



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

Pesticide Usage in Ireland

Grassland and Fodder Crops Survey Report 2020



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GRASSLAND AND FODDER CROPS SURVEY REPORT 2020

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Grassland and Fodder Crops Survey Report Summary

This is the fourth survey of pesticide¹ usage on grassland and fodder crops in Ireland carried out by DAFM, providing comparative data to that obtained in the previous survey in 2017.

Information on all aspects of pesticide usage was collected from 464 holdings across Ireland representing 0.63% of the total area of grassland and fodder crops grown.

Quantitative data have been adjusted to provide estimates of total pesticide usage.

In 2020, an estimated 4,867,754 hectares of grassland and fodder crops were grown which represents an overall 3% increase compared to the total estimated area for the years 2013 and 2017. In 2020, an estimated 646,069 kgs of active substance was applied to grassland and fodder crops which represents an 25% increase compared to 2017 and 8% since 2013 in total weight of pesticide applied. In 2020, the total pesticide treated area increased to 601,565 ha from 431,154 ha in 2017 representing a 40% increase. In contrast to 2013, it was 465,877 ha representing a 29% increase of the total pesticide treated area.

In 2020, a total of 66 active substances were recorded in use on grassland and fodder crops in the survey compared to 82 in 2017 and 78 in 2013.

Herbicides were applied to 99% of the pesticide treated area, representing 100% of the total weight of pesticides used. Fungicides, insecticides, molluscicides, growth regulators and seed treatments were applied to 1% of the pesticide treated area, accounting for less than 1% of the total weight of pesticides used.

Permanent grassland comprised of 57% of the area of grassland and fodder crops in Ireland 2020, accounting for 47% of the total pesticide treated area and 53% of the total weight of pesticides used on all grassland and fodder crops. Grass silage 1st cut comprised of 19% of the area of grassland and fodder crops in Ireland 2020, accounting for 22% of the total pesticide treated area and 15% of the total weight of pesticides used on all grassland and fodder crops in 2020. Grass silage 2nd cut comprised of 8% of the area of grassland and fodder crops in Ireland 2020, accounting for 3% of the total pesticide treated area and 1% of the total weight of pesticides used on all grassland and fodder crops. Grass silage 3rd cut comprised of 1% of

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.

the area of grassland and fodder crops in Ireland 2020, with no pesticide applications to this area. Rough grazing comprised of 10% of the area of grassland and fodder crops in Ireland 2020, accounting for 2% of the total pesticide treated area and 2% of the total weight of pesticides used on all grassland and fodder crops. Grass reseed comprised of 2% of the area of grassland and fodder crops in Ireland 2020, accounting for 12% of the total pesticide treated area and 19% of the total weight of pesticides used on all grassland and fodder crops. Hay and haylage comprised of 3% of the area of grassland and fodder crops in Ireland 2020, accounting for 2% of the total pesticide treated area and 1% of the total weight of pesticides used on all grassland and fodder crops.

Arable silage comprised of less than 1% of the area of grassland and fodder crops in 2020, accounting for 5% of the total pesticide treated area and less than 1% of the total weight of pesticides. Fodder maize comprised of less than 1% of the area of grassland and fodder crops grown in Ireland in 2020, accounting for 1% of the total pesticide treated area and 6% of the total weight of pesticides used on grassland and fodder crops. Fodder beet comprised of less than 1% of the area of grassland and fodder crops grown in Ireland in 2020, accounting for 5% of the total pesticide treated area and 2% of the total weight of pesticides used on grassland and fodder crops. Other fodder crops comprised of less than 1% of the area of grassland and fodder crops grown in Ireland in 2020, accounting for less than 1% of the total pesticide treated area and less than 1% of the total weight of pesticides used on grassland and fodder crops.

Background

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

Legislation has been put in place at both EU and national level to minimise the risks associated with the use of PPPs while ensuring necessary crop protection. The Sustainable Use of Pesticides Directive based on the EU 'Thematic strategy on the sustainable use of pesticides' aims to achieve a balance between ensuring human and environmental safety while maintaining continued viability of the farming and amenity sectors. This involves training and registration of advisers, distributors, operators and inspectors of pesticide application equipment, controls on storage, supply and use, adoption of the principles of IPM and improved statistics on PPP use.

To address the requirement for improved statistics, Regulation (EC) No 1185/2009 was adopted on 25th November 2009 which requires each member state to collect statistics on PPP use. It is the area identified above as “improved statistics on PPP use” that this survey and future surveys will be addressing.

While sales data can provide information on the overall 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 sample of holdings to be surveyed was selected from each of the 26 counties, on the basis of the total area of grassland and fodder crops grown, using data from DAFM. For the purpose of the survey the country was divided into three geographical regions namely the East, North/West and the South as per Table 1. The sample was categorised into six size groups, according to the total area of grassland and fodder crops grown in each region. Holdings were

selected at random within each of the size groups and the number of holdings selected was proportional to the total area of crops grown.

Table 1. Regions selected for survey and respective counties.

<i>Regions</i>	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 participants of selected holdings in preliminary correspondence. A total of 464 holdings were contacted during the period June to August 2022 and data collected by phone and or physical interview for grassland and fodder crops grown and harvested in 2020. The data collected included; the area of crops grown, area treated, target crop, pesticide used, application rates and number of treatments applied. Holdings selected in the original sample which were unable to provide data were replaced with ones from the same county and size group held on a reserve list. The total number of farms sampled in each size group is shown in Table 2. The collected data were entered using Oracle, a relational database programme. Validated data were downloaded for analysis using SPSS software.

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

<i>Region</i>	Holding Size (Hectares)						Total
	<10 ha	10<20 ha	20<30 ha	30<50 ha	50<100 ha	>100 ha	
<i>East</i>	13	11	9	17	23	12	85
<i>North/West</i>	5	16	18	34	52	28	153
<i>South</i>	10	33	38	60	57	28	226
<i>Ireland</i>	28	60	65	111	132	68	464

Definitions

- 'Basic area'; refers to the actual planted area of crop 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.

- '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.
- 'Molluscicides'; are defined as PPPs used to control and / or prevent harmful slugs and snails.
- 'PPP'; refers to plant protection product.
- 'Rounding'; due to rounding of figures there may be slight differences in totals both within and between tables.
- '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)).
- 'Seed treatments'; are defined as PPPs applied to seeds to provide protection and improve the establishment of healthy crops.
- 'Arable silage'; is defined as arable crops particularly cereals, which has been ensiled whole and has not been combined for grain.
- 'Rough grazing'; is defined as land containing semi-natural vegetation including heathland, heather moorland, bog and rough grassland suitable only for use as grazing.
- 'Spray applications'; refers to the number of treatments of any pesticide type to the treated areas.
- No applications of pesticides to 3rd cut grass silage was noted during the survey.
- 'Other fodder crops' refer to fodder kale and fodder rape, fodder turnips and fodder triticale (spring).

Crops

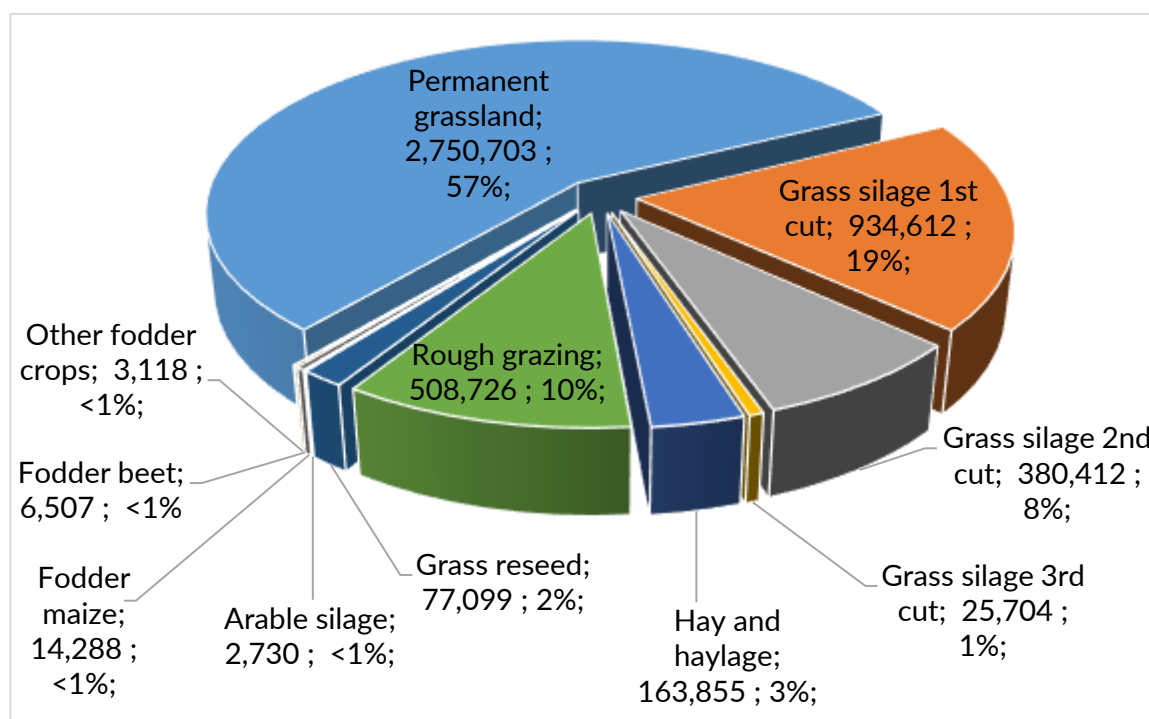
Information was collected for permanent grassland, grass silage (1st, 2nd and 3rd), hay and haylage, rough grazing, grass reseed, arable silage, fodder maize, fodder beet, and other fodder crops. The number and areas of crops surveyed are shown in Table 3. Data from 464 farms provided information on 1,475 examples of 14 crop types. The total area of crops sampled in the survey (30,488 ha) was representative of the area of grassland and fodder crops grown in Ireland in 2020 (4,867,754 ha).

Table 3. The total number and area (hectares) of crops sampled, estimated total area and the proportion (%) of the total area of grassland and fodder crops surveyed in Ireland, 2020.

Crop	Number of crops surveyed	Survey area (ha)	Estimated area (ha)	Proportion of crops surveyed (%)
Permanent grassland	506	16,681	2,750,703	0.61%
Grass silage 1 st cut	350	5,347	934,612	0.57%
Grass silage 2 nd cut	189	2,308	380,412	0.61%
Grass silage 3 rd cut	15	141	25,704	0.55%
Hay and haylage	139	698	163,855	0.43%
Rough grazing	95	3,902	508,726	0.77%
Grass reseed	81	492	77,099	0.64%
Arable silage	25	224	2,730	8.20%
Fodder maize	34	388	14,288	2.72%
Fodder beet	25	243	6,507	3.73%
Other fodder crops	16	64	3,118	2.06%
Total	1,475	30,488	4,867,754	0.63%

Permanent grassland covered an estimated 57% of the total area of grassland and fodder crops in 2020. Grass silage 1st, 2nd and 3rd cuts accounted for 19% and 8% and 1% of the area of grassland and fodder crops in 2020 respectively. Rough grazing and grass reseed accounted for 10% and 2%, while hay and haylage represented 3% of the total area of grassland and fodder crops in 2020. Arable silage, fodder maize and fodder beet each accounted for less than 1% of the total area of grassland and fodder crops in 2020. This was also the same for other fodder crops as below in Figure 1.

Figure 1. Areas of individual grassland and fodder crops grown in Ireland (ha), 2020.



Regional distribution of crops

The South region had the largest area of grassland and forage crops during 2020, accounting for 43% of the area of grassland and fodder crops grown as below in Figure 2 and 40% of the total pesticide treated area. Overall, 46% of the weight of fungicides, 34% of the weight of herbicides, 71% of the weight of insecticides, 95% of the weight of molluscicides, 77% of the weight of growth regulators, and 40% of the weight of seed treatments were applied to grassland and fodder crops in this region.

The North/West region accounted for 42% of the total area of grassland and fodder crops grown as below in Figure 2 and 55% of the total pesticide treated area. Overall, 16% of the weight of fungicides, 53% of the weight of herbicides, 3% of the molluscicides, 9% of the growth regulators, 27% of the weight of seed treatments and no insecticides were applied to grassland and fodder crops in this region.

The East region accounted for 15% of the total grassland and fodder crop area grown as below in Figure 2 and 16% of the pesticide treated area. Overall, 37% of the weight of fungicides, 14% of the weight of herbicides, 29% of the weight of insecticides, 3% of the weight of molluscicides, 14% of the weight of growth regulators, and 32% of the weight of seed treatments were applied to grassland and fodder crops in this region.

Figure 2. Regional distribution (ha) of grassland and fodder crops grown in Ireland, 2020.

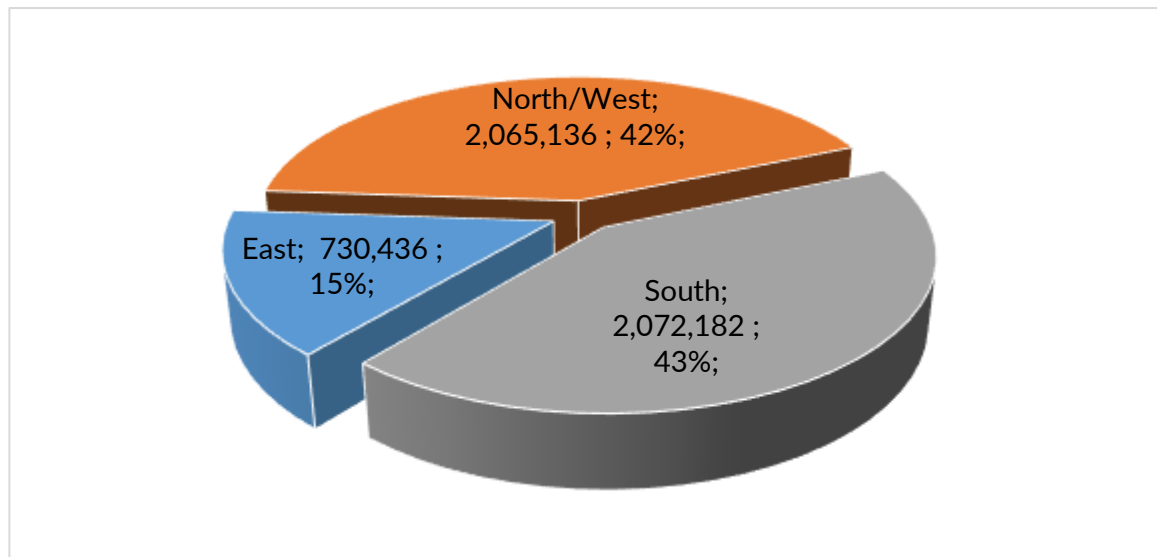


Figure 3. Regional distribution (ha) of individual grassland and fodder crops grown in Ireland, 2020.

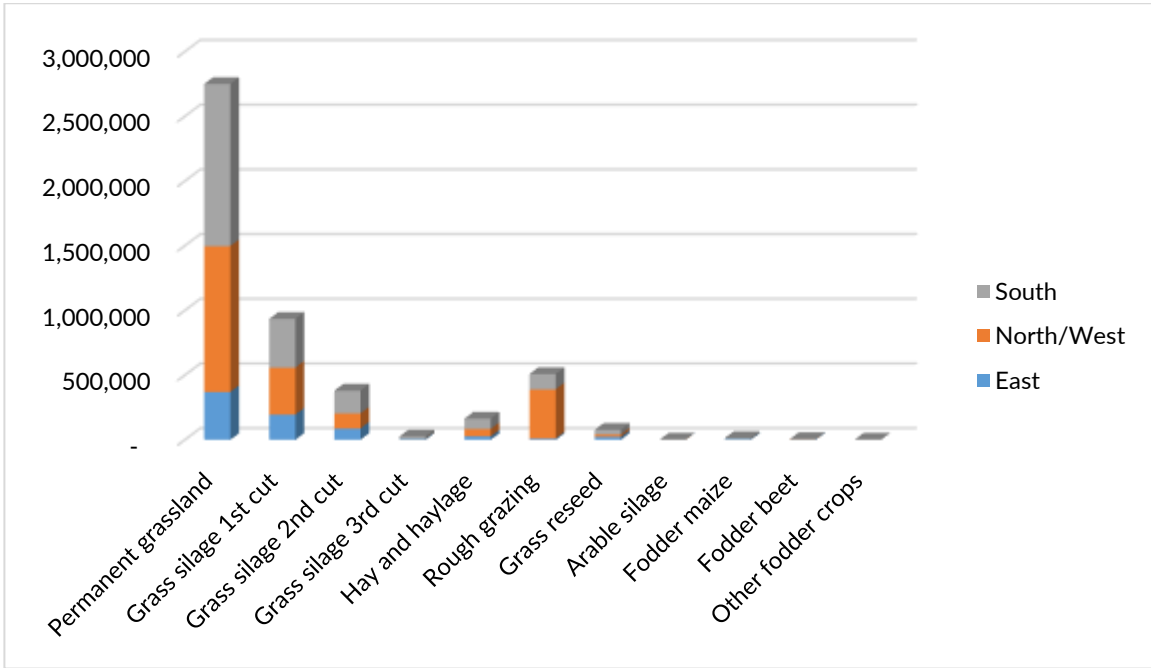


Figure 4. Regional distribution (ha) of all grassland crops grown in Ireland, 2020.

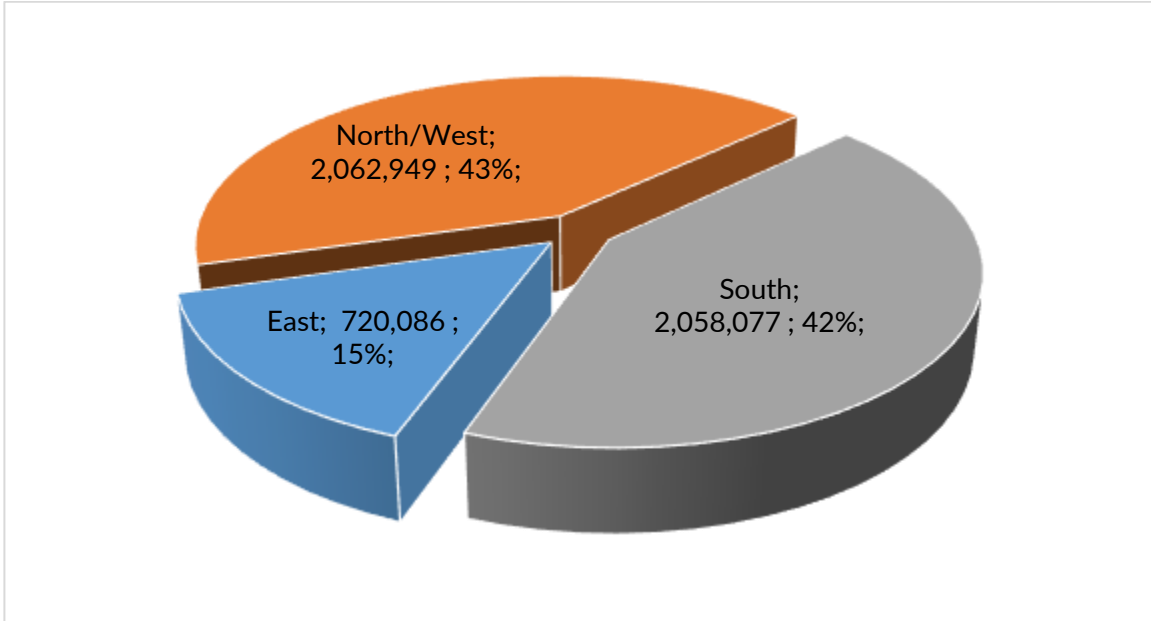
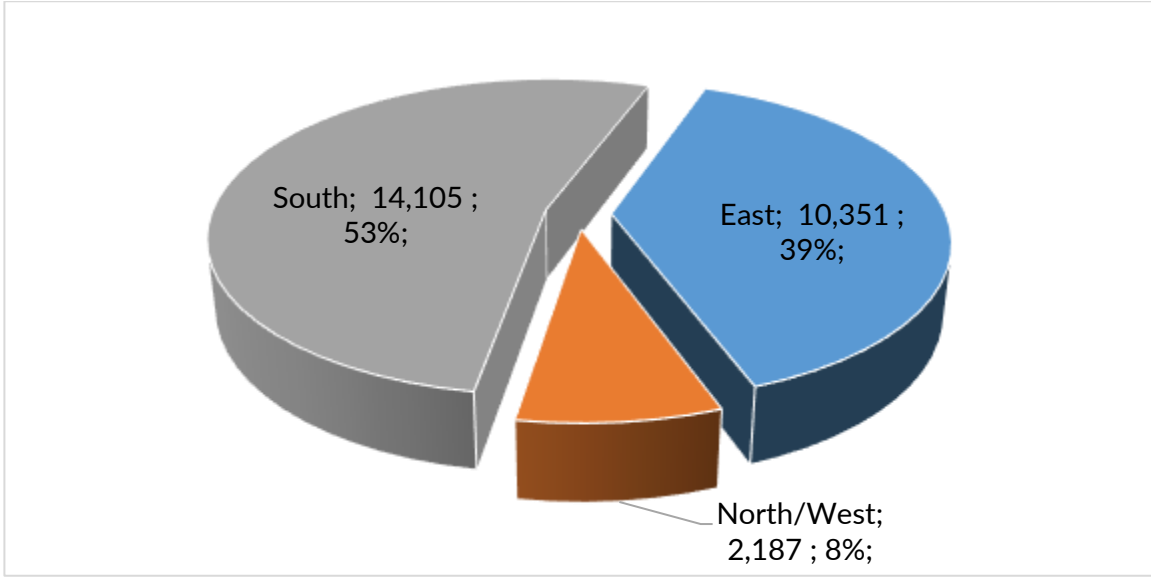


Figure 5. Regional distribution (ha) of fodder crops grown in Ireland, 2020.



Pesticide usage

Herbicides were applied to 99% of the pesticide treated area accounting for 100% of the total weight of pesticides used. Fungicides were applied to 1% of the pesticide treated area and accounted for less than 1% of the total weight of pesticides used. Insecticides, molluscicides, growth regulators and seed treatments were applied to less than 1% of the pesticide treated area of grassland and fodder crops, accounting for less than 1% of the weight of pesticides applied.

Figure 6. Pesticide usage (spha) on grassland and fodder crops treated in Ireland, 2020.

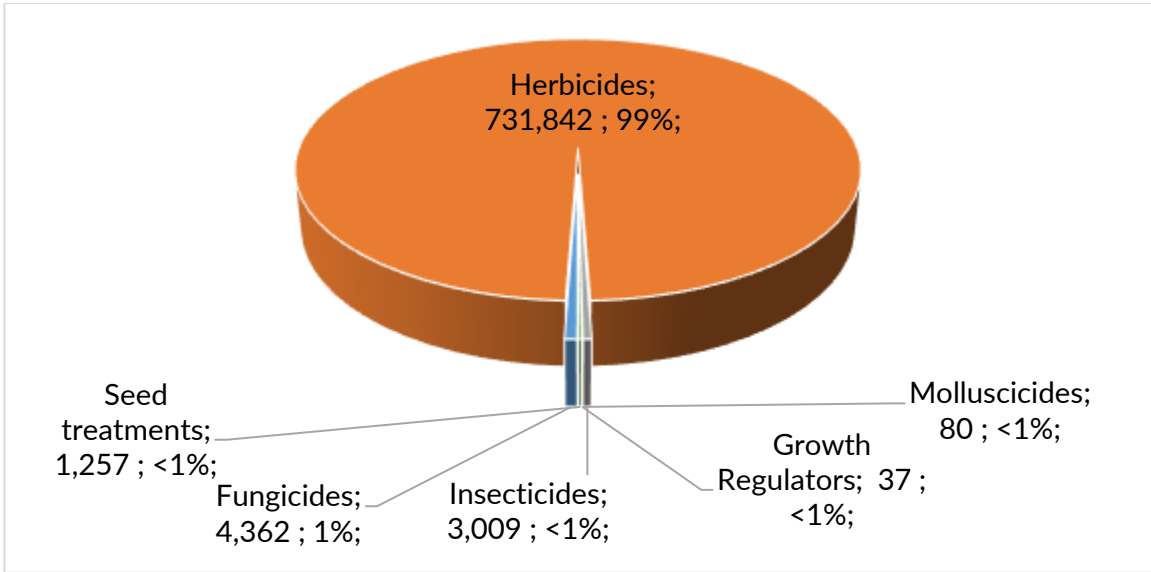
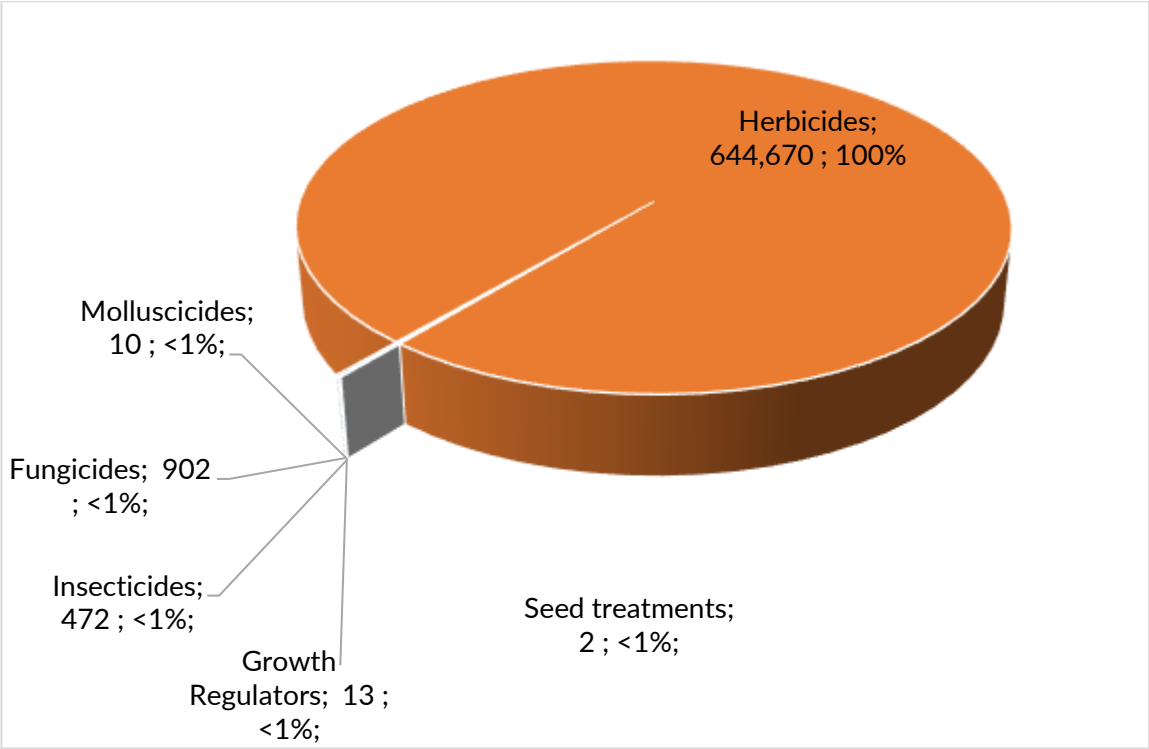


Figure 7. Weight (kg) of pesticides applied to grassland and fodder crops treated in Ireland, 2020.



The use of herbicide on grassland crops accounted for 100% of the grassland pesticide treated area and 100% of the total weight of pesticides applied to grassland crops.

Figure 8 : Pesticide usage (spha) on grassland crops treated in Ireland, 2020.

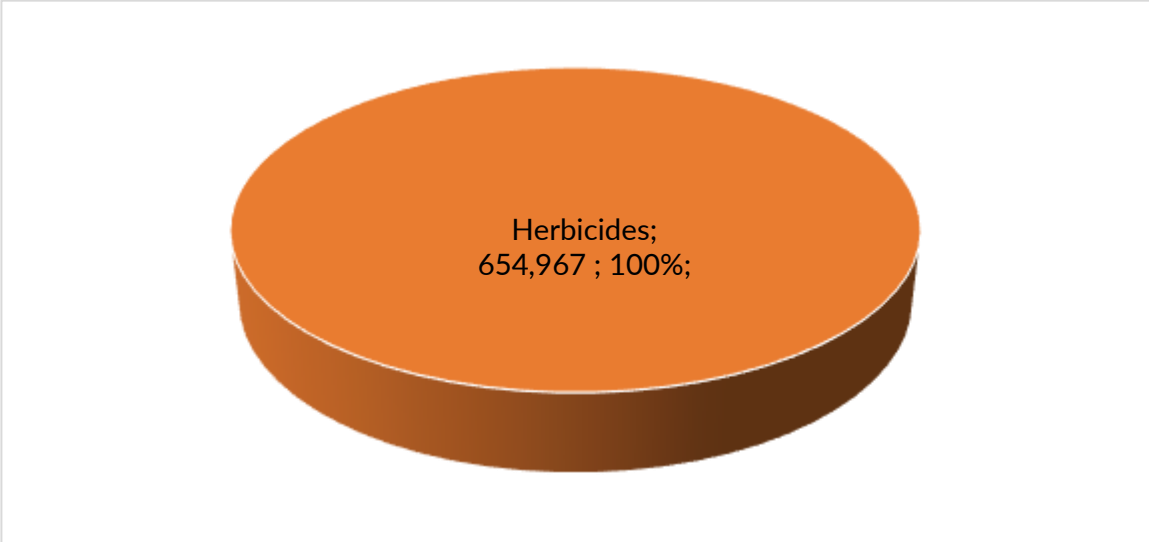
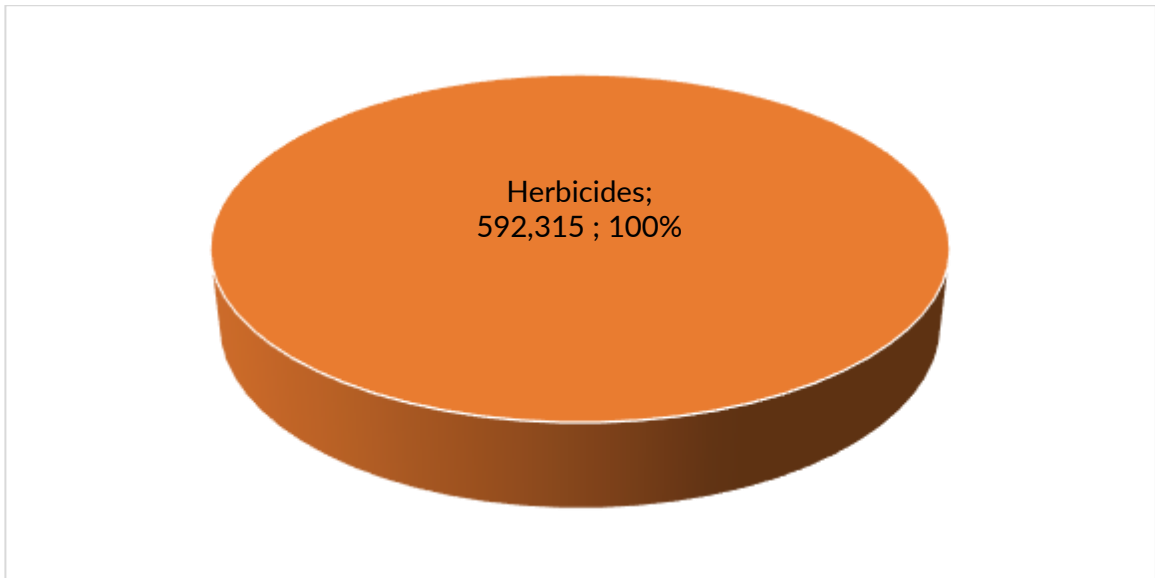


Figure 9. Weight (kg) of pesticides applied to grassland crops treated in Ireland, 2020.



The use of herbicide on fodder crops accounted for 90% of the fodder crop treated area and 97% of the total weight of pesticides applied to fodder crops. The use of fungicides on fodder crops accounted for 5% of the fodder crop pesticide treated area and 2% of the total weight of pesticides applied to fodder crops. Seed treatments on fodder crops accounted for 1% of the pesticide treated area and less than 1% of the total weight of pesticides applied to fodder crops. The use of molluscicides on fodder crops accounted for less than 1% of the pesticide treated area and less than 1% of the total weight of pesticides applied to fodder crops. The use of insecticides on fodder crops accounted for 4% of the fodder crop pesticide treated area and 1% of the total weight of pesticides applied to fodder crops. The use of growth regulators on fodder crops accounted for less than 1% of the pesticide treated area and less than 1% of the total weight of pesticides applied to fodder crops.

Figure 10. Pesticide usage (spha) on fodder crops grown in Ireland, 2020.

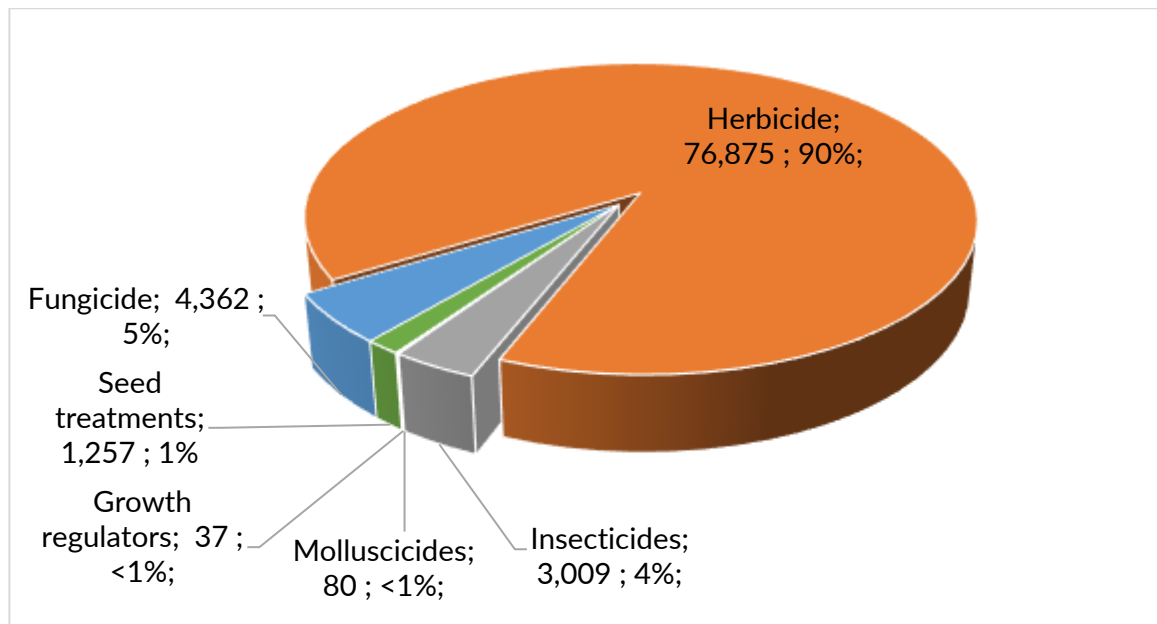
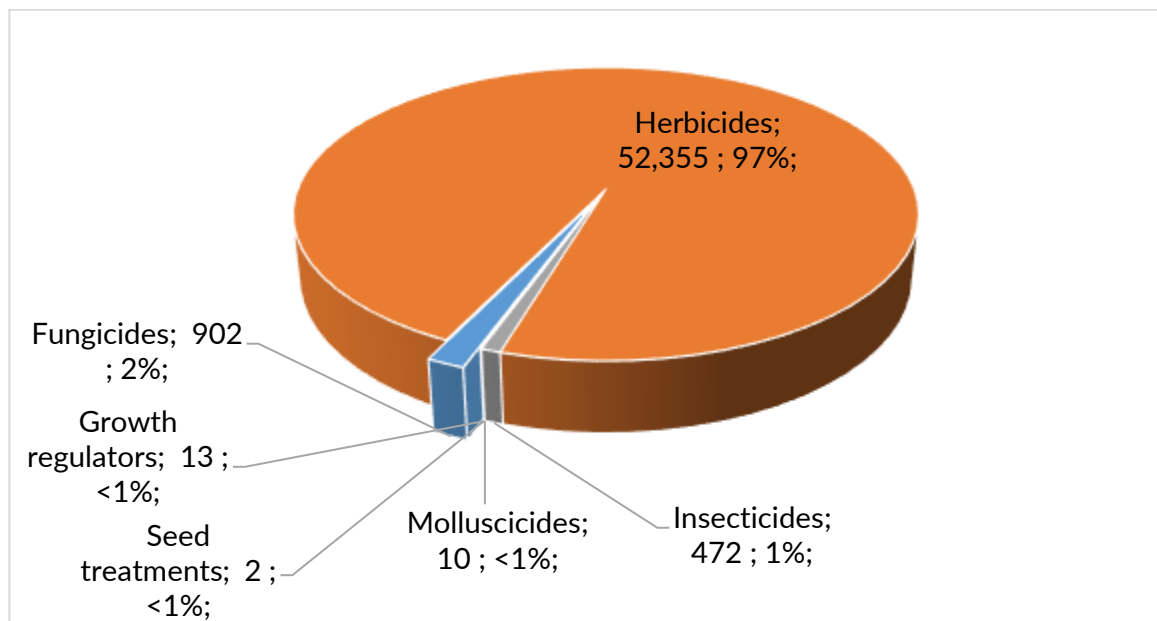


Figure 11. Weight of pesticides (kg) applied to fodder crops grown in Ireland, 2020.



Grassland and fodder crop areas 2013, 2017 and 2020

The largest proportional change in crop areas when comparing 2013 and 2017 with 2020 data is fodder maize where the area has increased 27% followed by grassland at 3%. Arable silage has decreased significantly from 14,414 ha in 2013 to 2,730 ha in 2020, while fodder beet has decreased from 9,751 ha in 2013 to 6,507 ha in 2020. The other fodder crops area shows a

reduction of 25% when compared to 2013. Details of changes in crop areas between 2013, 2017 and 2020 are outlined in Table 4 below.

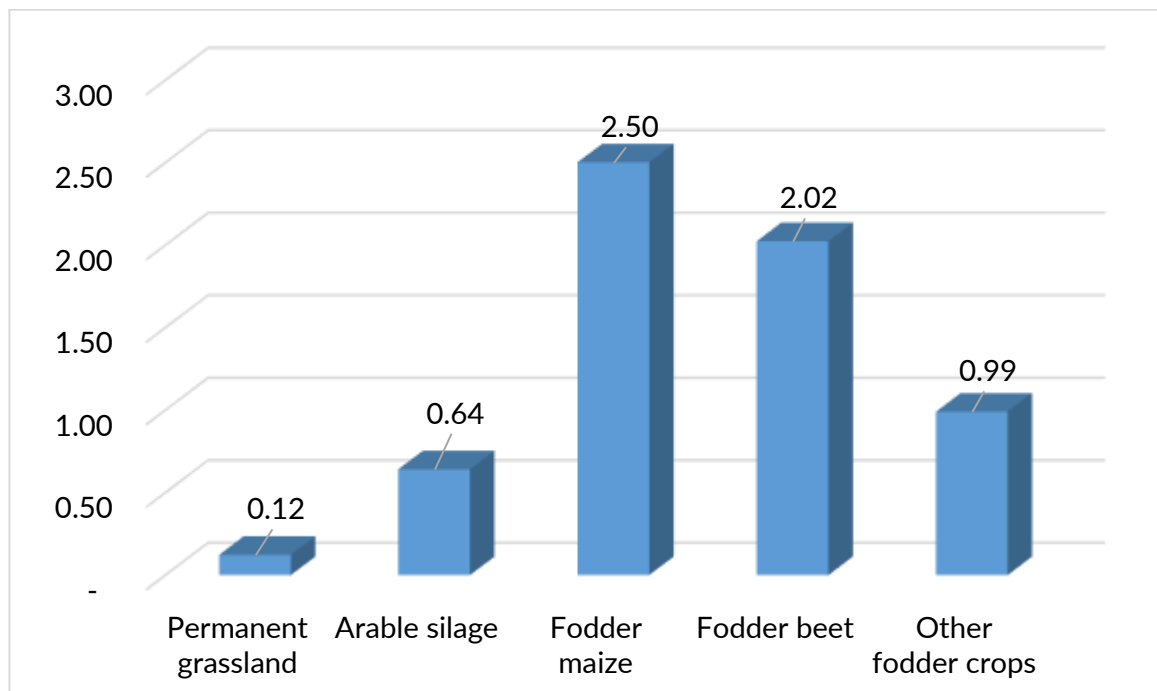
Table 4. Grassland and fodder crops areas (ha) for surveys in 2013, 2017 and 2020 and percentage (%) change in areas grown from 2013 and 2017 compared to 2020.

Crop	Hectares Grown (Ha)			Crop area change between 2013, 2017 and 2020 (%)
	2013	2017	2020	
Grassland	4,660,903	4,620,176	4,841,111	3%
Arable silage	14,414	11,487	2,730	-71%
Fodder maize	9,207	10,174	14,288	27%
Fodder beet	9,751	14,945	6,507	-37%
Other fodder crops	4,175	5,199	3,118	-25%
All crops	4,698,451	4,661,983	4,867,754	3%

Quantity of pesticide applied per crop, 2013, 2017 and 2020

The average weight of pesticide applied per hectare of crop grown for each crop in 2020 is provided in Figure 12. Average weights were calculated as the total weight of pesticides applied divided by the total area of crop grown (whether treated or untreated).

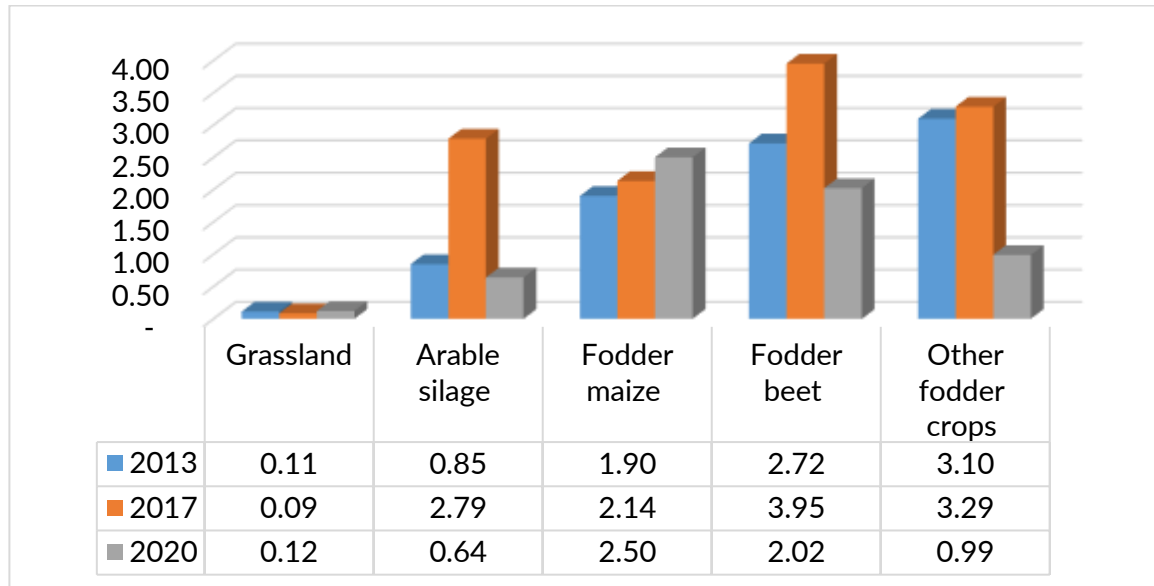
Figure 12. Average weight of pesticides applied per hectare of crop grown in Ireland (kg/ha), 2020.



The highest weight of pesticides applied per hectare was on fodder maize (2.50 kg/ha). Fodder beet had the next highest levels of pesticide use (2.02 kg/ha) followed by other fodder crops

(0.99 kg/ha). The average weight of pesticide applied per hectare of crop grown is below in Figure 13 across the years 2013, 2017 and 2020.

Figure 13. Average weight of pesticides applied per hectare of crop grown in Ireland (kg/ha), in 2013, 2017 and 2020.



The quantity of pesticides applied to fodder beet decreased from 2.72 kg/ha (2013) to 2.02 kg/ha (2020). In addition, the quantity of pesticides applied to arable silage crops has decreased from 0.85 kg/ha (2013) to 0.64 kg/ha (2020). The quantity of pesticides applied to other fodder crops has increased from 3.10 kg/ha (2017) to 0.99 kg/ha (2020).

Pesticide applied on crop growing area, 2013, 2017 and 2020

The average weight of pesticide applied per hectare of crop grown for 2013, 2017 and 2020 including percentage change is provided.

Grass

Overall, there was a 18% increase in the quantities (kg/ha) of pesticides applied to all grass crops when comparing 2020 with 2013 and 2017. This is solely attributable to an increase in herbicides being applied. No applications of fungicides, seed treatments, molluscicides, insecticides and growth regulators to grassland were noted during the survey.

Table 5. Quantity of pesticide type (kg/ha) and percentage change (%) for grass for surveys between 2020 and 2013-2017 average.

Pesticide Type	(kg/ha) on area grown			
	2013	2017	2020	(%) change
Fungicides				
Herbicides (incl. spot tr)	0.11	0.09	0.12	18%
Insecticides				
Molluscicides	0.00001	0.00	0.00	-100%
Growth regulators				
Seed treatments				
All pesticides	0.11	0.09	0.12	18%

Fodder crops

Quantities (kg/ha) of fungicides, herbicides, molluscicides, growth regulators and seed treatments decreased by 53%, 54%, 84%, 89% and 28% respectively when comparing 2020 with 2013 and 2017. Quantities (kg/ha) of insecticides increased by 89% when comparing 2020 with 2013 and 2017. Overall, there was a 26% decrease in the quantities (kg/ha) of pesticides applied to all grass crops when comparing 2020 with 2013 and 2017.

Table 6. Quantity of pesticide type (kg/ha) and percentage change (%) for fodder crops for surveys between 2020 and 2013-2017 average.

Pesticide Type	(kg/ha) on area grown			
	2013	2017	2020	(%) change
Fungicides	0.127	0.432	0.132	-53%
Herbicides (incl. spot tr)	1.512	2.142	0.842	-54%
Insecticides	0.010	0.003	0.610	89%
Molluscicides	0.031	0.006	0.003	-84%
Growth regulators	0.016	0.009	0.001	-89%
Seed treatments	0.060	0.072	0.047	-28%
All pesticides	1.76	2.67	1.64	-26%

Pesticide Usage Survey Results 2020

Pesticide usage on permanent grassland

- 2,750,703 ha of permanent grassland in Ireland.
- 348,639 treated hectares (spha).
- 343,576 kilograms applied (100% herbicides)

Table 7. The top 10 active ingredients most extensively used on permanent grassland in 2020, ranked by area treated (spray-hectares).

Active Substance	Treated area (spha)	Basic area treated (ha)	Quantity applied (kg)
Triclopyr	110,631	109,145	28,241
MCPA	105,983	105,036	154,549
Glyphosate	86,941	86,585	110,426
Fluroxypyr	70,329	70,329	14,780
Clopyralid	53,986	53,312	4,809
Aminopyralid	15,461	15,323	841
2,4-D	10,002	10,002	12,737
Dicamba	9,018	9,018	1,405
Asulam	5,624	5,624	12,056
Mecoprop-P	5,096	5,096	1,172

Table 8. The top 10 active ingredients most extensively used on permanent grassland in Ireland in 2020, ranked by weight (kg).

Active Substance	Quantity applied (kg)	Treated area (spha)	Basic area treated (ha)
MCPA	154,549	105,983	105,036
Glyphosate	110,426	86,941	86,585
Triclopyr	28,241	110,631	109,145
Fluroxypyr	14,780	70,329	70,329
2,4-D	12,737	10,002	10,002
Asulam	12,056	5,624	5,624
Clopyralid	4,809	53,986	53,312
2,4-DB	1,584	1,350	1,350
Dicamba	1,405	9,018	9,018
Mecoprop-P	1,172	5,096	5,096

Pesticide usage on grass silage 1st cut

- 934,612 ha of grass silage 1st cut in Ireland.
- 162,671 treated hectares (spha).
- 96,504 kilograms applied (100% herbicides).

Table 9. The top 10 active ingredients most extensively used on grass silage 1st cut in Ireland in 2020, ranked by area treated (spray-hectares).

Active Substance	Treated area (spha)	Basic area treated (ha)	Quantity applied (kg)
Triclopyr	102,738	100,633	26,345
Fluroxypyr	88,133	88,133	21,606
Aminopyralid	20,231	20,231	1,204
MCPA	16,624	16,624	19,810
2,4-D	12,104	12,104	8,142
Glyphosate	11,668	11,668	14,013
Clopyralid	9,072	9,072	916
Dicamba	7,253	7,253	1,234
Amidosulfuron	5,455	5,455	205
Mecoprop-P	2,104	2,104	3,030

Table 10. The top 10 active ingredients most extensively used on grass silage 1st cut in Ireland in 2020, ranked by weight (kg).

Active Substance	Quantity applied (kg)	Treated area (spha)	Basic area treated (ha)
Triclopyr	26,345	102,738	100,633
Fluroxypyr	21,606	88,133	88,133
MCPA	19,810	16,624	16,624
Glyphosate	14,013	11,668	11,668
2,4-D	8,142	12,104	12,104
Mecoprop-P	3,030	2,104	2,104
Dicamba	1,234	7,253	7,253
Aminopyralid	1,204	20,231	20,231
Clopyralid	916	9,072	9,072
Amidosulfuron	205	5,455	5,455

Pesticide usage on grass silage 2nd cut

- 380,412 ha of grass silage 2nd cut in Ireland.
- 22,295 treated hectares (spha).
- 8,784 kilograms applied (100% herbicides).

Table 11. The top 7 active ingredients most extensively used on grass silage 2nd cut in Ireland in 2020, ranked by area treated (spray-hectares).

Active Substance	Treated area (spha)	Basic area treated (ha)	Quantity applied (kg)
Fluroxypyr	19,867	19,867	5,467
Triclopyr	11,154	11,154	2,940
Clopyralid	3,356	3,356	261
Florasulam	2,970	2,970	7
Aminopyralid	1,423	1,423	79
Amidosulfuron	608	608	18
MCPA	12	12	12

Table 12. The top 7 active ingredients most extensively used on grass silage 2nd cut in Ireland in 2020, ranked by weight (kg).

Active Substance	Quantity applied (kg)	Treated area (spha)	Basic area treated (ha)
Fluroxypyr	5,467	19,867	19,867
Triclopyr	2,940	11,154	11,154
Clopyralid	261	3,356	3,356
Aminopyralid	79	1,423	1,423
Amidosulfuron	18	608	608
MCPA	12	12	12
Florasulam	7	2,970	2,970

Pesticide usage on rough grazing

- 508,726 ha of rough grazing in Ireland.
- 11,851 treated hectares (spha).
- 13,001 kilograms applied (100% herbicides).

Table 13. The top 5 active ingredients most extensively used on rough grazing in Ireland in 2020, ranked by area treated (spray-hectares).

Active Substance	Treated area (spha)	Basic area treated (ha)	Quantity applied (kg)
MCPA	8,748	8,748	11,687
Clopyralid	1,743	1,743	199
Triclopyr	1,743	1,743	796
Fluroxypyr	771	771	308
Glyphosate	590	590	11

Table 14. The top 5 active ingredients most extensively used on rough grazing in Ireland in 2020, ranked by weight (kg).

Active Substance	Quantity applied (kg)	Treated area (spha)	Basic area treated (ha)
MCPA	11,687	8,748	8,748
Triclopyr	796	1,743	1,743
Fluroxypyr	308	771	771
Clopyralid	199	1,743	1,743
Glyphosate	11	590	590

Pesticide usage on grass reseed

- 77,099 ha of grass reseed in Ireland.
- 91,848 treated hectares (spha).
- 120,856 kilograms applied (100% herbicides).

Table 15. The top 10 active ingredients most extensively used on grass reseed in Ireland in 2020, ranked by area treated (spray-hectares).

Active Substance	Treated area (spha)	Basic area treated (ha)	Quantity applied (kg)
Glyphosate	53,911	53,911	91,386
2,4-DB	15,583	15,272	18,834
Fluroxypyr	12,752	12,752	2,208
MCPA	11,921	11,610	2,649
Clopyralid	9,951	9,951	1,088
Triclopyr	9,457	9,457	3,234
Florasulam	6,092	6,092	21
Aminopyralid	4,190	4,190	251
Tribenuron-methyl	2,046	2,046	10
Mecoprop-P	740	740	28

Table 16. The top 10 active ingredients most extensively used on grass reseed in Ireland in 2020, ranked by weight (kg).

Active Substance	Quantity applied (kg)	Treated area (spha)	Basic area treated (ha)
Glyphosate	91,386	53,911	53,911
2,4-DB	18,834	15,583	15,272
Triclopyr	3,234	9,457	9,457
MCPA	2,649	11,921	11,610
Fluroxypyr	2,208	12,752	12,752
2,4-D	1,123	730	730
Clopyralid	1,088	9,951	9,951
Aminopyralid	251	4,190	4,190
Mecoprop-P	28	740	740
Florasulam	21	6,092	6,092

Pesticide usage on hay and haylage

- 163,855 ha of hay and haylage grown in Ireland.
- 17,663 treated hectares (spha).
- 9,595 kilograms applied (100% herbicides).

Table 17. The top 5 active ingredients most extensively used on hay and haylage in Ireland in 2020, ranked by area treated (spray-hectares).

Active Substance	Treated area (spha)	Basic area treated (ha)	Quantity applied (kg)
Fluroxypyr	8,650	8,650	1,730
Triclopyr	6,732	6,082	1,390
MCPA	6,632	6,632	5,344
Clopyralid	1,730	1,730	195
Mecoprop-P	650	650	936

Table 18. The top 5 active ingredients most extensively used on hay and haylage in Ireland in 2020, ranked by weight (kg).

Active Substance	Quantity applied (kg)	Treated area (spha)	Basic area treated (ha)
MCPA	5,344	6,632	6,632
Fluroxypyr	1,730	8,650	8,650
Triclopyr	1,390	6,732	6,082
Mecoprop-P	936	650	650
Clopyralid	195	1,730	1,730

Pesticide usage on arable silage

2,730 ha of arable silage grown in Ireland.

4,027 treated hectares (spha).

1,751 kilograms applied.

Figure 14. Pesticide usage (spha) on arable silage crops in Ireland, 2020.

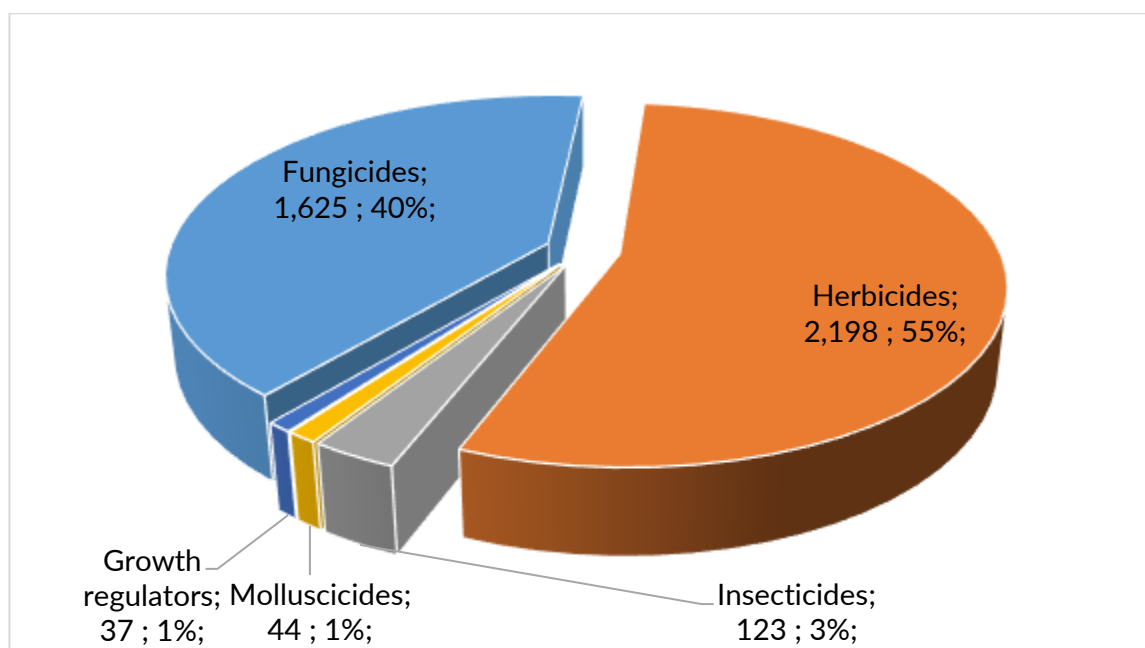


Figure 15. Weight of pesticides (kg) applied to arable silage crops in Ireland, 2020.

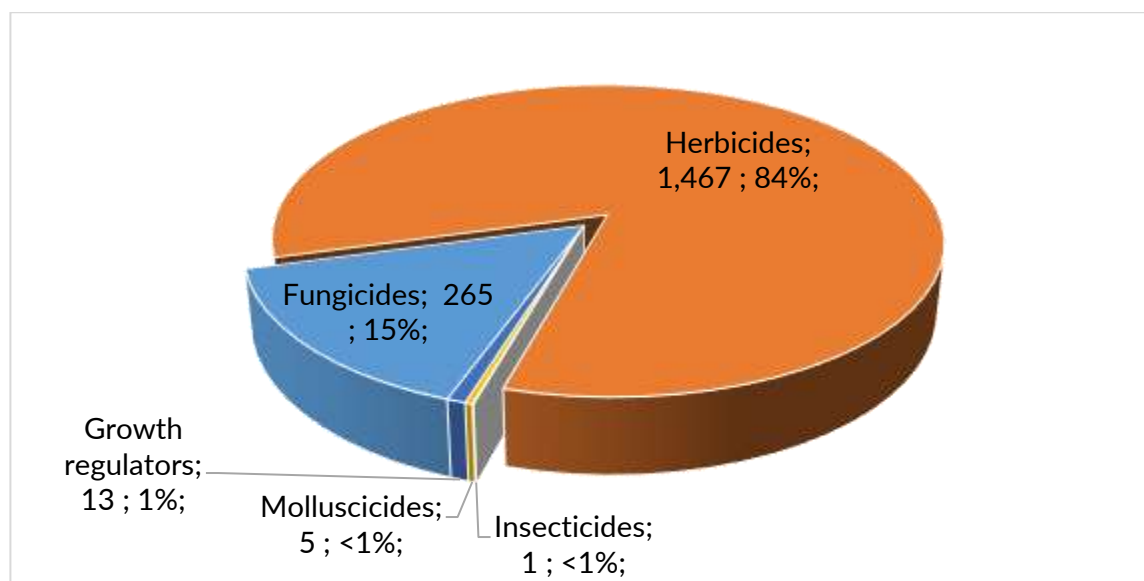


Table 19. The top 10 active ingredients most extensively used on arable silage in Ireland in 2020, ranked by area treated (spray-hectares).

Active Substance	Treated area (spha)	Basic area treated (ha)	Quantity applied (kg)
Glyphosate	709	585	1,065
Fluroxypyr	683	683	128
Chlorothalonil	416	416	90
Epoxiconazole	381	191	24
Metsulfuron-methyl	352	352	2
Azoxystrobin	227	227	28
Pinoxaden	220	220	10
Prothioconazole	183	183	25
Mecoprop-P	172	172	83
Benzovindiflupyr	147	147	11

Table 20. The top 10 active ingredients most extensively used on arable silage in Ireland in 2020, ranked by weight (kg).

Active Substance	Quantity applied (kg)	Treated area (spha)	Basic area treated (ha)
Glyphosate	1,065	709	585
2,4-DB	165	110	110
Fluroxypyr	128	683	683
Chlorothalonil	90	416	416
Mecoprop-P	83	172	172
Penthiopyrad	44	147	147
Proquinazid	29	147	147
Azoxystrobin	28	227	227
Prothioconazole	25	183	183
Epoxiconazole	24	381	191

Pesticide usage on fodder maize

- 14,288 ha of fodder maize grown in Ireland.
- 34,888 treated hectares (spha).
- 35,745 kilograms applied.

Figure 16. Pesticide usage (spha) on fodder maize crops in Ireland, 2020.

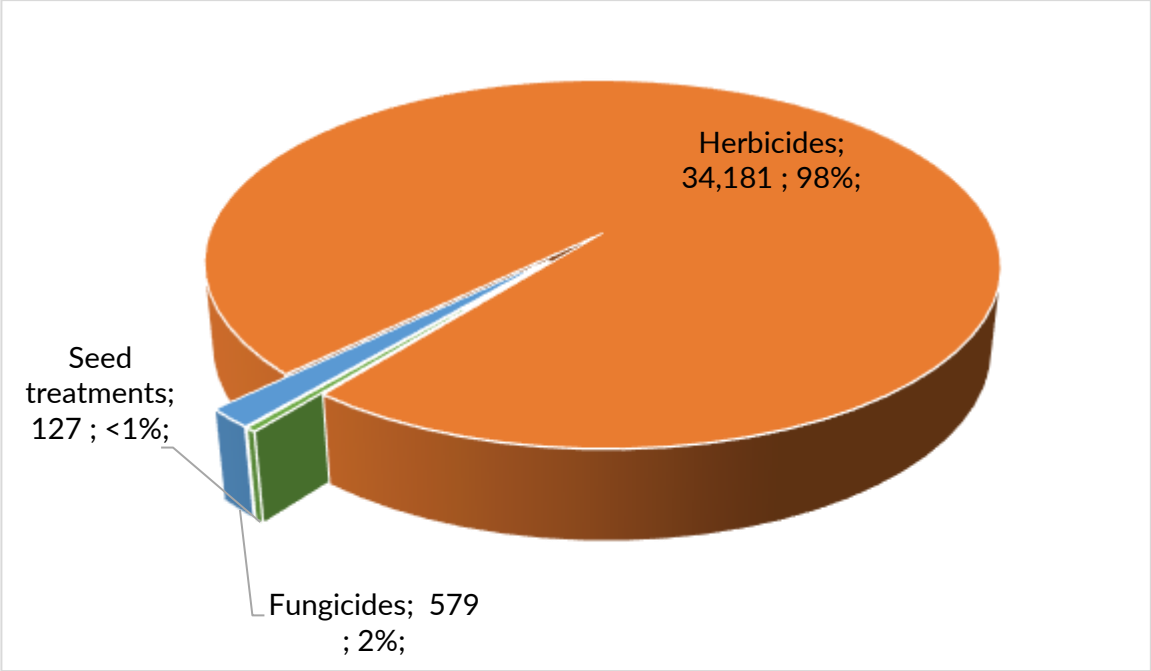


Figure 17. Weight of pesticides (kg) applied to fodder maize crops in Ireland, 2020.

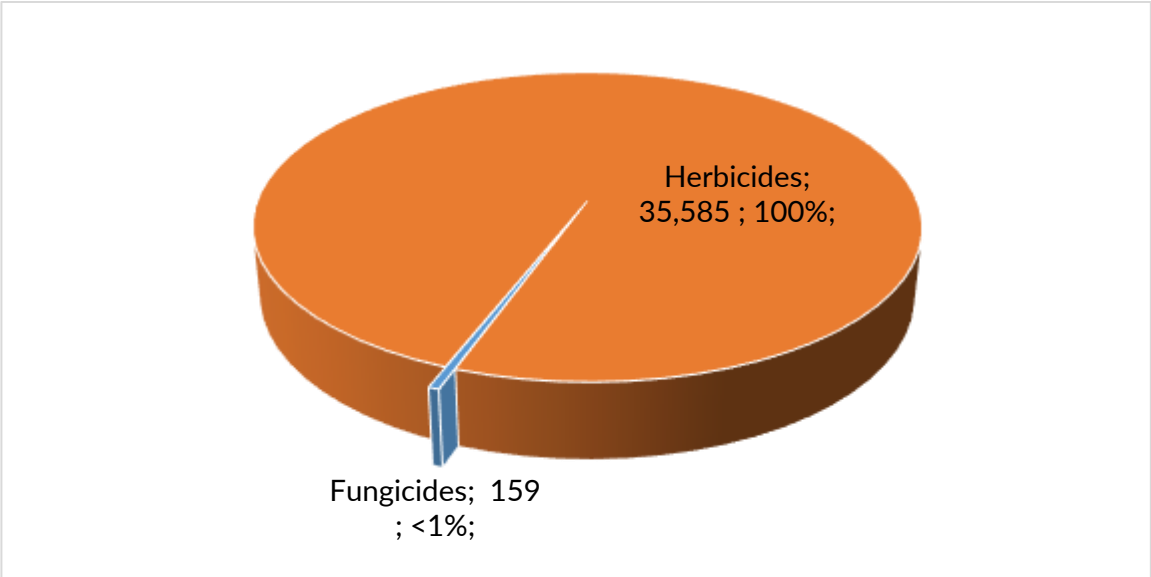


Table 21. The top 10 active ingredients most extensively used on fodder maize in Ireland in 2020, ranked by area treated (spray-hectares).

Active Substance	Treated area (spha)	Basic area treated (ha)	Quantity applied (kg)
Pendimethalin	16,823	10,234	17,920
Mesotrione	7,565	7,072	632
Terbuthylazine	7,565	7,072	2,980
Glyphosate	6,925	6,925	8,287
Dimethenamid-P	6,588	6,588	5,663
Nicosulfuron	2,868	2,868	103
Epoxiconazole	579	579	43
Pyraclostrobin	579	579	116
Metalaxyl	127	127	
Prothioconazole	127	127	

Table 22. The top 10 active ingredients most extensively used on fodder maize in Ireland in 2020, ranked by weight (kg).

Active Substance	Quantity applied (kg)	Treated area (spha)	Basic area treated (ha)
Pendimethalin	17,920	16,823	10,234
Glyphosate	8,287	6,925	6,925
Dimethenamid-P	5,663	6,588	6,588
Terbuthylazine	2,980	7,565	7,072
Mesotrione	632	7,565	7,072
Pyraclostrobin	116	579	579
Nicosulfuron	103	2,868	2,868
Epoxiconazole	43	579	579
Prothioconazole		127	127
Metalaxyl		127	127

Pesticide usage on fodder beet

- 6,507 ha of fodder beet grown in Ireland.
- 40,572 treated hectares (spha).
- 13,170 kilograms applied.

Figure 18. Pesticide usage (spha) on fodder beet grown in Ireland, 2020.

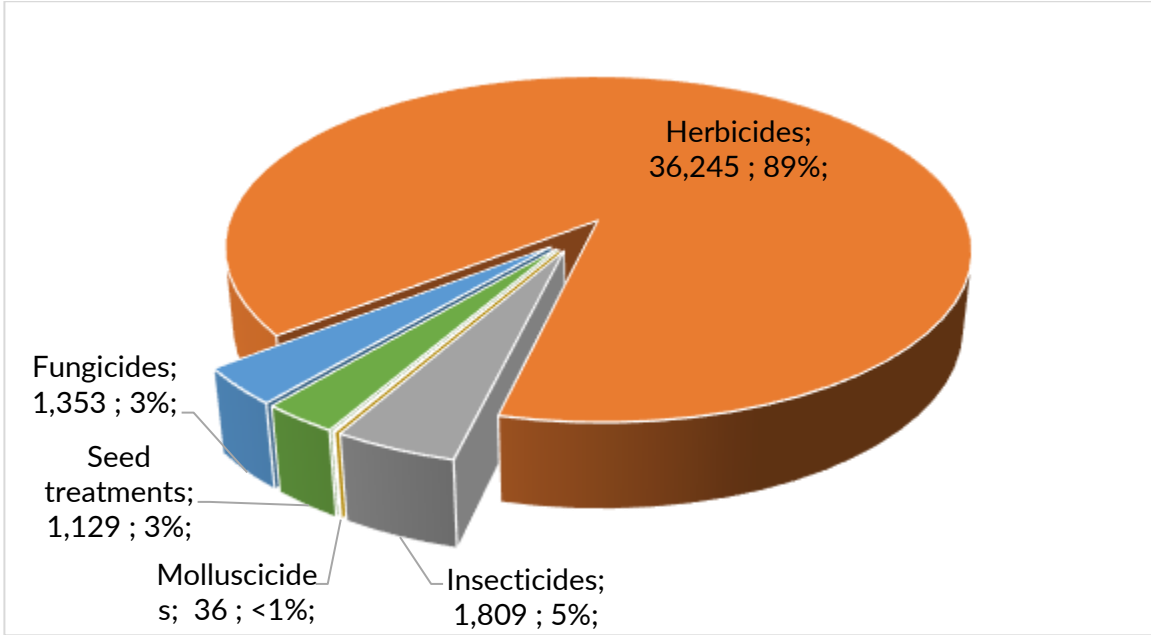


Figure 19. Weight of pesticides (kg) applied to fodder beet crops in Ireland, 2020.

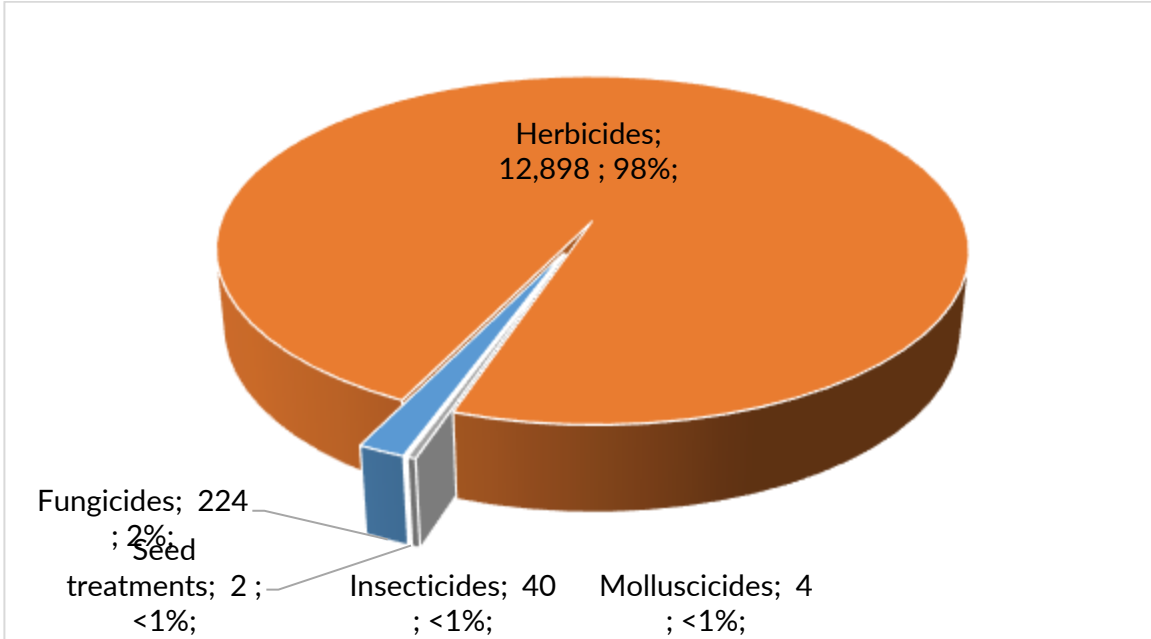


Table 23. The top 10 active ingredients most extensively used on fodder beet in Ireland in 2020, ranked by area treated (spray-hectares).

Active Substance	Treated area (spha)	Basic area treated (ha)	Quantity applied (kg)
Ethofumesate	9,752	5,050	1,869
Phenmedipham	9,273	4,942	869
Lenacil	8,103	4,893	1,438
Metamitron	7,601	5,221	6,047
Desmedipham	5,434	3,557	186
Triflusaluron-methyl	4,804	3,842	72
Glyphosate	1,903	1,903	1,983
Lambda-cyhalothrin	1,654	1,654	13
Clopyralid	1,133	951	63
Tefluthrin	1,129	1,129	2

Table 24. The top 10 active ingredients most extensively used on fodder beet in Ireland in 2020, ranked by weight (kg).

Active Substance	Quantity applied (kg)	Treated area (spha)	Basic area treated (ha)
Metamitron	6,047	7,601	5,221
Glyphosate	1,983	1,903	1,903
Ethofumesate	1,869	9,752	5,050
Lenacil	1,438	8,103	4,893
Phenmedipham	869	9,273	4,942
Desmedipham	186	5,434	3,557
Cycloxydim	143	910	910
Chloridazon	121	248	248
Pyraclostrobin	117	881	881
Triflusaluron-methyl	72	4,804	3,842

Pesticide usage on other fodder crops

- 3,118 ha of other fodder crops grown in Ireland.
- 6,132 treated hectares (spha).
- 3,089 kilograms applied.

Figure 20. Pesticide usage (spha) on other fodder crops grown in Ireland, 2020.

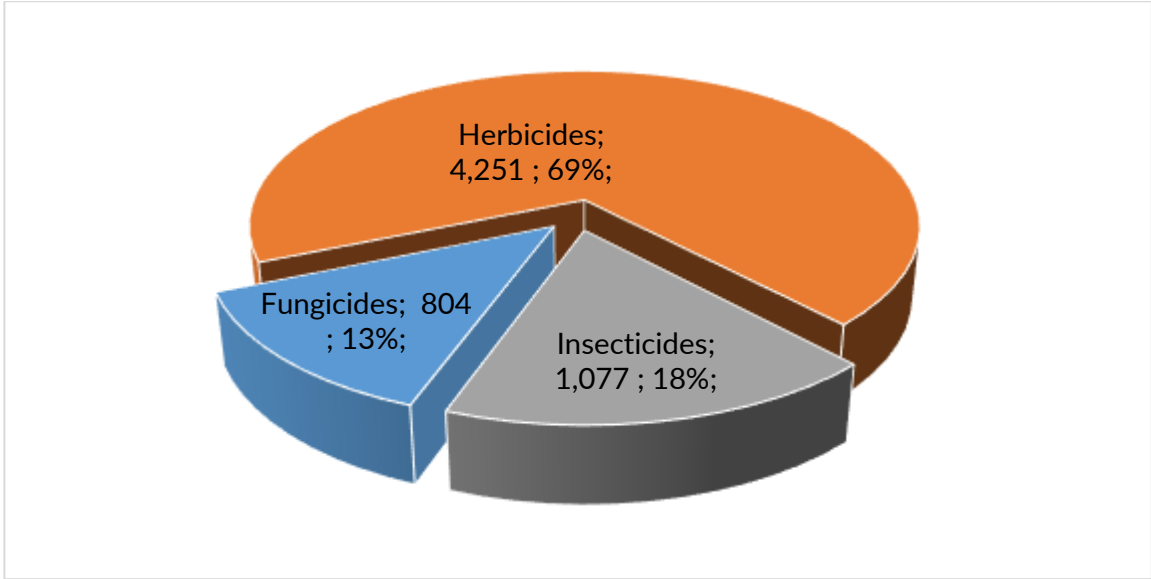


Figure 21. Weight of pesticides (kg) applied to other fodder crops in Ireland, 2020.

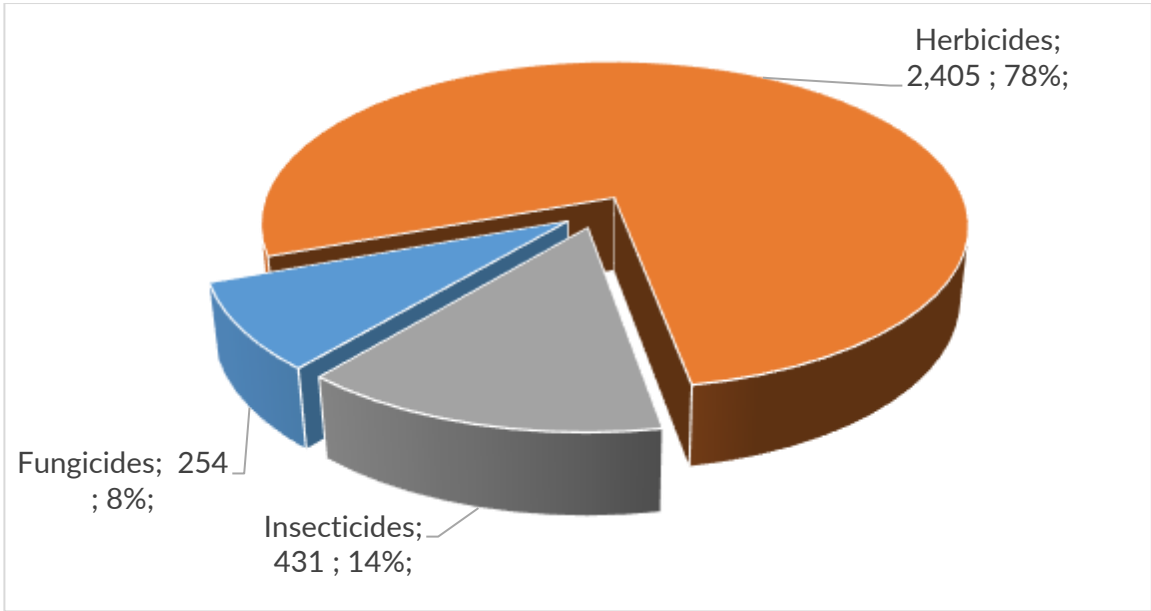


Table 25. The top 7 active ingredients most extensively used on other fodder crops in Ireland in 2020, ranked by area treated (spray-hectares).

Active Substance	Treated area (spha)	Basic area treated (ha)	Quantity applied (kg)
Glyphosate	3,381	2,304	2,337
Dimethoate	1,077	1,077	431
Prothioconazole	804	804	13
Spiroxamine	804	804	241
Thifensulfuron-methyl	804	804	12
Tribenuron-methyl	804	804	12
Metazachlor	67	67	43

Table 26. The top 7 active ingredients most extensively used on other fodder crops in Ireland in 2020, ranked by weight (kg).

Active Substance	Quantity applied (kg)	Treated area (spha)	Basic area treated (ha)
Glyphosate	2,337	3,381	2,304
Dimethoate	431	1,077	1,077
Spiroxamine	241	804	804
Metazachlor	43	67	67
Prothioconazole	13	804	804
Thifensulfuron-methyl	12	804	804
Tribenuron-methyl	12	804	804

Table 27. Estimated area (ha) of grassland and fodder crops grown regionally in Ireland, 2020.

Crop	East	North/West	South	Ireland
Permanent grassland	370,385	1,127,191	1,253,127	2,750,703
Grass silage 1 st cut	195,559	362,765	376,287	934,612
Grass silage 2 nd cut	87,603	116,926	175,883	380,412
Grass silage 3 rd cut	5,986	270	19,448	25,704
Hay and haylage	27,253	56,981	79,620	163,855
Rough grazing	10,427	379,620	118,678	508,726
Grass reseed	22,871	19,195	35,033	77,099
Arable silage	470	1,067	1,192	2,730
Fodder maize	5,562	467	8,259	14,288
Fodder beet	3,620	382	2,504	6,507
Other fodder crops	697	271	2,150	3,118
Total	730,436	2,065,136	2,072,182	4,867,754

Table 28. Estimated area (spray-hectares) of grassland and fodder crops treated regionally with each pesticide type in Ireland, 2020.

Pesticide Type	Region			
	East	North/West	South	Ireland
Fungicides	1,146	1,305	1,910	4,362
Herbicides	115,765	324,992	291,084	731,842
Insecticides	1,295		1,714	3,009
Molluscicides	80			80
Growth regulators		37		37
Seed treatments	1,129	127		1,257
Total	119,416	326,462	294,709	740,586

Table 29. Estimated weight (kg) applied to grassland and fodder crops regionally with each pesticide type in Ireland, 2020.

Pesticide Type	Region			
	East	North/West	South	Ireland
Fungicides	164	170	568	902
Herbicides	78,920	354,845	210,905	644,670
Insecticides	37		435	472
Molluscicides	10			10
Growth regulators		13		13
Seed treatments	2			2
Total	79,132	355,029	211,909	646,069

Table 30. The total area (spray hectares) and the basic area (hectares), of grassland and fodder crops in Ireland 2020 treated with each pesticide type.

Pesticide Type															
	Fungicides		Herbicides		Insecticides		Molluscicides		Growth regulators		Seed treatments		Total	All Pesticides	
Crop type	(sp ha)	(ha)	(sp ha)	(ha)	(sp ha)	(ha)	(sp ha)	(ha)	(sp ha)	(ha)	(sp ha)	(ha)	(sp ha)	(ha) treated	(ha) grown
Permanent grassland			348,639	318,729									348,639	318,729	2,750,703
Grass silage 1 st cut			162,671	153,938									162,671	153,938	934,612
Grass silage 2 nd cut			22,295	22,295									22,295	22,295	380,412
Grass silage 3 rd cut															25,704
Hay and haylage			17,663	16,363									17,663	16,363	163,855
Rough grazing			11,851	11,851									11,851	11,851	508,726
Grass reseed			91,848	55,122									91,848	55,122	77,099
Arable silage	1,625	790	2,198	1,330	123	123	44	44	37	37			4,027	1,529	2,730
Fodder maize	579	579	34,181	13,232							127	127	34,888	13,232	14,288
Fodder beet	1,353	1,353	36,245	5,490	1,809	1,809	36	36			1,129	1,129	40,572	6,135	6,507
Other fodder crops	804	804	4,251	2,370	1,077	1,077							6,132	2,370	3,118
Total	4,362	3,526	731,842	600,720	3,009	3,009	80	80	37	37	1,257	1,257	740,586	601,565	4,867,754

Table 31. The total quantities (kilograms) of each pesticide type used on grassland and fodder crops in Ireland 2020.

Crop	Pesticide Type						Total weight applied (kg)
	Fungicides	Herbicides	Insecticides	Molluscicides	Growth regulators	Seed treatments	
Permanent grassland		343,576					343,576
Grass silage 1 st cut		96,504					96,504
Grass silage 2 nd cut		8,784					8,784
Hay and haylage		9,595					9,595
Rough grazing		13,001					13,001
Grass reseed		120,856					120,856
Arable silage	265	1,467	1	5	13		1,751
Fodder maize	159	35,585				0	35,745
Fodder beet	224	12,898	40	4		2	13,170
Other fodder crops	254	2,405	431				3,089
Total	902	644,670	472	10	13	2	646,069

Table 32. The total quantities (kilograms) of each pesticide type used on grassland and fodder crops in Ireland 2020.

Pesticide type and formulation	Crop										Total
	Permanent grassland	Grass silage 1 st cut	Grass silage 2 nd cut	Hay and haylage	Rough grazing	Grass reseed	Arable silage	Fodder maize	Fodder beet	Other fodder Crops	
Fungicides											
Azoxystrobin							227				227
Benzovindiflupyr/prothioconazole							147				147
Boscalid/epoxiconazole									155		155
Chlorothalonil							291				291
Chlorothalonil/flusilazole							124				124
Epoxiconazole							381				381
Epoxiconazole/pyraclostrobin								579	881		1,460
Hymexazol									317		317
Penthiopyrad							147				147
Proquinazid							147				147
Prothioconazole							37				37
Prothioconazole/spiroxamine										804	804
Pyraclostrobin							124				124
All fungicides							1,625	579	1,353	804	4,362

Table 33. Estimated area (spray-hectares) of grassland and fodder crops treated with pesticide formulations in Ireland, 2020.

Pesticide type and formulation	Crop										Total
	Permanent grassland	Grass silage 1 st cut	Grass silage 2 nd cut	Hay and haylage	Rough grazing	Grass reseed	Arable silage	Fodder maize	Fodder beet	Other fodder Crops	
Herbicides											
2,4-D	5,228	3,009				674					8,911
2,4-D/dicamba	3,922	13									3,936
2,4-D/dicamba/triclopyr		7,239				56					7,296
2,4-D/MCPA	851	1,842									2,693
2,4-DB						2,922					2,922
2,4-DB/MCPA	1,350					11,921	62				13,334
2,4-DB/mecoprop-P						740	48				787
Amidosulfuron	2,586	5,455	608			412					9,060
Aminopyralid/triclopyr	15,461	20,231	1,423			4,190					41,304
Asulam	5,624										5,624
Chloridazon									248		248
Clethodim									231		231
Clopyralid						843			1,004		1,846
Clopyralid/florasulam									130		130
Clopyralid/florasulam/fluroxypyr	4,853		2,970			5,680					13,504
Clopyralid/fluroxypyr/triclopyr		878				2,046					2,924
Clopyralid/triclopyr	49,132	8,194	386	1,730	1,743	1,382					62,567
Cycloxydim									910		910
Desmedipham/ethofumesate/lenacil/phenmedipham									2,128		2,128
Desmedipham/ethofumesate/phenmedipham									3,306		3,306
Dicamba/MCPA/mecoprop-P	3,397										3,397
Dicamba/mecoprop-P	1,699										1,699
Dimethenamid-P/pendimethalin								6,588			6,588
Ethofumesate									2,654		2,654
Ethofumesate/phenmedipham									1,664		1,664
Florasulam/fluroxypyr						412					412
Fluroxypyr	19,439	21,060	7,552	3,649	771	2,831	683				55,984
Fluroxypyr/triclopyr	46,037	66,196	9,345	5,001		1,783					128,363
Glyphosate	86,941	11,668			590	53,911	709	6,925	1,903	3,381	166,027
Lenacil									5,975		5,975
MCPA	100,384	14,782	12	6,632	8,748						130,559
Mecoprop-P		2,104		650			124				2,879

Mesotrione/terbuthylazine								7,565			7,565
Metamitron									7,446		7,446
Metamitron/quinmerac									155		155
Metazachlor	1,734									67	1,801
Metsulfuron-methyl							227				227
Metsulfuron-methyl/tribenuron-methyl							124				124
Nicosulfuron								2,868			2,868
Pendimethalin								10,234			10,234
Phenmedipham									2,175		2,175
Pinoxaden							220				220
Propaquizafop									810		810
Thifensulfuron-methyl/tribenuron-methyl										804	804
Tribenuron-methyl						2,046					2,046
Triflusalufuron									704		704
Triflusalufuron-methyl									4,804		4,804
All herbicides	348,639	162,671	22,295	17,663	11,851	91,848	2,198	34,181	36,245	4,251	731,842

Table 34. Estimated area (spray-hectares) of grassland and fodder crops treated with pesticide formulations in Ireland, 2020.

Pesticide type and formulation	Crop										Total
	Permanent grassland	Grass silage 1 st cut	Grass silage 2 nd cut	Hay and haylage	Rough grazing	Grass reseed	Arable silage	Fodder maize	Fodder beet	Other fodder Crops	
Insecticides											
Dimethoate									155	1,077	1,232
Lambda-cyhalothrin							123		1,654		1,777
All insecticides							123		1,809	1,077	3,009

Table 35. Estimated area (spray-hectares) of grassland and fodder crops treated with pesticide formulations in Ireland, 2020.

Pesticide type and formulation	Crop										All crops
	Permanent grassland	Grass silage 1 st cut	Grass silage 2 nd cut	Rough grazing	Grass reseed	Hay and haylage	Arable silage	Fodder maize	Fodder beet	Other fodder crops	
Molluscicides											
Metaldehyde							44		36		80
All molluscicides							44		36		80

Table 36. Estimated area (spray-hectares) of grassland and fodder crops treated with pesticide formulations in Ireland, 2020.

Pesticide type and formulation	Crop										
	Permanent grassland	Grass silage 1 st cut	Grass silage 2 nd cut	Rough grazing	Grass reseed	Hay and haylage	Arable silage	Fodder maize	Fodder beet	Other fodder crops	All crops
Growth regulators											
Chlormequat							37				37
All growth regulators							37				37

Table 37. Estimated area (spray-hectares) of grassland and fodder crops treated with pesticide formulations in Ireland, 2020.

Pesticide type and formulation	Crop										
	Permanent grassland	Grass silage 1 st cut	Grass silage 2 nd cut	Rough grazing	Grass reseed	Hay and haylage	Arable silage	Fodder maize	Fodder beet	Other fodder crops	All crops
Seed treatments											
Metalaxyl/prothioconazole								127			127
Tefluthrin									1,129		1,129
All seed treatments								127	1,129		1,257

Table 38. Estimated total area (spray-hectares) of grassland and fodder crops treated with pesticide formulations in Ireland, 2020.

Pesticide type and formulation	Crop										
	Permanent grassland	Grass silage 1 st cut	Grass silage 2 nd cut	Rough grazing	Grass reseed	Hay and haylage	Arable silage	Fodder maize	Fodder beet	Other fodder crops	All crops
All pesticides	348,639	162,671	22,295	17,663	11,851	91,848	4,027	34,888	40,572	6,132	740,586

Table 39. The 40 active ingredients most extensively used on grassland and fodder crops in Ireland in 2020, ranked by area treated (spray-hectares).

No.	Active Ingredient	Treated area (sp ha)
1	Triclopyr	242,453
2	Fluroxypyr	201,186
3	Glyphosate	166,027
4	MCPA	149,983
5	Clopyralid	80,971
6	Aminopyralid	41,304
7	2,4-D	22,835
8	2,4-DB	17,043
9	Pendimethalin	16,823
10	Dicamba	16,327
11	Florasulam	14,046
12	Ethofumesate	9,752
13	Phenmedipham	9,273
14	Amidosulfuron	9,060
15	Mecoprop-P	8,761
16	Lenacil	8,103
17	Metamitron	7,601
18	Terbuthylazine	7,565
19	Mesotrione	7,565
20	Dimethenamid-P	6,588
21	Asulam	5,624
22	Desmedipham	5,434
23	Triflusalufuron-methyl	4,804
24	Tribenuron-methyl	2,974
25	Nicosulfuron	2,868
26	Epoxiconazole	1,997
27	Metazachlor	1,801
28	Lambda-cyhalothrin	1,777
29	Pyraclostrobin	1,585
30	Dimethoate	1,232
31	Prothioconazole	987
32	Cycloxydim	910
33	Propaquizafop	810
34	Spiroxamine	804
35	Thifensulfuron-methyl	804
36	Triflusalufuron	704
37	Chlorothalonil	416
38	Metsulfuron-methyl	352
39	Hymexazol	317
40	Chloridazon	248

Table 40. The 40 active ingredients most extensively used on grassland and fodder crops in Ireland in 2020, ranked by weight (kilograms).

No.	Active Ingredient	Quantity (kgs)
1	Glyphosate	229,508
2	MCPA	194,065
3	Triclopyr	62,946
4	Fluroxypyr	46,226
5	2,4-D	22,003
6	2,4-DB	20,584
7	Pendimethalin	17,920
8	Asulam	12,056
9	Clopyralid	7,530
10	Metamitron	6,047
11	Dimethenamid-P	5,663
12	Mecoprop-P	5,249
13	Terbuthylazine	2,980
14	Dicamba	2,644
15	Aminopyralid	2,375
16	Ethofumesate	1,869
17	Lenacil	1,438
18	Metazachlor	910
19	Phenmedipham	869
20	Mesotrione	632
21	Dimethoate	458
22	Amidosulfuron	330
23	Pyraclostrobin	242
24	Spiroxamine	241
25	Desmedipham	186
26	Cycloxydim	143
27	Chloridazon	121
28	Epoxiconazole	115
29	Nicosulfuron	103
30	Chlorothalonil	90
31	Triflurosulfuron-methyl	72
32	Propaquizafop	69
33	Florasulam	47
34	Hymexazol	44
35	Penthiopyrad	44
36	Prothioconazole	38
37	Proquinazid	29
38	Azoxystrobin	28
39	Clethodim	28
40	Tribenuron-methyl	23

Table 41. Estimated quantity (kg), spray area (spha) and basic area (ha) of active substance for permanent grassland, 2020.

Crop	Active Ingredient	Quantity (kg) applied	Treated area (spha)	Basic area (ha) treated
Permanent grassland	Herbicides			
	2,4-D	12,737	10,002	10,002
	2,4-DB	1,584	1,350	1,350
	Amidosulfuron	89	2,586	2,586
	Aminopyralid	841	15,461	15,323
	Asulam	12,056	5,624	5,624
	Clopyralid	4,809	53,986	53,312
	Dicamba	1,405	9,018	9,018
	Florasulam	18	4,854	4,854
	Fluroxypyr	14,780	70,329	70,329
	Glyphosate	110,426	86,941	86,585
	MCPA	154,549	105,983	105,036
	Mecoprop-P	1,172	5,096	5,096
	Metazachlor	867	1,734	1,734
	Triclopyr	28,241	110,631	109,145

Table 42. Estimated quantity (kg), spray area (spha) and basic area (ha) of active substance for grass silage 1st cut, 2020.

Crop	Active Ingredient	Quantity (kg) applied	Treated area (spha)	Basic area (ha) treated
Grass silage 1 st cut	Herbicides			
	2,4-D	8,142	12,104	12,104
	Amidosulfuron	205	5,455	5,455
	Aminopyralid	1,204	20,231	20,231
	Clopyralid	916	9,072	9,072
	Dicamba	1,234	7,253	7,253
	Fluroxypyr	21,606	88,133	88,133
	Glyphosate	14,013	11,668	11,668
	MCPA	19,810	16,624	16,624
	Mecoprop-P	3,030	2,104	2,104
	Triclopyr	26,345	102,738	100,633

Table 43. Estimated quantity (kg), spray area (spha) and basic area (ha) of active substance for grass silage 2nd cut, 2020.

Crop	Active Ingredient	Quantity (kg) applied	Treated area (spha)	Basic area (ha) treated
Grass silage 2 nd cut	Herbicides			
	Amidosulfuron	18	608	608
	Aminopyralid	79	1,423	1,423
	Clopyralid	261	3,356	3,356
	Florasulam	7	2,970	2,970
	Fluroxypyr	5,467	19,867	19,867
	MCPA	12	12	12
	Triclopyr	2,940	11,154	11,154

Table 44. Estimated quantity (kg), spray area (spha) and basic area (ha) of active substance for rough grazing, 2020.

Crop	Active Ingredient	Quantity (kg) applied	Treated area (spha)	Basic area (ha) treated
Rough grazing	Herbicides			
	Clopyralid	199	1,743	1,743
	Fluroxypyr	308	771	771
	Glyphosate	11	590	590
	MCPA	11,687	8,748	8,748
	Triclopyr	796	1,743	1,743

Table 45. Estimated quantity (kg), spray area (spha) and basic area (ha) of active substance for grass reseed, 2020.

Crop	Active Ingredient	Quantity (kg) applied	Treated area (spha)	Basic area (ha) treated
Grass reseed	Herbicides			
	2,4-D	1,123	730	730
	2,4-DB	18,834	15,583	15,272
	Amidosulfuron	19	412	412
	Aminopyralid	251	4,190	4,190
	Clopyralid	1,088	9,951	9,951
	Dicamba	5	56	56
	Florasulam	21	6,092	6,092
	Fluroxypyr	2,208	12,752	12,752
	Glyphosate	91,386	53,911	53,911
	MCPA	2,649	11,921	11,610
	Mecoprop-P	28	740	740
	Tribenuron-methyl	10	2,046	2,046
	Triclopyr	3,234	9,457	9,457

Table 46. Estimated quantity (kg), spray area (spha) and basic area (ha) of active substance for hay and haylage, 2020.

Crop	Active Ingredient	Quantity (kg) applied	Treated area (spha)	Basic area (ha) treated
Hay and haylage	Herbicides			
	Clopyralid	195	1,730	1,730
	Fluroxypyr	1,730	8,650	8,650
	MCPA	5,344	6,632	6,632
	Mecoprop-P	936	650	650
	Triclopyr	1,390	6,732	6,082

Table 47. Estimated quantity (kg), spray area (spha) and basic area (ha) of active substance for arable silage, 2020.

Crop	Active Ingredient	Quantity (kg) applied	Treated area (spha)	Basic area (ha) treated
Arable silage	Fungicides			
	Azoxystrobin	28	227	227
	Benzovindiflupyr	11	147	147
	Chlorothalonil	90	416	416
	Epoxiconazole	24	381	191
	Flusilazole	4	124	124
	Penthiopyrad	44	147	147
	Proquinazid	29	147	147
	Prothioconazole	25	183	183
	Pyraclostrobin	9	124	124
	Herbicides			
	2,4-DB	165	110	110
	Fluroxypyr	128	683	683
	Glyphosate	1,065	709	585
	MCPA	14	62	62
	Mecoprop-P	83	172	172
	Metsulfuron-methyl	2	352	352
	Pinoxaden	10	220	220
	Tribenuron-methyl	0	124	124
	Growth regulators			
	Chlormequat	13	37	37
	Insecticides			
	Lambda-cyhalothrin	1	123	123
	Molluscicides			
	Metaldehyde	5	44	44

Table 48. Estimated quantity (kg), spray area (spha) and basic area (ha) of active substance for fodder maize, 2020.

Crop	Active Ingredient	Quantity (kg) applied	Treated area (spha)	Basic area (ha) treated
Fodder maize	Fungicides			
	Epoxiconazole	43	579	579
	Prothioconazole	0	127	127
	Pyraclostrobin	116	579	579
	Herbicides			
	Dimethenamid-P	5,663	6,588	6,588
	Glyphosate	8,287	6,925	6,925
	Mesotrione	632	7,565	7,072
	Pendimethalin	17,920	16,823	10,234
	Terbuthylazine	2,980	7,565	7,072
	Nicosulfuron	103	2,868	2,868
	Seed treatments			
	Metalaxyl	0	127	127

Table 49. Estimated quantity (kg), spray area (spha) and basic area (ha) of active substance for fodder beet, 2020.

Crop	Active Ingredient	Quantity (kg) applied	Treated area (spha)	Basic area (ha) treated
Arable Silage	Fungicides			
	Boscalid	14	155	155
	Epoxiconazole	48	1,036	1,036
	Hymexazol	44	317	317
	Pyraclostrobin	117	881	881
	Herbicides			
	Chloridazon	121	248	248
	Clethodim	28	231	231
	Clopyralid	63	1,133	951
	Cycloxydim	143	910	910
	Desmedipham	186	5,434	3,557
	Ethofumesate	1,869	9,752	5,050
	Florasulam	1	130	130
	Glyphosate	1,983	1,903	1,903
	Lenacil	1,438	8,103	4,893
	Metamitron	6,047	7,601	5,221
	Phenmedipham	869	9,273	4,942
	Propaquizafop	69	810	810
	Quinmerac	0	155	155
	Triflusalufuron	11	704	704
	Triflusalufuron-methyl	72	4,804	3,842
	Insecticides			
	Dimethoate	27	155	155
	Lambda-cyhalothrin	13	1,654	1,654
	Molluscicides			
	Metaldehyde	4	36	36
	Seed treatments			
	Tefluthrin	2	1,129	1,129

Table 50. Estimated quantity (kg), spray area (spha) and basic area (ha) of active substance for other fodder crops, 2020.

Crop	Active Ingredient	Quantity (kg) applied	Treated area (spha)	Basic area (ha) treated
Other fodder crops	Fungicides			
	Spiroxamine	241	804	804
	Herbicides			
	Glyphosate	2,337	3,381	2,304
	Metazachlor	43	67	67
	Prothioconazole	13	804	804
	Thifensulfuron-methyl	12	804	804
	Tribenuron-methyl	12	804	804
	Insecticides			
	Dimethoate	431	1,077	1,077

Acknowledgements

This report was compiled by James Quirke and Angela Ryan, DAFM, with special thanks to James for his assistance and valuable contribution. Sincere thanks to the invaluable assistance from the team in AFBI of Michael Lavery, Joanna Kirbas, David Matthews, Trudyann Kelly and Amanda Browne. Thanks to all the survey participants who co-operated willingly with the survey and provided the detailed information needed to compile this report. Data collection for the survey was carried out by staff of the Agricultural Environment and Structures (AES) Division of the Department of Agriculture, Food and the Marine. Interviews with survey participants were conducted by Barry McDonnell, Neil O' Brien, Gemma Creane, Una McDonnell, Emma Duffy, Michael McManus, Mark Freeman, Jimmy Callaghan and Richenda Delahunty, James Quirke and Angela Ryan.

References

Pesticide Control Service, Department of Agriculture and Food Laboratories (2006).

Pesticide Usage Survey, Report Number 1, Grassland and fodder crops, 2003.

Pesticide Control Service, Department of Agriculture and Food Laboratories (2016).

Pesticide Usage Survey, Report Number 6, Grassland and fodder Crops, 2013.

Pesticide Control Service, Department of Agriculture and Food Laboratories (2020).

Pesticide Usage Survey, Report Number 11, Grassland and fodder Crops, 2017.