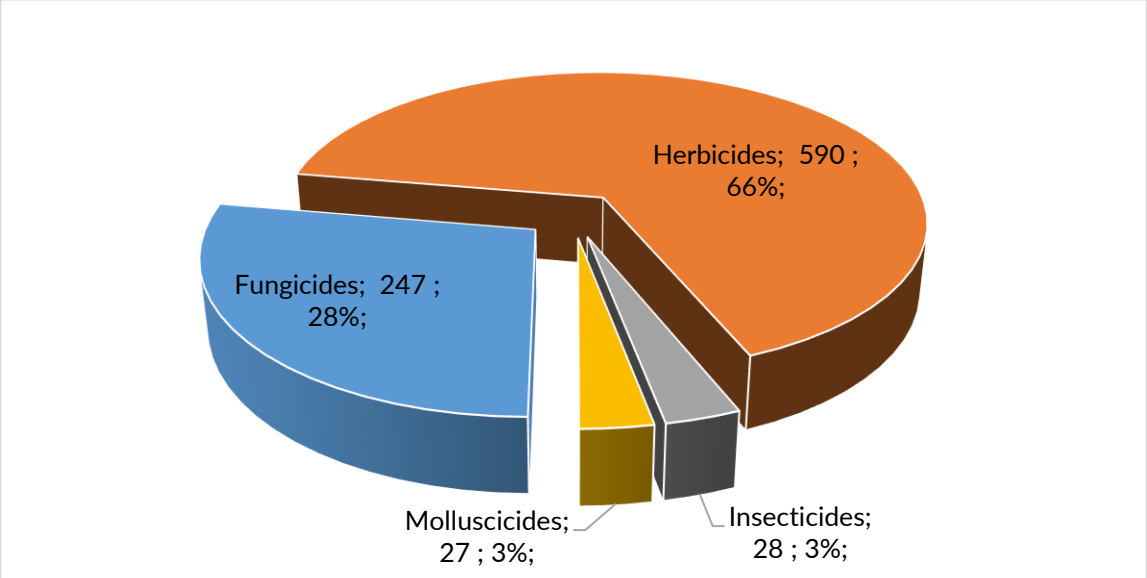


Figure 19. Proportional area of cabbage treated with each pesticide group in Ireland, 2021.

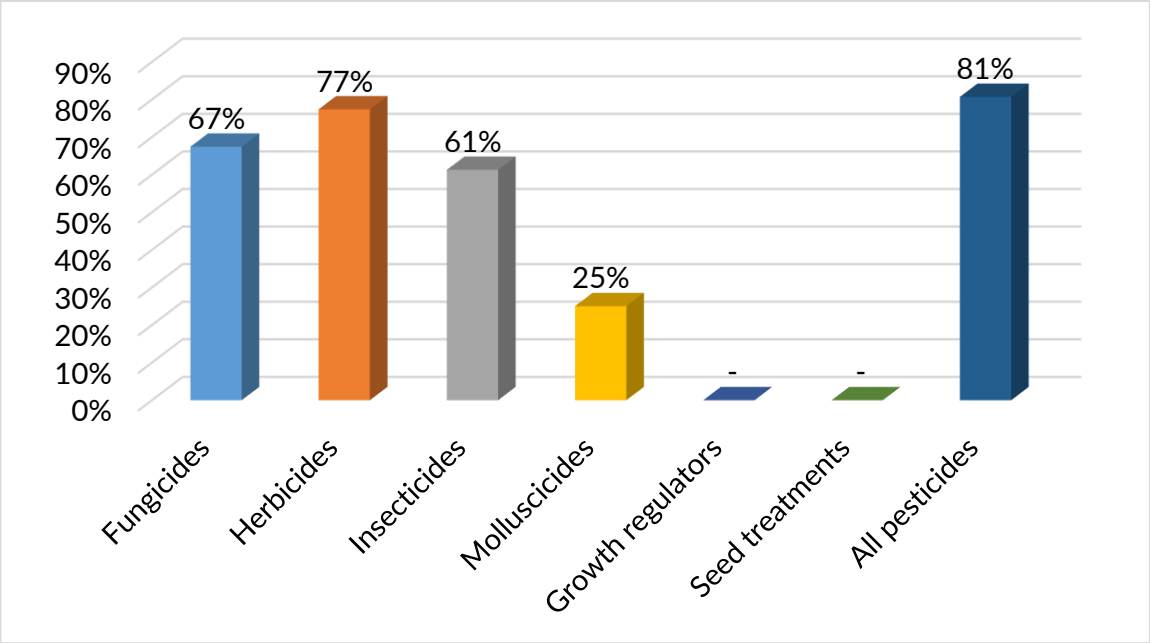


Table 18. The top 10 active ingredients most extensively used on cabbage in 2021, ranked by area treated (spray-hectares).

Active Substance	Treated area (spha)	Basic area treated (ha)	Quantity applied (kg)
Metazachlor	410.92	406.22	286.65
Difenoconazole	294.54	243.80	34.30
Spirotetramat	258.08	214.31	18.62
Deltamethrin	177.82	177.82	0.96
Indoxacarb	167.37	108.95	4.27
Prothioconazole	140.76	118.34	27.03
Metaldehyde	137.20	137.20	26.99
Pendimethalin	133.82	129.12	135.89
Clomazone	113.14	113.14	8.87
Boscalid	113.06	113.06	50.21

Table 19. The top 10 active ingredients most extensively used on cabbage in Ireland in 2021, ranked by weight (kg).

Active Substance	Quantity applied (kg)	Treated area (spha)	Basic area treated (ha)
Metazachlor	286.65	410.92	406.22
Pendimethalin	135.89	133.82	129.12
Mancozeb	75.86	105.25	105.25
S-metolachlor	69.40	59.73	59.73
Boscalid	50.21	113.06	113.06
Difenoconazole	34.30	294.54	243.80
Pyridate	28.99	34.14	29.44
Prothioconazole	27.03	140.76	118.34
Metaldehyde	26.99	137.20	137.20
Azoxystrobin	21.83	90.55	84.44

Pesticide usage on carrots

- 953 ha of carrots grown in Ireland.
- 810 treated hectares (spha).
- 3,482 kilograms applied.
- 85% of the area of carrots received a pesticide treatment.

Figure 20. Pesticide usage (spha) on carrots in Ireland, 2021.

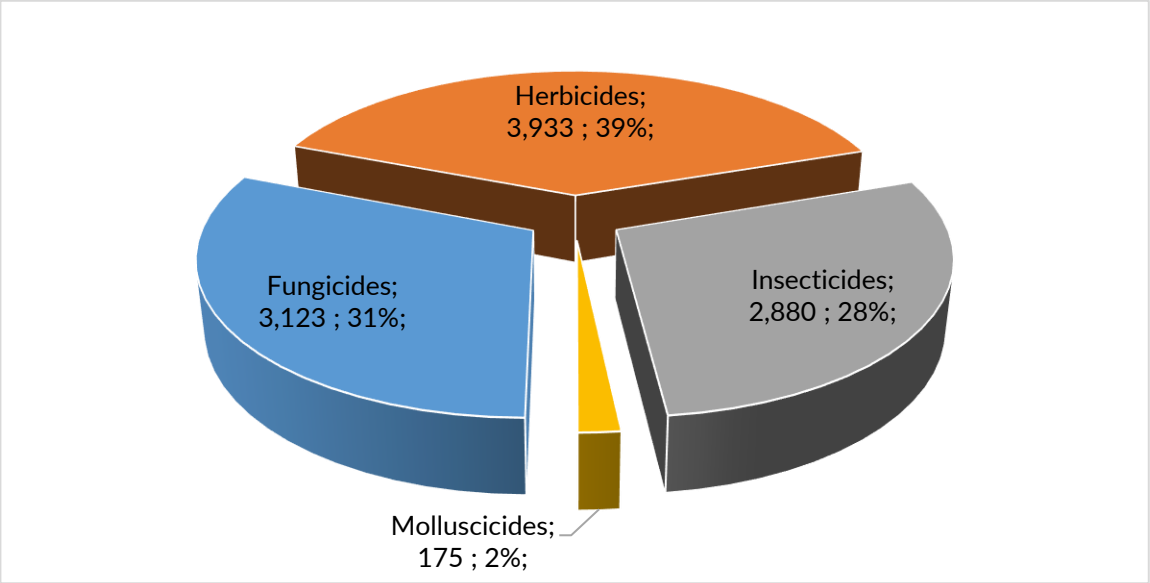


Figure 21. Weight of pesticides (kg) applied to carrots in Ireland, 2021.

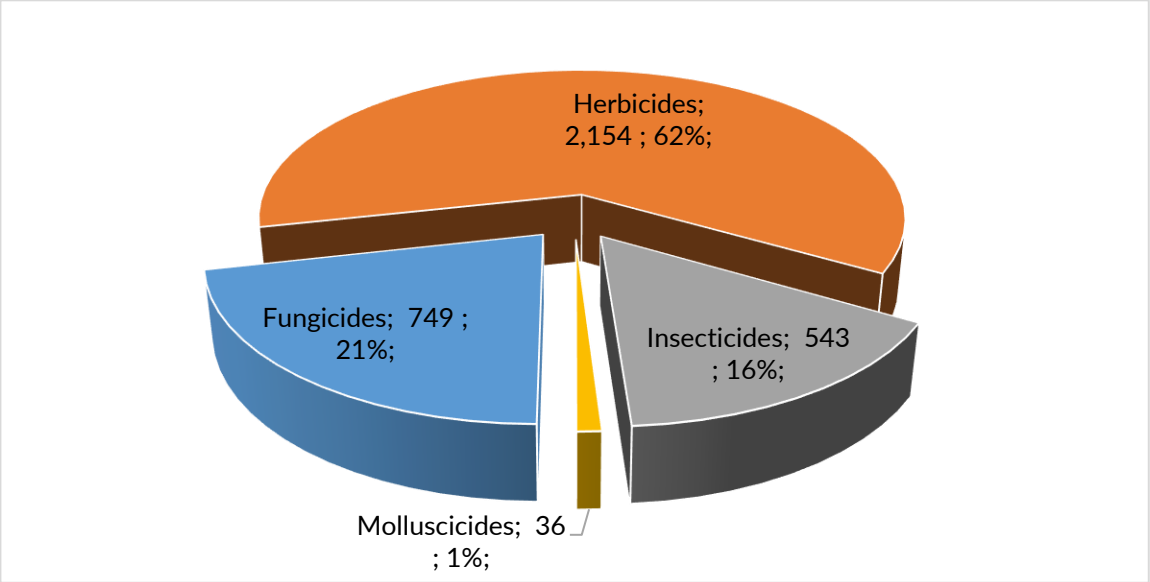


Figure 22. Proportional area of carrots treated with each pesticide group in Ireland, 2021.

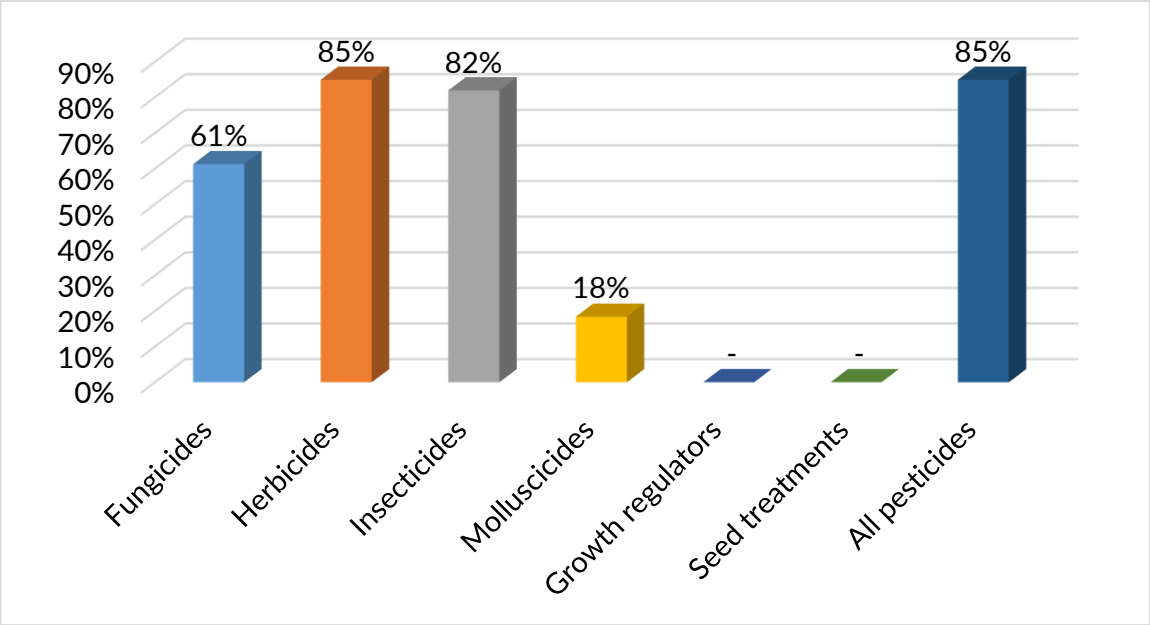


Table 20. The top 10 active ingredients most extensively used on carrots in 2021, ranked by area treated (spray-hectares).

Active Substance	Treated area (spha)	Basic area treated (ha)	Quantity applied (kg)
Lambda-cyhalothrin	1701.10	779.47	16.28
Metribuzin	863.73	624.76	104.87
Aclonifen	719.96	711.34	486.51
Pendimethalin	709.07	700.45	865.95
Azoxystrobin	665.97	500.28	121.46
Clomazone	617.58	608.96	47.08
Difenoconazole	573.54	179.29	23.68
Boscalid	538.43	363.14	129.73
Pyraclostrobin	538.43	363.14	32.56
Cyprodinil	511.54	336.25	135.72

Table 21. The top 10 active ingredients most extensively used on carrots in Ireland in 2021, ranked by weight (kg).

Active Substance	Quantity applied (kg)	Treated area (spha)	Basic area treated (ha)
Pendimethalin	865.95	709.07	700.45
Aclonifen	486.51	719.96	711.34
Oxamyl	485.03	306.71	306.71
Glyphosate	406.66	282.96	282.96
Prosulfocarb	182.15	137.41	128.79
Cyprodinil	135.72	511.54	336.25
Boscalid	129.73	538.43	363.14
Azoxystrobin	121.46	665.97	500.28
Metribuzin	104.87	863.73	624.76
Fludioxonil	90.48	511.54	336.25

Pesticide usage on cauliflower

- 377 ha of cauliflower grown in Ireland.
- 341 treated hectares (spha).
- 474 kilograms applied.
- 90% of the area of cauliflower received a pesticide treatment.

Figure 23. Pesticide usage (spha) on cauliflower in Ireland, 2021.

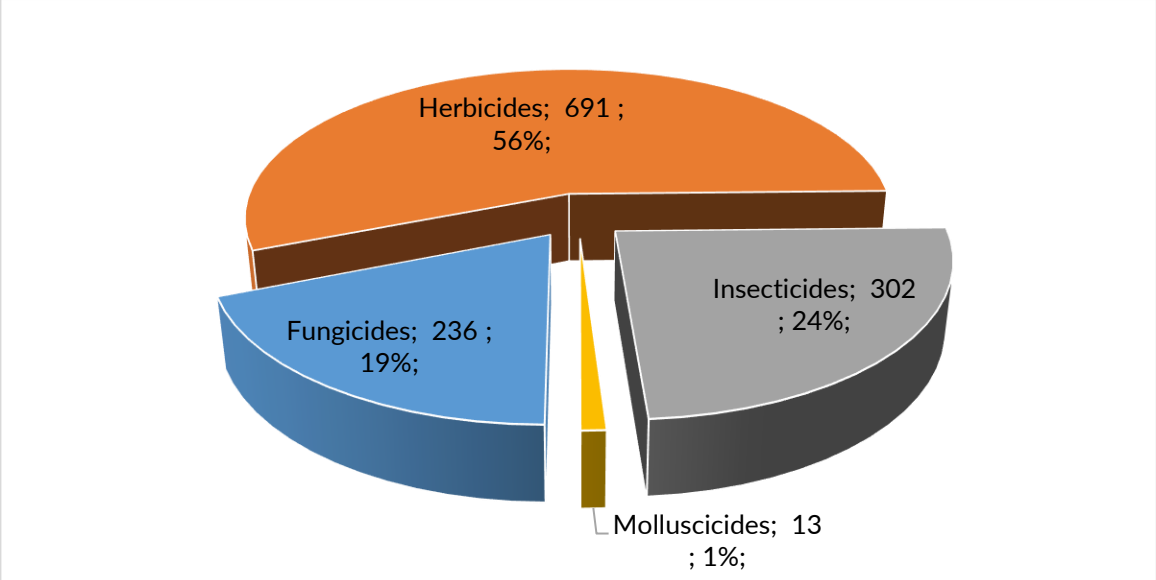


Figure 24. Weight of pesticides (kg) applied to cauliflower in Ireland, 2021.

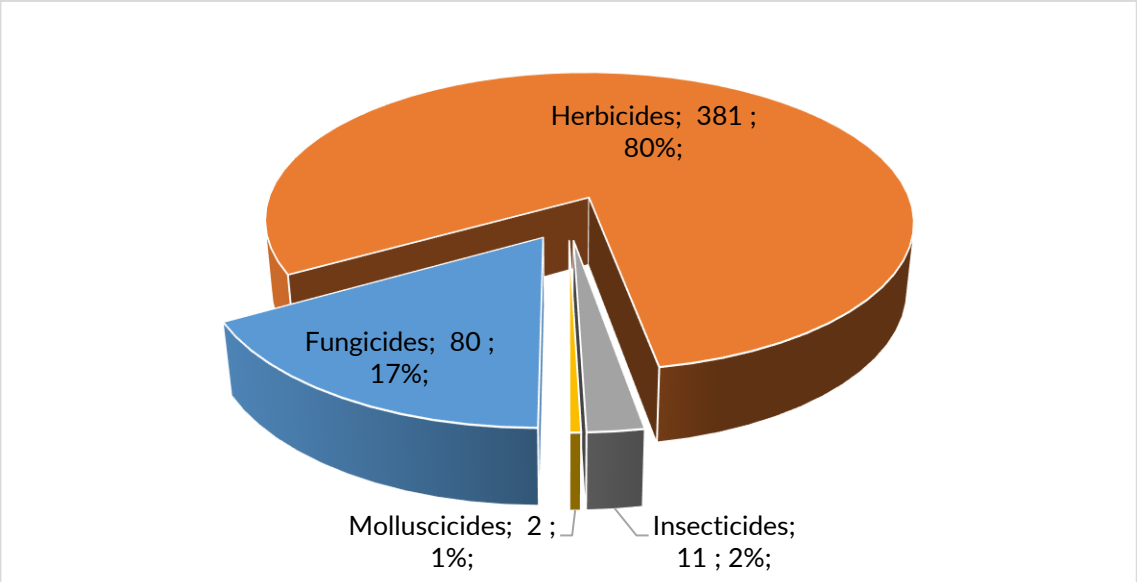


Figure 25. Proportional area of cauliflower treated with each pesticide group in Ireland, 2021.

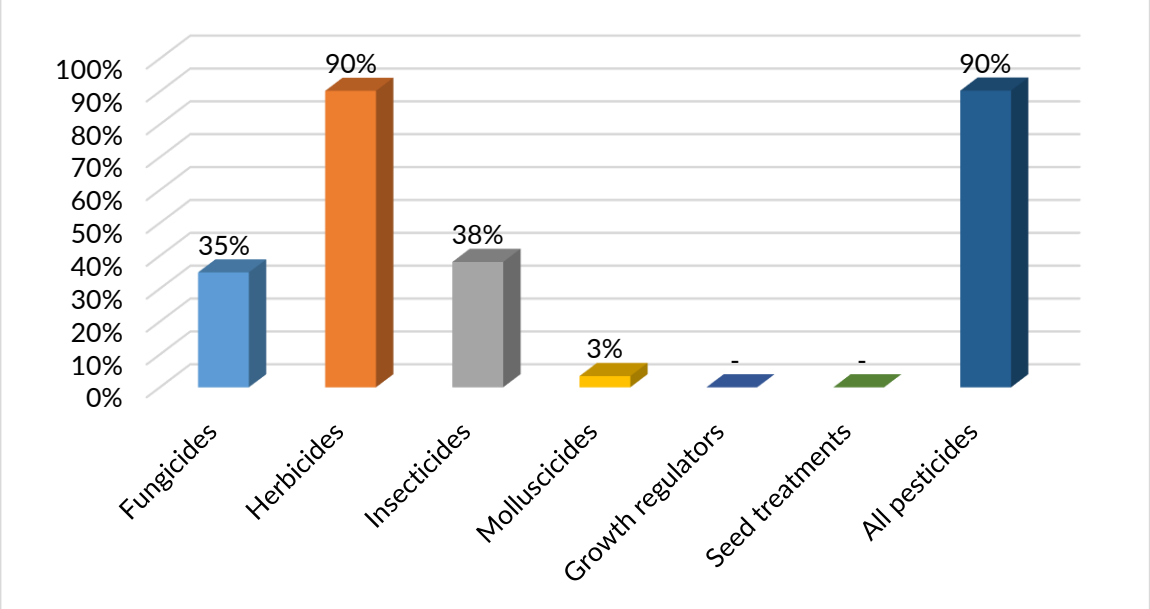


Table 22. The top 10 active ingredients most extensively used on cauliflower in 2021, ranked by area treated (spray-hectares).

Active Substance	Treated area (spha)	Basic area treated (ha)	Quantity applied (kg)
Metazachlor	340.42	340.42	155.30
Pendimethalin	234.49	227.60	116.94
Spirotetramat	108.92	70.45	8.17
Difenoconazole	97.45	79.68	10.65
Cyantraniliprole	78.66	51.58	1.70
Benfluralin	70.38	70.38	63.34
Prothioconazole	52.19	52.19	10.02
Esfenvalerate	51.14	51.14	0.19
Deltamethrin	44.86	44.86	0.21
Mancozeb	40.00	40.00	38.52

Table 23. The top 10 active ingredients most extensively used on cauliflower in Ireland in 2021, ranked by weight (kg).

Active Substance	Quantity applied (kg)	Treated area (spha)	Basic area treated (ha)
Metazachlor	155.30	340.42	340.42
Pendimethalin	116.94	234.49	227.60
Benfluralin	63.34	70.38	70.38
Mancozeb	38.52	40.00	40.00
S-metolachlor	20.48	17.78	17.78
Pyridate	13.85	18.22	11.32
Glyphosate	11.17	6.89	6.89
Difenoconazole	10.65	97.45	79.68
Prothioconazole	10.02	52.19	52.19
Spirotetramat	8.17	108.92	70.45

Pesticide usage on celery

- 38 ha of celery grown in Ireland.
- 35 treated hectares (spha).
- 119 kilograms applied.
- 92% of the area of celery received a pesticide treatment.

Figure 26. Pesticide usage (spha) on celery in Ireland, 2021.

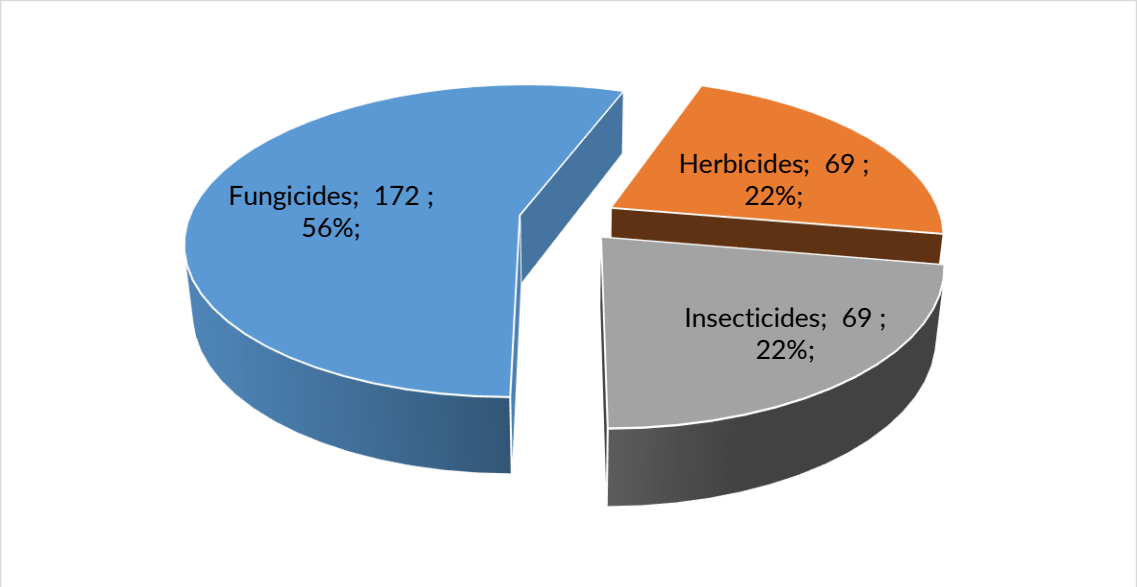


Figure 27. Weight of pesticides (kg) applied to celery in Ireland, 2021.

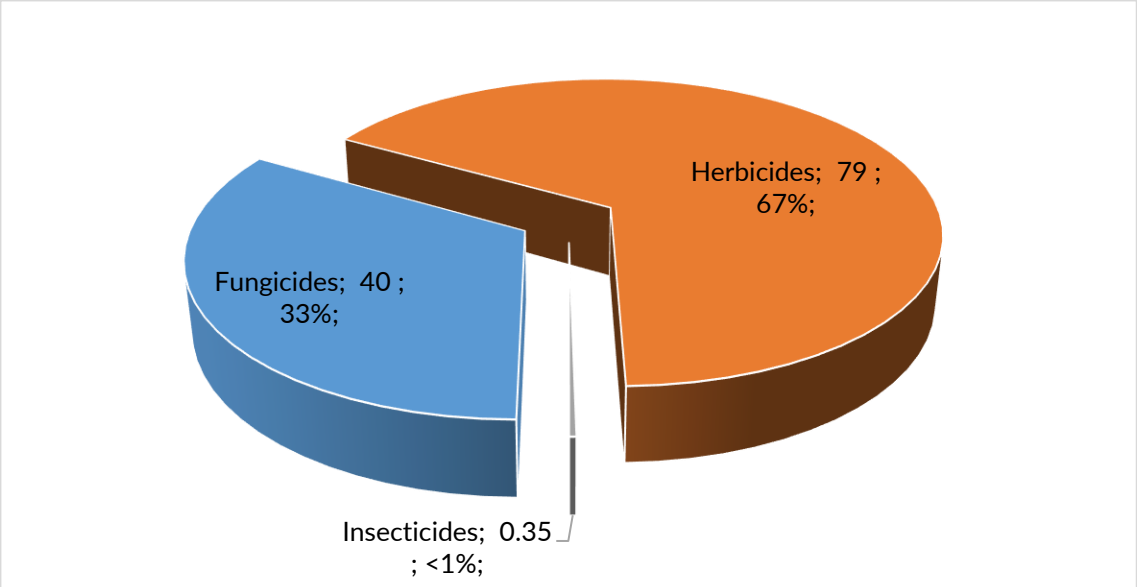


Figure 28. Proportional area of celery treated with each pesticide group in Ireland, 2021.

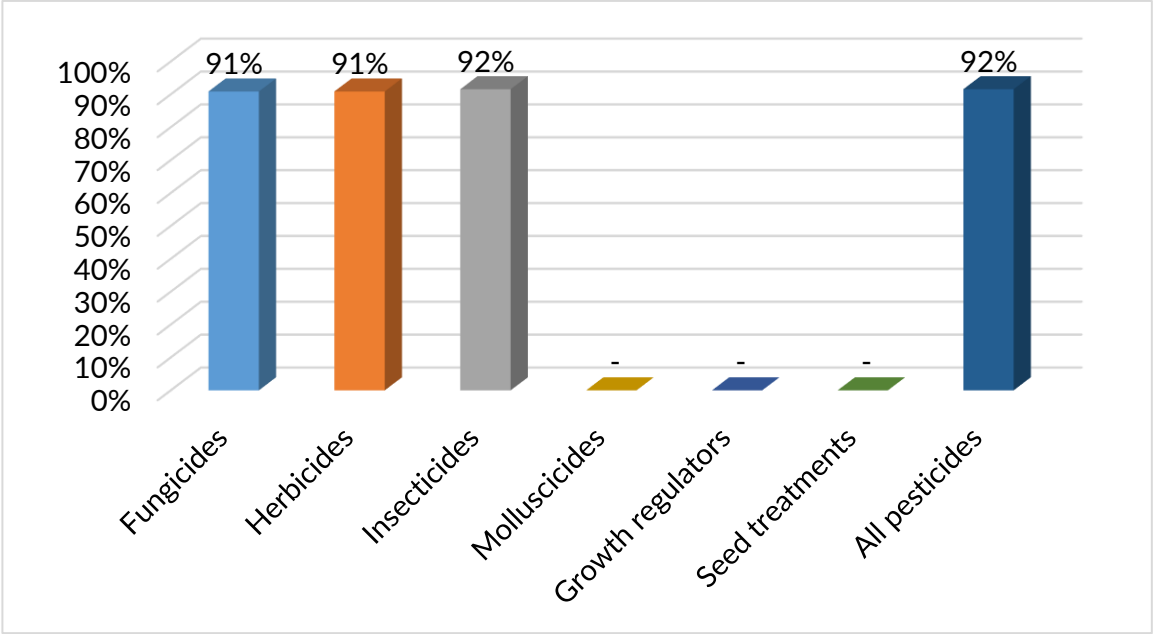


Table 24. The top 10 active ingredients most extensively used on beetroot in 2021, ranked by area treated (spray-hectares).

Active Substance	Treated area (spha)	Basic area treated (ha)	Quantity applied (kg)
Difenoconazole	68.92	34.46	6.46
Lambda-cyhalothrin	68.92	34.46	0.34
Tebuconazole	68.92	34.46	10.34
Trifloxystrobin	68.92	34.46	5.17
Aclonifen	34.46	34.46	10.34
Azoxystrobin	34.46	34.46	6.89
Cyprodinil	34.46	34.46	6.46
Fludioxonil	34.46	34.46	4.31
Prosulfocarb	34.46	34.46	68.92
Cyantraniliprole	0.26	0.26	0.002

Table 25. The top 10 active ingredients most extensively used on celery in Ireland in 2021, ranked by weight (kg).

Active Substance	Quantity applied (kg)	Treated area (spha)	Basic area treated (ha)
Prosulfocarb	68.92	34.46	34.46
Aclonifen	10.34	34.46	34.46
Tebuconazole	10.34	68.92	34.46
Azoxystrobin	6.89	34.46	34.46
Cyprodinil	6.46	34.46	34.46
Difenoconazole	6.46	68.92	34.46
Trifloxystrobin	5.17	68.92	34.46
Fludioxonil	4.31	34.46	34.46
Lambda-cyhalothrin	0.34	68.92	34.46
Cyantraniliprole	0.00	0.26	0.26

Pesticide usage on courgettes and others

- 132 ha of courgettes and others grown in Ireland.
- 6 treated hectares (spha).
- 5 kilograms applied.
- 5% of the area of courgettes and others received a pesticide treatment.

Figure 29. Pesticide usage (spha) on courgettes and others in Ireland, 2021.

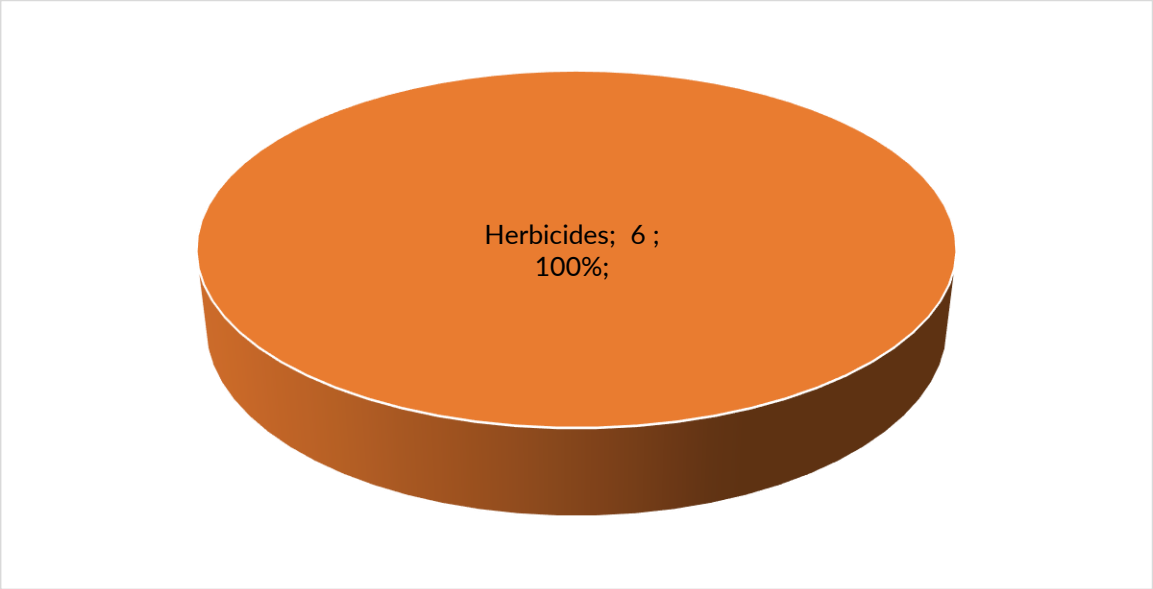


Figure 30. Weight of pesticides (kg) applied to courgettes and others in Ireland, 2021.

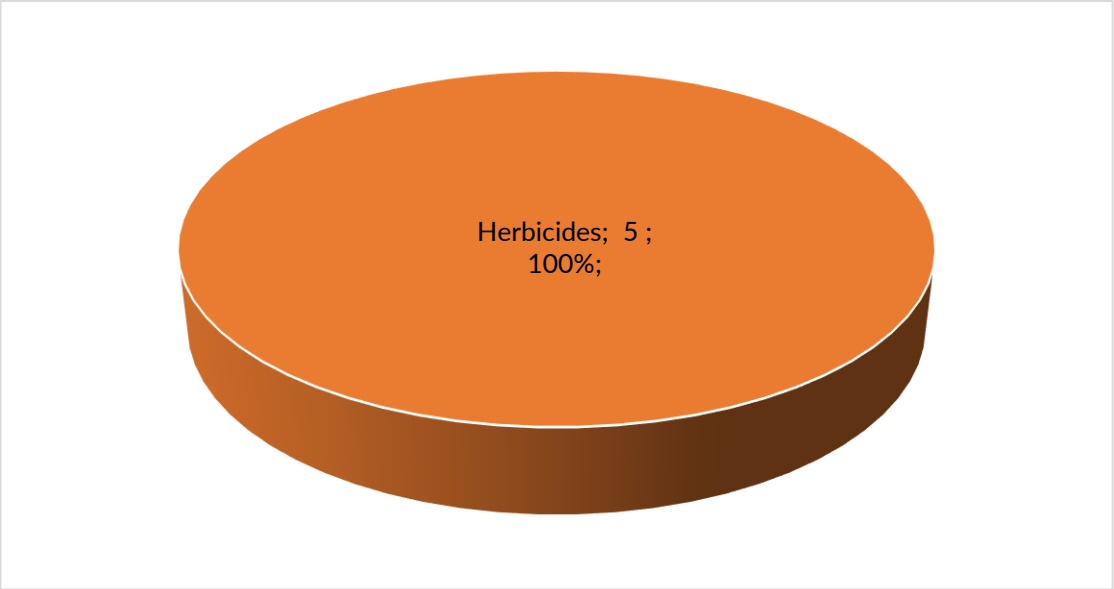


Figure 31. Proportional area of courgettes and others treated with each pesticide group in Ireland, 2021.

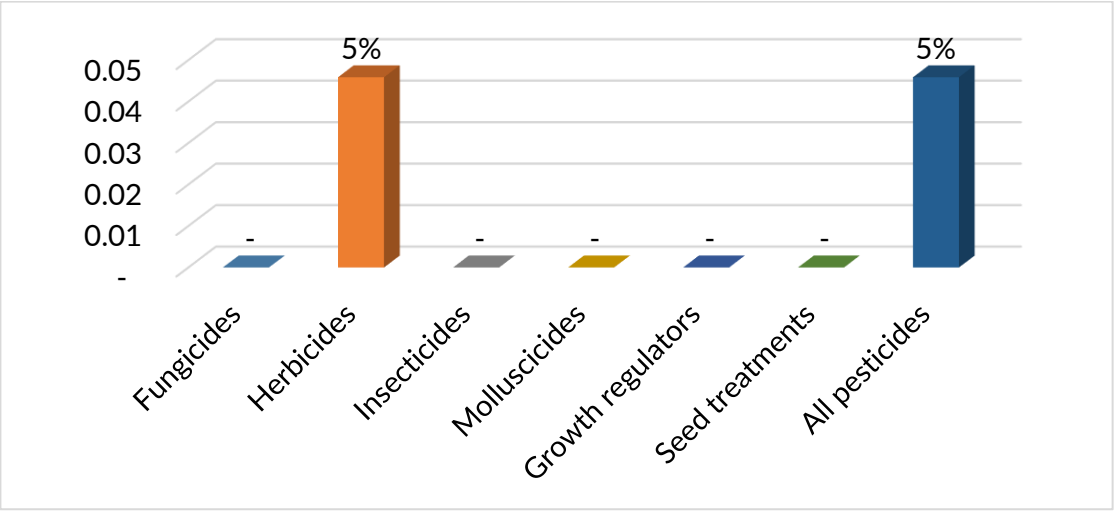


Table 26. The top active ingredient most extensively used on courgettes and others in 2021, ranked by area treated (spray-hectares).

Active Substance	Treated area (spha)	Basic area treated (ha)	Quantity applied (kg)
Glyphosate	6.04	6.04	5.27

Table 27. The top active ingredient most extensively used on courgettes and others in Ireland in 2021, ranked by weight (kg).

Active Substance	Quantity applied (kg)	Treated area (spha)	Basic area treated (ha)
Glyphosate	5.27	6.04	6.04

Pesticide usage on kale

- 232 ha of kale grown in Ireland.
- 160 treated hectares (spha).
- 307 kilograms applied.
- 69% of the area of kale received a pesticide treatment.

Figure 32. Pesticide usage (spha) on kale in Ireland, 2021.

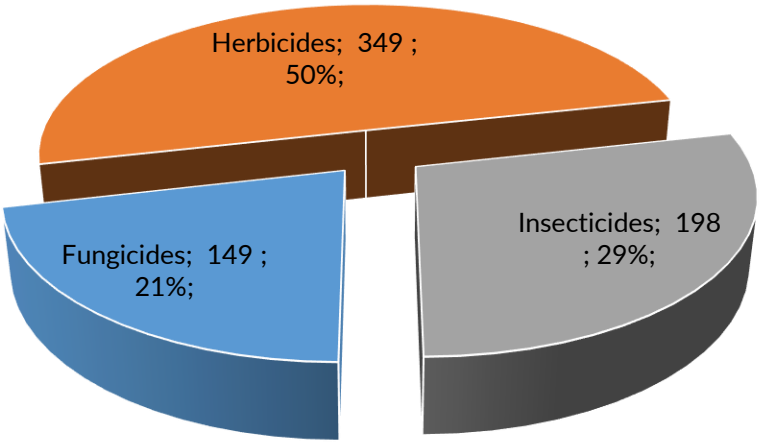


Figure 33. Weight of pesticides (kg) applied to kale in Ireland, 2021.

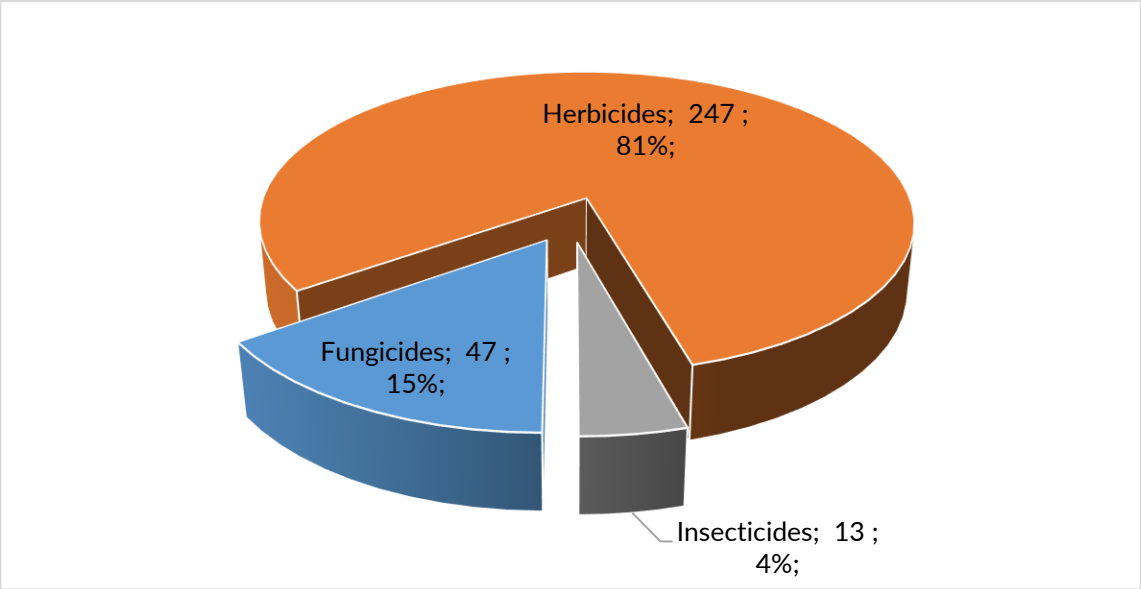


Figure 34. Proportional area of kale treated with each pesticide group in Ireland, 2021.

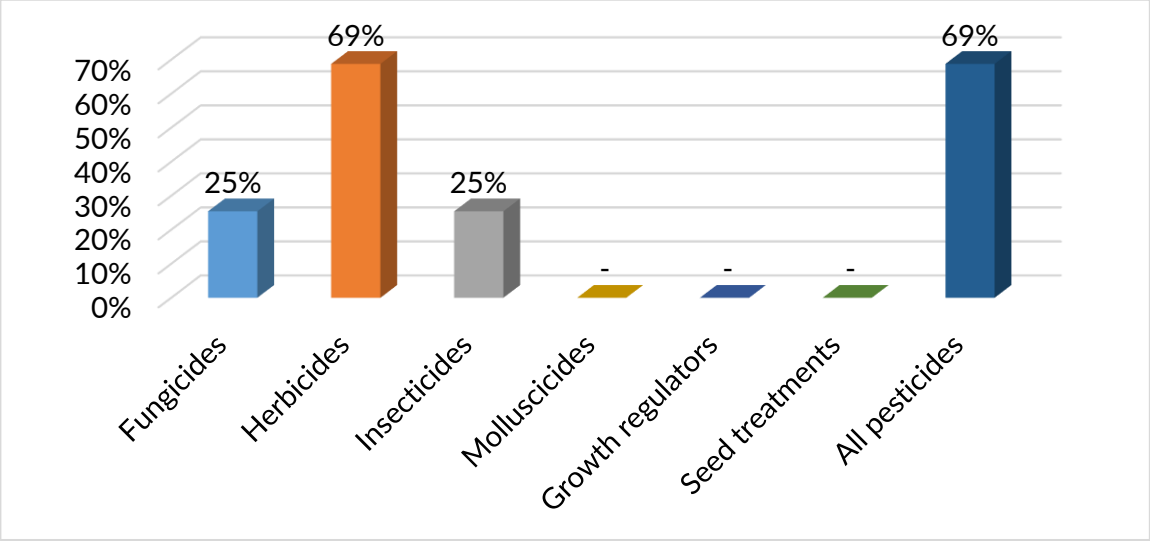


Table 28. The top 10 active ingredients most extensively used on kale in 2021, ranked by area treated (spray-hectares).

Active Substance	Treated area (spha)	Basic area treated (ha)	Quantity applied (kg)
Pyridate	137.35	137.35	123.62
Spinosad	104.57	96.59	10.04
Metazachlor	98.15	85.34	66.97
Azoxystrobin	89.21	89.21	19.35
Clomazone	69.82	69.82	4.71
Boscalid	59.67	59.67	15.93
Pyraclostrobin	59.67	59.67	4.00
Difenoconazole	59.08	59.08	7.39
Esfenvalerate	52.87	44.90	0.22
Spirotetramat	40.47	40.47	3.04

Table 29. The top 10 active ingredients most extensively used on kale in Ireland in 2021, ranked by weight (kg).

Active Substance	Quantity applied (kg)	Treated area (spha)	Basic area treated (ha)
Pyridate	123.62	137.35	137.35
Metazachlor	66.97	98.15	85.34
Benfluralin	40.20	27.91	27.91
Azoxystrobin	19.35	89.21	89.21
Boscalid	15.93	59.67	59.67
S-metolachlor	11.06	15.36	15.36
Spinosad	10.04	104.57	96.59
Difenoconazole	7.39	59.08	59.08
Clomazone	4.71	69.82	69.82
Pyraclostrobin	4.00	59.67	59.67

Pesticide usage on leeks

- 97 ha of leeks grown in Ireland.
- 55 treated hectares (spha).
- 133 kilograms applied.
- 57% of the area of leeks received a pesticide treatment.

Figure 35. Pesticide usage (spha) on leeks in Ireland, 2021.

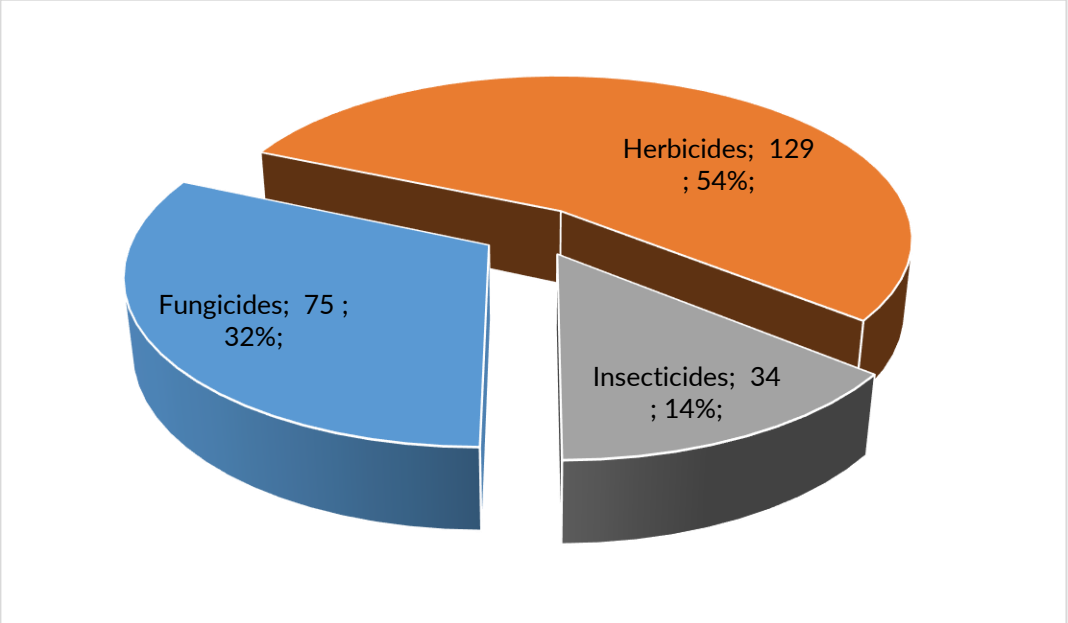


Figure 36. Weight of pesticides (kg) applied to leeks in Ireland, 2021.

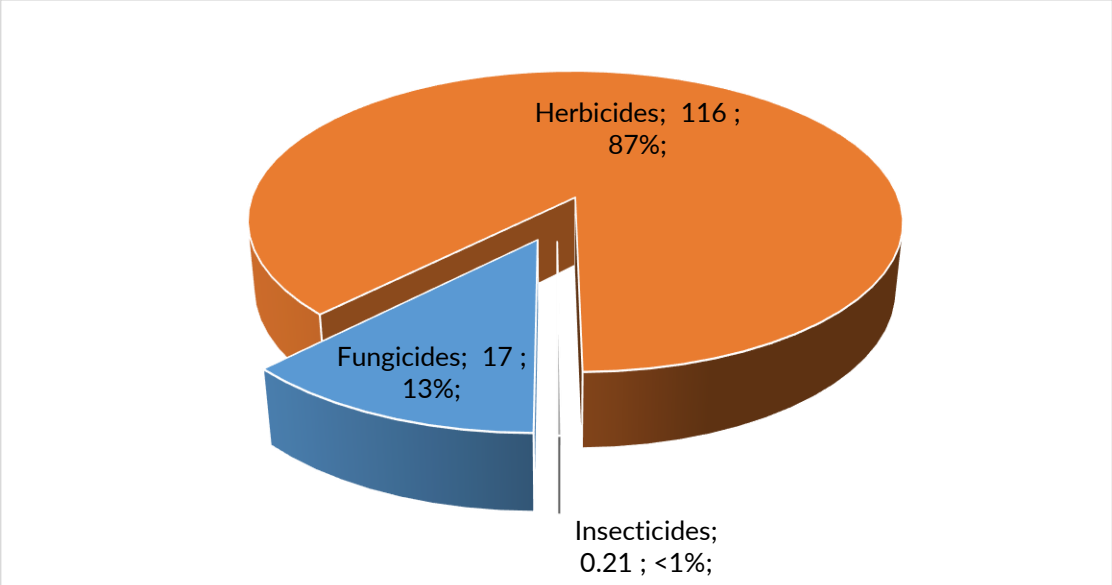


Figure 37. Proportional area of leeks treated with each pesticide group in Ireland, 2021.

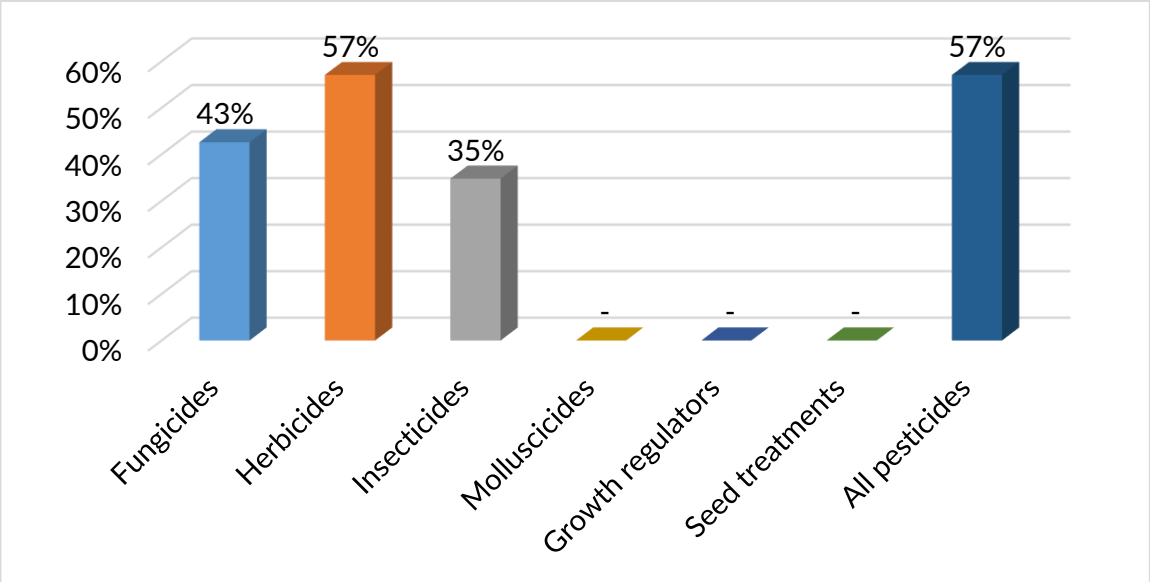


Table 30. The top active ingredient most extensively used on leeks in 2021, ranked by area treated (spray-hectares).

Active Substance	Treated area (spha)	Basic area treated (ha)	Quantity applied (kg)
Dimethenamid-P	47.00	47.00	25.31
Pendimethalin	47.00	47.00	29.78
Deltamethrin	33.75	33.75	0.21
Bentazone	26.86	26.86	9.35
Fluroxypyr	26.86	26.86	1.61
Prothioconazole	26.86	26.86	5.16
Tebuconazole	26.86	26.86	4.03
Trifloxystrobin	26.86	26.86	2.02
Azoxystrobin	21.37	14.47	5.34
Metazachlor	14.47	14.47	8.89

Table 31. The top 10 active ingredients most extensively used on leeks in Ireland in 2021, ranked by weight (kg).

Active Substance	Quantity applied (kg)	Treated area (spha)	Basic area treated (ha)
Prosulfocarb	41.06	14.03	14.03
Pendimethalin	29.78	47.00	47.00
Dimethenamid-P	25.31	47.00	47.00
Bentazone	9.35	26.86	26.86
Metazachlor	8.89	14.47	14.47
Azoxystrobin	5.34	21.37	14.47
Prothioconazole	5.16	26.86	26.86
Tebuconazole	4.03	26.86	26.86
Trifloxystrobin	2.02	26.86	26.86
Fluroxypyr	1.61	26.86	26.86

Pesticide usage on leafy greens, legumes and others

- 396 ha of leafy greens, legumes and others grown in Ireland.
- 352 treated hectares (spha).
- 365 kilograms applied.
- 89% of the area of leafy greens, legumes and others received a pesticide treatment.

Figure 38. Pesticide usage (spha) on leafy greens, legumes and others in Ireland, 2021.

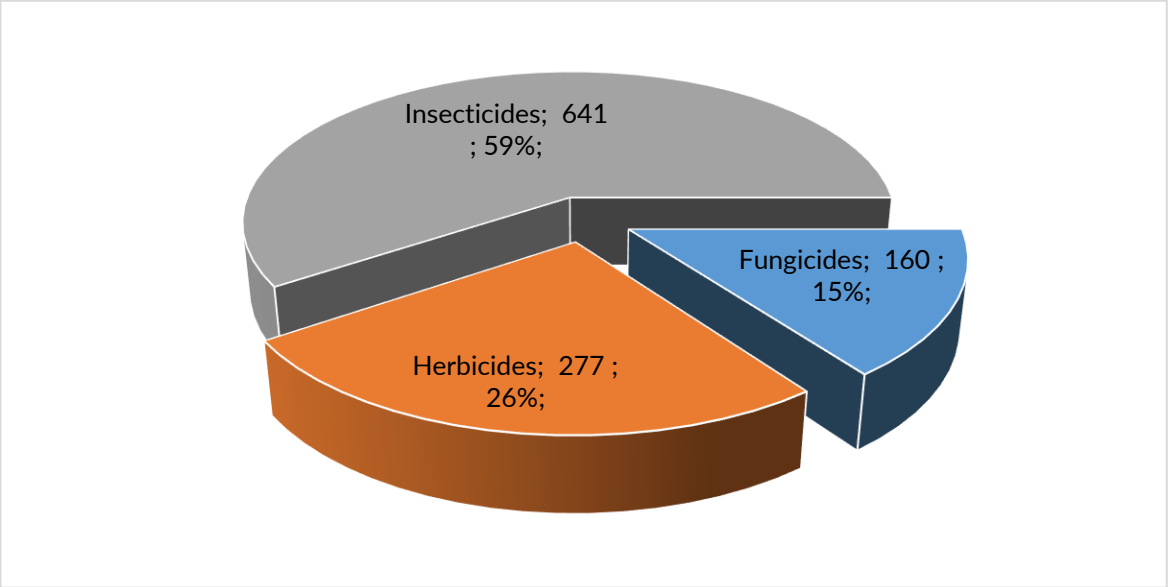


Figure 39. Weight of pesticides (kg) applied to leafy greens, legumes and others in Ireland, 2021.

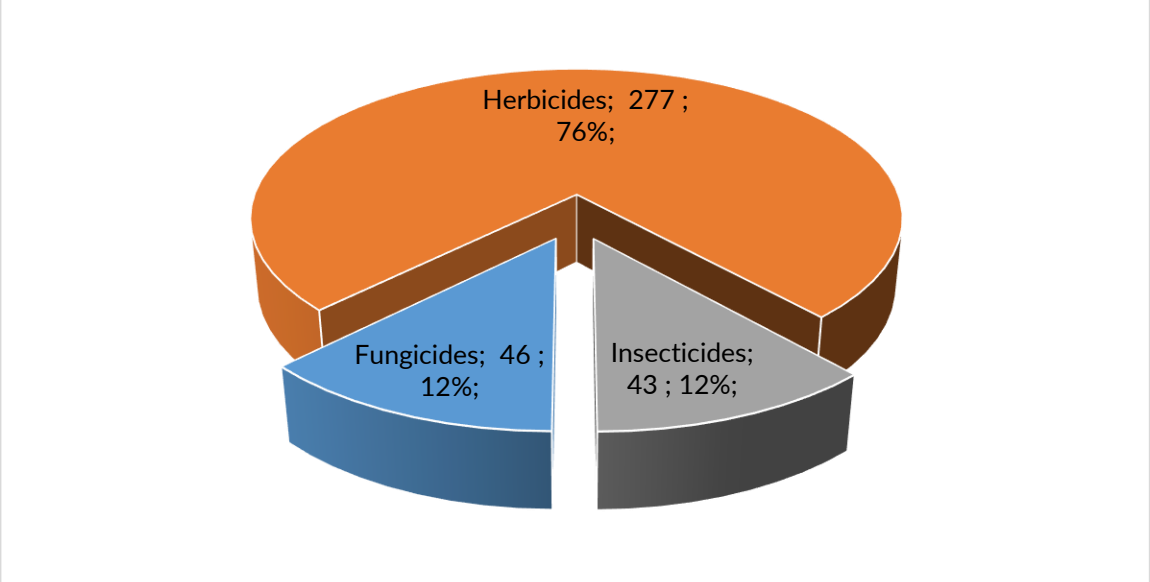


Figure 40. Proportional area of leafy greens, legumes and others treated with each pesticide group in Ireland, 2021.

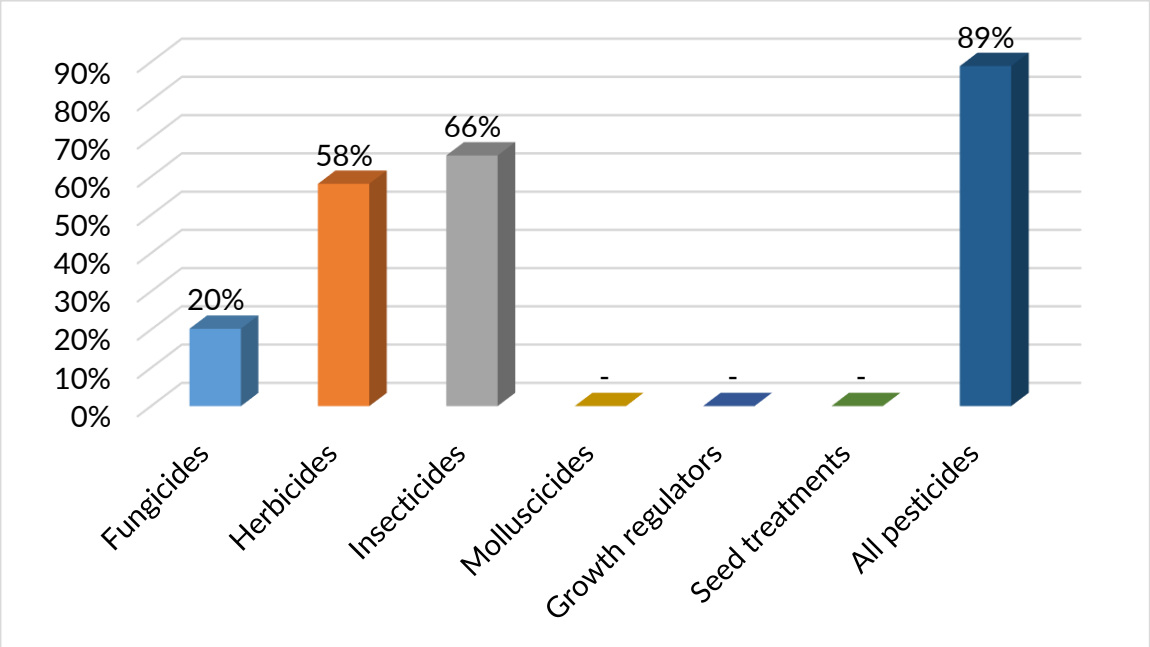


Table 32. The top 10 active ingredients most extensively used on leafy greens, legumes and others in 2021, ranked by area treated (spray-hectares).

Active Substance	Treated area (spha)	Basic area treated (ha)	Quantity applied (kg)
Lambda-cyhalothrin	641.00	259.54	42.59
Propyzamide	128.28	128.28	96.21
Boscalid	79.75	39.88	21.29
Pyraclostrobin	79.75	39.88	5.34
Pendimethalin	62.92	62.92	46.66
Azoxystrobin	40.26	40.26	10.07
Prosulfocarb	40.26	40.26	101.74
Tebuconazole	40.26	40.26	6.04
Trifloxystrobin	40.26	40.26	3.02
Imazamox	39.88	39.88	2.00

Table 33. The top 10 active ingredients most extensively used on leafy greens, legumes and others in Ireland in 2021, ranked by weight (kg).

Active Substance	Quantity applied (kg)	Treated area (spha)	Basic area treated (ha)
Prosulfocarb	101.74	40.26	40.26
Propyzamide	96.21	128.28	128.28
Pendimethalin	46.66	62.92	62.92
Lambda-cyhalothrin	42.59	641.00	259.54
Boscalid	21.29	79.75	39.88
Aclonifen	18.66	38.88	38.88
Glyphosate	11.27	7.04	7.04
Azoxystrobin	10.07	40.26	40.26
Tebuconazole	6.04	40.26	40.26
Pyraclostrobin	5.34	79.75	39.88

Pesticide usage on onions and scallions

- 184 ha of onions and scallions grown in Ireland.
- 161 treated hectares (spha).
- 1,614 kilograms applied.
- 88% of the area of onions and scallions received a pesticide treatment.

Figure 41. Pesticide usage (spha) on onions and scallions in Ireland, 2021.

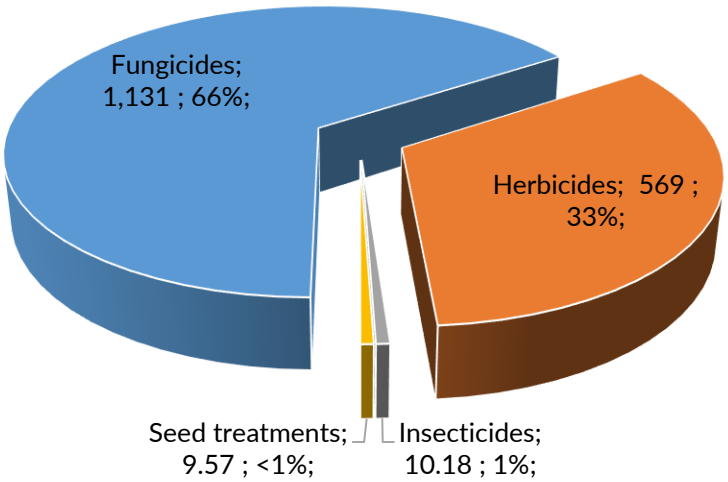


Figure 42. Weight of pesticides (kg) applied to onions and scallions in Ireland, 2021.

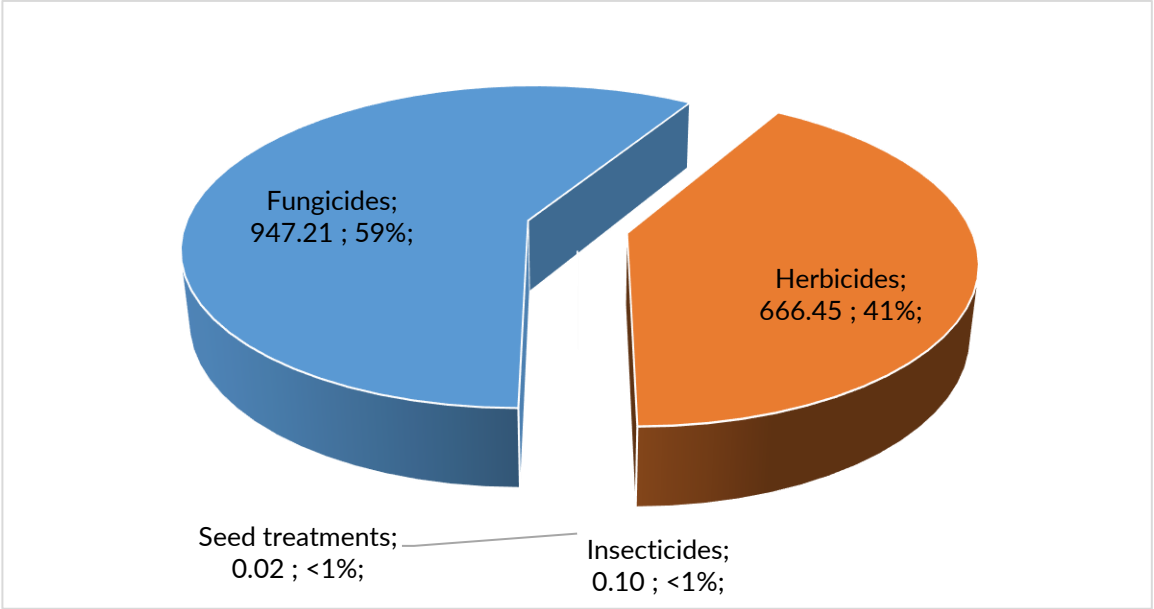


Figure 43. Proportional area of onions and scallions treated with each pesticide group in Ireland, 2021.

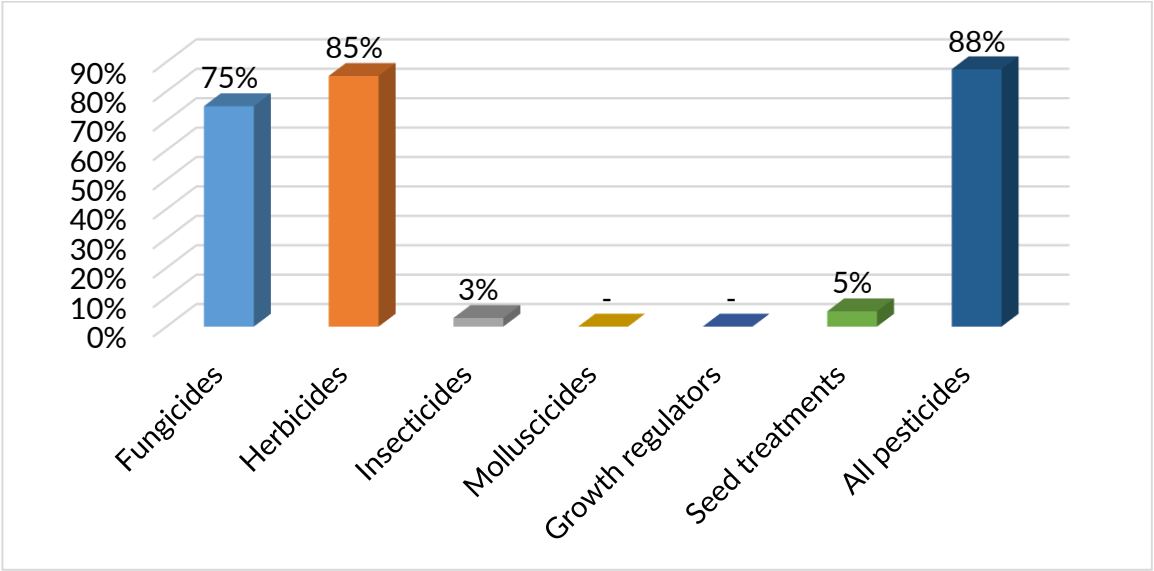


Table 34. The top active ingredient most extensively used on onions and scallions in 2021, ranked by area treated (spray-hectares).

Active Substance	Treated area (spha)	Basic area treated (ha)	Quantity applied (kg)
Mancozeb	494.40	128.98	732.60
oxathiapiprolin	487.23	121.81	6.70
Pendimethalin	272.77	149.11	146.05
Dimethenamid-P	262.04	140.23	114.84
Benthiavalicarb	243.61	121.81	8.53
Dimethomorph	243.61	121.81	45.68
Fluopicolide	132.69	126.16	13.27
Propamocarb hydrochloride	132.69	126.16	132.69
Prosulfocarb	132.18	132.18	365.96
Benthiavalicarb-isopropyl	128.98	128.98	3.59

Table 35. The top 10 active ingredients most extensively used on onions and scallions in Ireland in 2021, ranked by weight (kg).

Active Substance	Quantity applied (kg)	Treated area (spha)	Basic area treated (ha)
Mancozeb	732.60	494.40	128.98
Prosulfocarb	365.96	132.18	132.18
Pendimethalin	146.05	272.77	149.11
Propamocarb hydrochloride	132.69	132.69	126.16
Dimethenamid-P	114.84	262.04	140.23
Dimethomorph	45.68	243.61	121.81
Fluopicolide	13.27	132.69	126.16
Propaquizafop	12.18	121.81	121.81
Glyphosate	9.14	16.64	16.64
Aclonifen	8.97	10.72	10.72

Pesticide usage on other herbs

- 57 ha of other herbs grown in Ireland.
- 42 treated hectares (spha).
- 134 kilograms applied.
- 74% of the area of other herbs received a pesticide treatment.

Figure 44. Pesticide usage (spha) on other herbs in Ireland, 2021.

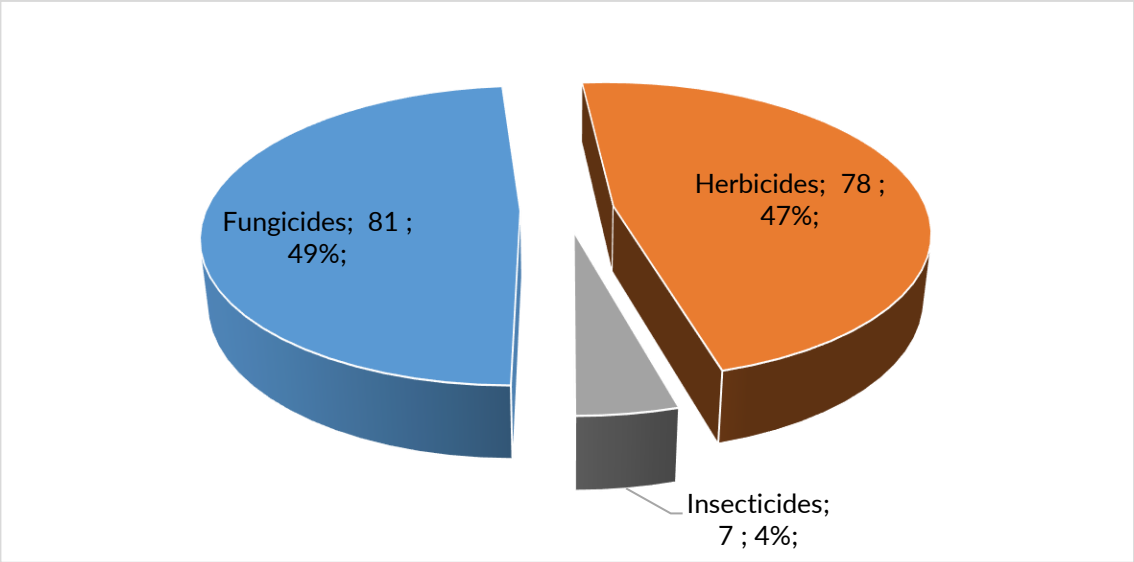


Figure 45. Weight of pesticides (kg) applied to other herbs in Ireland, 2021.

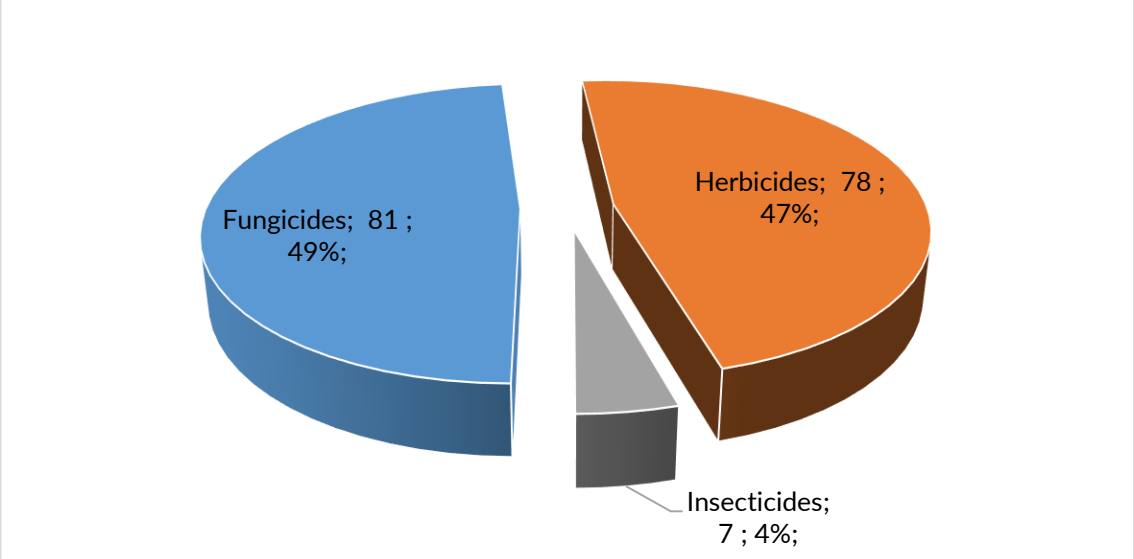


Figure 46. Proportional area of other herbs treated with each pesticide group in Ireland, 2021.

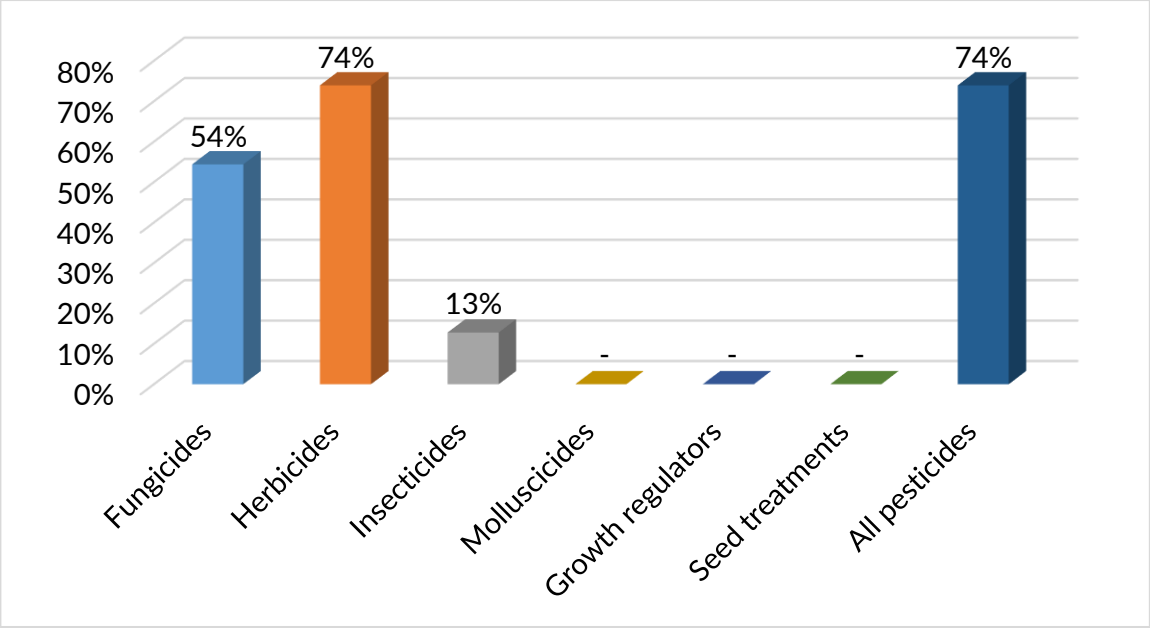


Table 36. The top active ingredient most extensively used on other herbs in 2021, ranked by area treated (spray-hectares).

Active Substance	Treated area (spha)	Basic area treated (ha)	Quantity applied (kg)
Dimethenamid-P	37.53	37.53	10.09
Pendimethalin	37.53	37.53	11.88
Mancozeb	27.21	17.23	28.21
Azoxystrobin	26.44	26.44	5.29
Difenoconazole	26.44	26.44	3.31
Glyphosate	16.47	16.47	28.45
Benthiavalicarb	9.98	9.98	0.28
Benthiavalicarb-isopropyl	9.98	9.98	0.26
Fluopicolide	9.98	9.98	1.00
Oxathiapiprolin	9.98	9.98	0.12

Table 37. The top 10 active ingredients most extensively used on other herbs in Ireland in 2021, ranked by weight (kg).

Active Substance	Quantity applied (kg)	Treated area (spha)	Basic area treated (ha)
Glyphosate	28.45	16.47	16.47
Mancozeb	28.21	27.21	17.23
Prosulfocarb	23.94	9.98	9.98
Pendimethalin	11.88	37.53	37.53
Dimethenamid-P	10.09	37.53	37.53
Propamocarb hydrochloride	9.98	9.98	9.98
S-metolachlor	6.97	7.26	7.26
Azoxystrobin	5.29	26.44	26.44
Difenoconazole	3.31	26.44	26.44
Boscalid	1.94	7.26	7.26

Pesticide usage on parsnips

- 359 ha of parsnips grown in Ireland.
- 338 treated hectares (spha).
- 1,788 kilograms applied.
- 94% of the area of parsnips received a pesticide treatment.

Figure 47. Pesticide usage (spha) on parsnips in Ireland, 2021.

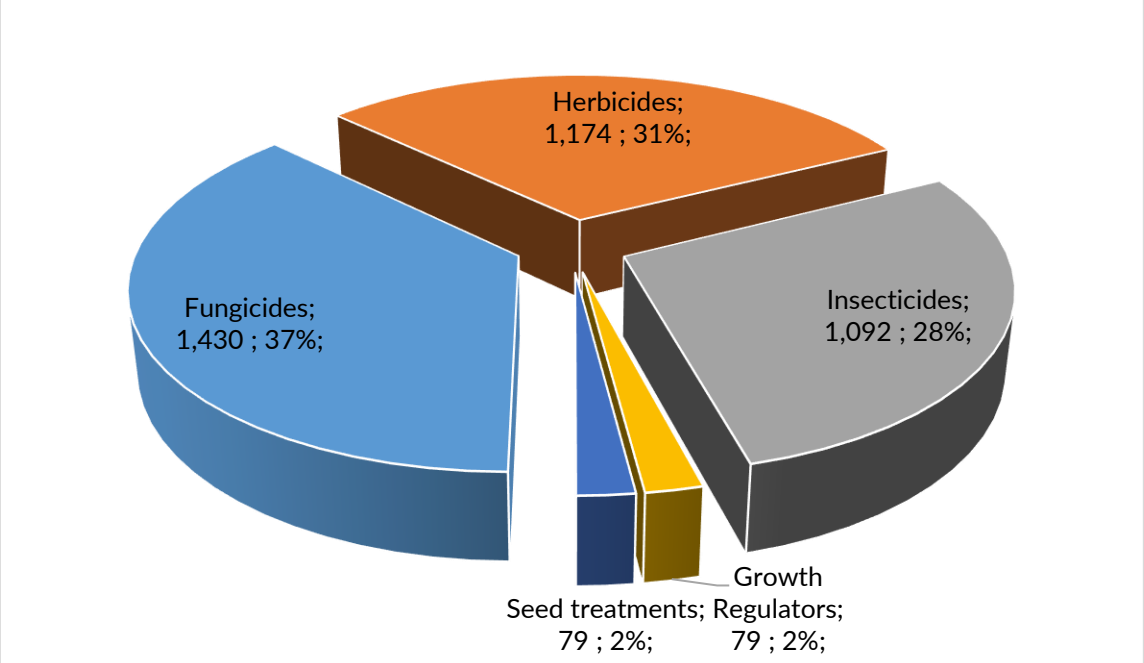


Figure 48. Weight of pesticides (kg) applied to parsnips in Ireland, 2021.

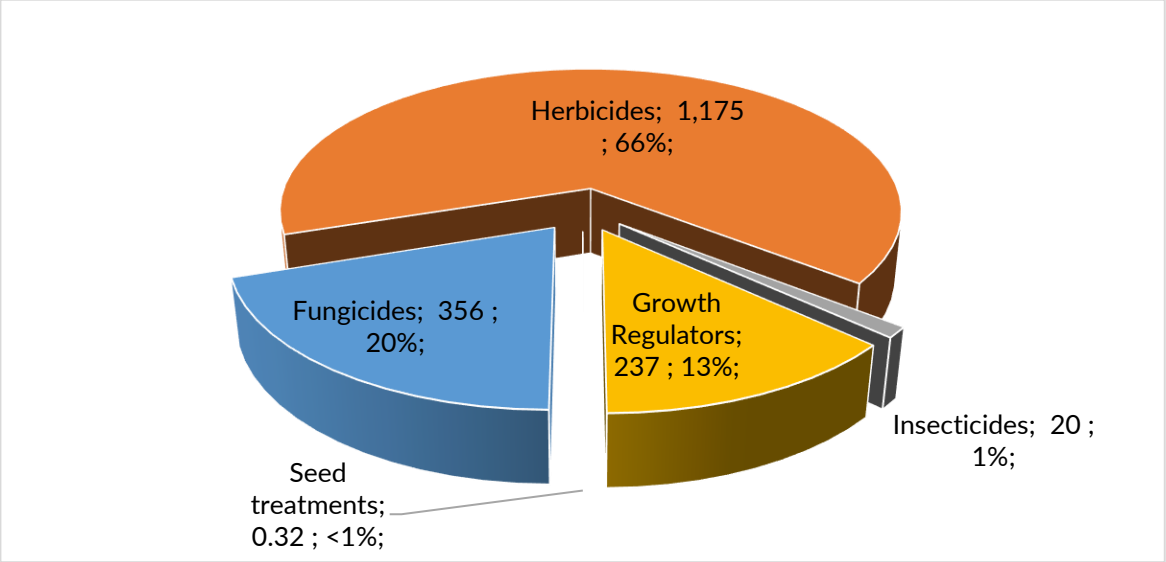


Figure 49. Proportional area of parsnips treated with each pesticide group in Ireland, 2021.

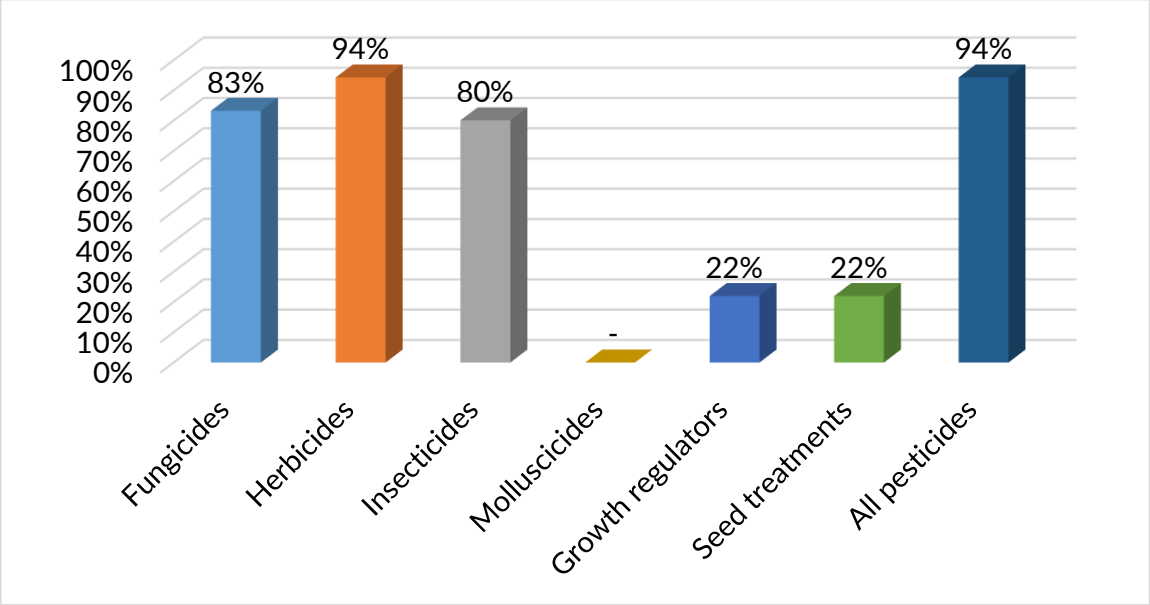


Table 38. The top 10 active ingredients most extensively used on parsnips in 2021, ranked by area treated (spray-hectares).

Active Substance	Treated area (spha)	Basic area treated (ha)	Quantity applied (kg)
Lambda-cyhalothrin	662.48	287.01	6.00
Aclonifen	334.55	323.94	230.36
Prothioconazole	304.68	225.76	54.07
Metamitron	282.10	279.98	388.37
Pendimethalin	278.62	276.50	342.31
Cyprodinil	260.87	260.87	73.20
Fludioxonil	260.87	260.87	48.80
Azoxystrobin	232.46	92.00	45.49
Tebuconazole	226.14	147.22	33.92
Trifloxystrobin	226.14	147.22	16.96

Table 39. The top 10 active ingredients most extensively used on parsnips in Ireland in 2021, ranked by weight (kg).

Active Substance	Quantity applied (kg)	Treated area (spha)	Basic area treated (ha)
Metamitron	388.37	282.10	279.98
Pendimethalin	342.31	278.62	276.50
Maleic hydrazide	236.76	78.92	78.92
Aclonifen	230.36	334.55	323.94
Prosulfocarb	144.42	129.53	129.53
Cyprodinil	73.20	260.87	260.87
Glyphosate	54.31	51.65	51.65
Prothioconazole	54.07	304.68	225.76
Fludioxonil	48.80	260.87	260.87
Azoxystrobin	45.49	232.46	92.00

Pesticide usage on turnips and swedes

- 609 ha of turnips and swedes grown in Ireland.
- 494 treated hectares (spha).
- 1,180 kilograms applied.
- 81% of the area of turnips and swedes received a pesticide treatment.

Figure 50. Pesticide usage (spha) on turnips and swedes in Ireland, 2021.

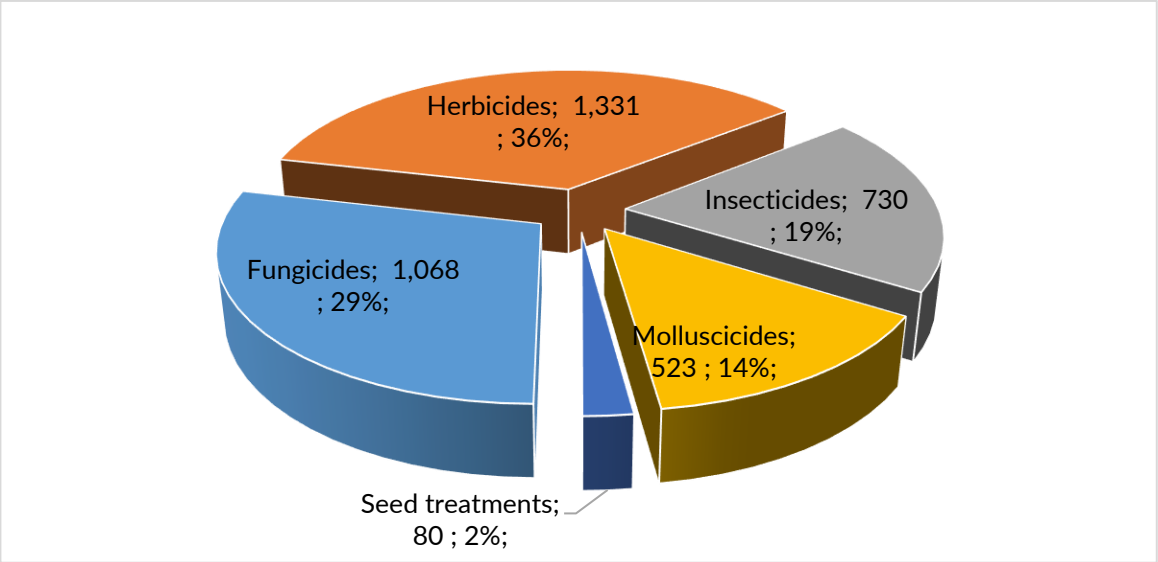


Figure 51. Weight of pesticides (kg) applied to turnips and swedes in Ireland, 2021.

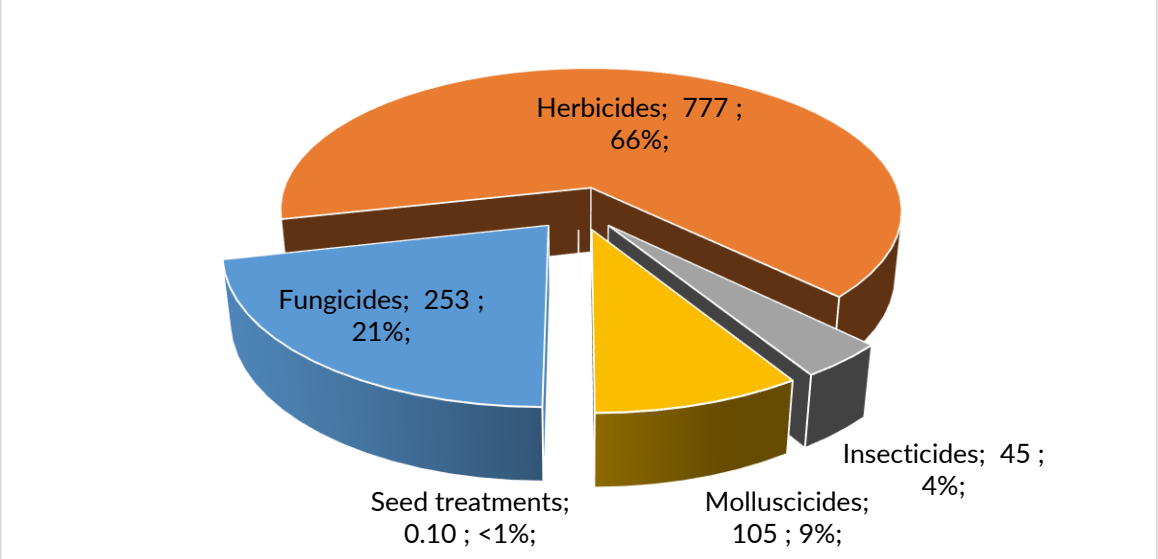


Figure 52. Proportional area of turnips and swedes treated with each pesticide group in Ireland, 2021.

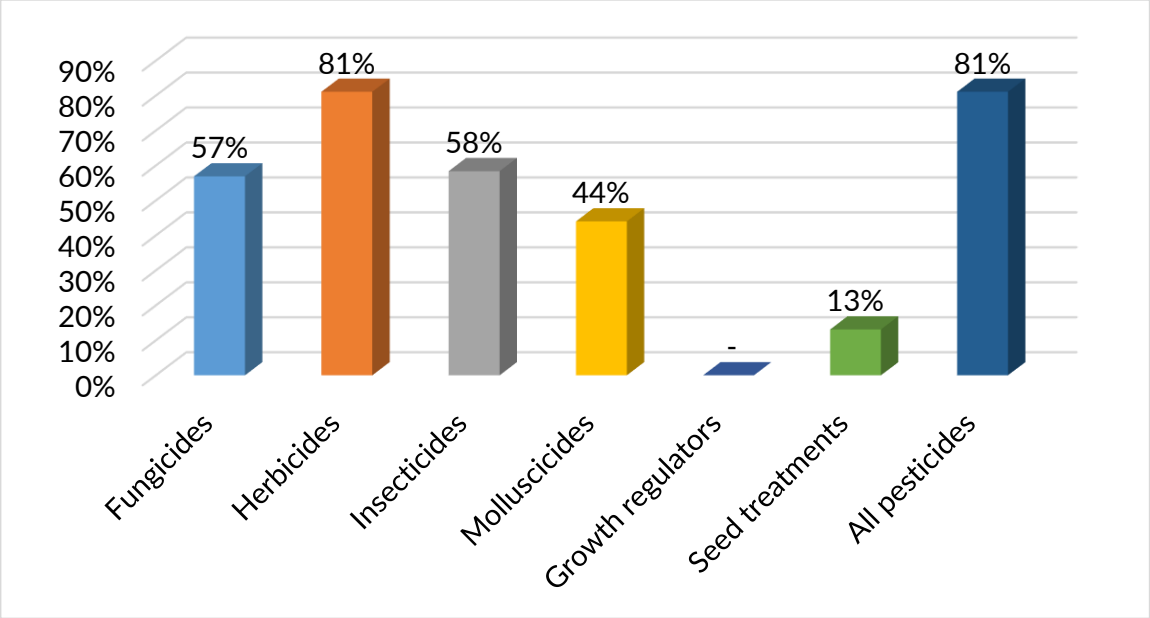


Table 40. The top 10 active ingredients most extensively used on turnips and swedes in 2021, ranked by area treated (spray-hectares).

Active Substance	Treated area (spha)	Basic area treated (ha)	Quantity applied (kg)
Metazachlor	573.40	510.87	382.02
Metaldehyde	523.36	279.17	104.67
S-metolachlor	416.22	353.70	264.35
Prothioconazole	391.14	332.52	75.10
Spirotetramat	313.31	254.70	23.34
Boscalid	312.68	140.06	63.14
Pyraclostrobin	312.68	140.06	15.84
Cyantraniliprole	277.47	179.41	20.04
Azoxystrobin	257.29	140.06	54.23
Clomazone	162.80	162.80	9.25

Table 41. The top 10 active ingredients most extensively used on turnips and swedes in Ireland in 2021, ranked by weight (kg).

Active Substance	Quantity applied (kg)	Treated area (spha)	Basic area treated (ha)
Metazachlor	382.02	573.40	510.87
S-metolachlor	264.35	416.22	353.70
Metaldehyde	104.67	523.36	279.17
Prothioconazole	75.10	391.14	332.52
Benfluralin	75.04	90.38	90.38
Boscalid	63.14	312.68	140.06
Azoxystrobin	54.23	257.29	140.06
Napropamide	41.23	84.37	84.37
Spirotetramat	23.34	313.31	254.70
Copper oxychloride	22.87	26.05	26.05

Tables

Outdoor vegetable tables

Table 42. Estimated area (ha) of outdoor vegetable crops grown regionally in Ireland, 2021.

	Region			
Crop	East	North/West	South	All Regions
Beetroot	32	2	20	54
Broccoli	449	5	75	529
Brussels sprouts	120	25	18	163
Cabbages	327	88	133	548
Carrots	390	97	465	953
Cauliflower	304		74	377
Celery	35	1	2	38
Courgettes and others	33	4	94	132
Kale	183	36	14	232
Leeks	38	35	23	97
Leafy greens, legumes and others	278	15	103	396
Onions and scallions	158	12	14	184
Other herbs	54	1	1	57
Parsnips	208	47	104	359
Turnips and Swedes	167	70	372	609
All crops	***2,777***	***440***	***1,512***	***4,728***

Table 43. Estimated area (spray-hectares) of outdoor vegetable crops treated regionally with each pesticide type in Ireland, 2021.

	Region			
Pesticide Type	East	North/West	South	All Regions
Fungicides	5,883	147	3,319	9,349
Herbicides	6,519	501	4,146	11,167
Insecticides	4,596	139	3,063	7,797
Molluscicides	392	149	576	1,117
Growth Regulators	79			79
Seed treatments	88		80	168
Total	***17,558***	***935***	***11,184***	***29,677***

Table 44. Estimated weight (kg) applied to outdoor vegetable crops regionally with each pesticide type in Ireland, 2021.

	Region			
Pesticide Type	East	North/West	South	All Regions
Fungicides	2,156	20	943	3,118
Herbicides	4,767	279	2,747	7,793
Insecticides	404	1	356	761
Molluscicides	69	30	114	212
Growth Regulators	237			237
Seed treatments	0		0	0
Total	***7,633***	***330***	***4,159***	***12,122***

Table 45. The total area (spray hectares) and the basic area (hectares), of outdoor vegetable crops in Ireland 2021 treated with each pesticide type.

	Pesticide Type														
	Fungicides		Herbicides		Insecticides		Molluscicides		Growth regulators		Seed treatments		Total all Pesticides		
Crop	(sp ha)	(ha)	(sp ha)	(ha)	(sp ha)	(ha)	(sp ha)	(ha)	(sp ha)	(ha)	(sp ha)	(ha)	(sp ha)	(ha) treated	(ha) grown
Beetroot	58	21	121	40	57	20	16	16	-	-	-	-	252	40	54
Broccoli	420	377	1,188	486	510	383	247	247	-	-	-	-	2,364	488	529
Brussels sprouts	428	113	388	129	528	109	6	6	-	-	-	-	1,350	129	163
Cabbage	818	370	863	424	740	336	137	137	-	-	-	-	2,558	442	548
Carrots	3,123	584	3,933	810	2,880	781	175	175	-	-	-	-	10,111	810	953
Cauliflower	236	132	691	340	302	144	13	13	-	-	-	-	1,241	341	377
Celery	172	34	69	34	69	35	-	-	-	-	-	-	310	35	38
Courgettes and others	-	-	6	6	-	-	-	-	-	-	-	-	6	6	132
Kale	149	59	349	160	198	59	-	-	-	-	-	-	695	160	232
Leeks	75	41	129	55	34	34	-	-	-	-	-	-	238	55	97
Leafy greens, legumes and others	160	80	277	230	641	260	-	-	-	-	-	-	1,079	352	396
Onions and scallions	1,131	138	569	157	10	5	-	-	-	-	10	10	1,720	161	184
Other herbs	81	31	78	42	7	7	-	-	-	-	-	-	167	42	57
Parsnips	1,430	299	1,174	338	1,092	288	-	-	79	79	79	79	3,854	338	359
Turnips and swedes	1,068	347	1,331	494	730	356	523	268	-	-	80	80	3,732	494	609
Total	***9,349***	***2,627***	***11,167***	***3,746***	***7,797***	***2,817***	***1,117***	***862***	***79***	***79***	***168***	***168***	***29,677***	***3,893***	***4,728***

Table 46. The total quantities (kilograms) of each pesticide type used on outdoor vegetable crops in Ireland 2021.

	Pesticide Type						
Crop	**Fungicides**	**Herbicides**	**Insecticides**	**Molluscicides**	**Growth Regulators**	**Seed treatments**	**Total weight applied (kg)**
Beetroot	15.07	114.41	0.38	1.92			132
Broccoli	175.29	915.73	28.82	39.82			1,160
Brussels sprouts	95.92	212.83	28.42	1.12			338
Cabbage	247.03	590.30	28.00	26.99			892
Carrots	749.05	2,154.19	542.74	35.58			3,482
Cauliflower	79.83	381.36	11.03	2.21			474
Celery	39.63	79.26	0.35				119
Courgettes and others		5.27					5
Kale	46.66	246.55	13.29				307
Leeks	16.54	115.99	0.21				133
Leafy greens, legumes and others	45.76	276.54	42.59				365
Onions and scallions	947.21	666.45	0.10			0.02	1,614
Other herbs	51.15	82.78	0.05				134
Parsnips	355.78	1,174.56	20.44		236.76	0.32	1,788
Turnips and swedes	253.46	777.07	44.52	104.67		0.10	1,180
Total	***3,118.40***	***7,793.30***	***760.95***	***212.32***	***236.76***	***0.44***	***12,122***

Table 47. Estimated area (spray-hectares) of outdoor vegetable crops treated with pesticide formulations in Ireland, 2021.

	Crop															
Pesticide type and formulation	**Beetroot**	**Broccoli**	**Brussels sprouts**	**Cabbages**	**Carrots**	**Cauliflower**	**Celery**	**Courgettes and others**	**Kale**	**Leek**	**Leafy greens, legumes and others**	**Onions and scallions**	**Other herbs**	**Parsnips**	**Turnips and Swedes**	**Total**
Fungicides																
Azoxystrobin	4.29	254.45	106.83	74.37	649.36				30.13	21.37	40.26	16.64		225.30	201.90	1,624.88
Azoxystrobin/difenoconazole				16.18	16.62	35.56	34.46		59.08				26.44	7.16	55.39	250.88
Benthiavalicarb-isopropyl/mancozeb												128.98	9.98			138.96
Benthiavalicarb/oxathiapiprolin												243.61	9.98			253.59
Boscalid/pyraclostrobin	36.30		103.38	113.07	538.43	7.38			59.67		79.75		7.26	151.53	312.69	1,409.45
Copper oxychloride															26.05	26.05
Cyprodinil/fludioxonil					511.54		34.46							260.87		806.87
Difenoconazole	17.15	27.56	111.43	278.36	425.51	61.90	34.46							109.59	25.23	1,091.19
Difenoconazole/fluxapyroxad					131.42											131.42
Dimethomorph/mancozeb												243.61				243.61
Fluopicolide/propamocarb hydrochloride		94.81		2.21								132.69	9.98			239.69
Fosetyl-aluminium/propamocarb hydrochloride		0.62	0.00	7.46												8.08
Isopyrazam					29.54									145.14		174.68
Mancozeb					131.42							121.81	9.98			263.20
Mancozeb/metalaxyl-M		42.22		105.25		40.00							7.26			194.73
Metalaxyl-M					29.54											29.54
Oxathiapiprolin												243.61				243.61
Prothioconazole			1.72	140.76	416.37	52.19				26.86				304.68	391.14	1,333.73
Tebuconazole/trifloxystrobin			105.11	80.03	243.52	38.48	68.92			26.86	40.26			226.14	55.39	884.71
Total	***57.74***	***419.66***	***428.48***	***817.68***	***3,123.26***	***235.51***	***172.31***		***148.87***	***75.09***	***160.27***	***1,130.96***	***80.85***	***1,430.40***	***1,067.79***	***9,348.86***

Table 48. Estimated area (spray-hectares) of outdoor vegetable crops treated with pesticide formulations in Ireland, 2021 (continued).

	Crop															
Pesticide type and formulation	**Beetroot**	**Broccoli**	**Brussels sprouts**	**Cabbages**	**Carrots**	**Cauliflower**	**Celery**	**Courgettes and others**	**Kale**	**Leek**	**Leafy greens, legumes and others**	**Onions and scallions**	**Other herbs**	**Parsnips**	**Turnips and Swedes**	**Total**
Herbicides																
Aclonifen					719.96		34.46				38.88	10.72		334.54		1,138.56
Benfluralin				16.18		70.38			27.91						90.38	204.85
Bentazone										26.86		6.20				33.06
Clethodim					408.44									95.58		504.02
Clomazone		45.92	112.25	113.14	617.58	3.20			69.82						162.80	1,124.70
Clopyralid				44.68												44.68
Cycloxydim														2.12		2.12
Dimethenamid-P/pendimethalin										47.00		262.04	37.53			346.56
Ethofumesate	16.04															16.04
Fluroxypyr										26.86		5.32				32.18
Glyphosate	4.13	241.38	6.89	18.78	282.96	6.89		6.04			7.04	16.64	16.47	51.65		658.88
Imazamox/pendimethalin											39.88					39.88
Lenacil	19.45															19.45
Metamitron	42.25													282.10		324.35
Metazachlor		490.64	135.80	410.92		340.42			98.15	14.47					573.40	2,063.80
Metribuzin					863.73											863.73
Napropamide				31.38											84.37	115.75
Pendimethalin		389.43	15.51	133.82	709.07	234.49					23.04	10.73		278.62	3.93	1,798.62
Phenmedipham	20.85															20.85
Propaquizafop					193.45							121.81				315.25
Propyzamide											128.28		7.26			135.54
Prosulfocarb					137.41		34.46			14.03	40.26	132.18	9.98	129.52		497.84
Pyridate		20.95	13.78	34.13		18.22			137.35							224.44
S-metolachlor	18.37		103.38	59.73		17.78			15.36			3.26	7.26		416.22	641.37
Total	***121.09***	***1,188.32***	***387.61***	***862.77***	***3,932.59***	***691.38***	***68.92***	***6.04***	***348.59***	***129.22***	***277.38***	***568.90***	***78.48***	***1,174.13***	***1,331.09***	***11,166.52***

Table 49. Estimated area (spray-hectares) of outdoor vegetable crops treated with pesticide formulations in Ireland, 2021 (continued).

	Crop															
Pesticide type and formulation	**Beetroot**	**Broccoli**	**Brussels sprouts**	**Cabbages**	**Carrots**	**Cauliflower**	**Celery**	**Courgettes and others**	**Kale**	**Leek**	**Leafy greens, legumes and others**	**Onions and scallions**	**Other herbs**	**Parsnips**	**Turnips and Swedes**	**Total**
Insecticides																
Chlorantraniliprole				4.70	117.00									9.54		131.24
Cyantraniliprole		129.63	103.58	93.30	183.54	78.65	0.26					0.59		70.59	277.47	937.61
Deltamethrin	39.51			177.83	204.83	44.86				33.75			7.26	201.75	62.52	772.30
Esfenvalerate				11.74		51.14			52.87							115.76
Flonicamid			103.38													103.38
Indoxacarb		9.52	108.92	167.37		13.85										299.66
Lambda-cyhalothrin	17.15	5.47		27.46	1,701.11		68.92				640.99	9.59		662.48	76.74	3,209.92
Oxamyl					306.71											306.71
Spinosad		0.73	103.38			4.15			104.57							212.84
Spirotetramat		364.27	108.92	258.08	366.71	108.92			40.47					147.38	313.32	1,708.07
Total	***56.66***	***509.62***	***528.19***	***740.48***	***2,879.90***	***301.57***	***69.18***		***197.91***	***33.75***	***640.99***	***10.18***	***7.26***	***1,091.73***	***730.05***	***7,797.48***

Table 50. Estimated area (spray-hectares) of outdoor vegetable crops treated with pesticide formulations in Ireland, 2021 (continued).

	Crop															
Pesticide type and formulation	**Beetroot**	**Broccoli**	**Brussels sprouts**	**Cabbages**	**Carrots**	**Cauliflower**	**Celery**	**Courgettes and others**	**Kale**	**Leek**	**Leafy greens, legumes and others**	**Onions and scallions**	**Other herbs**	**Parsnips**	**Turnips and Swedes**	**Total**
Molluscicides																
Ferric phosphate		8.78	5.54		175.29	12.92										202.54
Metaldehyde	16.04	237.74		137.20											523.36	914.34
Total	***16.04***	***246.52***	***5.54***	***137.20***	***175.29***	***12.92***									***523.36***	***1,116.88***

Table 51. Estimated area (spray-hectares) of outdoor vegetable crops treated with pesticide formulations in Ireland, 2021 (continued).

	Crop															
Pesticide type and formulation	**Beetroot**	**Broccoli**	**Brussels sprouts**	**Cabbages**	**Carrots**	**Cauliflower**	**Celery**	**Courgettes and others**	**Kale**	**Leek**	**Leafy greens, legumes and others**	**Onions and scallions**	**Other herbs**	**Parsnips**	**Turnips and Swedes**	**Total**
Growth regulators																
Maleic hydrazide														79		79
Total														***79***		***79***

Table 52. Estimated area (spray-hectares) of outdoor vegetable crops treated with pesticide formulations in Ireland, 2021 (continued).

	Crop															
Pesticide type and formulation	**Beetroot**	**Broccoli**	**Brussels sprouts**	**Cabbages**	**Carrots**	**Cauliflower**	**Celery**	**Courgettes and others**	**Kale**	**Leek**	**Leafy greens, legumes and others**	**Onions and scallions**	**Other herbs**	**Parsnips**	**Turnips and Swedes**	**Total**
Seed treatments																
Tefluthrin												9.57		78.92		88.49
Thiram															79.89	79.89
Total												***9.57***		***78.92***	***79.89***	***168.38***

Table 53. Estimated area (spray-hectares) of outdoor vegetable crops treated with pesticide formulations in Ireland, 2021 (continued).

	Crop														
Pesticide type and formulation	**Beetroot**	**Broccoli**	**Brussels sprouts**	**Cabbages**	**Carrots**	**Cauliflower**	**Celery**	**Courgettes and others**	**Kale**	**Leek**	**Leafy greens, legumes and others**	**Onions and scallions**	**Other herbs**	**Parsnips**	**Turnips and Swedes**	**Total**
Total	***252***	***2,364***	***1,350***	***2,558***	***10,111***	***1,241***	***310***	***6***	***695***	***238***	***1,079***	***1,720***	***167***	***3,854***	***3,732***	***29,677***

Table 54. Estimated quantities (kilograms) of pesticide formulations used on outdoor vegetable crops in Ireland, 2021.

	Crop															
Pesticide type and formulation	**Beetroot**	**Broccoli**	**Brussels sprouts**	**Cabbages**	**Carrots**	**Cauliflower**	**Celery**	**Courgettes and others**	**Kale**	**Leek**	**Leafy greens, legumes and others**	**Onions and scallions**	**Other herbs**	**Parsnips**	**Turnips and Swedes**	**Total**
Fungicides																
Azoxystrobin	0.81	27.95	26.71	18.59	118.13				7.53	5.34	10.06	4.16		44.06	43.15	306.49
Azoxystrobin/difenoconazole				5.26	5.40	11.56	11.20		19.20				8.59	2.33	18.00	81.54
Benthiavalicarb-isopropyl/mancozeb												147.25	10.74			157.99
Benthiavalicarb/oxathiapiprolin												12.18	0.40			12.58
Boscalid/pyraclostrobin	12.12		34.53	62.82	162.28	2.47			19.93		26.64		2.42	50.61	78.99	452.80
Copper oxychloride															22.87	22.87
Cyprodinil/fludioxonil					226.20		10.77							122.00		358.97
Difenoconazole	2.14	2.96	13.80	32.28	18.98	6.20	2.15							13.69	2.89	95.10
Difenoconazole/fluxapyroxad					6.57											6.57
Dimethomorph/mancozeb												451.91				451.91
Fluopicolide/propamocarb hydrochloride		104.30		2.43								145.96	10.97			263.66
Fosetyl-aluminium/propamocarb hydrochloride		0.00	0.00	0.02												0.02
Isopyrazam					3.69									18.14		21.83
Mancozeb					78.85							182.71	13.09			274.65
Mancozeb/metalaxyl-M		40.08		80.60		40.93							4.93			166.55
Metalaxyl-M					17.86											17.86
Oxathiapiprolin												3.05				3.05
Prothioconazole			0.33	27.03	69.90	10.02				5.16				54.07	75.10	241.61
Tebuconazole/trifloxystrobin			20.55	18.01	41.19	8.66	15.51			6.04	9.06			50.88	12.46	182.36
Total	***15.07***	***175.29***	***95.92***	***247.03***	***749.05***	***79.83***	***39.63***		***46.66***	***16.54***	***45.76***	***947.21***	***51.15***	***355.78***	***253.46***	***3,118.40***

Table 55. Estimated quantities (kilograms) of pesticide formulations used on outdoor vegetable crops in Ireland, 2021 (continued).

	Crop															
Pesticide type and formulation	**Beetroot**	**Broccoli**	**Brussels sprouts**	**Cabbages**	**Carrots**	**Cauliflower**	**Celery**	**Courgettes and others**	**Kale**	**Leek**	**Leafy greens, legumes and others**	**Onions and scallions**	**Other herbs**	**Parsnips**	**Turnips and Swedes**	**Total**
Herbicides																
Aclonifen					486.51		10.34				18.66	8.97		230.36		754.84
Benfluralin				14.56		63.34			40.20						75.04	193.14
Bentazone										9.35		5.65				15.00
Clethodim					57.88									14.37		72.25
Clomazone		3.79	8.08	8.87	47.08	0.29			4.71						9.25	82.07
Clopyralid				4.47												4.47
Cycloxydim														0.42		0.42
Dimethenamid-P/pendimethalin										55.08		249.94	21.97			326.99
Ethofumesate	16.04															16.04
Fluroxypyr										1.61		0.53				2.14
Glyphosate	5.15	262.66	11.17	20.29	406.66	11.17		5.27			11.27	9.14	28.45	54.31		825.53
Imazamox/pendimethalin											31.91					31.91
Lenacil	3.89															3.89
Metamitron	56.94													388.37		445.31
Metazachlor		245.32	95.30	286.65		155.30			66.96	8.89					382.02	1,240.45
Metribuzin					104.87											104.87
Napropamide				21.18											41.23	62.41
Pendimethalin		388.99	17.95	135.89	865.95	116.94					16.76	10.94		342.31	5.18	1,900.92
Phenmedipham	7.69															7.69
Propaquizafop					3.10							12.18				15.28
Propyzamide											96.21		1.45			97.66
Prosulfocarb					182.15		68.92			41.06	101.74	365.96	23.94	144.42		928.19
Pyridate		14.96	10.86	28.99		13.85			123.62							192.27
S-metolachlor	24.69		69.47	69.40		20.48			11.06			3.13	6.97		264.35	469.56
Total	***114.41***	***915.73***	***212.83***	***590.30***	***2,154.19***	***381.36***	***79.26***	***5.27***	***246.55***	***115.99***	***276.54***	***666.45***	***82.78***	***1,174.56***	***777.07***	***7,793.30***

Table 56. Estimated quantities (kilograms) of pesticide formulations used on outdoor vegetable crops in Ireland, 2021 (continued).

	Crop															
Pesticide type and formulation	**Beetroot**	**Broccoli**	**Brussels sprouts**	**Cabbages**	**Carrots**	**Cauliflower**	**Celery**	**Courgettes and others**	**Kale**	**Leek**	**Leafy greens, legumes and others**	**Onions and scallions**	**Other herbs**	**Parsnips**	**Turnips and Swedes**	**Total**
Insecticides																
Chlorantraniliprole				0.09	3.78									0.27		4.14
Cyantraniliprole		1.16	0.31	3.83	13.72	1.70	0.002					0.03		5.29	20.04	46.09
Deltamethrin	0.30			0.96	1.54	0.21				0.21			0.05	1.50	0.38	5.15
Esfenvalerate				0.04		0.19			0.22							0.45
Flonicamid			7.24													7.24
Indoxacarb		0.24	2.78	4.27		0.35										7.64
Lambda-cyhalothrin	0.09	0.03		0.19	16.28		0.34				42.59	0.07		6.00	0.76	66.35
Oxamyl					485.03											485.03
Spinosad		0.07	9.92			0.40			10.04							20.43
Spirotetramat		27.32	8.17	18.61	22.39	8.17			3.04					7.37	23.34	118.41
Total	***0.38***	***28.82***	***28.42***	***28.00***	***542.74***	***11.03***	***0.35***		***13.29***	***0.21***	***42.59***	***0.10***	***0.05***	***20.44***	***44.52***	***760.95***

Table 57. Estimated quantities (kilograms) of pesticide formulations used on outdoor vegetable crops in Ireland, 2021 (continued).

	Crop															
Pesticide type and formulation	**Beetroot**	**Broccoli**	**Brussels sprouts**	**Cabbages**	**Carrots**	**Cauliflower**	**Celery**	**Courgettes and others**	**Kale**	**Leek**	**Leafy greens, legumes and others**	**Onions and scallions**	**Other herbs**	**Parsnips**	**Turnips and Swedes**	**Total**
Molluscicides																
Ferric phosphate		1.78	1.12		35.58	2.21										40.70
Metaldehyde	1.92	38.04		26.99											104.67	171.62
Total	***1.92***	***39.82***	***1.12***	***26.99***	***35.58***	***2.21***									***104.67***	***212.32***

Table 58. Estimated quantities (kilograms) of pesticide formulations used on outdoor vegetable crops in Ireland, 2021 (continued).

	Crop															
Pesticide type and formulation	**Beetroot**	**Broccoli**	**Brussels sprouts**	**Cabbages**	**Carrots**	**Cauliflower**	**Celery**	**Courgettes and others**	**Kale**	**Leek**	**Leafy greens, legumes and others**	**Onions and scallions**	**Other herbs**	**Parsnips**	**Turnips and Swedes**	**Total**
Growth regulators																
Maleic hydrazide														236.76		236.76
Total														***236.76***		***236.76***

Table 59. Estimated quantities (kilograms) of pesticide formulations used on outdoor vegetable crops in Ireland, 2021 (continued).

	Crop															
Pesticide type and formulation	**Beetroot**	**Broccoli**	**Brussels sprouts**	**Cabbages**	**Carrots**	**Cauliflower**	**Celery**	**Courgettes and others**	**Kale**	**Leek**	**Leafy greens, legumes and others**	**Onions and scallions**	**Other herbs**	**Parsnips**	**Turnips and Swedes**	**Total**
Seed treatments																
Tefluthrin												0.02		0.32		0.34
Thiram															0.10	0.10
Total												***0.02***		***0.32***	***0.10***	***0.44***

Table 60. Estimated quantities (kilograms) of pesticide formulations used on outdoor vegetable crops in Ireland, 2021 (continued).

	Crop														
Pesticide type and formulation	**Beetroot**	**Broccoli**	**Brussels sprouts**	**Cabbages**	**Carrots**	**Cauliflower**	**Celery**	**Courgettes and others**	**Kale**	**Leek**	**Leafy greens, legumes and others**	**Onions and scallions**	**Other herbs**	**Parsnips**	**Turnips and Swedes**	**Total**
Total	***131.79***	***1,159.66***	***338.30***	***892.33***	***3,481.57***	***474.43***	***119.24***	***5.27***	***306.50***	***132.74***	***364.89***	***1,613.78***	***133.98***	***1,787.85***	***1,179.83***	***12,122.16***

Table 61. The fifty active ingredients most extensively used on outdoor vegetable crops in Ireland in 2021, ranked by area treated (spray-hectares).

No.	*Active ingredient*	Treated area (sp ha)
1	*Lambda-cyhalothrin*	3,210
2	*Pendimethalin*	2,185
3	*Metazachlor*	2,064
4	*Azoxystrobin*	1,876
5	*Spirotetramat*	1,708
6	*Difenoconazole*	1,473
7	*Pyraclostrobin*	1,409
8	*Boscalid*	1,409
9	*Prothioconazole*	1,334
10	*Aclonifen*	1,139
11	*Clomazone*	1,125
12	*Cyantraniliprole*	938
13	*Metaldehyde*	914
14	*Trifloxystrobin*	885
15	*Tebuconazole*	885
16	*Metribuzin*	864
17	*Mancozeb*	841
18	*Cyprodinil*	807
19	*Fludioxonil*	807
20	*Deltamethrin*	772
21	*Glyphosate*	659
22	*S-metolachlor*	641
23	*Clethodim*	504
24	*Prosulfocarb*	498
25	*oxathiapiprolin*	497
26	*Dimethenamid-P*	347
27	*Metamitron*	324
28	*Propaquizafop*	315
29	*Oxamyl*	307
30	*Indoxacarb*	300
31	*Benthiavalicarb*	254
32	*Propamocarb hydrochloride*	248
33	*Dimethomorph*	244
34	*Fluopicolide*	240
35	*Pyridate*	224
36	*Metalaxyl-M*	224
37	*Spinosad*	213
38	*Benfluralin*	205
39	*Ferric phosphate*	203
40	*Isopyrazam*	175
41	*Benthiavalicarb-isopropyl*	139
42	*Propyzamide*	136
43	*Fluxapyroxad*	131
44	*Chlorantraniliprole*	131
45	*Esfenvalerate*	116
46	*Napropamide*	116
47	*Flonicamid*	103
48	*Maleic hydrazide*	79
49	*Clopyralid*	45
50	*Imazamox*	40

Table 62. The fifty active ingredients most extensively used on outdoor vegetable crops in Ireland in 2021, ranked by weight (kilograms).

No.	*Active ingredient*	Quantity (kg) of active ingredient
1	*Pendimethalin*	2,108
2	*Metazachlor*	1,240
3	*Mancozeb*	992
4	*Prosulfocarb*	928
5	*Glyphosate*	826
6	*Aclonifen*	755
7	*Oxamyl*	485
8	*S-metolachlor*	470
9	*Metamitron*	445
10	*Boscalid*	362
11	*Azoxystrobin*	357
12	*Prothioconazole*	242
13	*Propamocarb hydrochloride*	240
14	*Maleic hydrazide*	237
15	*Cyprodinil*	215
16	*Benfluralin*	193
17	*Pyridate*	192
18	*Metaldehyde*	172
19	*Dimethenamid-P*	150
20	*Fludioxonil*	144
21	*Difenoconazole*	129
22	*Tebuconazole*	122
23	*Spirotetramat*	118
24	*Metribuzin*	105
25	*Propyzamide*	98
26	*Pyraclostrobin*	91
27	*Clomazone*	82
28	*Clethodim*	72
29	*Lambda-cyhalothrin*	66
30	*Napropamide*	62
31	*Trifloxystrobin*	61
32	*Cyantraniliprole*	46
33	*Dimethomorph*	46
34	*Ferric phosphate*	41
35	*Metalaxyl-M*	28
36	*Fluopicolide*	24
37	*Copper oxychloride*	23
38	*Isopyrazam*	22
39	*Spinosad*	20
40	*Ethofumesate*	16
41	*Propaquizafop*	15
42	*Bentazone*	15
43	*Benthiavalicarb*	9
44	*Phenmedipham*	8
45	*Indoxacarb*	8
46	*Flonicamid*	7
47	*Oxathiapiprolin*	7
48	*Deltamethrin*	5
49	*Clopyralid*	4
50	*Chlorantraniliprole*	4

Table 63. Estimated quantity (kg), spray area (spha) and basic area (ha) of active substance for beetroot, 2021.

Crop	*Active Ingredient*	Quantity (kg) applied	Treated area (sp ha)	Basic area (ha) treated
Beetroot	***Fungicides***			
	Azoxystrobin	0.8	4.3	4.3
	Boscalid	9.7	36.3	19.1
	Difenoconazole	2.1	17.2	20.4
	Pyraclostrobin	2.4	36.3	17.2
	Herbicides			
	Ethofumesate	16.0	16.0	16.0
	Glyphosate	5.1	4.1	4.1
	Lenacil	3.9	19.5	17.2
	Metamitron	56.9	42.3	19.5
	Phenmedipham	7.7	20.8	16.0
	S-metolachlor	24.7	18.4	37.0
	Insecticides			
	Deltamethrin	0.3	39.5	18.9
	Lambda-cyhalothrin	0.1	17.2	19.1
	Molluscicides			
	Metaldehyde	1.9	16.0	18.4

Table 64. Estimated quantity (kg), spray area (spha) and basic area (ha) of active substance for broccoli, 2021.

Crop	*Active Ingredient*	Quantity (kg) applied	Treated area (sp ha)	Basic area (ha) treated
Broccoli	***Fungicides***			
	Azoxystrobin	28.0	254.4	254.4
	Difenoconazole	3.0	27.6	27.6
	Fluopicolide	9.5	94.8	94.8
	Fosetyl-aluminium	0.001	0.6	0.6
	Mancozeb	37.7	42.2	25.5
	Metalaxyl-M	2.4	42.2	25.5
	Propamocarb hydrochloride	94.8	95.4	95.4
	Herbicides			
	Clomazone	3.8	45.9	45.9
	Glyphosate	262.7	241.4	241.4
	Metazachlor	245.3	490.6	487.0
	Pendimethalin	389.0	389.4	385.8
	Pyridate	15.0	21.0	17.3
	Insecticides			
	Cyantraniliprole	1.2	129.6	112.9
	Indoxacarb	0.2	9.5	9.5
	Lambda-cyhalothrin	0.03	5.5	5.5
	Spinosad	0.1	0.7	0.7
	Spirotetramat	27.3	364.3	360.6
	Molluscicides			
	Ferric phosphate	1.8	8.8	8.8
	Metaldehyde	38.0	237.7	237.7

Table 65. Estimated quantity (kg), spray area (spha) and basic area (ha) of active substance for brussels sprouts, 2021.

Crop	*Active Ingredient*	Quantity (kg) applied	Treated area (sp ha)	Basic area (ha) treated
Brussels sprouts	***Fungicides***			
	Azoxystrobin	26.7	106.8	105.1
	Boscalid	27.6	103.4	103.4
	Difenoconazole	13.8	111.4	111.4
	Fosetyl-aluminium	-	0.004	0.004
	Propamocarb hydrochloride	-	0.004	0.004
	Prothioconazole	0.3	1.7	1.7
	Pyraclostrobin	6.9	103.4	103.4
	Tebuconazole	13.7	105.1	105.1
	Trifloxystrobin	6.8	105.1	105.1
	Herbicides			
	Clomazone	8.1	112.2	112.2
	Glyphosate	11.2	6.9	6.9
	Metazachlor	95.3	135.8	128.9
	Pendimethalin	18.0	15.5	8.6
	Pyridate	10.9	13.8	6.9
	S-metolachlor	69.5	103.4	103.4
	Insecticides			
	Cyantraniliprole	0.3	103.6	103.6
	Flonicamid	7.2	103.4	103.4
	Indoxacarb	2.8	108.9	108.9
	Spinosad	9.9	103.4	103.4
	Spirotetramat	8.2	108.9	108.9
	Molluscicides			
	Ferric phosphate	1.1	5.5	5.5

Table 66. Estimated quantity (kg), spray area (spha) and basic area (ha) of active substance for cabbages, 2021.

Crop	*Active Ingredient*	Quantity (kg) applied	Treated area (sp ha)	Basic area (ha) treated
Cabbages	***Fungicides***			
	Azoxystrobin	21.8	90.5	84.4
	Boscalid	50.2	113.1	113.1
	Difenoconazole	34.3	294.5	243.8
	Fluopicolide	0.2	2.2	2.2
	Fosetyl-aluminium	0.01	7.5	7.5
	Mancozeb	75.9	105.3	105.3
	Metalaxyl-M	4.7	105.3	105.3
	Propamocarb hydrochloride	2.2	9.7	7.5
	Prothioconazole	27.0	140.8	118.3
	Pyraclostrobin	12.6	113.1	113.1
	Tebuconazole	12.0	80.0	58.7
	Trifloxystrobin	6.0	80.0	58.7
	Herbicides			
	Benfluralin	14.6	16.2	16.2
	Clomazone	8.9	113.1	113.1
	Clopyralid	4.5	44.7	33.0
	Glyphosate	20.3	18.8	18.8
	Metazachlor	286.7	410.9	406.2
	Napropamide	21.2	31.4	31.4
	Pendimethalin	135.9	133.8	129.1
	Pyridate	29.0	34.1	29.4
	S-metolachlor	69.4	59.7	59.7
	Insecticides			
	Chlorantraniliprole	0.1	4.7	4.7
	Cyantraniliprole	3.8	93.3	66.7
	Deltamethrin	1.0	177.8	177.8
	Esfenvalerate	0.04	11.7	11.7
	Indoxacarb	4.3	167.4	108.9
	Lambda-cyhalothrin	0.2	27.5	27.5
	Spirotetramat	18.6	258.1	214.3
	Molluscicides			
	Metaldehyde	27.0	137.2	137.2

Table 67. Estimated quantity (kg), spray area (spha) and basic area (ha) of active substance for carrots, 2021.

Crop	*Active Ingredient*	Quantity (kg) applied	Treated area (sp ha)	Basic area (ha) treated
Carrots	***Fungicides***			
	Azoxystrobin	121.5	666.0	500.3
	Boscalid	129.7	538.4	363.1
	Cyprodinil	135.7	511.5	336.2
	Difenoconazole	23.7	573.5	179.3
	Fludioxonil	90.5	511.5	336.2
	Fluxapyroxad	3.9	131.4	131.4
	Isopyrazam	3.7	29.5	29.5
	Mancozeb	78.9	131.4	131.4
	Metalaxyl-M	17.9	29.5	29.5
	Prothioconazole	69.9	416.4	388.4
	Pyraclostrobin	32.6	538.4	363.1
	Tebuconazole	27.5	243.5	243.5
	Trifloxystrobin	13.7	243.5	243.5
	Herbicides			
	Aclonifen	486.5	720.0	711.3
	Clethodim	57.9	408.4	408.4
	Clomazone	47.1	617.6	609.0
	Glyphosate	406.7	283.0	283.0
	Metribuzin	104.9	863.7	624.8
	Pendimethalin	865.9	709.1	700.5
	Propaquizafop	3.1	193.4	193.4
	Prosulfocarb	182.2	137.4	128.8
	Insecticides			
	Chlorantraniliprole	3.8	117.0	46.4
	Cyantraniliprole	13.7	183.5	173.4
	Deltamethrin	1.5	204.8	204.8
	Lambda-cyhalothrin	16.3	1,701.1	779.5
	Oxamyl	485.0	306.7	306.7
	Spirotetramat	22.4	366.7	301.2
	Molluscicides			
	Ferric phosphate	35.6	175.3	175.3

Table 68. Estimated quantity (kg), spray area (spha) and basic area (ha) of active substance for cauliflower, 2021.

Crop	*Active Ingredient*	Quantity (kg) applied	Treated area (sp ha)	Basic area (ha) treated
Cauliflower	***Fungicides***			
	Azoxystrobin	7.1	35.6	17.8
	Boscalid	2.0	7.4	7.4
	Difenoconazole	10.6	97.5	79.7
	Mancozeb	38.5	40.0	40.0
	Metalaxyl-M	2.4	40.0	40.0
	Prothioconazole	10.0	52.2	52.2
	Pyraclostrobin	0.5	7.4	7.4
	Tebuconazole	5.8	38.5	38.5
	Trifloxystrobin	2.9	38.5	38.5
	Herbicides			
	Benfluralin	63.3	70.4	70.4
	Clomazone	0.3	3.2	3.2
	Glyphosate	11.2	6.9	6.9
	Metazachlor	155.3	340.4	340.4
	Pendimethalin	116.9	234.5	227.6
	Pyridate	13.8	18.2	11.3
	S-metolachlor	20.5	17.8	17.8
	Insecticides			
	Cyantraniliprole	1.7	78.7	51.6
	Deltamethrin	0.2	44.9	44.9
	Esfenvalerate	0.2	51.1	51.1
	Indoxacarb	0.4	13.8	13.8
	Spinosad	0.4	4.2	4.2
	Spirotetramat	8.2	108.9	70.4
	Molluscicides			
	Ferric phosphate	2.2	12.9	12.9

Table 69. Estimated quantity (kg), spray area (spha) and basic area (ha) of active substance for celery, 2021.

Crop	*Active Ingredient*	Quantity (kg) applied	Treated area (sp ha)	Basic area (ha) treated
Celery	***Fungicides***			
	Azoxystrobin	6.9	34.5	34.5
	Cyprodinil	6.5	34.5	34.5
	Difenoconazole	6.5	68.9	34.5
	Fludioxonil	4.3	34.5	34.5
	Tebuconazole	10.3	68.9	34.5
	Trifloxystrobin	5.2	68.9	34.5
	Herbicides			
	Aclonifen	10.3	34.5	34.5
	Prosulfocarb	68.9	34.5	34.5
	Insecticides			
	Cyantraniliprole	0.002	0.3	0.3
	Lambda-cyhalothrin	0.3	68.9	34.5

Table 70. Estimated quantity (kg), spray area (spha) and basic area (ha) of active substance for courgettes and others, 2021.

Crop	*Active Ingredient*	Quantity (kg) applied	Treated area (sp ha)	Basic area (ha) treated
Courgettes and others	***Herbicides***			
	Glyphosate	5.3	6.0	6.0

Table 71. Estimated quantity (kg), spray area (spha) and basic area (ha) of active substance for kale, 2021.

Crop	*Active Ingredient*	Quantity (kg) applied	Treated area (sp ha)	Basic area (ha) treated
Kale	***Fungicides***			
	Azoxystrobin	19.3	89.2	89.2
	Boscalid	15.9	59.7	59.7
	Difenoconazole	7.4	59.1	59.1
	Pyraclostrobin	4.0	59.7	59.7
	Herbicides			
	Benfluralin	40.2	27.9	27.9
	Clomazone	4.7	69.8	69.8
	Metazachlor	67.0	98.1	85.3
	Pyridate	123.6	137.4	137.4
	S-metolachlor	11.1	15.4	15.4
	Insecticides			
	Esfenvalerate	0.2	52.9	44.9
	Spinosad	10.0	104.6	96.6
	Spirotetramat	3.0	40.5	40.5

Table 72. Estimated quantity (kg), spray area (spha) and basic area (ha) of active substance for leeks, 2021.

Crop	*Active Ingredient*	Quantity (kg) applied	Treated area (sp ha)	Basic area (ha) treated
Leeks	***Fungicides***			
	Azoxystrobin	5.3	21.4	14.5
	Prothioconazole	5.2	26.9	26.9
	Tebuconazole	4.0	26.9	26.9
	Trifloxystrobin	2.0	26.9	26.9
	Herbicides			
	Bentazone	9.3	26.9	26.9
	Dimethenamid-P	25.3	47.0	47.0
	Fluroxypyr	1.6	26.9	26.9
	Metazachlor	8.9	14.5	14.5
	Pendimethalin	29.8	47.0	47.0
	Prosulfocarb	41.1	14.0	14.0
	Insecticides			
	Deltamethrin	0.2	33.8	33.8

Table 73. Estimated quantity (kg), spray area (spha) and basic area (ha) of active substance for leafy greens, legumes and others, 2021.

Crop	*Active Ingredient*	Quantity (kg) applied	Treated area (sp ha)	Basic area (ha) treated
Leafy greens, legumes and others	***Fungicides***			
	Azoxystrobin	10.1	40.3	40.3
	Boscalid	21.3	79.8	39.9
	Pyraclostrobin	5.3	79.8	39.9
	Tebuconazole	6.0	40.3	40.3
	Trifloxystrobin	3.0	40.3	40.3
	Herbicides			
	Aclonifen	18.7	38.9	38.9
	Glyphosate	11.3	7.0	7.0
	Imazamox	2.0	39.9	39.9
	Pendimethalin	46.7	62.9	62.9
	Propyzamide	96.2	128.3	128.3
	Prosulfocarb	101.7	40.3	40.3
	Insecticides			
	Lambda-cyhalothrin	42.6	641.0	259.5

Table 74. Estimated quantity (kg), spray area (spha) and basic area (ha) of active substance for onions and scallions, 2021.

Crop	*Active Ingredient*	Quantity (kg) applied	Treated area (sp ha)	Basic area (ha) treated
Onions and scallions	***Fungicides***			
	Azoxystrobin	4.2	16.6	10.7
	Benthiavalicarb	8.5	243.6	121.8
	Benthiavalicarb-isopropyl	3.6	129.0	129.0
	Dimethomorph	45.7	243.6	121.8
	Fluopicolide	13.3	132.7	126.2
	Mancozeb	732.6	494.4	129.0
	Oxathiapiprolin	6.7	487.2	121.8
	Propamocarb hydrochloride	132.7	132.7	126.2
	Herbicides			
	Aclonifen	9.0	10.7	10.7
	Bentazone	5.7	6.2	6.2
	Dimethenamid-P	114.8	262.0	140.2
	Fluroxypyr	0.5	5.3	5.3
	Glyphosate	9.1	16.6	16.6
	Pendimethalin	146.0	272.8	149.1
	Propaquizafop	12.2	121.8	121.8
	Prosulfocarb	366.0	132.2	132.2
	S-metolachlor	3.1	3.3	3.3
	Insecticides			
	Cyantraniliprole	0.03	0.6	0.6
	Lambda-cyhalothrin	0.1	9.6	4.8
	Seed Treatments			
	Tefluthrin	0.02	9.6	9.6

Table 75. Estimated quantity (kg), spray area (spha) and basic area (ha) of active substance for other herbs, 2021.

Crop	*Active Ingredient*	Quantity (kg) applied	Treated area (sp ha)	Basic area (ha) treated
Other herbs	***Fungicides***			
	Azoxystrobin	5.3	26.4	26.4
	Benthiavalicarb	0.3	10.0	10.0
	Benthiavalicarb-isopropyl	0.3	10.0	10.0
	Boscalid	1.9	7.3	7.3
	Difenoconazole	3.3	26.4	26.4
	Fluopicolide	1.0	10.0	10.0
	Mancozeb	28.2	27.2	17.2
	Metalaxyl-M	0.3	7.3	7.3
	oxathiapiprolin	0.1	10.0	10.0
	Propamocarb hydrochloride	10.0	10.0	10.0
	Pyraclostrobin	0.5	7.3	7.3
	Herbicides			
	Dimethenamid-P	10.1	37.5	37.5
	Glyphosate	28.5	16.5	16.5
	Pendimethalin	11.9	37.5	37.5
	Propyzamide	1.5	7.3	7.3
	Prosulfocarb	23.9	10.0	10.0
	S-metolachlor	7.0	7.3	7.3
	Insecticides			
	Deltamethrin	0.1	7.3	7.3

Table 76. Estimated quantity (kg), spray area (spha) and basic area (ha) of active substance for parsnips, 2021.

Crop	*Active Ingredient*	Quantity (kg) applied	Treated area (sp ha)	Basic area (ha) treated
Parsnips	***Fungicides***			
	Azoxystrobin	45.5	232.5	92.0
	Boscalid	40.5	151.5	151.5
	Cyprodinil	73.2	260.9	260.9
	Difenoconazole	14.6	116.7	62.2
	Fludioxonil	48.8	260.9	260.9
	Isopyrazam	18.1	145.1	145.1
	Prothioconazole	54.1	304.7	225.8
	Pyraclostrobin	10.2	151.5	151.5
	Tebuconazole	33.9	226.1	147.2
	Trifloxystrobin	17.0	226.1	147.2
	Herbicides			
	Aclonifen	230.4	334.5	323.9
	Clethodim	14.4	95.6	95.6
	Cycloxydim	0.4	2.1	2.1
	Glyphosate	54.3	51.7	51.7
	Metamitron	388.4	282.1	280.0
	Pendimethalin	342.3	278.6	276.5
	Prosulfocarb	144.4	129.5	129.5
	Insecticides			
	Chlorantraniliprole	0.3	9.5	9.5
	Cyantraniliprole	5.3	70.6	70.6
	Deltamethrin	1.5	201.7	147.2
	Lambda-cyhalothrin	6.0	662.5	287.0
	Spirotetramat	7.4	147.4	147.4
	Growth Regulator			
	Maleic hydrazide	236.8	78.9	78.9
	Seed Treatments			
	Tefluthrin	0.3	78.9	78.9

Table 77. Estimated quantity (kg), spray area (spha) and basic area (ha) of active substance for turnips and swedes, 2021.

Crop	*Active Ingredient*	Quantity (kg) applied	Treated area (sp ha)	Basic area (ha) treated
Turnips and swedes	***Fungicides***			
	Azoxystrobin	54.2	257.3	140.1
	Boscalid	63.1	312.7	140.1
	Copper oxychloride	22.9	26.1	26.1
	Difenoconazole	9.8	80.6	80.6
	Prothioconazole	75.1	391.1	332.5
	Pyraclostrobin	15.8	312.7	140.1
	Tebuconazole	8.3	55.4	55.4
	Trifloxystrobin	4.2	55.4	55.4
	Herbicides			
	Benfluralin	75.0	90.4	90.4
	Clomazone	9.3	162.8	162.8
	Metazachlor	382.0	573.4	510.9
	Napropamide	41.2	84.4	84.4
	Pendimethalin	5.2	3.9	3.9
	S-metolachlor	264.4	416.2	353.7
	Insecticides			
	Cyantraniliprole	20.0	277.5	179.4
	Deltamethrin	0.4	62.5	62.5
	Lambda-cyhalothrin	0.8	76.7	50.7
	Spirotetramat	23.3	313.3	254.7
	Molluscicides			
	Metaldehyde	104.7	523.4	279.2
	Seed Treatments			
	Thiram	0.1	79.9	79.9

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