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PESTICIDE USAGE SURVEY REPORT 258

NORTHERN IRELAND

GRASSLAND & FODDER CROPS

2013

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The County Regions of Northern Ireland



SUMMARY

This is the seventh survey examining pesticide usage practices on grassland and fodder crops in Northern Ireland, providing data comparative to that obtained from previous surveys in 1989 (Jess *et al.*, 1992), 1993 (Jess *et al.*, 1995), 1997 (Jess *et al.*, 2000), 2003 (Withers *et al.*, 2005), 2005 (Withers *et al.*, 2007) and 2009 (Withers *et al.*, 2010). In this survey, information on all aspects of pesticide usage was collected from 235 enclosed grazing, 56 arable silage, 11 fodder maize and 18 other fodder crop holdings throughout the province, representing 1.9% of the total area of grassland and fodder crops grown. Quantitative data obtained were adjusted to provide estimates of total pesticide usage.

Overall, the area of grassland and fodder crops grown in 2013, 1,302,730 ha, increased by 14% when compared to 2009. The area of established grassland crops also increased by 14% throughout this period. The area of sown crops increased by 38% mainly due to the increase of grass reseeds. The area of fodder crops grown in Northern Ireland in 2013 decreased by 40% compared to that recorded in 2009. This was principally due to the decrease in fodder maize production. A fourth cut of silage was recorded for the first time in 2005 and this recurred in 2009. During 2013 the area of fourth cut silage increased by over five fold when compared to 2009.

The area of grassland and fodder crops receiving pesticide treatment, increased by 21% when compared to that recorded in 2009. A total of 87 tonnes of pesticide was applied to 123,354 spray hectares of grassland and fodder crops during 2009. This represented a 16% increase in the weight of pesticides applied compared to 2009. A total of 118 products comprising 78 active substances were recorded in use during this survey. Herbicides accounted for 78% of the pesticide-treated area, representing 85% of the weight of pesticides applied. Insecticides accounted for 12% of both the treated area and the weight of active ingredients applied. This was a five-fold increase in insecticide use compared with 2009. The weight of insecticide active substances applied increased from 176kg to 10,375kg. This was principally due to increased chlorpyrifos applications to first cut silage to control leatherjackets, although enclosed and rough grazing also received increased applications. Fungicides, growth regulators and seed treatments collectively accounted for the remainder of the total pesticide usage and were exclusively applied to arable silage crops and the nurse crop in undersown arable silage crops. No molluscicide use was recorded during this survey.

The area of established grassland crops treated with pesticides increased by 44% when compared to the 2009 survey. This was mainly due to increased areas of grass silage grown and

subsequent treatment for leatherjackets and docks (*Rumex* spp.). Correspondingly, the weight of active substance applied to established grassland crops increased by 35%. Pesticide usage on sown grassland crops increased by 16% when compared with 2009. However, the weight of active substances applied decreased by 10%. This was mainly due to the increased area of arable silage grown and grass reseeds together with decreased application rates. The reduction in the area of fodder crops sown is mainly attributed to the 44% reduction in fodder maize crop production. However, other fodder crops reduced by 25% when compared to 2009. The pesticide-treated area of fodder crops decreased by 59% from 16,703 spray hectares (spha) to 7,040 spha and the weight of active substances applied decreased by 40%.

In keeping with data from previous years, herbicides remained the most extensively used pesticide type on grassland and fodder crops. The use of herbicides decreased by 21% between 2003 and 2005. This trend continued between 2005 and 2009, showing a 32% reduction. When comparing 2013 with 2009 there was a 2% increase in the weight of active substances applied. However, there was a 20% increase in the area treated. The formulation of fluroxypyr/triclopyr remained the most frequently-used herbicide, principally applied to the first-cut of grass silage to control docks (*Rumex* spp.).

DEFINITIONS AND NOTES

‘Basic area’. This refers to the actual planted area of crop which was treated with a given pesticide.

‘Treated area’. This refers to the total area treated with a pesticide, which includes all repeated applications to the basic area. This is measured in ‘spray-hectares’ (spha).

‘Reasons for use’. This refers to the perceived reasons reported by the farmer for the use of a particular pesticide. These reasons may sometimes be inappropriate.

‘Rounding’. Due to rounding of figures there may be slight differences in totals both within and between tables.

‘Spray applications’. This refers to the number of treatments of any pesticide type applied to the treated areas.

‘General weed control’. This refers to post emergence weed control.

‘Ground preparation’. This refers to treatments applied before or during seed bed preparation.

‘Sealer’. This refers to the application of herbicides to the crop, usually during sowing, to kill weed seedlings as they emerge.

‘Grass silage’. Prior to 1997, the survey areas of grass silage from multiple cuts were reported as a single crop. However, in keeping with 1997, 2003 and 2005 the 2009 survey areas and pesticide treatments on individual cuts of silage were recorded separately.

‘Rough grazing’. Is defined as land containing semi-natural vegetation including heathland, heather moorland, bog and rough grassland suitable only for use as grazing.

‘Enclosed grazing’. Is defined as land which has been improved by management practices such as liming, top dressing and fencing etc., where there is not a significant presence of sensitive plant species, and which could be cultivated for other purposes.

‘Arable silage’. Is defined as arable crops, particularly cereals, which has been ensiled whole and has not been combined for grain.

‘Arable silage (undersown)’. Is defined as an arable crop grown as a nurse crop for a green cover crop, such as ryegrass, and which has been ensiled rather than combined for grain.

‘Cereals (undersown)’. Are defined as cereal crops which have been grown as a nurse crop for a green cover crop, such as ryegrass, and which has been combined for grain.

‘Other fodder crops’ comprised fodder beet, fodder kale, fodder rape, fodder swede and fodder turnip. These were grouped together for statistical purposes.

INTRODUCTION

As a participant of the UK Working Party on Pesticide Usage Surveys, and on behalf of the Department of Agriculture and Rural Development (DARD), the Agri-food and Biosciences Institute conducts a cyclical programme of surveys to examine pesticide usage in all sectors of the agricultural and horticultural industries. Principally, the data collected provides information for consideration by the Advisory Committee on Pesticides. However, pesticide usage data may also be used by those involved in residue testing, for public information, for provision of data for research and for evaluation of trends in pesticide usage.

This is the seventh survey of pesticide usage on grassland and fodder crops in Northern Ireland. The previous surveys of this sector were conducted in 1989 (Jess *et al.*, 1992), 1993 (Jess *et al.*, 1995), 1997 (Jess *et al.*, 2000), 2003 (Withers *et al.*, 2005), 2005 (Withers *et al.*, 2007) and 2009 (Withers *et al.*, 2010), data from which are included in this report for comparative purposes.

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

METHODS

The sample of holdings to be surveyed was selected from each of the six counties on the basis of the total area of enclosed grassland grown. To ensure adequate coverage of different fodder crops and to accurately assess total usage for fodder crops, separate samples were selected for farms that grew arable silage, fodder maize and other fodder crops. The Northern Ireland Agricultural Census, June 2012 (Anon., 2013) was used for this purpose.

In each region the sample holdings was stratified into six size groups according to the total area of enclosed grassland. Holdings were selected at random from within each size group with the number of holdings selected proportional to the total area of enclosed grassland in the size group as a. Samples of holdings for arable silage, fodder maize and other fodder crops were selected from defined populations of fodder crop growers using separate area size groups, with the number of holdings selected being proportional to the total area of fodder crops.

The purpose of the survey was explained to the occupiers of the selected holdings in preliminary correspondence. A total of 235 enclosed grazing, 56 arable silage, 11 fodder maize and 18 other fodder crop holdings were surveyed by either telephone or personal interview from October 2013 - January 2014. The data collected included the area of crops grown, area treated, target crop, pesticides used and the number of treatments applied. The growers' given reasons for pesticide use, including inappropriate usage, were also recorded. Holdings selected in the

original sample that were unable to provide data were replaced with those from the same region and size group held on a reserve list. During analysis, the sample data were raised to the total population level using raising factors calculated from the ratio of the number of farms sampled to the number of farms in the population within each region and size group. A further adjustment factor corrected the data in accordance with the areas of grassland and fodder crops published in the Northern Ireland Agricultural Census, June 2013 (Anon., 2014). The total number of farms in each size group and the number of farms sampled are shown in Tables 1a - d.

The collected data were entered into an Oracle relational database programme. Validated data were downloaded for analysis using SPSS software.

Crops:

Information was collected for enclosed grazing, grass silage, hay and haylage, rough grazing, sown crops and fodder crops. Data for pesticide usage on these crops were collected from 1,175 crops surveyed on 235 enclosed grassland, 56 arable crop silage, 11 maize crop and 18 other fodder crop holdings. This accounted for 1.9% of crops (Table 2).

Figure 1: Regional distribution of grassland and fodder crops grown in Northern Ireland (ha), 2013.

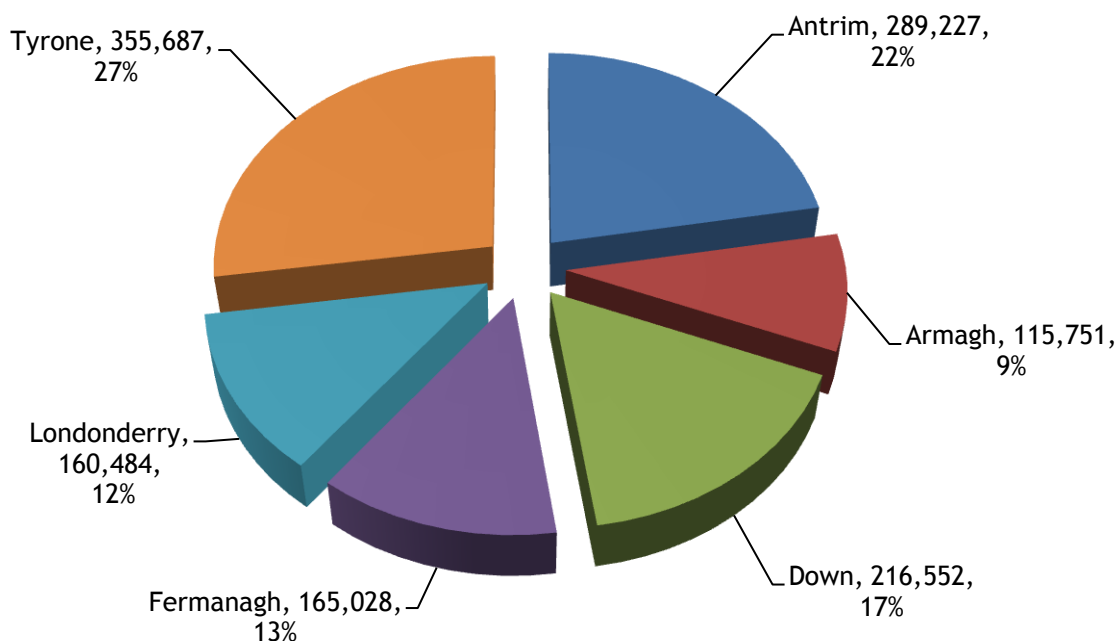


Figure 2: Regional distribution of individual grassland and fodder crops grown in Northern Ireland (ha), 2013.

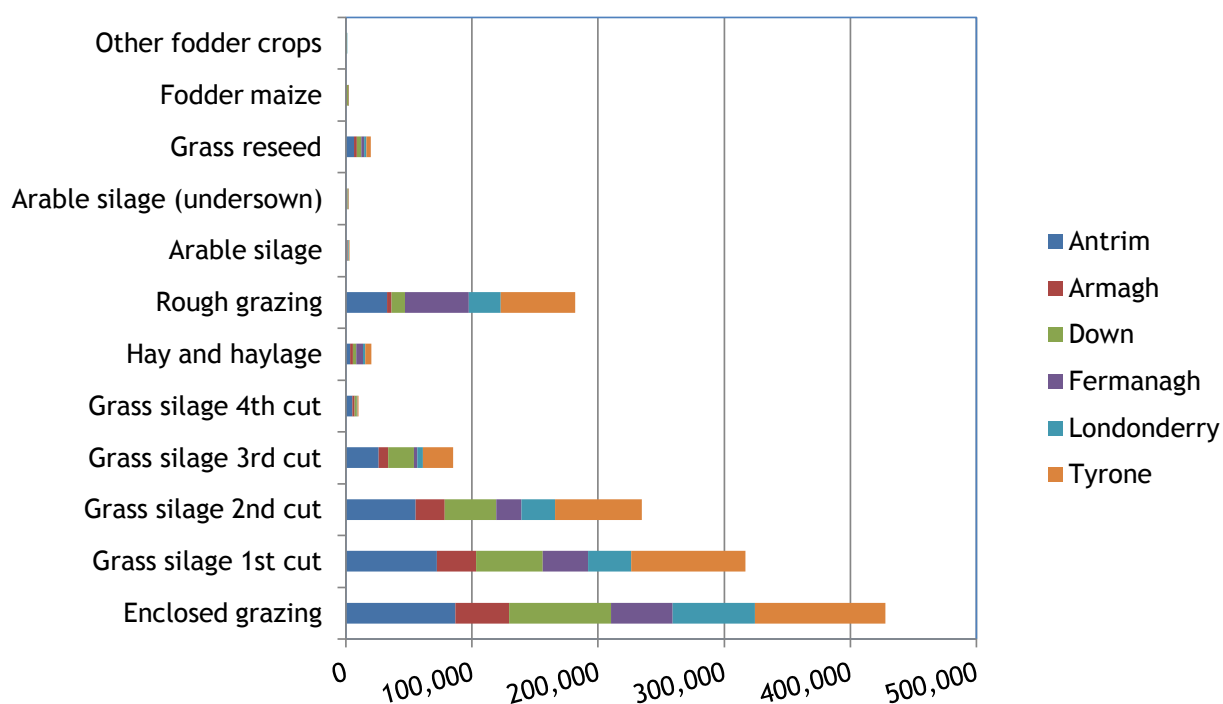


Figure 3: Regional distribution of area (ha) of grassland crops grown in Northern Ireland, 2013.

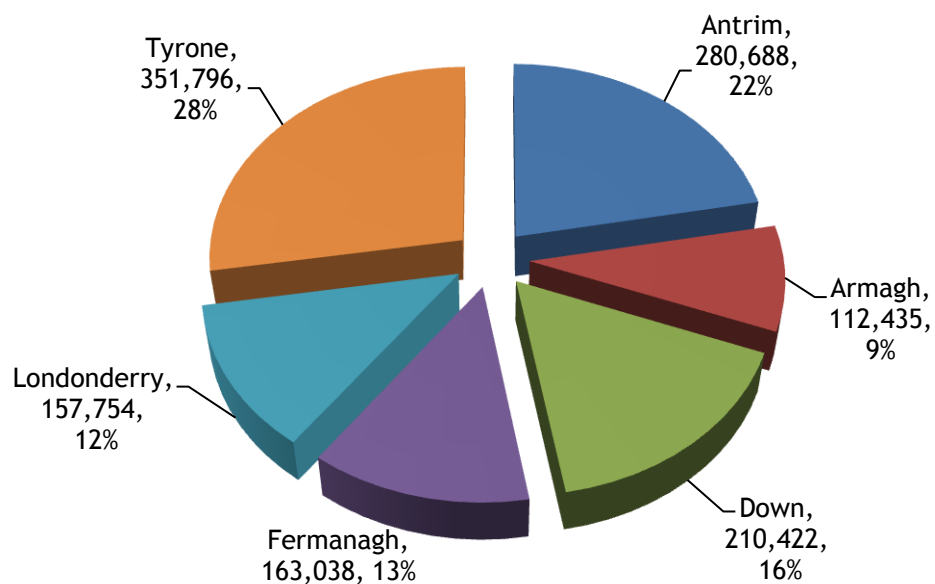


Figure 4: Regional distribution of area (ha) of sown crops grown in Northern Ireland, 2013.

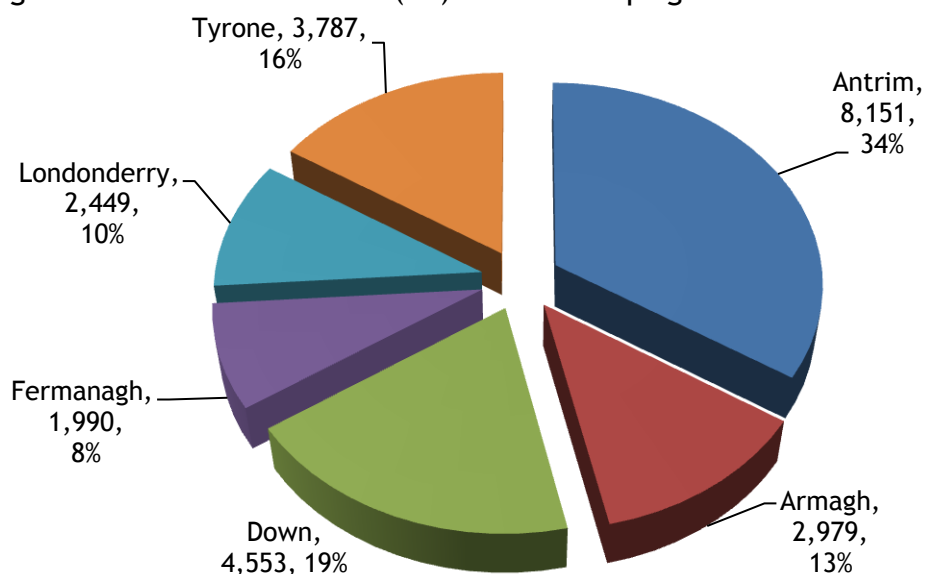
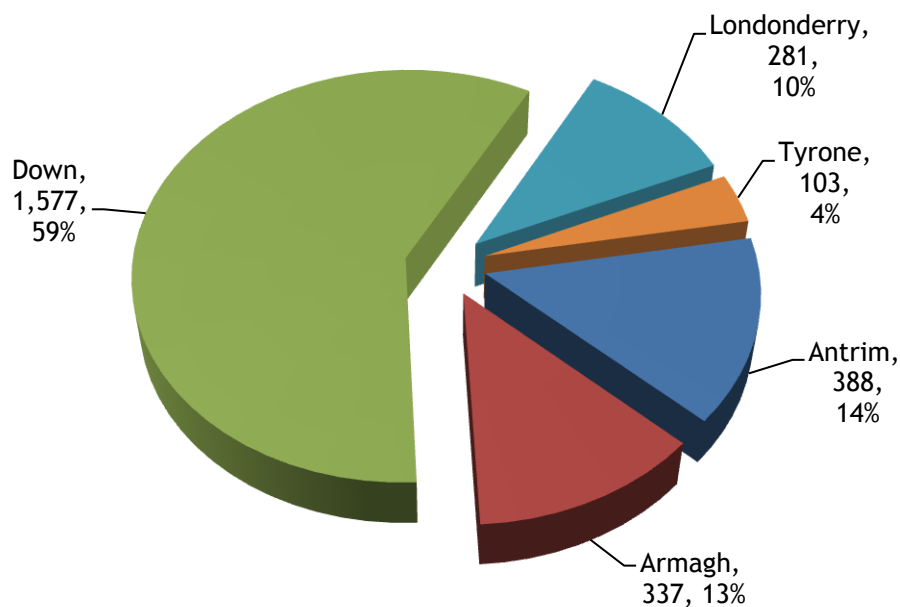


Figure 5: Regional distribution of area (ha) of fodder crops grown in Northern Ireland, 2013.



Pesticide usage:

Figure 6: Pesticide usage (spha) on grassland & fodder crops in Northern Ireland, 2013.

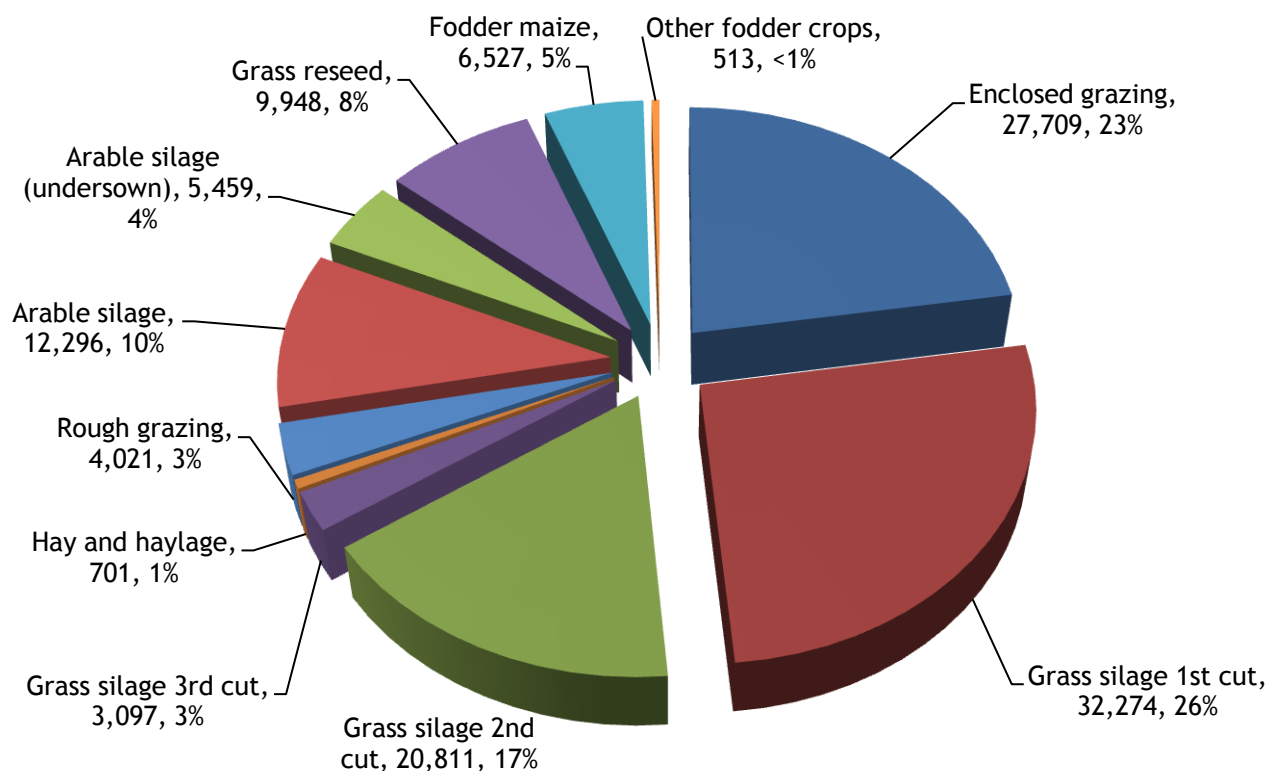


Figure 7: Weight (kg) of pesticide applied to grassland & fodder crops in Northern Ireland, 2013.

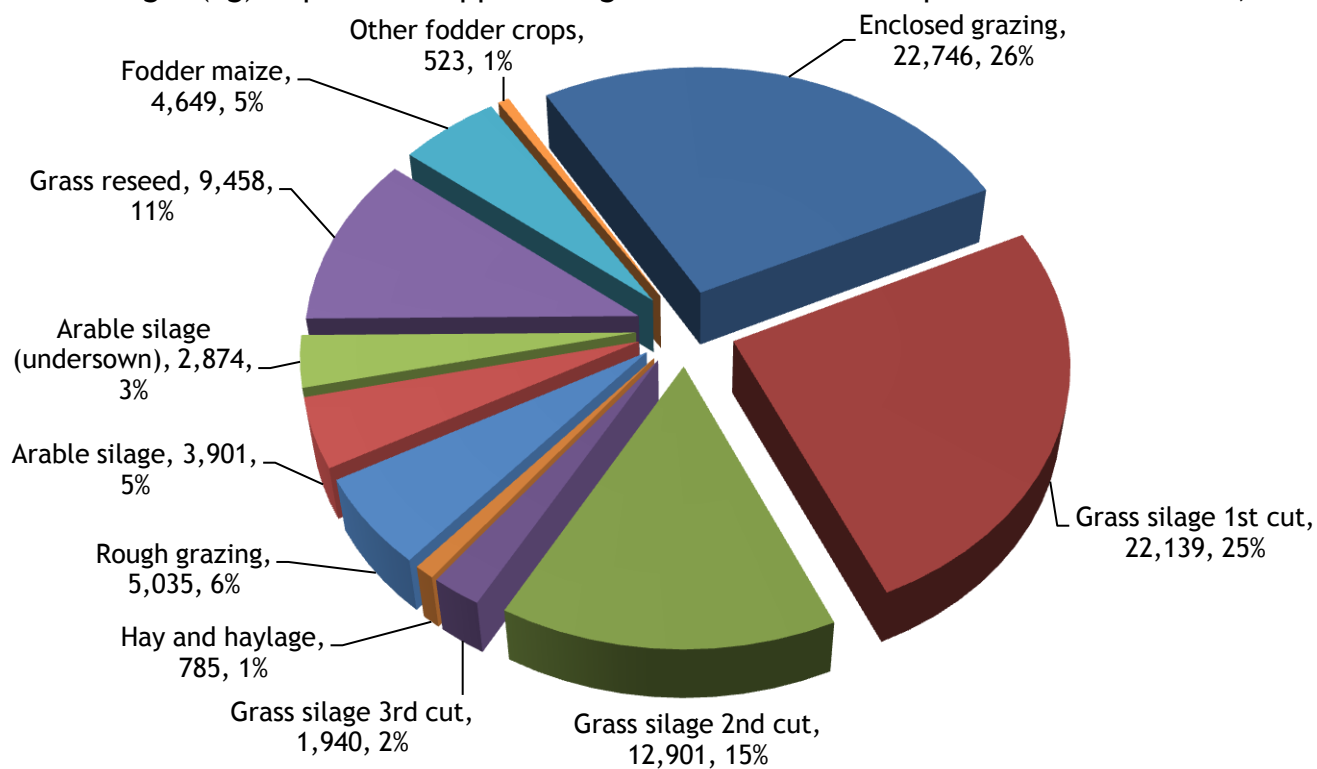


Figure 8: Area (spha) of grassland & fodder crops treated regionally with each pesticide type in Northern Ireland, 2013.

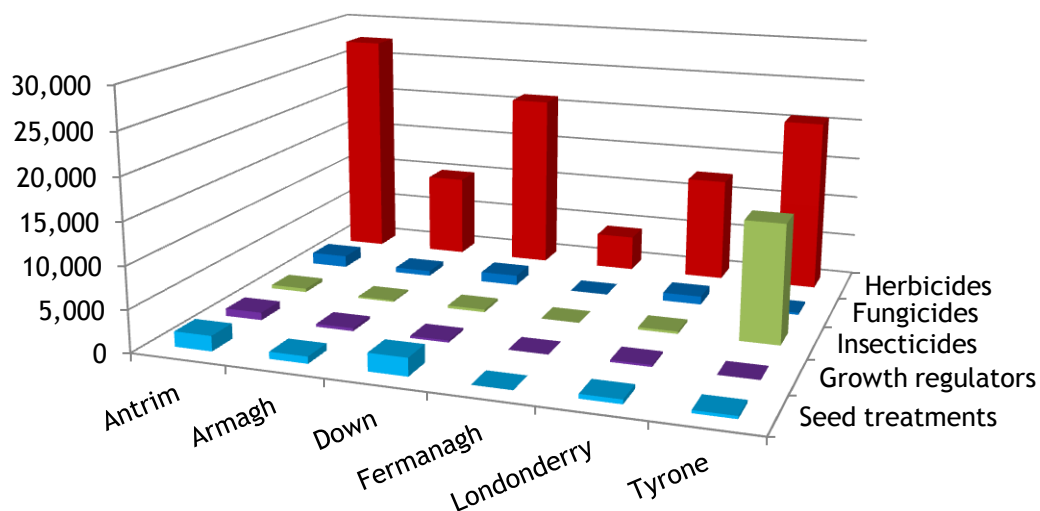


Figure 9: Weight (kg) of each pesticide type applied regionally to grassland & fodder crops in Northern Ireland, 2013.

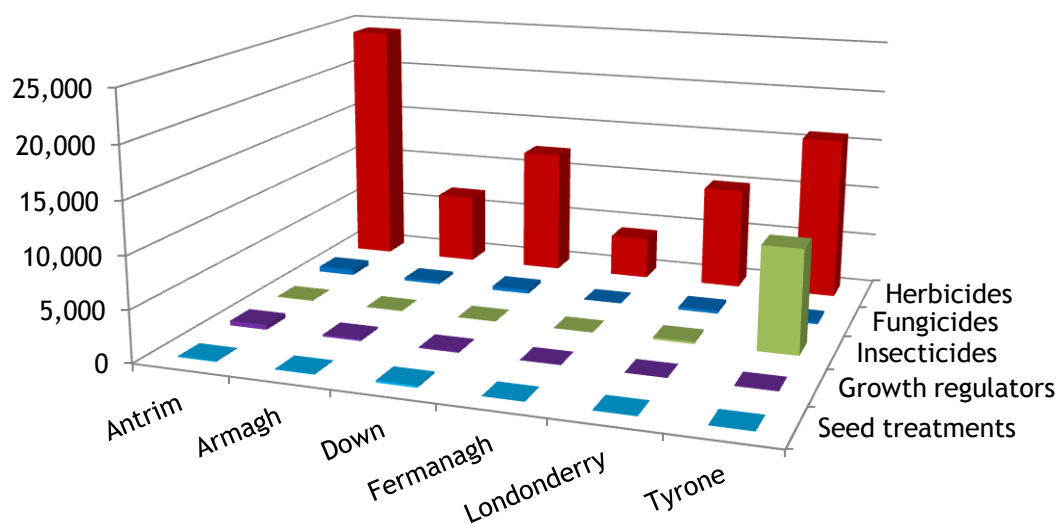


Figure 10: Pesticide usage (spha) on grassland and fodder crops in Northern Ireland, 2013.

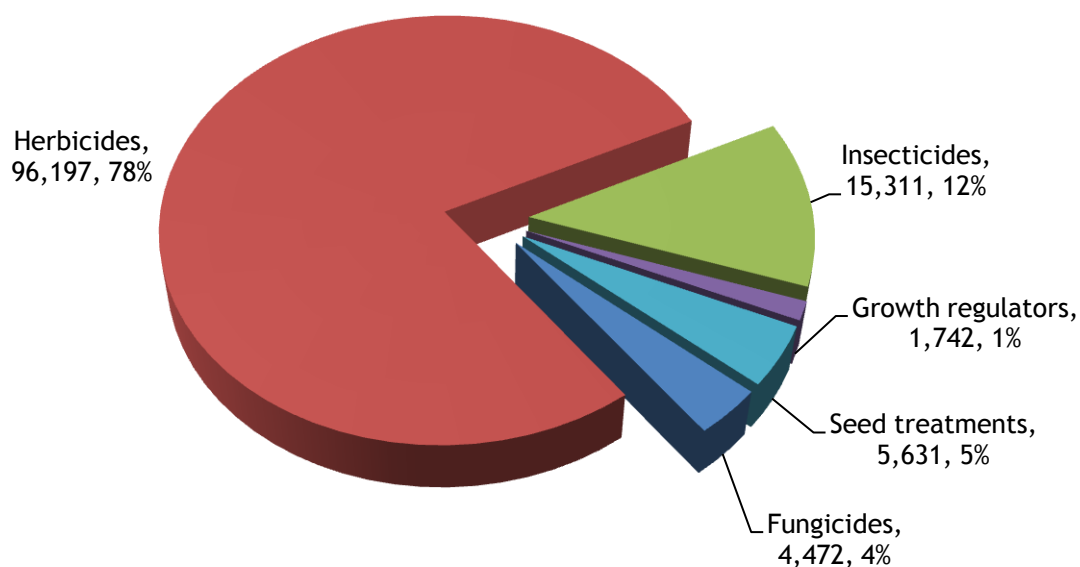


Figure 11: Weight (kg) of pesticide applied to grassland and fodder crops in Northern Ireland, 2013.

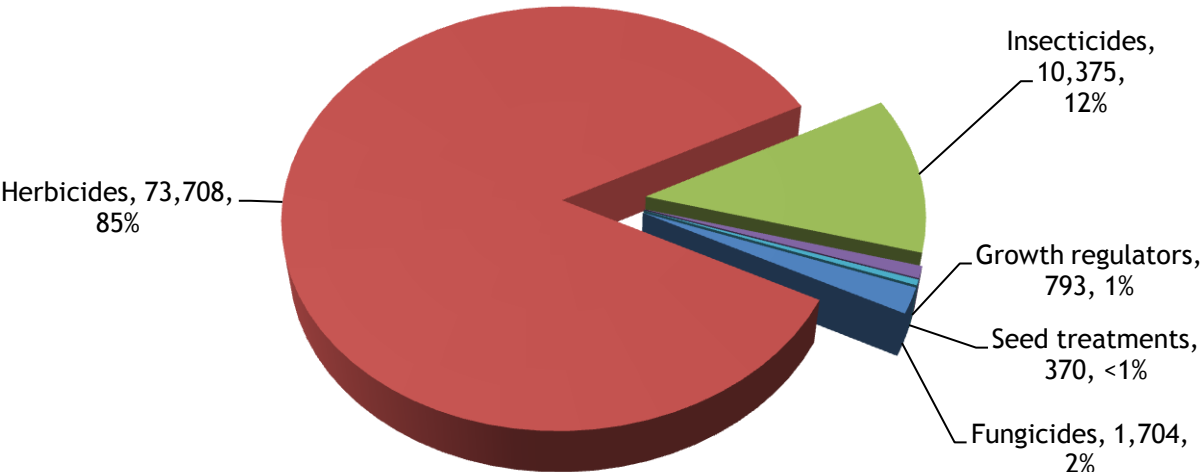


Figure 12: Pesticide usage (spha) on established grassland crops in Northern Ireland, 2013.

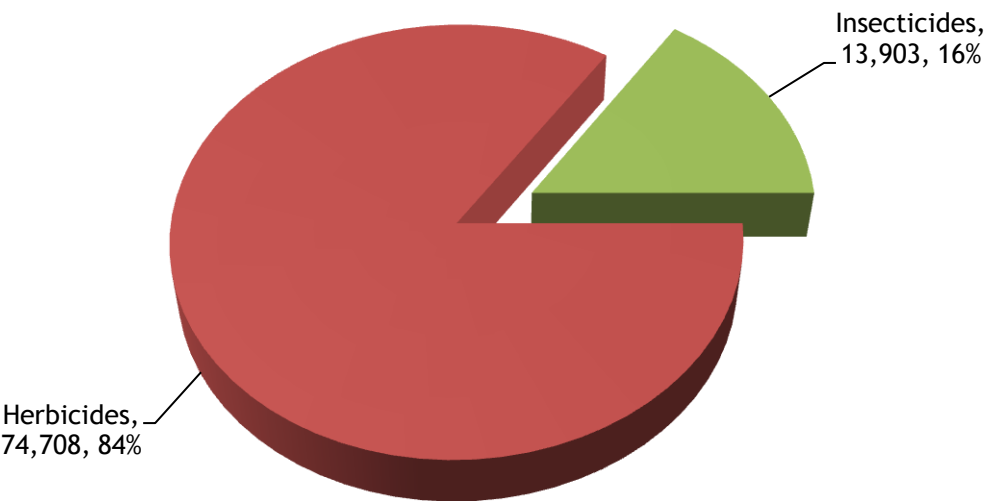


Figure 13: Weight (kg) of pesticide applied to established grassland crops in Northern Ireland, 2013.

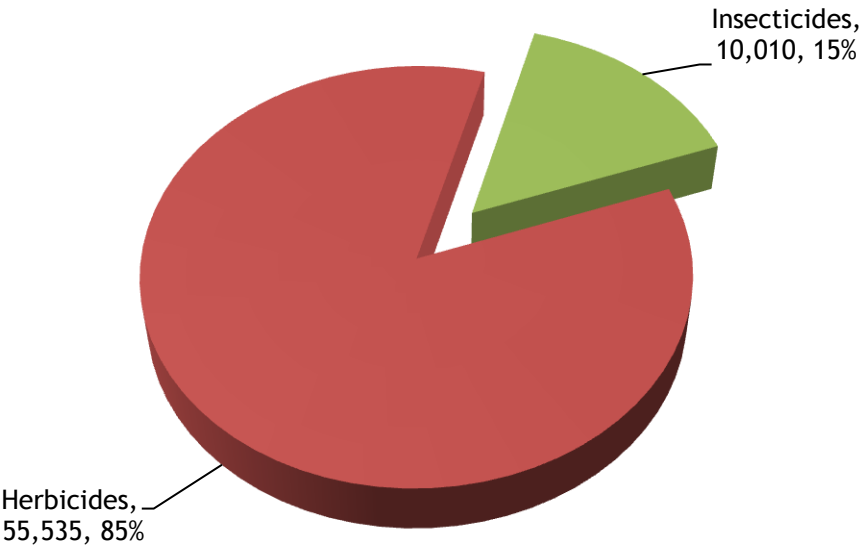


Figure 14: Pesticide usage (spha) on sown crops in Northern Ireland, 2013.

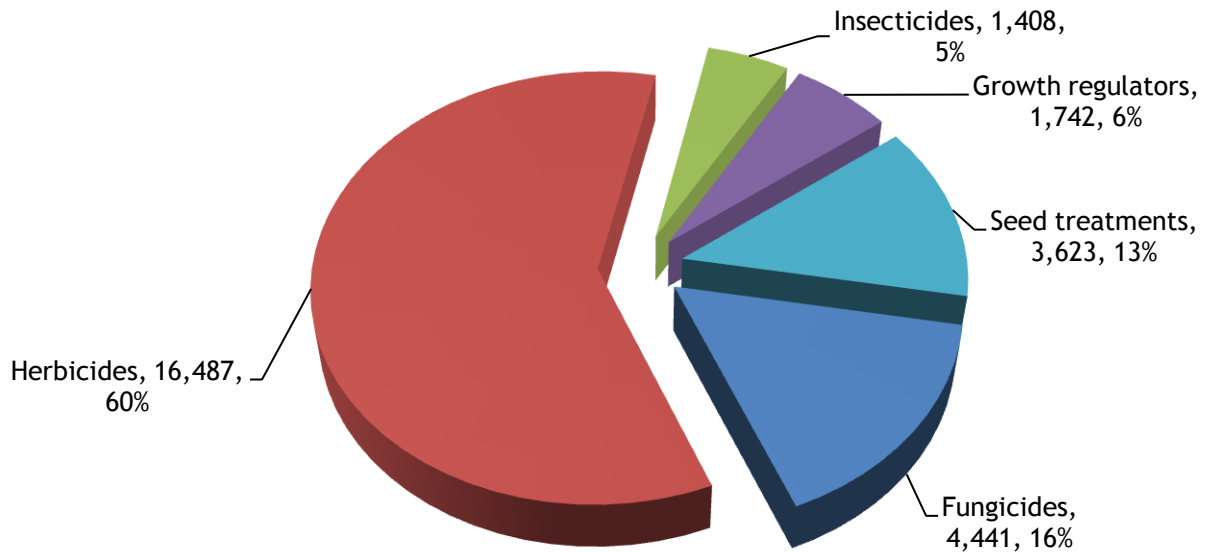


Figure 15: Weight (kg) of pesticide applied to sown crops in Northern Ireland, 2013.

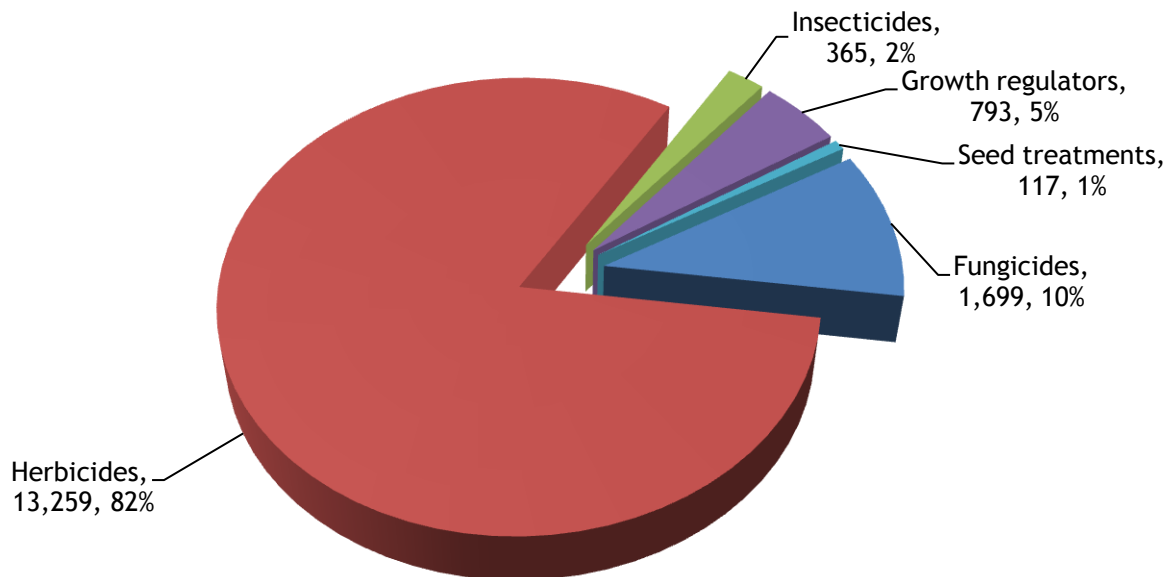


Figure 16: Pesticide usage (spha) on fodder crops in Northern Ireland, 2013.

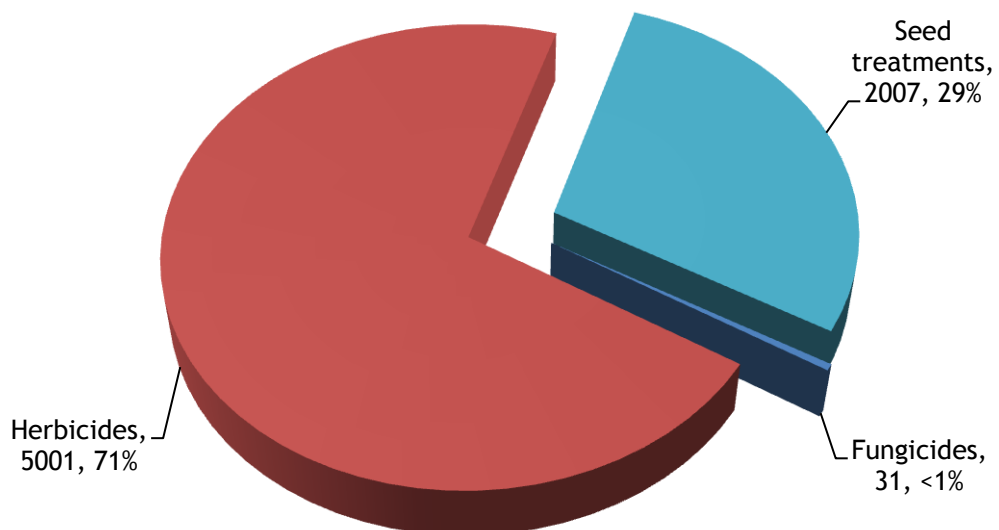
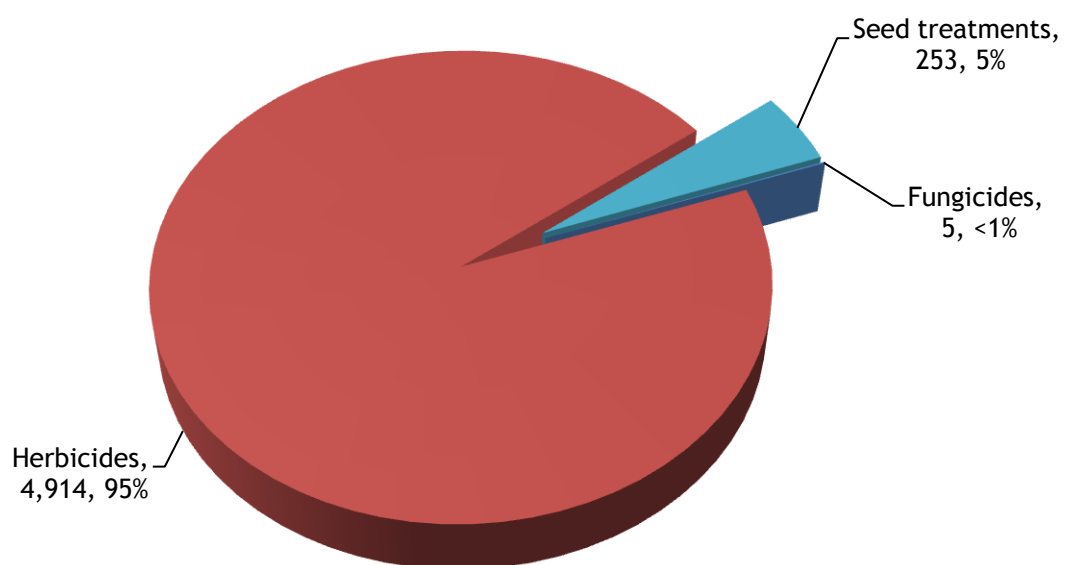


Figure 17: Weight (kg) of pesticide applied to fodder crops in Northern Ireland, 2013.



Pesticide usage on grassland:

Enclosed grassland

Tables: 3, 6, 7, 8, 9, 10, 13

- 427,889 hectares of enclosed grassland grown in Northern Ireland.
- 27,709 treated 'spray hectares'.
- 22,746 kg of active substances applied.
- Herbicides and insecticides were applied.
- 24,120 ha (5.6%) were treated with herbicides.
- 3,312 ha (0.8%) were treated with chlorpyrifos to control leatherjackets.
- 6.4% of the enclosed grassland area received treatments.

Figure 18: Enclosed grazing: pesticide-treated area (spha) of herbicide active substances, 2013.

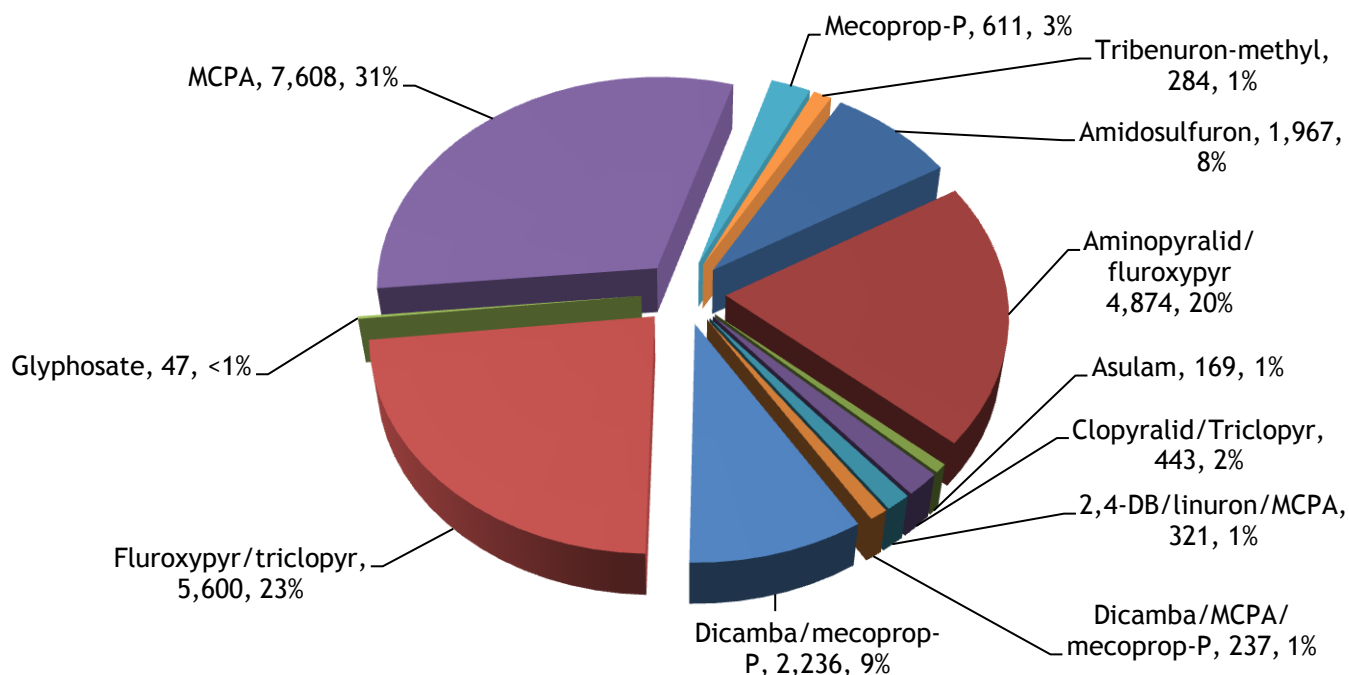


Figure 19: Enclosed grazing: weight (kg) of herbicide active substances applied, 2013.

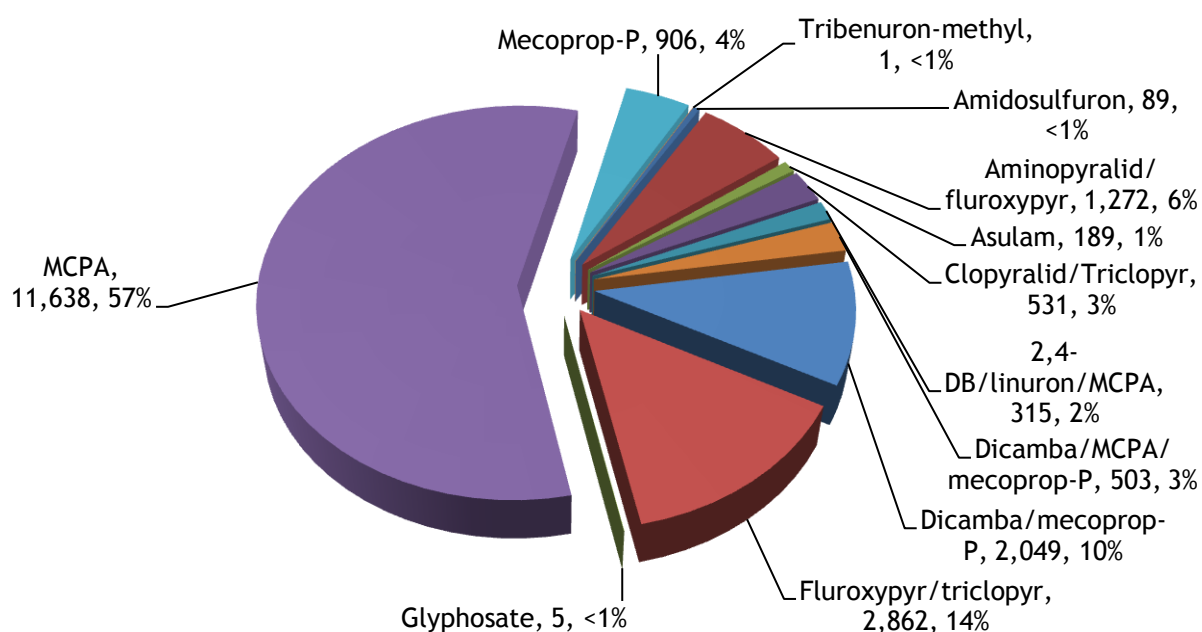
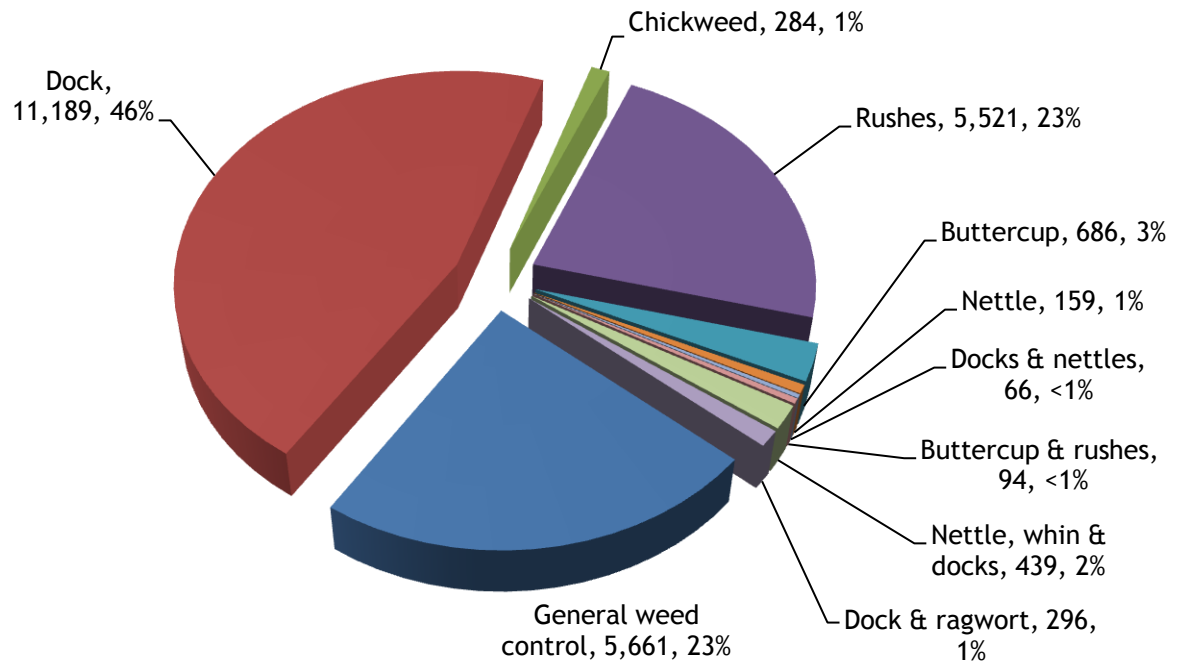


Figure 20: Enclosed grazing: reasons for herbicide use (spha), 2013.



Grass silage 1st cut

Tables: 3, 6, 7, 8, 9, 10, 14

- 317,079 hectares of 1st cut grass silage grown in Northern Ireland.
- 32,274 treated 'spray hectares'.
- 22,139 kg of active substances applied.
- 22,883 ha (7.2%) were treated with herbicides.
- 8,976 ha (2.8%) were treated with chlorpyrifos to control leatherjackets
- 10% of the 1st cut grass silage area received treatments.

Figure 21: Grass silage 1st cut: pesticide-treated area (spha) of herbicide active substances, 2013.

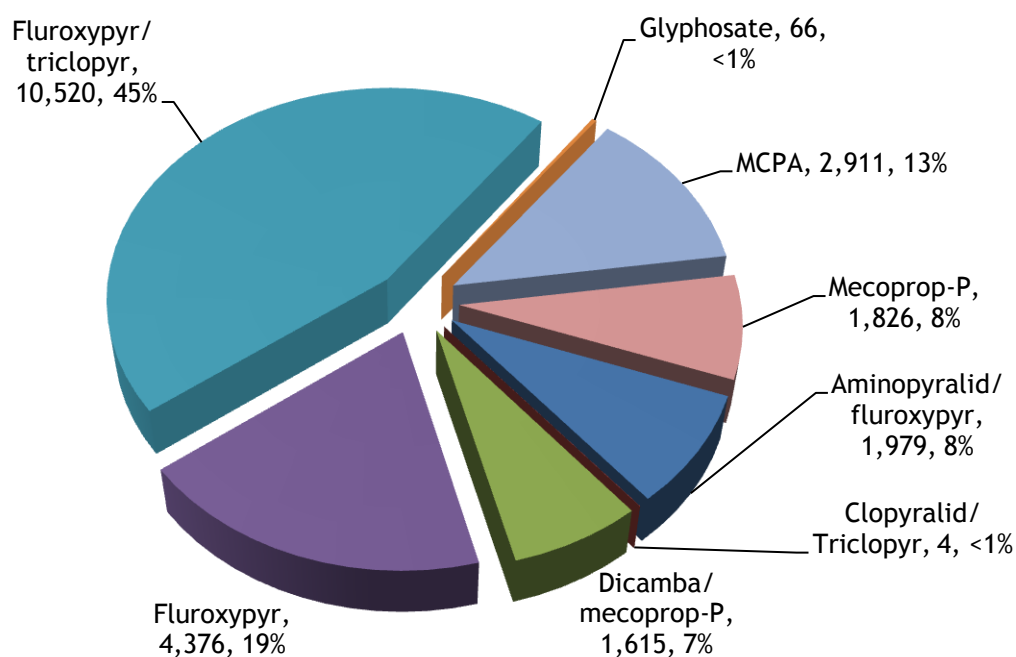


Figure 22: Grass silage 1st cut: weight (kg) of herbicide active substances applied, 2013.

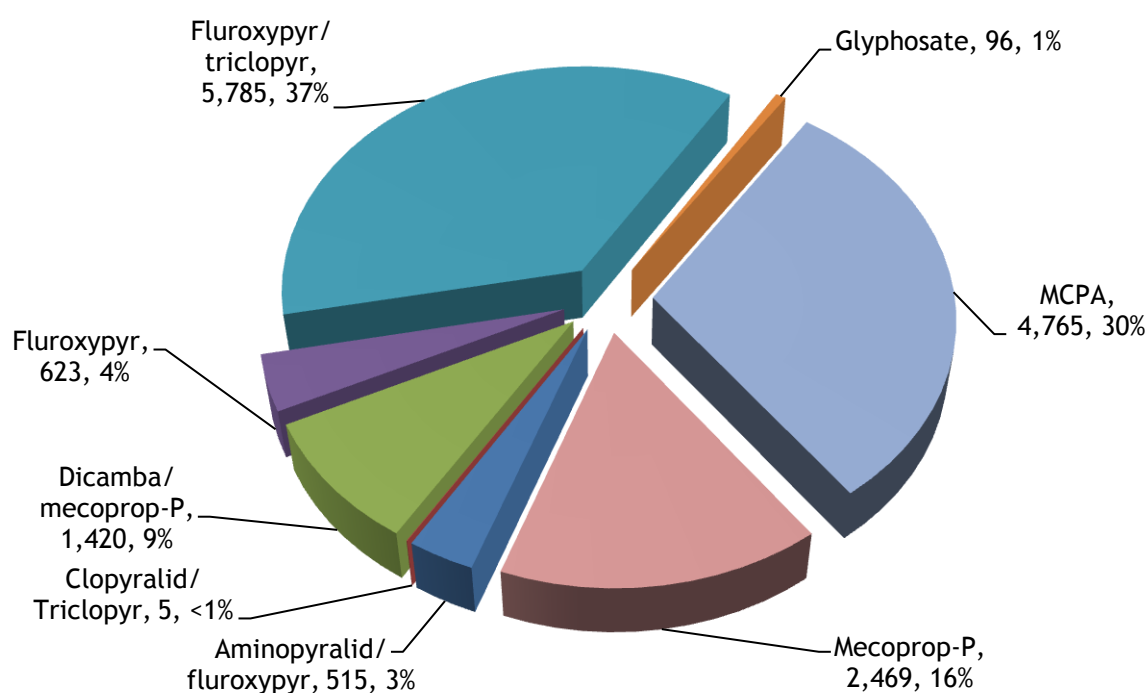
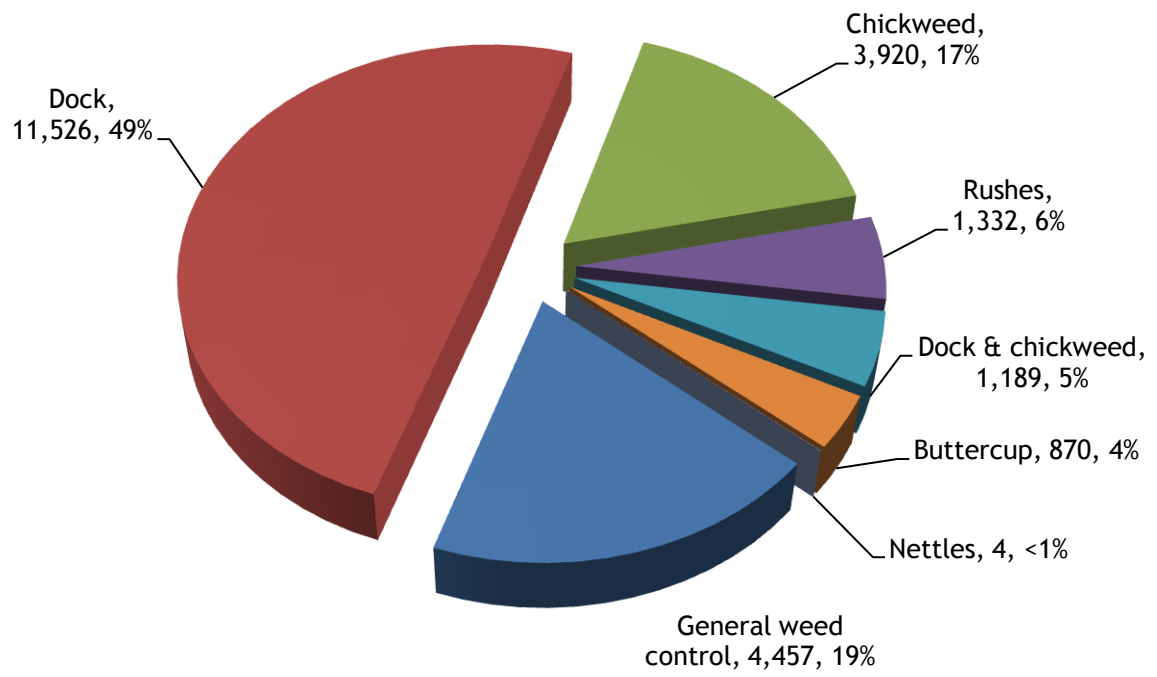


Figure 23: Grass silage 1st cut: reasons for herbicide use (spha), 2013.



Grass silage 2nd cut

Tables: 3, 6, 7, 8, 9, 10, 15

- 234,478 hectares of 2st cut grass silage grown in Northern Ireland.
- 20,811 treated 'spray hectares'.
- 12,901 tonnes of active substances applied.
- Herbicides were the only active substances applied.
- 8.3% of the 2nd cut grass silage area received treatments.

Figure 24: Grass silage 2nd cut: pesticide-treated area (spha) of herbicide active substances, 2013.

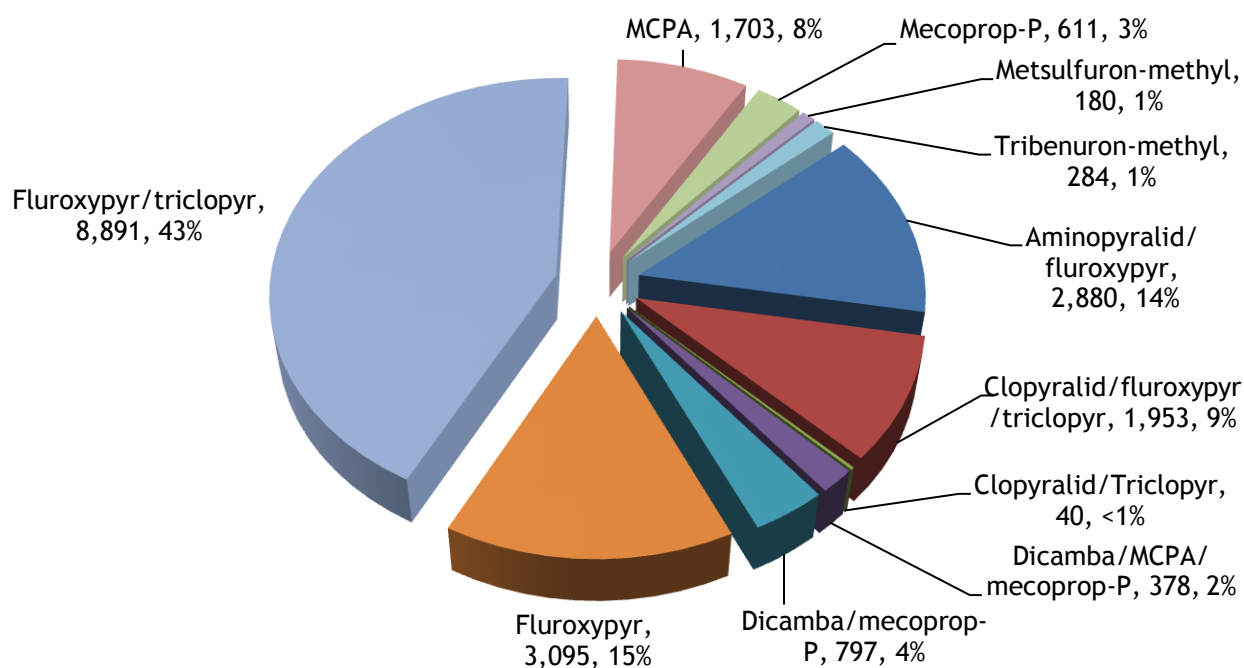


Figure 25: Grass silage 2nd cut: weight (kg) of herbicide active substances applied, 2013.

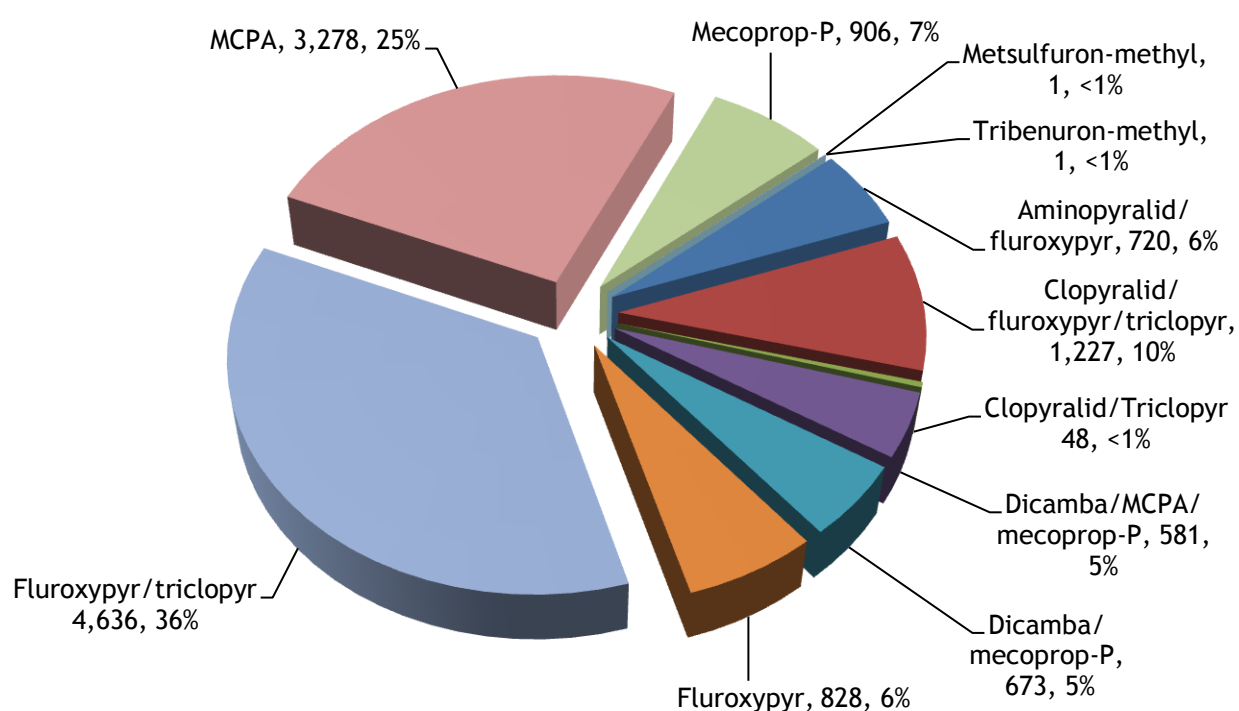
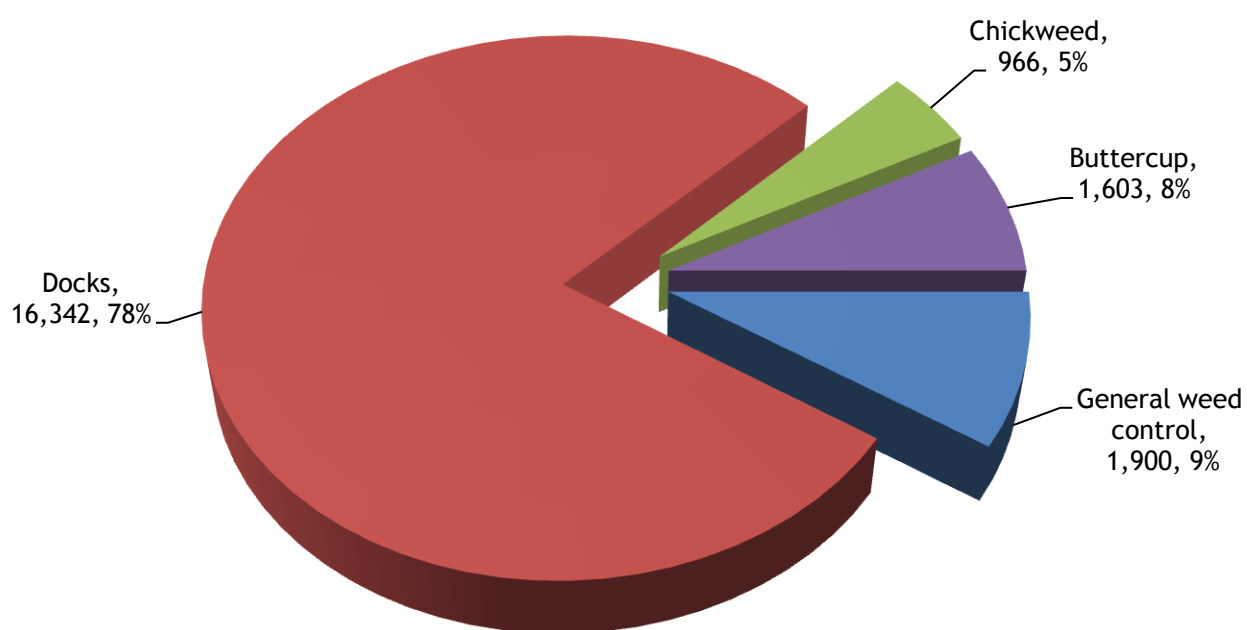


Figure 26: Grass silage 2nd cut: reasons for herbicide use (spha), 2013.



Grass silage 3rd cut

Tables: 3, 6, 7, 8, 9, 10, 16

- 85,108 hectares of 3rd cut grass silage grown in Northern Ireland.
- 3,097 treated 'spray hectares'.
- 1,940 kilograms of active substances applied.
- Herbicides were the only active substances applied.
- 3.4% of the 3rd cut silage area received treatments.

Figure 27: Grass silage 3rd cut: pesticide-treated area (spha) of herbicide active substances, 2013.

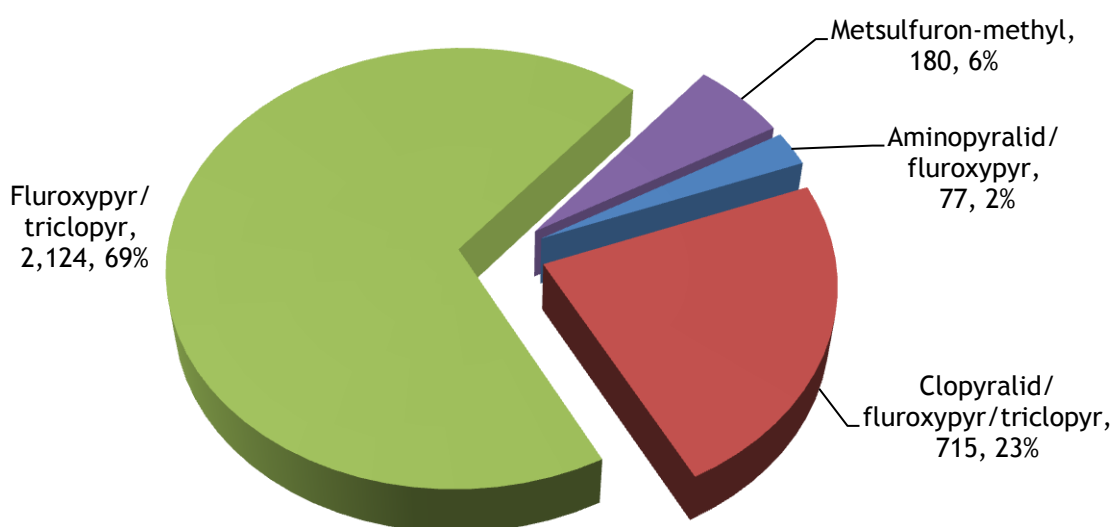


Figure 28: Grass silage 3rd cut: weight (kg) of herbicide active substances applied, 2013.

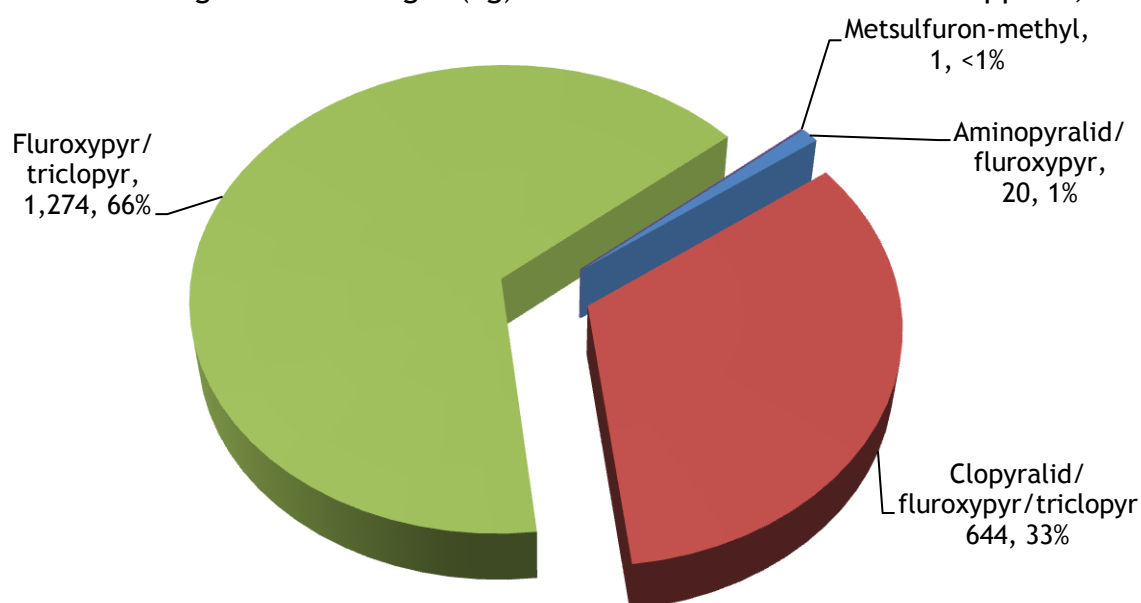
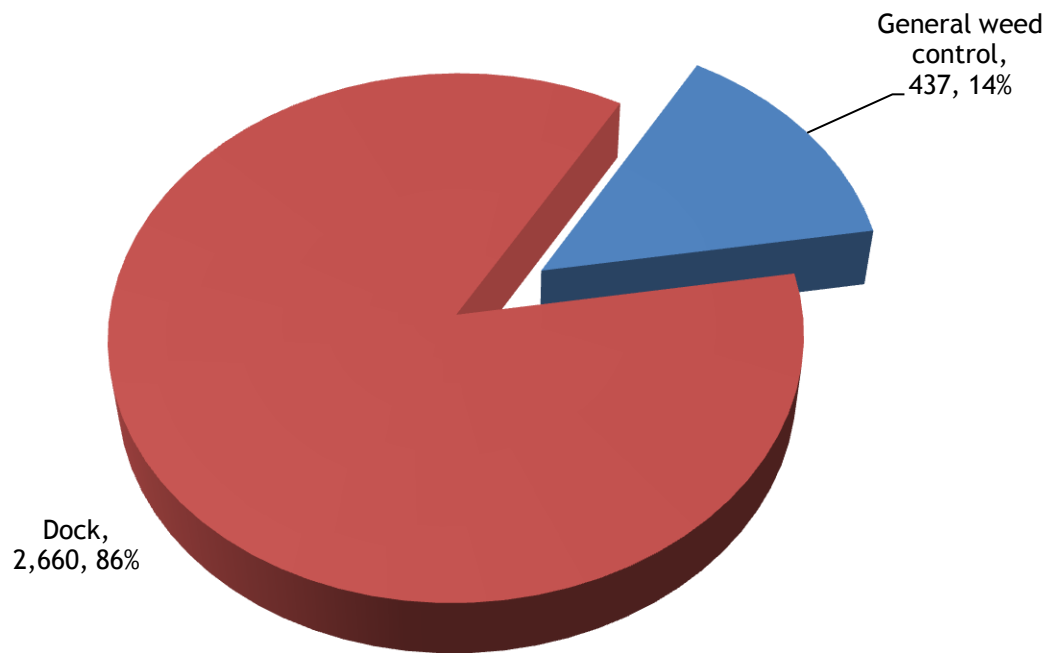


Figure 29: Grass silage 3rd cut: reasons for herbicide use (spha), 2013.



Grass silage 4th cut

Tables: 3, 6, 7, 8, 9, 10

- 9,867 hectares of 4th cut grass silage grown in Northern Ireland.
- No treatments were applied.

Hay & haylage

Tables: 3, 6, 7, 8, 17

- 20,079 hectares of hay grown in Northern Ireland.
- 701 treated 'spray hectares'.
- 785 kilograms of active substances applied.
- Asulam was the only active substance applied to control docks.
- 3.5% of the hay and haylage area received treatments.

Rough grazing

Tables: 3, 6, 7, 8, 9, 10, 18

- 181,633 hectares of rough grazing in Northern Ireland.
- 4,021 treated 'spray hectares'.
- 5,035 kilograms of active substances applied.
- 2,405 ha (1.3%) were treated with herbicides.
- 1,616 ha (0.9%) were treated with chlorpyrifos to control leatherjackets
- 2.2% of the rough grazing area received treatments.

Figure 30: Rough grazing: pesticide-treated area (spha) of herbicide active substances, 2013.

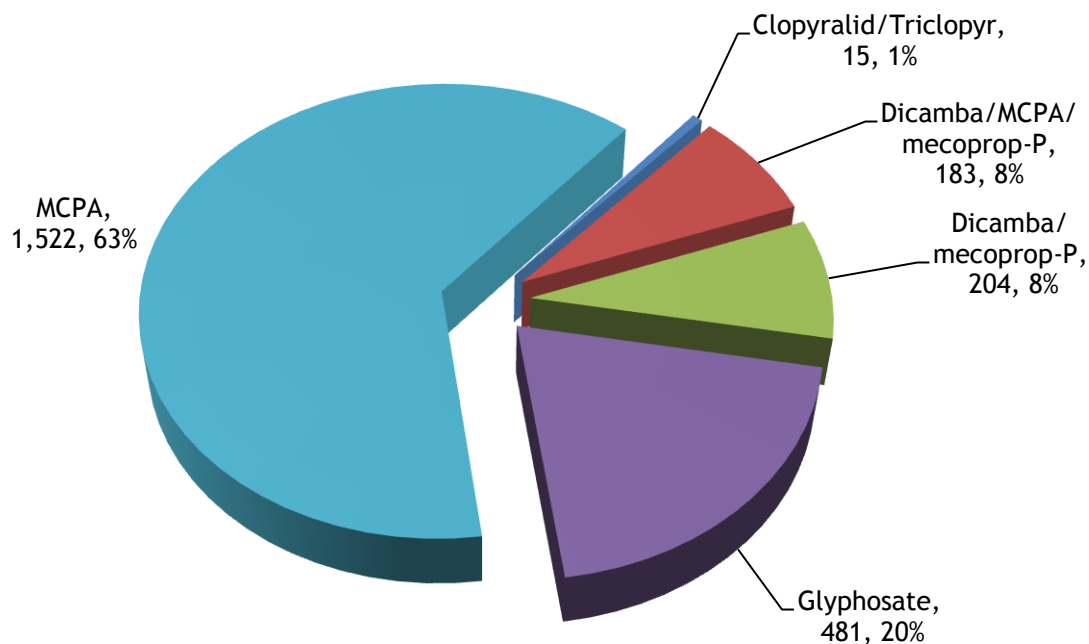


Figure 31: Rough grazing: weight (kg) of herbicide active substances applied, 2013.

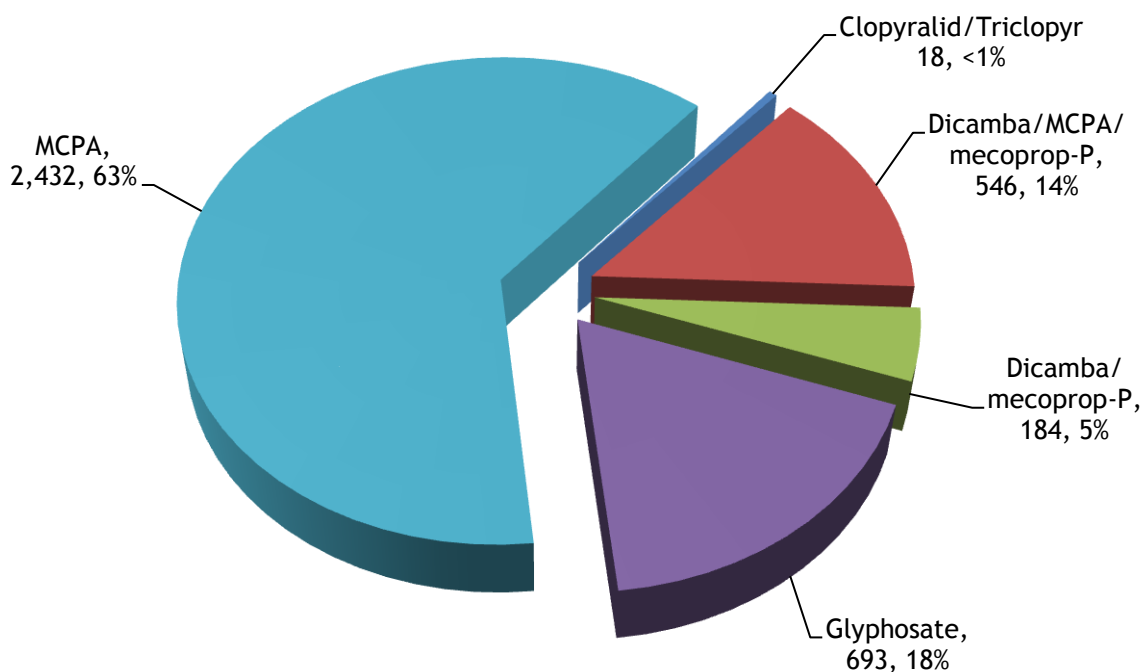
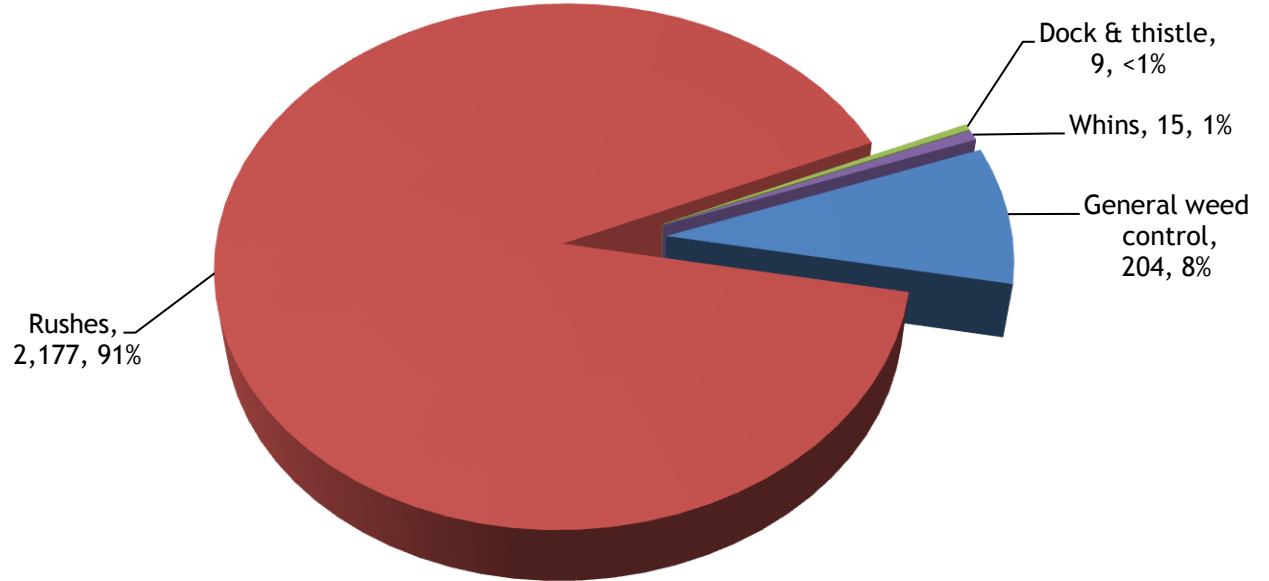


Figure 32: Rough grazing: reasons for herbicide use (spha), 2013.



Arable silage

Tables: 3, 6, 7, 8, 9, 10, 19

- 2,334 hectares of arable silage in Northern Ireland.
- 12,296 treated 'spray hectares'.
- 3,901 kilograms of active substances applied.
- Fungicides, herbicides, insecticides, growth regulators and seed treatments were all applied.
- 100% of the arable silage area received treatments.

Figure 33: Arable silage: Area (spha) of pesticide groups applied, 2013.

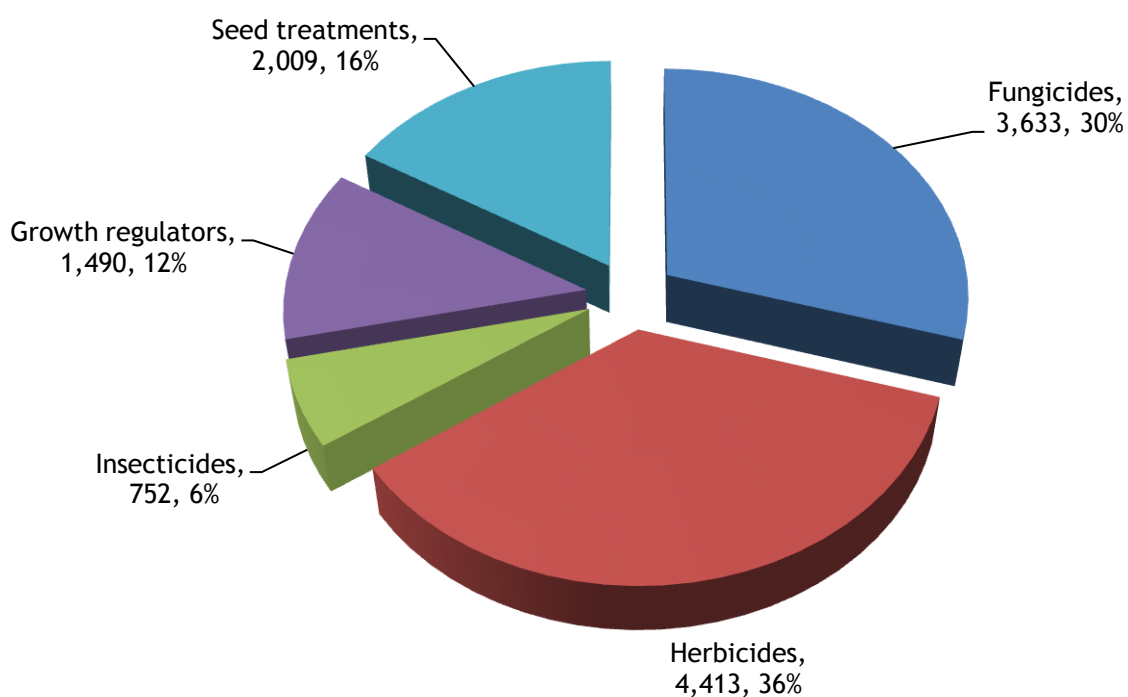


Figure 34: Arable silage: Weight (kg) of pesticide groups applied, 2013.

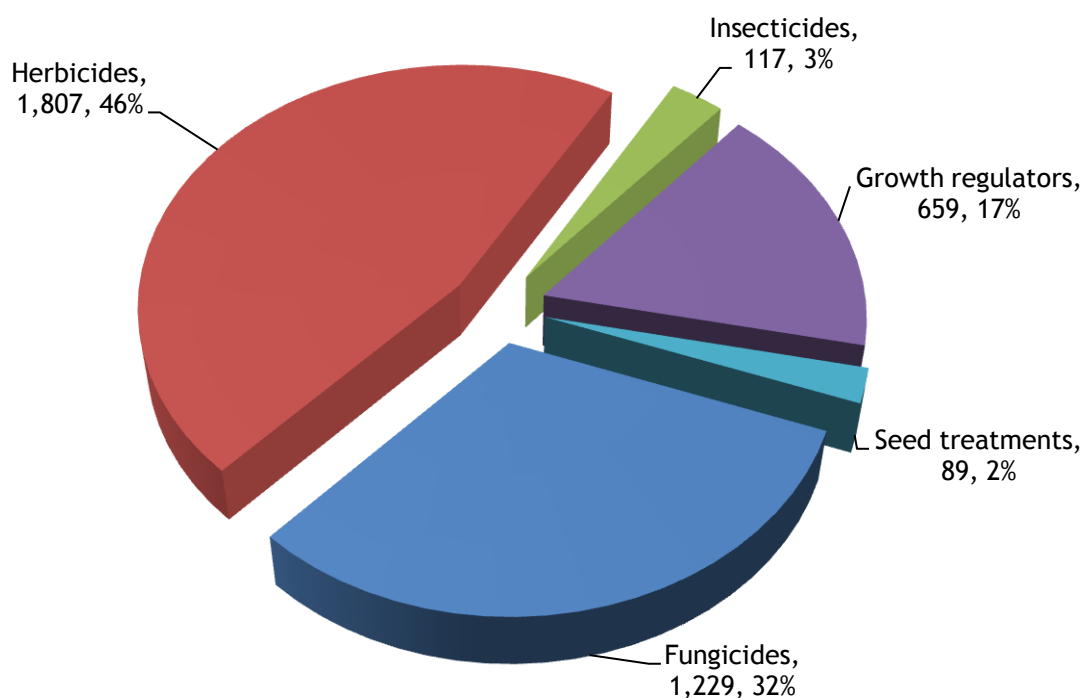


Figure 35: Arable silage: pesticide-treated area (spha) of fungicide active substances, 2013.

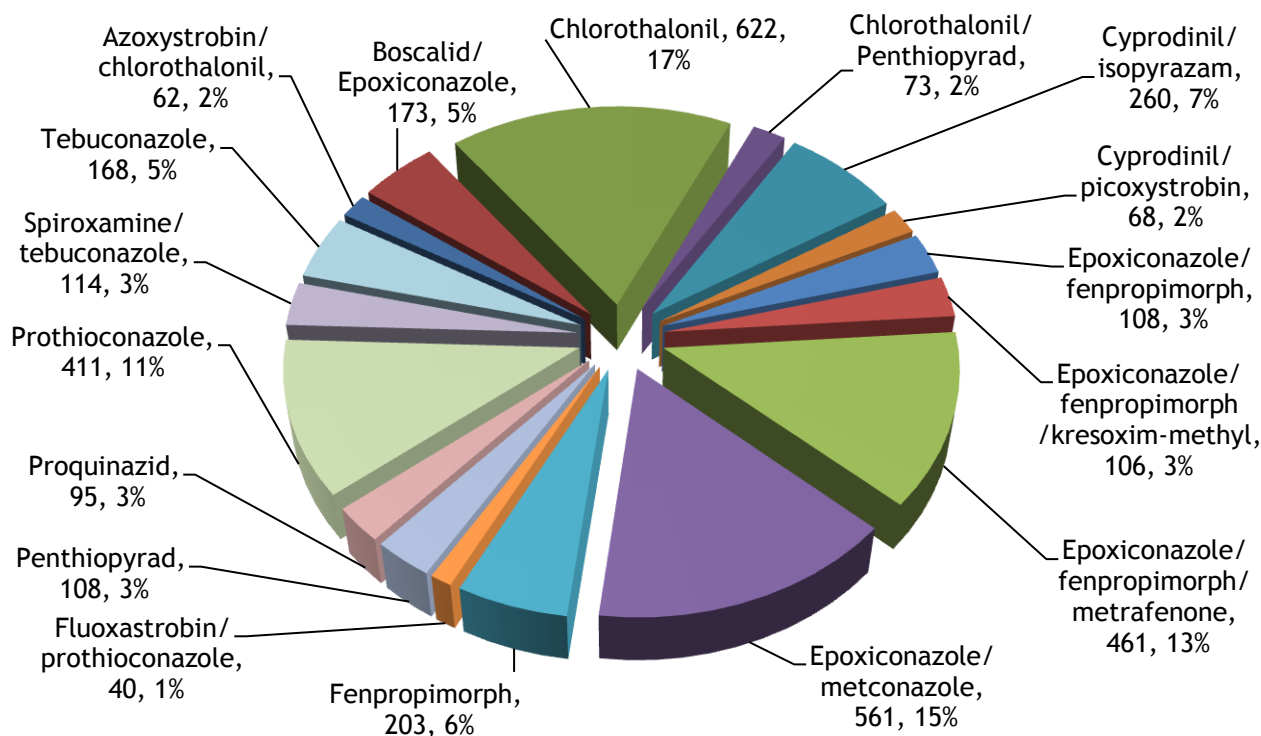


Figure 36: Arable silage: weight (kg) of fungicide active substances applied, 2013.

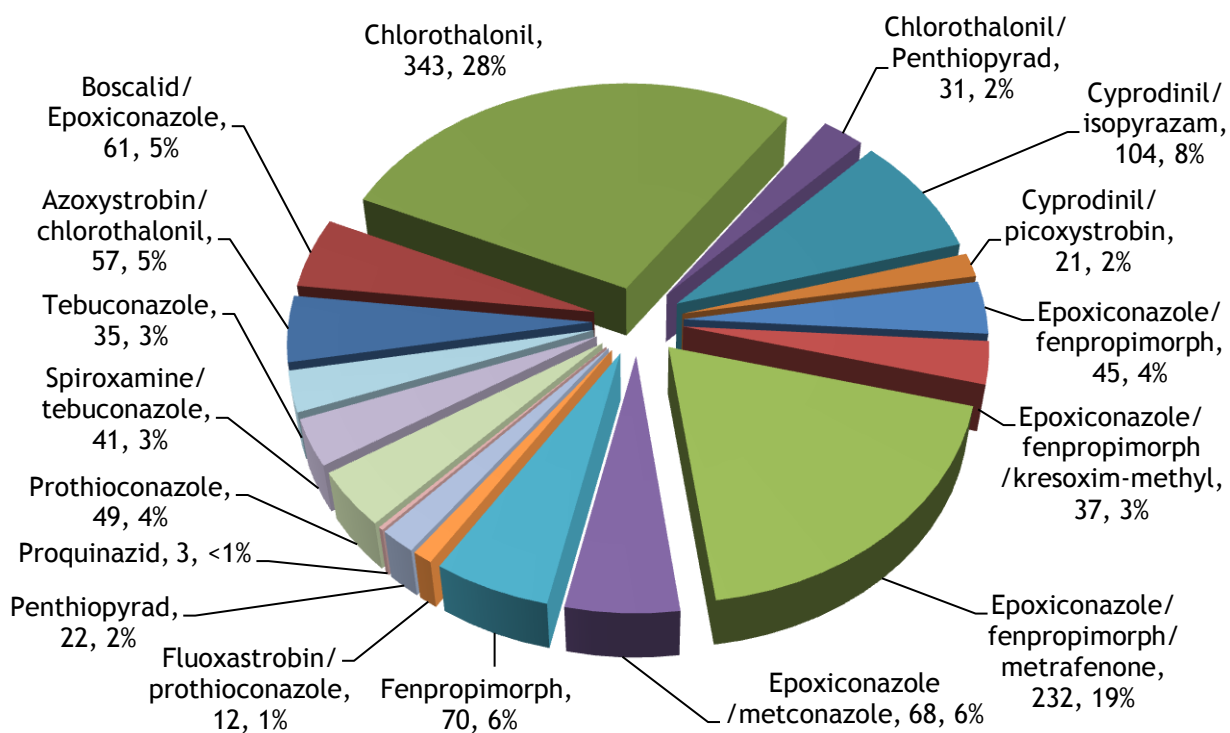


Figure 37: Arable silage: pesticide-treated area (spha) of herbicide active substances, 2013.

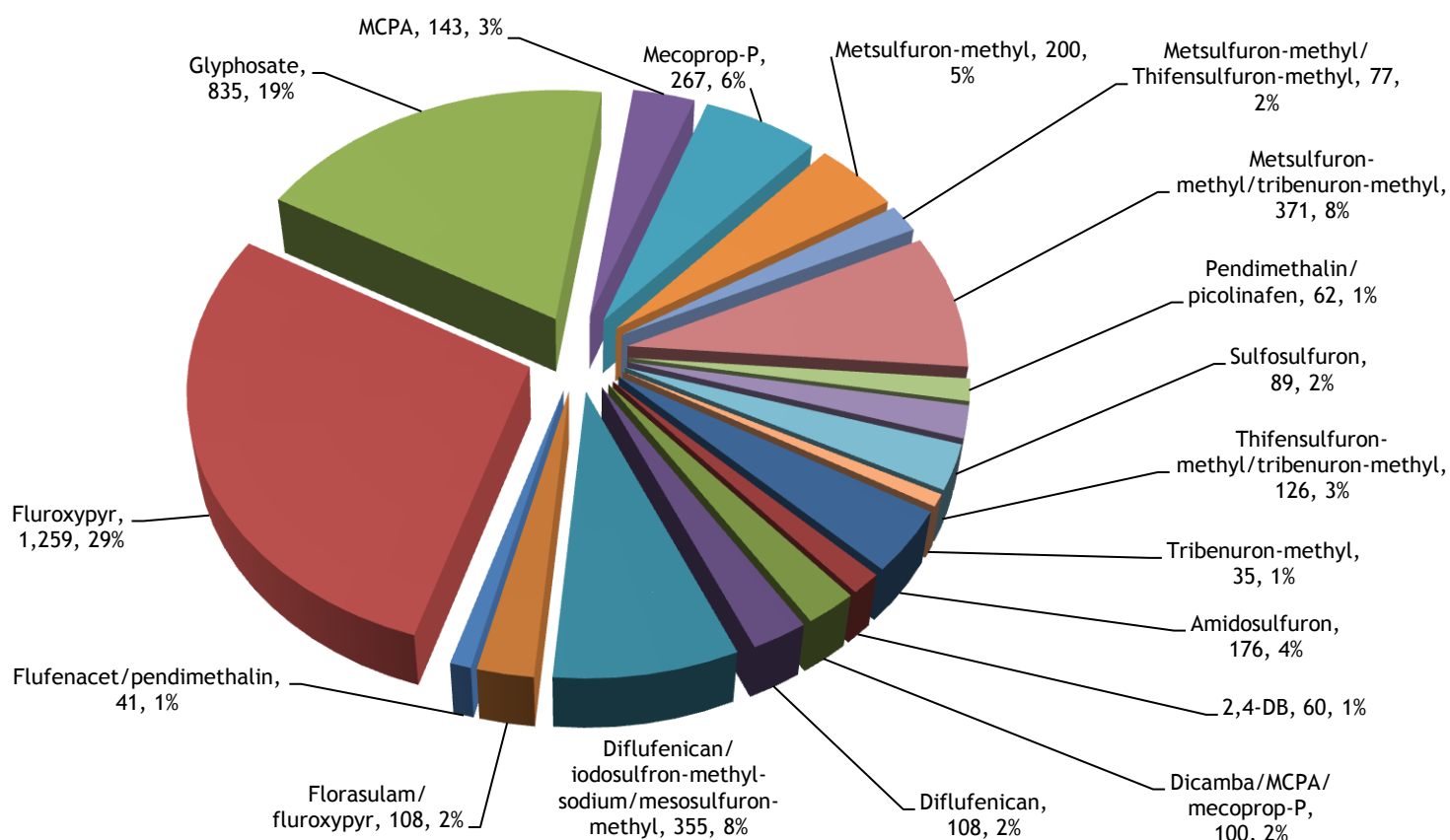


Figure 38: Arable silage: weight (kg) of herbicide active substances applied, 2013.

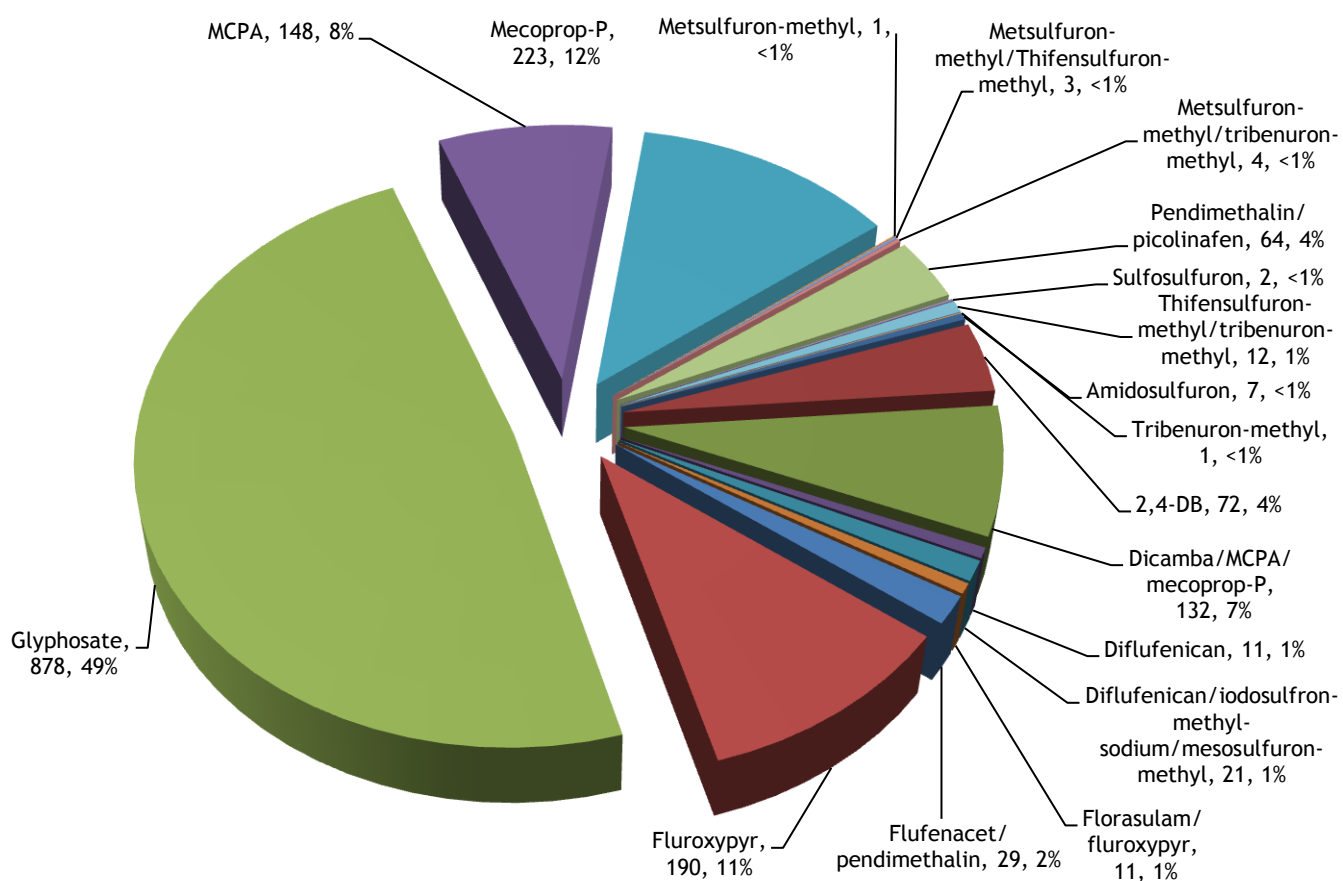


Figure 39: Arable silage: pesticide-treated area (spha) of insecticide active substances, 2013.

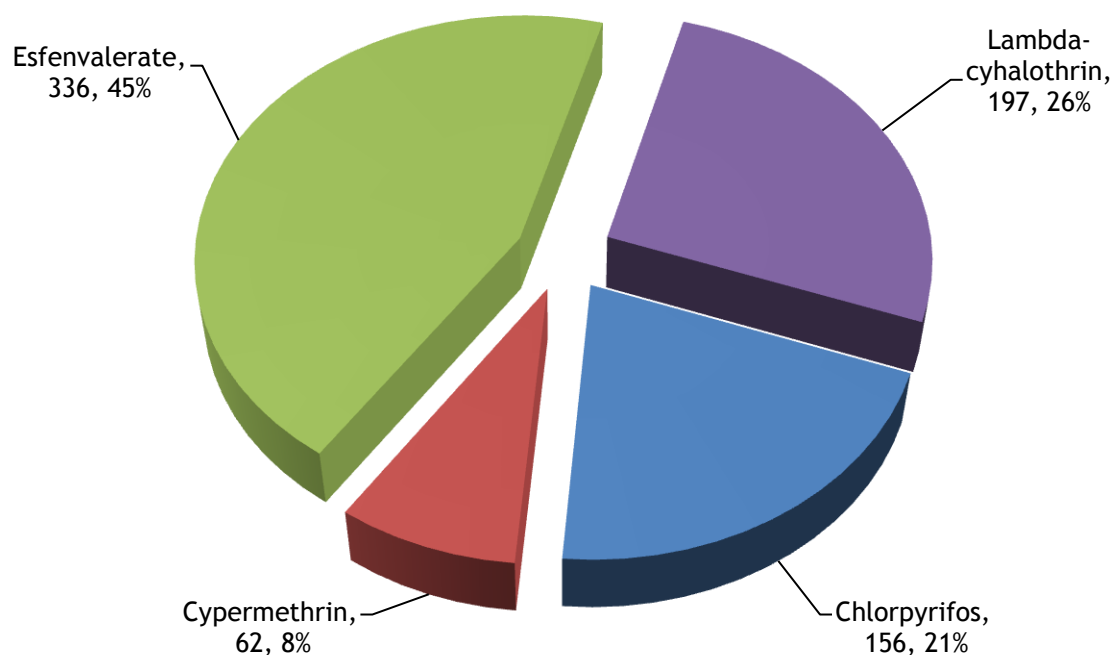


Figure 40: Arable silage: weight (kg) of insecticide active substances applied, 2013.

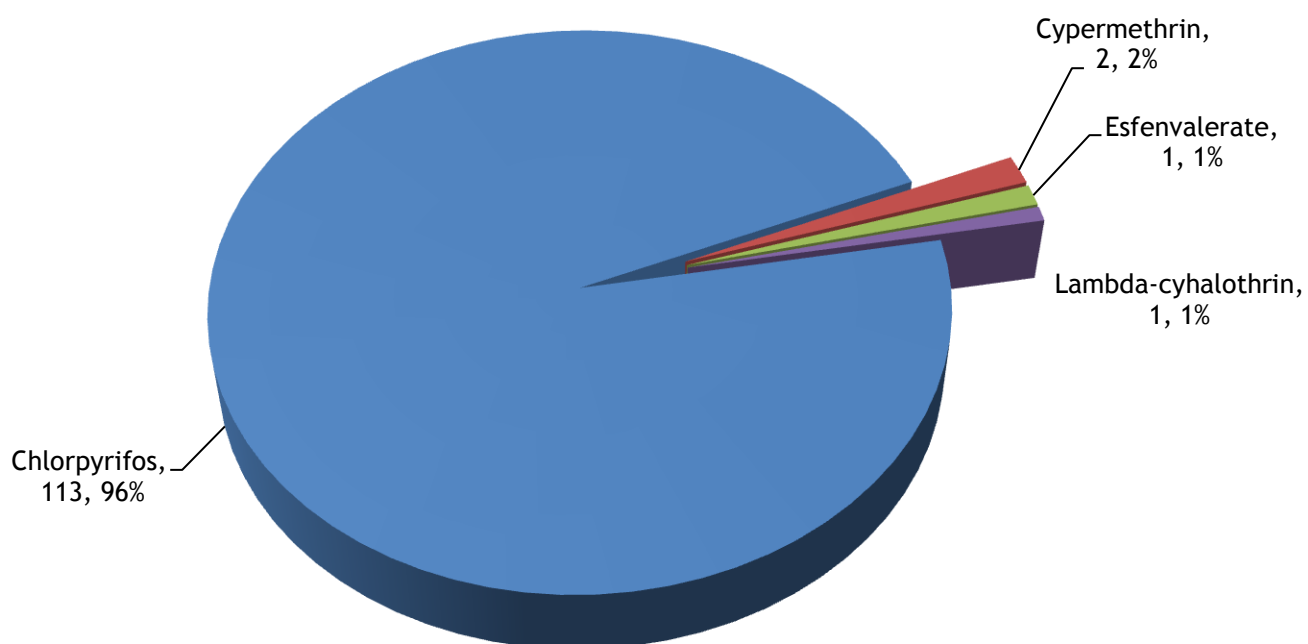


Figure 41: Arable silage: pesticide-treated area (spha) of growth regulator active substances, 2013.

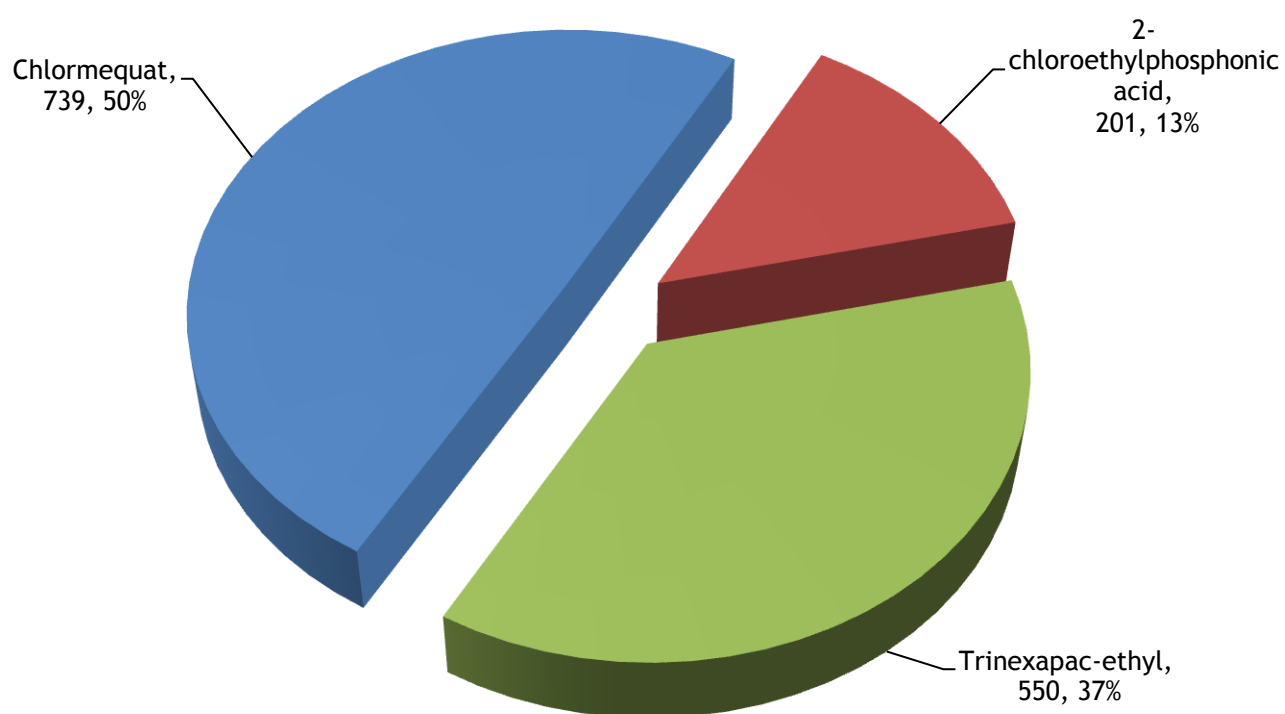


Figure 42: Arable silage: weight (kg) of growth regulator active substances applied, 2013.

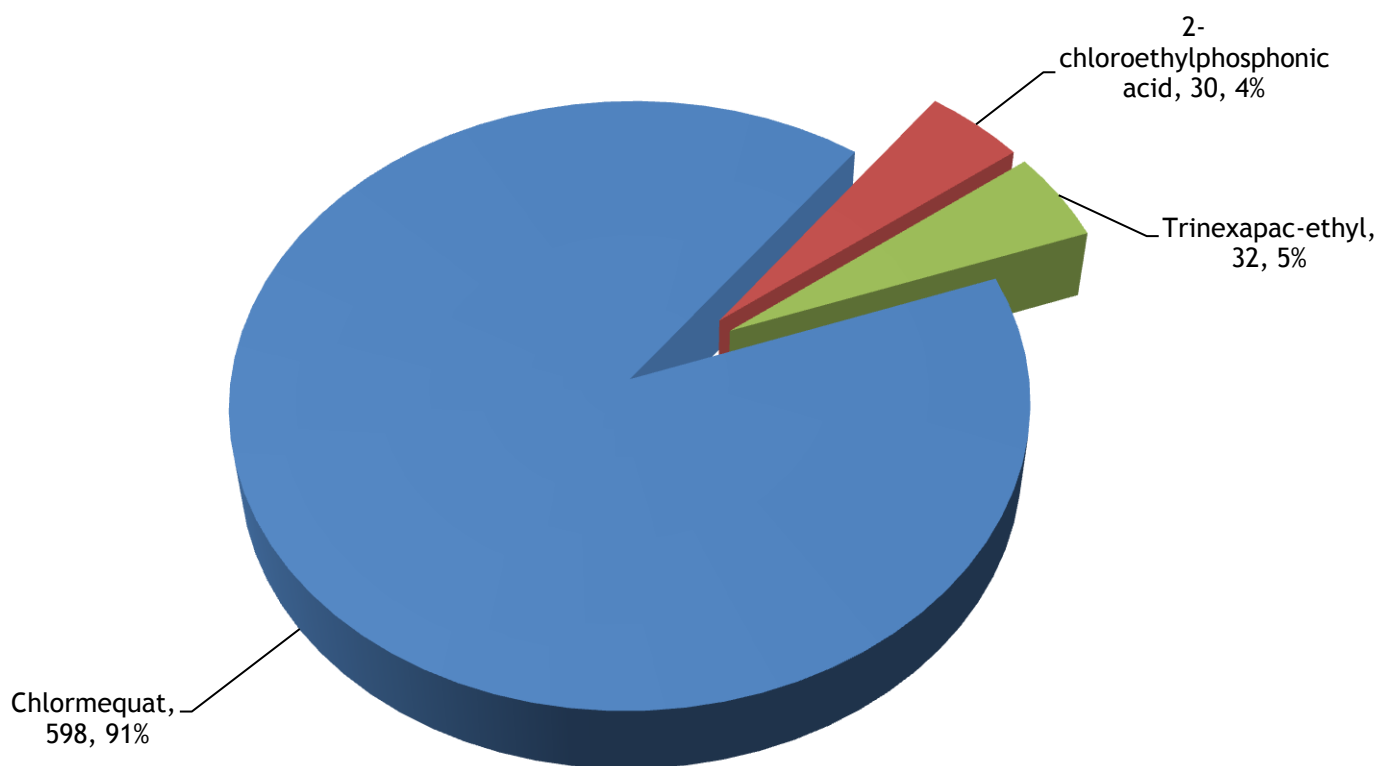


Figure 43: Arable silage: pesticide-treated area (ha) of seed treatment active substances, 2013.

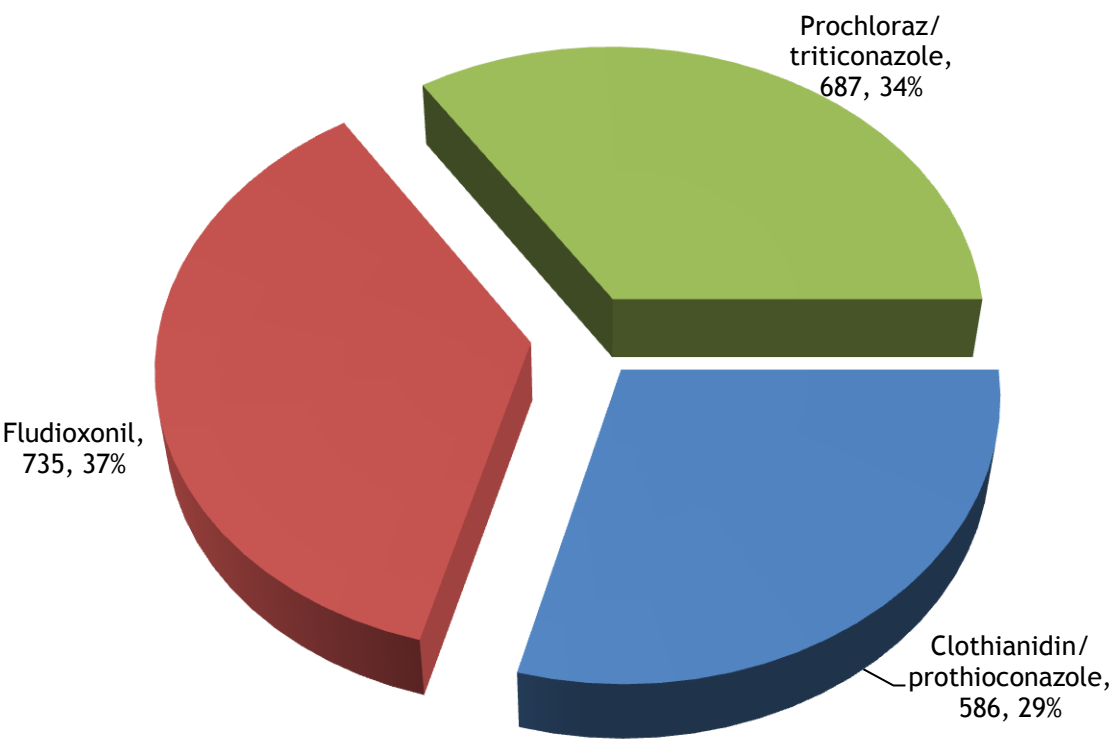


Figure 44: Arable silage: weight (kg) of seed treatment active substances applied, 2013.

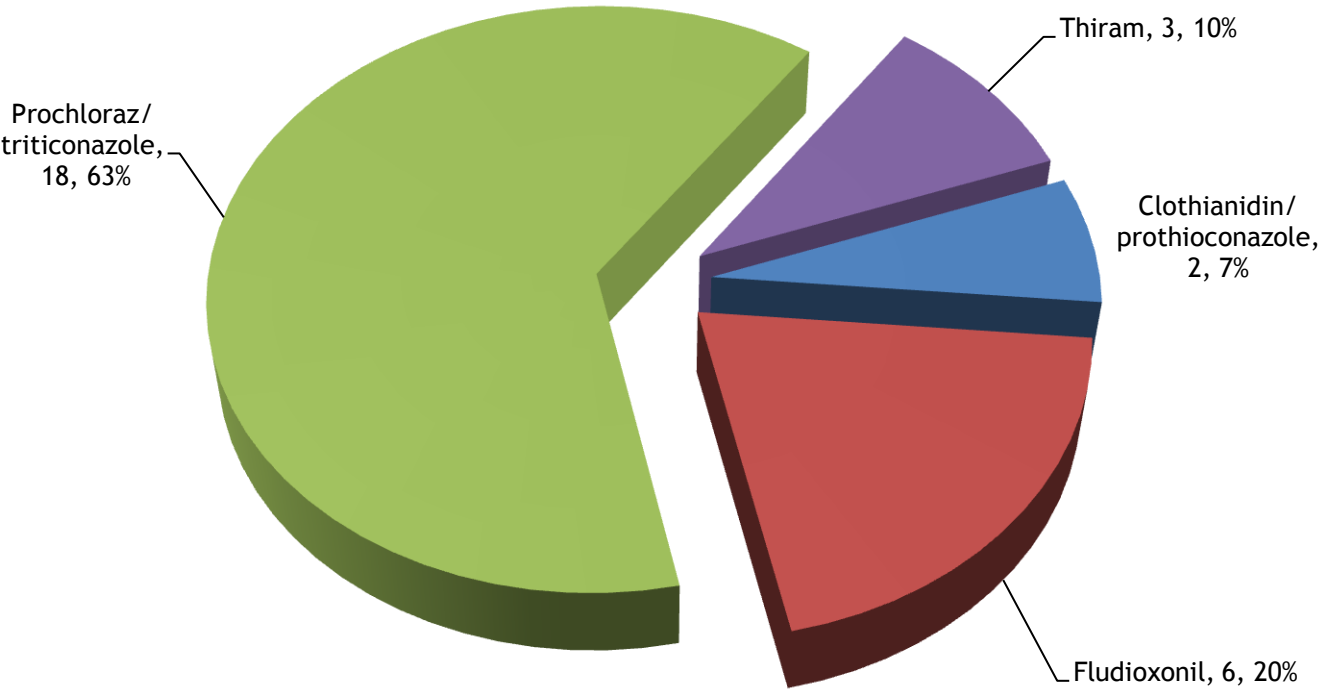
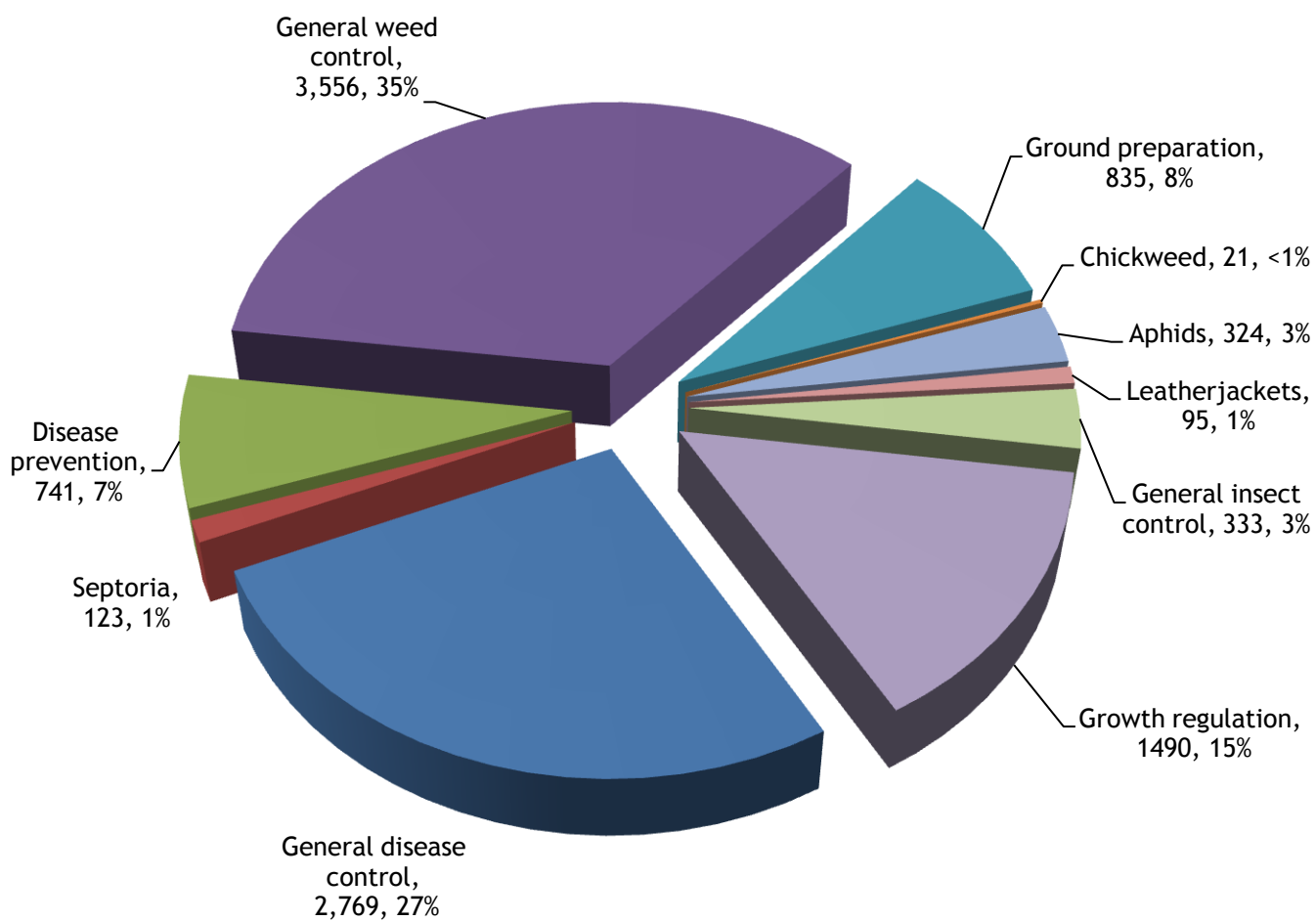


Figure 45: Arable silage: reasons for pesticide use (spha), 2013.



Arable silage (undersown)

Tables: 3, 6, 7, 8, 9, 10, 20

- 1,929 hectares of arable silage (undersown) grown in Northern Ireland.
- 5,459 treated 'spray hectares'.
- 2,874 kilograms of active substances applied.
- Fungicides, herbicides, insecticides, growth regulators and seed treatments were all applied.
- Chlormequat was the only growth regulator applied.
- 86.5% of the undersown arable silage area received treatments.

Figure 46: Arable silage (undersown): Area (spha) of pesticide groups applied, 2013.

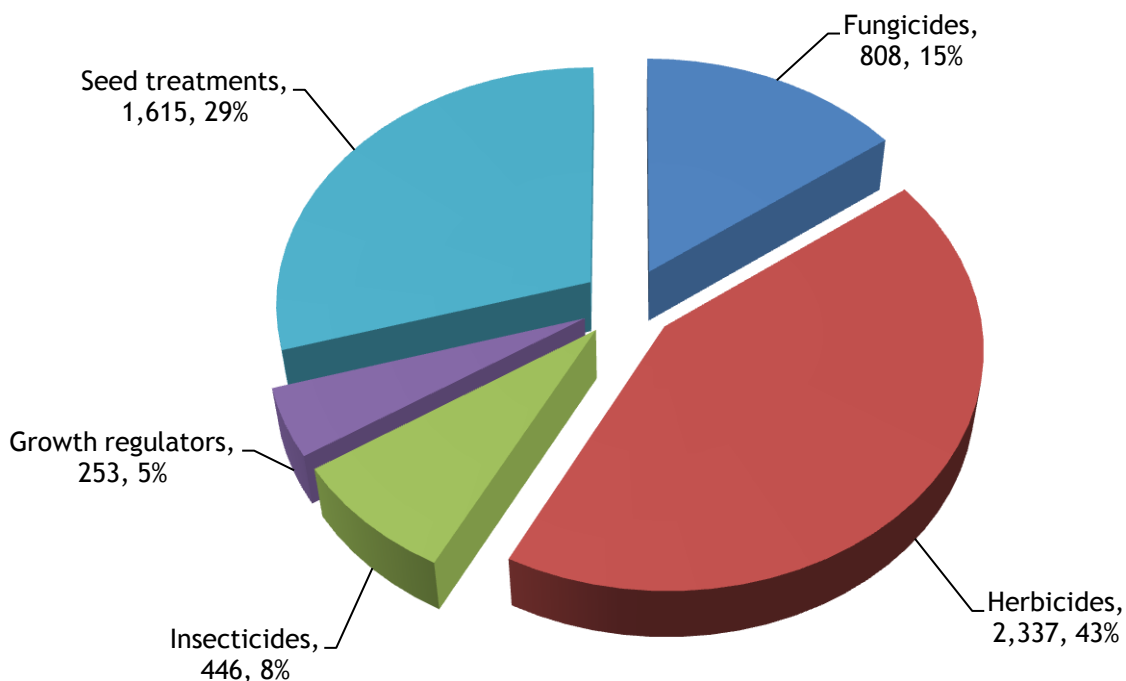


Figure 47: Arable silage (undersown): Weight (kg) of pesticide groups applied, 2013.

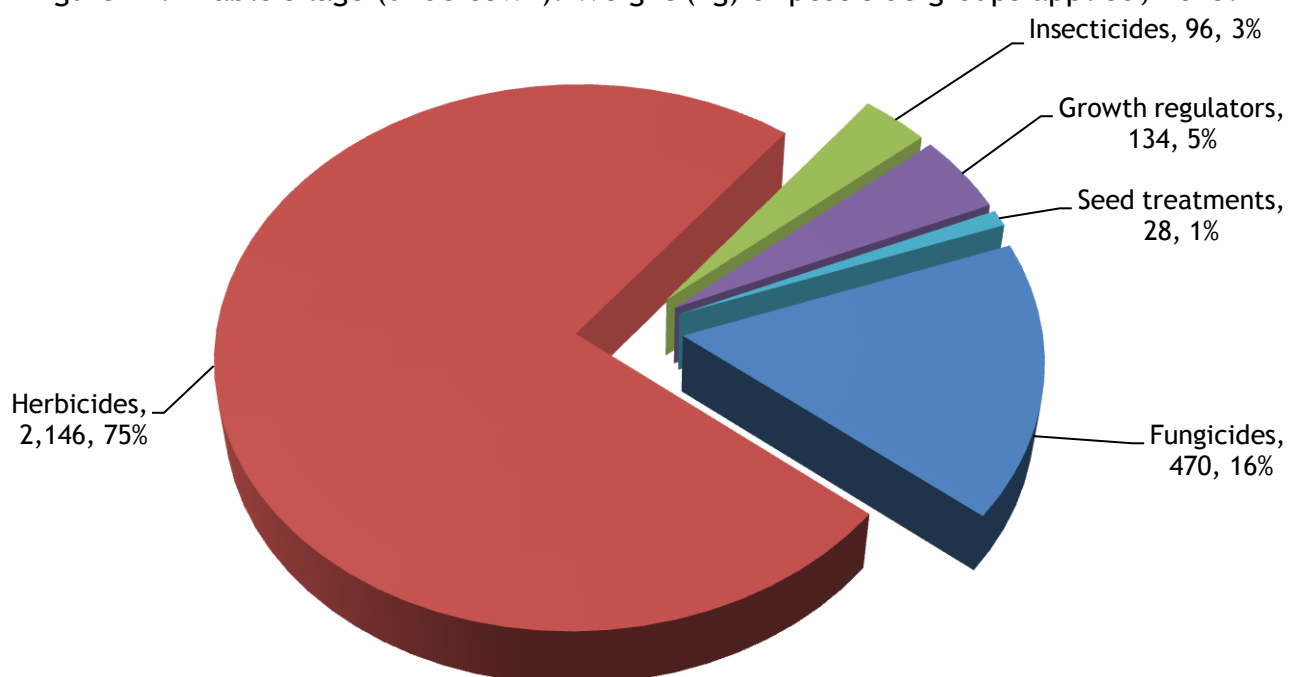


Figure 48: Arable silage (undersown): pesticide-treated area (spha) of fungicide active substances, 2013.

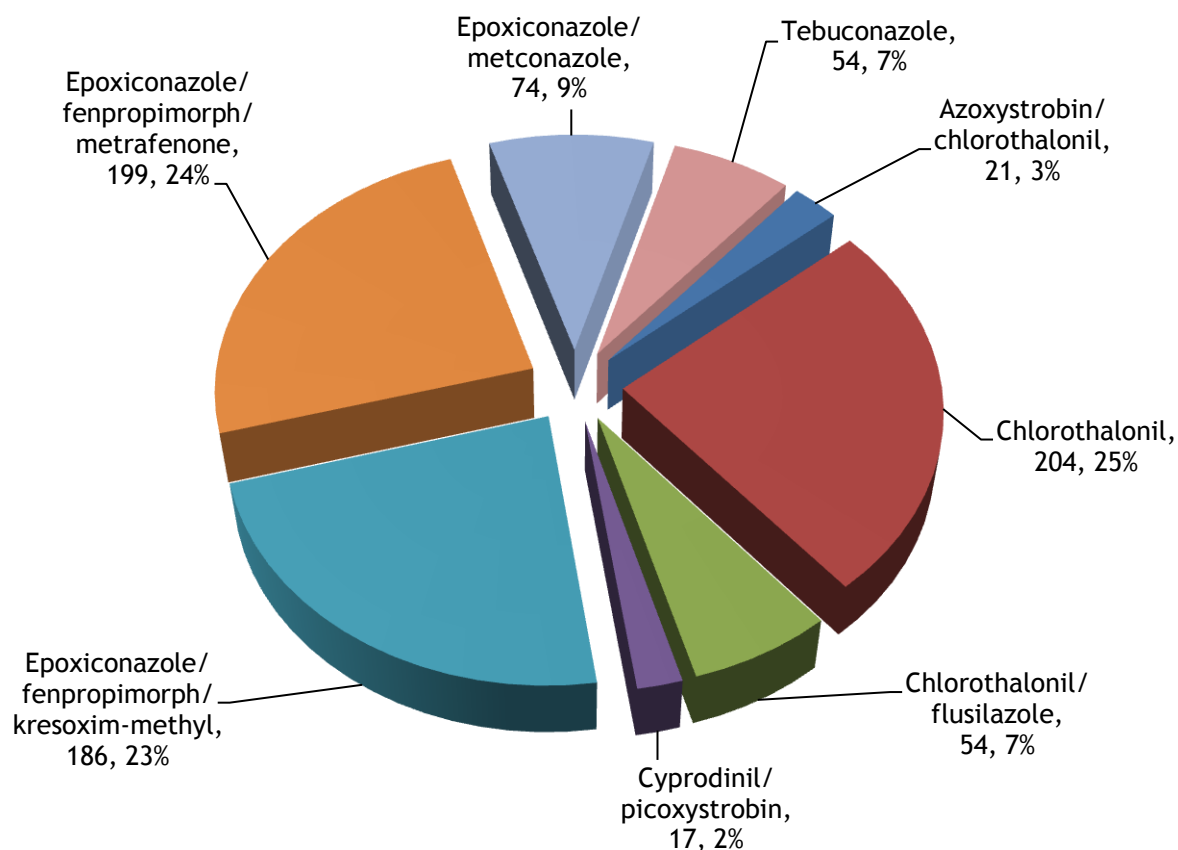


Figure 49: Arable silage (undersown): weight (kg) of fungicide active substances applied, 2013.

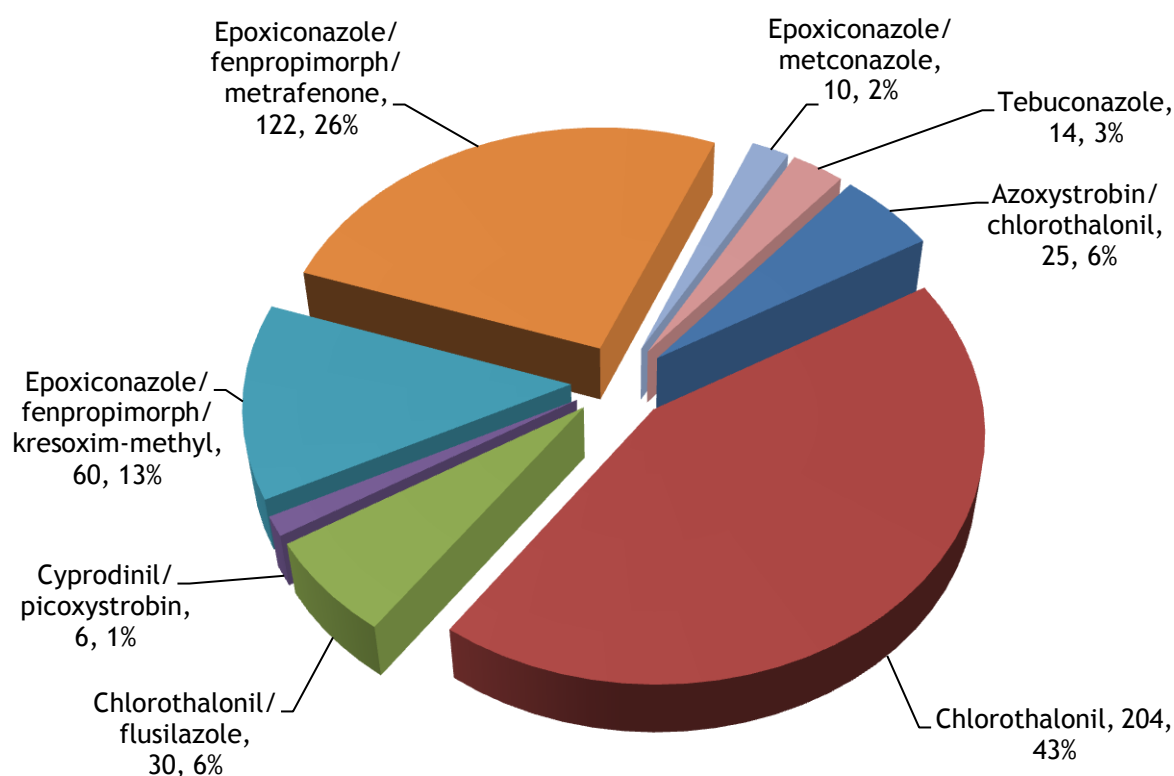


Figure 50: Arable silage (undersown): pesticide-treated area (spha) of herbicide active substances, 2013.

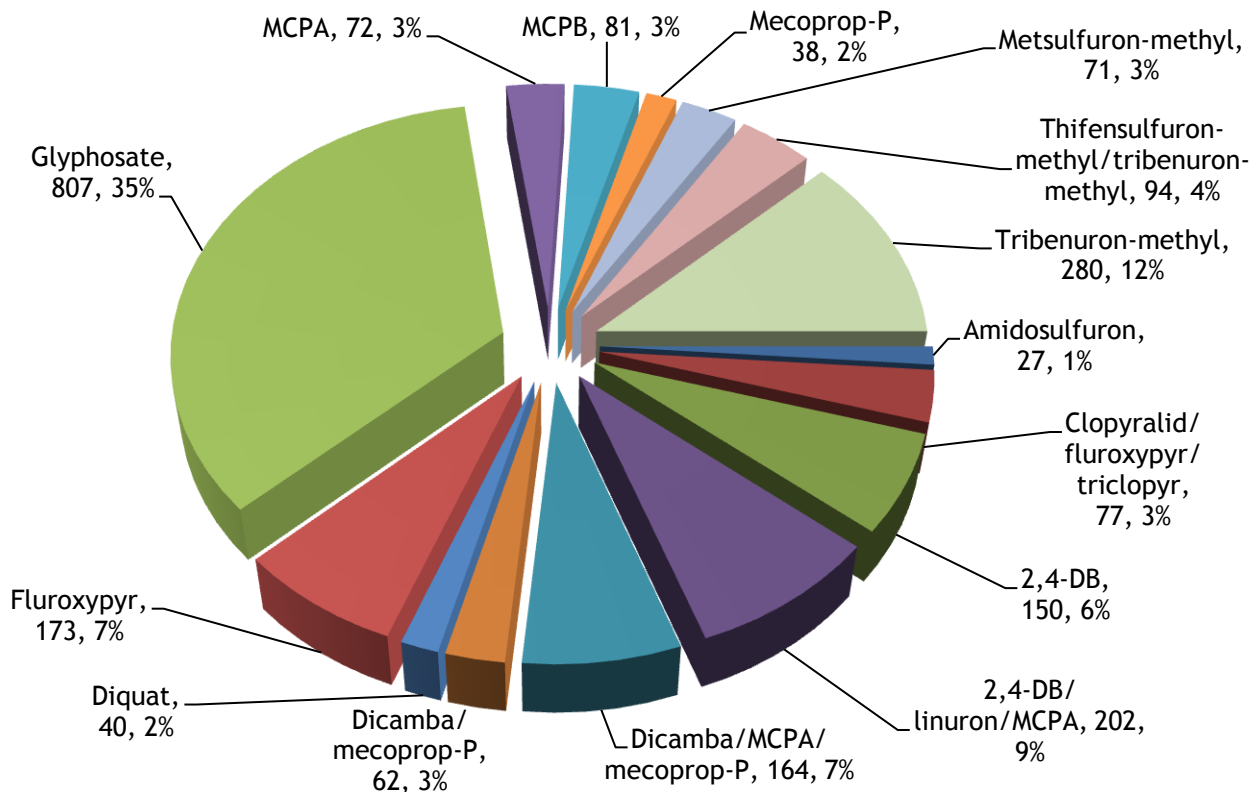


Figure 51: Arable silage (undersown): weight (kg) of herbicide active substances applied, 2013.

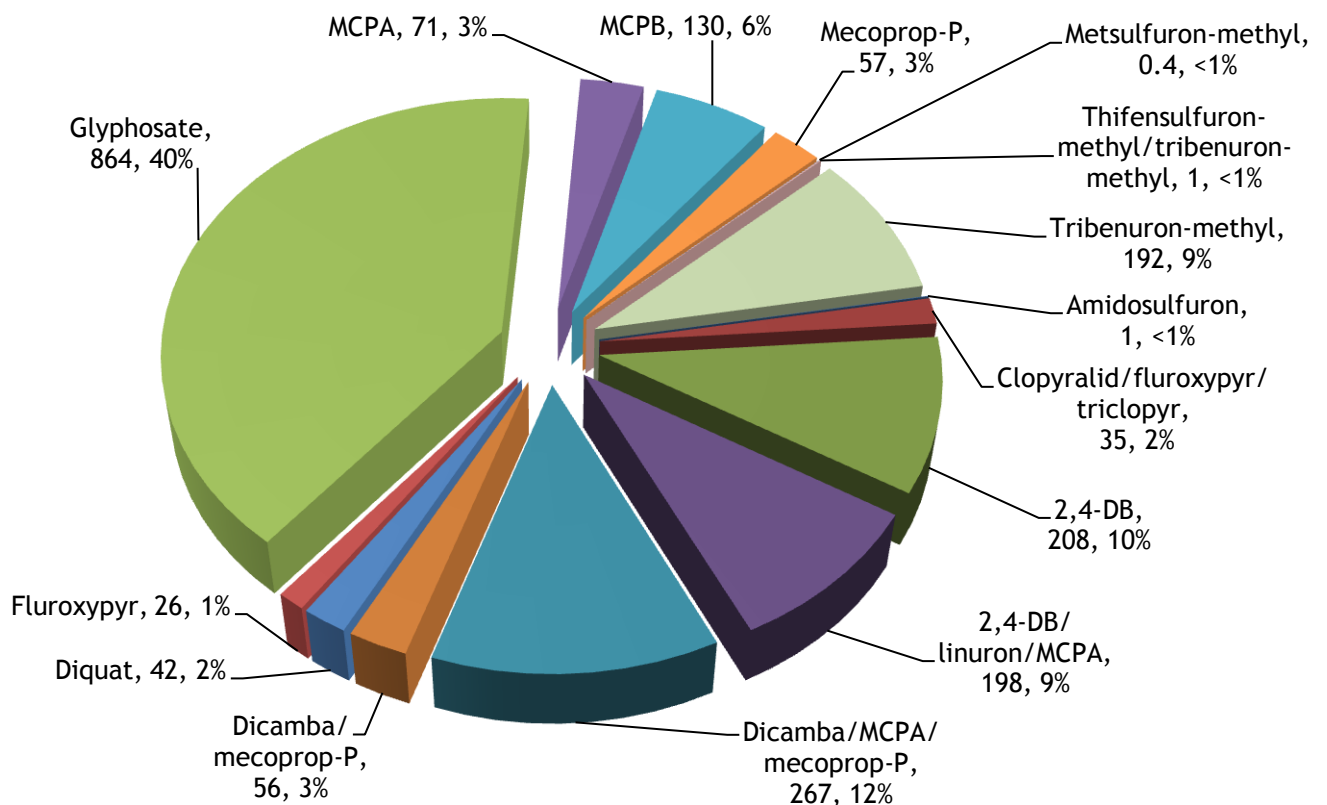


Figure 52: Arable silage (undersown): pesticide-treated area (spha) of insecticide active substances, 2013.

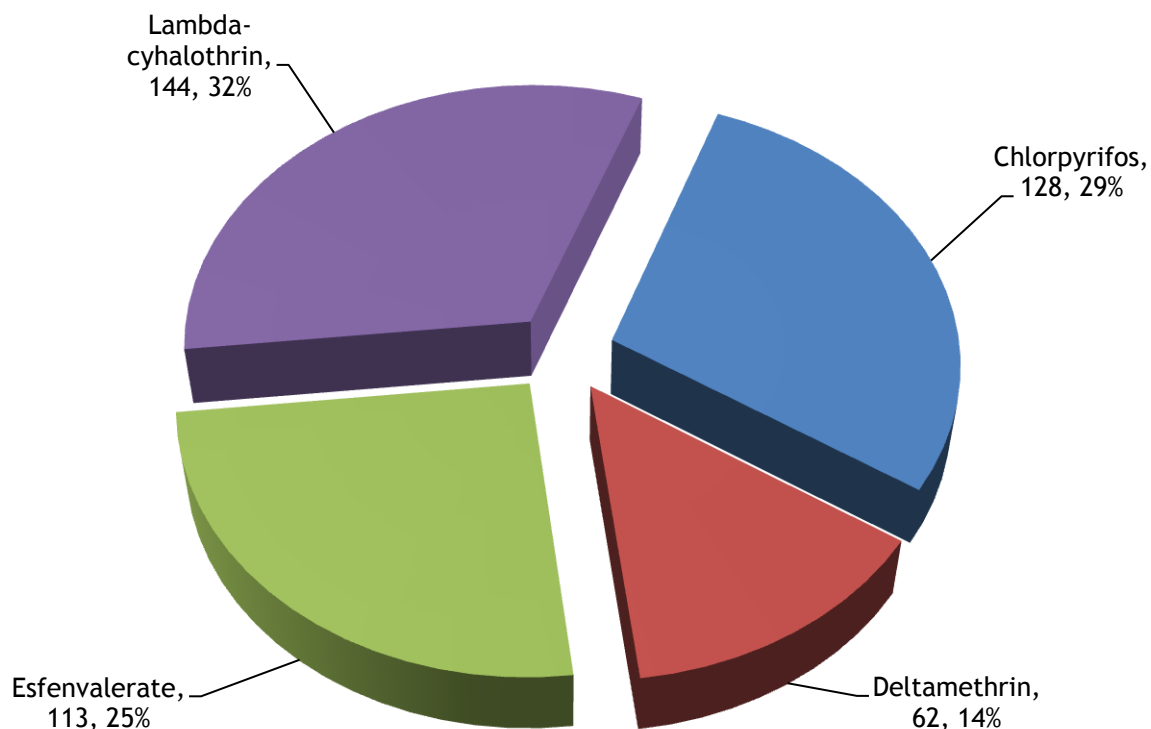


Figure 53: Arable silage (undersown): weight (kg) of insecticide active substances applied, 2013.

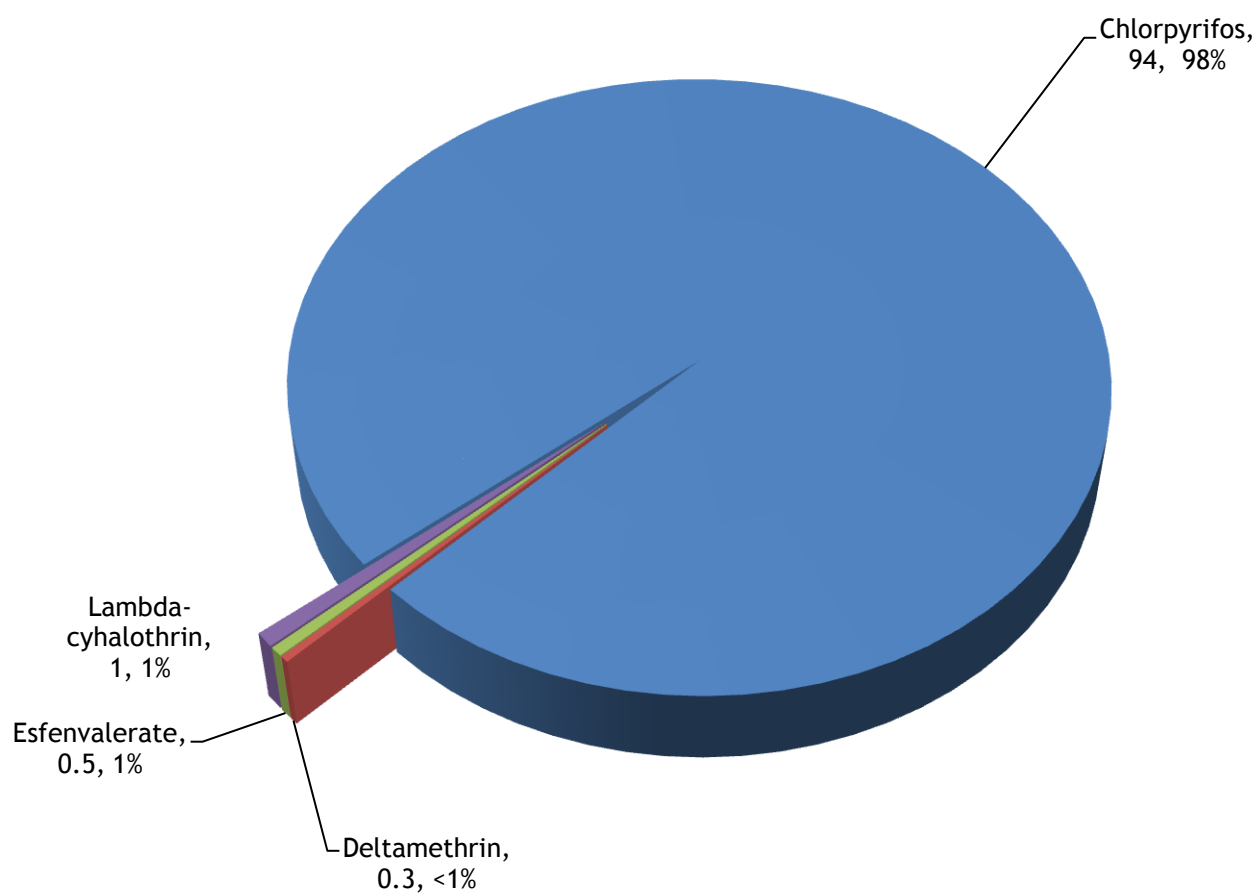


Figure 54: Arable silage (undersown): pesticide-treated area (ha) of seed treatment active substances, 2013.

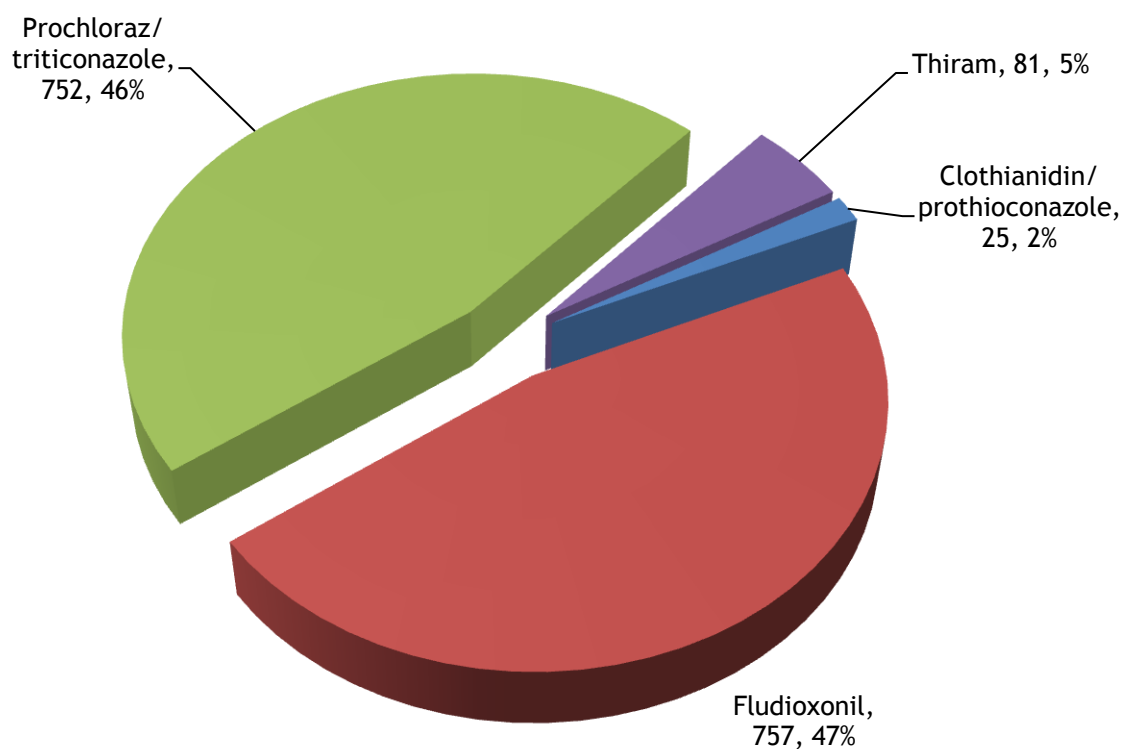


Figure 55: Arable silage (undersown): weight (kg) of seed treatment active substances applied, 2013.

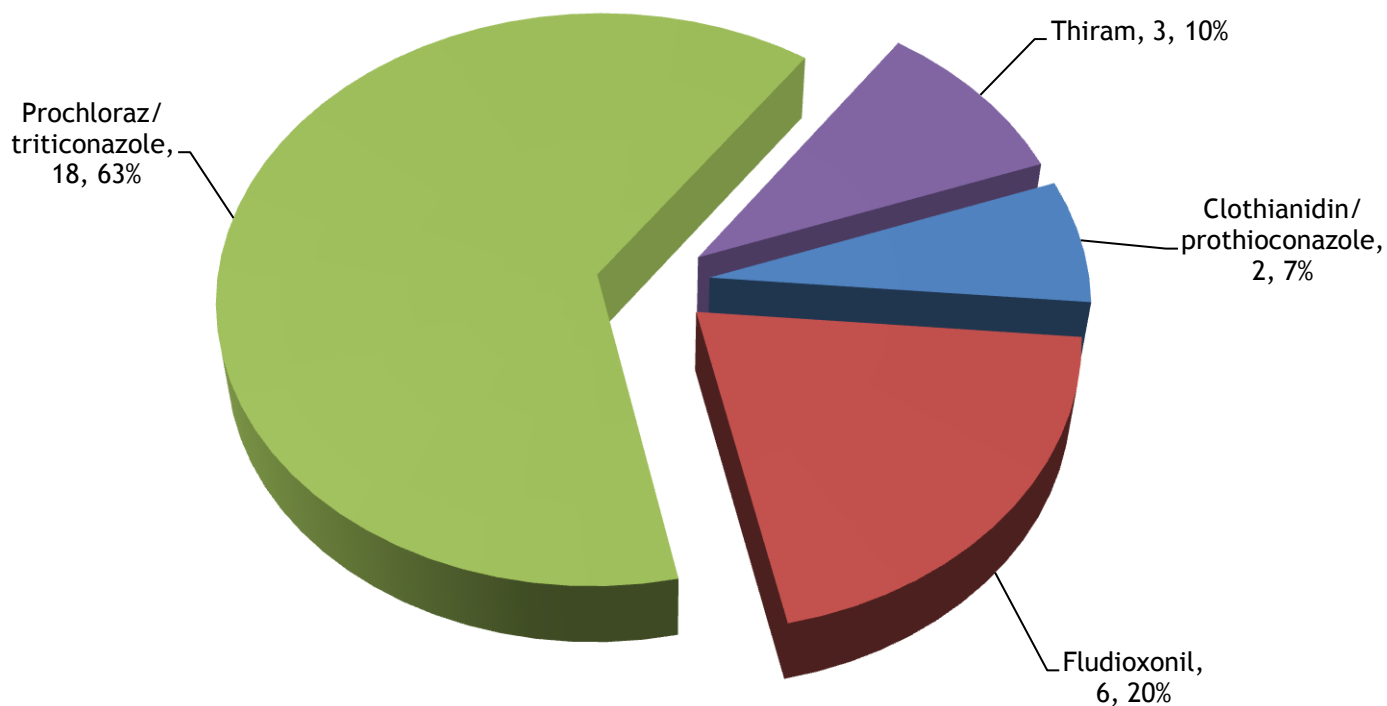
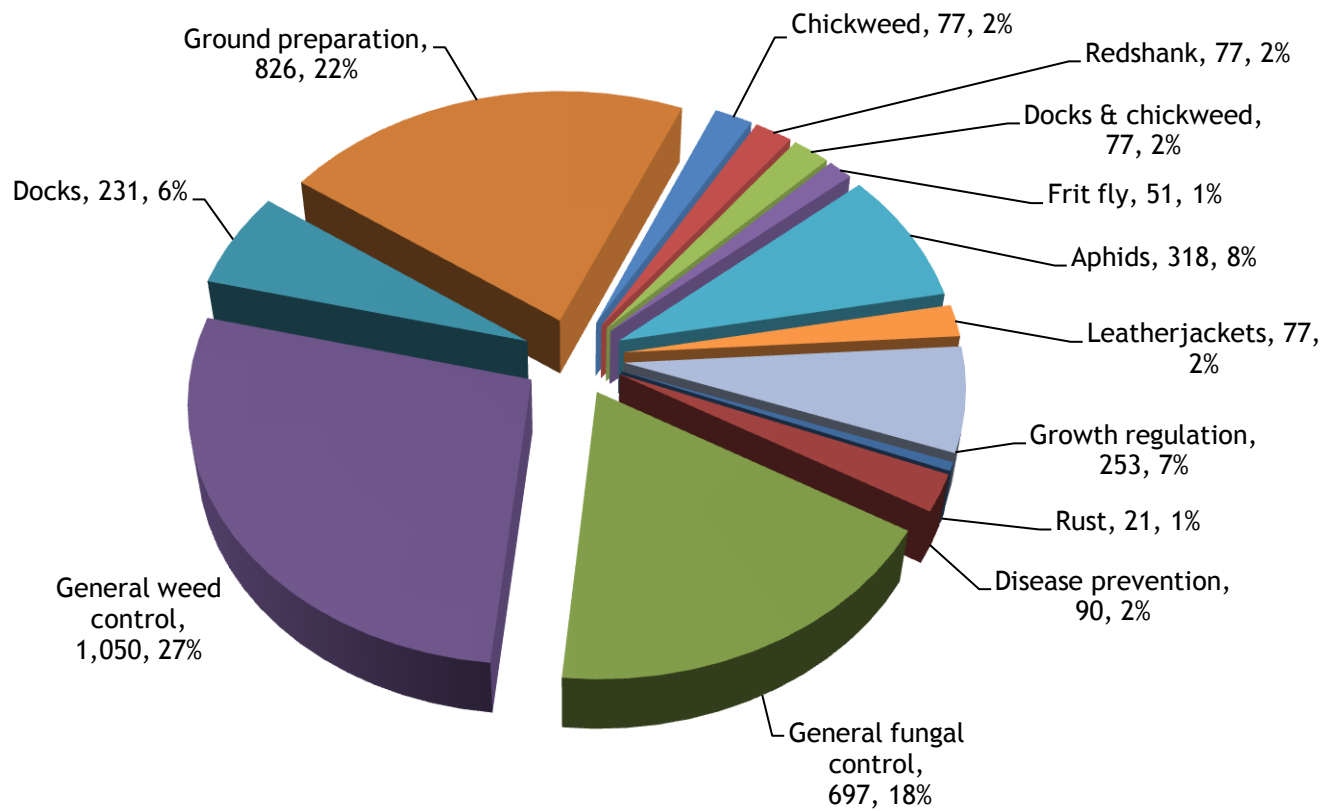


Figure 56: Arable silage (undersown): reasons for pesticide use (spha), 2013.



Cereals (undersown)

- No undersown cereals were recorded as grown in Northern Ireland during 2013.

Grass reseed

Tables: 3, 6, 7, 8, 9, 10, 21

- 19,647 hectares of grass reseeds were sown in Northern Ireland.
- 9,948 treated 'spray hectares'.
- 9,458 kilograms of active substances applied.
- 7,550 ha (38.4%) were treated with herbicides.
- 211 ha (1.1%) were treated with chlorpyrifos to control leatherjackets
- 38.4% of the grass reseed area received treatments.

Figure 57: Grass reseeds: Area (spha) of pesticide groups applied, 2013.

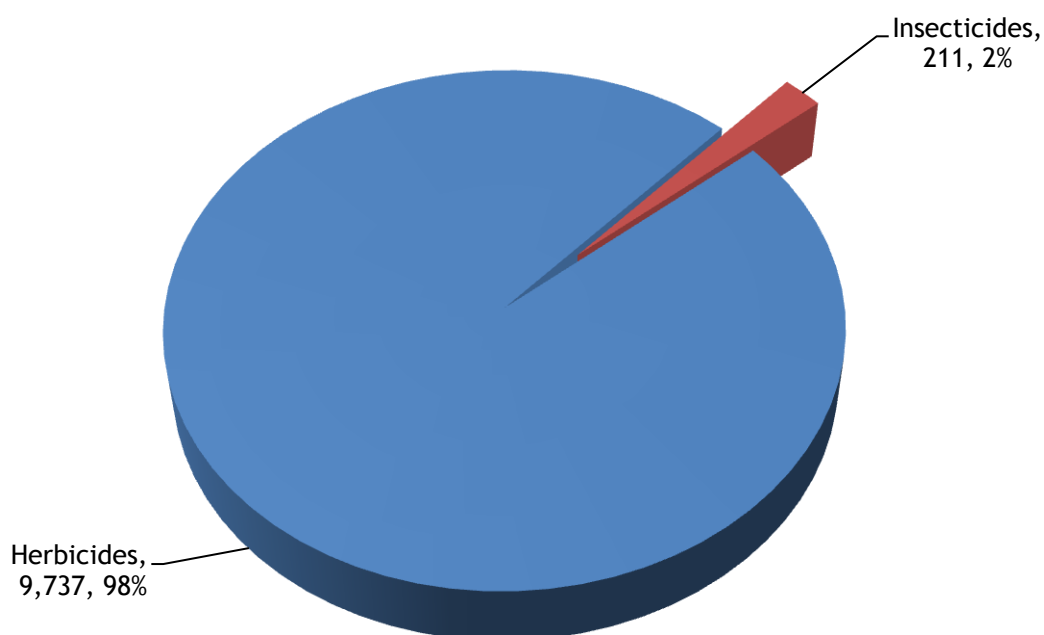


Figure 58: Grass reseeds: Weight (kg) of pesticide groups applied, 2013.

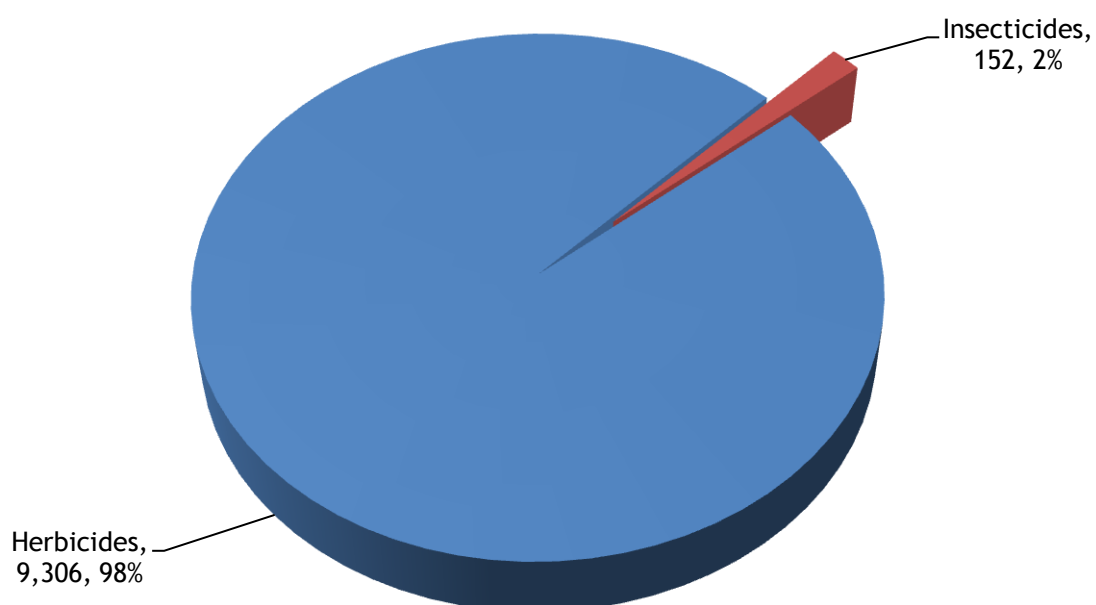


Figure 59: Grass reseeds: pesticide-treated area (spha) of herbicide active substances, 2013.

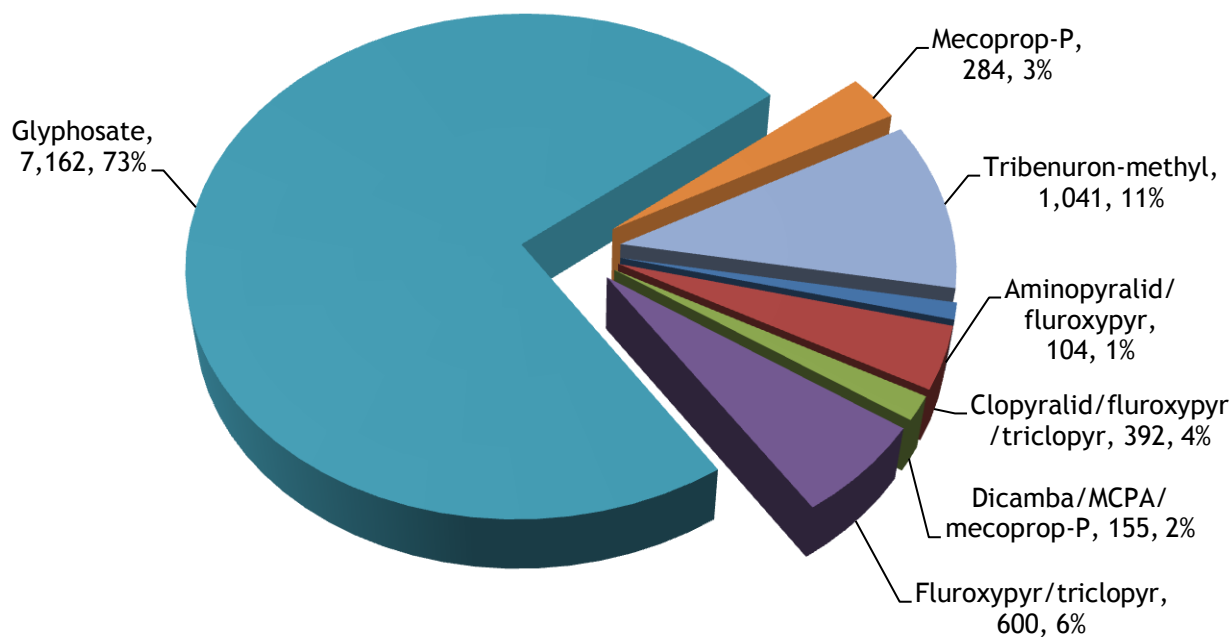


Figure 60: Grass reseeds: weight (kg) of herbicide active substances applied, 2013.

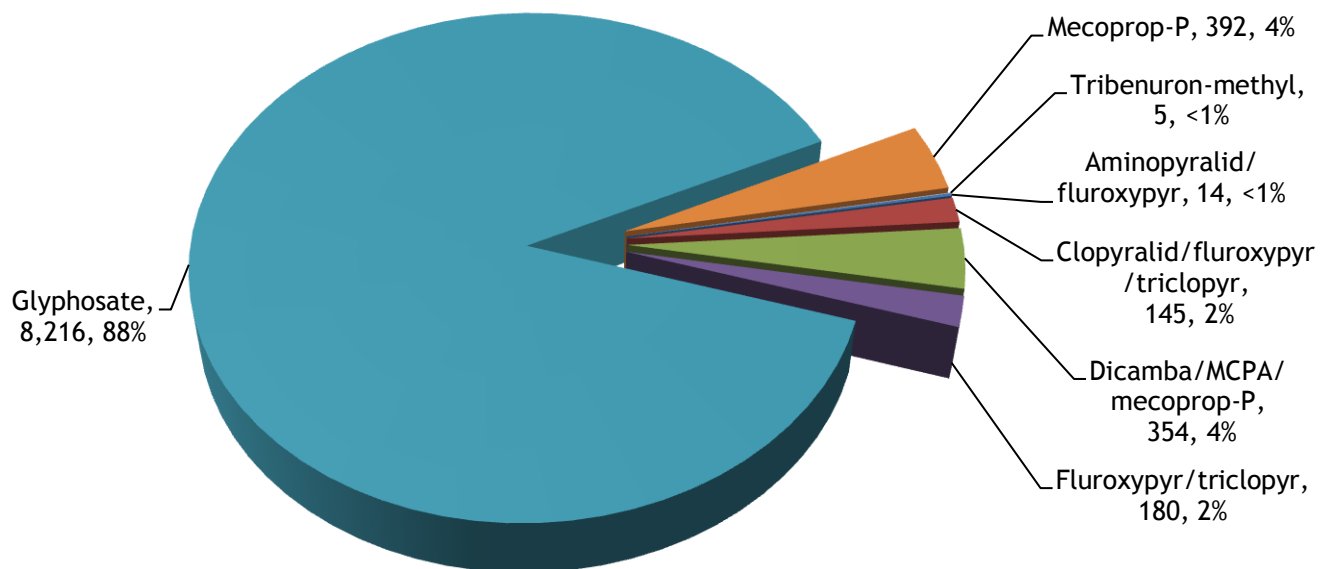
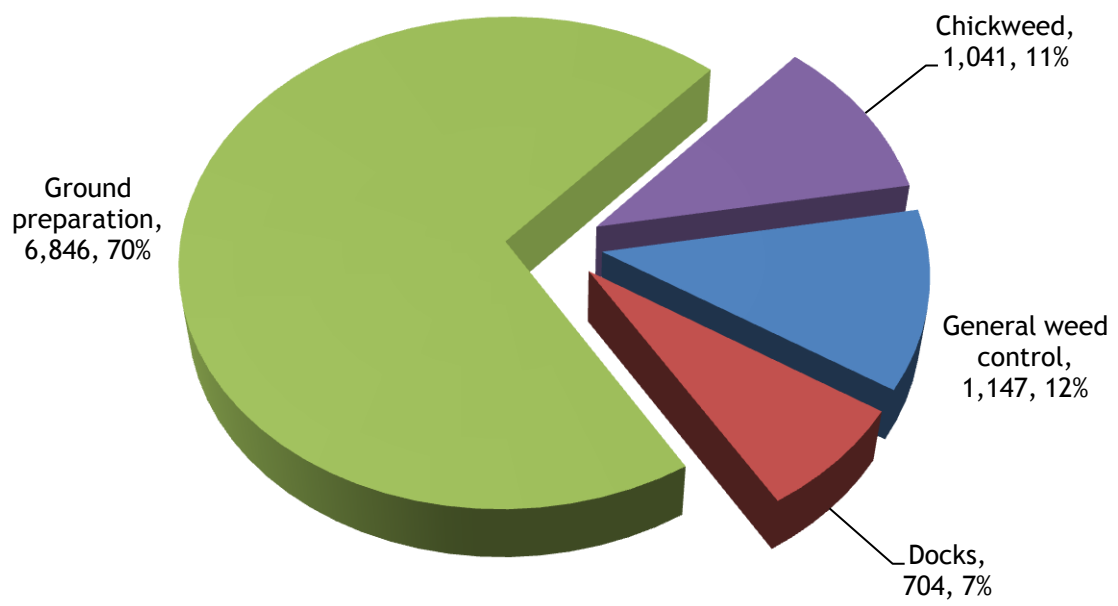


Figure 61: Grass reseeds: reasons for herbicide use (spha), 2013.



Fodder maize

Tables: 3, 6, 7, 8, 9, 10, 23

- 1,918 hectares of fodder maize were sown in Northern Ireland.
- 6,527 treated 'spray hectares'.
- 4,649 kilograms of active substances applied.
- Herbicides and seed treatments were the only pesticide active ingredients applied.
- Methiocarb was the only seed treatment applied.
- 100% of the fodder maize area received treatments.

Figure 62: Fodder Maize: pesticide-treated area (spha) of herbicide active substances, 2013.

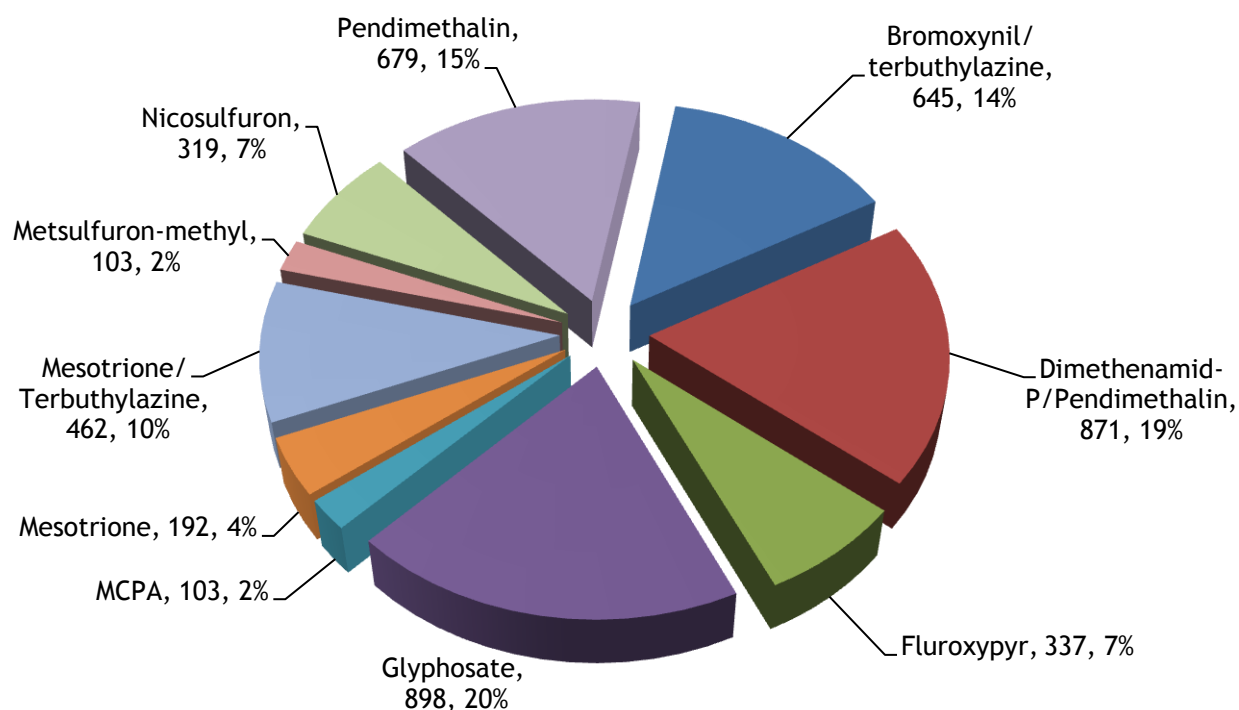


Figure 63: Fodder maize: weight (kg) of herbicide active substances applied, 2013.

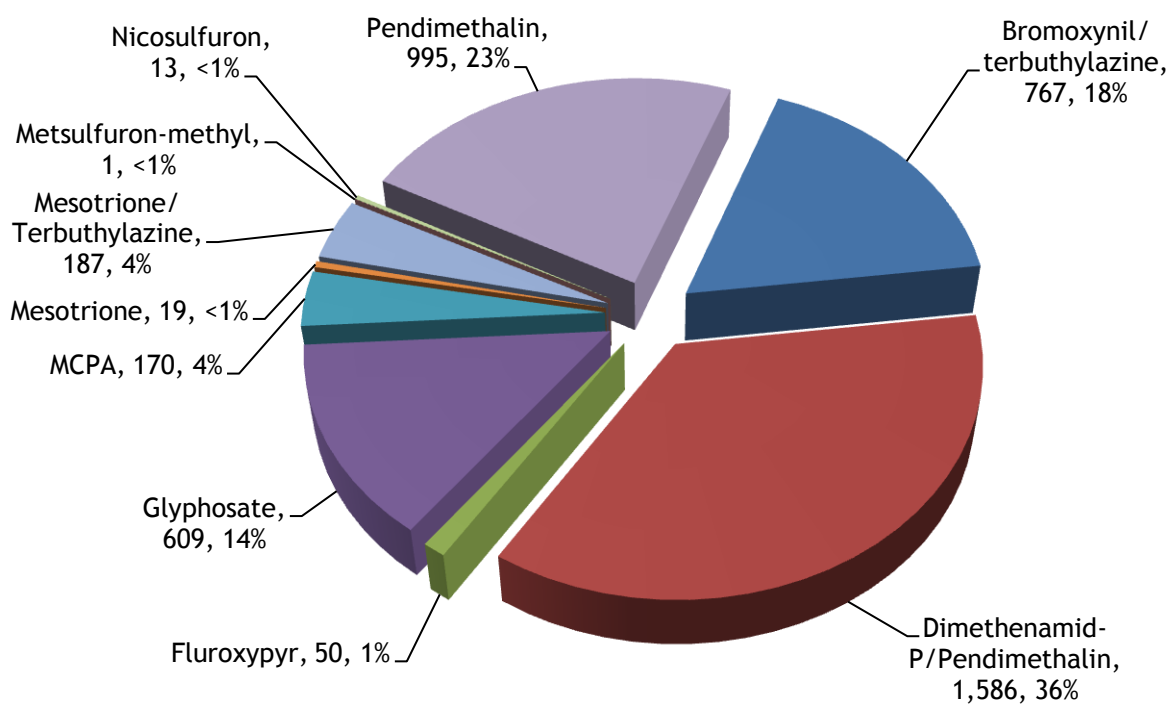
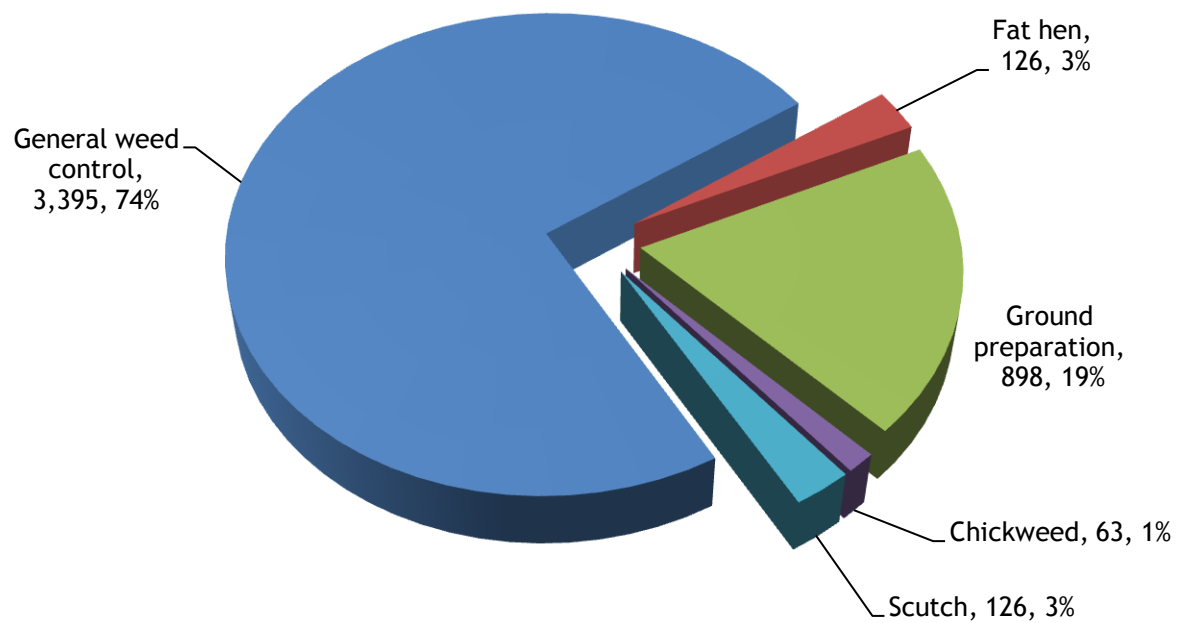


Figure 64: Fodder maize: reasons for herbicide use (spha), 2013.



Other fodder crops

Tables: 3, 6, 7, 8, 9, 10, 22

- 769 hectares of other fodder crops were sown in Northern Ireland.
- 513 treated 'spray hectares'.
- 523 kilograms of active substances applied.
- Fungicides, herbicides and seed treatments were applied.
- The active substance flusilazole was the only fungicide applied.
- This was applied for general fungal control.
- 23.8% of the other fodder crops area received treatments.

Figure 65: Other fodder crops: Area (spha) of pesticide groups applied, 2013.

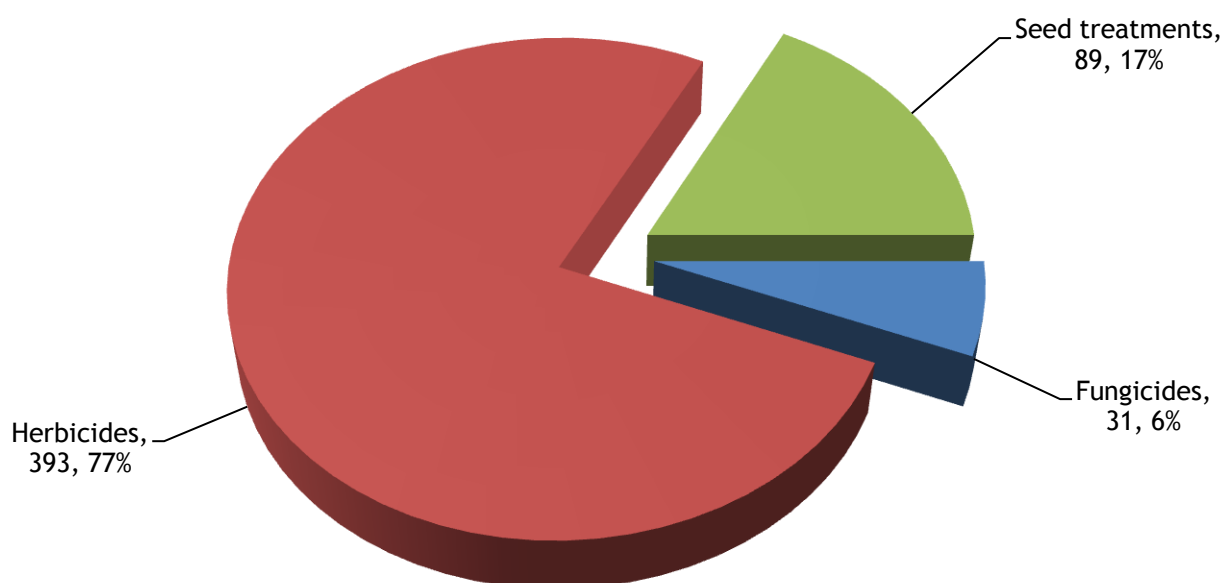


Figure 66: Other fodder crops: Weight (kg) of pesticide groups applied, 2013.

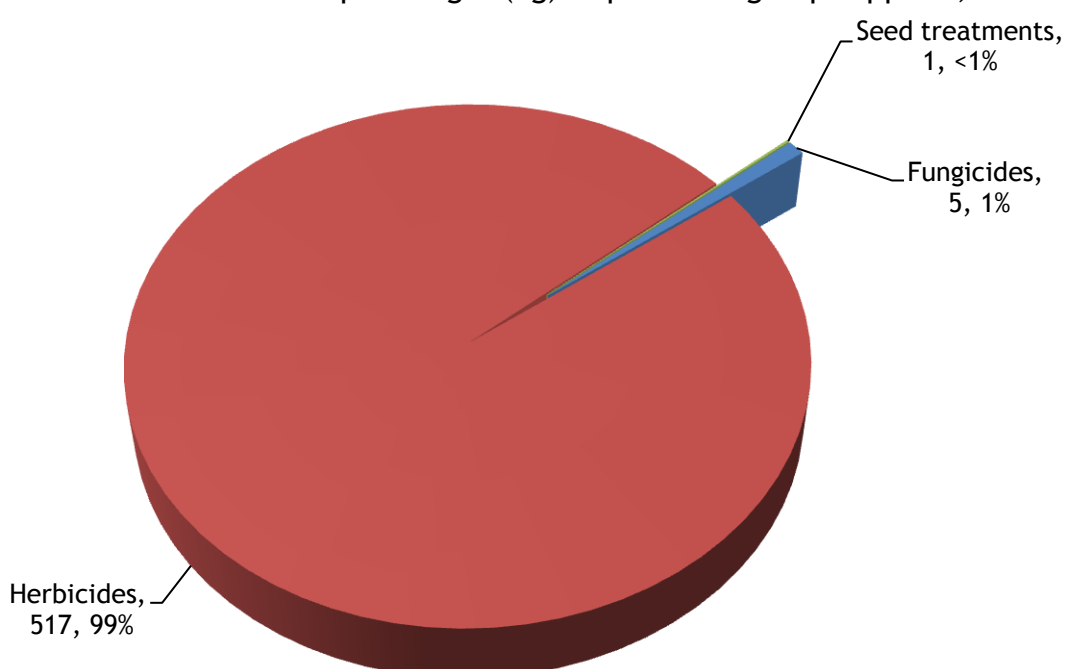


Figure 67: Other fodder crops: pesticide-treated area (spha) of herbicide active substances, 2013.

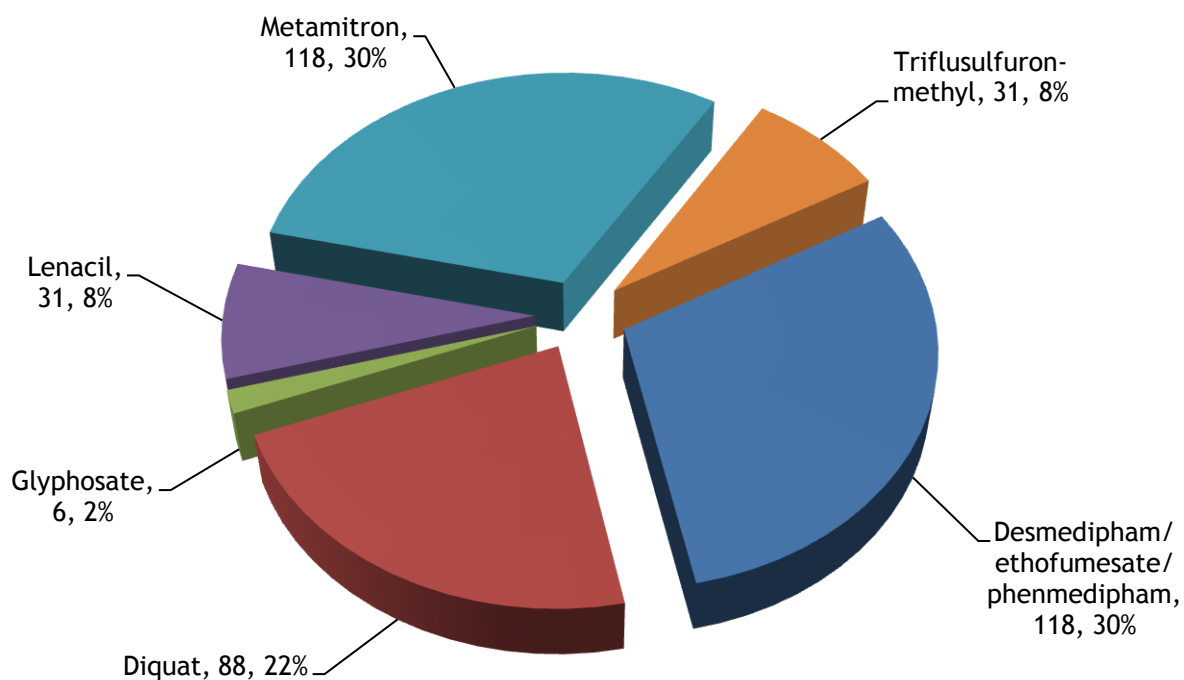


Figure 68: Other fodder crops: weight (kg) of herbicide active substances applied, 2013.

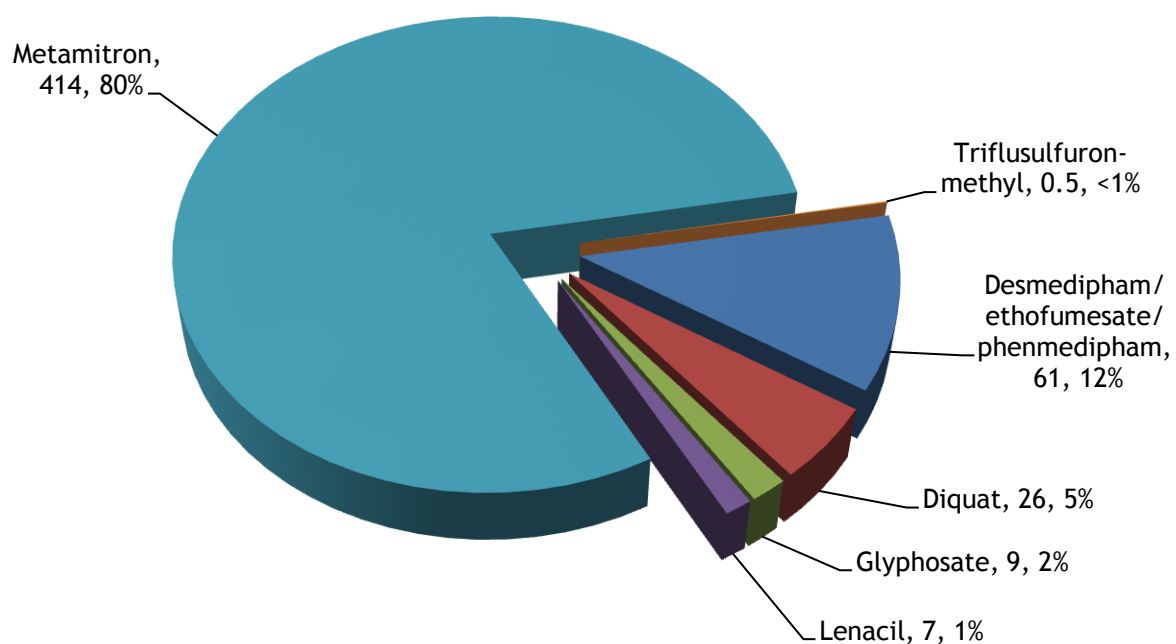
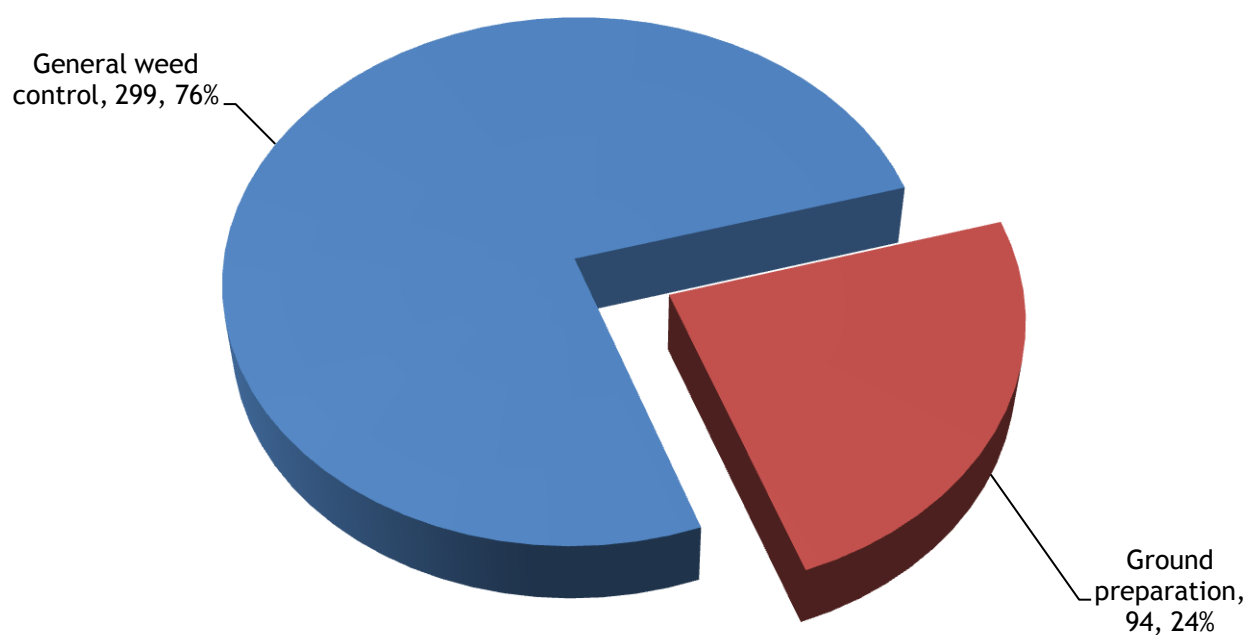


Figure 69: Other fodder crops: reasons for herbicide use (spha), 2013.



Trends:

Figure 70a: Area (ha) of grassland and fodder crops grown, 1989-2013.

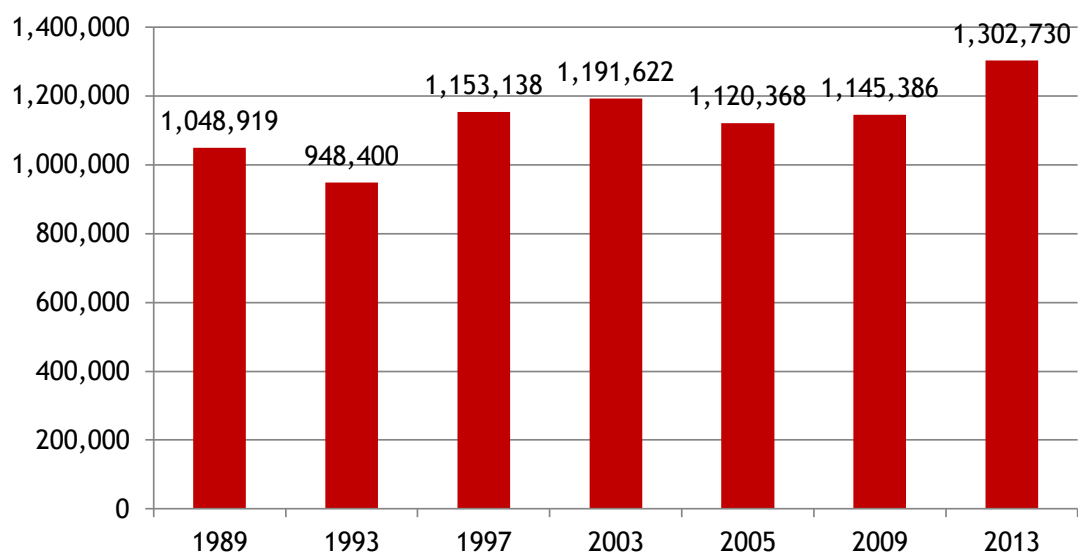


Figure 70b: Pesticide-treated area (spha) of grassland and fodder crops, 1989-2013.

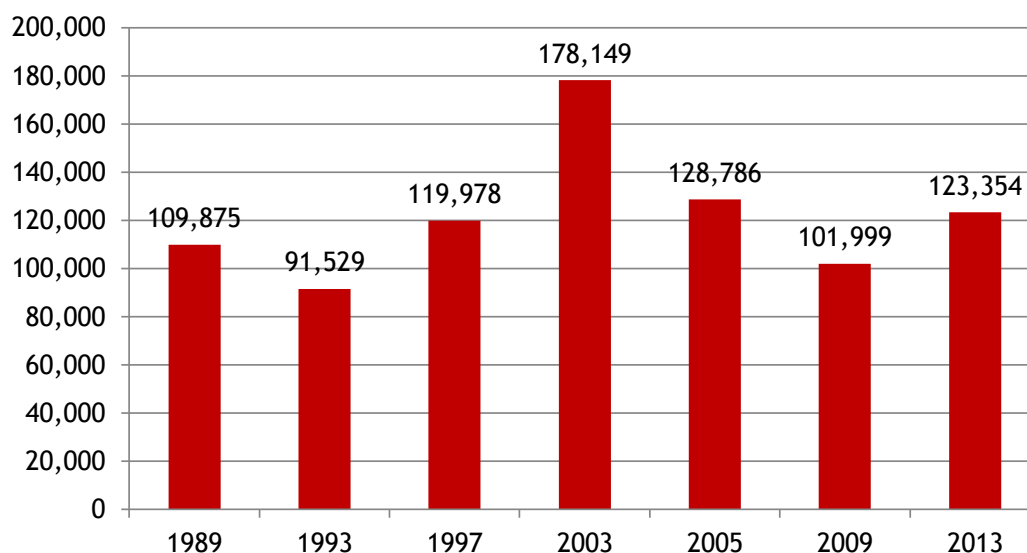


Figure 70c: Weight (t) of pesticides applied to grassland and fodder crops, 1989-2013.

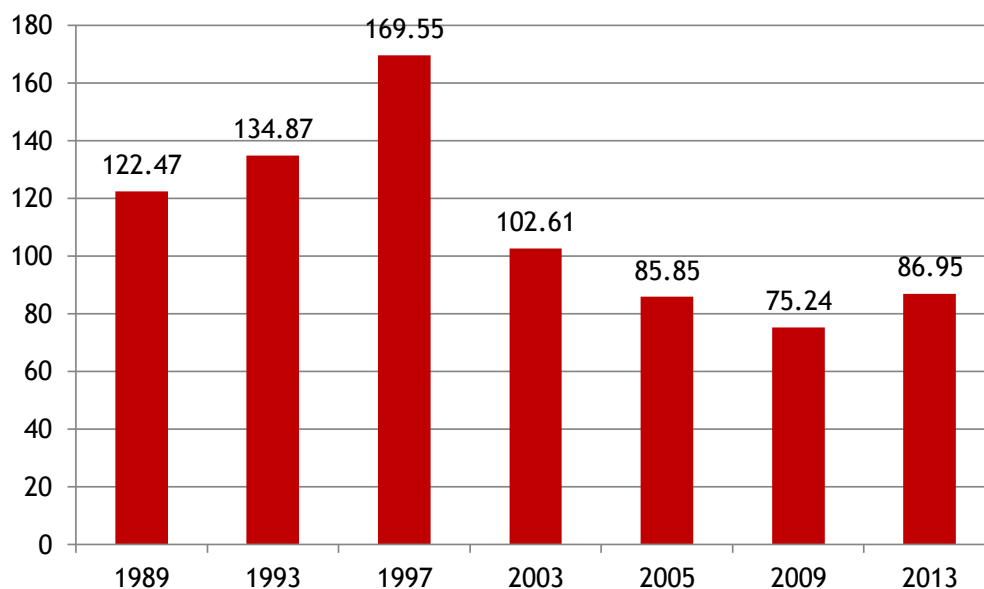


Figure 71a: Area (ha) of established grassland grown, 1989-2013.

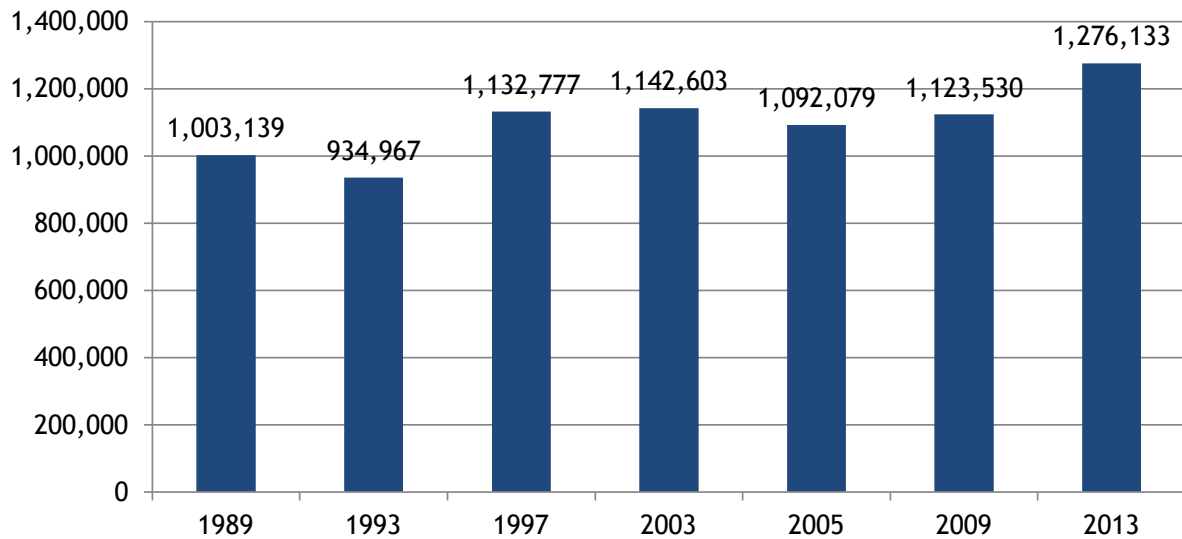


Figure 71b: Pesticide-treated area (spha) of established grassland, 1989-2013.

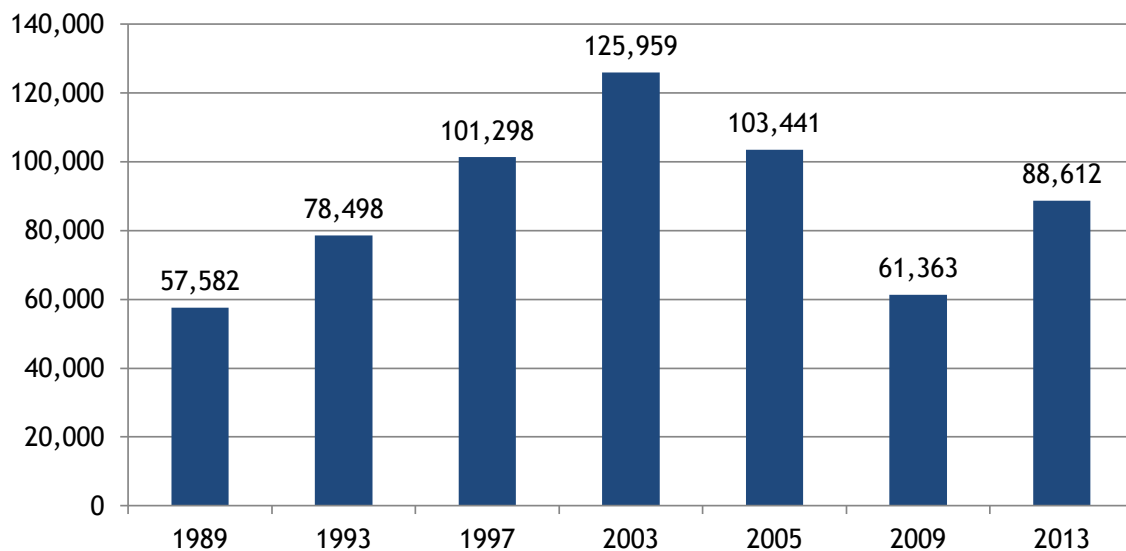


Figure 71c: Weight (t) of pesticides applied to established grassland, 1989-2013.

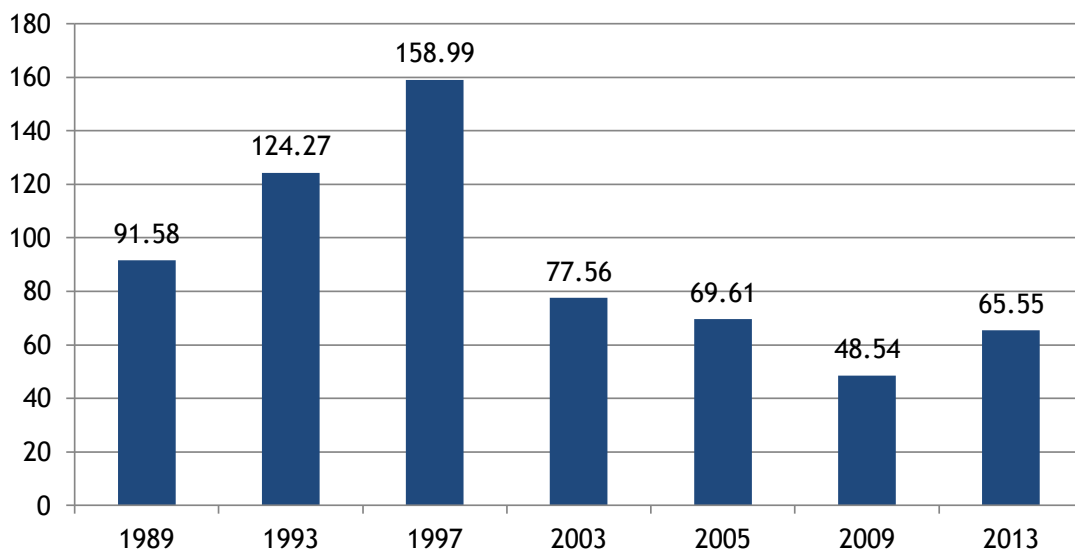


Figure 72a: Area (ha) of enclosed grassland grown (ha), 1989-2013.

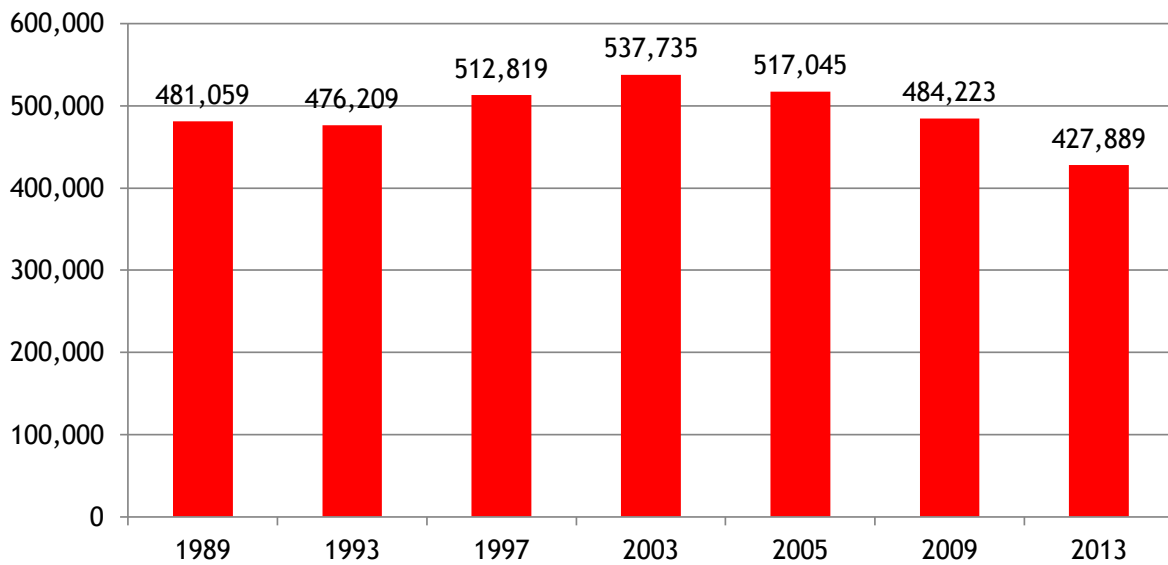


Figure 72b: Pesticide-treated area (spha) of enclosed grassland, 1989-2013.

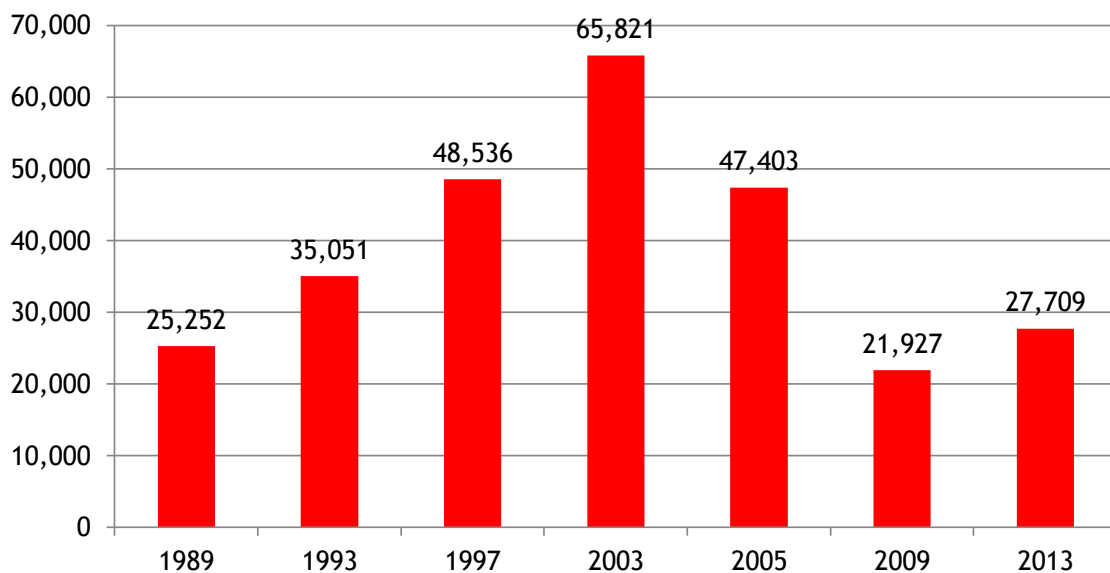


Figure 72c: Weight (t) of pesticides applied to enclosed grassland, 1989-2013.

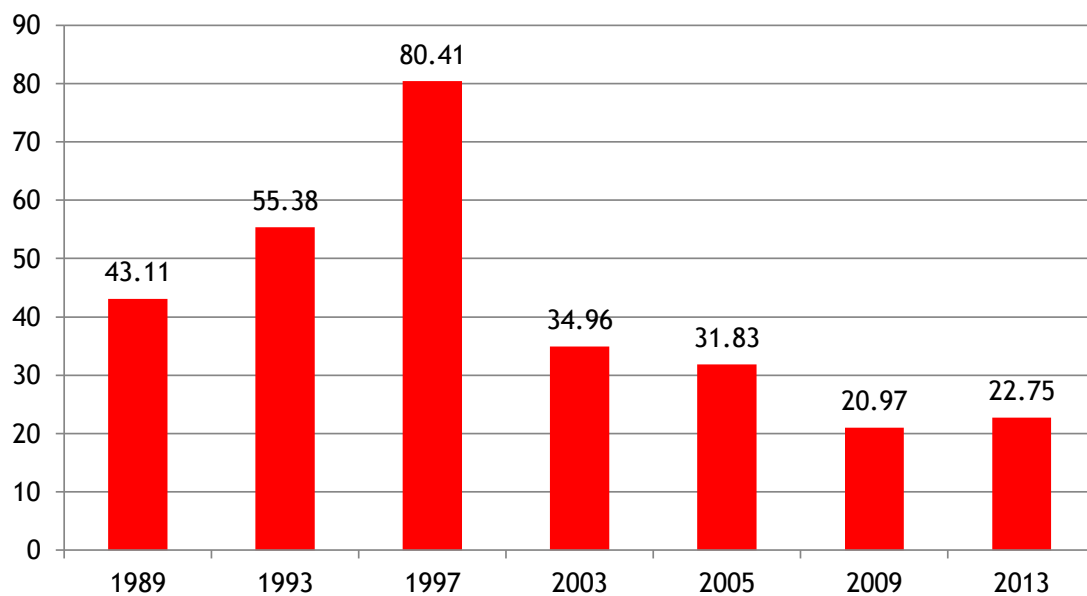


Figure 73a: Area (ha) of grass silage grown, 1989-2013.

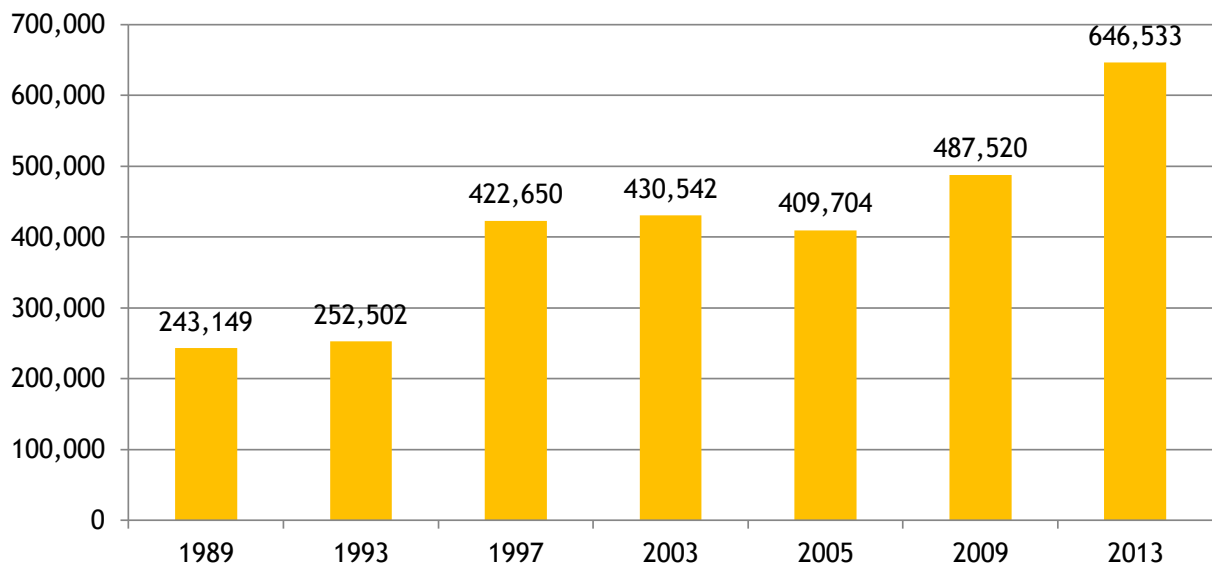


Figure 73b: Pesticide-treated area (spha) of grass silage, 1989-2013.

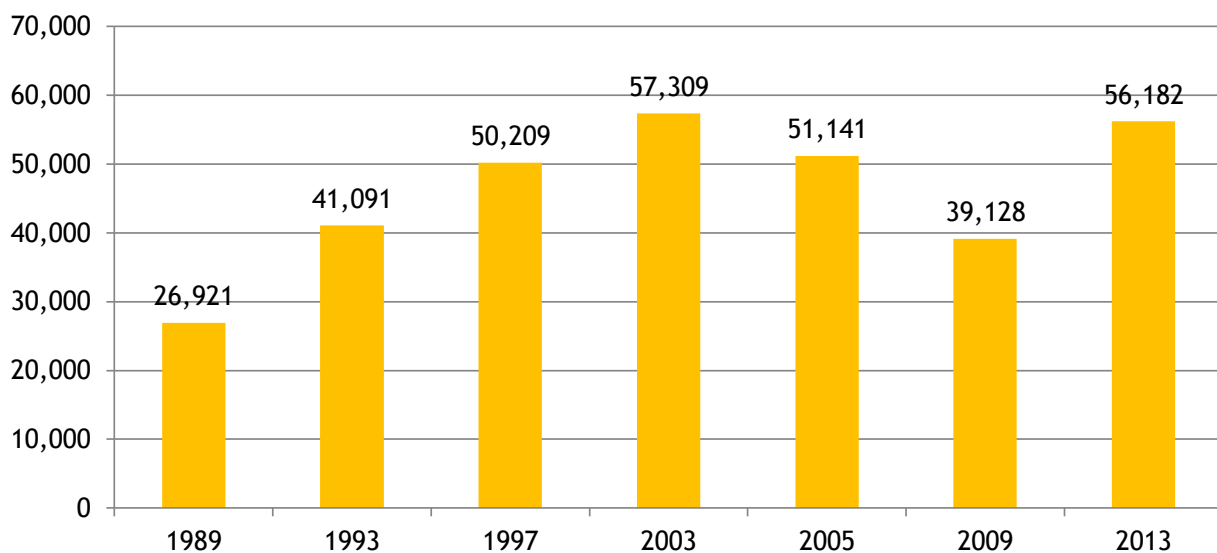


Figure 73c: Weight (t) of pesticides applied to grass silage, 1989-2013.

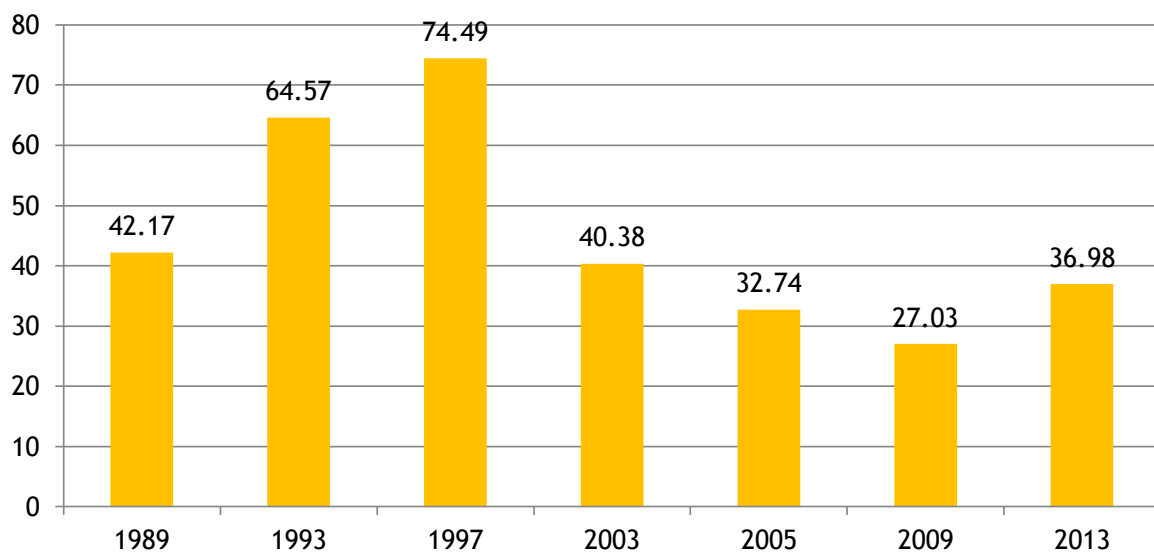


Figure 74a: Area (ha) of hay and haylage grown, 1989-2013.

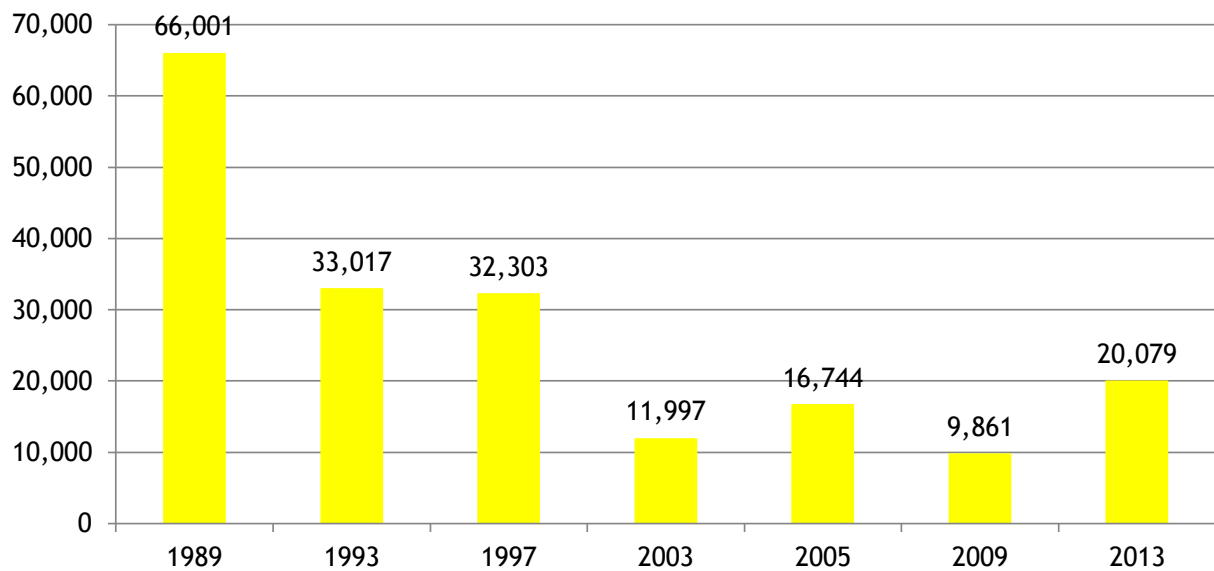


Figure 74b: Pesticide-treated area (spha) of hay and haylage, 1989-2013.

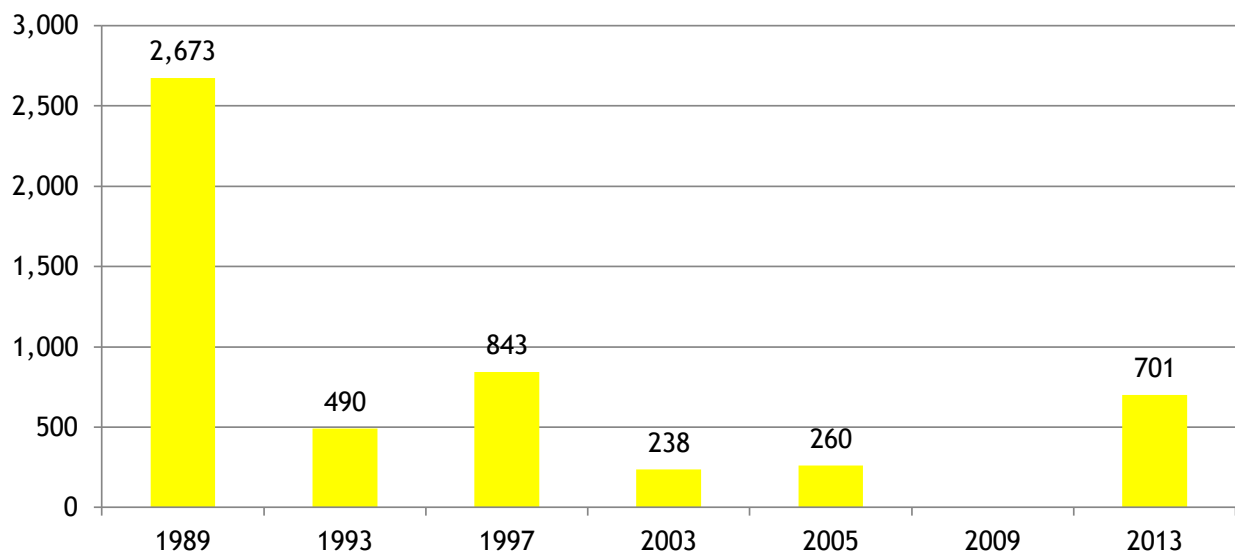


Figure 74c: Weight (t) of pesticides applied to hay and haylage, 1989-2013.

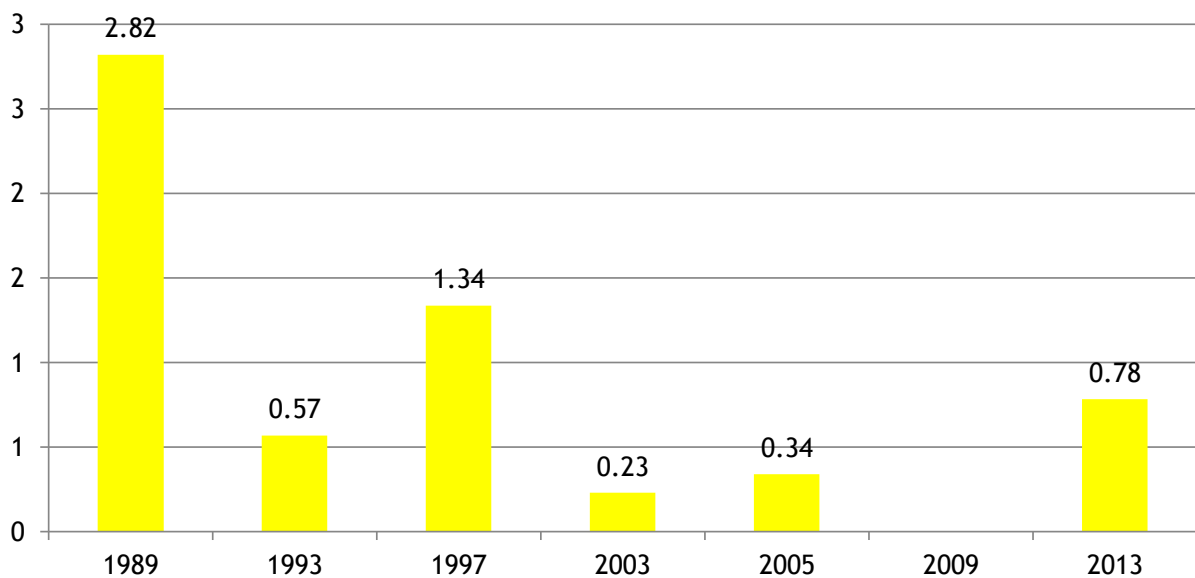


Figure 75a: Area (ha) of rough grazing, 1989-2013.

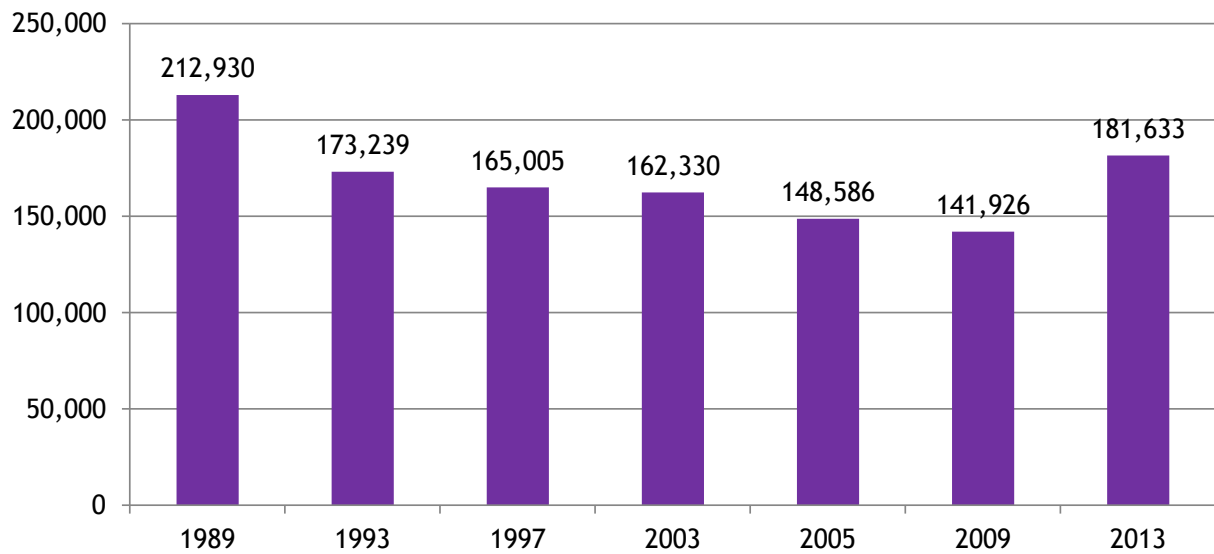


Figure 75b: Pesticide-treated area (spha) of rough grazing, 1989-2013.

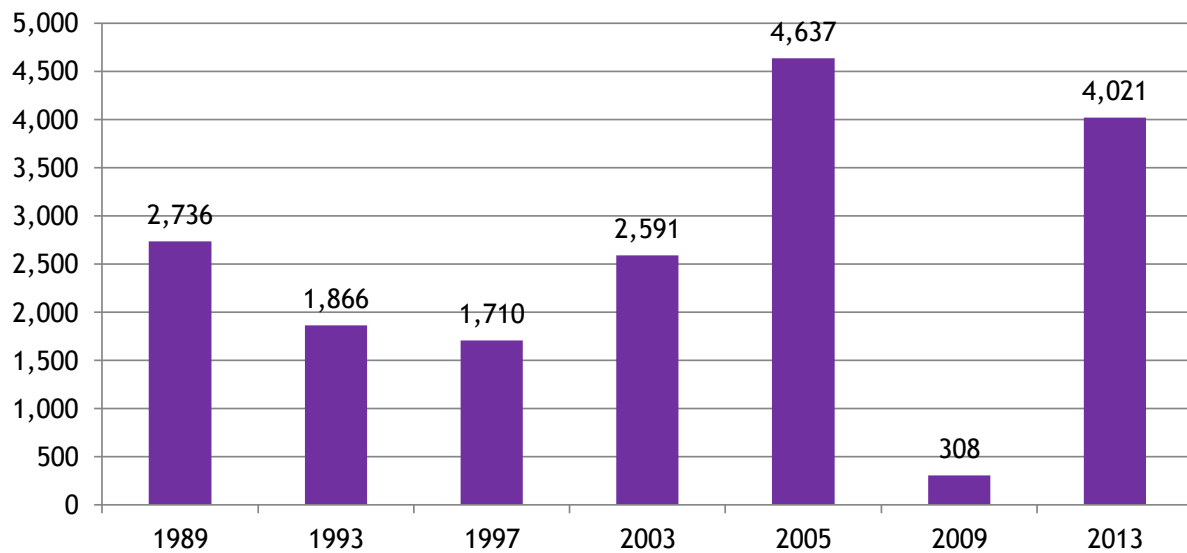


Figure 75c: Weight (t) of pesticides applied to rough grazing, 1989-2013.

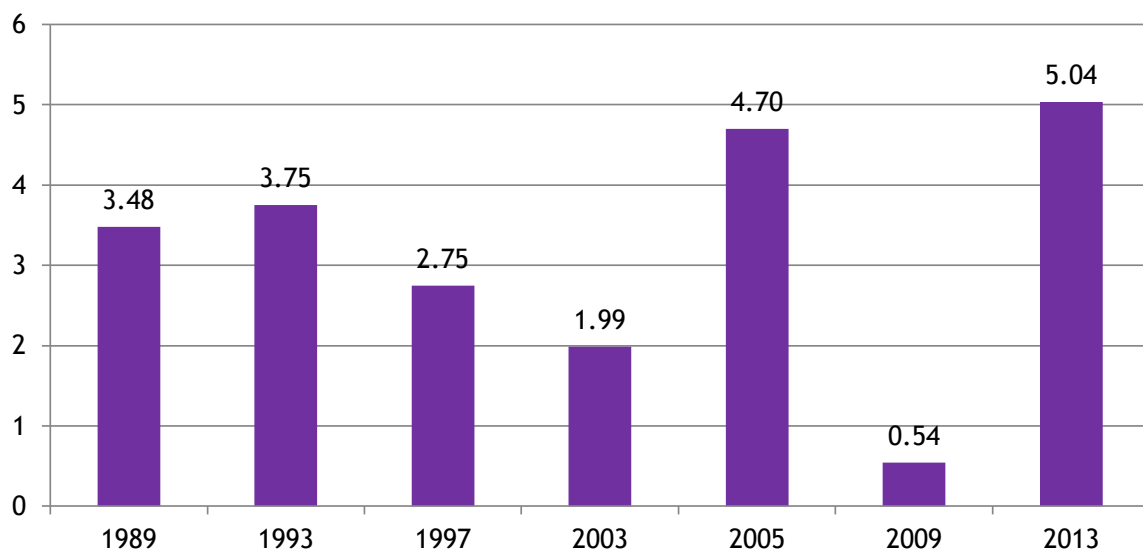


Figure 76a: Area (ha) of sown crops grown, 1989-2013.

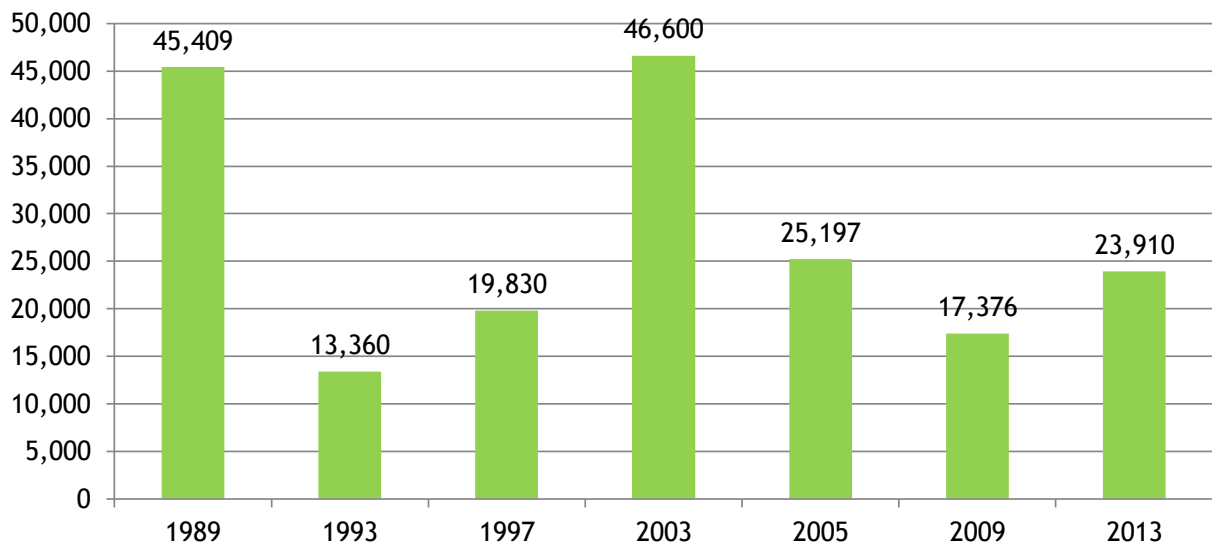


Figure 76b: Pesticide-treated area (spha) of sown crops, 1989-2013.

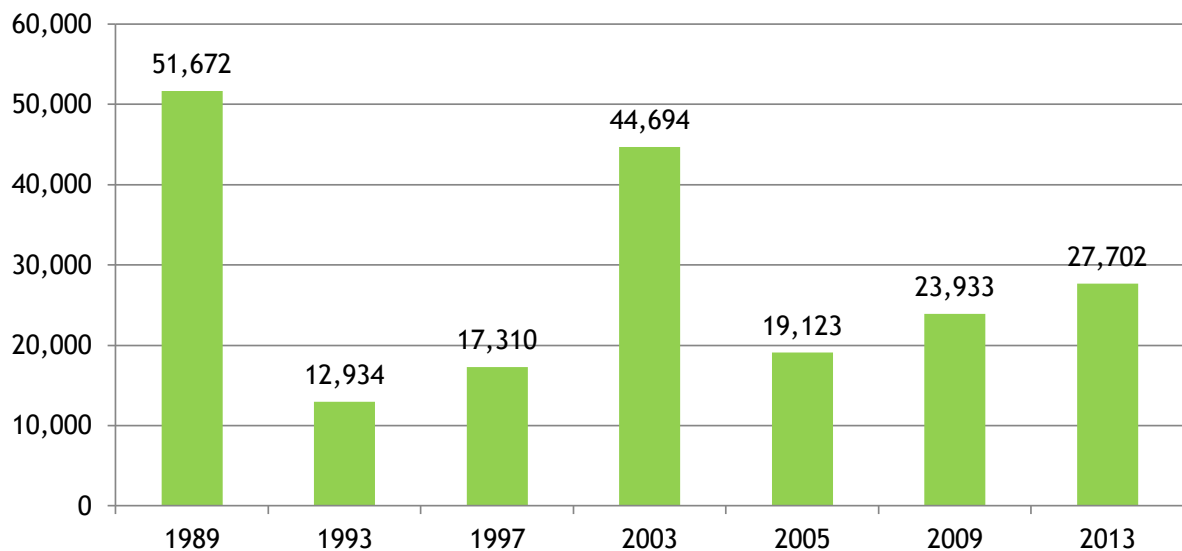


Figure 76c: Weight (t) of pesticides applied to sown crops, 1989-2013.

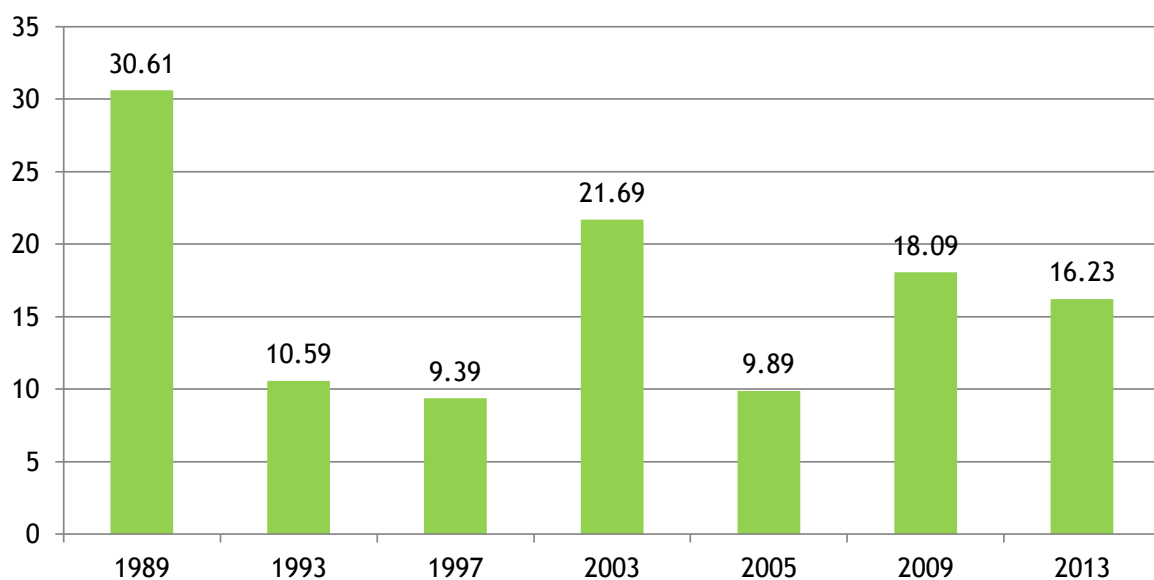


Figure 77a: Area (ha) of arable silage, 1989-2013.

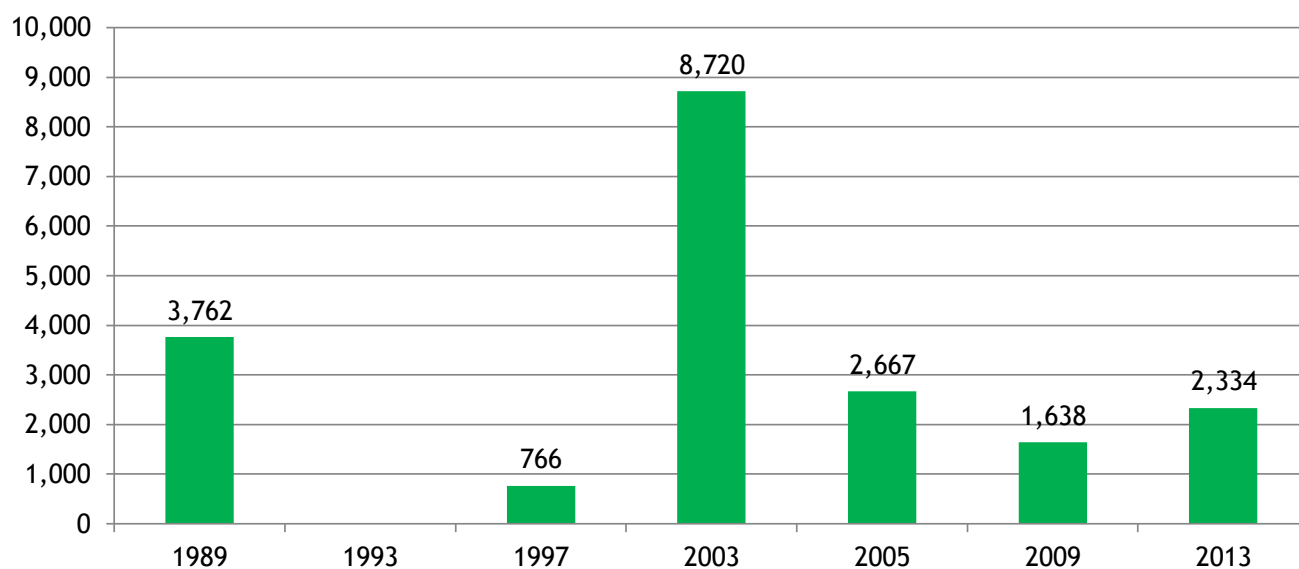


Figure 77b: Pesticide-treated area (spha) of arable silage, 1989-2013.

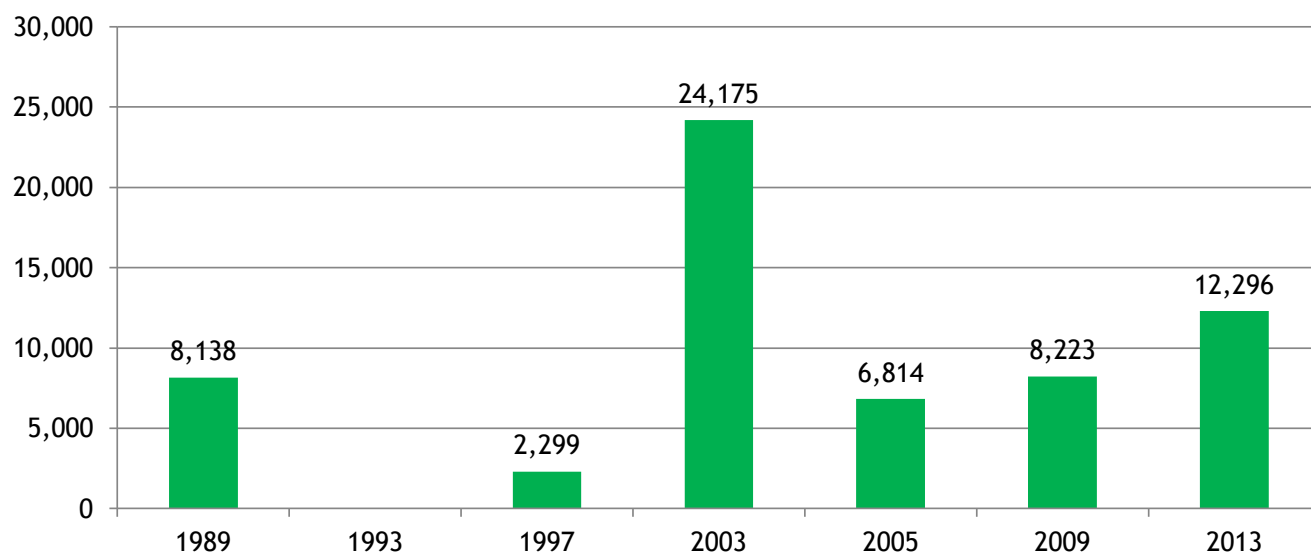


Figure 77c: Weight (t) of pesticides applied to arable silage, 1989-2013.

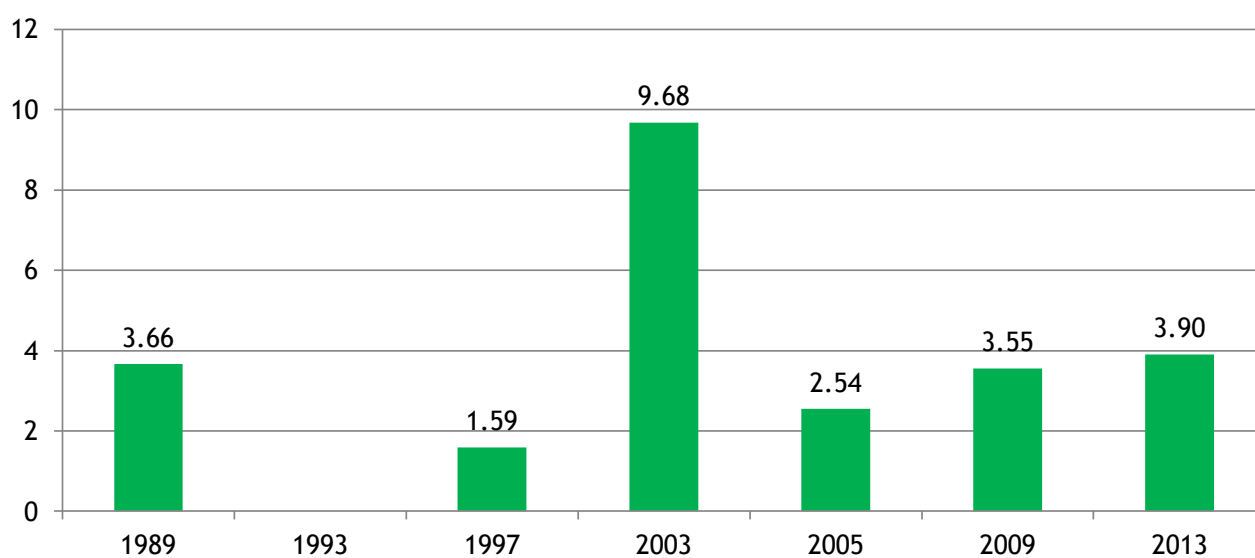


Figure 78a: Area (ha) of arable silage (undersown), 1989-2013.

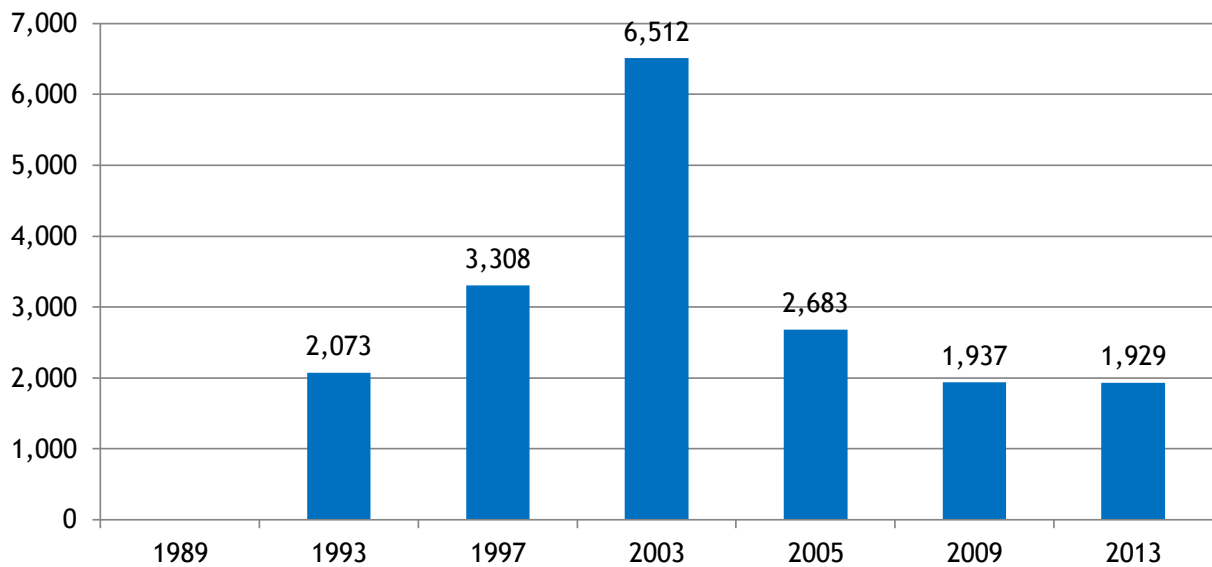


Figure 78b: Pesticide-treated area (spha) of arable silage (undersown), 1989-2013.

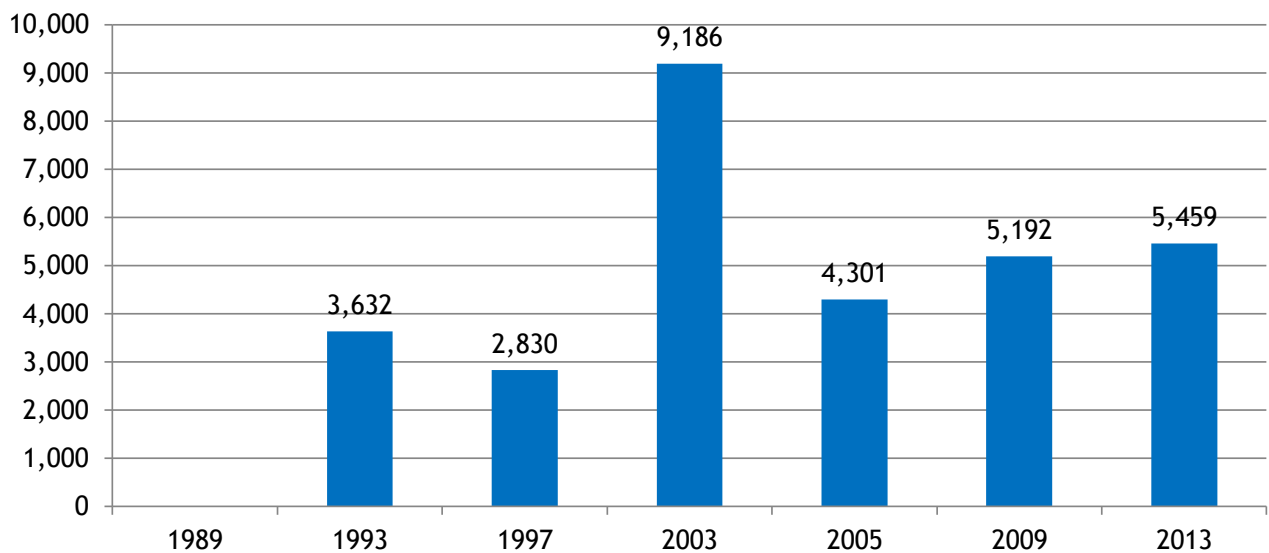


Figure 78c: Weight (t) of pesticides applied to arable silage (undersown), 1989-2013.

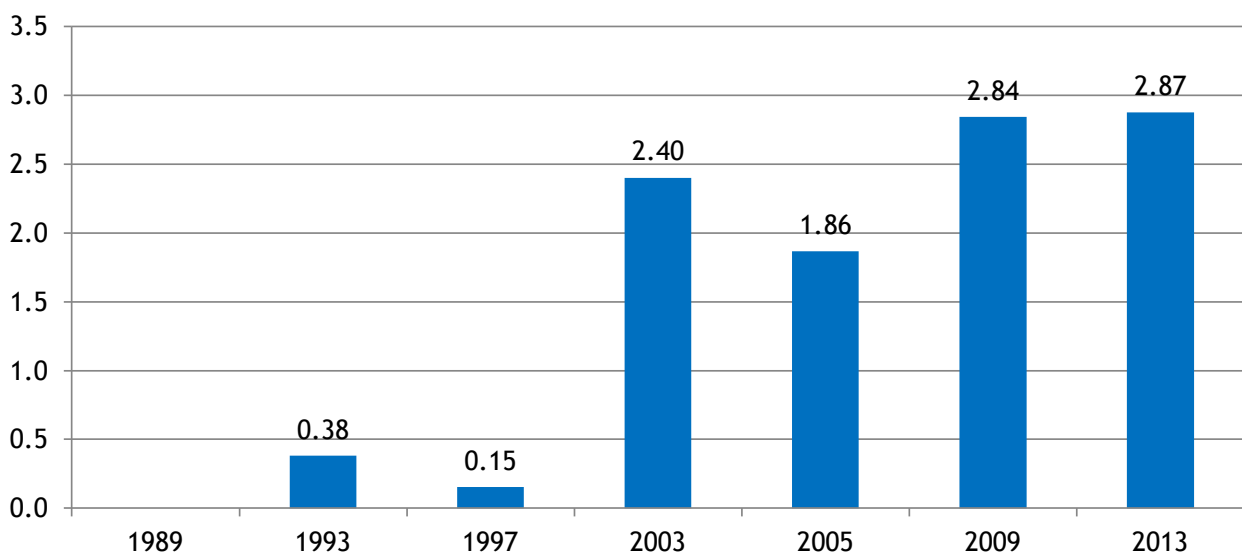


Figure 79a: Area (ha) of grass reseeds sown, 1989-2013.

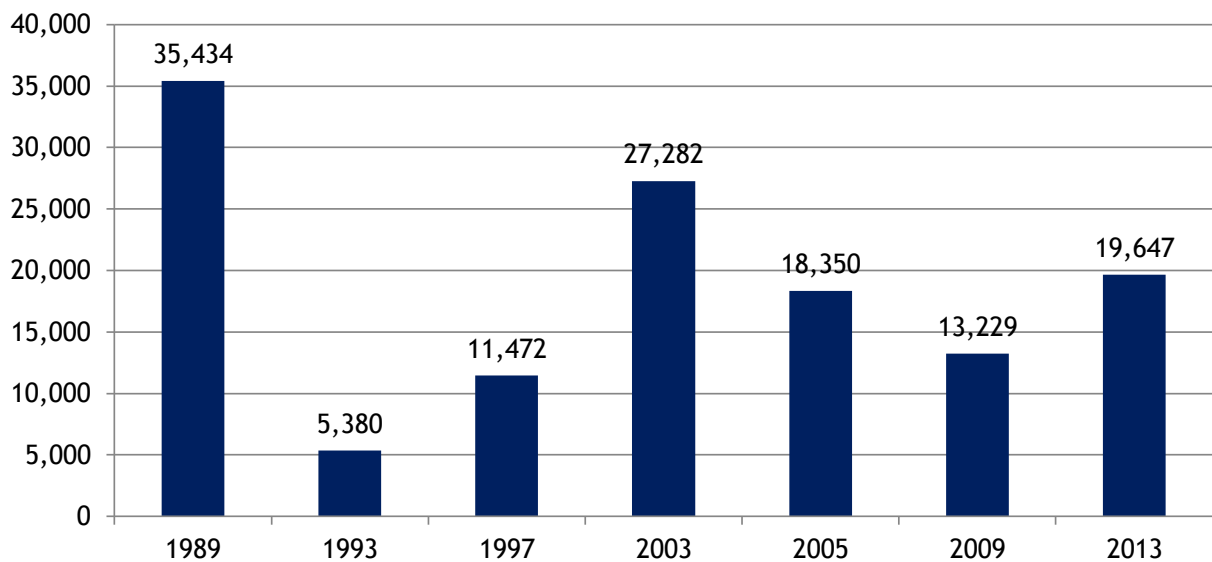


Figure 79b: Pesticide-treated area (spha) of grass reseeds, 1989-2013.

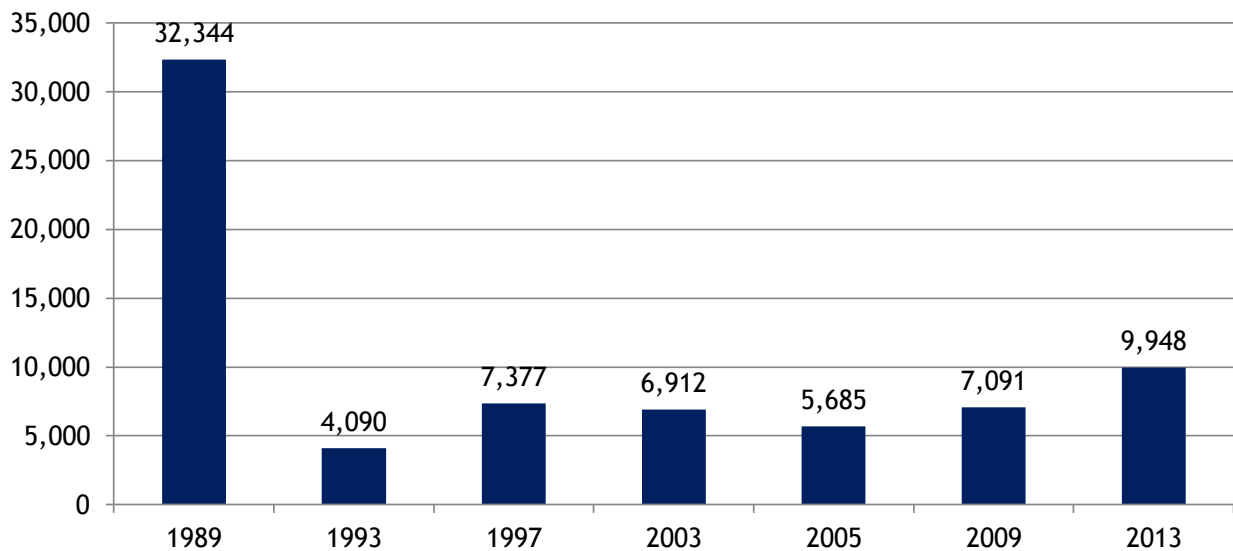


Figure 79c: Weight (t) of pesticides applied to grass reseeds, 1989-2013.

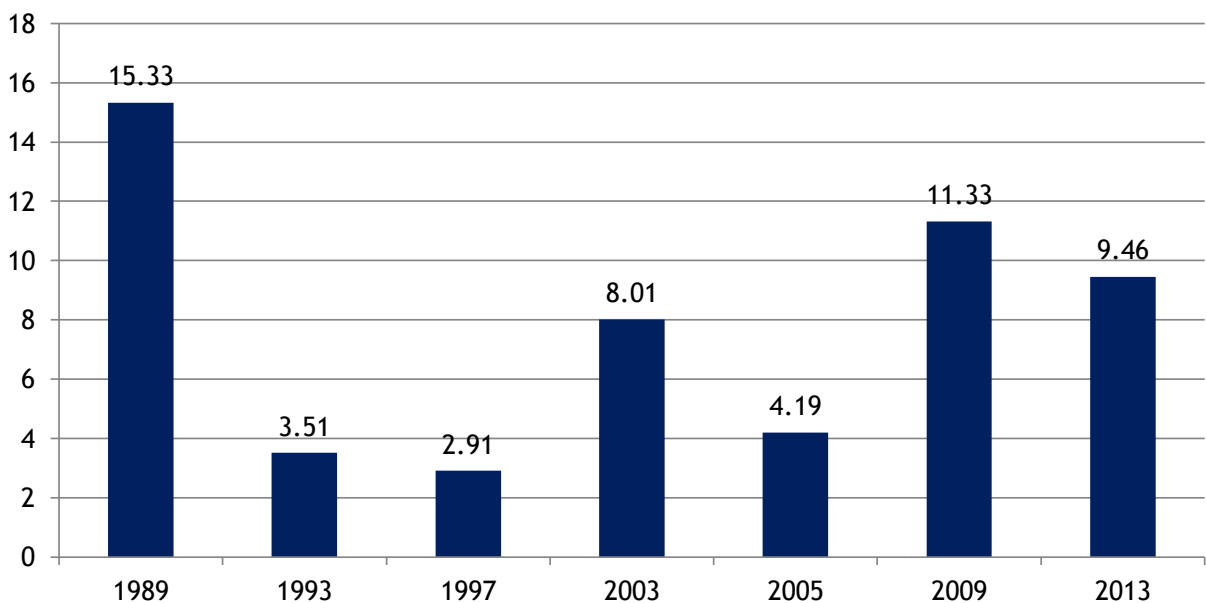


Figure 80a: Area (ha) of fodder crops sown, 1989-2013.

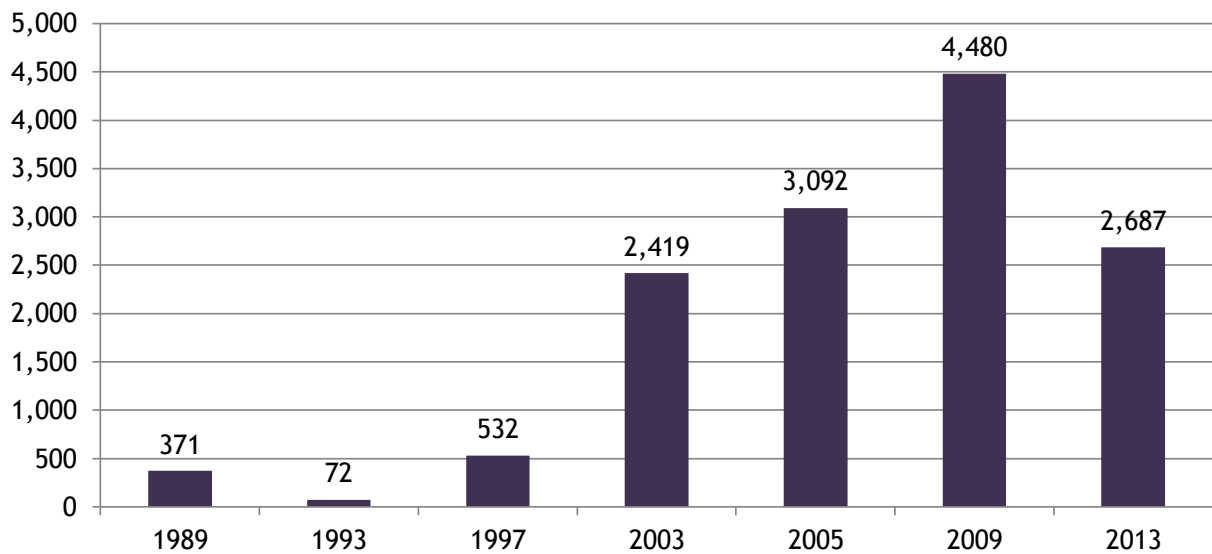


Figure 80b: Pesticide-treated area (spha) of fodder crops, 1989-2013.

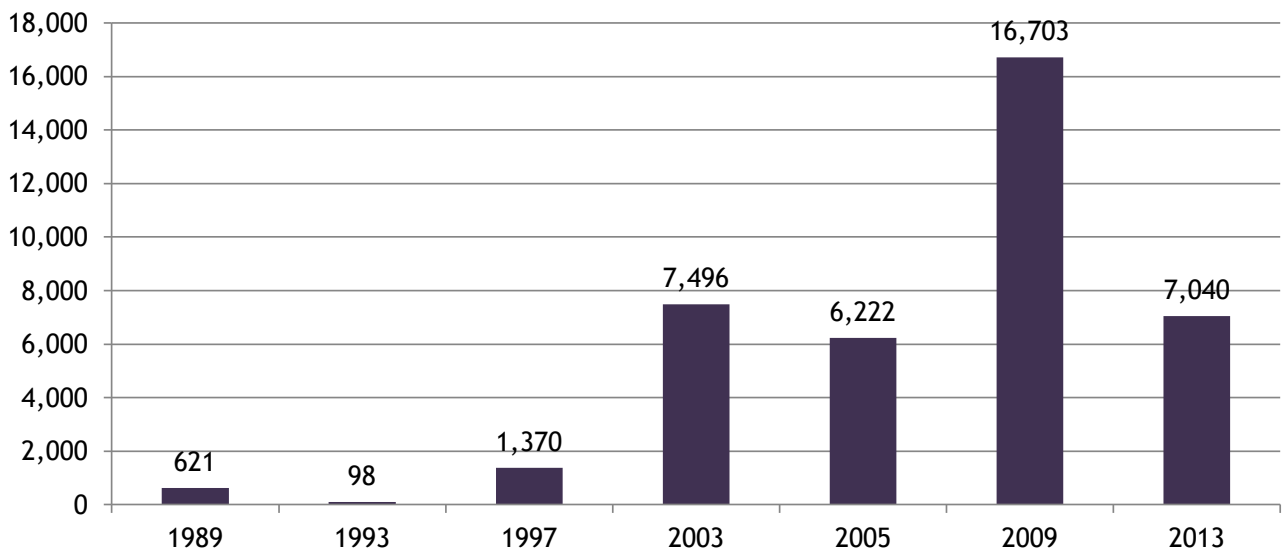


Figure 80c: Weight (t) of pesticides applied to fodder crops, 1989-2013.

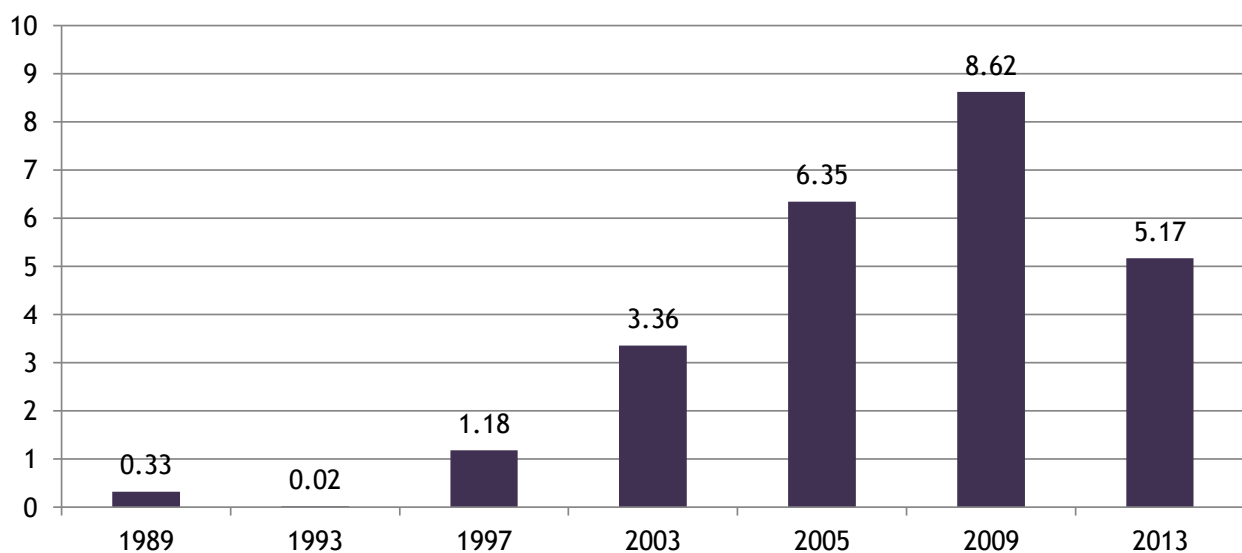


Figure 81: Area (ha) of fodder maize sown, 1989-2013.

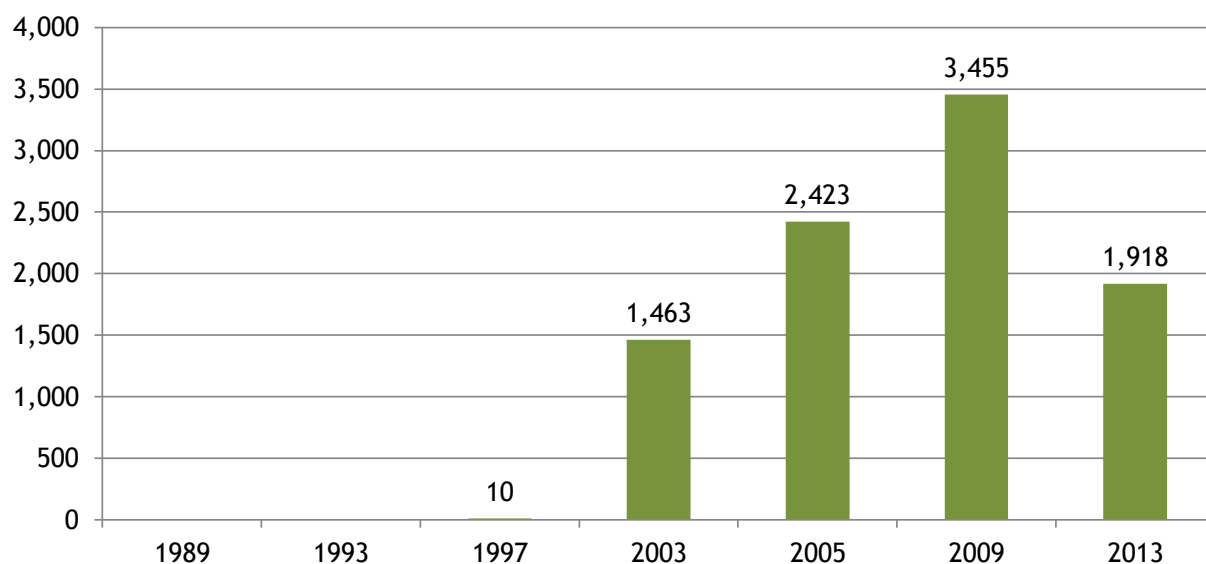


Figure 81b: Pesticide-treated area (spha) of fodder maize crops, 1989-2013.

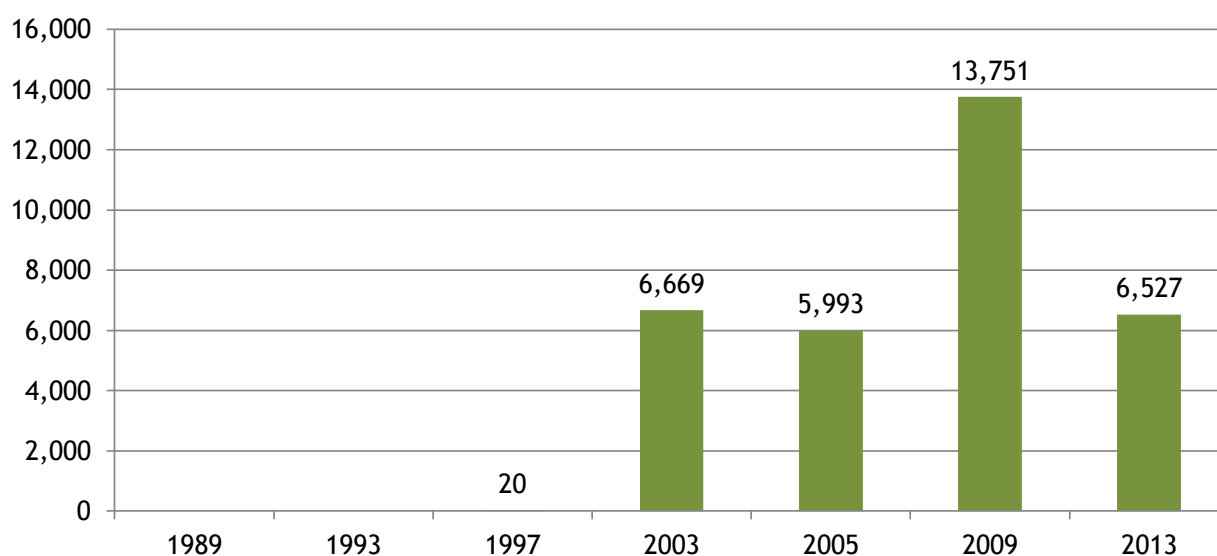


Figure 81c: Weight (t) of pesticides applied to fodder maize crops, 1989-2013.

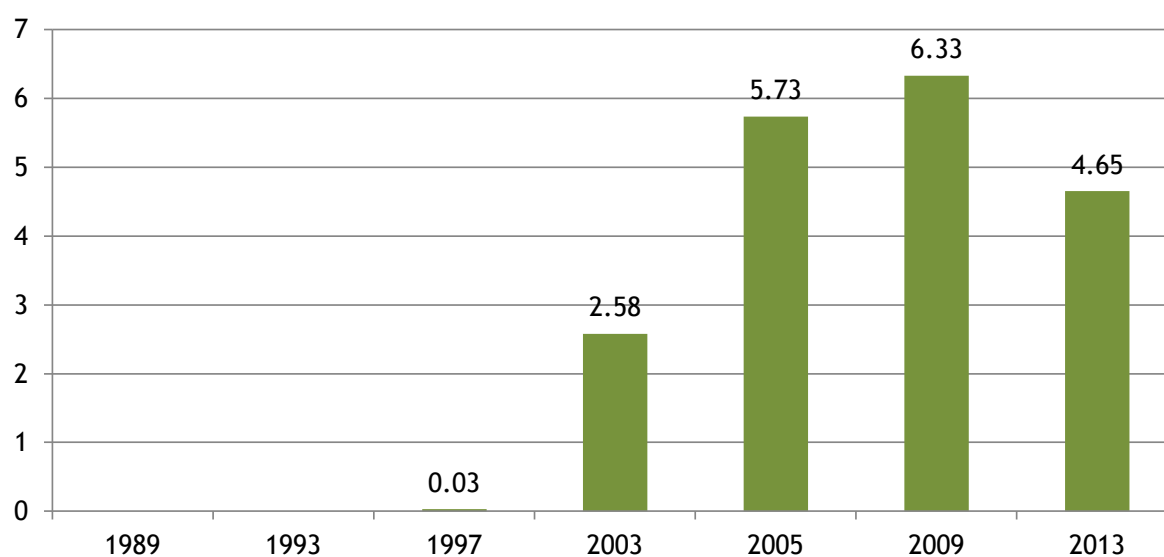


Figure 82a: Area (ha) of other fodder crops sown, 1989-2013.

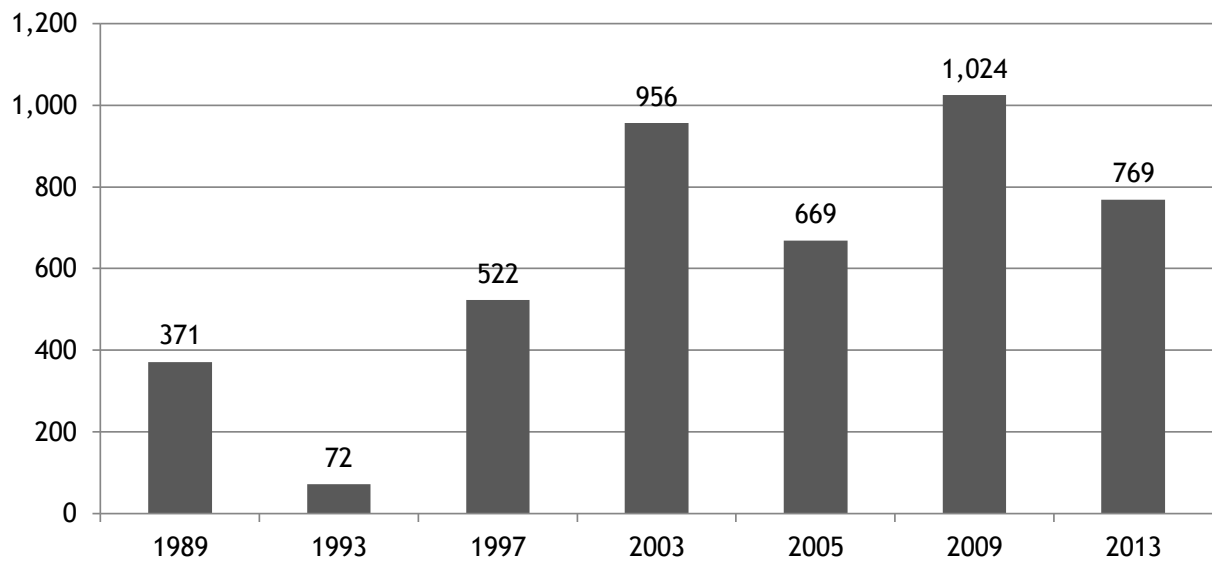


Figure 82b: Pesticide-treated area (spha) of other fodder crops, 1989-2013.

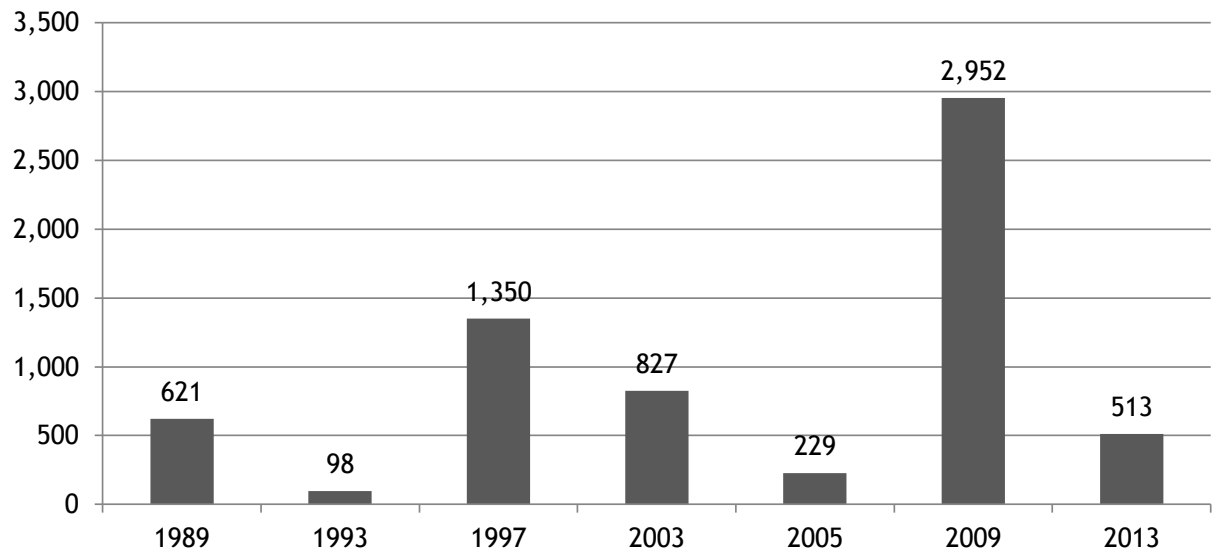


Figure 82c: Weight (t) of pesticides applied to other fodder crops, 1989-2013.

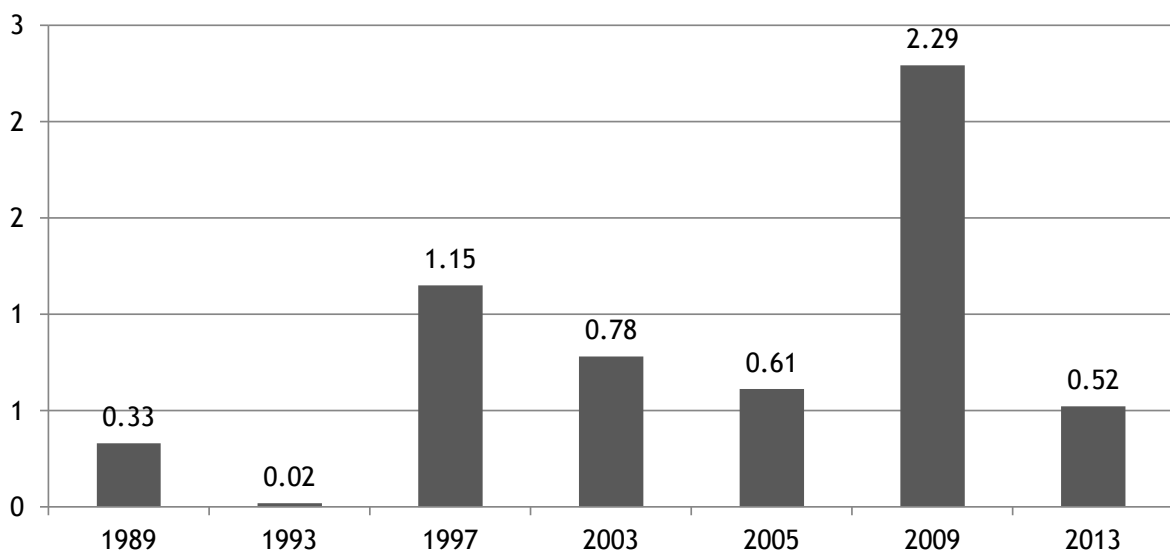


Table 1a Number of farms in each size class with enclosed grassland in the Northern Ireland June 2013 census and the number of samples from each class.

County	Size group (hectares)												Total	
	< 10		10 < 20		20 <30		30 < 50		50 < 100		100+			
	Holdings in strata	Holdings sampled	Holdings in strata	Holdings sampled	Holdings in strata	Holdings sampled	Holdings in strata	Holdings sampled	Holdings in strata	Holdings sampled	Holdings in strata	Holdings sampled	Holdings in strata	Holdings sampled
Antrim	821	5	848	7	643	3	776	13	794	15	278	13	4,160	56
Armagh	886	0	943	2	513	3	523	5	330	8	70	6	3,265	24
Down	1,186	3	1,112	9	702	6	735	8	591	18	204	6	4,530	50
Fermanagh	430	2	675	3	553	2	567	1	492	5	157	4	2,874	17
Londonderry	634	2	733	6	481	4	611	8	513	15	163	5	3,135	40
Tyrone	1,058	8	1,459	6	1,057	7	1,109	5	856	17	236	5	5,775	48
Northern Ireland	5,015	20	5,770	33	3,949	25	4,321	40	3,576	78	1,108	39	23,739	235

Table 1b Number of farms in each size class with arable crop silage in the Northern Ireland June 2013 census and the number of samples from each class.

	Size group (hectares)							
	< 5		5 < 10		10+		Total	
	Holdings in strata	Holdings sampled	Holdings in strata	Holdings sampled	Holdings in strata	Holdings sampled	Holdings in strata	Holdings sampled
Northern Ireland	231	22	133	14	134	20	498	56

Table 1c Number of farms in each size class with fodder maize in the Northern Ireland June 2013 census and the number of samples from each class.

	Size group (hectares)							
	< 8		8 < 12		12+		Total	
	Holdings in strata	Holdings sampled	Holdings in strata	Holdings sampled	Holdings in strata	Holdings sampled	Holdings in strata	Holdings sampled
Northern Ireland	68	4	30	2	52	5	150	11

Table 1d Number of farms in each size class with other fodder crops in the Northern Ireland June 2013 census and the number of samples from each class.

	Size group (hectares)							
	< 3		3 < 5		5+		Total	
	Holdings in strata	Holdings sampled	Holdings in strata	Holdings sampled	Holdings in strata	Holdings sampled	Holdings in strata	Holdings sampled
Northern Ireland	138	9	48	4	53	5	239	18

Table 2 The total number and area (hectares) of crops sampled, and the proportion (%) of the total area of grassland and fodder crops surveyed in Northern Ireland, 2013.

CROP	Number of crops surveyed	Survey area (ha)	Proportion of crops surveyed (%)
<i>Established grassland crops</i>			
Enclosed grazing	290	7,344	2%
Grass silage 1st cut	256	6,295	2%
Grass silage 2nd cut	202	5,230	2%
Grass silage 3rd cut	80	2,433	3%
Grass silage 4th cut	11	324	3%
Hay and haylage	53	248	1%
Rough grazing	110	1,741	1%
<i>Sown crops</i>			
Arable silage	39	323	14%
Arable silage (undersown)	38	227	12%
Grass reseed	68	438	2%
<i>Fodder crops</i>			
Fodder maize	14	163	8%
Other fodder crops	14	45	6%
All crops	1,175	24,810	2%

Table 3 Estimated area (hectares) of grassland and fodder crops grown regionally in Northern Ireland 2013.

CROP	County						Northern Ireland
	Antrim	Armagh	Down	Fermanagh	Londonderry	Tyrone	
<i>Established grassland crops</i>							
Enclosed grazing	86,546	42,909	80,895	48,622	65,419	103,499	427,889
Grass silage 1st cut	72,156	31,228	52,885	35,561	34,205	91,043	317,079
Grass silage 2nd cut	55,334	22,963	40,857	20,200	26,656	68,468	234,478
Grass silage 3rd cut	25,822	7,779	20,318	2,821	4,202	24,166	85,108
Grass silage 4th cut	4,927	1,776	1,971	.	277	917	9,867
Hay and haylage	3,385	2,229	2,692	5,337	1,615	4,822	20,079
Rough grazing	32,518	3,552	10,805	50,498	25,380	58,880	181,633
<i>Sown crops</i>							
Arable silage	1,066	344	565	.	239	119	2,334
Arable silage (undersown)	686	313	485	.	279	166	1,929
Grass reseed	6,399	2,322	3,503	1,990	1,931	3,502	19,647
<i>Fodder crops</i>							
Fodder maize	314	337	1,116	.	48	103	1,918
Other fodder crops	74	.	461	.	233	.	769
All crops	289,227	115,751	216,552	165,028	160,484	355,687	1,302,730

Table 4 Estimated area (spray hectares) of grassland and fodder crops treated regionally with each pesticide type in Northern Ireland 2013.

Pesticide type	County						Northern Ireland
	Antrim	Armagh	Down	Fermanagh	Londonderry	Tyrone	
Fungicides	1,425	613	1,202	.	987	246	4,472
Herbicides	27,568	9,967	21,165	4,237	12,544	20,717	96,197
Insecticides	435	182	319	.	288	14,088	15,311
Growth regulators	907	350	247	.	239	.	1,742
Seed treatments	1,810	831	2,127	.	524	338	5,631
Total	32,146	11,942	25,059	4,237	14,581	35,388	123,354

Table 5 Estimated weight (kilograms) of pesticides applied to grassland and fodder crops regionally in Northern Ireland 2013.

Pesticide type	County						Northern Ireland
	Antrim	Armagh	Down	Fermanagh	Londonderry	Tyrone	
Fungicides	555	286	381	.	290	192	1,704
Herbicides	24,228	6,923	12,339	4,133	10,087	15,998	73,708
Insecticides	70	1	38	.	210	10,057	10,375
Growth regulators	474	195	112	.	12	.	793
Seed treatments	87	49	192	.	19	23	370
Total	25,413	7,454	13,062	4,133	10,618	26,270	86,949

Table 6 The total area (spray hectares) and the basic area (hectares), (in parentheses), of grassland and fodder crops treated, , with each pesticide type in Northern Ireland 2013 .

CROP	Pesticide type											
	Fungicides		Herbicides		Insecticides		Growth regulators		Seed treatments		All pesticides	
	sp ha	(ha)	sp ha	(ha)	sp ha	(ha)	sp ha	(ha)	sp ha	(ha)	sp ha	(ha)
<i>Established grassland crops</i>												
Enclosed grazing	.	.	24,397	(24,120)	3,312	(3,312)	.	.	.	.	27,709	(27,432)
Grass silage 1st cut	.	.	23,298	(22,883)	8,976	(8,976)	.	.	.	.	32,274	(31,858)
Grass silage 2nd cut	.	.	20,811	(19,417)	.	.	.	.	.	.	20,811	(19,417)
Grass silage 3rd cut	.	.	3,097	(2,917)	.	.	.	.	.	.	3,097	(2,917)
Grass silage 4th cut	.	.	.	.	.	.	.	.	.	.	.	.
Hay and haylage	.	.	701	701	.	.	.	.	.	.	701	(701)
Rough grazing	.	.	2,405	(2,405)	1,616	(1,616)	.	.	.	.	4,021	(4,021)
<i>Sown crops</i>												
Arable silage	3,633	(1,625)	4,413	(2,165)	752	(690)	1,490	(1,229)	2,009	(2,009)	12,296	(2,334)
Arable silage (undersown)	808	(618)	2,337	(1,384)	446	(446)	253	(199)	1,615	(1,534)	5,459	(1,669)
Grass reseed			9737	(7,550)	211	(211)	.	.	.	.	9,948	(7,550)
<i>Fodder crops</i>												
Fodder maize	.	.	4,609	(1,918)	.	.	.	.	1,918	(1,918)	6,527	(1,918)
Other fodder crops	31	(31)	393	(183)	.	.	.	.	89	(89)	513	(183)
All crops	4,472	(2,274)	96,197	(85,642)	15,311	(15,250)	1,742	(1,428)	5,631	(5,549)	123,354	(99,999)

Table 7 Total weight (kilograms) of each pesticide type applied to grassland and fodder crops in Northern Ireland 2013.

CROP	Fungicides	Herbicides	Insecticides	Growth regulators	Seed treatments	Total
<i>Established grassland crops</i>						
Enclosed grazing	.	20,361	2,384	.	.	22,746
Grass silage 1st cut	.	15,677	6,463	.	.	22,139
Grass silage 2nd cut	.	12,901	.	.	.	12,901
Grass silage 3rd cut	.	1,940	.	.	.	1,940
Grass silage 4th cut	.	.	.	.	.	.
Hay and haylage	.	785	.	.	.	785
Rough grazing	.	3,872	1,163	.	.	5,035
<i>Sown crops</i>						
Arable silage	1,229	1,807	117	659	89	3,901
Arable silage (undersown)	470	2,146	96	134	28	2,874
Grass reseed	.	9,306	152	.	.	9,458
<i>Fodder crops</i>						
Fodder maize	.	4,396	.	.	252	4,649
Other fodder crops	5	517	.	.	1	523
All crops	1,704	73,708	10,375	793	370	86,949

Table 8 The proportional area (%) of each crop treated with pesticides and the number of spray applications (in parentheses) in Northern Ireland, 2013.

CROP	Fungicides		Herbicides		Insecticides		Growth regulators		Seed treatments	All pesticides	
	%	sp apps	%	sp apps	%	sp apps	%	sp apps	%	%	sp apps
<i>Established grassland crops</i>											
Enclosed grazing	.	.	5.6%	(1.0)	0.8%	(1.0)	.	.	.	6.4%	(1.0)
Grass silage 1st cut	.	.	7.2%	(1.0)	2.8%	(1.0)	.	.	.	10.0%	(1.0)
Grass silage 2nd cut	.	.	8.3%	(1.1)	.	.	.	.	.	8.3%	(1.1)
Grass silage 3rd cut	.	.	3.4%	(1.1)	.	.	.	.	.	3.4%	(1.1)
Grass silage 4th cut	.	.	.	.	.	.	.	.	.	.	.
Hay and haylage	.	.	3.5%	(1.0)	.	.	.	.	.	3.5%	(1.0)
Rough grazing	.	.	1.3%	(1.0)	0.9%	(1.0)	.	.	.	2.2%	(1.0)
<i>Sown crops</i>											
Arable silage	69.6%	(2.3)	92.8%	(2.1)	29.6%	(1.2)	52.7%	(1.2)	86.1%	100.0%	(1.6)
Arable silage (undersown)	32.1%	(1.4)	71.8%	(1.5)	23.1%	(1.0)	10.3%	(1.2)	79.5%	86.5%	(1.3)
Grass reseed	.	.	38.4%	(1.4)	1.1%	(1.0)	.	.	.	38.4%	(1.3)
<i>Fodder crops</i>											
Fodder maize	.	.	100.0%	(2.1)	.	.	.	.	100.0%	100.0%	(1.6)
Other fodder crops	4.0%	(1.0)	23.8%	(1.6)	.	.	.	.	11.6%	23.8%	(1.4)
All crops	0.2%	(1.9)	6.6%	(1.1)	1.2%	(1.0)	0.1%	(1.2)	0.4%	34.8%	(1.1)

Table 9 Estimated area (spray hectares) of grassland and fodder crops treated with pesticide formulations in Northern Ireland in 2013

Pesticide type & formulation	Enclosed grazing	Silage 1st cut	Silage 2nd cut	Silage 3rd cut	Silage 4th cut	Hay and haylage	Rough grazing	Arable silage	Arable silage (undersown)	Grass reseed	Fodder maize	Other fodder crops	All crops
<i>Fungicides</i>													
Azoxystrobin/chlorothalonil	62	21	.	.	.	83
Boscalid/Epoxiconazole	173	.	.	.	.	173
Chlorothalonil	622	204	.	.	.	825
Chlorothalonil/flusilazole	54	.	.	.	54
Chlorothalonil/Penthiopyrad	73	.	.	.	.	73
Cyprodinil/isopyrazam	260	.	.	.	.	260
Cyprodinil/picoxystrobin	68	17	.	.	.	85
Epoxiconazole/fenpropimorph	108	.	.	.	.	108
Epoxiconazole/fenpropimorph/kresoxim-methyl	106	186	.	.	.	292
Epoxiconazole/fenpropimorph/metrafenone	461	199	.	.	.	660
Epoxiconazole/metconazole	561	74	.	.	.	634
Fenpropimorph	203	.	.	.	.	203
Fluoxastrobin/prothioconazole	40	.	.	.	.	40
Flusilazole	31	31
Penthiopyrad	108	.	.	.	.	108
Proquinazid	95	.	.	.	.	95
Prothioconazole	411	.	.	.	.	411
Spiroxamine/tebuconazole	114	.	.	.	.	114
Tebuconazole	168	54	.	.	.	222
<i>All fungicides</i>	3,633	808	.	.	31	4,472
<i>Herbicides</i>													
2,4-DB	60	150	.	.	.	210
2,4-DB/linuron/MCPA	321	.	.	.	.	.	.	.	202	.	.	.	523
Amidosulfuron	1,967	.	.	.	.	.	.	176	27	.	.	.	2,170
Aminopyralid/fluroxypyr	4,874	1,979	2,880	77	.	.	.	.	.	104	.	.	9,915
Asulam	169	.	.	.	.	701	.	.	.	.	.	.	870
Bromoxynil/terbuthylazine	645	.	645
Clopyralid/fluroxypyr/triclopyr	.	.	1,953	715	.	.	.	.	77	392	.	.	3,137
Clopyralid/Triclopyr	443	4	40	.	.	.	15	.	.	.	.	.	502

Table 9 cont. Estimated area (spray hectares) of grassland and fodder crops treated with pesticide formulations in Northern Ireland in 2013

Pesticide type & formulation	Enclosed grazing	Silage 1st cut	Silage 2nd cut	Silage 3rd cut	Silage 4th cut	Hay and haylage	Rough grazing	Arable silage	Arable silage (undersown)	Grass reseed	Fodder maize	Other fodder crops	All crops
Herbicides cont.													
Desmedipham/ethofumesate/phenmedipham	.	.	.	.	.	.	.	.	.	.	.	118	118
Dicamba/MCPA/mecoprop-P	237	.	378	.	.	.	183	100	164	155	.	.	1,216
Dicamba/mecoprop-P	2,236	1,615	797	.	.	.	204	.	62	.	.	.	4,913
Diflufenican	.	.	.	.	.	.	.	108	.	.	.	.	108
Diflufenican/iodosulfuron-methyl-sodium/mesosulfuron-methyl	.	.	.	.	.	.	.	355	.	.	.	.	355
Dimethenamid-P/Pendimethalin	.	.	.	.	.	.	.	.	.	.	871	.	871
Diquat	.	.	.	.	.	.	.	.	40	.	.	88	127
Florasulam/fluroxypyr	.	.	.	.	.	.	.	108	.	.	.	.	108
Flufenacet/pendimethalin	.	.	.	.	.	.	.	41	.	.	.	.	41
Fluroxypyr	.	4,376	3,095	.	.	.	.	1,259	173	.	337	.	9,239
Fluroxypyr/triclopyr	5,600	10,520	8,891	2,124	.	.	.	.	.	600	.	.	27,734
Glyphosate	47	66	.	.	.	.	481	835	807	7,162	898	6	10,303
Lenacil	.	.	.	.	.	.	.	.	.	.	.	31	31
MCPA	7,608	2,911	1,703	.	.	.	1,522	143	72	.	103	.	14,063
MCPB	.	.	.	.	.	.	.	.	81	.	.	.	81
Mecoprop-P	611	1,826	611	.	.	.	.	267	38	284	.	.	3,638
Mesotrione	.	.	.	.	.	.	.	.	.	.	192	.	192
Mesotrione/Terbuthylazine	.	.	.	.	.	.	.	.	.	.	462	.	462
Metamitron	.	.	.	.	.	.	.	.	.	.	.	118	118
Metsulfuron-methyl	.	.	180	180	.	.	.	200	70	.	103	.	733
Metsulfuron-methyl/Thifensulfuron-methyl	.	.	.	.	.	.	.	77	.	.	.	.	77
Metsulfuron-methyl/tribenuron-methyl	.	.	.	.	.	.	.	371	.	.	.	.	371
Nicosulfuron	.	.	.	.	.	.	.	.	.	.	319	.	319
Pendimethalin	.	.	.	.	.	.	.	.	.	.	679	.	679
Pendimethalin/picolinafen	.	.	.	.	.	.	.	62	.	.	.	.	62
Sulfosulfuron	.	.	.	.	.	.	.	89	.	.	.	.	89
Thifensulfuron-methyl/tribenuron-methyl	.	.	.	.	.	.	.	126	94	.	.	.	220
Tribenuron-methyl	284	.	284	.	.	.	.	35	280	1,041	.	.	1,923
Triflusalufuron-methyl	.	.	.	.	.	.	.	.	.	.	.	31	31
All herbicides	24,397	23,298	20,811	3,097	.	701	2,405	4,413	2,337	9,737	4,609	393	96,197

Table 9 cont. Estimated area (spray hectares) of grassland and fodder crops treated with pesticide formulations in Northern Ireland in 2013

Pesticide type & formulation	Enclosed grazing	Silage 1st cut	Silage 2nd cut	Silage 3rd cut	Silage 4th cut	Hay and haylage	Rough grazing	Arable silage	Arable silage (undersown)	Grass reseed	Fodder maize	Other fodder crops	All crops
<i>Insecticides</i>													
Chlorpyrifos	3,312	8,976	.	.	.	.	1,616	156	128	211	.	.	14,399
Cypermethrin	62	.	.	.	.	62
Deltamethrin	62	.	.	.	62
Esfenvalerate	336	113	.	.	.	449
Lambda-cyhalothrin	197	144	.	.	.	341
<i>All insecticides</i>	3,312	8,976	.	.	.	.	1,616	752	446	211	.	.	15,311
<i>Growth regulators</i>													
2-chloroethylphosphonic acid	201	.	.	.	.	201
Chlormequat	739	253	.	.	.	992
Trinexapac-ethyl	550	.	.	.	.	550
<i>All growth regulators</i>	1,490	253	.	.	.	1,742
<i>Seed treatments</i>													
Clothianidin/prothioconazole	586	25	.	.	.	612
Fludioxonil	735	757	.	.	.	1,492
Methiocarb	1,918	.	1,918
Prochloraz/triticonazole	687	752	.	.	.	1,439
Tefluthrin	58	58
Thiram	81	.	.	.	81
Unknown seed treatment	31	31
<i>All seed treatments</i>	2,009	1,615	.	1,918	89	5,631
<i>All pesticides</i>	27,709	32,274	20,811	3,097	.	701	4,021	12,296	5,459	9,948	6,527	513	123,354

Table 10 cont. Estimated weight (kilograms) of pesticides applied to grassland and fodder crops in Northern Ireland in 2013

Pesticide type & formulation	Enclosed grazing	Silage 1st cut	Silage 2nd cut	Silage 3rd cut	Silage 4th cut	Hay and haylage	Rough grazing	Arable silage	Arable silage (undersown)	Grass reseed	Fodder maize	Other fodder crops	All crops
<i>Fungicides</i>													
Azoxystrobin/chlorothalonil	57	25	.	.	.	82
Boscalid/Epoxiconazole	61	.	.	.	.	61
Chlorothalonil	343	204	.	.	.	546
Chlorothalonil/flusilazole		30	.	.	.	30
Chlorothalonil/Penthiopyrad	31	.	.	.	.	31
Cyprodinil/isopyrazam	104	.	.	.	.	104
Cyprodinil/picoxystrobin	21	6	.	.	.	27
Epoxiconazole/fenpropimorph	45	.	.	.	.	45
Epoxiconazole/fenpropimorph/kresoxim-methyl	37	60	.	.	.	96
Epoxiconazole/fenpropimorph/metrafenone	232	122	.	.	.	354
Epoxiconazole/metconazole	68	10	.	.	.	77
Fenpropimorph	70	.	.	.	.	70
Fluoxastrobin/prothioconazole	12	.	.	.	.	12
Flusilazole	5	5
Penthiopyrad	22	.	.	.	.	22
Proquinazid	3	.	.	.	.	3
Prothioconazole	49	.	.	.	.	49
Spiroxamine/tebuconazole	41	.	.	.	.	41
Tebuconazole	35	14	.	.	.	49
<i>All fungicides</i>	1,229	470	.	.	5	1,704
<i>Herbicides</i>													
2,4-DB	72	208	.	.	.	279
2,4-DB/linuron/MCPA	315	.	.	.	.	.	.	.	198	.	.	.	513
Amidosulfuron	89	.	.	.	.	.	.	7	0.8	.	.	.	96
Aminopyralid/fluroxypyr	1,272	515	720	20	.	.	.	.	.	14	.	.	2,541
Asulam	189	.	.	.	.	785	.	.	.	.	.	.	974
Bromoxynil/terbuthylazine	767	.	767
Clopyralid/fluroxypyr/triclopyr	.	.	1,227	644	.	.	.	.	35	145	.	.	2,051
Clopyralid/Triclopyr	531	5	48	.	.	.	18	.	.	.	.	.	602
Desmedipham/ethofumesate/phenmedipham	61	61

Table 10 cont. Estimated weight (kilograms) of pesticides applied to grassland and fodder crops in Northern Ireland in 2013

Pesticide type & formulation	Enclosed grazing	Silage 1st cut	Silage 2nd cut	Silage 3rd cut	Silage 4th cut	Hay and haylage	Rough grazing	Arable silage	Arable silage (undersown)	Grass reseed	Fodder maize	Other fodder crops	All crops
<i>Herbicides</i>													
Dicamba/MCPA/mecoprop-P	503	.	581	.	.	.	546	132	267	354	.	.	2,383
Dicamba/mecoprop-P	2,049	1,420	673	.	.	.	184	.	56	.	.	.	4,381
Diflufenican	.	.	.	.	.	.	.	11	.	.	.	.	11
Diflufenican/iodosulfuron-methyl-sodium/mesosulfuron-methyl	.	.	.	.	.	.	.	21	.	.	.	.	21
Dimethenamid-P/Pendimethalin	.	.	.	.	.	.	.	.	.	.	1,586	.	1,586
Diquat	.	.	.	.	.	.	.	.	42	.	.	26	68
Florasulam/fluroxypyr	.	.	.	.	.	.	.	11	.	.	.	.	11
Flufenacet/pendimethalin	.	.	.	.	.	.	.	29	.	.	.	.	29
Fluroxypyr	.	623	828	.	.	.	.	190	26	.	50	.	1,717
Fluroxypyr/triclopyr	2,862	5,785	4,636	1,274	.	.	.	.	.	180	.	.	14,738
Glyphosate	5	96	.	.	.	.	693	878	864	8,216	609	9	11,369
Lenacil	.	.	.	.	.	.	.	.	.	.	.	7	7
MCPA	11,638	4,765	3,278	.	.	.	2,432	148	71	.	170	.	22,501
MCPB	.	.	.	.	.	.	.	.	130	.	.	.	130
Mecoprop-P	906	2,469	906	.	.	.	.	223	57	392	.	.	4,953
Mesotrione	.	.	.	.	.	.	.	.	.	.	19	.	19
Mesotrione/Terbuthylazine	.	.	.	.	.	.	.	.	.	.	187	.	187
Metamitron	.	.	.	.	.	.	.	.	.	.	.	414	414
Metsulfuron-methyl	.	.	1.1	1.1	.	.	.	1.2	0.4	.	0.6	.	4
Metsulfuron-methyl/Thifensulfuron-methyl	.	.	.	.	.	.	.	3	.	.	.	.	3
Metsulfuron-methyl/tribenuron-methyl	.	.	.	.	.	.	.	4	.	.	.	.	4
Nicosulfuron	.	.	.	.	.	.	.	.	.	.	13	.	13
Pendimethalin	.	.	.	.	.	.	.	.	.	.	995	.	995
Pendimethalin/picolinafen	.	.	.	.	.	.	.	64	.	.	.	.	64
Sulfosulfuron	.	.	.	.	.	.	.	2	.	.	.	.	2
Thifensulfuron-methyl/tribenuron-methyl	.	.	.	.	.	.	.	12	1.3	.	.	.	14
Tribenuron-methyl	1.4	.	1.4	.	.	.	.	0.6	192	5	.	.	200
Triflurosulfuron-methyl	.	.	.	.	.	.	.	.	.	.	.	0.5	0.5
<i>All herbicides</i>	20,361	15,677	12,901	1,940	.	785	3,872	1,807	2,146	9,306	4,396	517	73,708

Table 10 cont. Estimated weight (kilograms) of pesticides applied to grassland and fodder crops in Northern Ireland in 2013

Pesticide type & formulation	Enclosed grazing	Silage 1st cut	Silage 2nd cut	Silage 3rd cut	Silage 4th cut	Hay and haylage	Rough grazing	Arable silage	Arable silage (undersown)	Grass reseed	Fodder maize	Other fodder crops	All crops
<i>Insecticides</i>													
Chlorpyrifos	2,384	6,463	.	.	.	.	1,163	113	94	152	.	.	10,369
Cypermethrin	2	.	.	.	.	2
Deltamethrin	0.3	.	.	.	0.3
Esfenvalerate	1.4	0.5	.	.	.	2
Lambda-cyhalothrin	1.0	0.7	.	.	.	2
<i>All insecticides</i>	2,384	6,463	.	.	.	.	1,163	117	96	152	.	.	10,375
<i>Growth regulators</i>													
2-chloroethylphosphonic acid	30	.	.	.	.	30
Chlormequat	598	134	.	.	.	732
Trinexapac-ethyl	32	.	.	.	.	32
<i>All growth regulators</i>	659	134	.	.	.	793
<i>Seed treatments</i>													
Clothianidin/prothioconazole	63	2	.	.	.	65
Fludioxonil	7	6	.	.	.	13
Methiocarb	252	.	252
Prochloraz/triticonazole	19	18	.	.	.	37
Tefluthrin	0.7	0.7
Thiram	3	.	.	.	3
<i>All seed treatments</i>	89	28	.	252	0.7	370
<i>All pesticides</i>	22,746	22,139	12,901	1,940	.	785	5,035	3,901	2,874	9,458	4,649	523	86,949

Table 11 The thirty active ingredients used most extensively on grassland and fodder crops in Northern Ireland in 2013, ranked by area treated (spray hectares) .

	Active ingredient	Treated area (sp ha)
1	Fluroxypyr	50,134
2	Triclopyr	31,373
3	MCPA	15,803
4	Chlorpyrifos	14,399
5	Glyphosate	10,303
6	Aminopyralid	9,915
7	Mecoprop-P	9,767
8	Dicamba	6,129
9	Clopyralid	3,639
10	Tribenuron-methyl	2,514
11	Amidosulfuron	2,170
12	Epoxiconazole	1,867
13	Pendimethalin	1,652
14	Fenpropimorph	1,263
15	Metsulfuron-methyl	1,182
16	Terbuthylazine	1,107
17	Chlorothalonil	1,035
18	Chlormequat	992
19	Dimethenamid-P	871
20	Asulam	870
21	2,4-DB	733
22	Metrafenone	660
23	Mesotrione	654
24	Bromoxynil	645
25	Metconazole	634
26	Trinexapac-ethyl	550
27	Linuron	523
28	Diflufenican	463
29	Prothioconazole	451
30	Esfenvalerate	449

Table 12 The thirty active ingredients used most extensively on grassland and fodder crops in Northern Ireland in 2013, ranked by weight applied (kilograms) .

	Active ingredient	Weight (kg)
1	MCPA	24,110
2	Fluroxypyr	11,735
3	Glyphosate	11,369
4	Chlorpyrifos	10,369
5	Mecoprop-P	9,517
6	Triclopyr	8,762
7	Pendimethalin	1,938
8	Asulam	974
9	Chlormequat	732
10	Dimethenamid-P	729
11	2,4-DB	682
12	Chlorothalonil	659
13	Dicamba	646
14	Terbuthylazine	614
15	Aminopyralid	586
16	Clopyralid	576
17	Metamitron	414
18	Fenpropimorph	350
19	Bromoxynil	307
20	Tribenuron-methyl	207
21	Epoxiconazole	168
22	MCPB	130
23	Cyprodinil	99
24	Amidosulfuron	96
25	Metrafenone	79
26	Diquat	68
27	Tebuconazole	63
28	Prothioconazole	55
29	Linuron	55
30	Mesotrione	52

Table 13 Enclosed grazing: pesticide-treated area (spray-hectares), weight of pesticide applied (kilograms) and reason for use.

Pesticide type & formulation	General weed control	Docks	Chickweed	Rushes	Buttercup	Nettles	Docks and nettles	Buttercup and rushes	Nettles, whins & docks	Docks & ragwort	All reasons	Basic area (ha) of treatment	Quantity (kgs)
<i>Herbicides</i>													
Amidosulfuron	1,285	682	.	.	.	.	.	.	.	.	1,967	1,967	89
Aminopyralid/fluroxypyr	958	3,620	.	.	.	.	.	.	.	296	4,874	4,874	1,272
Asulam	.	169	.	.	.	.	.	.	.	.	169	169	189
Clopyralid/Triclopyr	.	.	.	.	.	4	.	.	439	.	443	443	531
2,4-DB/linuron/MCPA	321	.	.	.	.	.	.	.	.	.	321	321	315
Dicamba/MCPA/mecoprop-P	.	237	.	.	.	.	.	.	.	.	237	237	503
Dicamba/mecoprop-P	2,019	216	.	.	.	.	.	.	.	.	2,236	2,236	2,049
Fluroxypyr/triclopyr	.	5,533	.	.	.	.	66	.	.	.	5,600	5,600	2,862
Glyphosate	47	.	.	.	.	.	.	.	.	.	47	47	5
MCPA	1,031	121	.	5,521	686	155	.	94	.	.	7,608	7,608	11,638
Mecoprop-P	.	611	.	.	.	.	.	.	.	.	611	611	906
Tribenuron-methyl	.	.	284	.	.	.	.	.	.	.	284	284	1
All herbicides	5,661	11,189	284	5,521	686	159	66	94	439	296	24,397	24,397	20,361
<i>Insecticides</i>													
Chlorpyrifos	3,312	3,312	3,312	2,384									
All insecticides	3,312	3,312	3,312	2,384									

Table 14 Grass silage 1st cut: pesticide-treated area (spray-hectares), weight of pesticide applied (kilograms) and reason for use.

Pesticide type & formulation	General weed control	Docks	Chickweed	Rushes	Docks & chickweed	Buttercup	Nettles	All reasons	Basic area (ha) of treatment	Quantity (kgs)
Herbicides										
Aminopyralid/fluroxypyr	472	1,114	.	394	.	.	.	1,979	1,979	515
Clopyralid/Triclopyr	.	.	.	.	.	.	4	4	4	5
Dicamba/mecoprop-P	1,393	221	.	.	.	.	.	1,615	1,615	1,420
Fluroxypyr	214	860	3,302	.	.	.	.	4,376	4,376	623
Fluroxypyr/triclopyr	.	8,713	618	.	1,189	.	.	10,520	10,520	5,785
Glyphosate	.	.	.	66	.	.	.	66	66	96
MCPA	1,170	.	.	872	.	870	.	2,911	2,911	4,765
Mecoprop-P	1,208	618	.	.	.	.	.	1,826	1,826	2,469
All herbicides	4,457	11,526	3,920	1,332	1,189	870	4	23,298	23,298	15,677
	Leatherjackets	All reasons	Basic area (ha) of treatment	Quantity (kgs)						
Insecticides										
Chlorpyrifos	8,976	8,976	8,976	6,463						
All insecticides	8,976	8,976	8,976	6,463						

Table 15 Grass silage 2nd cut: pesticide-treated area (spray-hectares), weight of pesticide applied (kilograms) and reason for use.

Pesticide type & formulation	General weed control	Docks	Chickweed	Buttercup	All reasons	Basic area (ha) of treatment	Quantity (kgs)
<i>Herbicides</i>							
Aminopyralid/fluroxypyr	1,054	1,826	.	.	2,880	2,880	720
Clopyralid/fluroxypyr/triclopyr	566	1,387	.	.	1,953	1,953	1,227
Clopyralid/Triclopyr	.	40	.	.	40	40	48
Dicamba/MCPA/mecoprop-P	.	378	.	.	378	378	581
Dicamba/mecoprop-P	.	797	.	.	797	797	673
Fluroxypyr	.	2,128	966	.	3,095	3,095	828
Fluroxypyr/triclopyr	.	8,891	.	.	8,891	8,891	4,636
MCPA	100	.	.	1,603	1,703	1,703	3,278
Mecoprop-P	.	611	.	.	611	611	906
Metsulfuron-methyl	180	.	.	.	180	180	1
Tribenuron-methyl	.	284	.	.	284	284	1
<i>All herbicides</i>	1,900	16,342	966	1,603	20,811	20,811	12,901

Table 16 Grass silage 3rd cut: pesticide-treated area (spray-hectares), weight of pesticide applied (kilograms) and reason for use.

Pesticide type & formulation	General weed control	Docks	All reasons	Basic area (ha) of treatment	Weight (kg)
<i>Herbicides</i>					
Aminopyralid/fluroxypyr	77	.	77	77	20
Clopyralid/fluroxypyr/triclopyr	180	536	715	715	644
Fluroxypyr/triclopyr	.	2,124	2,124	2,124	1,274
Metsulfuron-methyl	180	.	180	180	1
<i>All herbicides</i>	437	2,660	3,097	3,097	1,940

Table 17 Hay and haylage: pesticide-treated area (spray-hectares), weight of pesticide applied (kilograms) and reason for use.

Pesticide type & formulation	Docks	All reasons	Basic area (ha) of treatment	Weight (kg)
<i>Herbicides</i>				
Asulam	701	701	701	785
<i>All herbicides</i>	701	701	701	785

Table 18 Rough grazing: pesticide-treated area (spray-hectares), weight of pesticide applied (kilograms) and reason for use.

Pesticide type & formulation	General weed control	Leatherjackets	Rushes	Docks and thistles	Whins	All reasons	Basic area (ha) of treatment	Quantity (kgs)
<i>Herbicides</i>								
Clopyralid/Triclopyr	.	.	.	.	15	15	15	18
Dicamba/MCPA/mecoprop-P	.	.	183	.	.	183	183	546
Dicamba/mecoprop-P	204	.	.	.	.	204	204	184
Glyphosate	.	.	472	9	.	481	481	693
MCPA	.	.	1,522	.	.	1,522	1,522	2,432
<i>All herbicides</i>	204	.	2,177	9	15	2,405	2,405	3,872
			Basic area (ha) of treatment	Quantity (kgs)				
<i>Insecticides</i>								
Chlorpyrifos	1,616	1,616	1,616	1,163				
<i>All insecticides</i>	1,616	1,616	1,616	1,163				

Table 19 Arable silage: pesticide-treated area (spray-hectares), weight of pesticide applied (kilograms) and reason for use.

Pesticide type & formulation	General disease control	Septoria	Disease prevention	General fungal control	General weed control	Ground preparation	Chickweed	Cereal aphids	Leatherjackets	General insect control	Growth regulation	All reasons	Basic area (ha) of treatment	Quantity (kgs)
<i>Fungicides</i>														
Azoxystrobin/chlorothalonil	.	62	.	.	.	.	.	.	.	.	.	62	62	57
Boscalid/Epoxiconazole	.	.	.	173	.	.	.	.	.	.	.	173	173	61
Chlorothalonil	38	.	211	373	.	.	.	.	.	.	.	622	560	343
Chlorothalonil/Penthiopyrad	73	.	.	.	.	.	.	.	.	.	.	73	73	31
Cyprodinil/isoprazam	.	.	260	.	.	.	.	.	.	.	.	260	130	104
Cyprodinil/picoxystrobin	38	.	30	.	.	.	.	.	.	.	.	68	68	21
Epoxiconazole/fenpropimorph	.	.	.	108	.	.	.	.	.	.	.	108	108	45
Epoxiconazole/fenpropimorph/ kresoxim-methyl	.	.	.	106	.	.	.	.	.	.	.	106	106	37
Epoxiconazole/fenpropimorph/ metrafenone	.	.	160	301	.	.	.	.	.	.	.	461	461	232
Epoxiconazole/metconazole	163	.	40	358	.	.	.	.	.	.	.	561	561	68
Fenpropimorph	203	.	.	.	.	.	.	.	.	.	.	203	203	70
Fluoxastrobin/prothioconazole	.	.	40	.	.	.	.	.	.	.	.	40	40	12
Penthiopyrad	.	.	.	108	.	.	.	.	.	.	.	108	108	22
Proquinazid	.	.	.	95	.	.	.	.	.	.	.	95	95	3
Prothioconazole	.	62	.	349	.	.	.	.	.	.	.	411	302	49
Spiroxamine/tebuconazole	114	.	.	.	.	.	.	.	.	.	.	114	114	41
Tebuconazole	.	.	.	168	.	.	.	.	.	.	.	168	168	35
<i>All fungicides</i>	630	123	741	2,140	.	.	.	.	.	.	.	3,633	3,333	1,229
<i>Herbicides</i>														
Amidosulfuron	.	.	.	.	176	.	.	.	.	.	.	176	176	7
2,4-DB	.	.	.	.	60	.	.	.	.	.	.	60	60	72
Dicamba/MCPA/mecoprop-P	.	.	.	.	100	.	.	.	.	.	.	100	100	132
Diflufenican	.	.	.	.	108	.	.	.	.	.	.	108	108	11
Diflufenican/iodosulfuron-methyl- sodium/mesosulfuron-methyl	.	.	.	.	355	.	.	.	.	.	.	355	355	21
Florasulam/fluroxypyr	.	.	.	.	108	.	.	.	.	.	.	108	108	11
Flufenacet/pendimethalin	.	.	.	.	41	.	.	.	.	.	.	41	41	29

Table 19 cont. Arable silage: pesticide-treated area (spray-hectares), weight of pesticide applied (kilograms) and reason for use.

Pesticide type & formulation	General disease control	Septoria	Disease prevention	General fungal control	General weed control	Ground preparation	Chickweed	Cereal aphids	Leatherjackets	General insect control	Growth regulation	All reasons	Basic area (ha) of treatment	Quantity (kgs)
Fluroxypyr	1,238	.	21	.	.	.	.	1,259	1,259	190
Glyphosate	835	.	.	.	.	.	835	835	878
MCPA	143	.	.	.	.	.	.	143	143	148
Mecoprop-P	267	.	.	.	.	.	.	267	267	223
Metsulfuron-methyl	200	.	.	.	.	.	.	200	200	1
Metsulfuron-methyl/Thifensulfuron-methyl	77	.	.	.	.	.	.	77	77	3
Metsulfuron-methyl/tribenuron-methyl	371	.	.	.	.	.	.	371	371	4
Pendimethalin/picolinafen	62	.	.	.	.	.	.	62	62	64
Sulfosulfuron	89	.	.	.	.	.	.	89	89	2
Thifensulfuron-methyl/tribenuron-methyl	126	.	.	.	.	.	.	126	126	12
Tribenuron-methyl	35	.	.	.	.	.	.	35	35	1
All herbicides	3,556	835	21	.	.	.	.	4,413	4,413	1,807
Insecticides														
Chlorpyrifos	62	95	.	.	156	156	113
Cypermethrin	62	.	.	.	62	62	2
Esfenvalerate	54	.	282	.	336	336	1
Lambda-cyhalothrin	146	.	51	.	197	197	1
All insecticides	324	95	333	.	752	752	117
Growth regulators														
Chlormequat	739	739	679	598
2-chloroethylphosphonic acid	201	201	201	30
Trinexapac-ethyl	550	550	550	32
All growth regulators	1,490	1,490	1,430	659

Table 20 Arable silage (undersown): pesticide-treated area (spray-hectares), weight of pesticide applied (kilograms) and reason for use.

Pesticide type & formulation	Rust	Disease prevention	General	General	Docks	Ground preparation	Chickweed	Redshank	Docks & chickweed	Frit fly	Cereal aphids	Leatherjackets	Growth regulation	All reasons	Basic area (ha)		Quantity (kgs)
			fungal control	weed control											All	of	
															treatment		
<i>Fungicides</i>																	
Azoxystrobin/chlorothalonil	21	.	.	.	.	.	.	.	.	.	.	.	.	21	21	25
Chlorothalonil	.	.	204	.	.	.	.	.	.	.	.	.	.	204	142	204
Chlorothalonil/flusilazole	.	.	54	.	.	.	.	.	.	.	.	.	.	54	54	30
Cyprodinil/picoxystrobin	.	17	.	.	.	.	.	.	.	.	.	.	.	17	17	6
Epoxiconazole/fenpropimorph/kresoxim-methyl	.	73	113	.	.	.	.	.	.	.	.	.	.	186	186	60
Epoxiconazole/fenpropimorph/metrafenone	.	.	199	.	.	.	.	.	.	.	.	.	.	199	199	122
Epoxiconazole/metconazole	.	.	74	.	.	.	.	.	.	.	.	.	.	74	74	10
Tebuconazole	.	.	54	.	.	.	.	.	.	.	.	.	.	54	54	14
<i>All fungicides</i>	21	90	697	.	.	.	.	.	.	.	.	.	.	808	747	470
<i>Herbicides</i>																	
Amidosulfuron	.	.	.	27	.	.	.	.	.	.	.	.	.	27	27	1
Clopyralid/fluroxypyr/triclopyr	77	.	.	.	.	.	.	.	.	77	77	35	
2,4-DB	.	.	.	73	.	.	.	.	77	.	.	.	.	150	150	208
2,4-DB/linuron/MCPA	.	.	.	202	.	.	.	.	.	.	.	.	.	202	202	198
Dicamba/MCPA/mecoprop-P	.	.	.	164	.	.	.	.	.	.	.	.	.	164	164	267
Dicamba/mecoprop-P	.	.	.	62	.	.	.	.	.	.	.	.	.	62	62	56
Diquat	40	.	.	.	.	.	.	.	40	40	42	
Fluroxypyr	.	.	.	173	.	.	.	.	.	.	.	.	.	173	173	26
Glyphosate	.	.	.	21	.	786	.	.	.	.	.	.	.	807	807	864
MCPA	.	.	.	72	.	.	.	.	.	.	.	.	.	72	72	71
MCPB	.	.	.	81	.	.	.	.	.	.	.	.	.	81	81	130
Mecoprop-P	.	.	.	38	.	.	.	.	.	.	.	.	.	38	38	57
Metsulfuron-methyl	.	.	.	71	.	.	.	.	.	.	.	.	.	71	71	0.4

Table 20 cont. Arable silage (undersown): pesticide-treated area (spray-hectares), weight of pesticide applied (kilograms) and reason for use.

Pesticide type & formulation														Basic area (ha)		Quantity (kgs)
	Rust	Disease prevention	General fungal control	General weed control	Docks	Ground preparation	Chickweed	Redshank	Docks & chickweed	Frit fly	Cereal aphids	Leatherjackets	Growth regulation	All reasons	of treatment	
Thifensulfuron-methyl/tribenuron-methyl	.	.	.	17	77	.	.	.	.	.	.	.	.	94	94	1
Tribenuron-methyl	.	.	.	49	77	.	77	77	.	.	.	.	.	280	280	192
All herbicides	.	.	.	1,050	231	826	77	77	77	.	.	.	.	2,337	2,337	2,146
Insecticides																
Chlorpyrifos	51	.	77	.	128	128	94
Deltamethrin	62	.	.	62	62	0.3
Esfenvalerate	113	.	.	113	113	0.5
Lambda-cyhalothrin	144	.	.	144	144	1
All insecticides	51	318	77	.	446	446	96
Growth Regulators																
Chlormequat	253	253	199	134
All growth regulators	253	253	199	134

Table 21 Grass reseed: pesticide-treated area (spray-hectares), weight of pesticide applied (kilograms) and reason for use.

Pesticide type & formulation	General weed control	Docks	Ground preparation	Chickweed	All reasons	Basic area (ha) of treatment	Quantity (kgs)
<i>Herbicides</i>							
Aminopyralid/fluroxypyr	.	104	.	.	104	104	14
Clopyralid/fluroxypyr/triclopyr	392	.	.	.	392	392	145
Dicamba/MCPA/mecoprop-P	155	.	.	.	155	155	354
Fluroxypyr/triclopyr	.	600	.	.	600	600	180
Glyphosate	600	.	6,562	.	7,162	7,162	8,216
Mecoprop-P	.	.	284	.	284	284	392
Tribenuron-methyl	.	.	.	1,041	1,041	1,041	5
<i>All herbicides</i>	1,147	704	6,846	1,041	9,737	9,737	9,306
	Leather-jackets	All reasons	Basic area (ha) of treatment	Quantity (kgs)			
<i>Insecticides</i>							
Chlorpyrifos	211	211	211	152			
<i>All insecticides</i>	211	211	211	152			

Table 22 Other fodder crops: pesticide-treated area (spray-hectares), weight of pesticide applied (kilograms) and reason for use.

Pesticide type & formulation	General weed control	Ground preparation	General fungal control	All reasons	Basic area (ha) of treatment	Quantity (kgs)
<i>Fungicides</i>						
Flusilazole	.	.	31	31	31	5
<i>All fungicides</i>	.	.	31	31	31	5
<i>Herbicides</i>						
Desmedipham/ethofumesate/phenmedipham	118	.	.	118	118	61
Diquat	.	88	.	88	88	26
Glyphosate	.	6	.	6	6	9
Lenacil	31	.	.	31	31	7
Metamitron	118	.	.	118	118	414
Triflurosulfuron-methyl	31	.	.	31	31	0.5
<i>All herbicides</i>	299	94	.	393		517

Table 23 Fodder maize: pesticide-treated area (spray-hectares), weight of pesticide applied (kilograms) and reason for use.

Pesticide type & formulation	General weed control	Fat hen	Ground preparation	Chickweed	Scutch	All reasons	Basic area (ha) of treatment	Quantity (kgs)
<i>Herbicides</i>								
Bromoxynil/terbuthylazine	582	.	.	63	.	645	582	767
Dimethenamid- P/Pendimethalin	871	.	.	.	.	871	871	1,586
Fluroxypyr	337	.	.	.	.	337	337	50
Glyphosate	.	.	898	.	.	898	898	609
MCPA	103	.	.	.	.	103	103	170
Mesotrione	192	.	.	.	.	192	192	19
Mesotrione/Terbuthylazine	335	126	.	.	.	462	462	187
Metsulfuron-methyl	103	.	.	.	.	103	103	1
Nicosulfuron	192	.	.	.	126	319	319	13
Pendimethalin	679	.	.	.	.	679	679	995
<i>All herbicides</i>	3,395	126	898	63	126	4,609	4,546	4,396

Table 24 Comparison of the area (hectares) of grassland and fodder crops grown in Northern Ireland, 1989-2013.

	Survey year						
	1989	1993	1997	2003	2005	2009	2013
Crop	Area grown (ha)	Area grown (ha)	Area grown (ha)	Area grown (ha)	Area grown (ha)	Area grown (ha)	Area grown (ha)
<i>Established grassland crops</i>							
Enclosed grazing	481,059	476,209	512,819	537,735	517,045	484,223	427,889
Grass silage	243,149	252,502	422,650	430,542	409,704	487,520	646,533
Hay	66,001	33,017	32,303	11,997	16,744	9,861	20,079
Rough grazing	212,930	173,239	165,005	162,330	148,586	141,926	181,633
<i>All established grassland crops</i>	1,003,139	934,967	1,132,777	1,142,603	1,092,079	1,123,530	1,276,133
<i>Sown crops</i>							
Arable silage	3,762	.	766	8,720	2,667	1,638	2,334
Arable silage (undersown)	.	2,073	3,308	6,512	2,683	1,937	1,929
Cereals (undersown)	6,213	5,907	4,284	4,086	1,497	573	.
Grass reseed	35,434	5,380	11,472	27,282	18,350	13,229	19,647
<i>All sown crops</i>	45,409	13,360	19,830	46,600	25,197	17,376	23,910
<i>Fodder crops</i>							
Fodder beet	.	.	70	.	85	.	.
Fodder kale	.	72	45	335	17	.	.
Fodder kale (undersown)	.	.	58	.	.	.	.
Fodder maize	.	.	10	1,463	2,423	3,455	1,918
Fodder rape	.	.	99	157	192	.	.
Fodder turnip	371	.	250	464	375	.	.
All fodder (excluding maize)	371	72	522	956	669	1,024	769

Table 24 cont. Comparison of the area (hectares) of grassland and fodder crops grown in Northern Ireland, 1989-2013.

Crop	Survey year						
	1989	1993	1997	2003	2005	2009	2013
	Area grown (ha)	Area grown (ha)	Area grown (ha)	Area grown (ha)	Area grown (ha)	Area grown (ha)	Area grown (ha)
<i>All fodder crops</i>	371	72	532	2,419	3,092	4,480	2,687
All crops	1,048,919	948,400	1,153,138	1,191,622	1,120,368	1,145,386	1,302,730

Table 25 Comparison of pesticide usage on grassland & fodder crops in Northern Ireland 1989-2013, area treated (spray hectares) and weight applied (tonnes).

Crop	Survey year													
	1989		1993		1997		2003		2005		2009		2013	
	Area (sp ha)	Weight (t)	Area (sp ha)	Weight (t)	Area (sp ha)	Weight (t)	Area (sp ha)	Weight (t)	Area (sp ha)	Weight (t)	Area (sp ha)	Weight (t)	Area (sp ha)	Weight (t)
<i>Established grassland crops</i>														
Enclosed grazing	25,252	43.11	35,051	55.38	48,536	80.41	65,821	34.96	47,403	31.83	21,927	20.97	27,709	22.75
Grass silage	26,921	42.17	41,091	64.57	50,209	74.49	57,309	40.38	51,141	32.74	39,128	27.03	56,182	36.98
Hay	2,673	2.82	490	0.57	843	1.34	238	0.23	260	0.34	.	.	701	0.78
Rough grazing	2,736	3.48	1,866	3.75	1,710	2.75	2,591	1.99	4,637	4.70	308	0.54	4,021	5.04
<i>All established grassland crops</i>	57,582	91.58	78,498	124.27	101,298	158.99	125,959	77.56	103,441	69.61	61,363	48.54	88,612	65.55
<i>Sown crops</i>														
Arable silage	8,138	3.66	.	.	2,299	1.59	24,175	9.68	6,814	2.54	8,223	3.55	12,296	3.90
Arable silage (undersown)	.	.	3,632	0.38	2,830	0.15	9,186	2.40	4,301	1.86	5,192	2.84	5,459	2.87
Cereals (undersown)	11,190	11.62	5,212	6.70	4,804	4.73	4,421	1.60	2,323	1.29	3,427	0.37	.	.
Grass reseed	32,344	15.33	4,090	3.51	7,377	2.91	6,912	8.01	5,685	4.19	7,091	11.33	9,948	9.46
<i>All sown crops</i>	51,672	30.61	12,934	10.59	17,310	9.39	44,694	21.69	19,123	9.89	23,933	18.09	27,702	16.23
<i>Fodder crops</i>														
Fodder beet	.	.	.	.	227	0.09	.	.	170	0.61	.	.	.	.
Fodder kale	.	.	98	0.02	105	0.21	670	0.78	.	.	.	.	.	.
Fodder kale (undersown)	.	.	.	.	203	0.25	.	.	.	.	.	.	.	.
Fodder maize	.	.	.	.	20	0.03	6,669	2.58	5,993	5.73	13,751	6.33	6,527	4.65
Fodder rape	.	.	.	.	164	0.25	157	0.00	59	0.00	.	.	.	.
Fodder turnip	621	0.33	.	.	651	0.35	.	.	.	.	.	.	.	.
All fodder (excluding maize)	621	0.33	98	0.02	1350	1.15	827	0.78	229	0.61	2,952	2	513	0.52
<i>All fodder crops</i>	621	0.33	98	0.02	1,370	1.18	7,496	3.36	6,222	6.35	16,703	8.62	7,040	5.17

Table 25 cont. Comparison of pesticide usage on grassland & fodder crops in Northern Ireland 1989-2013, area treated (spray hectares) and weight applied (tonnes).

Crop	Survey year													
	1989		1993		1997		2003		2005		2009		2013	
	Area (sp ha)	Weight (t)	Area (sp ha)	Weight (t)	Area (sp ha)	Weight (t)	Area (sp ha)	Weight (t)	Area (sp ha)	Weight (t)	Area (sp ha)	Weight (t)	Area (sp ha)	Weight (t)
All crops	109,875	122.47	91,529	134.87	119,978	169.55	178,149	102.61	128,786	86	101,999	75	123,354	86.95

Table 26 Comparison of pesticide usage on grassland and fodder crops in Northern Ireland 1989-2013, area treated (spray hectares), weight applied (kilograms) and the area grown (hectares).

Pesticide type	Survey year													
	1,989		1993		1997		2003		2005		2009		2013	
	Area (sp ha)	Weight (kg)	Area (sp ha)	Weight (kg)	Area (sp ha)	Weight (kg)	Area (sp ha)	Weight (kg)	Area (sp ha)	Weight (kg)	Area (sp ha)	Weight (kg)	Area (sp ha)	Weight (kg)
Fungicides	251	235	180	59	421	161	7,933	2,417	1,776	502	4,737	1,106	4,471	1,704
Herbicides	73,637	120,551	85,151	134,680	109,253	168,545	149,630	97,976	118,499	84,221	80,173	72,516	96,197	73,708
Insecticides														
<i>Carbamates</i>	.	.	.	.	.	.	.	.	.	.	.	.	.	.
<i>Organochlorines</i>	.	.	.	.	8	4	.	.	.	.	.	.	.	.
<i>Organophosphates</i>	91	51	.	.	.	.	415	379	1,268	647	298	159	14,399	10,369
<i>Pyrethroids</i>	258	4	.	.	.	.	558	14	960	21	2,623	16	912	6
<i>Unknown</i>	.	.	.	.	.	.	.	.	269	.	.	.	.	.
insecticides	.	.	.	.	.	.	.	.	269	.	.	.	.	.
All insecticides	349	55	.	.	8	4	974	393	2,498	667	2,922	176	15,311	10,375
Growth regulators	.	.	.	.	176	42	1,870	1,369	486	159	1,973	715	1,742	793
Seed treatments	35,635	1,624	6,199	129	10,121	793	17,741	458	5,527	304	12,193	730	5,631	370
All pesticides	109,874	122,465	91,529	134,869	119,978	169,545	178,148	102,613	128,786	85,854	101,998	75,243	123,354	86,949
<i>Area grown (ha)</i>	<i>1,048,919</i>		<i>948,400</i>		<i>1,153,138</i>		<i>1,191,622</i>		<i>1,120,368</i>		<i>1,145,386</i>		<i>1,302,730</i>	

Table 27 The proportional differences (%) of pesticide usage on grassland and fodder crops in Northern Ireland during 2013 compared to 1989, 1993, 1997, 2003, 2005 & 2009.

	1989 cf 2013		1993 cf 2013		1997 cf 2013		2003 cf 2013		2005 cf 2013		2009 cf 2013	
Pesticide type	Area	Weight	Area	Weight	Area	Weight	Area	Weight	Area	Weight	Area	Weight
Fungicides	1681%	625%	2384%	2788%	962%	958%	-44%	-29%	152%	239%	-6%	54%
Herbicides	31%	-39%	13%	-45%	-12%	-56%	-36%	-25%	-19%	-12%	20%	2%
Insecticides	4287%	18764%	.	.	191288%	259275%	1472%	2540%	513%	1455%	424%	5793%
Growth regulators	.	.	.	.	890%	1788%	-7%	-42%	258%	399%	-12%	11%
Seed treatments	-84%	-77%	-9%	187%	-44%	-53%	-68%	-19%	2%	22%	-54%	-49%
<i>All pesticides</i>	12%	-29%	35%	-36%	3%	-49%	-31%	-15%	-4%	1%	21%	16%
<i>Area grown (ha)</i>	24%		37%		13%		9%		16%		14%	

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99	Grassland & Fodder Crops 1989	1-855 27 079 X
105	Arable Crops 1990	1-855 27 130 3
106	Soft Fruit Crops 1990	1-855 27 149 4
109	Vegetable Crops 1991	1-855 27 137 0
110	Protected Crops 1991 (edible & ornamental)	1-855 27 283 0
111	Mushroom Crops 1991	1-855 27 150 8
117	Arable Crops 1992	1-855 27 193 1
118	Top Fruit Crops 1992	1-855 27 194 X
124	Grassland & Fodder crops 1993	1-855 27 221 0
131	Forestry 1993	1-855 27 282 2
132	Arable Crops 1994	1-855 27 314 4
139	Vegetable Crops 1995	1-855 27 346 2
140	Mushroom Crops 1995	1-855 27 347 0
146	Arable Crops 1996	1-855 27 469 8
147	Top fruit 1996	1-855 27 470 1
156	Grassland & Fodder Crops 1997	1-855 27 506 6
157	Sheep Treatments 1997	1-855 27 425 6
167	Soft Fruit 1998	1-855 27 540 6
168	Arable Crops 1998	1-855 27 536 8
169	Vegetable Crops 1999	1-855 27 561 9
170	Mushroom Crops 1999	1-855 27 549 X
177	Arable Crops 2000	1-855 27 670 450
178	Top Fruit Crops 2002	1-855 27 618 6
194	Arable Crops 2002	1-855 27 674 7
198	Grassland & Fodder Crops 2003	1-855 27 797 2
199	Hardy Nursery Stock Crops 2003	1-855 27 789 1
201	Protected Ornamental Crops 2003	1-855 27 739 5
206	Arable Crops 2004	1-855 27 833 2
207	Vegetable crops 2004	1-855 27 869 3
208	Grassland & Fodder Crops 2005	1-855 27 998 8
209	Sheep Treatments 2005	1-855 27 999 5
216	Arable Crops 2006	1-848 07 035 6
217	Top Fruit Crops 2006	1-848 07 019 6
218	Soft Fruit Crops 2006	1-848 07 036 3
222	Vegetable Crops 2007	1-848 07 062 2

223	Mushroom Crops 2007	1 848 07 061 5
230	Arable Crops 2008	1 848 07 135 3
231	Top Fruit Crops 2008	1-848 07 134 6
238	Grassland & Fodder Crops 2009	1-848 07 186 5
239	Hardy Nursery Stock Crops 2009	1-848 07 187 2
240	Soft Fruit Crops 2010	1-848 07 251 0
242	Arable Crops 2010	1-848 07 252 7
245	Mushroom Crops 2011	1-848 07 308 1
246	Vegetable Crops 2011	1-848 07 309 8
247	Arable Crops 2012	1-848 07 404 3
248	Soft Fruit Crops 2012	1-848 07 402 6
249	Top Fruit Crops 2012	1-848 07 403 3

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