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PESTICIDE USAGE SURVEY REPORT 282

GRASSLAND AND FODDER CROPS IN NORTHERN IRELAND 2017

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Department of Agriculture, Environment and Rural Affairs
https://www.daera-ni.gov.uk/articles/departmental-responsibilities-regarding-pesticides

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The County Regions of Northern Ireland

SUMMARY

This is the eighth survey examining pesticide usage practices on grassland and fodder crops in Northern Ireland, providing comparative data to that obtained in the 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), 2009 (Withers *et al*., 2010) and 2013 (Withers *et al*., 2014). Information on all aspects of pesticide usage was collected from 276 grazing, 47 arable silage, 20 fodder maize and 25 other fodder crop holdings throughout the Province, representing 2.7% of the total area of grassland and fodder crops grown. Quantitative data have been adjusted to provide estimates of total pesticide usage. The total area of grassland and fodder crops grown in Northern Ireland in 2017 was an estimated 1,185,337 hectares.

Overall, the area of grassland and fodder crops grown in 2017 decreased by 9% when compared to 2013. The area of established grassland crops decreased by 14% throughout this period. The area of sown crops increased from 23,190 hectares to 80,567 hectares. This was primarily due to the inclusion of all grass reseeds up to five years old. The area of fodder crops grown in Northern Ireland in 2017 decreased by 12% compared to that recorded in 2013. This was 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 and 2013. During 2017 the area of fourth cut silage decreased by 52% when compared to the previous survey.

The area of grassland and fodder crops receiving pesticide treatment increased by 19% when compared to that recorded in 2013. A total of 99 tonnes of pesticide was applied to 144,772 spray hectares of grassland and fodder crops during 2017. This represented a 12% decrease in the weight of pesticides applied compared to 2013. A total of 119 products comprising 75 active substances were recorded in use during this survey. Herbicides accounted for 90% of the pesticide-treated area, representing 96% of the weight of pesticides applied. Insecticides accounted for 1% of the treated area and less than 1% of the weight of active ingredients applied. In 2013, the weight of insecticide active substances applied increased from 176kg to 10,375kg when compared with 2009. This was principally due to increased applications of the organophosphate chlorpyrifos to first cut silage to control leatherjackets. It should be noted, however, during this survey period there was no approval for use of chlorpyrifos on grassland or arable silage crops.

A total of 6kg of insecticide active substances were applied to arable silage and grass reseed areas in 2017. Fungicides, growth regulators and seed treatments collectively accounted for the remainder of the total pesticide usage and were applied to arable silage crops, undersown arable silage crops and reseeded grass areas. No molluscicide use was recorded during this survey.

The area of established grassland crops treated with pesticides increased by 22% when compared to the 2013 survey. This was mainly due to increased areas of enclosed grazing and rough grazing and subsequent treatment for docks (*Rumex* spp.) and rushes (*Juncaceae* spp.). Correspondingly, the weight of active substance applied to established grassland crops increased by 26%. Pesticide usage on sown grassland crops increased by 10% when compared with 2013, however, the weight of active substances applied decreased by 19%. The area of fodder maize sown decreased by 28% whilst the area of other fodder crops sown increased by 40%. The pesticide-treated area of fodder crops decreased by 18% from 7,040 spray hectares (spha) to 5,802 spha and the weight of active substances applied decreased by 29%.

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 32% between 2005 and 2009 but increased by 20% between 2009 and 2013. This trend continued when comparing 2013 with 2017 with a 36% increase in the area treated with herbicides and a 30% increase in the weight of active substances applied. The active substance triclopyr was the most frequently-used herbicide (in formulation with aminopyralid, clopyralid and fluroxypyr), ranked by treated area (spha). MCPA was the most frequently-used herbicide, ranked by weight applied (kg). An estimated 52% (24,483 spha) of first-cut grass silage received herbicide treatments for control of docks (*Rumex* spp.) with a further 15% (6,801 spha) receiving treatments for control of chickweed (*Stellaria* spp.). ‘Docks and chickweed’ combined was given as the reason for an additional 13% of herbicide treatments to first-cut grass silage crops.

DEFINITIONS AND NOTES

- ‘Grown area’ refers to the actual planted area of crop, and is referred to in hectares (ha).
- ‘Basic area’ refers to the actual planted area of crop which received at least one pesticide application and is referred to in hectares (ha).
- ‘Treated area’ refers to the total area treated with a pesticide, including all repeated applications to the basic area, and is referred to in spray hectares (spha).
- ‘Quantity applied’ refers to the weight of pesticides applied, including all repeated applications, and is referred to in kilograms (kg).
- ‘Reasons for use’: the reasons reported for the use of pesticides are the **growers** “stated reason for use” and may sometimes seem inappropriate.
- ‘Rounding’: due to rounding of figures, there may be slight differences in totals both within and between tables.
- ‘Spray applications’ refers to the number of treatments of any pesticide type applied to the treated areas.
- ‘General weed control’ refers to post emergence weed control.
- ‘Ground preparation’ refers to treatments applied before or during seed bed preparation.
- ‘Sealer’ 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, 2005, and the 2009 and 2013 reports, 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.
- ‘Other fodder crops’ comprised fodder beet, fodder kale, fodder rape, fodder swede and fodder turnip. These were grouped together for statistical purposes.
- ‘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.

INTRODUCTION

As a participant of the UK Working Party on Pesticide Usage Surveys, the Agri-Food and Biosciences Institute (AFBI), on behalf of the Department of Agriculture, Environment and Rural Affairs (DAERA), conducts a programme of surveys to examine pesticide usage in all sectors of the agricultural and horticultural industries.

Principally, the data collected provides information for consideration by the UK Expert Committee on Pesticides. In addition, the information may be used by those involved in residue testing, environmental impact studies, public information and for the evaluation and regulation of trends in pesticide usage. Pesticide usage monitoring forms part of an obligation under the Food and Environment Act (1985) for post-registration monitoring of pesticides approved for use. In addition, regulation EC 1185/2009 also provides a statutory requirement for the collection of pesticide statistics. The programme forms an integral part of the government's pesticide safety control arrangements, in providing quantitative and qualitative data on the usage of pesticides in agriculture, horticulture, food storage and associated industries.

This work is also undertaken in England and Wales by FERA Science Ltd (FERA) and in Scotland by Science and Advice for Scottish Agriculture (SASA). Pesticide usage reports from these regions may be obtained at the following sites:
(https://secure.fera.defra.gov.uk/pusstats/surveys/)
(https://www.sasa.gov.uk/pesticides/pesticide-usage/pesticide-usage-survey-reports)

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 2016 (Anon., 2017) 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. 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. The holdings were then surveyed by either telephone or personal interview between October 2017 and March 2018. 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 2016 (Anon., 2017). 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 using SQL, a relational database programme. Validated data were downloaded for analysis using IBM SPSS Statistics Version 22 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 1,372 crops surveyed on 276 enclosed grassland, 47 arable crop silage, 20 maize crop and 25 other fodder crop holdings.

Figure 1 **Regional distribution of grassland and fodder crops grown in Northern Ireland (ha), 2017.**

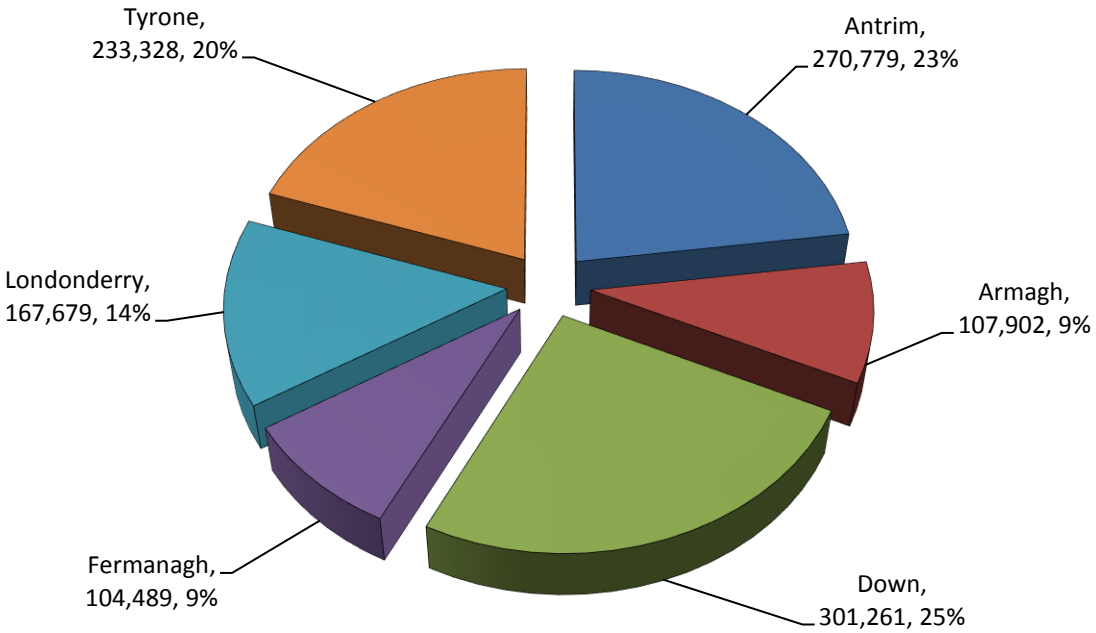


Figure 2 **Regional distribution of individual grassland and fodder crops grown in Northern Ireland (ha), 2017.**

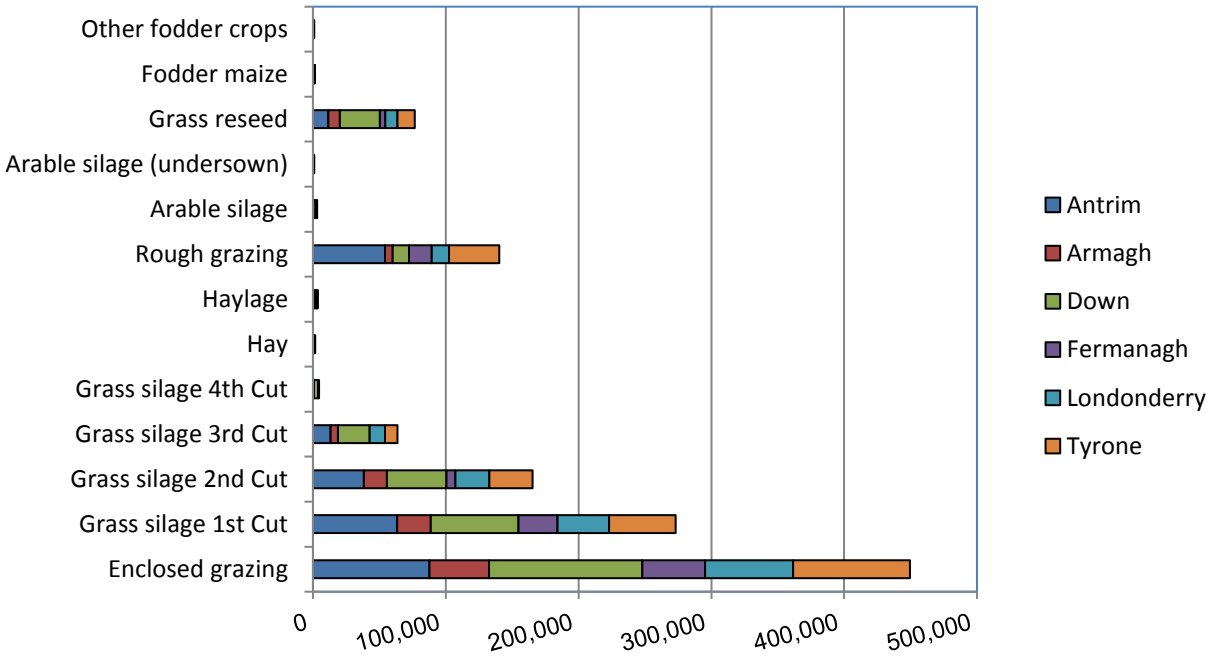


Figure 3 **Regional distribution of area (ha) of grassland crops grown in Northern Ireland, 2017.**

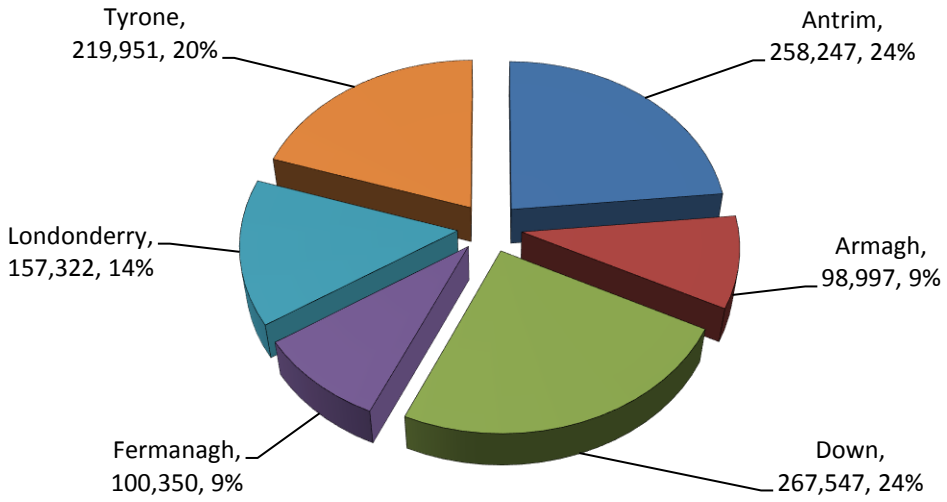


Figure 4 **Regional distribution of area (ha) of sown crops grown in Northern Ireland, 2017.**

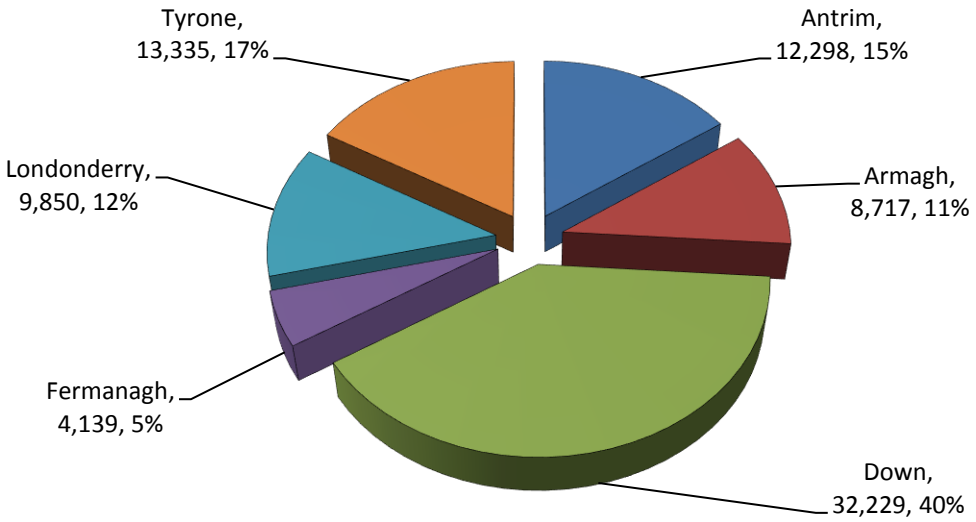
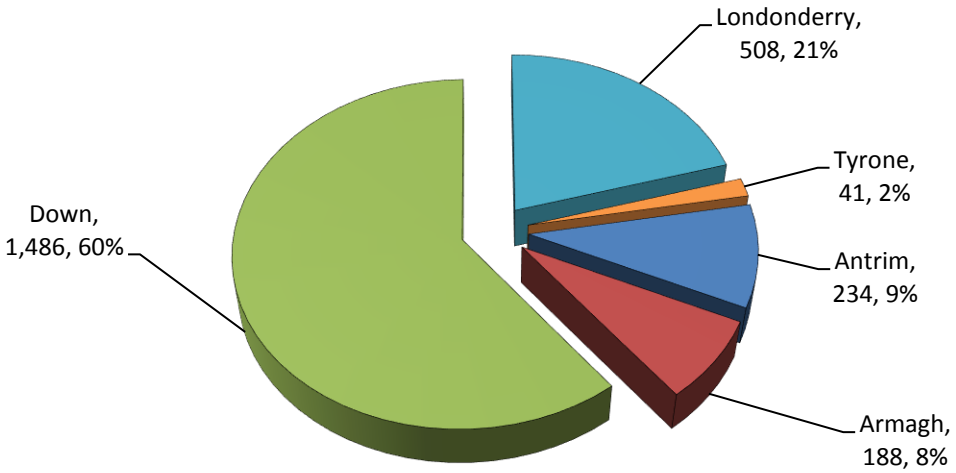


Figure 5 **Regional distribution of area (ha) of fodder crops grown in Northern Ireland, 2017.**



PESTICIDE USAGE

Figure 6 **Pesticide usage (spha) on grassland & fodder crops in Northern Ireland, 2017.**

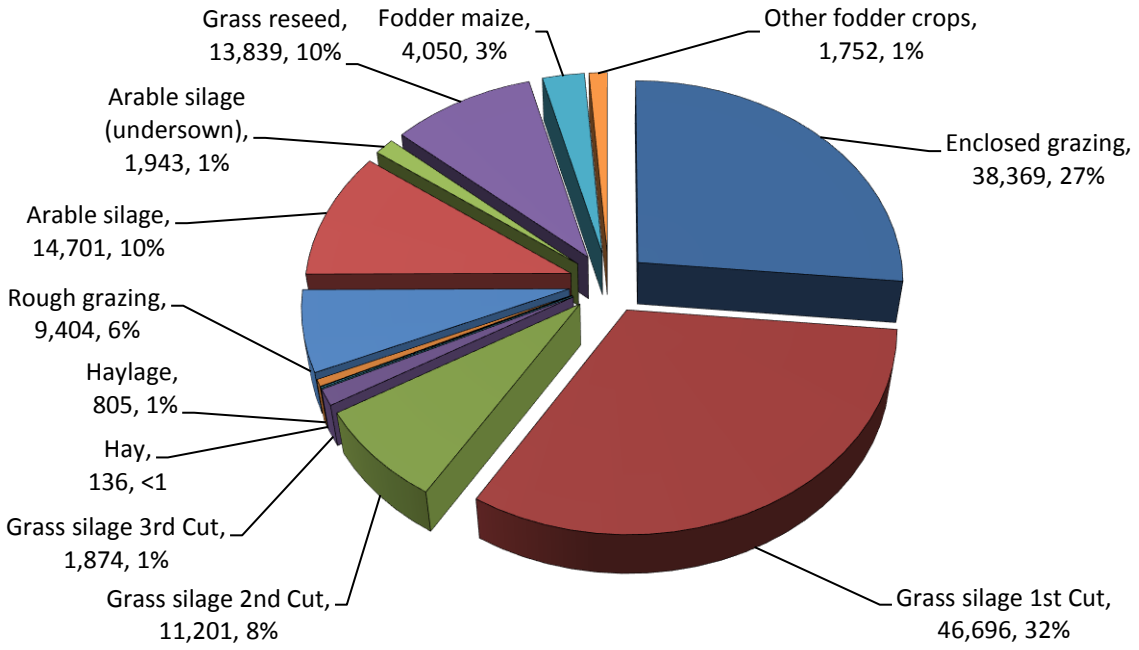


Figure 7 **Weight (kg) of pesticide applied to grassland & fodder crops in Northern Ireland, 2017.**

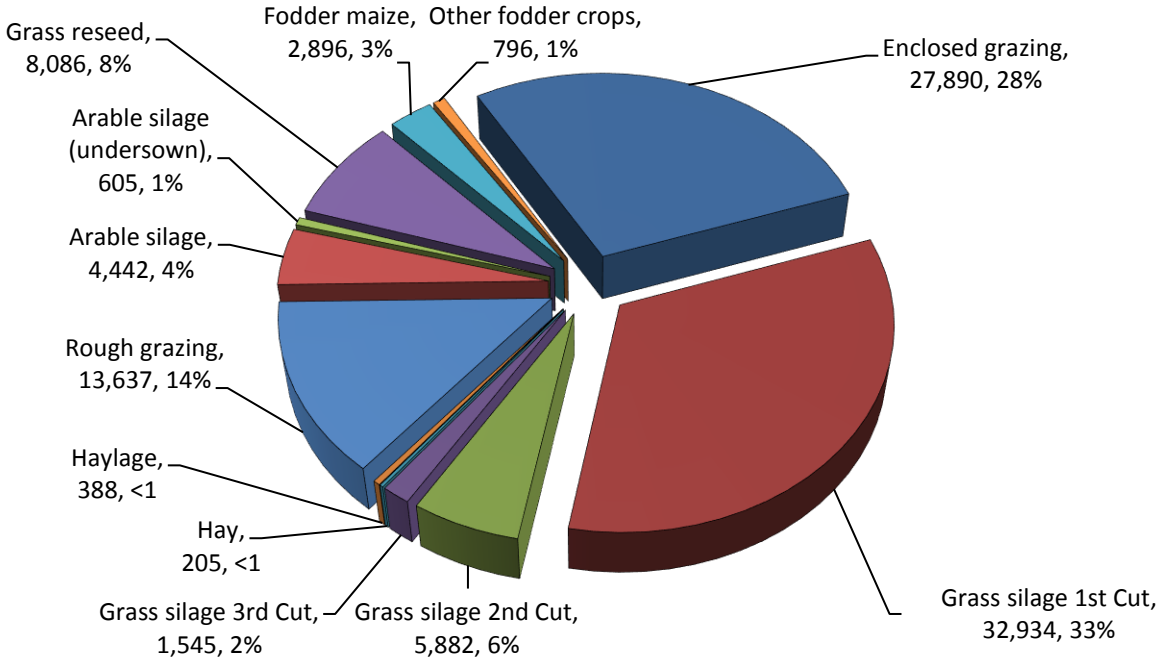


Figure 8 **Area (spha) of grassland & fodder crops treated regionally with each pesticide type in Northern Ireland, 2017.**

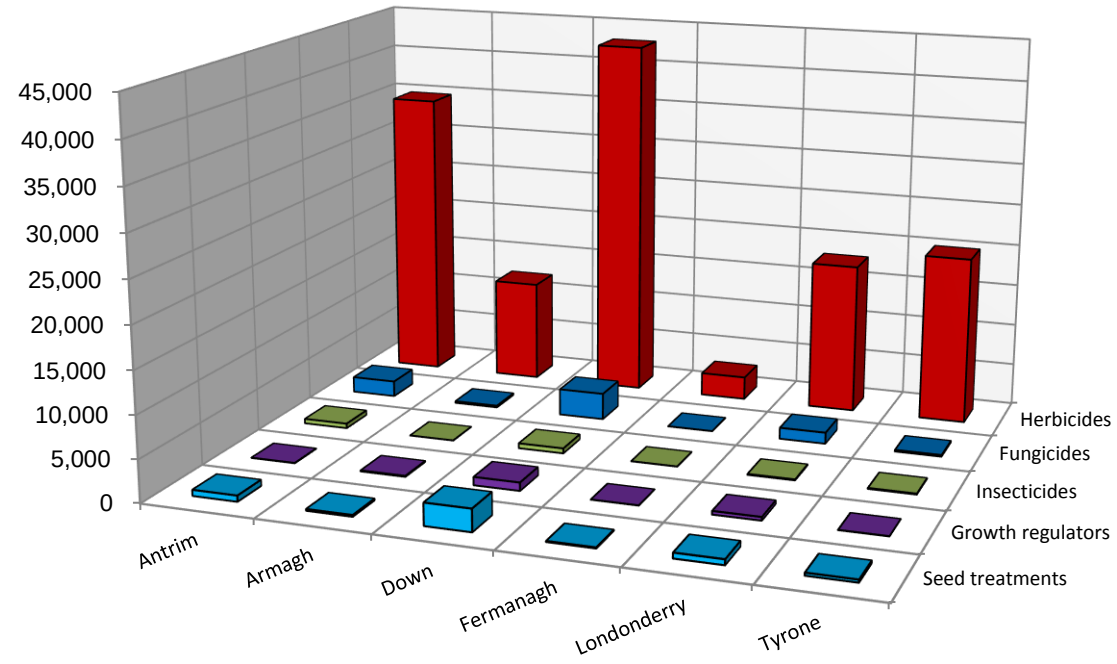


Figure 9 **Weight (kg) of each pesticide type applied regionally to grassland & fodder crops in Northern Ireland, 2017.**

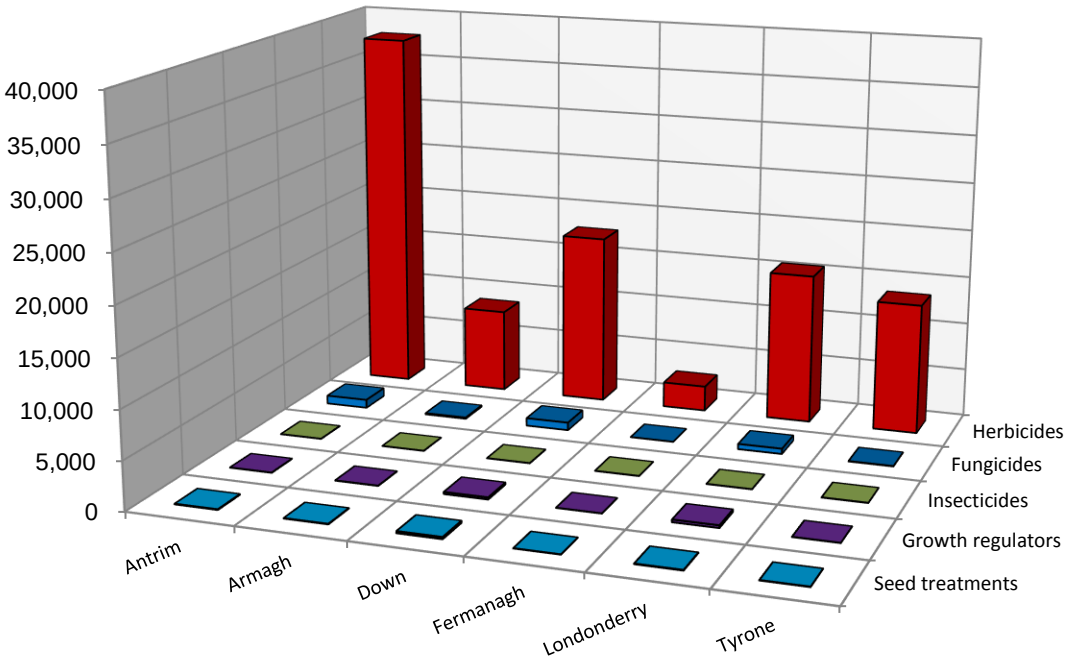


Figure 10 **Pesticide usage (spha) on grassland and fodder crops in crops in Northern Ireland, 2017.**

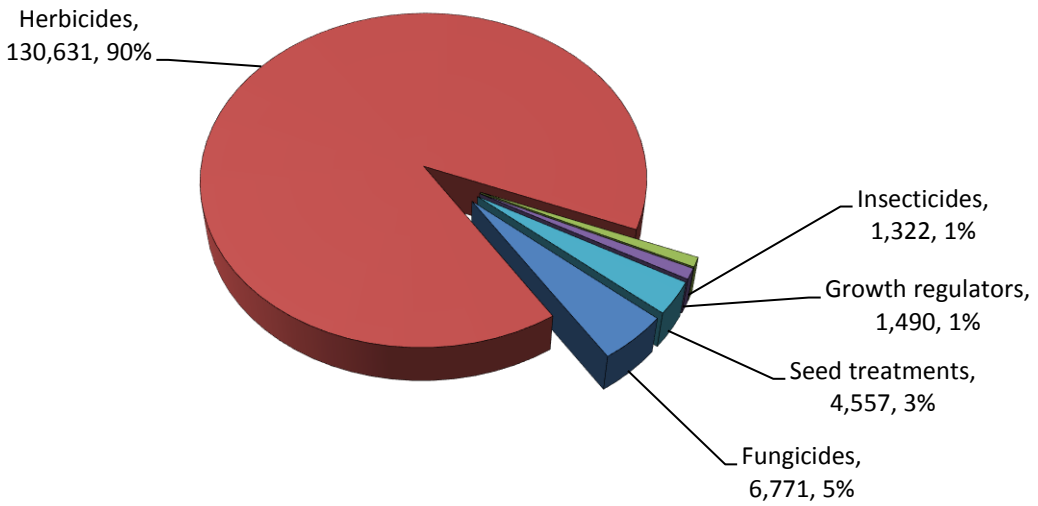


Figure 11 **Weight (kg) of pesticide applied to grassland and fodder crops in crops in Northern Ireland, 2017.**

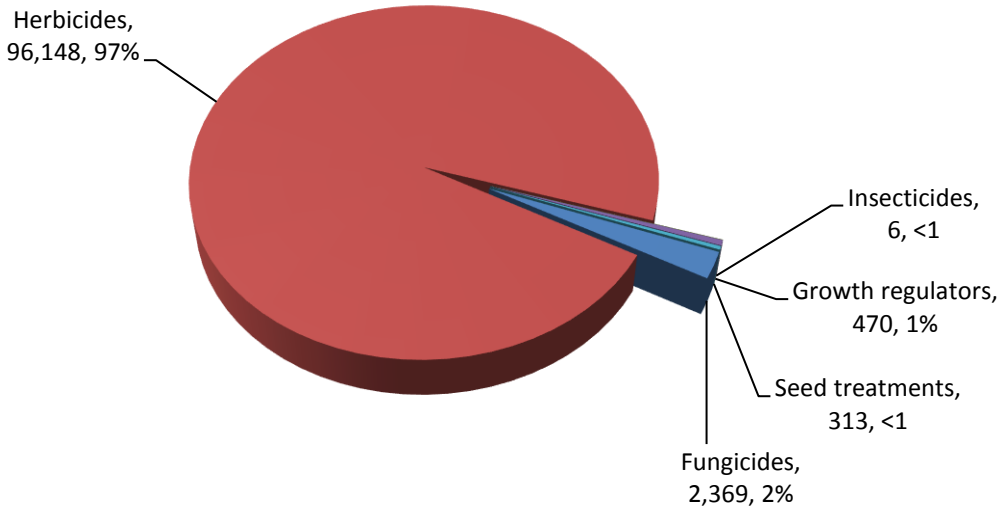


Figure 12 **Pesticide usage (spha) on sown crops in crops in Northern Ireland, 2017.**

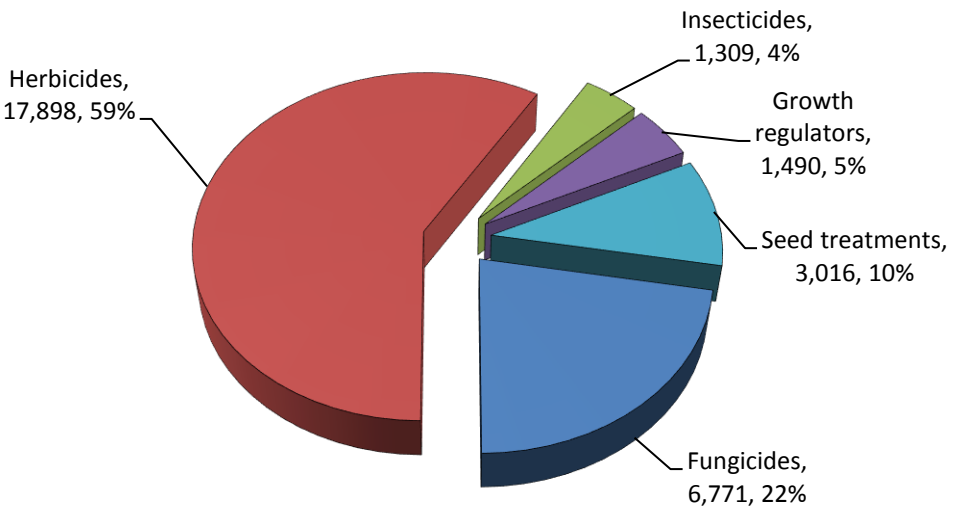


Figure 13 **Weight (kg) of pesticide applied to sown crops in crops in Northern Ireland, 2017.**

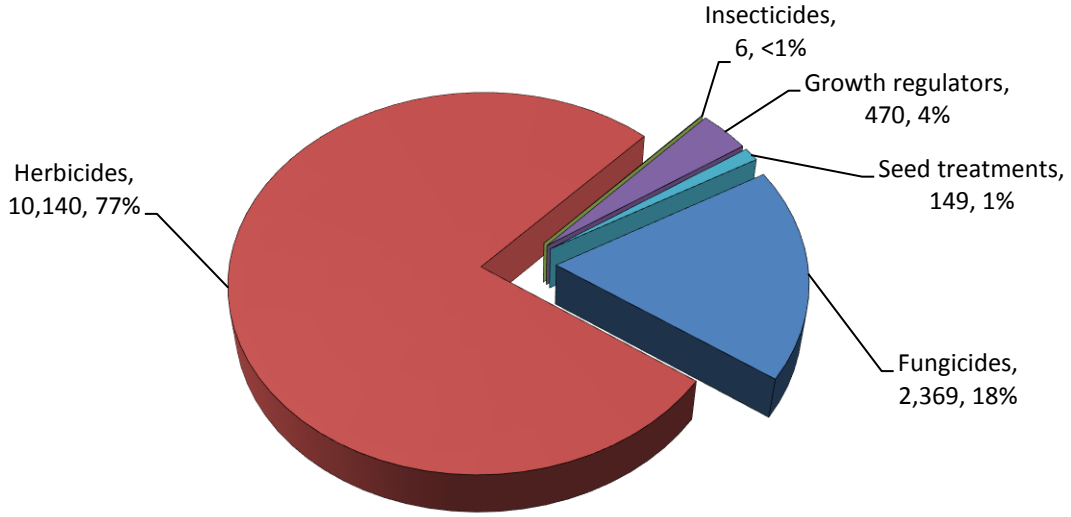


Figure 14 **Pesticide usage (spha) on fodder crops in crops in Northern Ireland, 2017.**

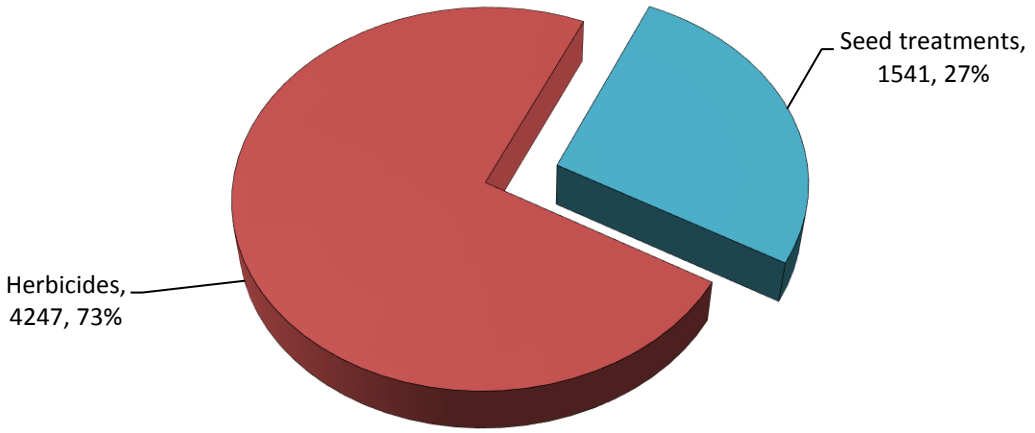
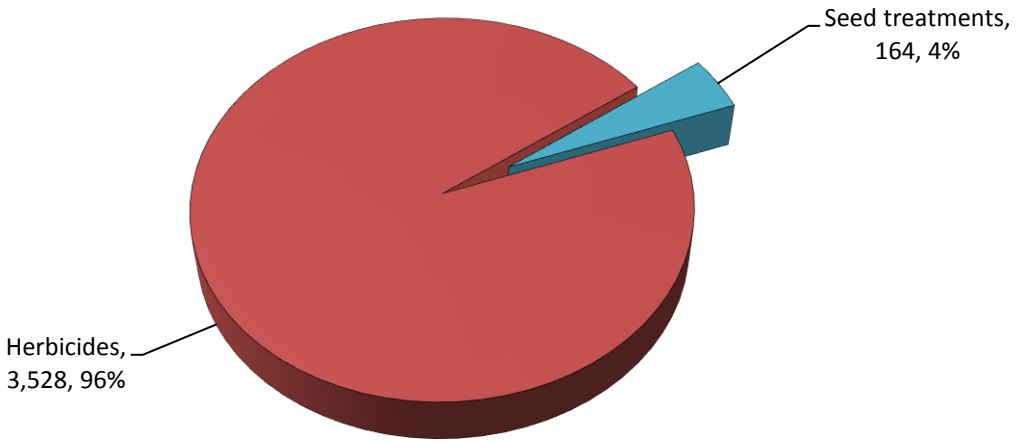


Figure 15 **Weight (kg) of pesticide applied to fodder crops in crops in Northern Ireland, 2017.**



PESTICIDE USAGE ON GRASSLAND

Enclosed grazing

Tables 3, 6, 7, 8, 9, 10 & 12

- 449,622 hectares of enclosed grassland grown in Northern Ireland.
- 38,369 treated 'spray hectares'.
- 27,890 kg of active substances applied.
- Only herbicides were applied.
- 7.6% of the enclosed grassland area received treatments.

Figure 16 **Enclosed grazing: pesticide-treated area (spha) of herbicide active substances, 2017.**

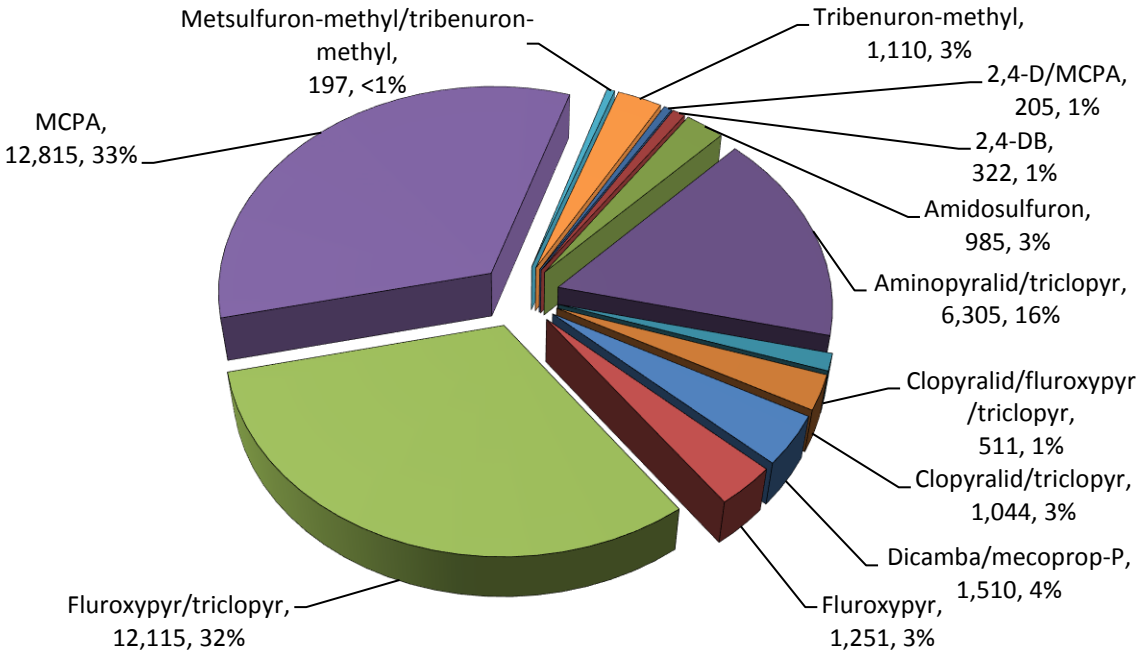


Figure 17 **Enclosed grazing: weight (kg) of herbicide active substances applied, 2017.**

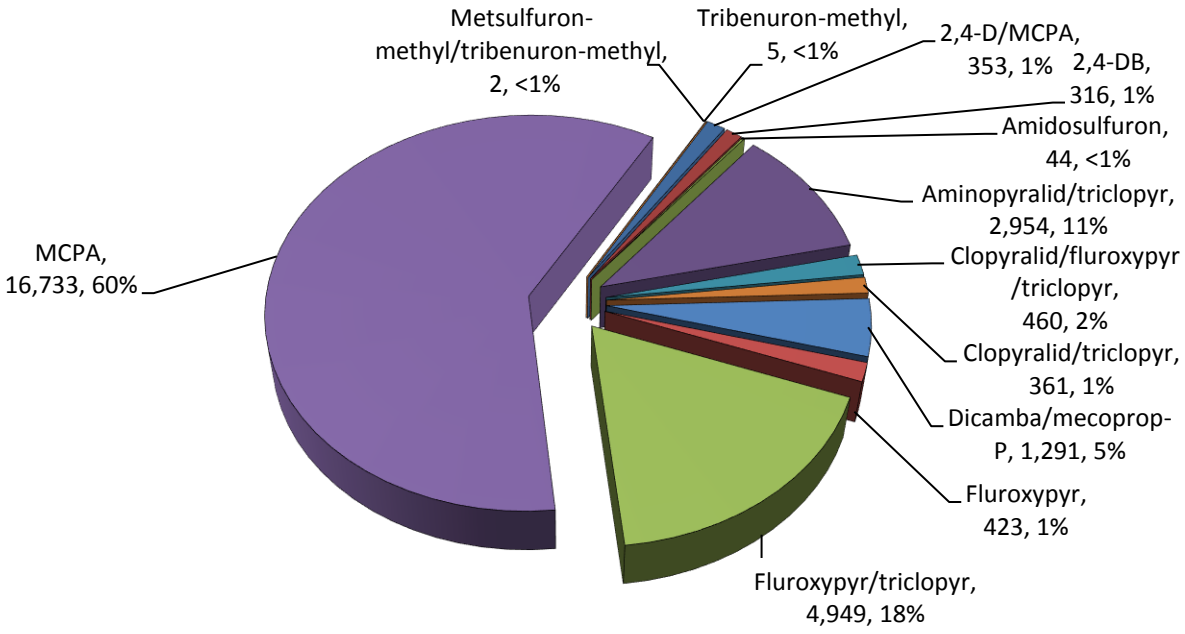
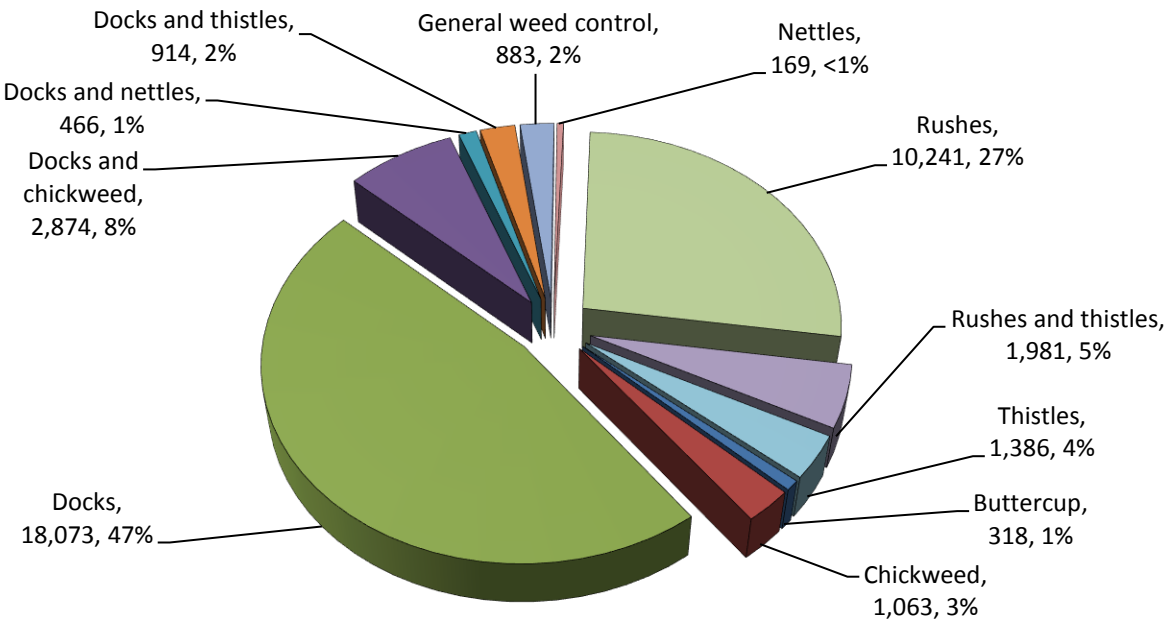


Figure 18 **Enclosed grazing: reasons for herbicide use (spha), 2017.**



Grass silage 1st cut

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

- 273,225 hectares of 1st cut silage grown in Northern Ireland.
- 46,696 treated 'spray hectares'.
- 32,934 kg of active substances applied.
- Only herbicides were applied.
- 15.8% of the 1st cut grass silage area received treatments.

Figure 19 **Grass silage 1st cut: pesticide-treated area (spha) of herbicide active substances, 2017.**

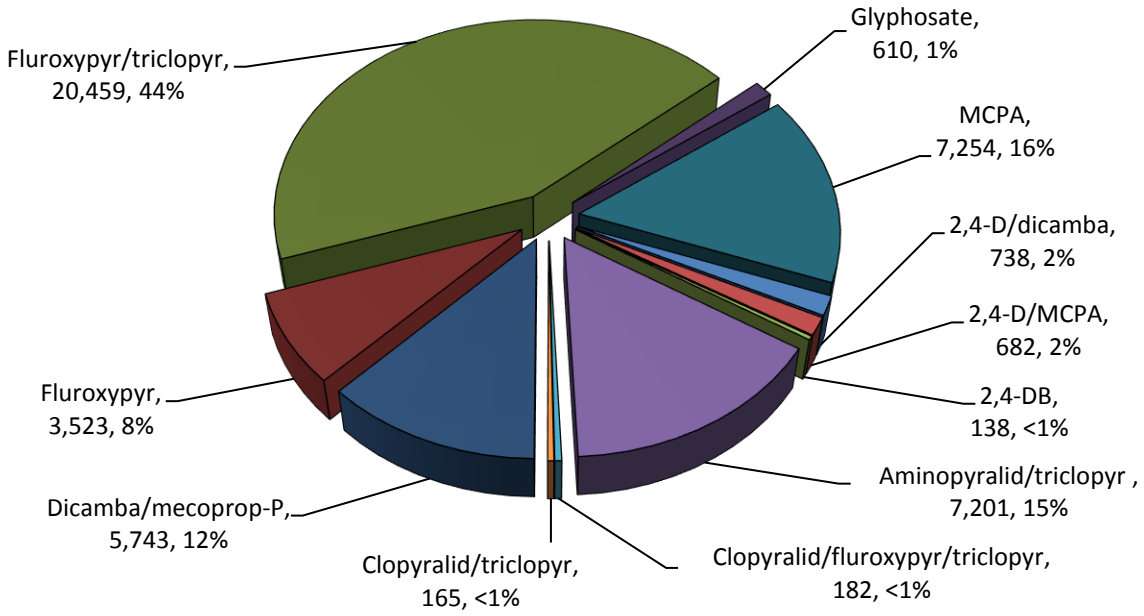


Figure 20 **Grass silage 1st cut: weight (kg) of herbicide active substances applied, 2017.**

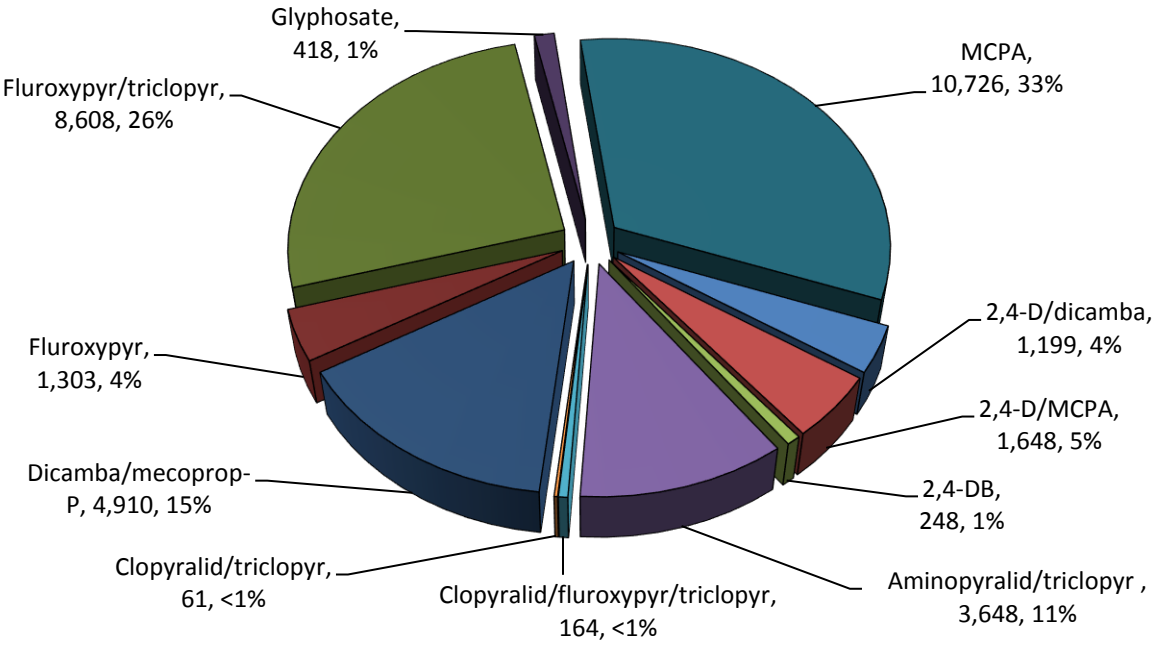
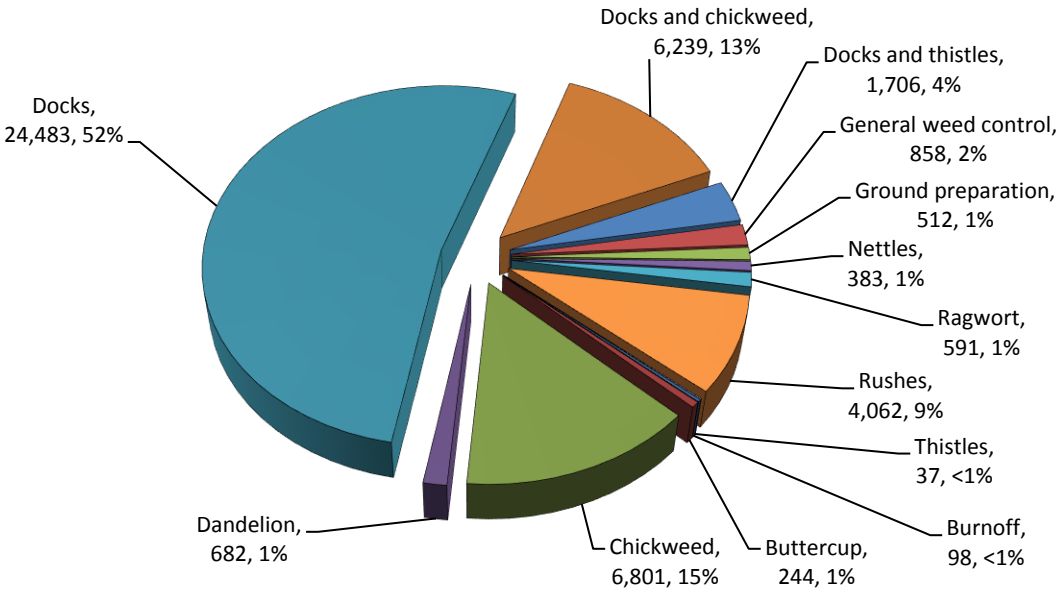


Figure 21 **Grass silage 1st cut: reasons for herbicide use (spha), 2017.**



Grass silage 2nd cut

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

- 165,444 hectares of 2nd cut silage grown in Northern Ireland.
- 11,201 treated 'spray hectares'.
- 5,882 kg of active substances applied.
- Only herbicides were applied.
- 6% of the 2nd cut grass silage area received treatments.

Figure 22 **Grass silage 2nd cut: pesticide-treated area (spha) of herbicide active substances, 2017.**

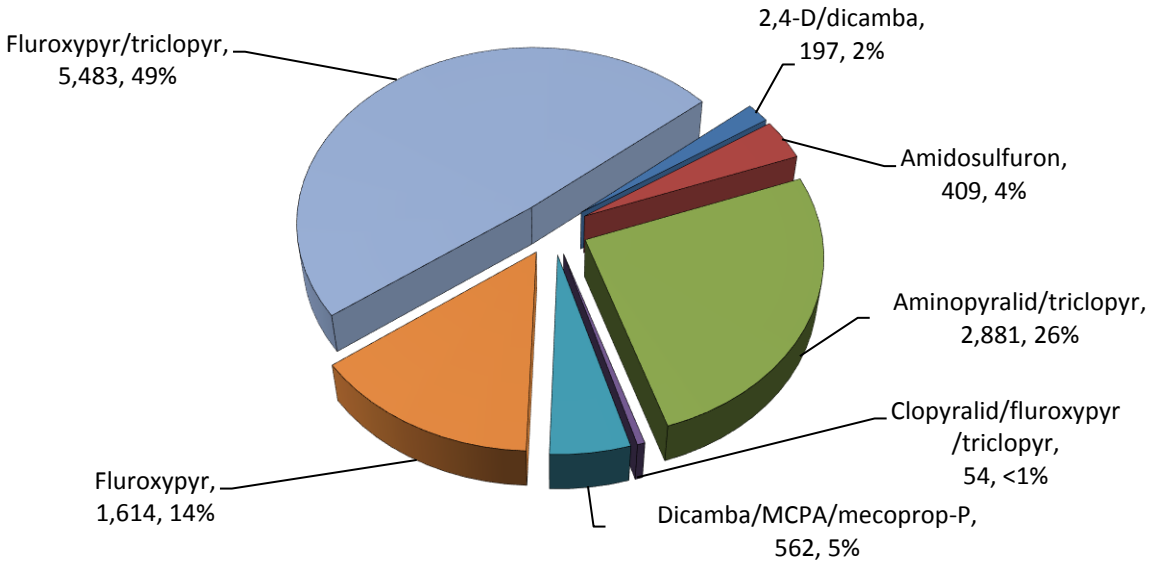


Figure 23 **Grass silage 2nd cut: weight (kg) of herbicide active substances applied, 2017.**

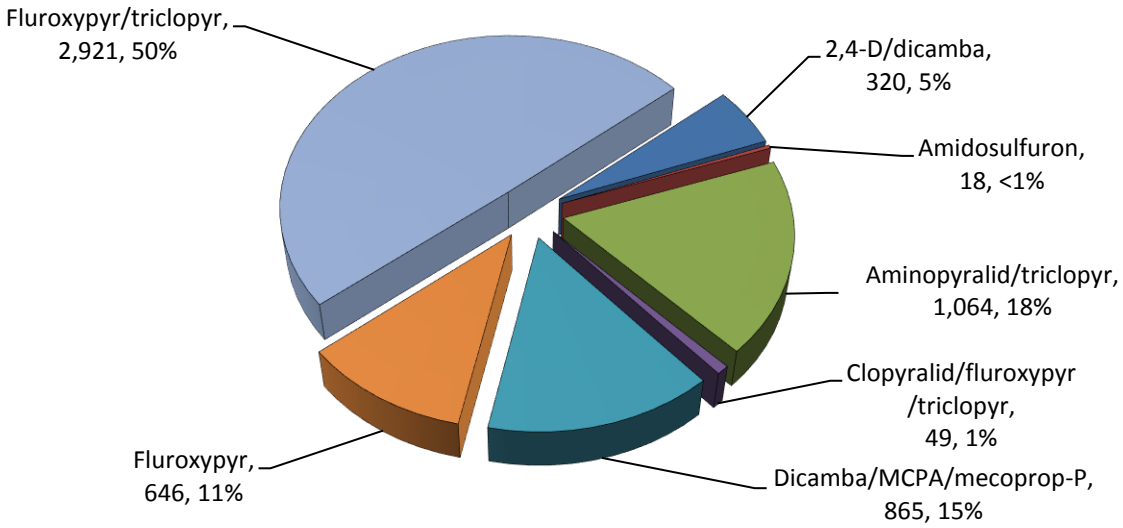
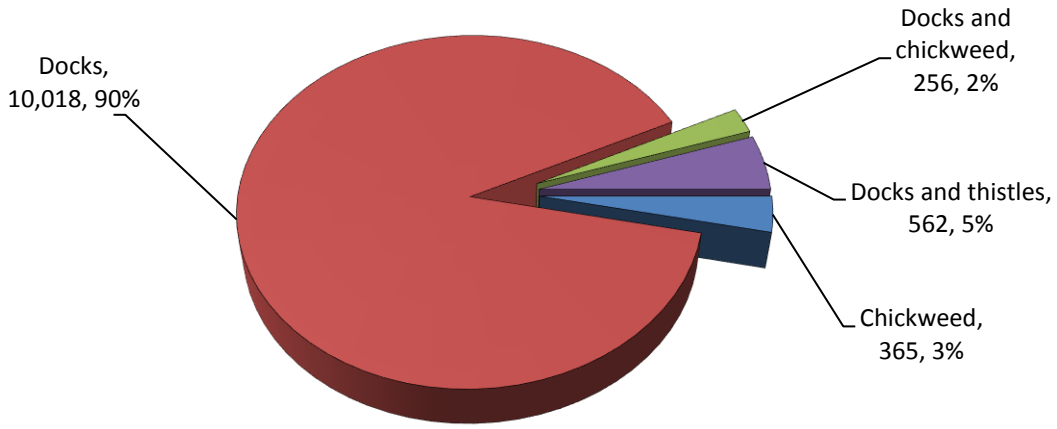


Figure 24 **Grass silage 2nd cut: reasons for herbicide use (spha), 2017.**



Grass silage 3rd cut

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

- 63,663 hectares of 3rd cut silage grown in Northern Ireland.
- 1,874 treated 'spray hectares'.
- 1,545 kg of active substances applied.
- Only herbicides were applied.
- 2.9% of the 3rd cut grass silage area received treatments.

Figure 25 **Grass silage 3rd cut: pesticide-treated area (spha) of herbicide active substances, 2017.**

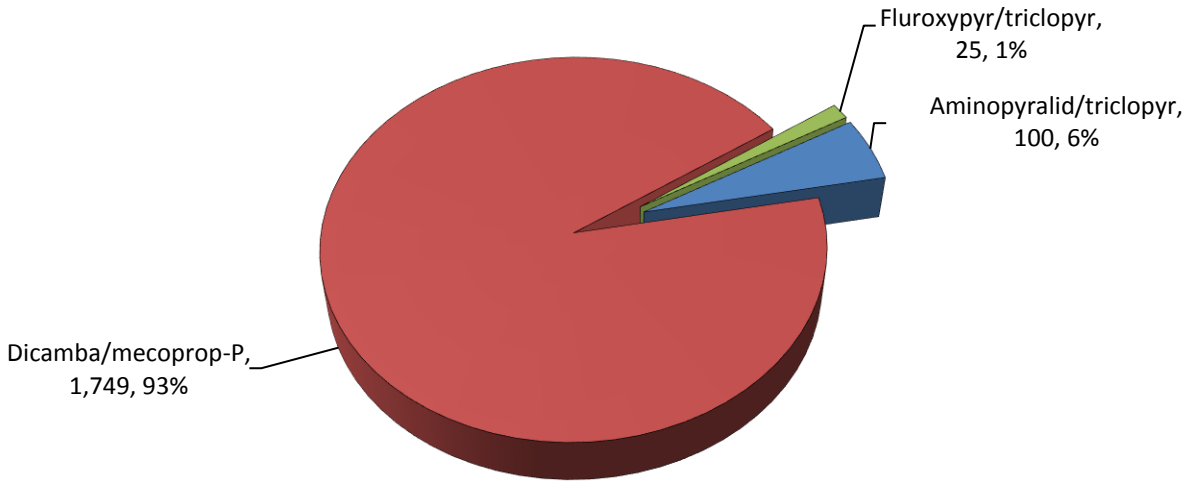


Figure 26 **Grass silage 3rd cut: weight (kg) of herbicide active substances applied, 2017.**

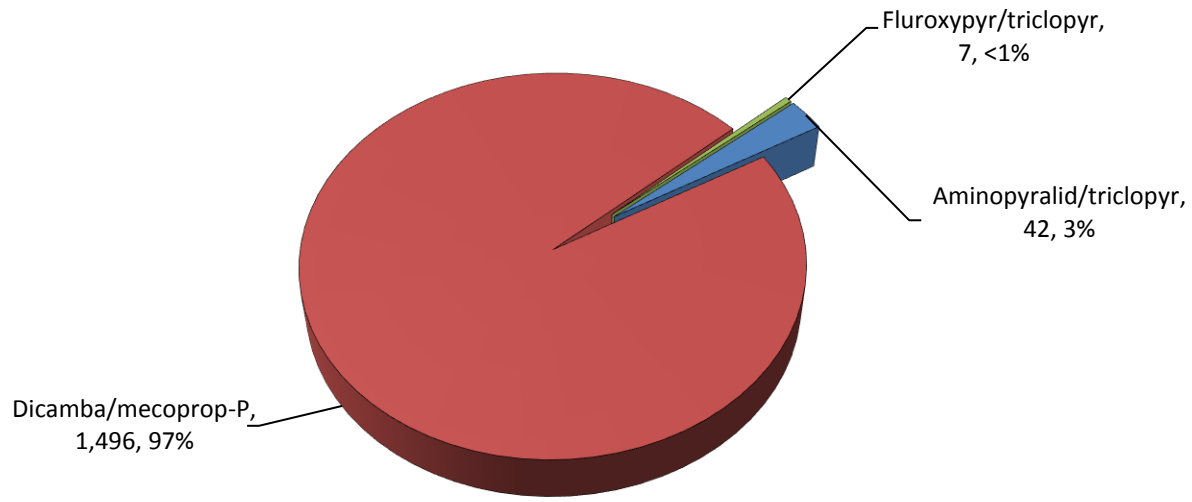
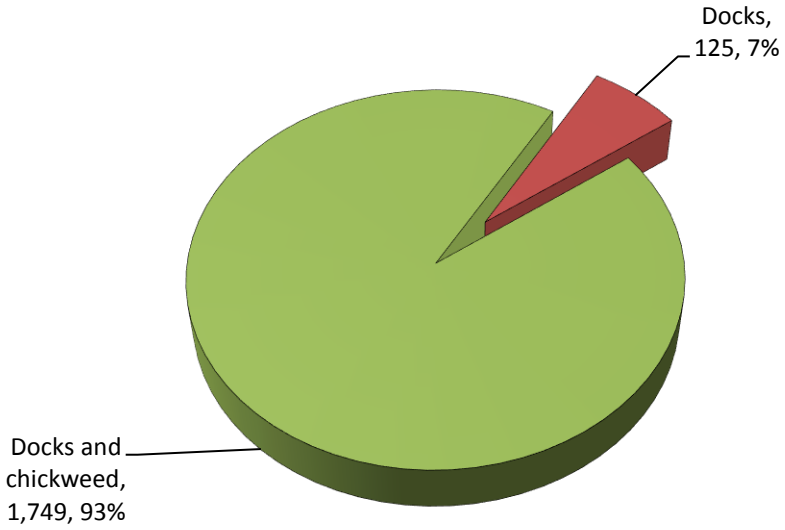


Figure 27 **Grass silage 3rd cut: reasons for herbicide use (spha), 2017.**



Grass silage 4th cut

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

- 4,707 hectares of 4th cut silage grown in Northern Ireland.
- No treatments were applied.

Hay and haylage

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

- 5,353 hectares of hay and haylage grown in Northern Ireland.
- 941 treated 'spray hectares'.
- 593 kg of active substances applied.
- Only herbicides were applied.
- 8.1% of the hay area received treatments.
- 22% of the haylage area received treatments.

Figure 28 **Hay and haylage: pesticide-treated area (spha) of herbicide active substances, 2017.**

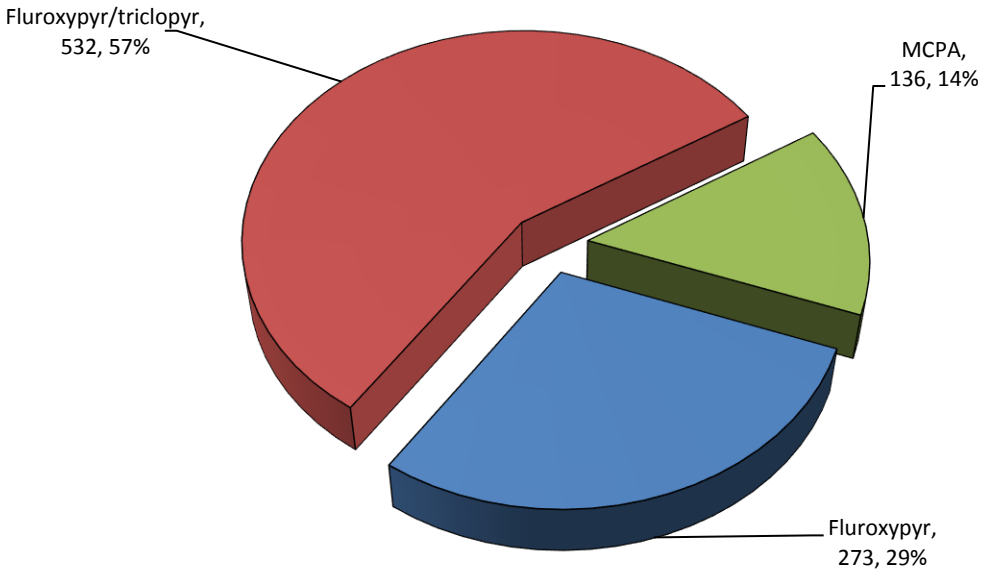


Figure 29 **Hay and haylage: weight (kg) of herbicide active substances applied, 2017.**

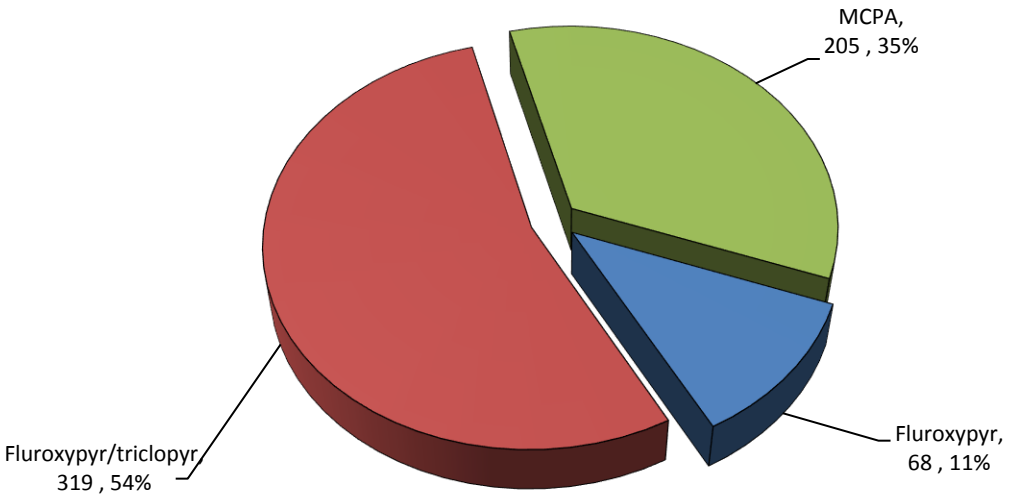
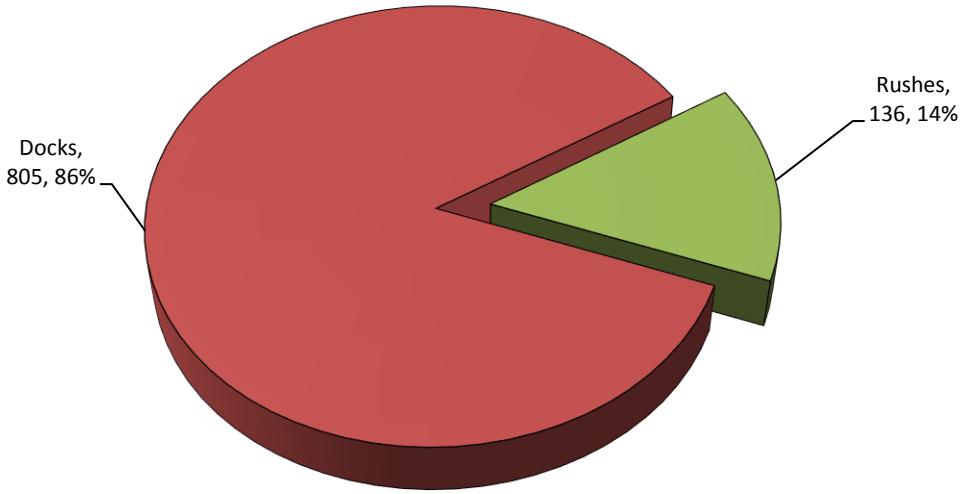


Figure 30 **Hay and haylage: reasons for herbicide use (spha), 2017.**



Rough grazing

Tables 3, 6, 7, 8, 9 & 17

- 140,400 hectares of rough grazing in Northern Ireland.
- 9,404 treated ‘spray hectares’.
- 13,637 kg of active substance applied.
- MCPA was the only active substance used, and was applied for control of rushes.
- 6.7% of the rough grazing area received treatments.

Arable silage

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

- 3,021 hectares of arable silage grown in Northern Ireland.
- 14,701 treated 'spray hectares'.
- 4,442 kg of active substances applied.
- Fungicides, herbicides, insecticides, growth regulators and seed treatments were applied to arable silage crops.
- 98% of the arable silage area received treatments.

Figure 31 **Arable silage: Area (spha) of pesticide groups applied, 2017.**

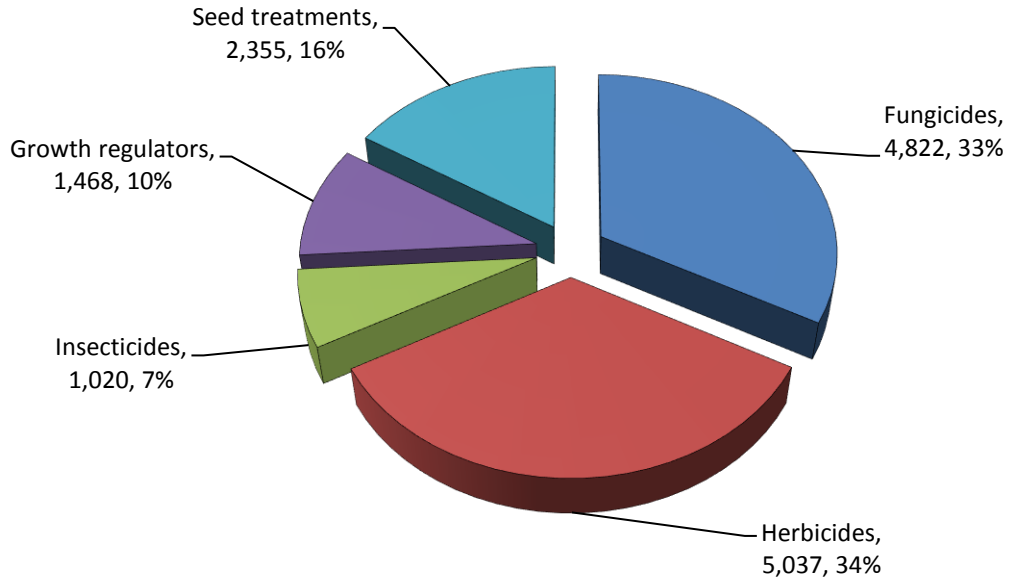


Figure 32 **Arable silage: Weight (kg) of pesticide groups applied, 2017.**

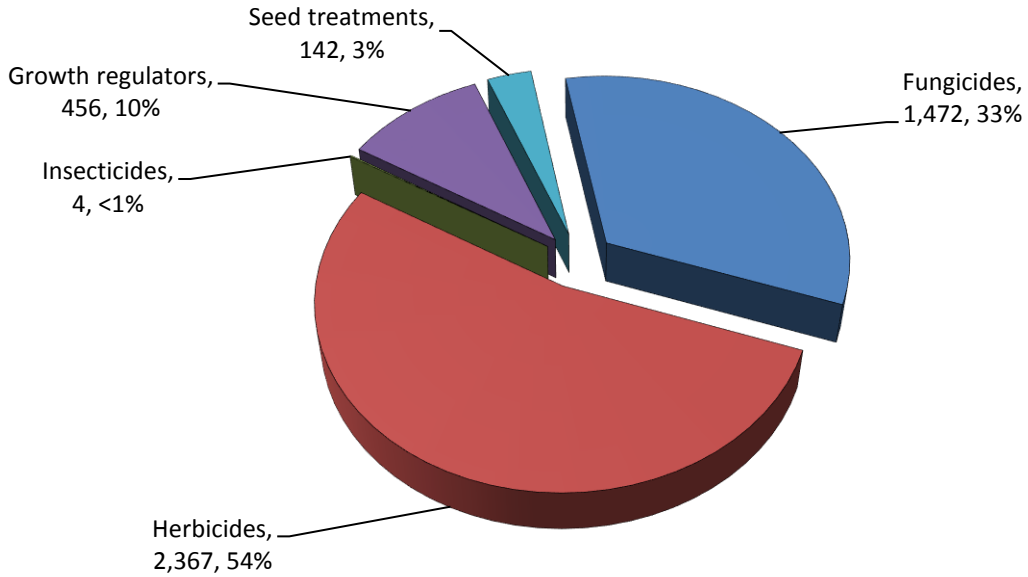


Figure 33 **Arable silage: pesticide-treated area (spha) of fungicide active substances, 2017.**

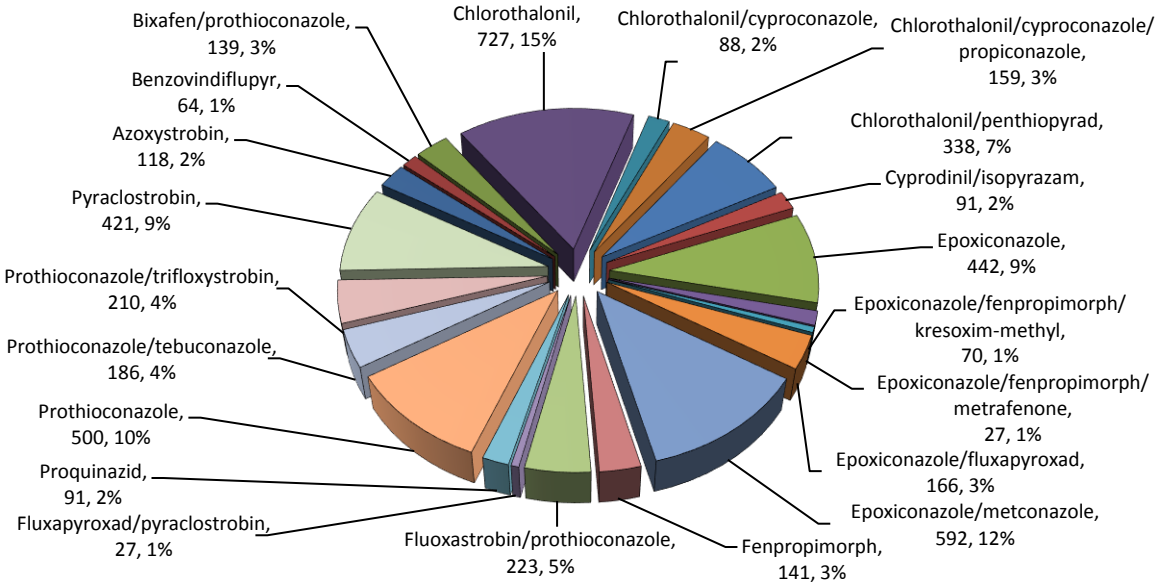


Figure 34 **Arable silage: weight (kg) of fungicide active substances applied, 2017.**

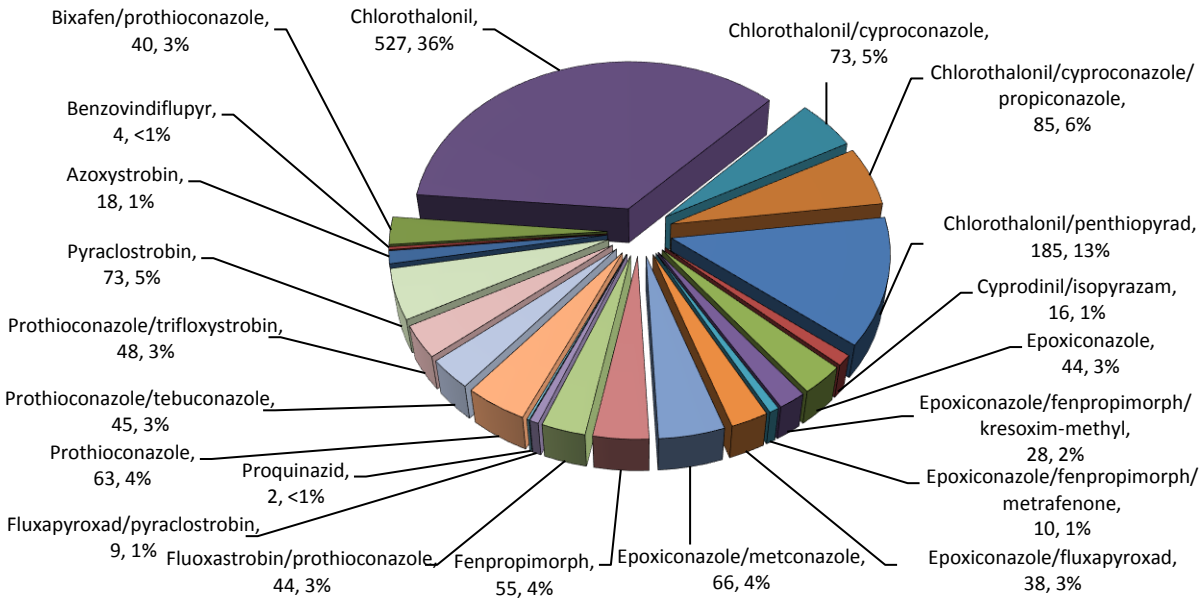


Figure 35 **Arable silage: pesticide-treated area (spha) of herbicide active substances, 2017.**

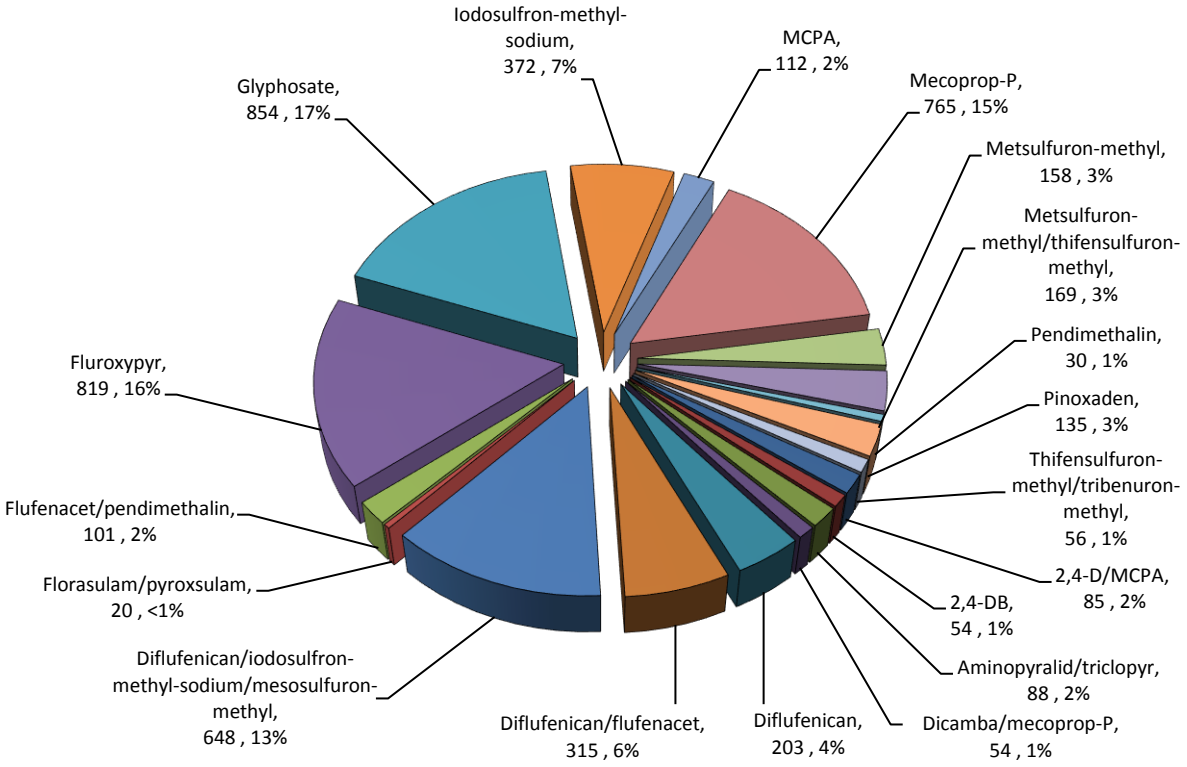


Figure 36 **Arable silage: weight (kg) of herbicide active substances applied, 2017.**

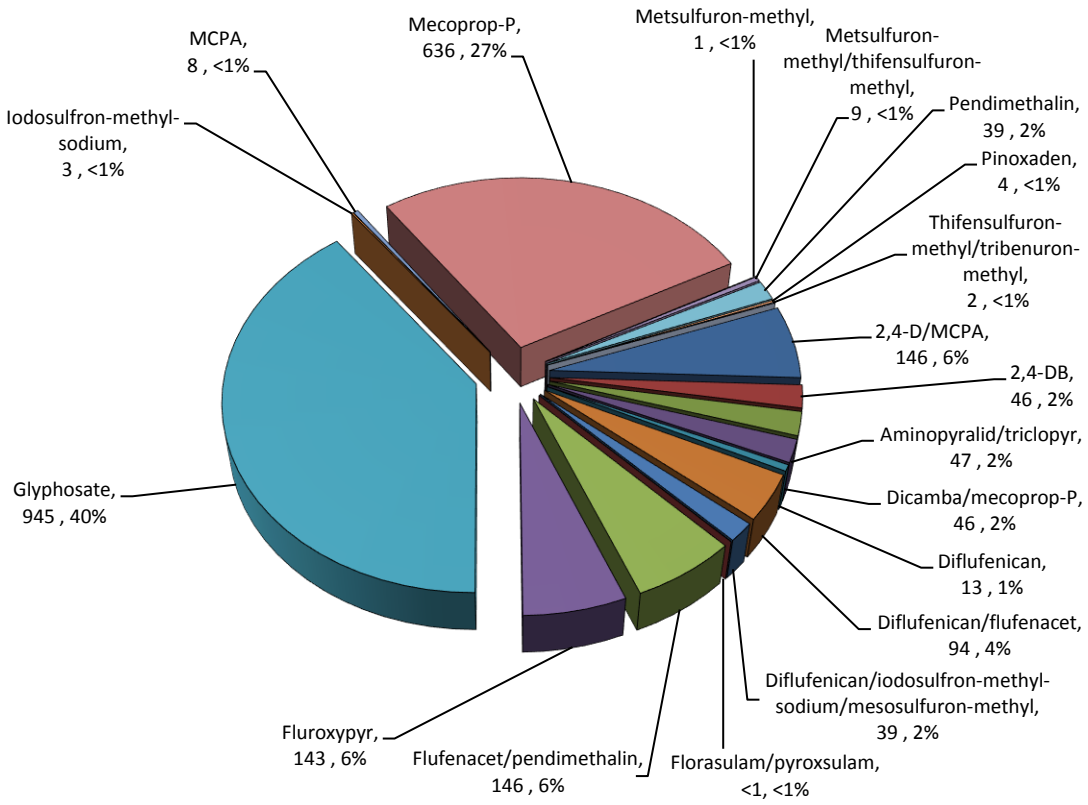


Figure 37 **Arable silage: pesticide-treated area (spha) of insecticide active substances, 2017.**

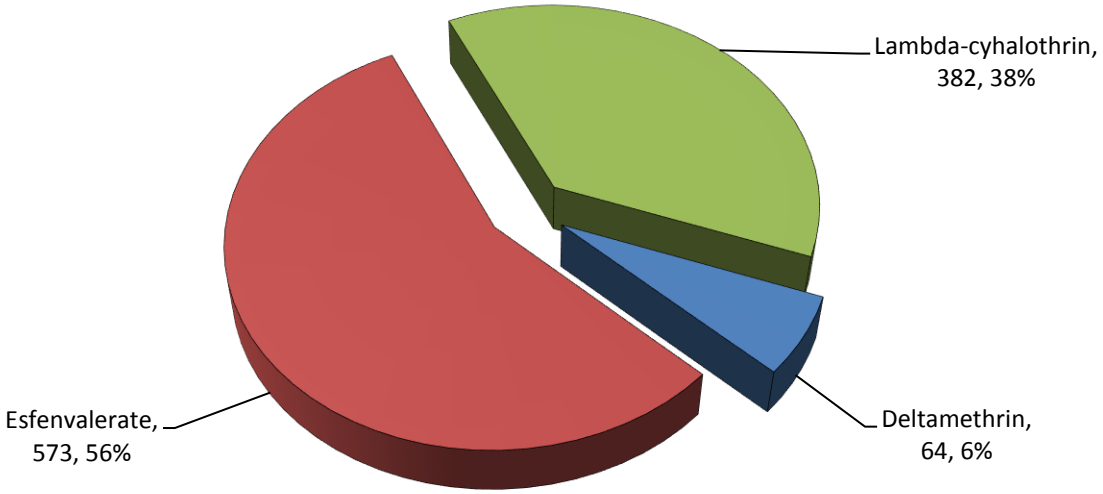


Figure 38 **Arable silage: weight (kg) of insecticide active substances applied, 2017.**

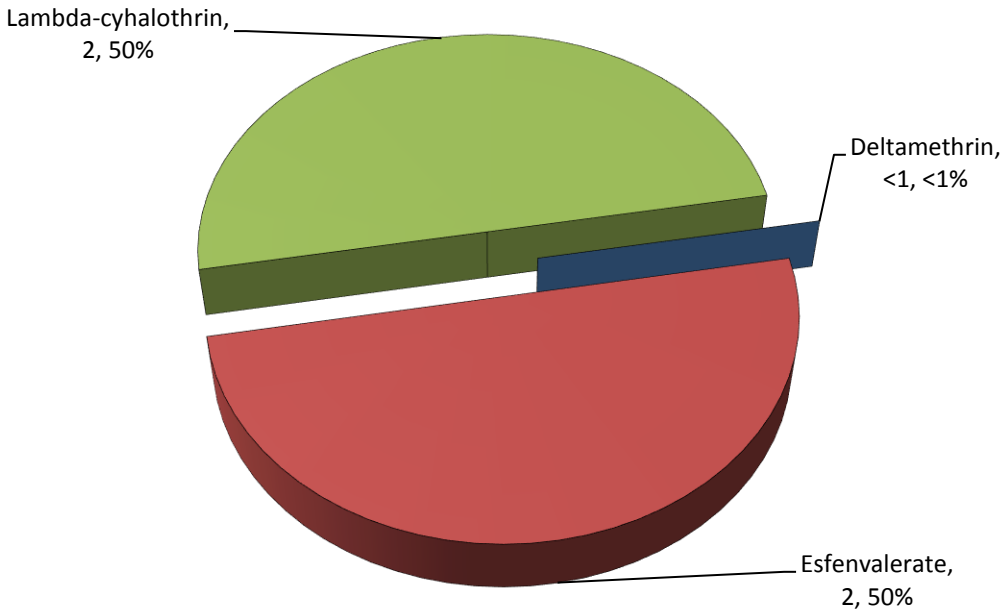


Figure 39 **Arable silage: pesticide-treated area (spha) of growth regulator active substances, 2017.**

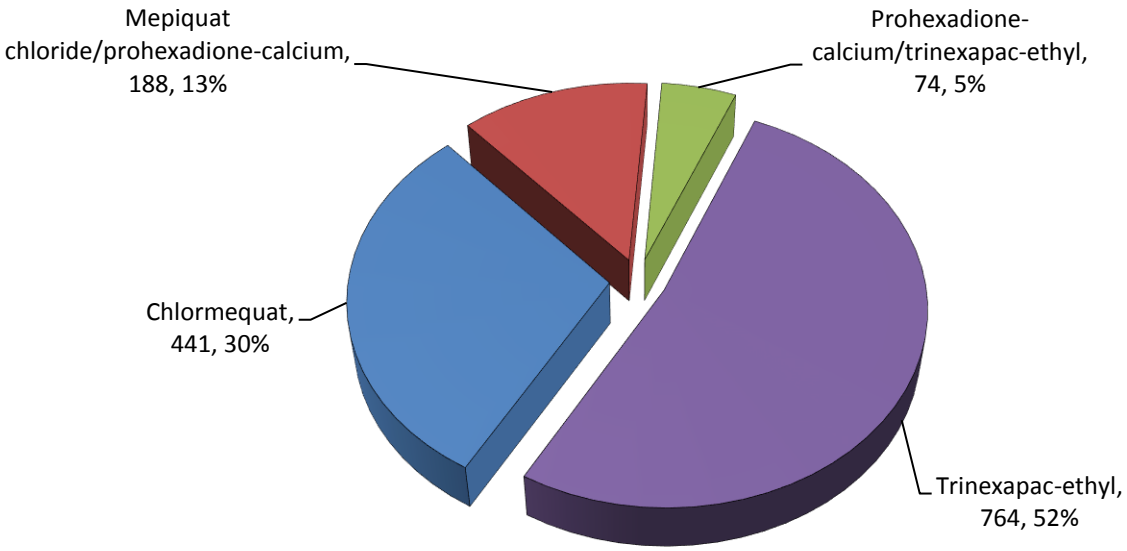


Figure 40 **Arable silage: weight (kg) of growth regulator active substances applied, 2017.**

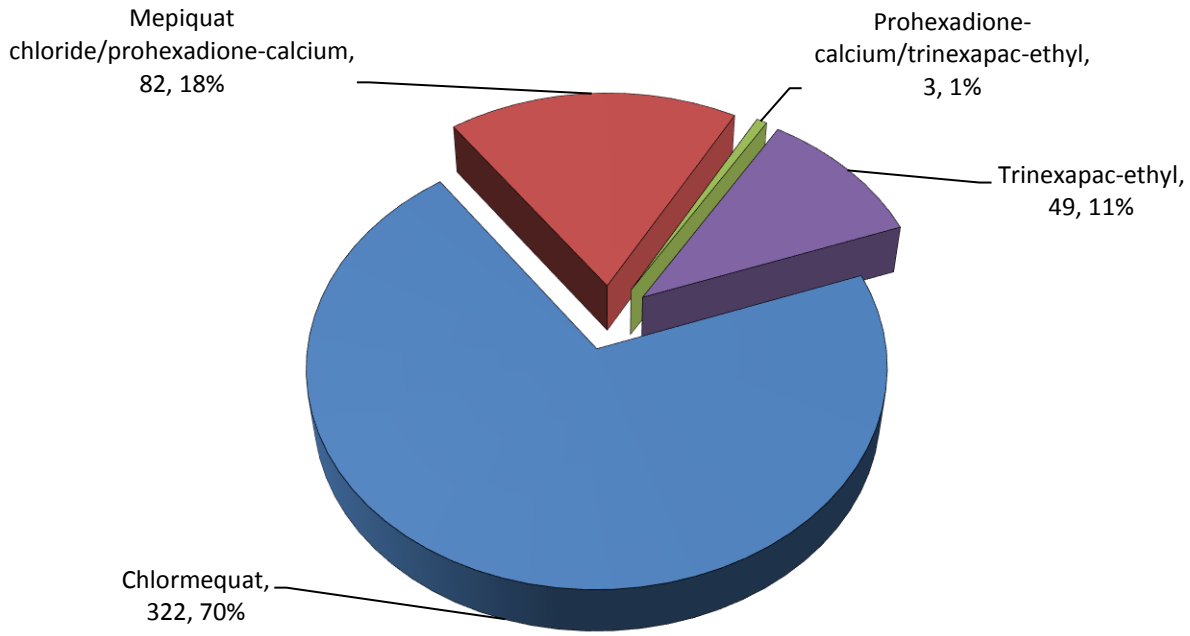


Figure 41 **Arable silage: pesticide-treated area (spha) of seed treatment active substances, 2017.**

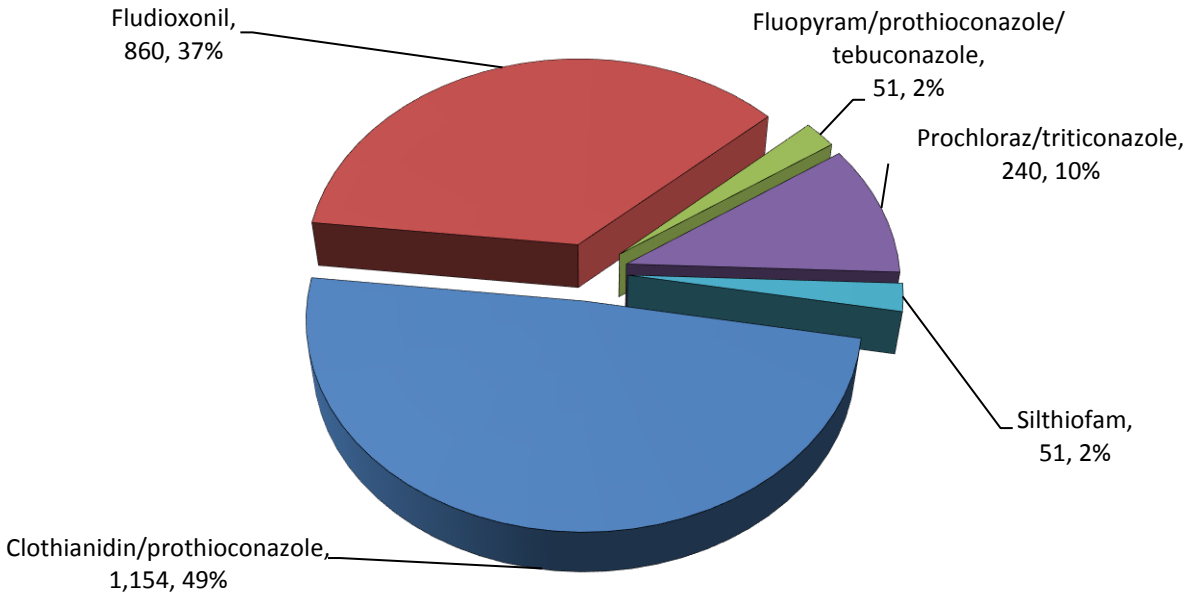


Figure 42 **Arable silage: weight (kg) of seed treatment active substances applied, 2017.**

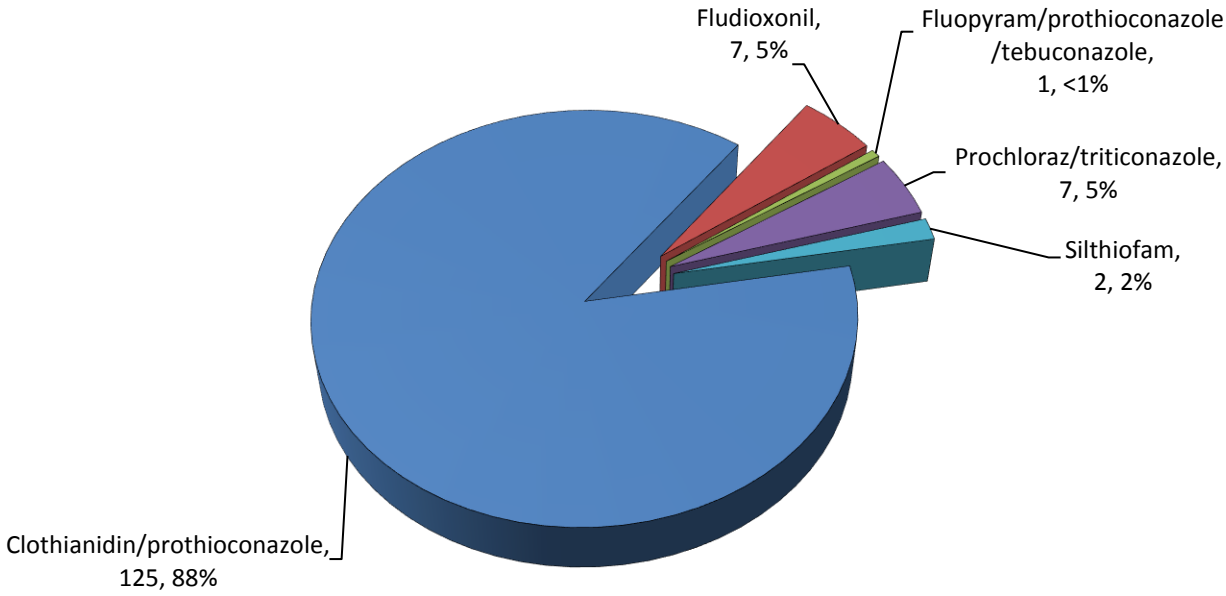
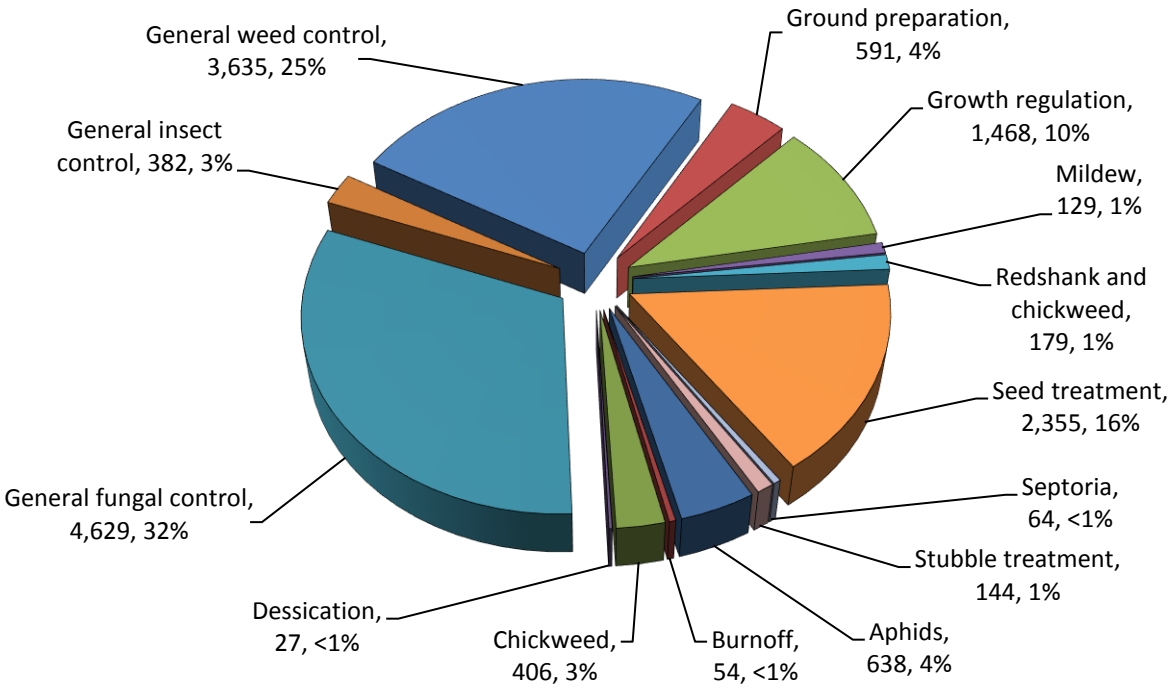


Figure 43 **Arable silage: reasons for pesticide use (spha), 2017.**



Arable silage (undersown)

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

- 795 hectares of arable silage (undersown) grown in Northern Ireland.
- 1,943 treated 'spray hectares'.
- 605 kg of active substances applied.
- Fungicides, herbicides, insecticides, growth regulators and seed treatments were applied to arable silage (undersown) crops.
- Esfenvalerate was the only insecticide and Chlormequat was the only growth regulator applied.
- 89.8% of the arable silage (undersown) area received treatments.

Figure 44 **Arable silage (undersown): Area (spha) of pesticide groups applied, 2017.**

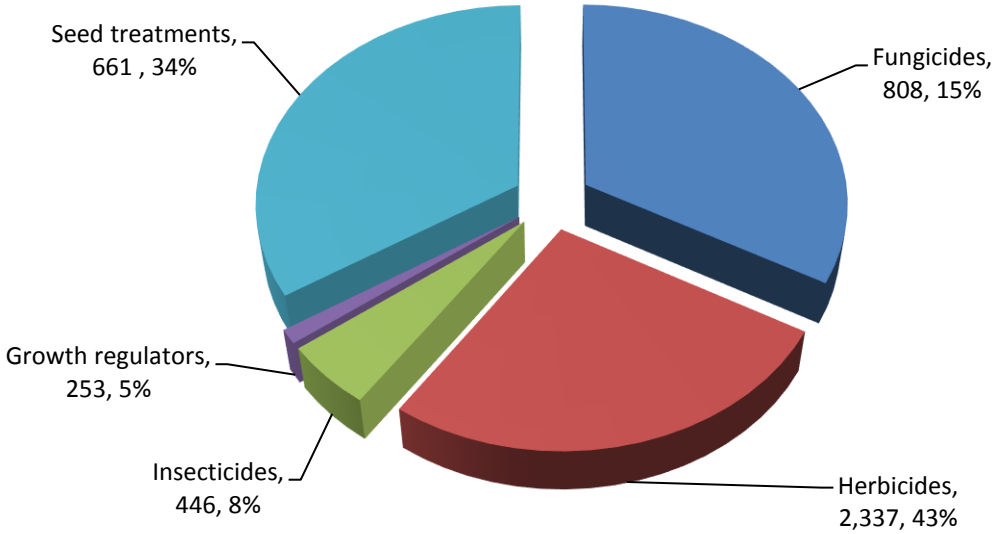


Figure 45 **Arable silage (undersown): Weight (kg) of pesticide groups applied, 2017.**

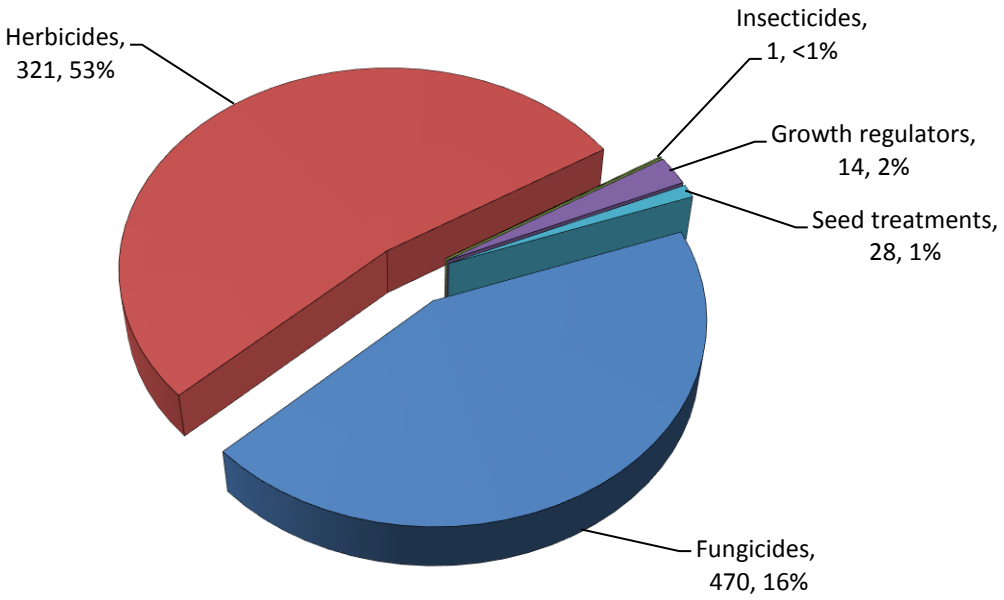


Figure 46 Arable silage (undersown): pesticide-treated area (spha) of fungicide active substances, 2017.

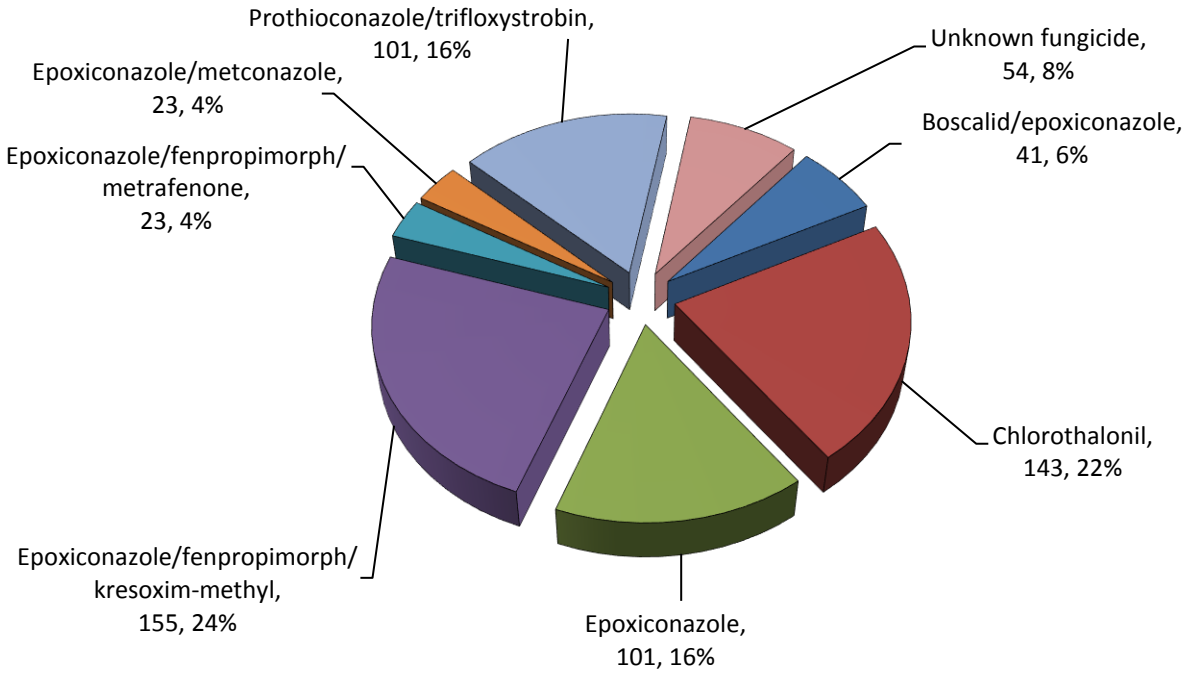
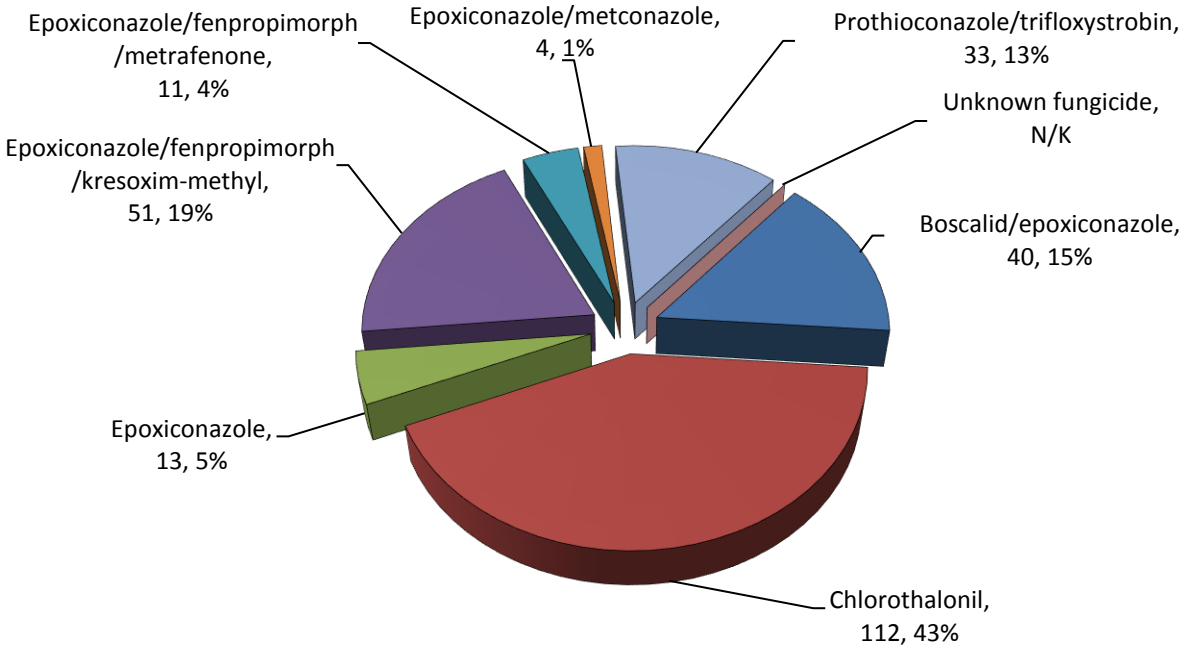


Figure 47 Arable silage (undersown): weight (kg) of fungicide active substances applied, 2017.



***N/K refers to those treatments where either the area of application or the quantity used could not be established**

Figure 48 Arable silage (undersown): pesticide-treated area (spha) of herbicide active substances, 2017.

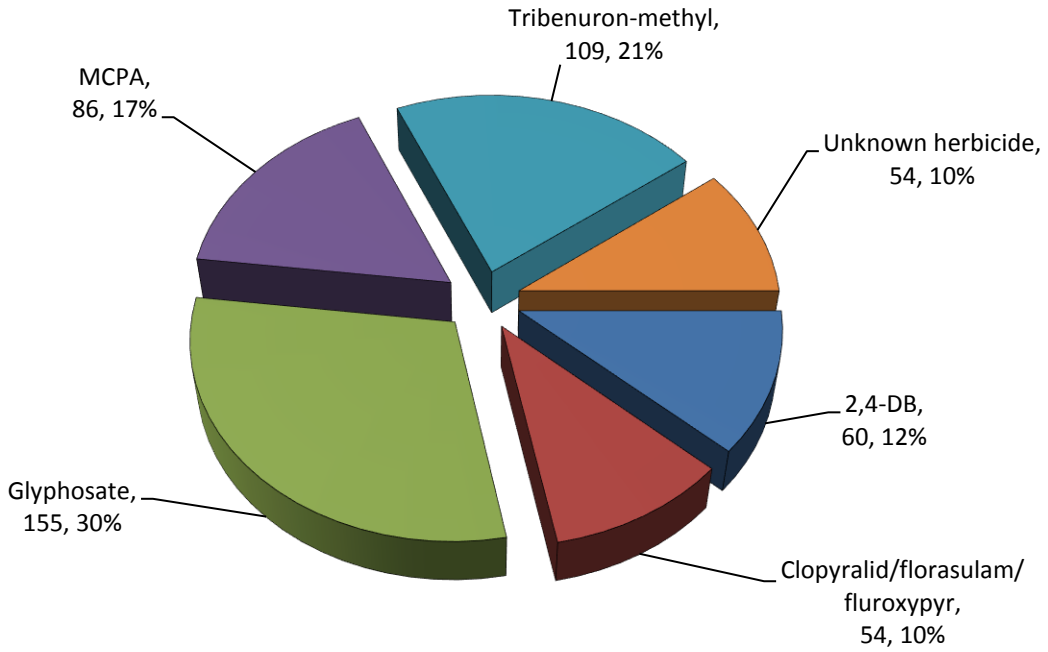
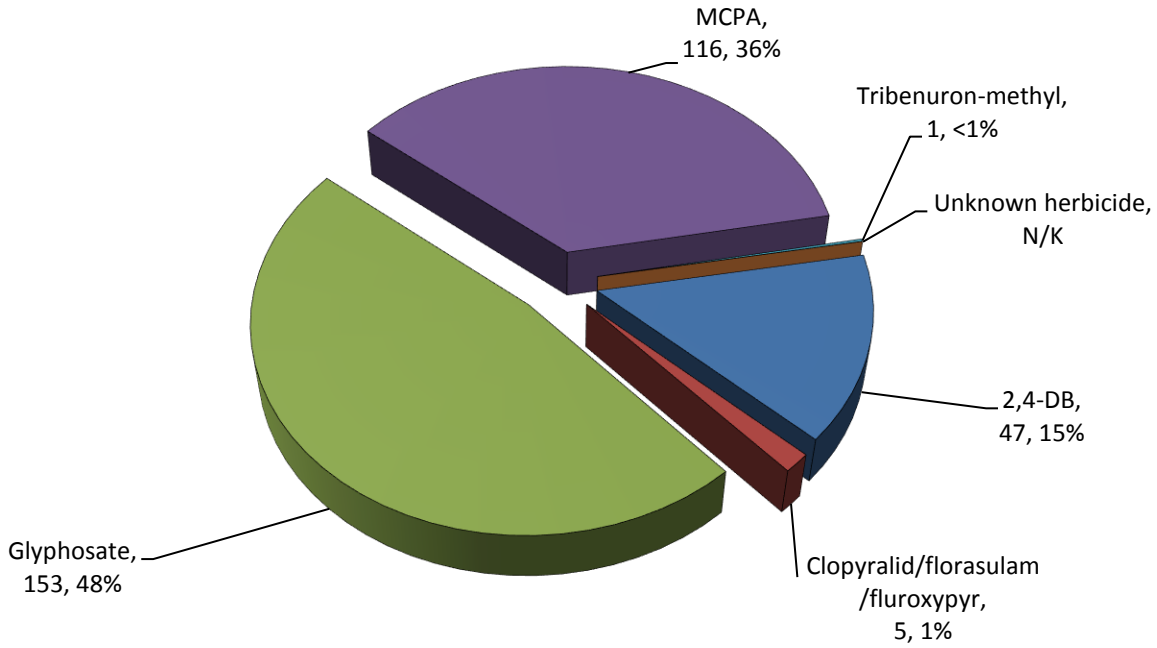


Figure 49 Arable silage (undersown): weight (kg) of herbicide active substances applied, 2017.



***N/K refers to those treatments where either the area of application or the quantity used could not be established**

Figure 50 Arable silage (undersown): pesticide-treated area (spha) of seed treatment active substances, 2017.

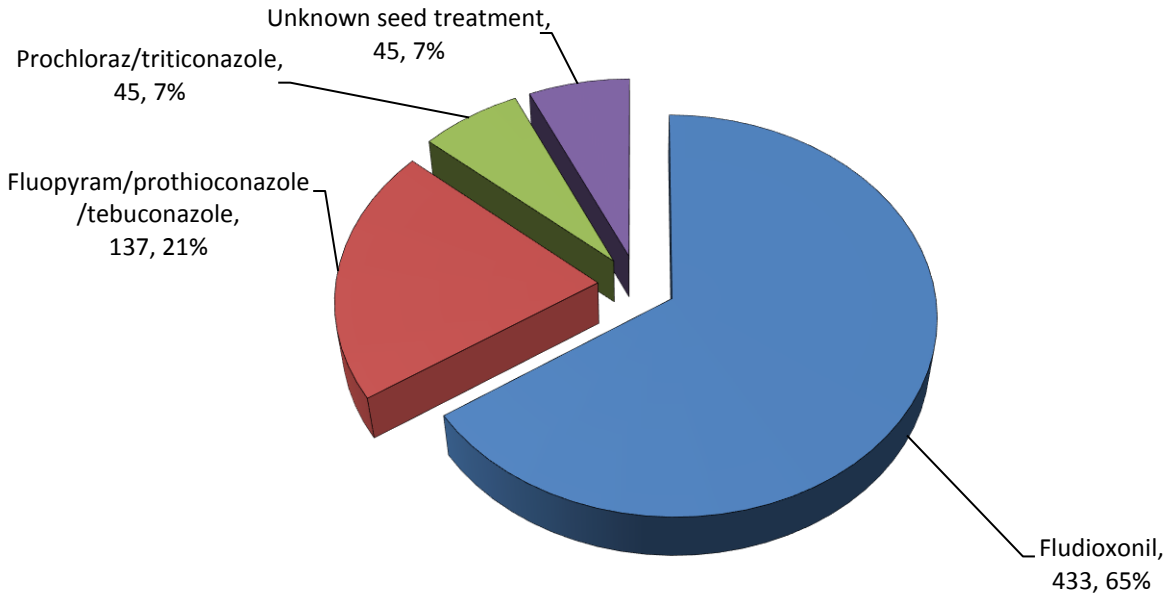
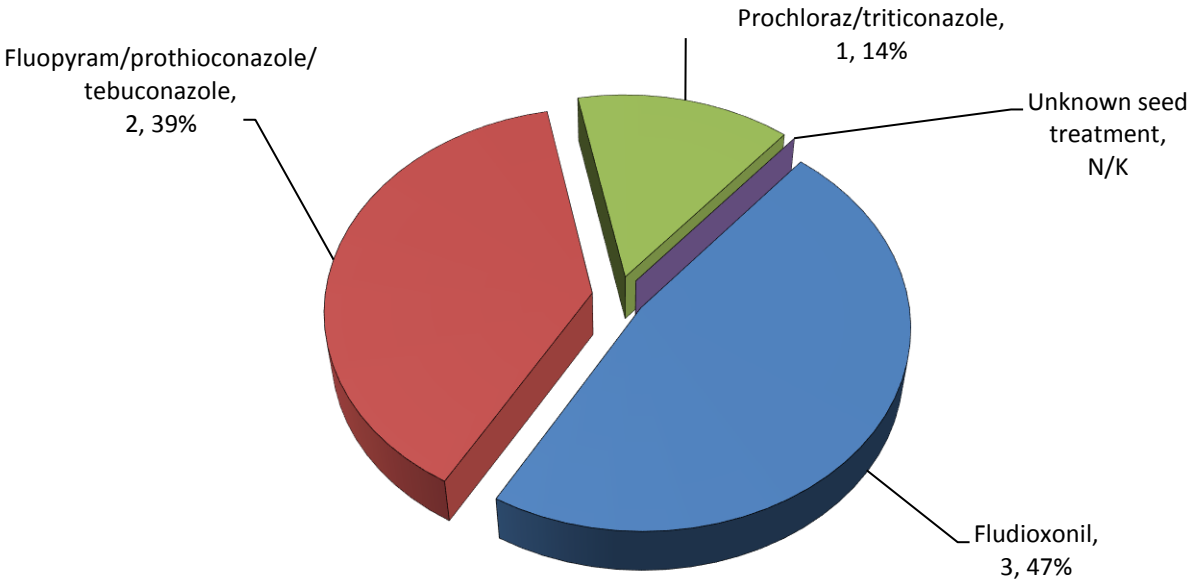
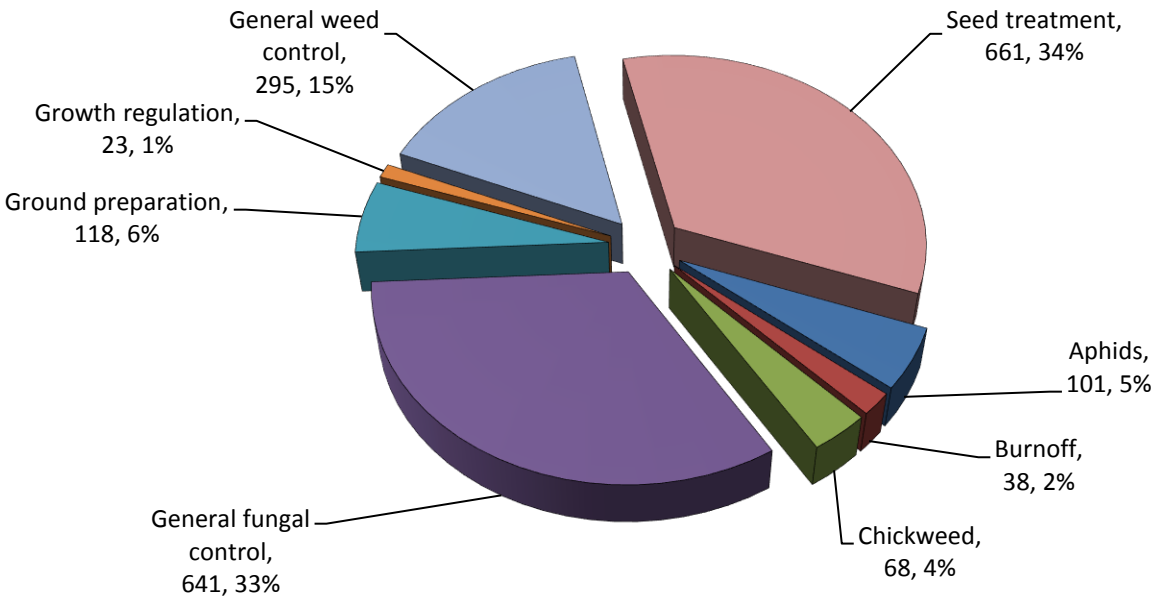


Figure 51 Arable silage (undersown): weight (kg) of seed treatment active substances applied, 2017.



***N/K refers to those treatments where either the area of application or the quantity used could not be established**

Figure 52 **Arable silage (undersown): reasons for pesticide use (spha), 2017.**



Grass reseed

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

- 76,751 hectares of grass reseeds were sown in Northern Ireland (includes all reseeds in previous 5 years).
- 13,839 treated 'spray hectares'.
- 8,086 kg of active substances applied.
- Fungicides, herbicides and insecticides were applied to grass reseed areas.
- Esfenvalerate was the only insecticide used, and was applied for control of aphids.
- 14% of the grass reseed area received treatments.

Figure 53 **Grass reseeds: Area (spha) of pesticide groups applied, 2017.**

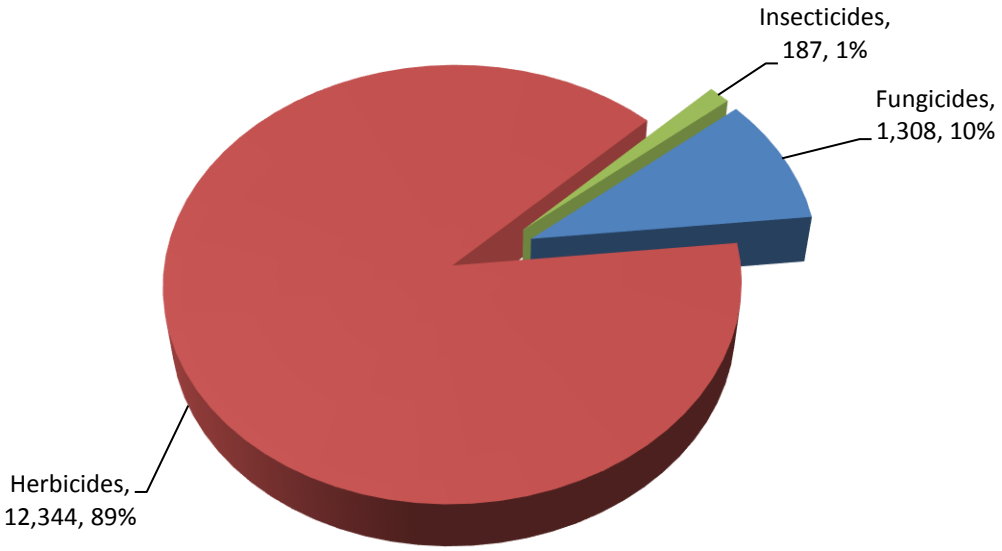


Figure 54 **Grass reseeds: Weight (kg) of pesticide groups applied, 2017.**

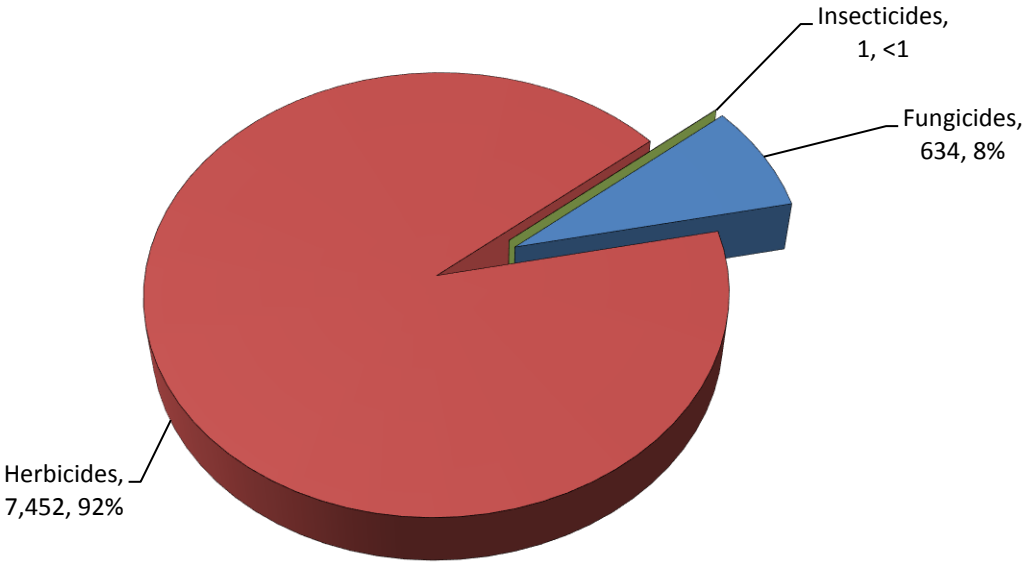


Figure 55 **Grass reseeds: pesticide-treated area (spha) of fungicide active substances, 2017.**

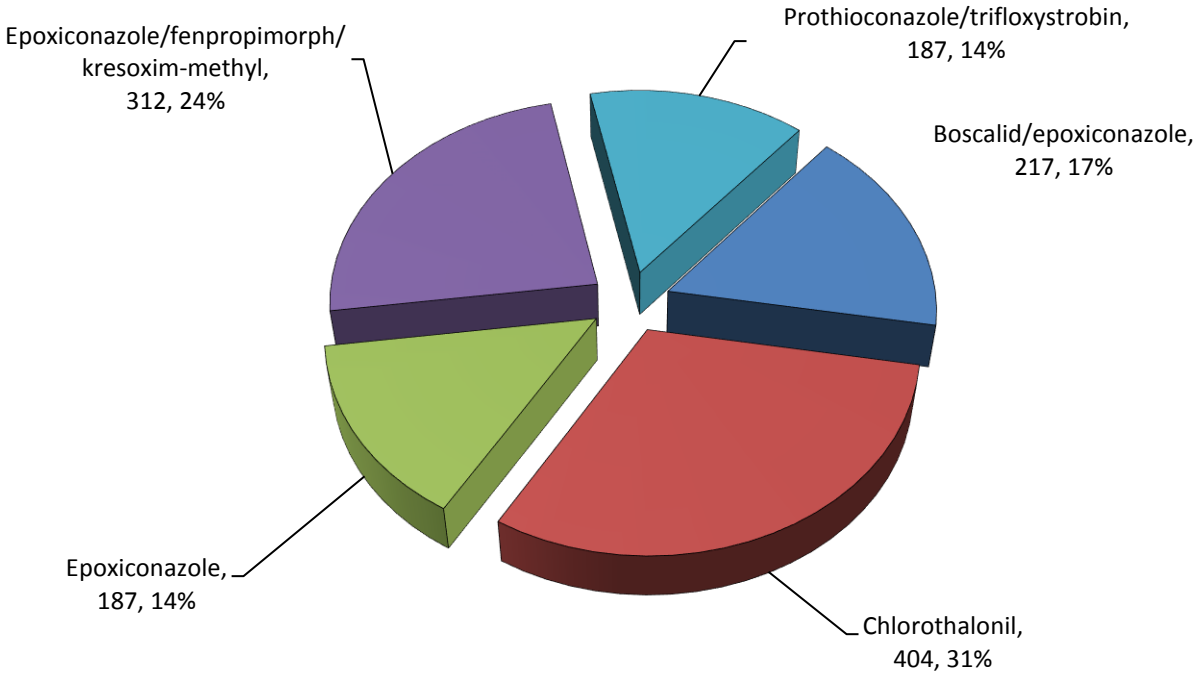


Figure 56 **Grass reseeds: weight (kg) of fungicide active substances applied, 2017.**

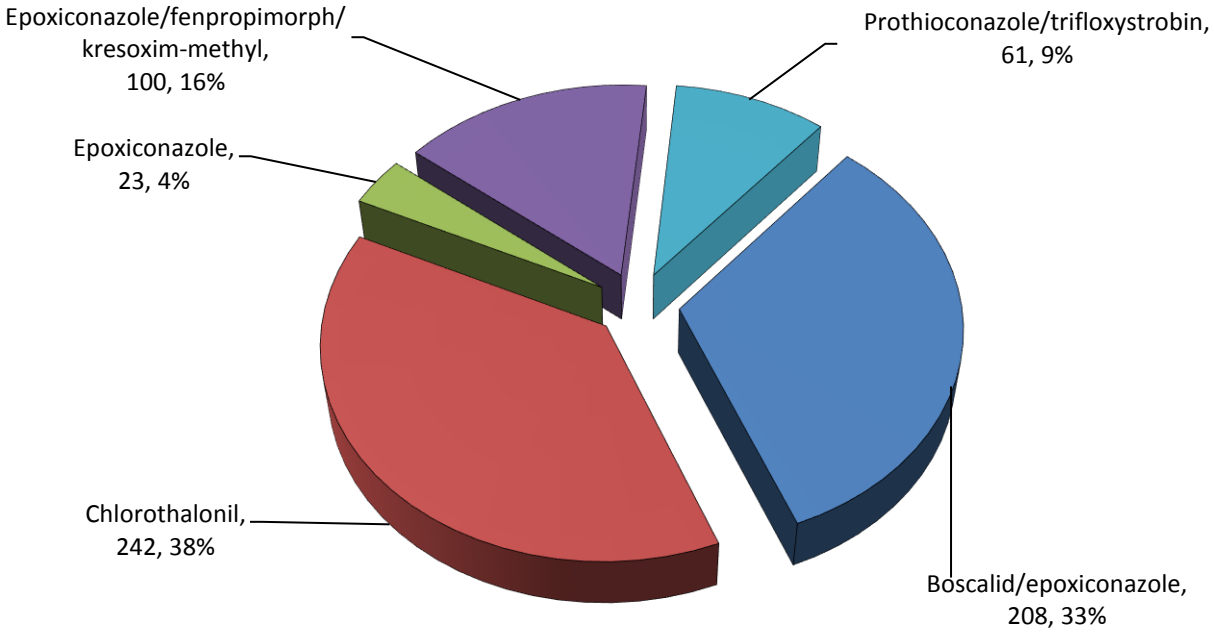


Figure 57 **Grass reseeds: pesticide-treated area (spha) of herbicide active substances, 2017.**

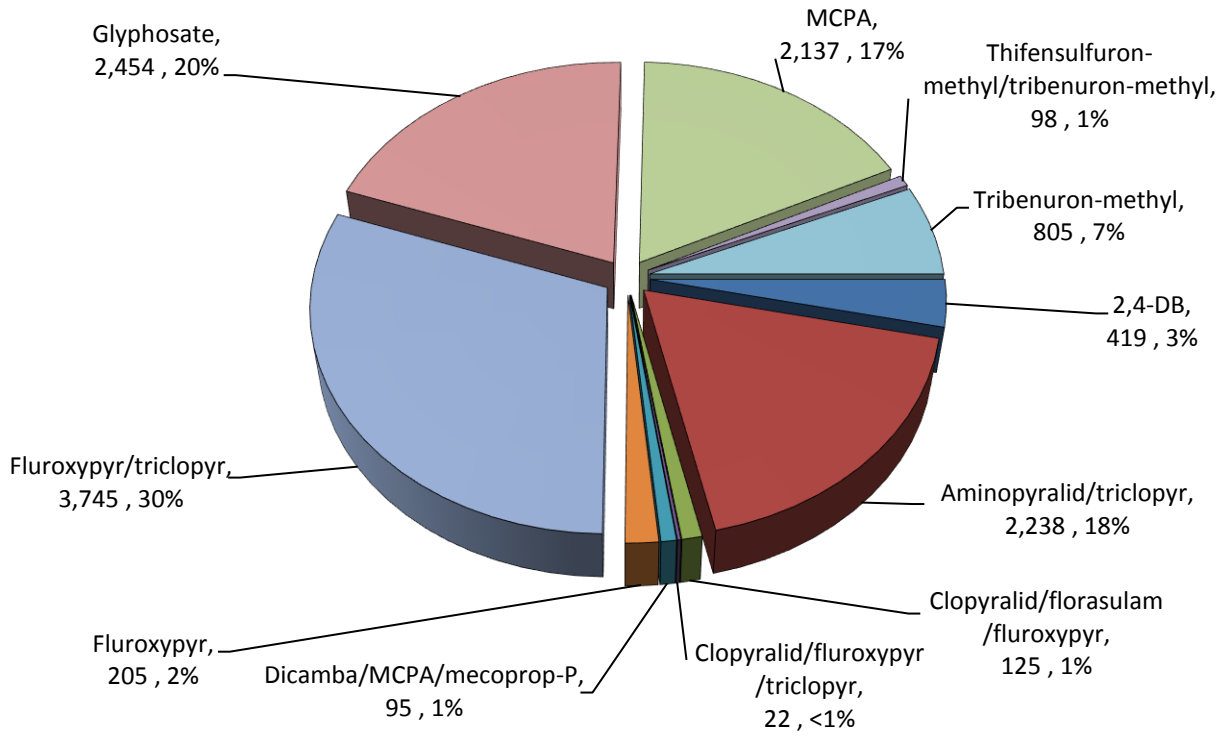


Figure 58 **Grass reseeds: weight (kg) of herbicide active substances applied, 2017.**

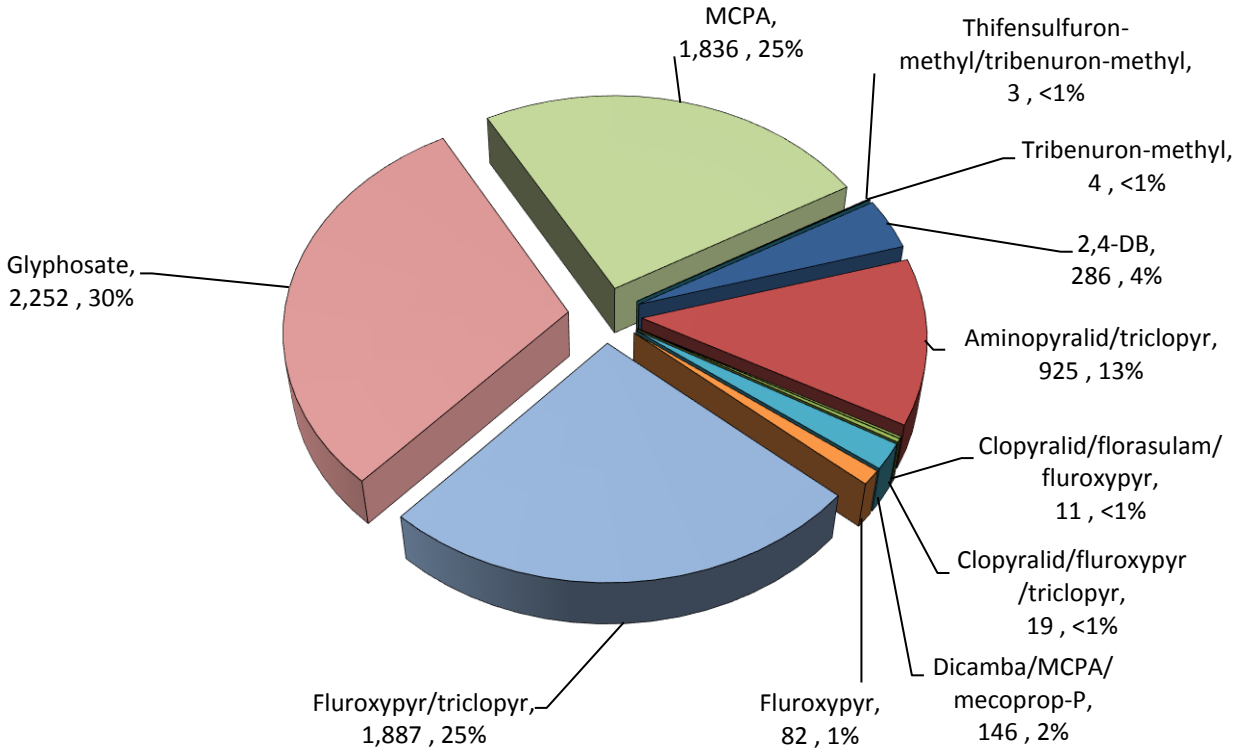
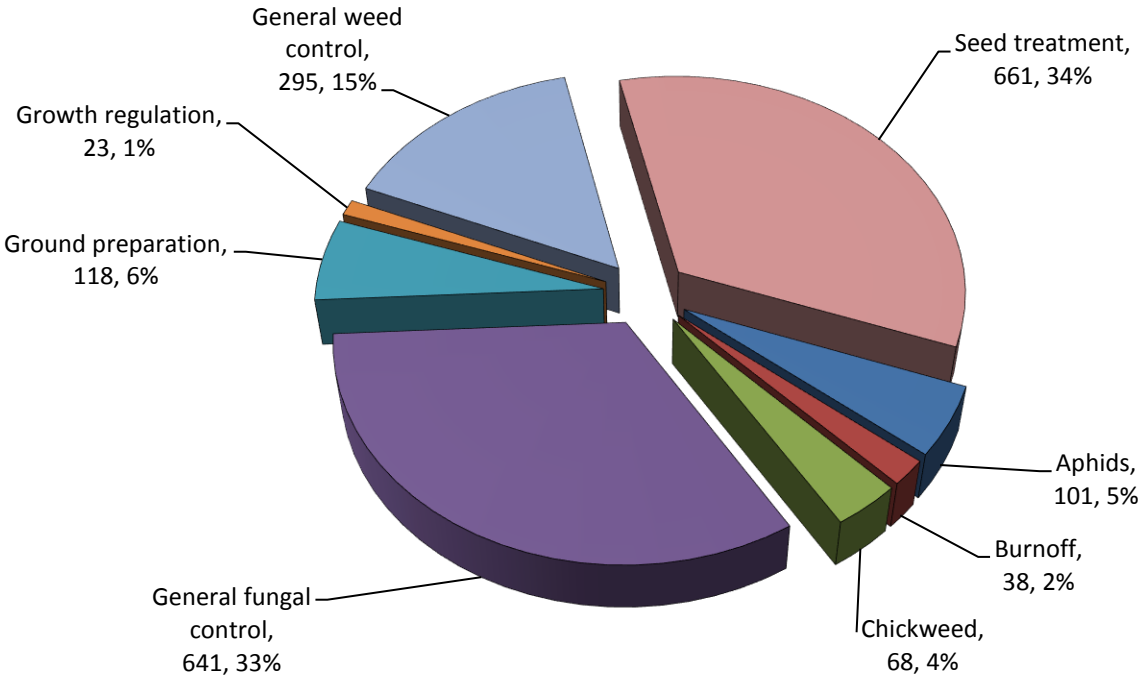


Figure 59 **Grass reseeds: reasons for pesticide use (spha), 2017.**



Fodder maize

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

- 1,381 hectares of fodder maize were sown in Northern Ireland.
- 2,539 treated 'spray hectares'.
- 2,896 kg of active substances applied.
- Herbicides and seed treatments were the only pesticide substances applied.
- Methiocarb was the only seed treatment applied to fodder maize crops.
- 97.7% of the fodder maize area received treatments.

Figure 60 **Fodder maize: Area (spha) of pesticide groups applied, 2017.**

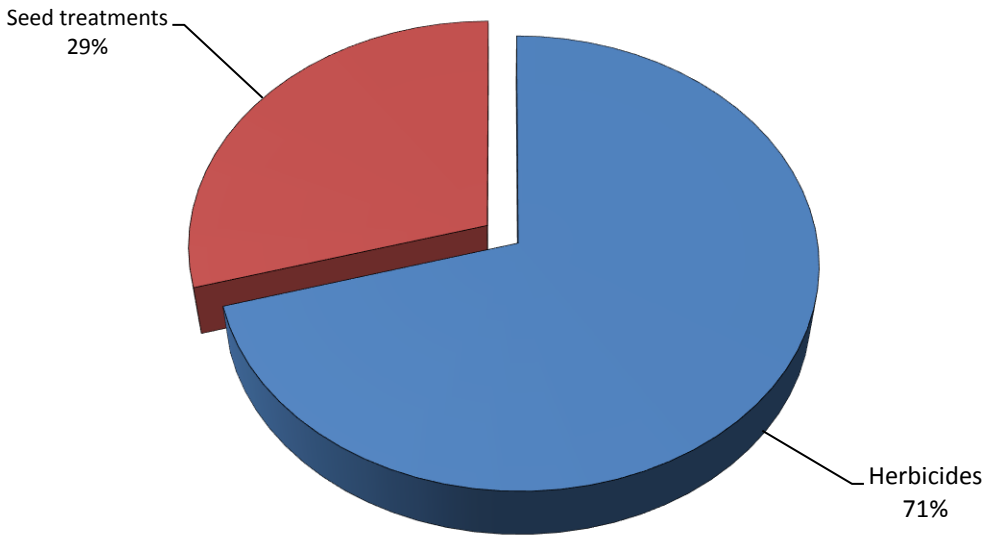


Figure 61 **Fodder maize: Weight (kg) of pesticide groups applied, 2017.**

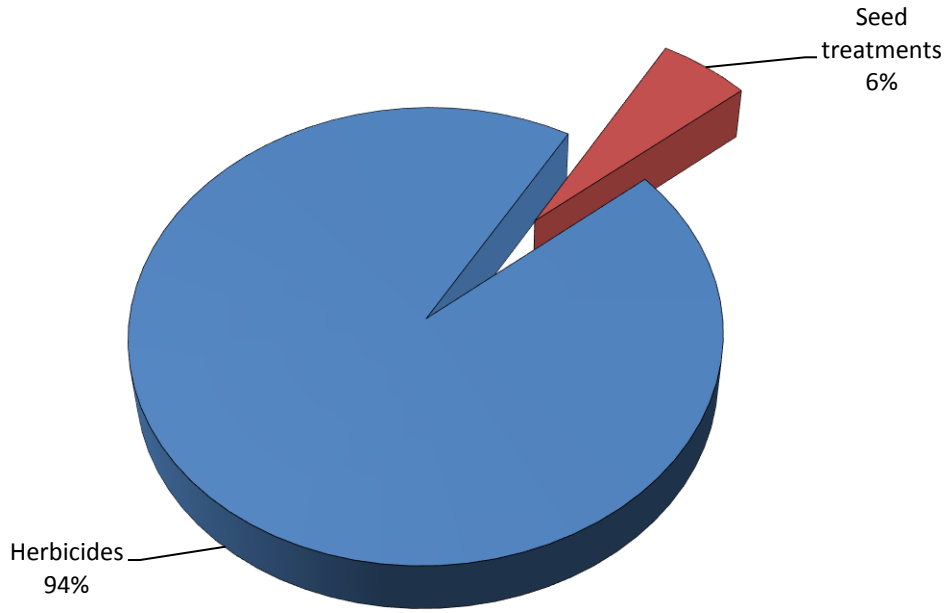


Figure 62 **Fodder maize: pesticide-treated area (spha) of herbicide active substances, 2017.**

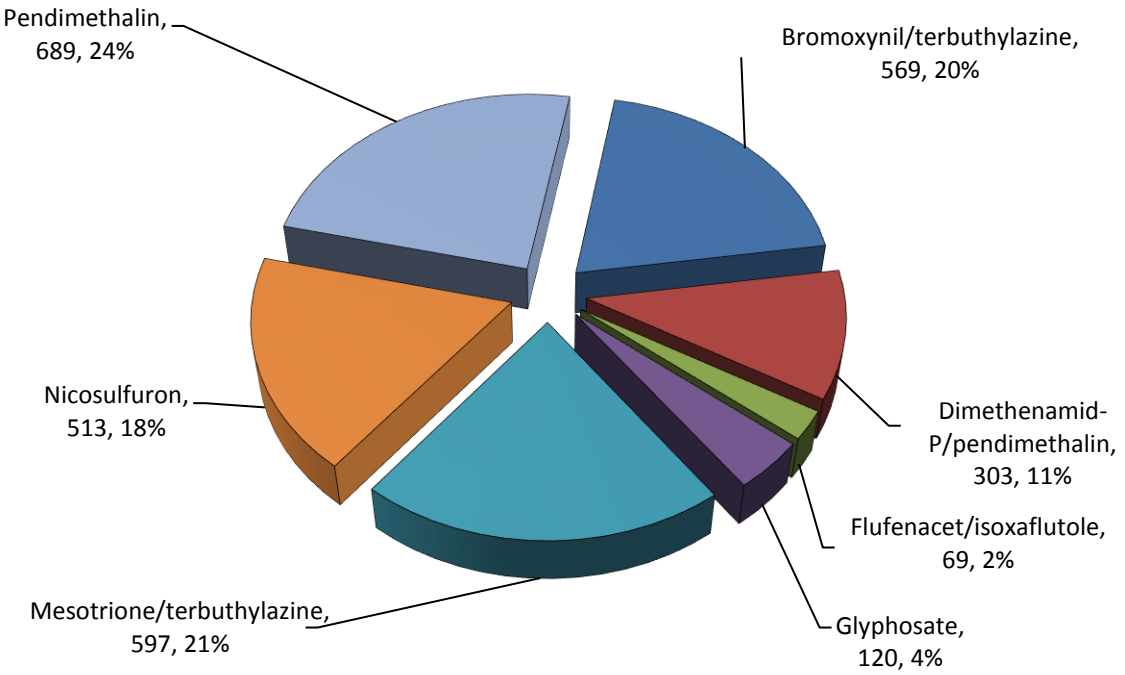


Figure 63 **Fodder maize: weight (kg) of herbicide active substances applied, 2017.**

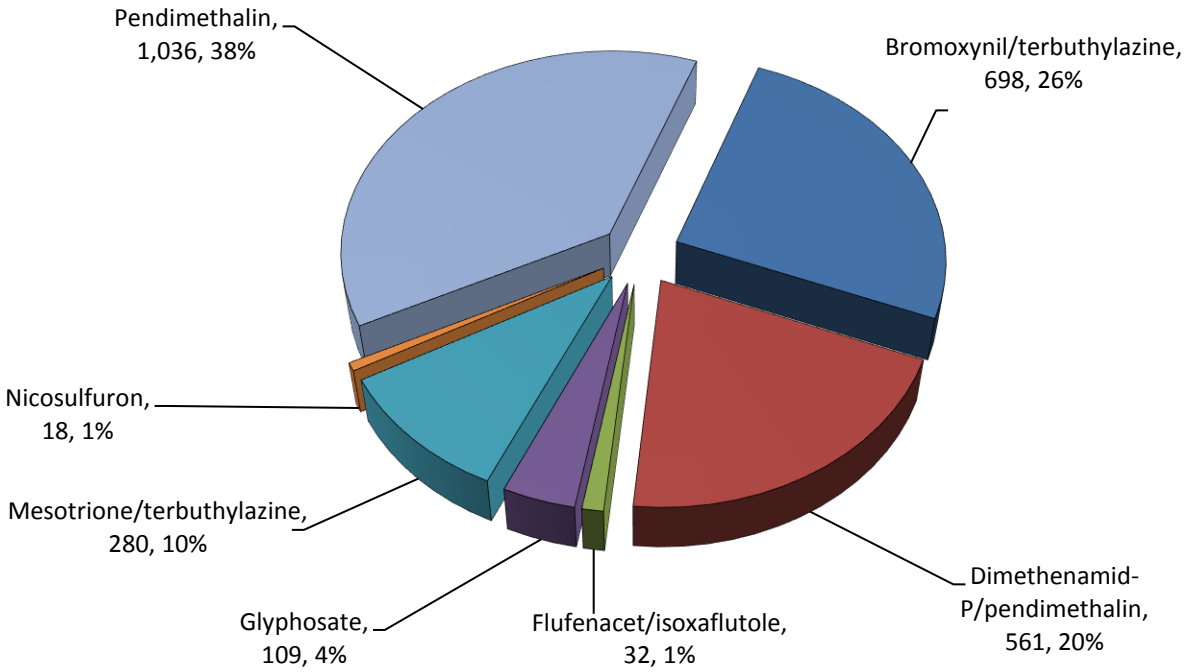
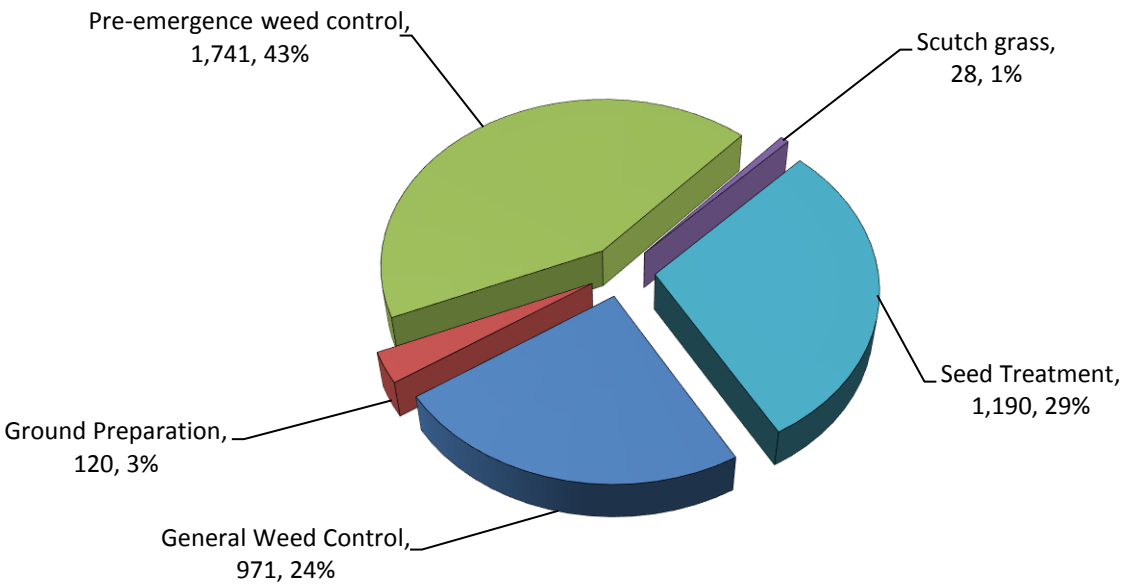


Figure 64 **Fodder maize: reasons for pesticide use (spha), 2017.**



Other fodder

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

- 1,075 hectares of other fodder crops were sown in Northern Ireland.
- 1,752 treated 'spray hectares'.
- 796 kg of active substances applied.
- Herbicides, an insecticide and two seed treatments were the only pesticide substances applied.
- 94.3% of fodder beet, 24.2% of fodder kale, 78.4% of fodder rape and 72.6% of fodder swede crops received treatments.

Figure 65 **Other fodder: Area (spha) of pesticide groups applied, 2017.**

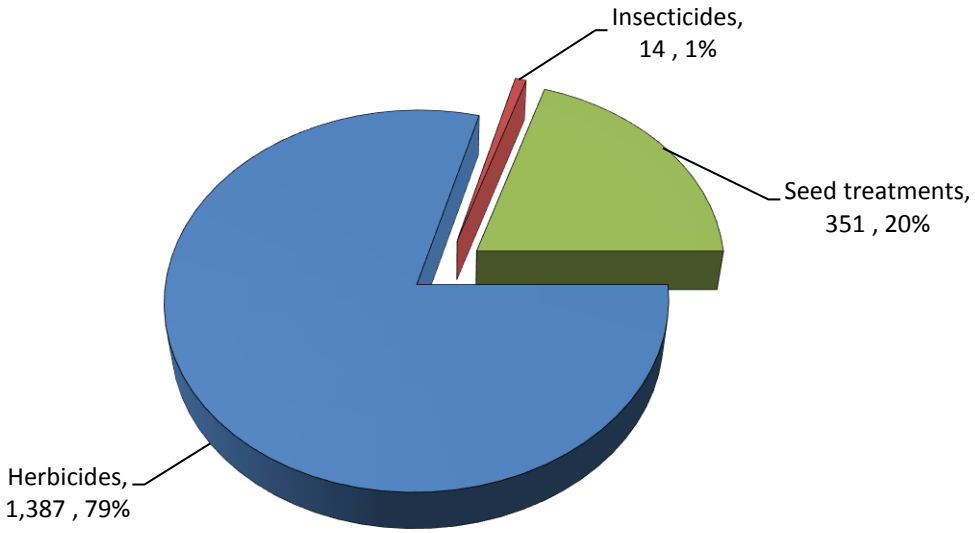
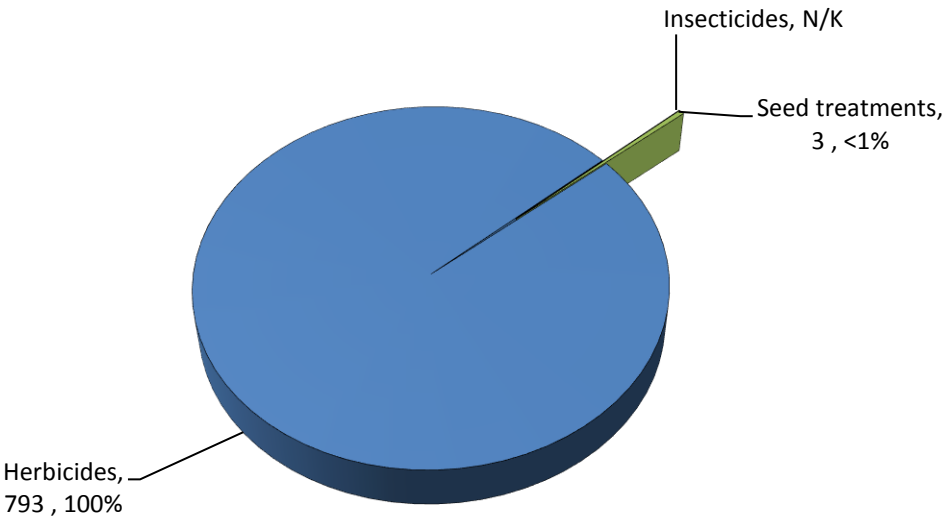


Figure 66 **Other fodder: Weight (kg) of pesticide groups applied, 2017.**



***N/K refers to those treatments where either the area of application or the quantity used could not be established**

Figure 67 Other fodder crops: pesticide-treated area (spha) of herbicide active substances, 2017.

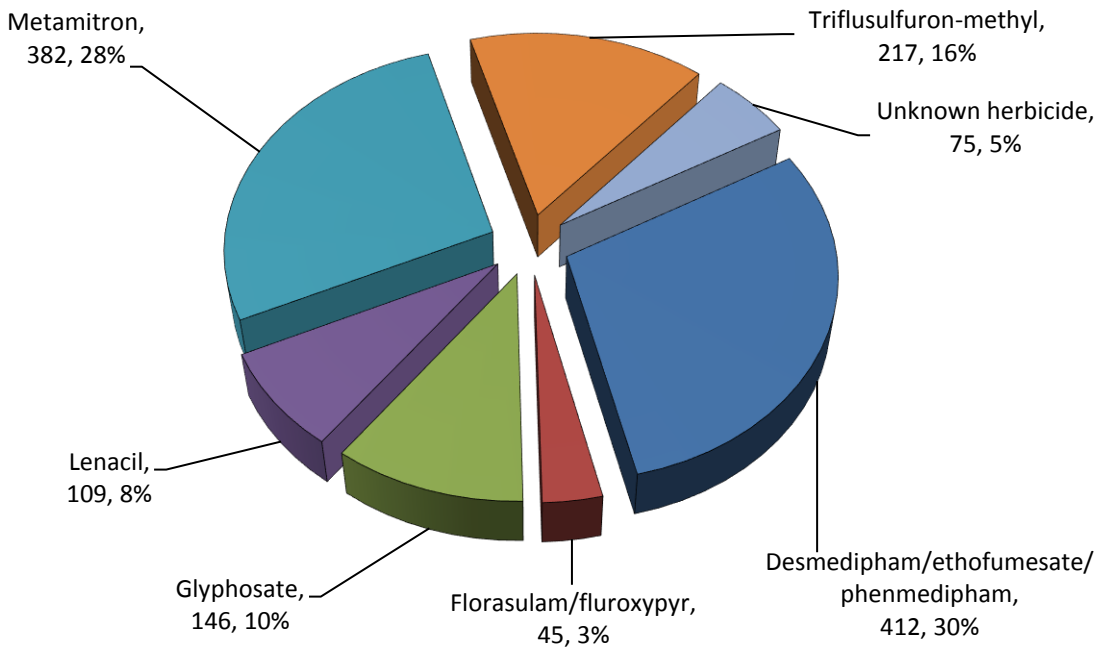
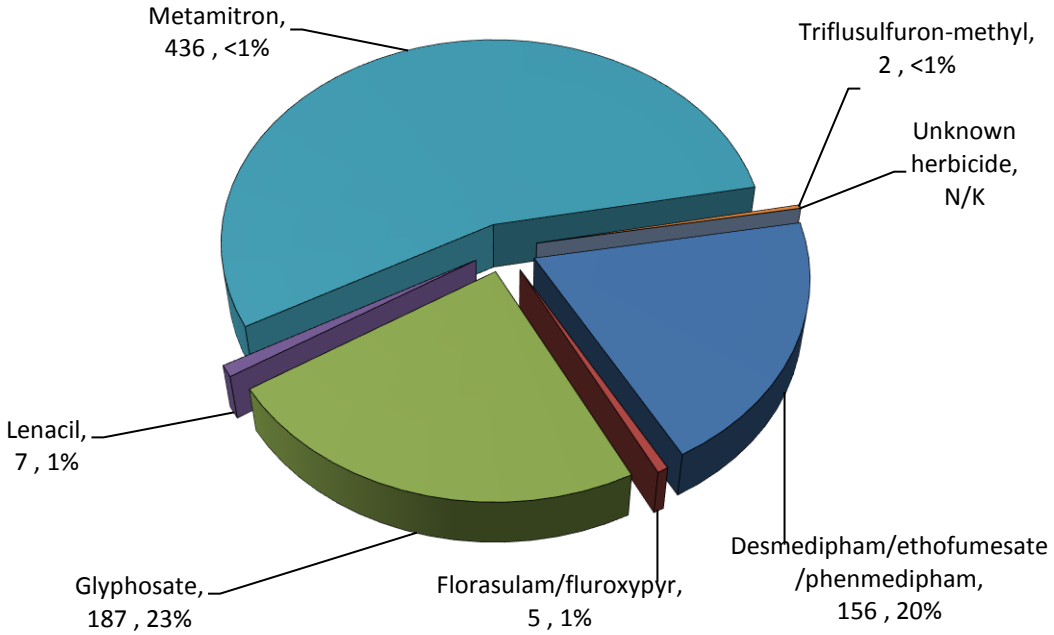
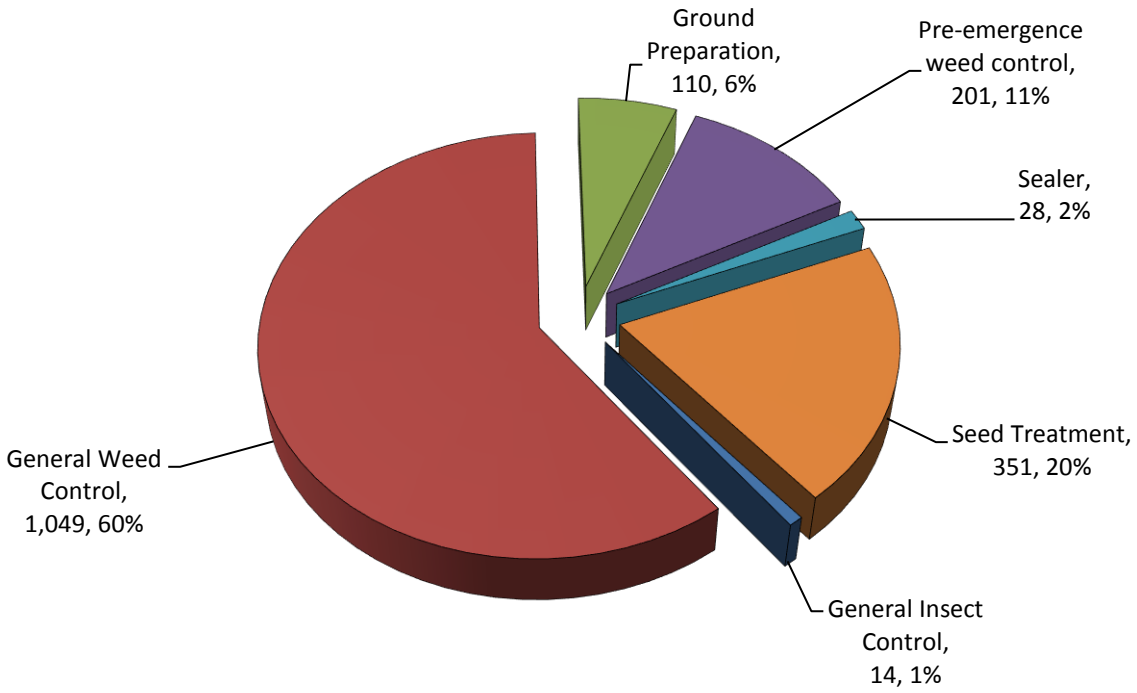


Figure 68 Other fodder crops: weight (kg) of herbicide active substances applied, 2017.



***N/K refers to those treatments where either the area of application or the quantity used could not be established**

Figure 69 **Other fodder crops: reasons for pesticide use (spha), 2017.**



TRENDS

Figure 70a **Area (ha) of grassland and fodder crops grown, 1989-2017.**

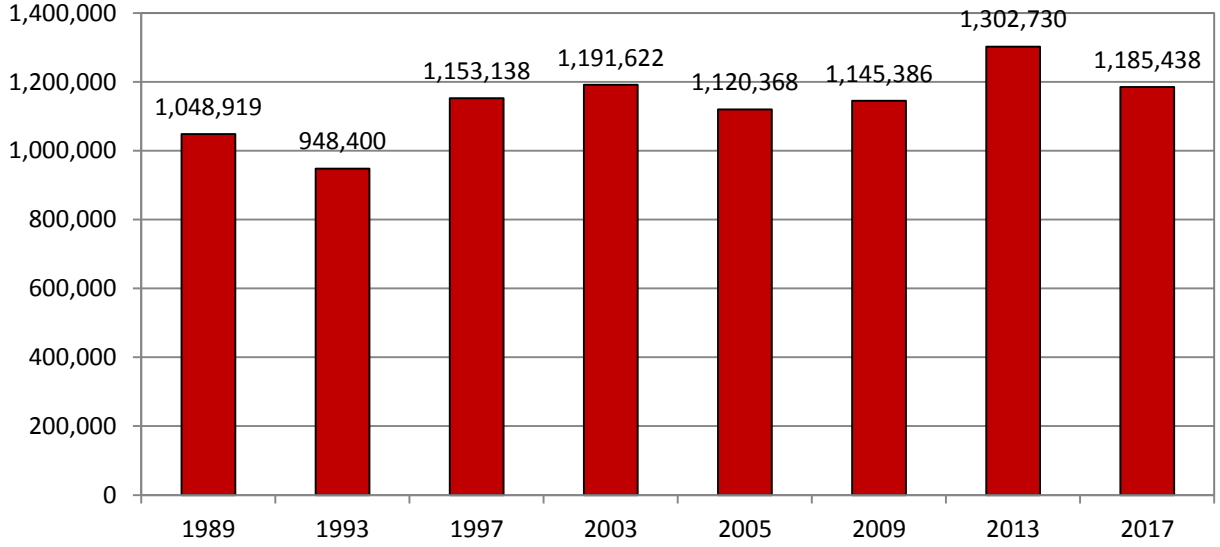


Figure 70b **Pesticide-treated area (spha) of grassland and fodder crops, 1989-2017.**

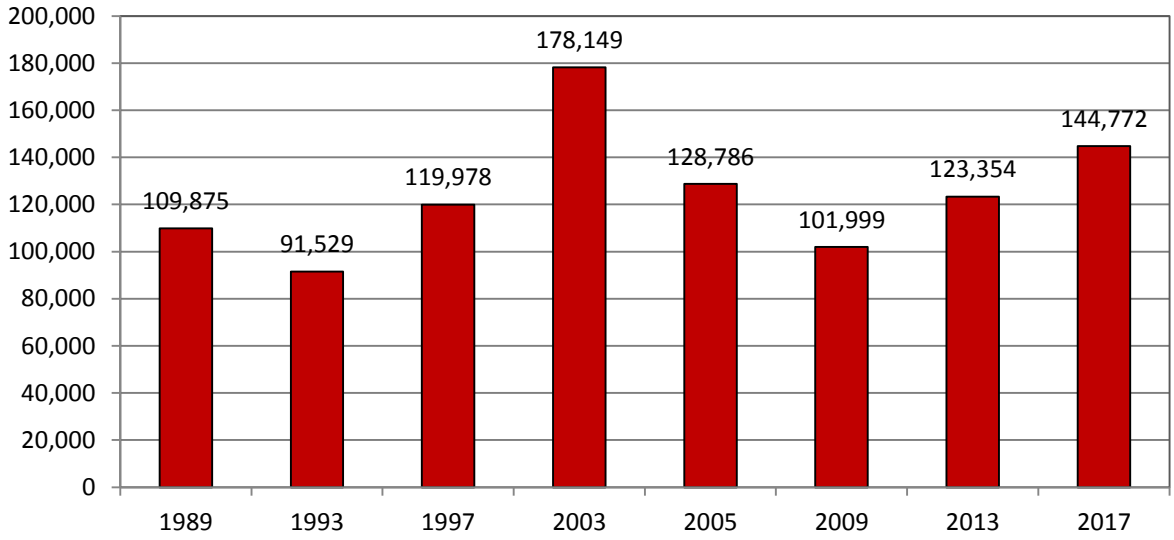


Figure 70c **Weight (t) of pesticides applied to grassland and fodder crops, 1989-2017.**

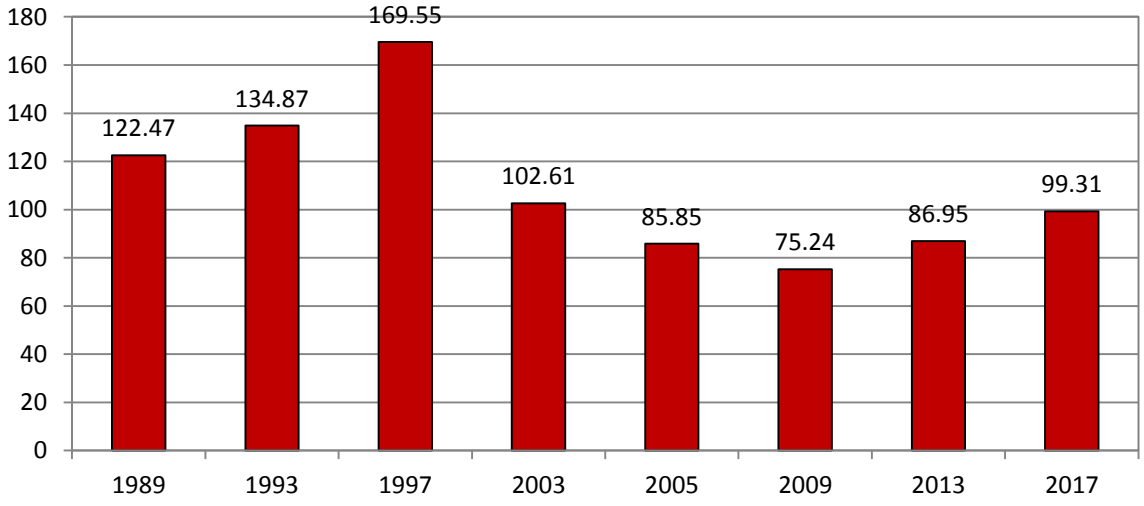


Figure 71a **Area (ha) of established grassland grown, 1989-2017.**

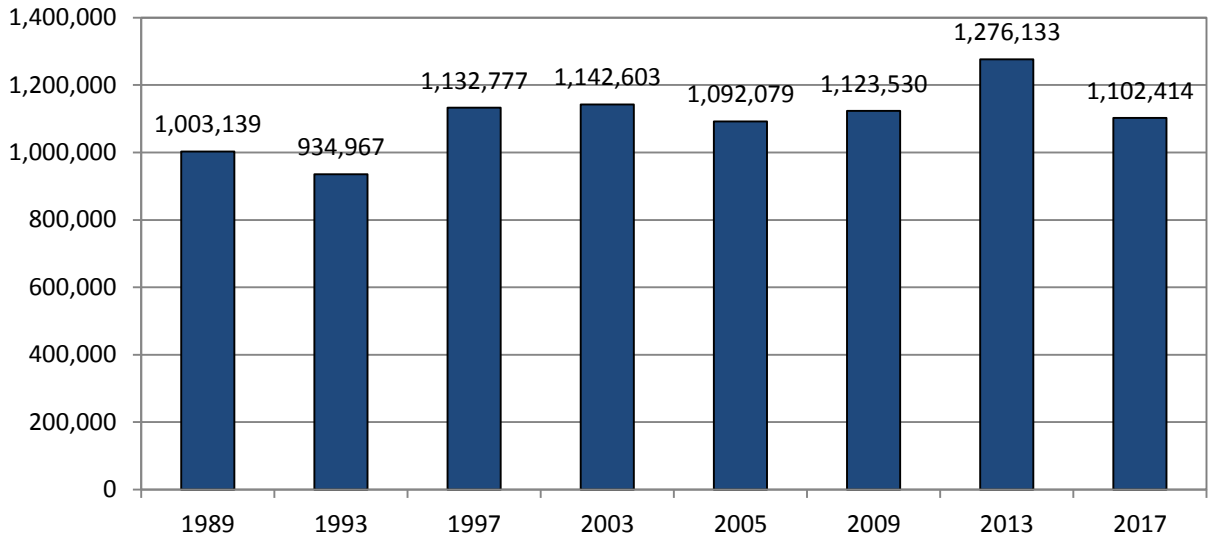


Figure 71b **Pesticide-treated area (spha) of established grassland crops, 1989-2017.**

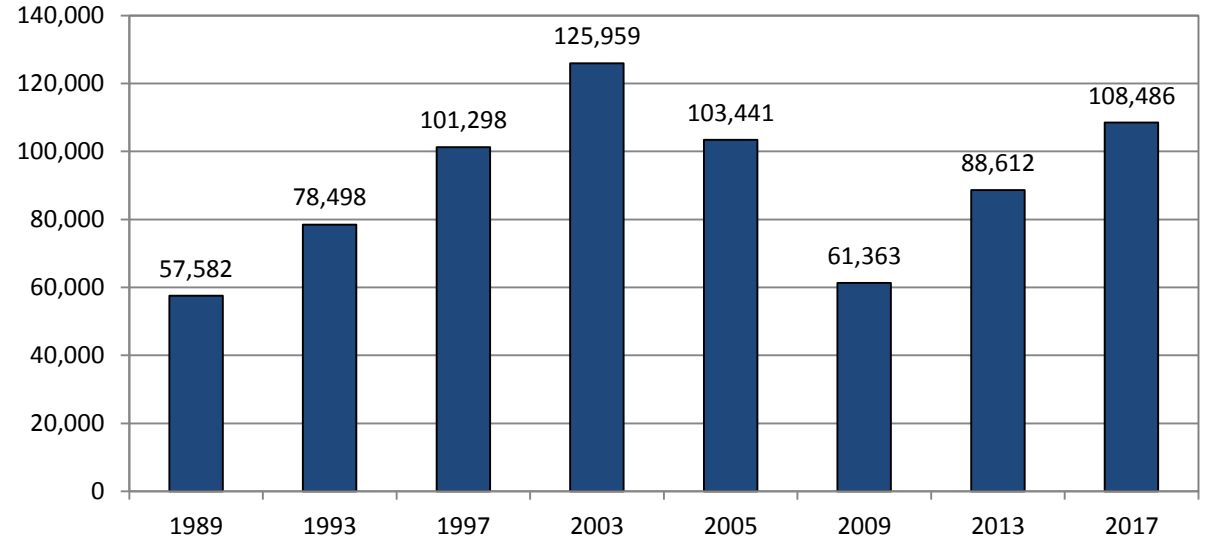


Figure 71c **Weight (t) of pesticides applied to established grassland crops, 1989-2017.**

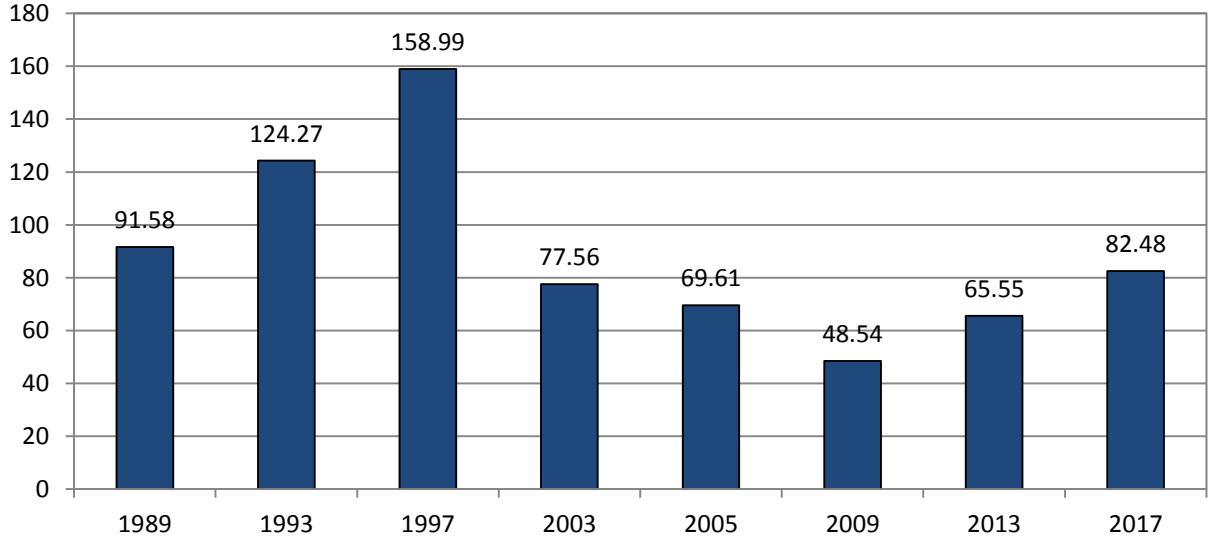


Figure 72a **Area (ha) of enclosed grassland grown, 1989-2017.**

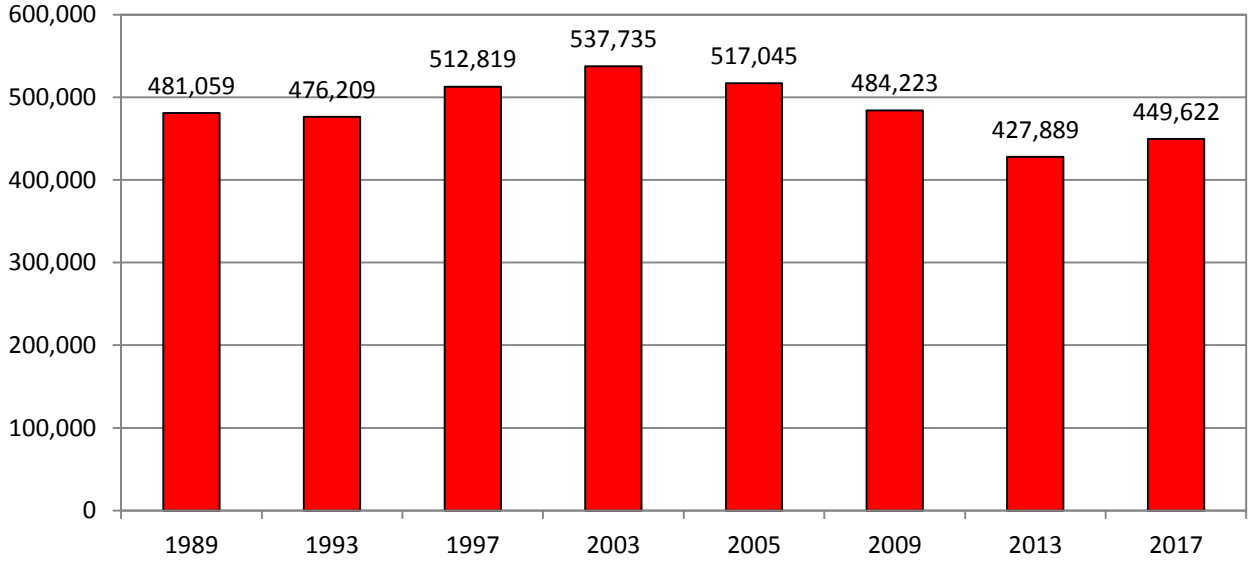


Figure 72b **Pesticide-treated area (spha) of enclosed grassland, 1989-2017.**

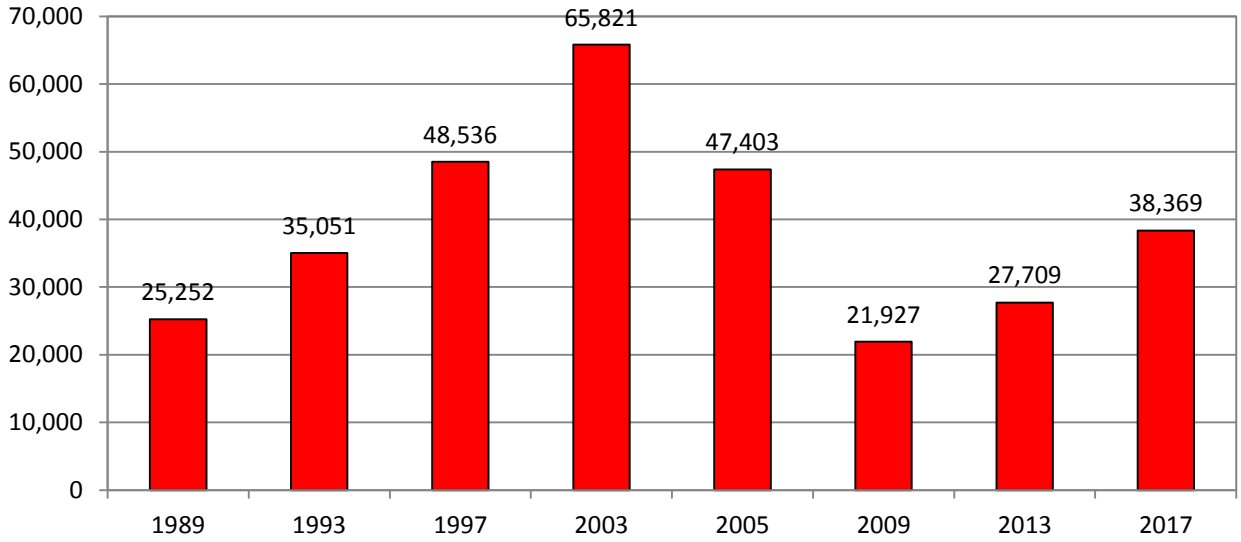


Figure 72c **Weight (t) of pesticides applied to enclosed grassland, 1989-2017.**

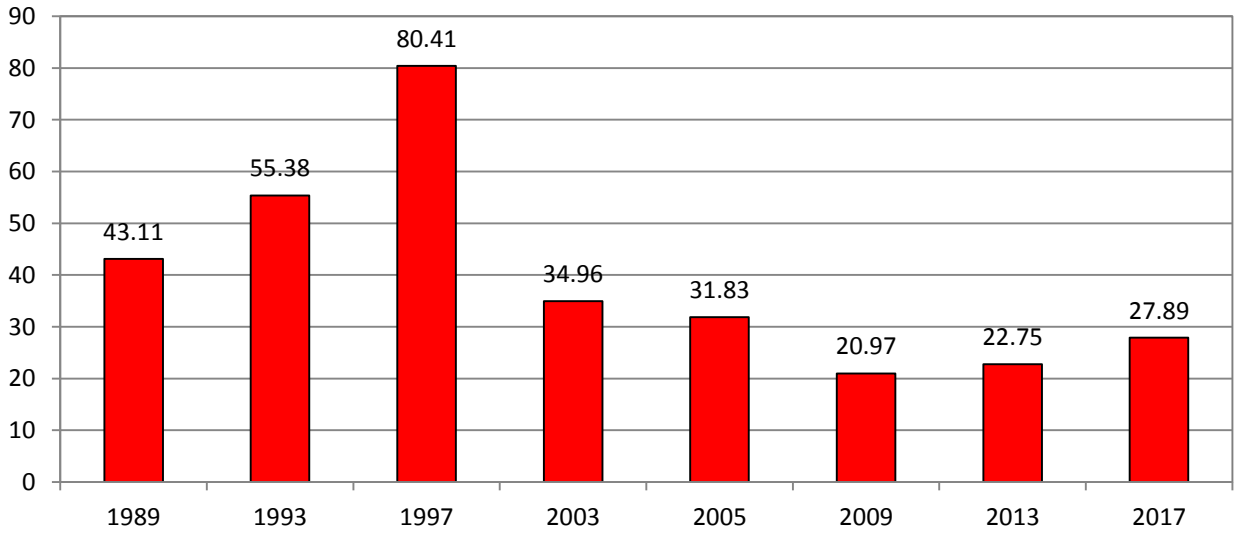


Figure 73a **Area (ha) of grass silage grown, 1989-2017.**

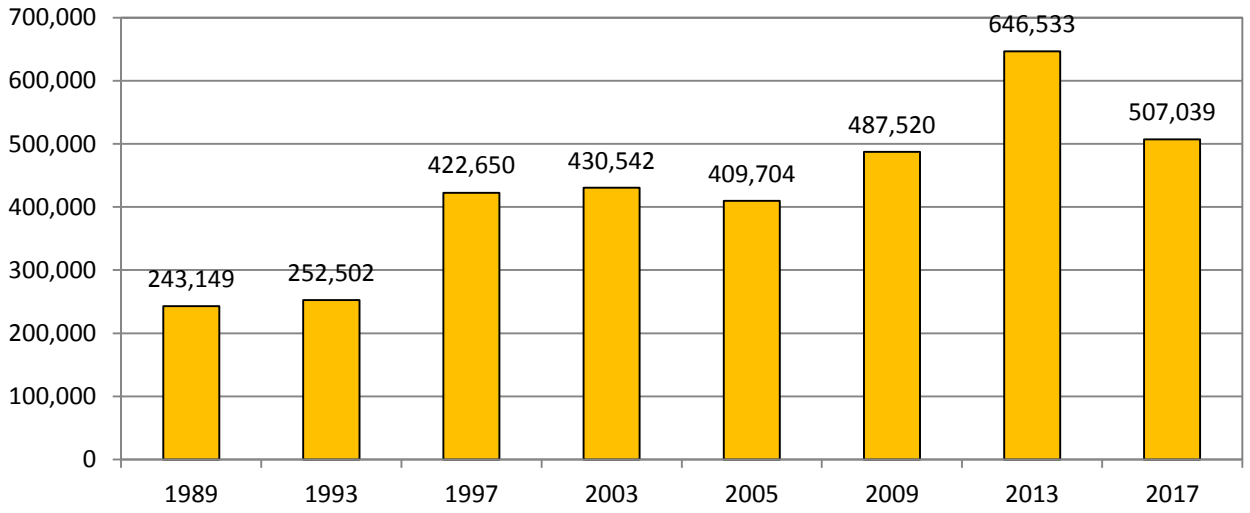


Figure 73b **Pesticide-treated area (spha) of grass silage, 1989-2017.**

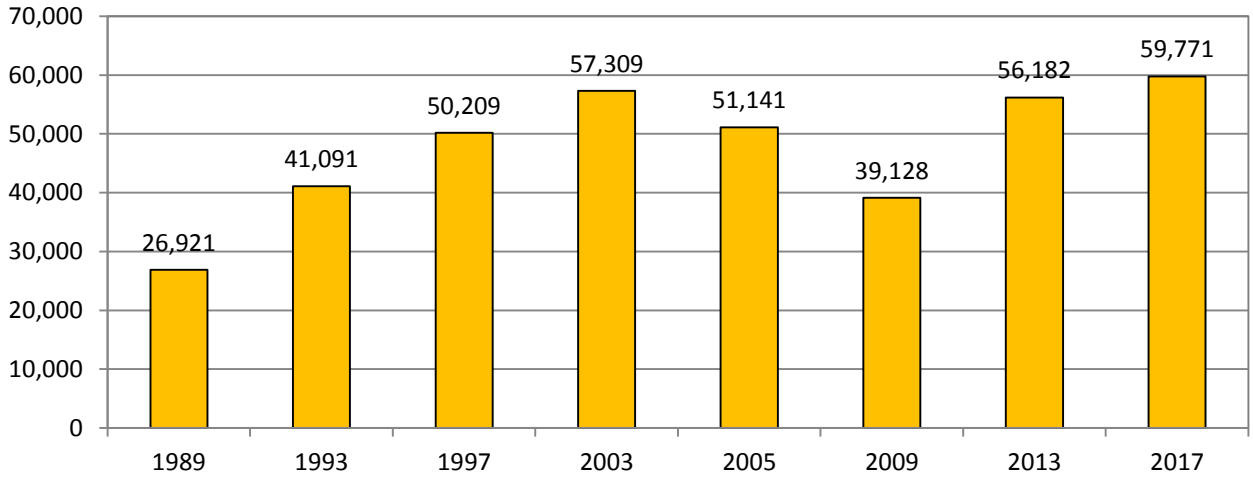


Figure 73c **Weight (t) of pesticides applied to grass silage, 1989-2017.**

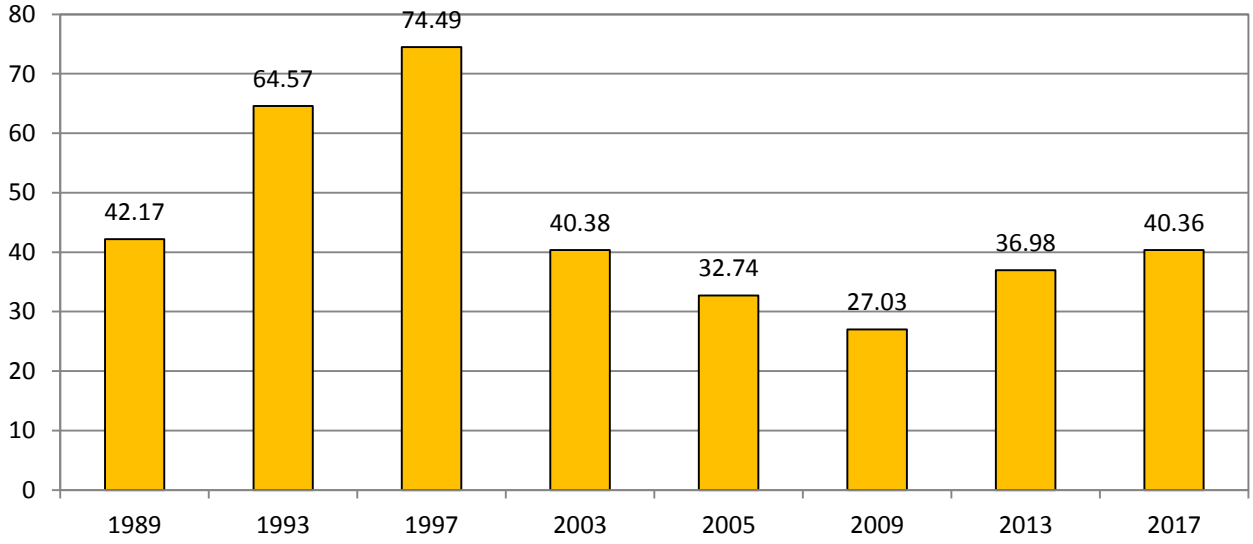


Figure 74a **Area (ha) of hay and haylage grown, 1989-2017.**

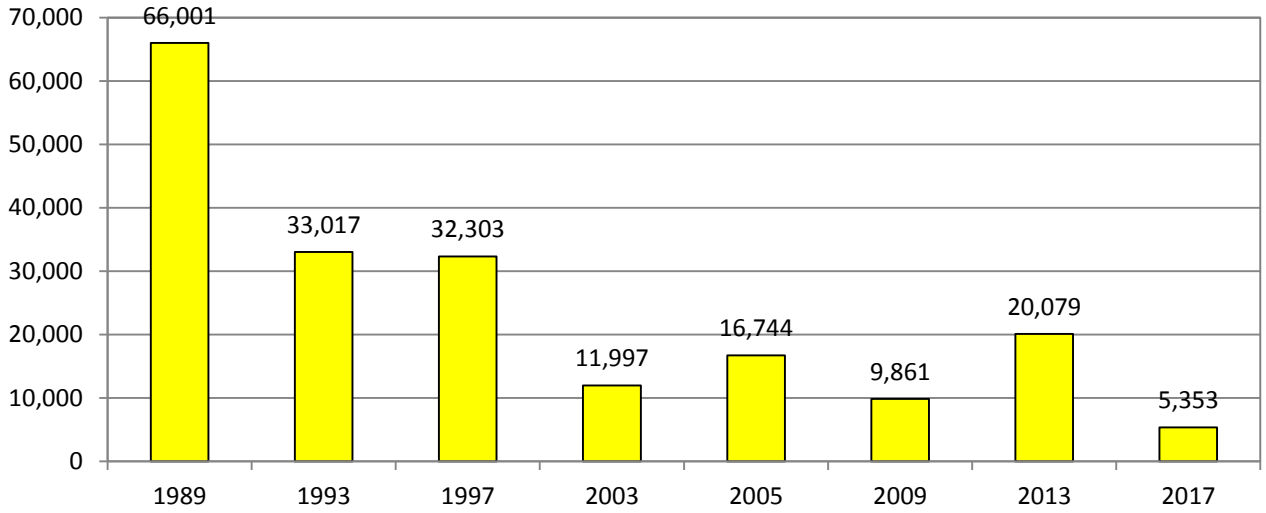


Figure 74b **Pesticide-treated area (spha) of hay and haylage, 1989-2017.**

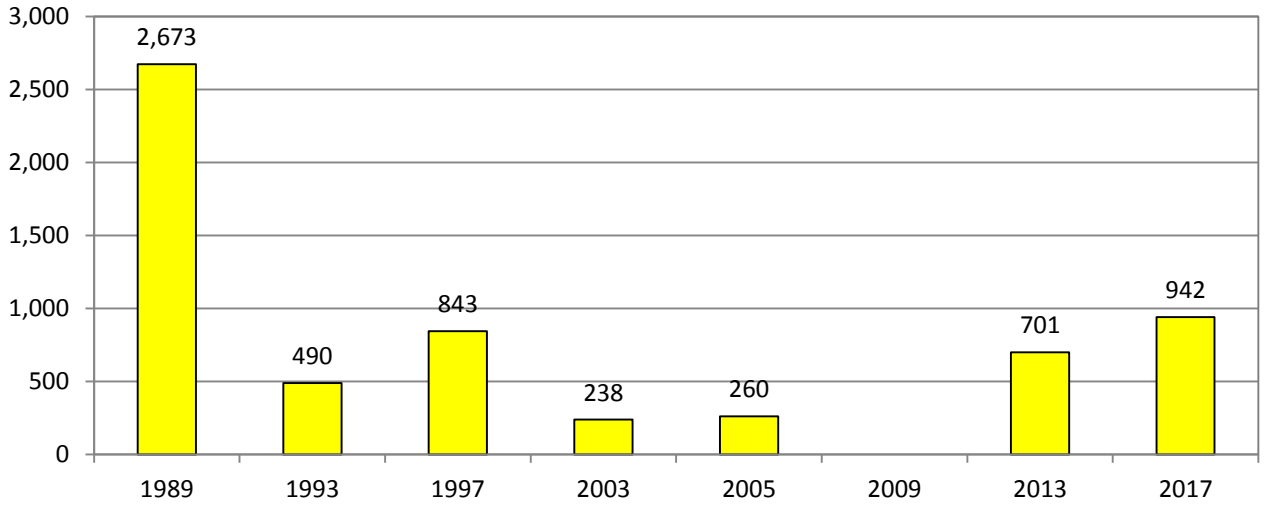


Figure 74c **Weight (t) of pesticides applied to hay and haylage, 1989-2017.**

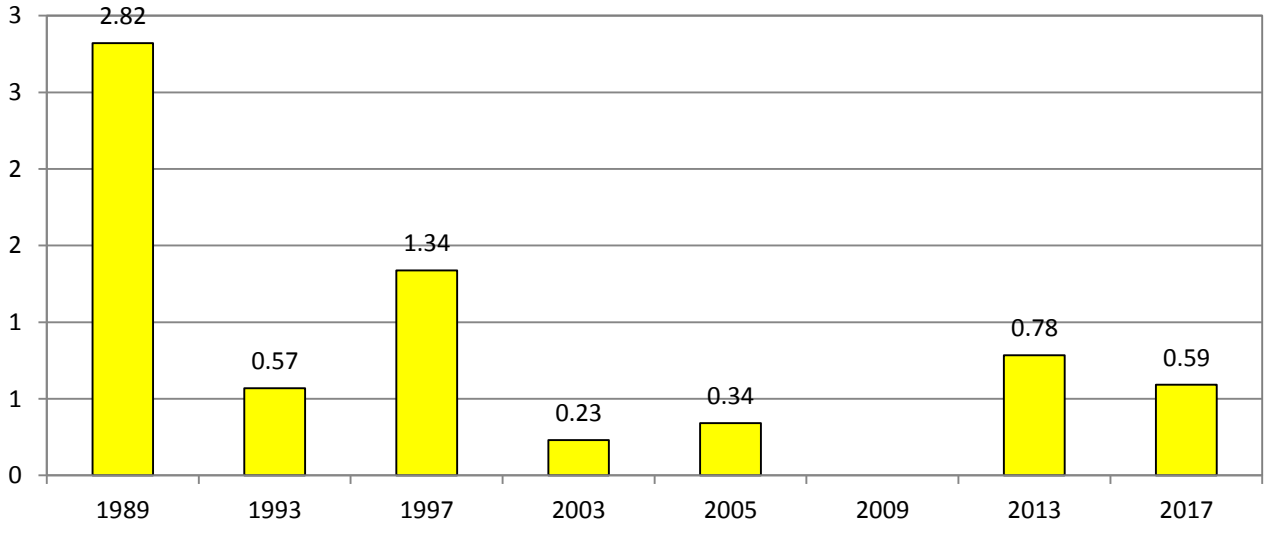


Figure 75a **Area (ha) of rough grazing, 1989-2017.**

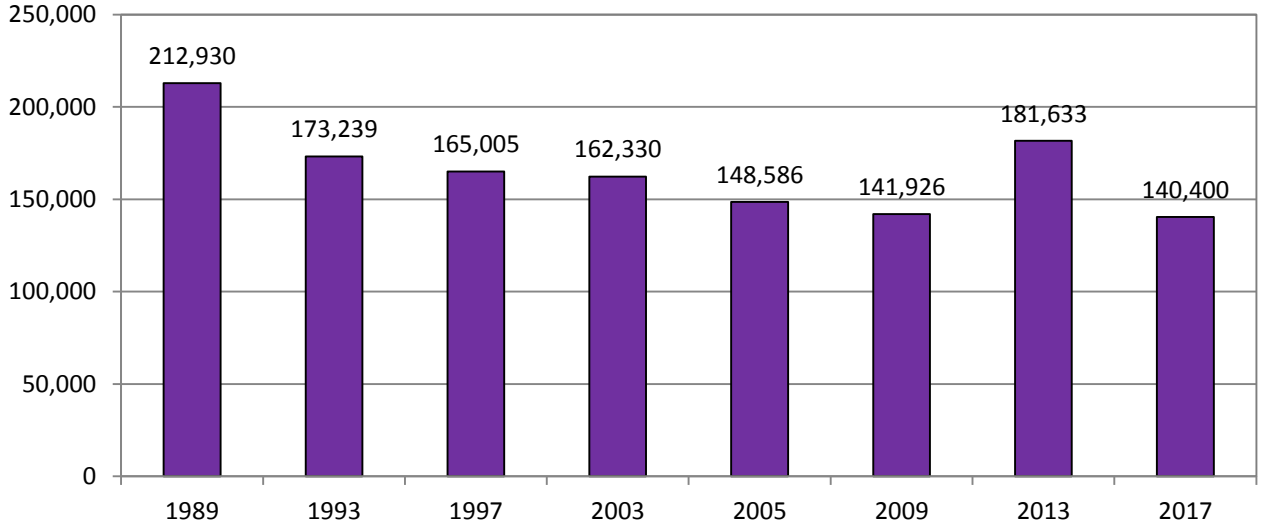


Figure 75b **Pesticide-treated area (spha) of rough grazing, 1989-2017.**

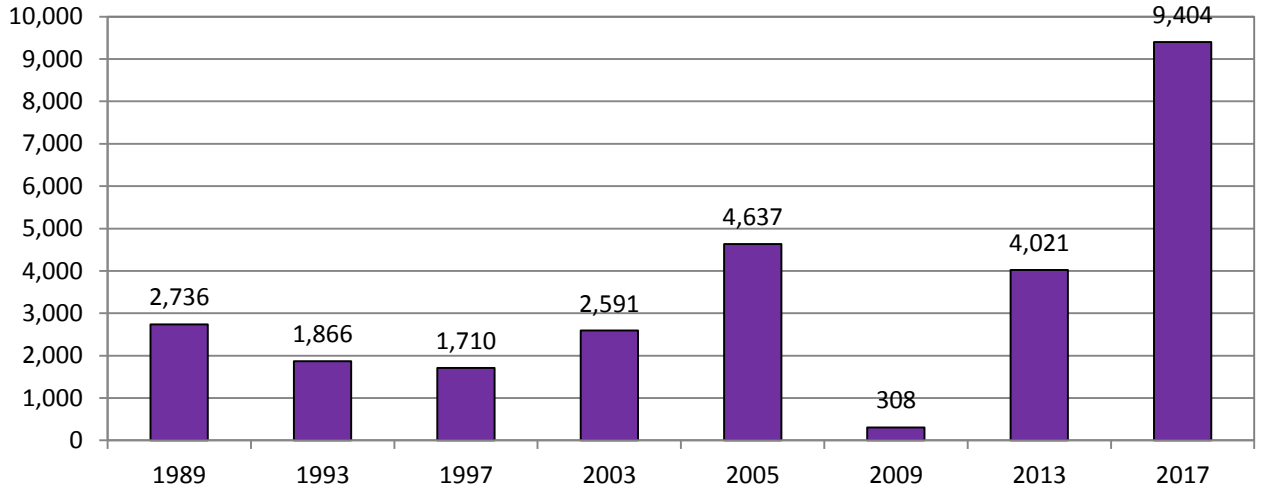


Figure 75c **Weight (t) of pesticides applied to rough grazing, 1989-2017.**

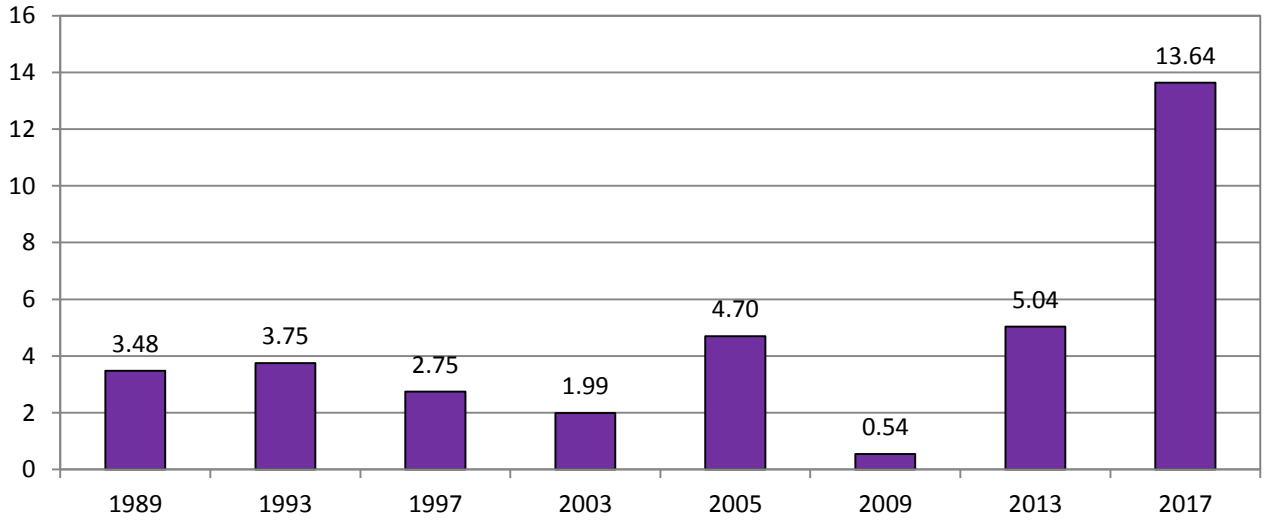


Figure 76a **Area (ha) of sown crops, 1989-2017.**

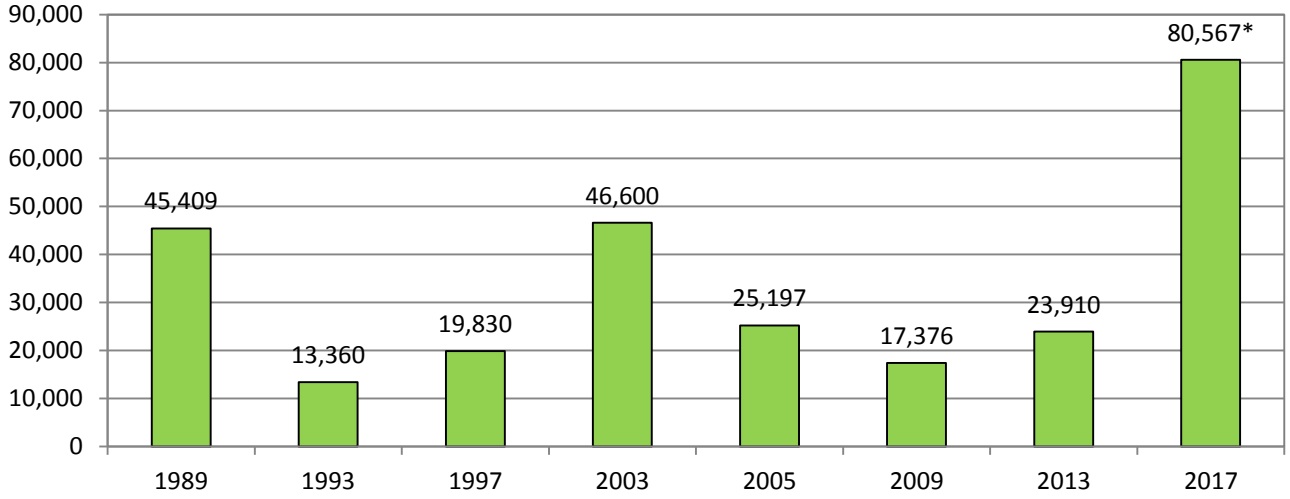


Figure 76b **Pesticide-treated area (spha) of sown crops, 1989-2017.**

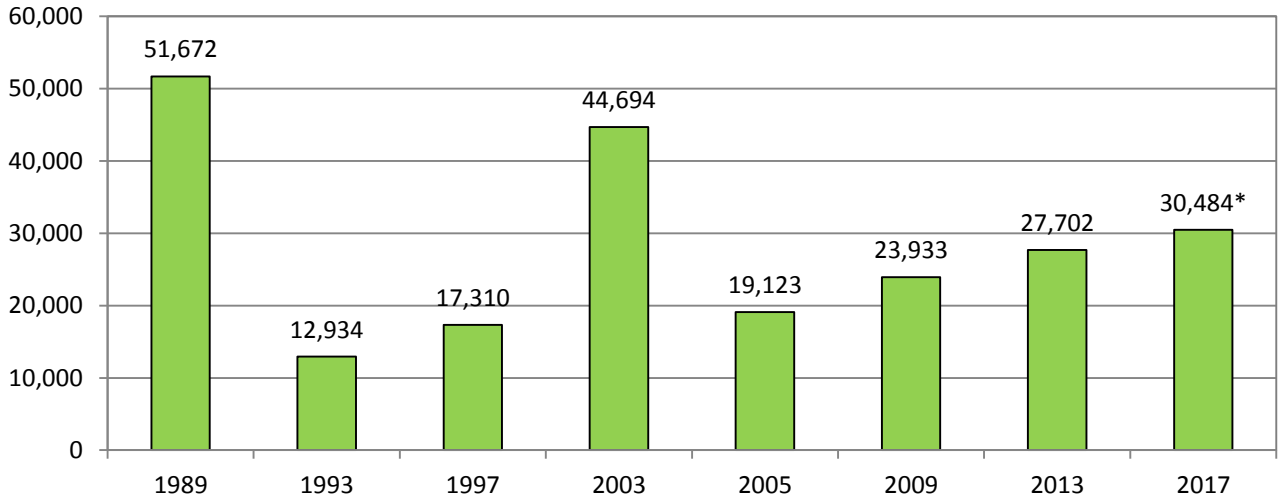
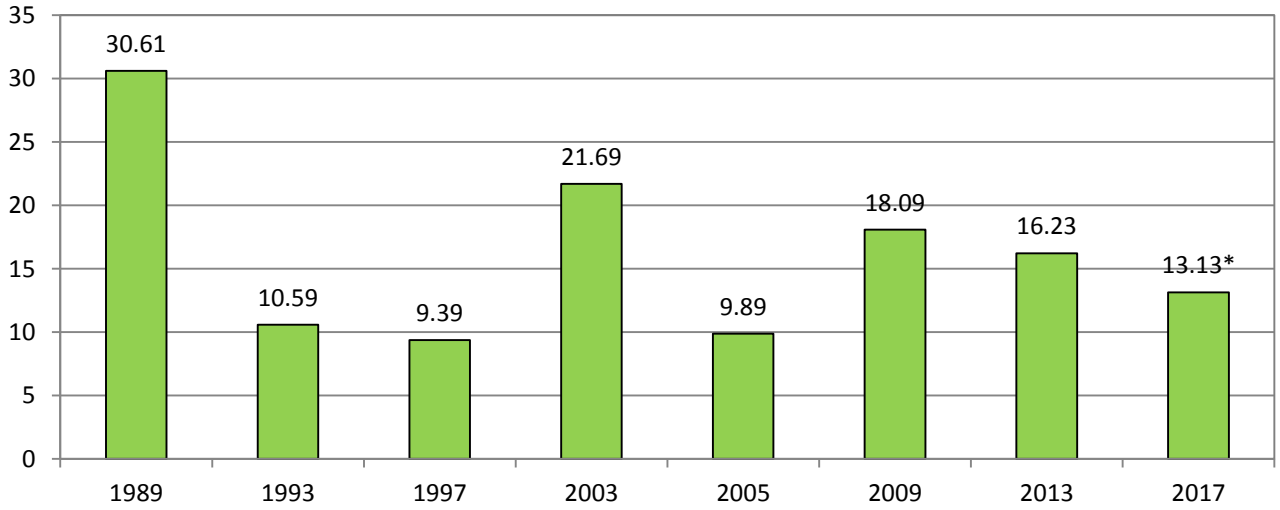


Figure 76c **Weight (t) of pesticides applied to sown crops, 1989-2017.**



***Includes all sown grass up to 5 years old**

Figure 77a **Area (ha) of arable silage, 1989-2017.**

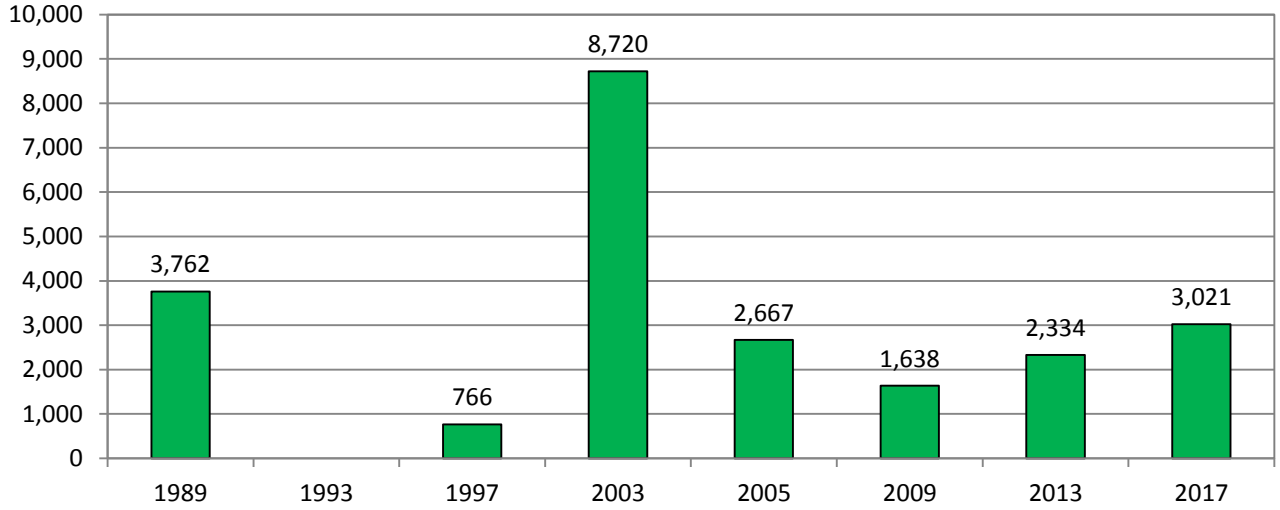


Figure 77b **Pesticide-treated area (spha) of arable silage, 1989-2017.**

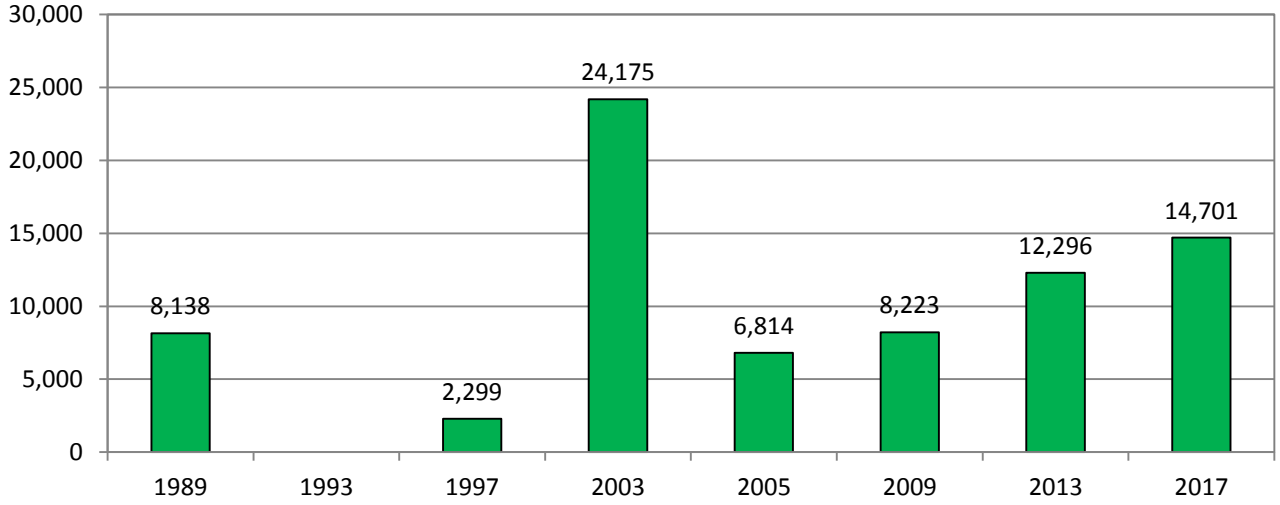
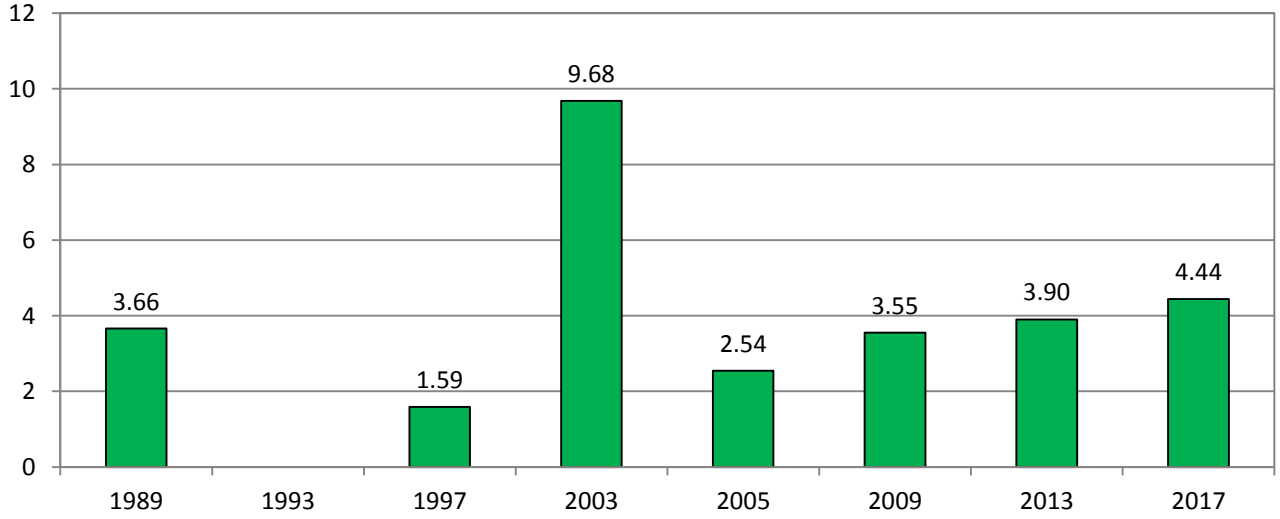


Figure 77c **Weight (t) of pesticides applied to arable silage, 1989-2017.**



***No data exist for 1993**

Figure 78a **Area (ha) of arable silage (undersown), 1989-2017.**

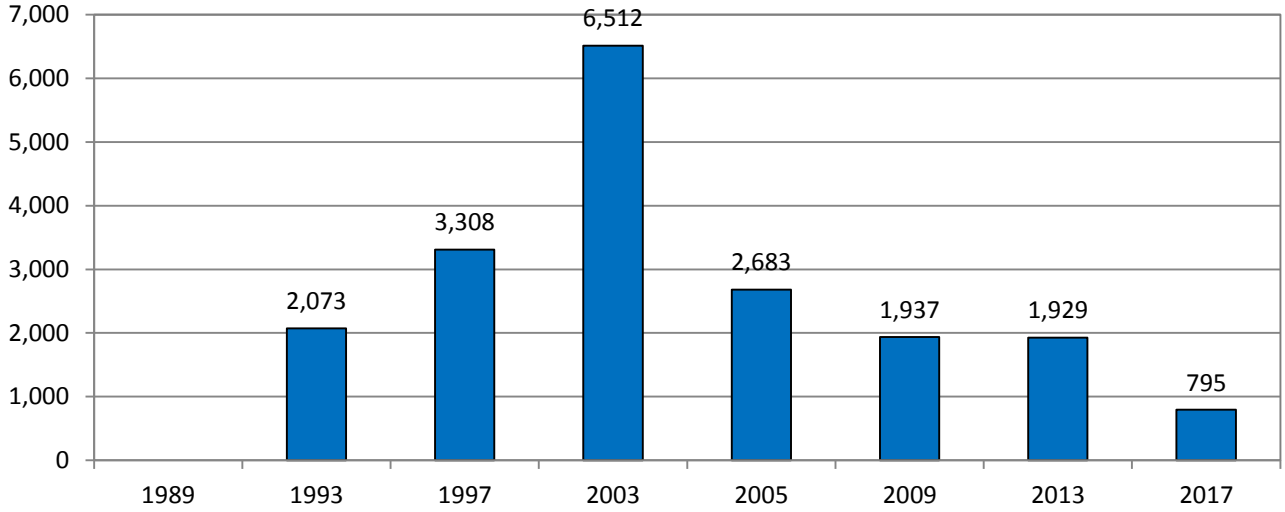


Figure 78b **Pesticide-treated area (spha) of arable silage (undersown), 1989-2017.**

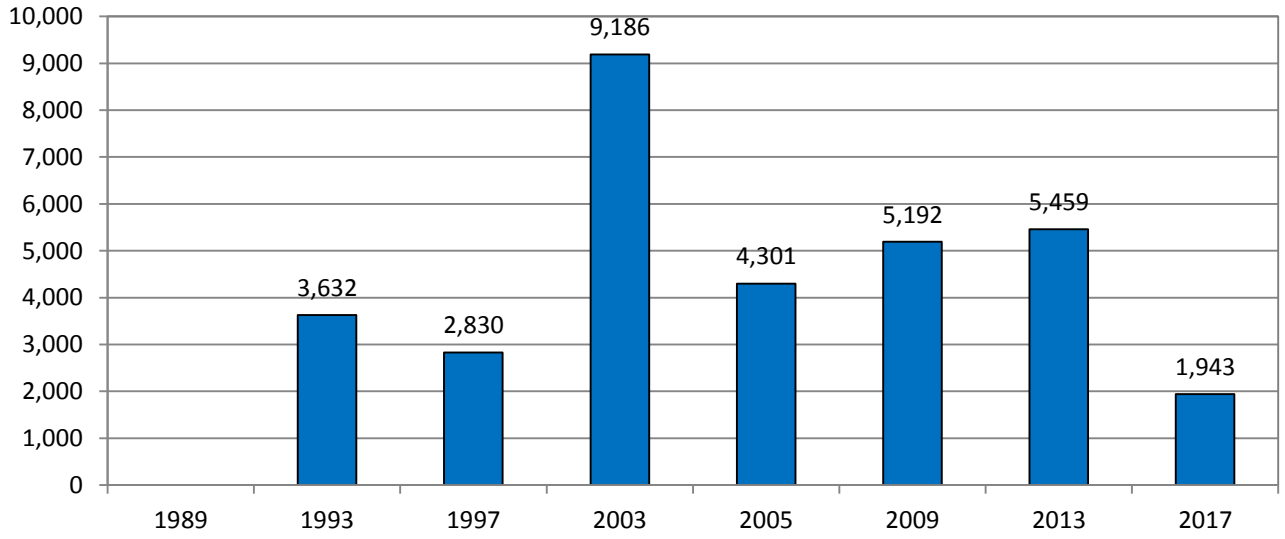
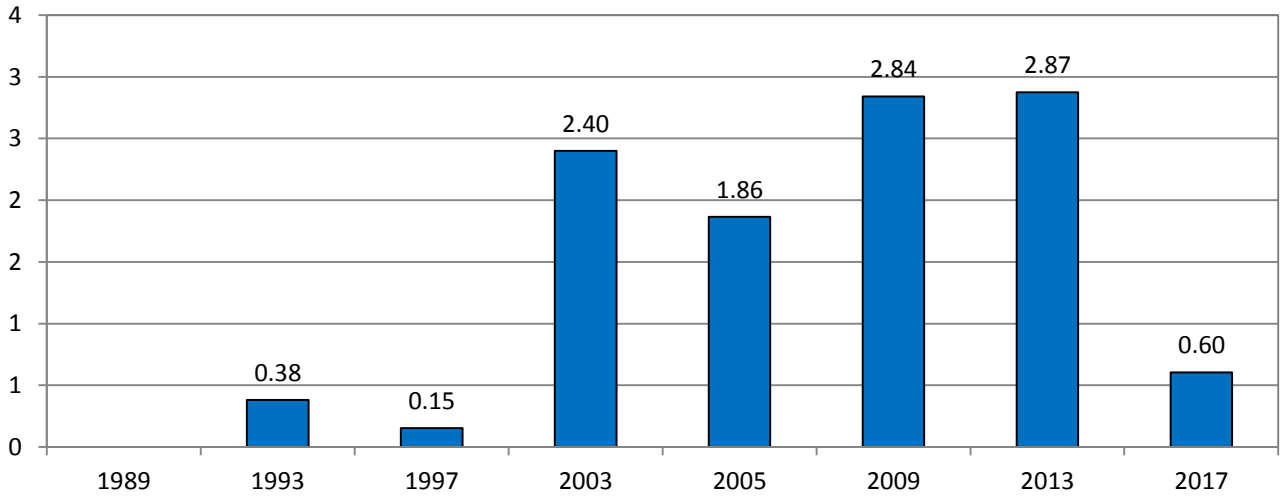


Figure 78c **Weight (t) of pesticides applied to arable silage (undersown), 1989-2017.**



***No data exist for 1989**

Figure 79a **Area (ha) of grass reseeds sown, 1989-2017.**

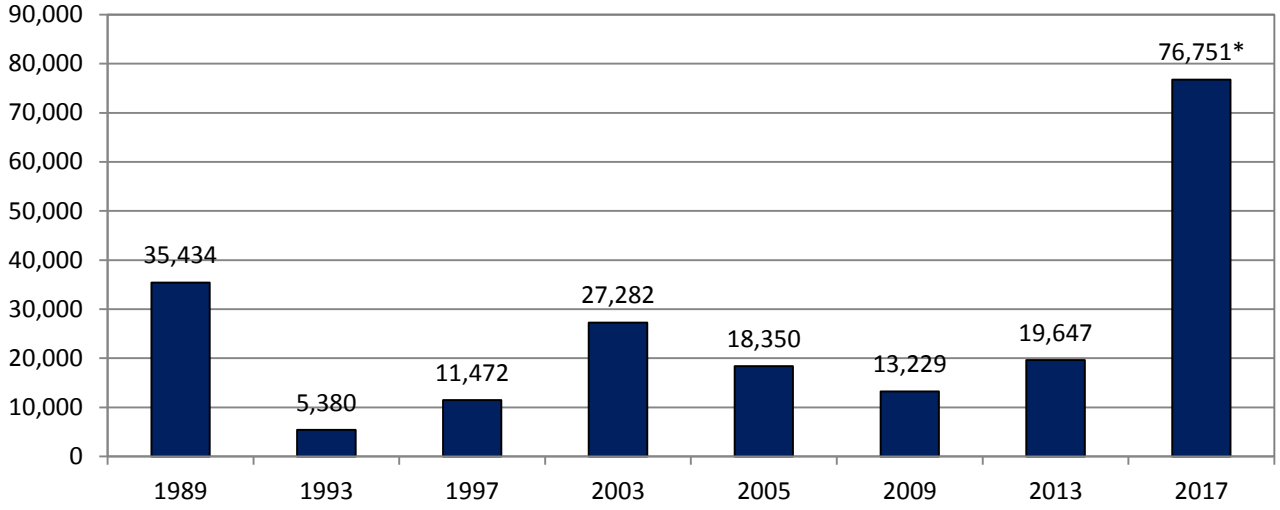


Figure 79b **Pesticide-treated area (spha) of grass reseeds, 1989-2017.**

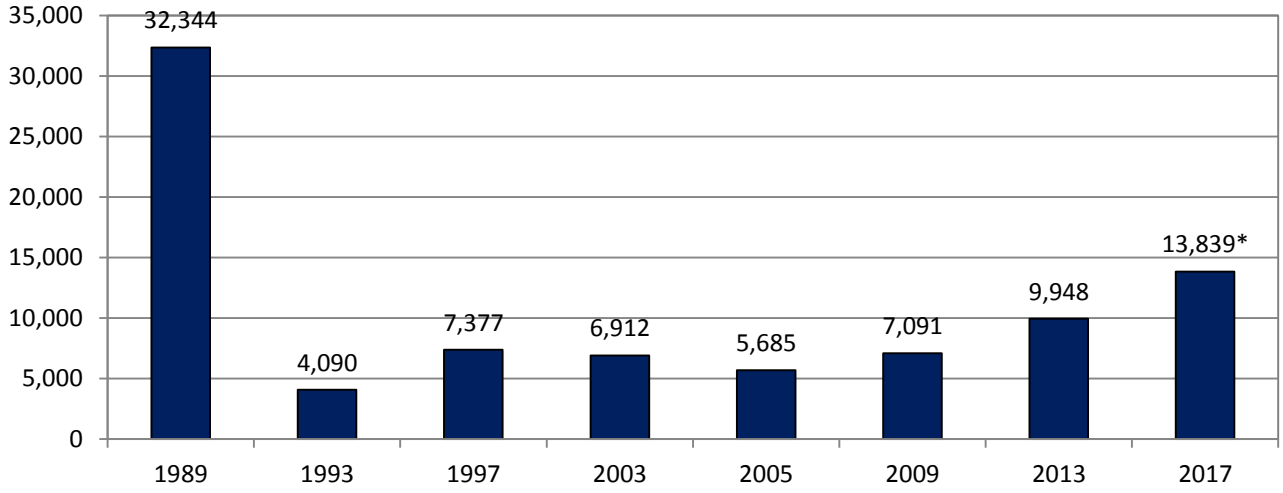
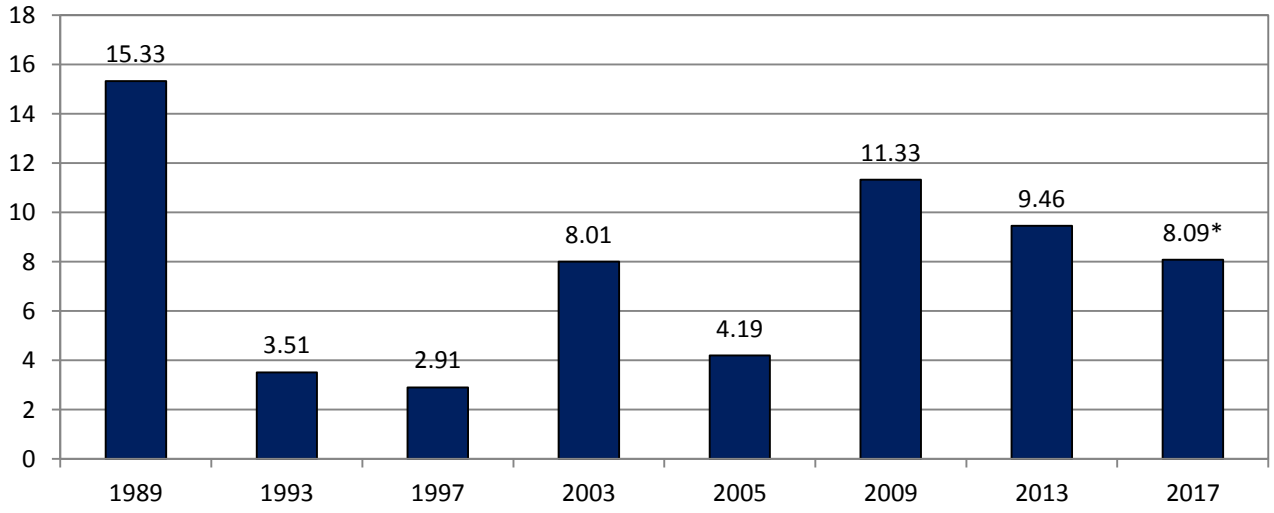


Figure 79c **Weight (t) of pesticides applied to grass reseeds, 1989-2017.**



***Includes all sown grass up to 5 years old**

Figure 80a **Area (ha) of fodder crops sown, 1989-2017.**

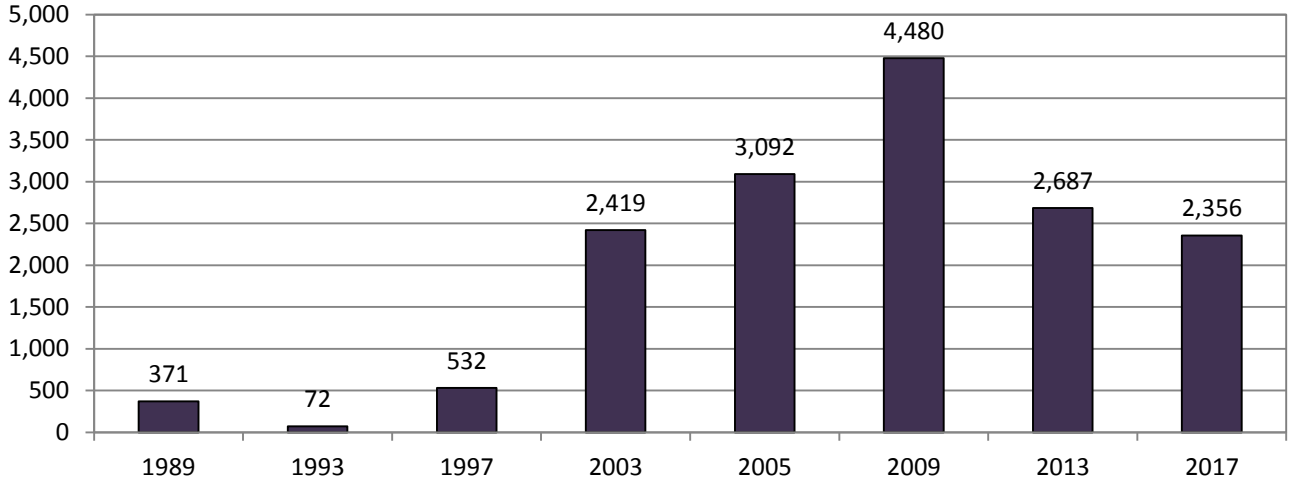


Figure 80b **Pesticide-treated area (spha) of fodder crops, 1989-2017.**

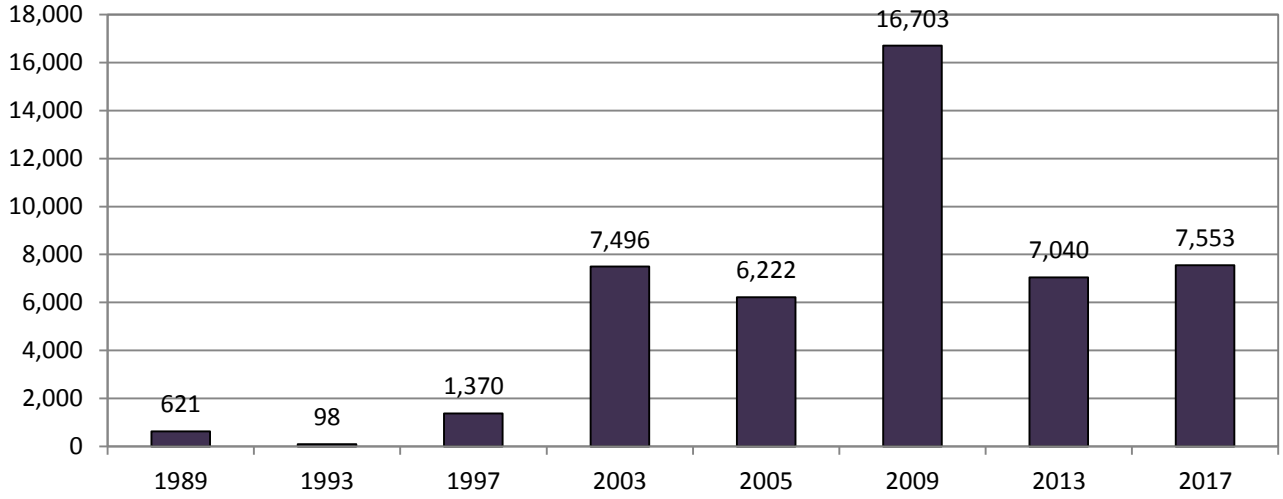


Figure 80c **Weight (t) of pesticides applied to fodder crops, 1989-2017.**

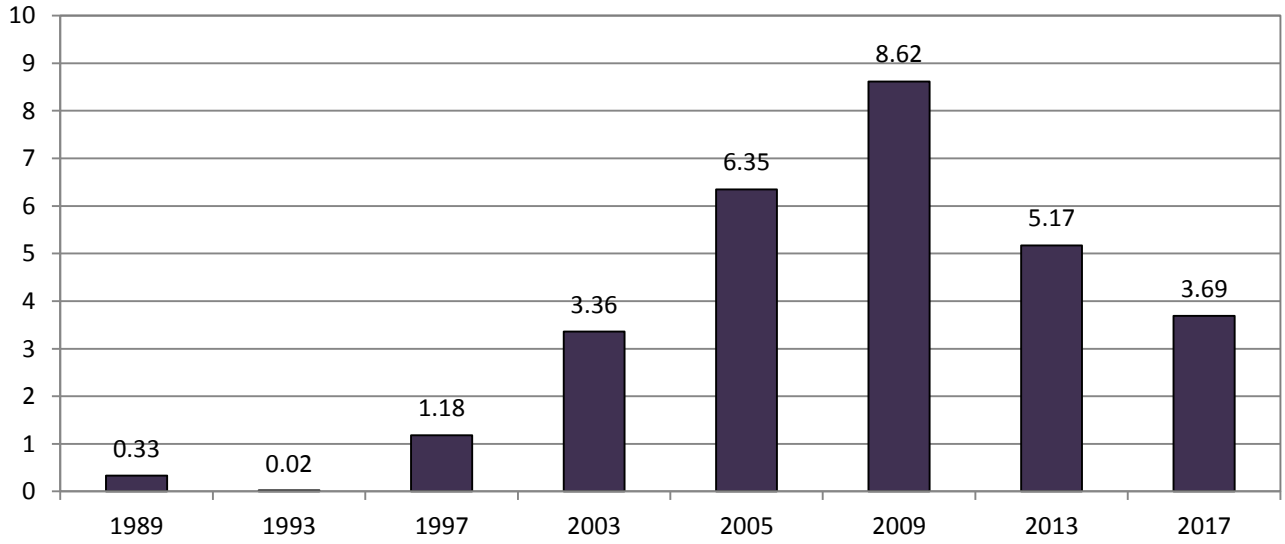


Figure 81a **Area (ha) of fodder maize sown, 1989-2017.**

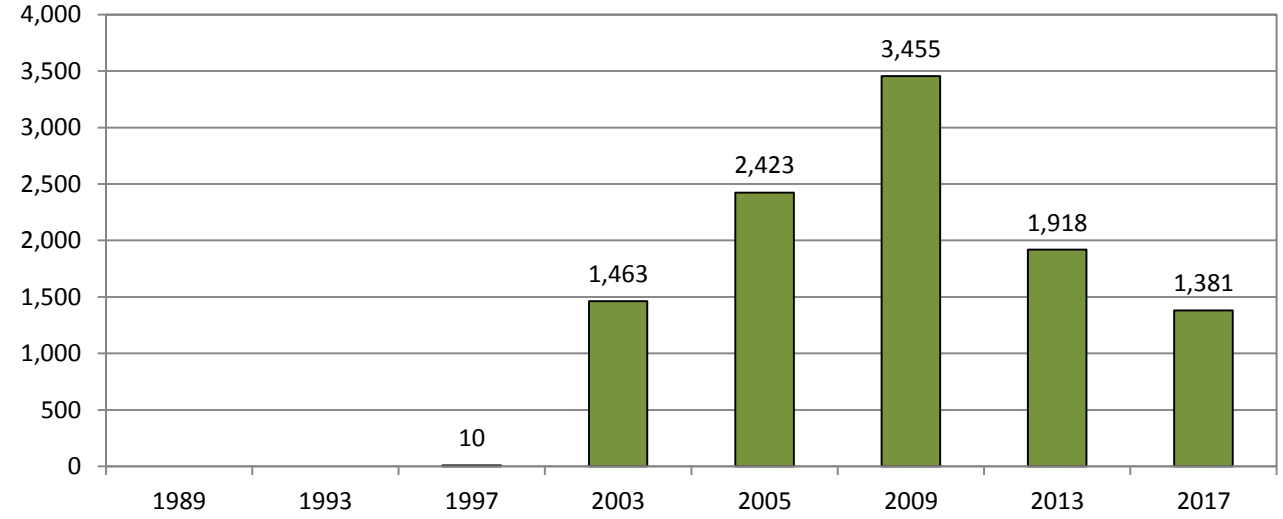


Figure 81b **Pesticide-treated area (spha) of fodder maize crops, 1989-2017.**

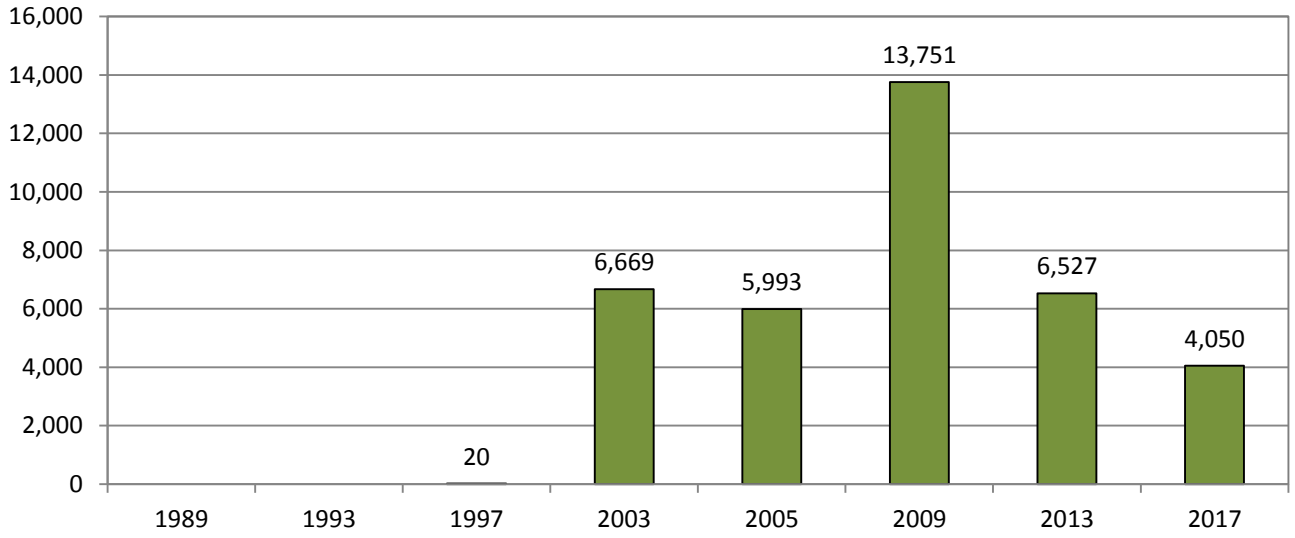
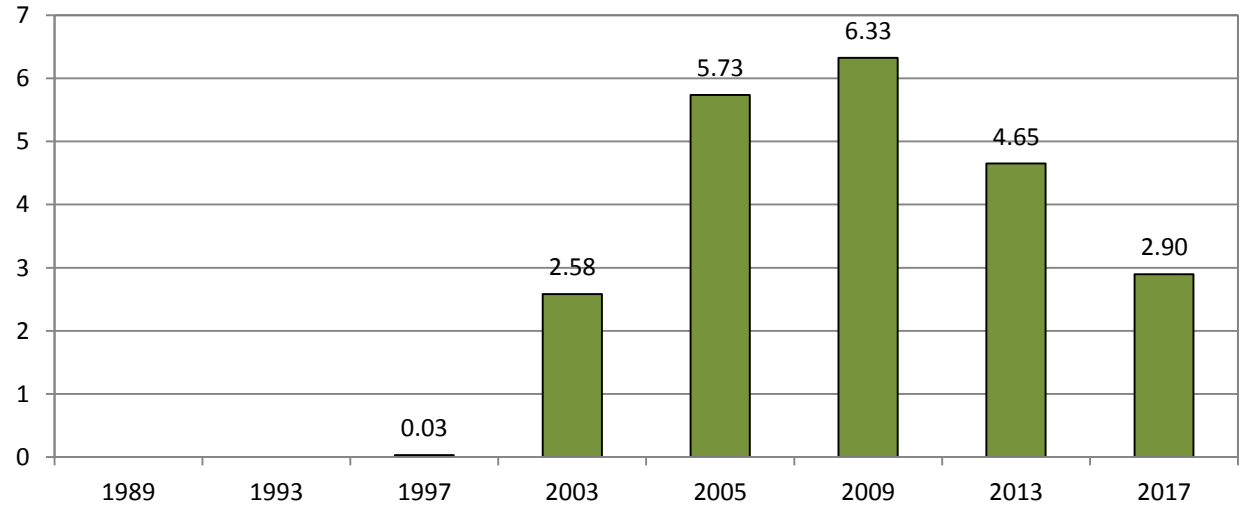


Figure 81c **Weight (t) of pesticides applied to fodder maize crops, 1989-2017.**



***No data exist for 1989 and 1993**

Figure 82a **Area (ha) of other fodder crops sown, 1989-2017.**

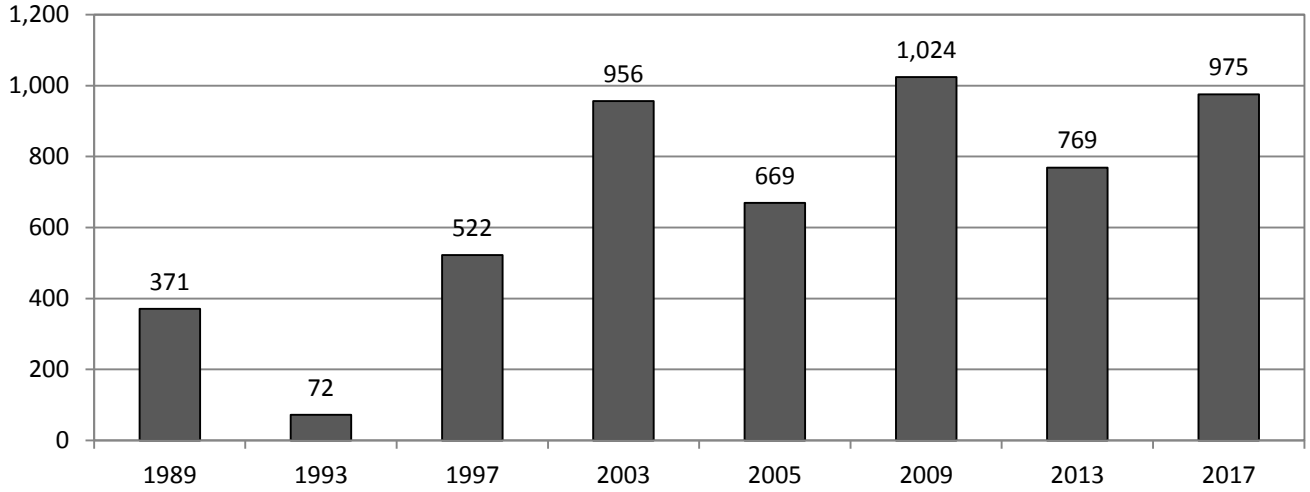


Figure 82b **Pesticide-treated area (spha) of other fodder crops, 1989-2017.**

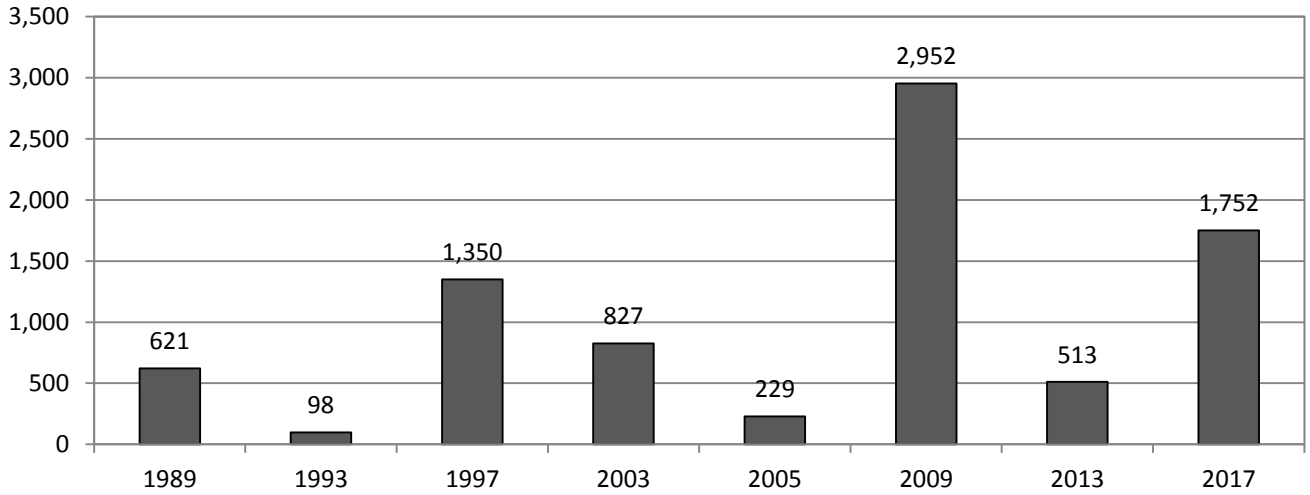


Figure 82c **Weight (t) of pesticides applied to other fodder crops, 1989-2017.**

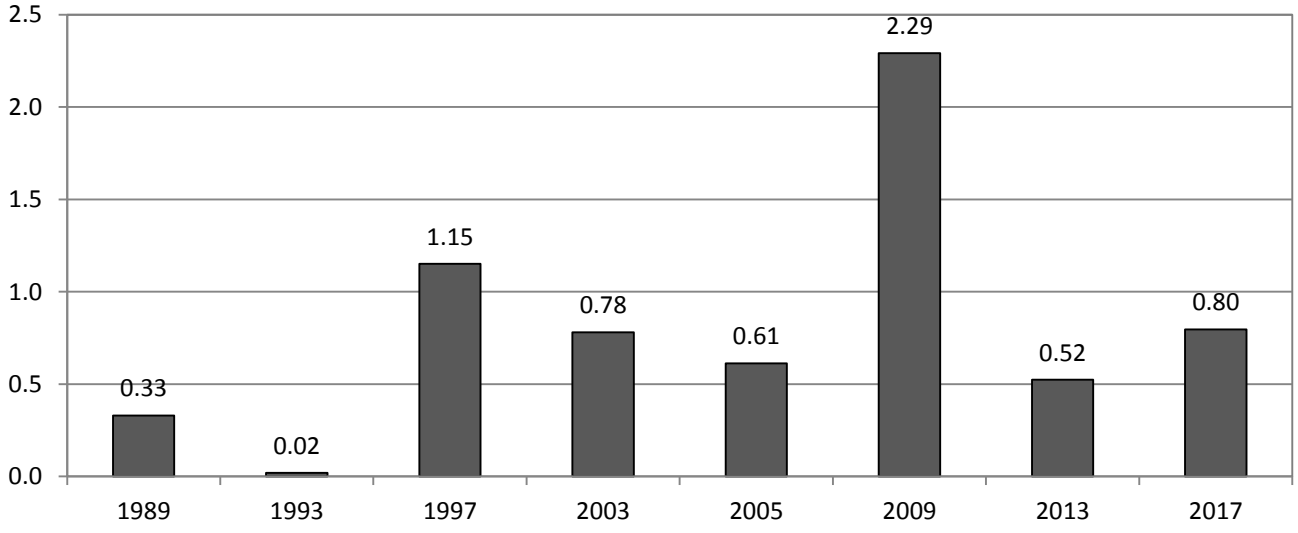


Table 1a **Total number of farms in each size group with enclosed grassland in the Northern Ireland June 2017 census and number of samples in each group.**

	Size group (hectares)													
	<5		5<10		10<20		20<50		50<100		100 +		Total	
County	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	322	1	569	2	888	5	1,390	20	745	11	320	17	4,234	56
Armagh	334	1	603	1	919	3	1,029	8	327	8	95	6	3,307	27
Down	528	1	741	6	1,148	5	1,456	25	594	15	211	23	4,678	75
Fermanagh	145	2	312	0	685	4	1,145	10	459	6	179	3	2,925	25
Londonderry	233	1	430	1	786	1	1,130	15	526	8	172	16	3,277	42
Tyrone	350	0	797	2	1,483	7	2,119	13	863	19	271	10	5,883	51
Northern Ireland	**1,912**	**6**	**3,452**	**12**	**5,909**	**25**	**8,269**	**91**	**3,514**	**67**	**1,248**	**75**	**24,304**	**276**

Table 1b **Total number of farms in each size group with arable crop silage in the Northern Ireland June 2017 census and number of samples from each group.**

	Size group (hectares)							
	<5		5<10		10+		Total	
County	Holdings in strata	Holdings sampled	Holdings in strata	Holdings sampled	Holdings in strata	Holdings sampled	Holdings in strata	Holdings sampled
All counties	158	17	106	16	117	14	381	47
Northern Ireland	**158**	**17**	**106**	**16**	**117**	**14**	**381**	**47**

Table 1c **Total number of farms in each size group with fodder maize in the Northern Ireland June 2017 census and number of samples from each group.**

	Size group (hectares)							
	<8		8<12		12+		Total	
County	Holdings in strata	Holdings sampled	Holdings in strata	Holdings sampled	Holdings in strata	Holdings sampled	Holdings in strata	Holdings sampled
All counties	57	5	29	3	41	12	127	20
Northern Ireland	**57**	**5**	**29**	**3**	**41**	**12**	**127**	**20**

Table 1d **Total number of farms in each size group with other fodder crops in the Northern Ireland June 2017 census and number of samples from each group.**

	Size group (hectares)							
	<3		3<5		5+		Total	
County	Holdings in strata	Holdings sampled	Holdings in strata	Holdings sampled	Holdings in strata	Holdings sampled	Holdings in strata	Holdings sampled
All counties	102	9	45	5	65	11	212	25
Northern Ireland	**102**	**9**	**45**	**5**	**65**	**11**	**212**	**25**

Table 2 **The total number and area (hectares) of crops sampled in Northern Ireland, 2017.**

Crop type	Number of crops surveyed	Surveyed area (ha)
Established grassland crops		
Enclosed grazing	343	11,030
Grass silage 1st Cut	302	7,551
Grass silage 2nd Cut	193	5,407
Grass silage 3rd Cut	82	2,526
Grass silage 4th Cut	10	257
Hay	6	29
Haylage	10	45
Rough grazing	72	1,222
Sown crops		
Arable silage	40	374
Arable silage (undersown)	20	103
Grass reseed	242	2,752
Fodder crops		
Fodder maize	24	316
Other fodder crops	28	158
All crops	**1,372**	**31,773**

Table 3 **Estimated area (ha) of grassland and fodder crops grown regionally in Northern Ireland, 2017.**

	County						
Crop type	**Antrim**	**Armagh**	**Down**	**Fermanagh**	**Londonderry**	**Tyrone**	**Northern Ireland**
Established grassland crops							
Enclosed grazing	87,777	44,738	115,574	47,203	66,283	88,047	449,622
Grass silage 1st Cut	63,412	25,321	66,127	29,381	38,648	50,335	273,225
Grass silage 2nd Cut	38,234	17,484	44,910	6,688	25,505	32,622	165,444
Grass silage 3rd Cut	13,344	5,464	23,800	.	11,611	9,443	63,663
Grass silage 4th Cut	836	.	3,059	.	812	.	4,707
Hay	474	.	171	.	187	853	1,685
Haylage	.	.	1,808	.	1,259	601	3,668
Rough grazing	54,169	5,990	12,098	17,077	13,016	38,051	140,400
Sown crops							
Arable silage	459	34	1,813	.	545	170	3,021
Arable silage (undersown)	211	.	276	101	105	102	795
Grass reseed	11,628	8,683	30,140	4,037	9,200	13,063	76,751
Fodder crops							
Fodder maize	184	188	850	.	118	41	1,381
Other fodder crops	50	.	636	.	390	.	1,075
All crops	**270,779**	**107,902**	**301,261**	**104,489**	**167,679**	**233,328**	**1,185,438**

Table 4a **Estimated area (spha) of grassland and fodder crops treated regionally with each pesticide type in Northern Ireland, 2017.**

	County						
Pesticide type	**Antrim**	**Armagh**	**Down**	**Fermanagh**	**Londonderry**	**Tyrone**	**Northern Ireland**
Fungicide	1,877	203	3,170	.	1,339	183	6,771
Herbicide	34,758	12,143	42,983	2,755	17,940	20,053	130,631
Insecticide	547	.	589	.	95	91	1,322
Growth regulators	20	102	966	.	403	.	1,490
Seed treatment	703	188	2,618	101	633	314	4,557
All pesticides	**37,906**	**12,635**	**50,325**	**2,856**	**20,409**	**20,641**	**144,772**

Table 4b **Estimated weight (kg) of pesticide applied to grassland and fodder crops regionally in Northern Ireland, 2017.**

	County						
Pesticide type	**Antrim**	**Armagh**	**Down**	**Fermanagh**	**Londonderry**	**Tyrone**	**Northern Ireland**
Fungicide	866	126	803	.	545	29	2,369
Herbicide	37,760	8,720	17,767	2,637	15,667	13,597	96,148
Insecticide	3	.	3	.	<1	<1	6
Growth regulators	11	10	200	.	249	.	470
Seed treatment	47	28	190	1	35	12	313
All pesticides	**38,686**	**8,884**	**18,963**	**2,638**	**16,496**	**13,638**	**99,306**

Table 5 **The total area (spha) and the basic area (ha) of grassland and fodder crops treated with each pesticide type in Northern Ireland, 2017.**

	Pesticide Type											
	Fungicides		Herbicides		Insecticides		Growth Regulators		Seed treatments		All pesticides	
Crop type	(spha)	(ha)	(spha)	(ha)	(spha)	(ha)	(spha)	(ha)	(spha)	(ha)	(spha)	(ha)
Established grassland crops												
Enclosed Grazing	.	.	38,369	34,004	.	.	.	.	.	.	38,369	34,004
Grass silage 1st Cut	.	.	46,696	43,306	.	.	.	.	.	.	46,696	43,306
Grass silage 2nd Cut	.	.	11,201	9,952	.	.	.	.	.	.	11,201	9,952
Grass silage 3rd Cut	.	.	1,874	1,874	.	.	.	.	.	.	1,874	1,874
Hay	.	.	136	136	.	.	.	.	.	.	136	136
Haylage	.	.	805	805	.	.	.	.	.	.	805	805
Rough Grazing	.	.	9,404	9,404	.	.	.	.	.	.	9,404	9,404
Sown crops												
Arable Silage	4,822	1,839	5,037	2,799	1,020	912	1,468	1,288	2,355	2,305	14,701	9,143
Arable Silage (Undersown)	641	273	518	422	101	101	23	23	661	661	1,943	1,480
Grass Reseed	1,308	529	12,344	10,779	187	187	.	.	.	.	13,839	11,496
Fodder crops												
Fodder Maize	.	.	2,860	1,349	.	.	.	.	1,190	1,190	4,050	2,539
Other fodder crops	.	.	1,387	451	14	14	.	.	351	351	1,752	815
All crops	**6,771**	**2,641**	**130,631**	**115,282**	**1,322**	**1,215**	**1,490**	**1,311**	**4,557**	**4,506**	**144,772**	**124,955**

Table 6 **The total quantities (kg) of each pesticide type applied to grassland and fodder crops in Northern Ireland, 2017.**

	Pesticide Type					
Crop type	**Fungicides**	**Herbicides**	**Insecticides**	**Growth Regulators**	**Seed treatments**	**Total quantity (kg)**
Established grassland crops						
Enclosed Grazing	.	27,890	.	.	.	27,890
Grass silage 1st Cut	.	32,934	.	.	.	32,934
Grass silage 2nd Cut	.	5,882	.	.	.	5,882
Grass silage 3rd Cut	.	1,545	.	.	.	1,545
Hay	.	205	.	.	.	205
Haylage	.	388	.	.	.	388
Rough Grazing	.	13,637	.	.	.	13,637
Sown crops						
Arable Silage	1,472	2,367	4	456	142	4,442
Arable Silage (Undersown)	263	321	1	14	6	605
Grass Reseed	634	7,452	1	.	.	8,086
Fodder crops						
Fodder Maize	.	2,735	.	.	161	2,896
Other fodder crops	.	793	.	.	3	796
All crops	**2,369**	**96,148**	**6**	**470**	**313**	**99,306**

Table 7 **The proportional area (%) of each crop treated with pesticides and the number of spray applications in Northern Ireland, 2017.**

	Pesticide type											
	Fungicide		Herbicides		Insecticides		Growth Regulators		Seed treatments		All pesticides	
Crop type	%	sp apps	%	sp apps	%	sp apps	%	sp apps	%	sp apps	%	sp apps
Established grassland crops												
Enclosed Grazing	.	.	7.6	1.1	.	.	.	.	.	.	7.6	1.1
Grass silage 1st Cut	.	.	15.8	1.1	.	.	.	.	.	.	15.8	1.1
Grass silage 2nd Cut	.	.	6.0	1.0	.	.	.	.	.	.	6.0	1.0
Grass silage 3rd Cut	.	.	2.9	1.0	.	.	.	.	.	.	2.9	1.0
Hay	.	.	8.1	1.0	.	.	.	.	.	.	8.1	1.0
Haylage	.	.	22.0	1.0	.	.	.	.	.	.	22.0	1.0
Rough Grazing	.	.	6.7	1.0	.	.	.	.	.	.	6.7	1.0
Sown crops												
Arable Silage	60.9	2.6	92.6	1.7	30.2	1.1	42.6	1.1	76.3	1.0	98.0	1.5
Arable Silage (Undersown)	34.3	1.7	53.1	1.4	12.8	1.0	2.8	1.0	83.1	1.0	89.8	1.2
Grass Reseed	0.7	2.0	14.0	1.1	0.2	1.0	.	.	.	.	14.0	1.2
Fodder crops												
Fodder Maize	.	.	97.7	2.1	.	.	.	.	86.2	1.0	97.7	1.6
Fodder Beet	.	.	94.3	3.5	.	.	.	.	56.3	1.0	94.3	2.4
Fodder Kale	.	.	24.2	1.0	.	.	.	.	.	.	24.2	1.0
Fodder Rape	.	.	.	.	.	.	.	.	78.4	1.0	78.4	1.0
Fodder Swede	.	.	72.6	1.7	13.7	1.0	.	.	45.2	1.0	72.6	1.4
All crops	**0.2**	**2.4**	**9.7**	**1.3**	**0.1**	**1.1**	**0.1**	**1.1**	**0.4**	**1.0**	**9.8**	**1.3**

Table 8 **Estimated area (spha) of grassland and fodder crops treated with pesticide formulations in Northern Ireland, 2017.**

	Crop type			
Pesticide group and active substance	**Arable silage**	**Arable silage (undersown)**	**Grass reseed**	**Total area (spha)**
Fungicides				
Azoxystrobin	118	.	.	118
Benzovindiflupyr	64	.	.	64
Bixafen/prothioconazole	139	.	.	139
Boscalid/epoxiconazole	.	41	217	258
Chlorothalonil	727	143	404	1,274
Chlorothalonil/cyproconazole	88	.	.	88
Chlorothalonil/cyproconazole/propiconazole	159	.	.	159
Chlorothalonil/penthiopyrad	338	.	.	338
Cyprodinil/isopyrazam	91	.	.	91
Epoxiconazole	442	101	187	731
Epoxiconazole/fenpropimorph/kresoxim-methyl	70	155	312	537
Epoxiconazole/fenpropimorph/metrafenone	27	23	.	50
Epoxiconazole/fluxapyroxad	166	.	.	166
Epoxiconazole/metconazole	592	23	.	615
Fenpropimorph	141	.	.	141
Fluoxastrobin/prothioconazole	223	.	.	223
Fluxapyroxad/pyraclostrobin	27	.	.	27
Proquinazid	91	.	.	91
Prothioconazole	500	.	.	500
Prothioconazole/tebuconazole	186	.	.	186
Prothioconazole/trifloxystrobin	210	101	187	499
Pyraclostrobin	421	.	.	421
Unknown fungicide	.	54	.	54
All fungicides	**4,822**	**641**	**1,308**	**6,771**

Table 8 (contd) **Estimated area (spha) of grassland and fodder crops treated with pesticide formulations in Northern Ireland, 2017.**

	Crop type														
Pesticide group and active substance	**Arable silage**	**Arable silage (undersown)**	**Grass reseed**	**Enclosed grazing**	**Fodder beet**	**Fodder kale**	**Fodder maize**	**Fodder swede**	**Hay**	**Haylage**	**Rough grazing**	**Grass silage 1st cut**	**Grass silage 2nd cut**	**Grass silage 3rd cut**	**Total area (spha)**
Herbicides															
2,4-D/dicamba	.	.	.	.	.	.	.	.	.	.	.	738	197	.	935
2,4-D/MCPA	85	.	.	205	.	.	.	.	.	.	.	682	.	.	972
2,4-DB	54	60	419	322	.	.	.	.	.	.	.	138	.	.	993
Amidosulfuron	.	.	.	985	.	.	.	.	.	.	.	.	409	.	1,394
Aminopyralid/triclopyr	88	.	2,238	6,305	.	.	.	.	.	.	.	7,201	2,881	100	18,812
Bromoxynil/terbuthylazine	.	.	.	.	.	.	569	.	.	.	.	.	.	.	569
Clopyralid/florasulam/fluroxypyr	.	54	125	.	.	.	.	.	.	.	.	.	.	.	179
Clopyralid/fluroxypyr/triclopyr	.	.	22	511	.	.	.	.	.	.	.	182	54	.	769
Clopyralid/triclopyr	.	.	.	1,044	.	.	.	.	.	.	.	165	.	.	1,209
Desmedipham/ethofumesate/phenmedipham	.	.	.	.	412	.	.	.	.	.	.	.	.	.	412
Dicamba/MCPA/mecoprop-P	.	.	95	.	.	.	.	.	.	.	.	.	562	.	657
Dicamba/mecoprop-P	54	.	.	1,510	.	.	.	.	.	.	.	5,743	.	1,749	9,056
Diflufenican	203	.	.	.	.	.	.	.	.	.	.	.	.	.	203
Diflufenican/flufenacet	315	.	.	.	.	.	.	.	.	.	.	.	.	.	315
Diflufenican/iodosulfron-methyl-sodium/mesosulfuron-methyl	648	.	.	.	.	.	.	.	.	.	.	.	.	.	648
Dimethenamid-P/pendimethalin	.	.	.	.	.	.	303	.	.	.	.	.	.	.	303
Florasulam/fluroxypyr	.	.	.	.	.	.	.	45	.	.	.	.	.	.	45
Florasulam/pyroxsulam	20	.	.	.	.	.	.	.	.	.	.	.	.	.	20
Flufenacet/isoxaflutole	.	.	.	.	.	.	69	.	.	.	.	.	.	.	69
Flufenacet/pendimethalin	101	.	.	.	.	.	.	.	.	.	.	.	.	.	101
Fluroxypyr	819	.	205	1,251	.	.	.	.	.	273	.	3,523	1,614	.	7,686
Fluroxypyr/triclopyr	.	.	3,745	12,115	.	.	.	.	.	532	.	20,459	5,483	25	42,360
Glyphosate	854	155	2,454	.	36	50	120	59	.	.	.	610	.	.	4,339
Iodosulfron-methyl-sodium	372	.	.	.	.	.	.	.	.	.	.	.	.	.	372
Lenacil	.	.	.	.	109	.	.	.	.	.	.	.	.	.	109
MCPA	112	86	2,137	12,815	.	.	.	.	136	.	9,404	7,254	.	.	31,944
Mecoprop-P	765	.	.	.	.	.	.	.	.	.	.	.	.	.	765
Mesotrione/terbuthylazine	.	.	.	.	.	.	597	.	.	.	.	.	.	.	597
Metamitron	.	.	.	.	382	.	.	.	.	.	.	.	.	.	382
Metsulfuron-methyl	158	.	.	.	.	.	.	.	.	.	.	.	.	.	158
Metsulfuron-methyl/thifensulfuron-methyl	169	.	.	.	.	.	.	.	.	.	.	.	.	.	169
Metsulfuron-methyl/tribenuron-methyl	.	.	.	197	.	.	.	.	.	.	.	.	.	.	197
Nicosulfuron	.	.	.	.	.	.	513	.	.	.	.	.	.	.	513

Table 8 (contd) **Estimated area (spha) of grassland and fodder crops treated with pesticide formulations in Northern Ireland, 2017.**

	Crop type														
Pesticide group and active substance	**Arable silage**	**Arable silage (undersown)**	**Grass reseed**	**Enclosed grazing**	**Fodder beet**	**Fodder kale**	**Fodder maize**	**Fodder swede**	**Hay**	**Haylage**	**Rough grazing**	**Grass silage 1st cut**	**Grass silage 2nd cut**	**Grass silage 3rd cut**	**Total area (spha)**
Herbicides															
Pendimethalin	30	.	.	.	.	.	689	.	.	.	.	.	.	.	718
Pinoxaden	135	.	.	.	.	.	.	.	.	.	.	.	.	.	135
Thifensulfuron-methyl/tribenuron-methyl	56	.	98	.	.	.	.	.	.	.	.	.	.	.	155
Tribenuron-methyl	.	109	805	1,110	.	.	.	.	.	.	.	.	.	.	2,024
Triflusulfuron-methyl	.	.	.	.	217	.	.	.	.	.	.	.	.	.	217
Unknown herbicide	.	54	.	.	.	48	.	28	.	.	.	.	.	.	129
All herbicides	**5,037**	**518**	**12,344**	**38,369**	**1,156**	**98**	**2,860**	**132**	**136**	**805**	**9,404**	**46,696**	**11,201**	**1,874**	**130,631**

Table 8 (contd) **Estimated area (spha) of grassland and fodder crops treated with pesticide formulations in Northern Ireland, 2017.**

Pesticide group and active substance	*Crop type* Arable silage	Arable silage (undersown)	Grass reseed	Fodder swede	Total area (spha)
Insecticides					
Deltamethrin	64	.	.	.	64
Esfenvalerate	573	101	187	.	862
Lambda-cyhalothrin	382	.	.	.	382
Unknown insecticide	.	.	.	14	14
All insecticides	**1,020**	**101**	**187**	**14**	**1,322**

Pesticide group and active substance	*Crop type* Arable silage	Arable silage (undersown)	Total area (spha)
Growth Regulators			
Chlormequat	441	23	463
Mepiquat chloride/prohexadione-calcium	188	.	188
Prohexadione-calcium/trinexapac-ethyl	74	.	74
Trinexapac-ethyl	764	.	764
All growth regulators	**1,468**	**23**	**1,490**

Table 8 (contd) **Estimated area (spha) of grassland and fodder crops treated with pesticide formulations in Northern Ireland, 2017.**

	Crop type						
Pesticide group and active substance	**Arable silage**	**Arable silage (undersown)**	**Fodder beet**	**Fodder maize**	**Fodder swede**	**Fodder rape**	**Total area (spha)**
Seed treatments							
Clothianidin/prothioconazole	1,154	.	.	.	.	.	1,154
Fludioxonil	860	433	.	.	.	.	1,293
Fluopyram/prothioconazole/tebuconazole	51	137	.	.	.	.	188
Methiocarb	.	.	.	1,190	.	.	1,190
Prochloraz/triticonazole	240	45	.	.	.	.	285
Silthiofam	51	.	.	.	.	.	51
Tefluthrin	.	.	167	.	.	.	167
Unknown seed treatment	.	45	.	.	45	139	229
All seed treatments	**2,355**	**661**	**167**	**1,190**	**45**	**139**	**4,557**

Table 9 **Estimated quantities (kg) of pesticide formulations applied to grassland and fodder crops in Northern Ireland, 2017.**

	Crop type			
Pesticide group and active substance	**Arable silage**	**Arable silage (undersown)**	**Grass reseed**	**Total quantity (kg)**
Fungicides				
Azoxystrobin	18	.	.	18
Benzovindiflupyr	4	.	.	4
Bixafen/prothioconazole	40	.	.	40
Boscalid/epoxiconazole	.	40	208	248
Chlorothalonil	527	112	242	880
Chlorothalonil/cyproconazole	73	.	.	73
Chlorothalonil/cyproconazole/propiconazole	85	.	.	85
Chlorothalonil/penthiopyrad	185	.	.	185
Cyprodinil/isopyrazam	16	.	.	16
Epoxiconazole	44	13	23	80
Epoxiconazole/fenpropimorph/kresoxim-methyl	28	51	100	179
Epoxiconazole/fenpropimorph/metrafenone	10	11	.	21
Epoxiconazole/fluxapyroxad	38	.	.	38
Epoxiconazole/metconazole	66	4	.	70
Fenpropimorph	55	.	.	55
Fluoxastrobin/prothioconazole	44	.	.	44
Fluxapyroxad/pyraclostrobin	9	.	.	9
Proquinazid	2	.	.	2
Prothioconazole	63	.	.	63
Prothioconazole/tebuconazole	45	.	.	45
Prothioconazole/trifloxystrobin	48	33	61	142
Pyraclostrobin	73	.	.	73
All fungicides	**1,472**	**263**	**634**	**2,369**

Table 9 (contd) Estimated quantities (kg) of pesticide formulations applied to grassland and fodder crops in Northern Ireland, 2017.

	Crop type														
Pesticide group and active substance	**Arable silage**	**Arable silage (undersown)**	**Grass reseed**	**Enclosed grazing**	**Fodder beet**	**Fodder kale**	**Fodder maize**	**Fodder swede**	**Hay**	**Haylage**	**Rough grazing**	**Grass silage 1st cut**	**Grass silage 2nd cut**	**Grass silage 3rd cut**	**Total quantity (kg)**
Herbicides															
2,4-D/dicamba	.	.	.	.	.	.	.	.	.	.	.	1,199	320	.	1,519
2,4-D/MCPA	146	.	.	353	.	.	.	.	.	.	.	1,648	.	.	2,147
2,4-DB	46	47	286	316	.	.	.	.	.	.	.	248	.	.	942
Amidosulfuron	.	.	.	44	.	.	.	.	.	.	.	.	18	.	63
Aminopyralid/triclopyr	47	.	925	2,954	.	.	.	.	.	.	.	3,648	1,064	42	8,680
Bromoxynil/terbuthylazine	.	.	.	.	.	.	698	.	.	.	.	.	.	.	698
Clopyralid/florasulam/fluroxypyr	.	5	11	.	.	.	.	.	.	.	.	.	.	.	16
Clopyralid/fluroxypyr/triclopyr	.	.	19	460	.	.	.	.	.	.	.	164	49	.	692
Clopyralid/triclopyr	.	.	.	361	.	.	.	.	.	.	.	61	.	.	422
Desmedipham/ethofumesate/phenmedipham	.	.	.	.	156	.	.	.	.	.	.	.	.	.	156
Dicamba/MCPA/mecoprop-P	.	.	146	.	.	.	.	.	.	.	.	.	865	.	1,011
Dicamba/mecoprop-P	46	.	.	1,291	.	.	.	.	.	.	.	4,910	.	1,496	7,743
Diflufenican	13	.	.	.	.	.	.	.	.	.	.	.	.	.	13
Diflufenican/flufenacet	94	.	.	.	.	.	.	.	.	.	.	.	.	.	94
Diflufenican/iodosulfron-methyl-sodium/mesosulfuron-methyl	39	.	.	.	.	.	.	.	.	.	.	.	.	.	39
Dimethenamid-P/pendimethalin	.	.	.	.	.	.	561	.	.	.	.	.	.	.	561
Florasulam/fluroxypyr	.	.	.	.	.	.	.	5	.	.	.	.	.	.	5
Florasulam/pyroxsulam	0	.	.	.	.	.	.	.	.	.	.	.	.	.	0
Flufenacet/isoxaflutole	.	.	.	.	.	.	32	.	.	.	.	.	.	.	32
Flufenacet/pendimethalin	146	.	.	.	.	.	.	.	.	.	.	.	.	.	146
Fluroxypyr	143	.	82	423	.	.	.	.	.	68	.	1,303	646	.	2,665
Fluroxypyr/triclopyr	.	.	1,887	4,949	.	.	.	.	.	319	.	8,608	2,921	7	18,691
Glyphosate	945	153	2,252	.	52	71	109	64	.	.	.	418	.	.	4,064
Iodosulfron-methyl-sodium	3	.	.	.	.	.	.	.	.	.	.	.	.	.	3
Lenacil	.	.	.	.	7	.	.	.	.	.	.	.	.	.	7
MCPA	8	116	1,836	16,733	.	.	.	.	205	.	13,637	10,726	.	.	43,261
Mecoprop-P	636	.	.	.	.	.	.	.	.	.	.	.	.	.	636
Mesotrione/terbuthylazine	.	.	.	.	.	.	280	.	.	.	.	.	.	.	280
Metamitron	.	.	.	.	436	.	.	.	.	.	.	.	.	.	436
Metsulfuron-methyl	1	.	.	.	.	.	.	.	.	.	.	.	.	.	1
Metsulfuron-methyl/thifensulfuron-methyl	9	.	.	.	.	.	.	.	.	.	.	.	.	.	9
Metsulfuron-methyl/tribenuron-methyl	.	.	.	2	.	.	.	.	.	.	.	.	.	.	2
Nicosulfuron	.	.	.	.	.	.	18	.	.	.	.	.	.	.	18

Table 9 (contd) **Estimated quantities (kg) of pesticide formulations applied to grassland and fodder crops in Northern Ireland, 2017.**

	Crop type														
Pesticide group and active substance	**Arable silage**	**Arable silage (undersown)**	**Grass reseed**	**Enclosed grazing**	**Fodder beet**	**Fodder kale**	**Fodder maize**	**Fodder swede**	**Hay**	**Haylage**	**Rough grazing**	**Grass silage 1st cut**	**Grass silage 2nd cut**	**Grass silage 3rd cut**	**Total quantity (kg)**
Herbicides															
Pendimethalin	39	.	.	.	.	.	1,036	.	.	.	.	.	.	.	1,076
Pinoxaden	4	.	.	.	.	.	.	.	.	.	.	.	.	.	4
Thifensulfuron-methyl/tribenuron-methyl	2	.	3	.	.	.	.	.	.	.	.	.	.	.	5
Tribenuron-methyl	.	1	4	5	.	.	.	.	.	.	.	.	.	.	10
Triflusulfuron-methyl	.	.	.	.	2	.	.	.	.	.	.	.	.	.	2
All herbicides	**2,367**	**321**	**7,452**	**27,890**	**653**	**71**	**2,735**	**69**	**205**	**388**	**13,637**	**32,934**	**5,882**	**1,545**	**96,148**

Table 9 (contd) **Estimated quantities (kg) of pesticide formulations applied to grassland and fodder crops in Northern Ireland, 2017.**

	Crop type			
Pesticide group and active substance	**Arable silage**	**Arable silage (undersown)**	**Grass reseed**	**Total quantity (kg)**
Insecticides				
Deltamethrin	<1	.	.	<1
Esfenvalerate	2	1	1	4
Lambda-cyhalothrin	2	.	.	2
All insecticides	**4**	**1**	**1**	**6**

	Crop type		
Pesticide group and active substance	**Arable silage**	**Arable silage (undersown)**	**Total quantity (kg)**
Growth Regulators			
Chlormequat	322	14	336
Mepiquat chloride/prohexadione-calcium	82	.	82
Prohexadione-calcium/trinexapac-ethyl	3	.	3
Trinexapac-ethyl	49	.	49
All growth regulators	**456**	**14**	**470**

Table 9 (contd) **Estimated quantities (kg) of pesticide formulations applied to grassland and fodder crops in Northern Ireland, 2017.**

	Crop type						
Pesticide group and active substance	**Arable silage**	**Arable silage (undersown)**	**Fodder beet**	**Fodder maize**	**Fodder swede**	**Fodder rape**	**Total quantity (kg)**
Seed treatments							
Clothianidin/prothioconazole	125	.	.	.	.	.	125
Fludioxonil	7	3	.	.	.	.	10
Fluopyram/prothioconazole/tebuconazole	1	2	.	.	.	.	3
Methiocarb	.	.	.	161	1,190	.	161
Prochloraz/triticonazole	7	1	.	.	.	.	8
Silthiofam	2	.	.	.	.	.	2
Tefluthrin	.	.	3	.	.	.	3
Unknown seed treatment	.	N/K*	.	.	N/K*	N/K*	N/K*
All seed treatments	**142**	**6**	**3**	**161**	**1,190**	**N/K***	**313**

***N/K refers to those treatments where either the area of application or the quantity used could not be established**

Table 10 **The fifty active ingredients most extensively used on grassland and fodder crops in Northern Ireland, 2017 ranked by treated area (spha).**

No.	Active substance	Treated area (spha)
1	Triclopyr	63,151
2	Fluroxypyr	51,039
3	MCPA	33,573
4	Aminopyralid	18,812
5	Dicamba	10,649
6	Mecoprop-P	10,478
7	Glyphosate	4,339
8	Tribenuron-methyl	2,375
9	Epoxiconazole	2,356
10	Clopyralid	2,157
11	2,4-D	1,907
12	Chlorothalonil	1,859
13	Prothioconazole	1,548
14	Amidosulfuron	1,394
15	Diflufenican	1,166
16	Terbuthylazine	1,165
17	Pendimethalin	1,123
18	Iodosulfron-methyl-sodium	1,020
19	2,4-DB	993
20	Esfenvalerate	862
21	Trinexapac-ethyl	839
22	Fenpropimorph	728
23	Mesosulfuron-methyl	648
24	Metconazole	615
25	Mesotrione	597
26	Bromoxynil	569
27	Kresoxim-methyl	537
28	Metsulfuron-methyl	524
29	Nicosulfuron	513
30	Trifloxystrobin	499
31	Flufenacet	485
32	Chlormequat	463
33	Pyraclostrobin	448
34	Desmedipham	412
35	Phenmedipham	412
36	Ethofumesate	412
37	Metamitron	382
38	Lambda-cyhalothrin	382
39	Penthiopyrad	338
40	Thifensulfuron-methyl	324
41	Dimethenamid-P	303
42	Prohexadione-calcium	262
43	Boscalid	258
44	Cyproconazole	247
45	Florasulam	244
46	Fluoxastrobin	223
47	Triflusulfuron-methyl	217
48	Fluxapyroxad	193
49	Mepiquat chloride	188
50	Tebuconazole	186

Table 11 **The fifty active ingredients most extensively used on grassland and fodder crops in Northern Ireland, 2017 ranked by weight (kg).**

No.	Active substance	Quantity applied (kg)
1	MCPA	45,139
2	Triclopyr	17,626
3	Fluroxypyr	12,255
4	Mecoprop-P	7,570
5	Glyphosate	4,064
6	2,4-D	2,200
7	Pendimethalin	1,501
8	Dicamba	1,408
9	Chlorothalonil	1,144
10	Aminopyralid	964
11	2,4-DB	942
12	Terbuthylazine	650
13	Metamitron	436
14	Epoxiconazole	393
15	Chlormequat	336
16	Clopyralid	325
17	Bromoxynil	279
18	Dimethenamid-P	258
19	Prothioconazole	236
20	Methiocarb	161
21	Fenpropimorph	135
22	Flufenacet	126
23	Clothianidin	104
24	Ethofumesate	87
25	Pyraclostrobin	79
26	Mepiquat chloride	70
27	Diflufenican	64
28	Trifloxystrobin	63
29	Amidosulfuron	63
30	Phenmedipham	57
31	Kresoxim-methyl	56
32	Boscalid	54
33	Penthiopyrad	53
34	Trinexapac-ethyl	51
35	Mesotrione	49
36	Metconazole	29
37	Tebuconazole	24
38	Fluoxastrobin	22
39	Fluxapyroxad	21
40	Azoxystrobin	18
41	Nicosulfuron	18
42	Cyproconazole	16
43	Prohexadione-calcium	13
44	Tribenuron-methyl	12
45	Bixafen	12
46	Thifensulfuron-methyl	12
47	Desmedipham	11
48	Cyprodinil	11
49	Propiconazole	11
50	Fludioxonil	10

Table 12 **Enclosed grazing: pesticide-treated area (spha), basic treated area (ha), quantity applied (kg) and growers 'stated' reasons for use.**

	Reasons for treatment													
Pesticide group and active substance	**Buttercup**	**Chickweed**	**Docks**	**Docks and chickweed**	**Docks and nettles**	**Docks and thistles**	**General weed control**	**Nettles**	**Rushes**	**Rushes and thistles**	**Thistles**	**Total treated area (spha)**	**Basic treated area (ha)**	**Quantity applied (kg)**
Herbicides														
2,4-D/MCPA	.	.	.	.	.	.	.	.	205	.	.	205	205	353
2,4-DB	.	.	197	.	.	.	125	.	.	.	.	322	322	316
Amidosulfuron	.	.	985	.	.	.	.	.	.	.	.	985	985	44
Aminopyralid/triclopyr	75	.	3,953	1,125	466	47	94	.	546	.	.	6,305	6,305	2,954
Clopyralid/fluroxypyr/triclopyr	.	.	108	.	.	108	295	.	.	.	.	511	511	460
Clopyralid/triclopyr	.	.	215	.	.	30	.	169	.	.	631	1,044	732	361
Dicamba/mecoprop-P	.	.	648	862	.	.	.	.	.	.	.	1,510	1,510	1,291
Fluroxypyr	.	.	312	203	.	.	244	.	492	.	.	1,251	1,251	423
Fluroxypyr/triclopyr	.	.	11,384	684	.	47	.	.	.	.	.	12,115	11,148	4,949
MCPA	244	79	75	.	.	682	.	.	8,998	1,981	755	12,815	12,815	16,733
Metsulfuron-methyl/tribenuron-methyl	.	.	197	.	.	.	.	.	.	.	.	197	197	2
Tribenuron-methyl	.	985	.	.	.	.	125	.	.	.	.	1,110	1,110	5
All herbicides	**318**	**1,063**	**18,073**	**2,874**	**466**	**914**	**883**	**169**	**10,241**	**1,981**	**1,386**	**38,369**	**.**	**27,890**

Table 13 **Grass silage 1st cut: pesticide-treated area (spha), basic treated area (ha), quantity applied (kg) and growers 'stated' reasons for use.**

	Reasons for treatment															
Pesticide group and active substance	**Burnoff**	**Buttercup**	**Chickweed**	**Dandelion**	**Docks**	**Docks and chickweed**	**Docks and thistles**	**General weed control**	**Ground preparation**	**Nettles**	**Ragwort**	**Rushes**	**Thistles**	**Total treated area (spha)**	**Basic treated area (ha)**	**Quantity applied (kg)**
Herbicides																
2,4-D/dicamba	.	.	.	.	148	591	.	.	.	.	.	.	.	738	738	1,199
2,4-D/MCPA	.	.	.	682	.	.	.	.	.	.	.	.	.	682	682	1,648
2,4-DB	.	.	.	.	138	.	.	.	.	.	.	.	.	138	138	248
Aminopyralid/triclopyr	.	.	2,374	.	2,817	805	.	614	.	.	591	.	.	7,201	7,201	3,648
Clopyralid/fluroxypyr/triclopyr	.	.	.	.	54	.	.	.	.	128	.	.	.	182	182	164
Clopyralid/triclopyr	.	.	.	.	.	.	.	.	.	128	.	.	37	165	165	61
Dicamba/mecoprop-P	.	.	3,993	.	.	1,749	.	.	.	.	.	.	.	5,743	5,743	4,910
Fluroxypyr	.	.	.	.	2,291	988	.	244	.	.	.	.	.	3,523	3,523	1,303
Fluroxypyr/triclopyr	.	.	.	.	18,353	2,106	.	.	.	.	.	.	.	20,459	18,897	8,608
Glyphosate	98	.	.	.	.	.	.	.	512	.	.	.	.	610	610	418
MCPA	.	244	433	.	682	.	1,706	.	.	127	.	4,062	.	7,254	7,254	10,726
All herbicides	**98**	**244**	**6,801**	**682**	**24,483**	**6,239**	**1,706**	**858**	**512**	**383**	**591**	**4,062**	**37**	**46,696**	**.**	**32,934**

Table 14 Grass silage 2nd cut: pesticide-treated area (spha), basic treated area (ha), quantity applied (kg) and growers 'stated' reasons for use.

	Reasons for treatment						
Pesticide group and active substance	**Chickweed**	**Docks**	**Docks and chickweed**	**Docks and thistles**	**Total treated area (spha)**	**Basic treated area (ha)**	**Quantity applied (kg)**
Herbicides							
2,4-D/dicamba	.	.	197	.	197	197	320
Amidosulfuron	.	409	.	.	409	409	18
Aminopyralid/triclopyr	.	2,881	.	.	2,881	2,881	1,064
Clopyralid/fluroxypyr/triclopyr	.	54	.	.	54	54	49
Dicamba/MCPA/mecoprop-P	.	.	.	562	562	562	865
Fluroxypyr	365	1,250	.	.	1,614	1,614	646
Fluroxypyr/triclopyr	.	5,424	59	.	5,483	5,483	2,921
All herbicides	**365**	**10,018**	**256**	**562**	**11,201**	**.**	**5,882**

Table 15 Grass silage 3rd cut: pesticide-treated area (spha), basic treated area (ha), quantity applied (kg) and growers 'stated' reasons for use.

	Reasons for treatment				
Pesticide group and active substance	**Docks**	**Docks and chickweed**	**Total treated area (spha)**	**Basic treated area (ha)**	**Quantity applied (kg)**
Herbicides					
Aminopyralid/triclopyr	100	.	100	100	42
Dicamba/mecoprop-P	.	1,749	1,749	1,749	1,496
Fluroxypyr/triclopyr	25	.	25	25	7
All herbicides	**125**	**1,749**	**1,874**	**.**	**1,545**

Table 16 Hay and haylage: pesticide-treated area (spha), basic treated area (ha), quantity applied (kg) and growers 'stated' reasons for use.

	Reasons for treatment				
Pesticide group and active substance	**Docks**	**Rushes**	**Total treated area (spha)**	**Basic treated area (ha)**	**Quantity applied (kg)**
Herbicides					
Fluroxypyr	273	.	273	273	68
Fluroxypyr/triclopyr	532	.	532	532	319
MCPA	.	136	136	136	205
All herbicides	**805**	136	**942**	**.**	**592**

Table 17 Rough grazing: pesticide-treated area (spha), basic treated area (ha), quantity applied (kg) and growers 'stated' reasons for use.

	Reasons for treatment			
Pesticide group and active substance	**Rushes**	**Total treated area (spha)**	**Basic treated area (ha)**	**Quantity applied (kg)**
Herbicides				
MCPA	9,404	9,404	9,404	13,637
All herbicides	**9,404**	**9,404**	**.**	**13,637**

Table 18 **Arable silage: pesticide-treated area (spha), basic treated area (ha), quantity applied (kg) and growers 'stated' reasons for use.**

	Reasons for treatment					
Pesticide group and active substance	**General fungal control**	**Mildew**	**Septoria**	**Total treated area (spha)**	**Basic treated area (ha)**	**Quantity applied (kg)**
Fungicides						
Azoxystrobin	118	.	.	118	118	18
Benzovindiflupyr	.	64	.	64	64	4
Bixafen/prothioconazole	139	.	.	139	139	40
Chlorothalonil	727	.	.	727	558	527
Chlorothalonil/cyproconazole	88	.	.	88	88	73
Chlorothalonil/cyproconazole/propiconazole	95	64	.	159	159	85
Chlorothalonil/penthiopyrad	338	.	.	338	209	185
Cyprodinil/isopyrazam	91	.	.	91	91	16
Epoxiconazole	442	.	.	442	351	44
Epoxiconazole/fenpropimorph/kresoxim-methyl	70	.	.	70	70	28
Epoxiconazole/fenpropimorph/metrafenone	27	.	.	27	27	10
Epoxiconazole/fluxapyroxad	102	.	64	166	98	38
Epoxiconazole/metconazole	592	.	.	592	381	66
Fenpropimorph	141	.	.	141	141	55
Fluoxastrobin/prothioconazole	223	.	.	223	112	44
Fluxapyroxad/pyraclostrobin	27	.	.	27	27	9
Proquinazid	91	.	.	91	91	2
Prothioconazole	500	.	.	500	500	63
Prothioconazole/tebuconazole	186	.	.	186	186	45
Prothioconazole/trifloxystrobin	210	.	.	210	210	48
Pyraclostrobin	421	.	.	421	303	73
All fungicides	**4,629**	**129**	**64**	**4,822**	**.**	**1,472**

Table 18 (contd) **Arable silage: pesticide-treated area (spha), basic treated area (ha), quantity applied (kg) and growers 'stated' reasons for use.**

	Reasons for treatment									
Pesticide group and active substance	**Burnoff**	**Chickweed**	**Dessication**	**General weed control**	**Ground preparation**	**Redshank and chickweed**	**Stubble treatment**	**Total treated area (spha)**	**Basic treated area (ha)**	**Quantity applied (kg)**
Herbicides										
2,4-D/MCPA	.	.	.	.	.	85	.	85	85	146
2,4-DB	.	.	.	54	.	.	.	54	54	46
Aminopyralid/triclopyr	.	.	.	88	.	.	.	88	88	47
Dicamba/mecoprop-P	.	.	.	54	.	.	.	54	54	46
Diflufenican	.	.	.	203	.	.	.	203	203	13
Diflufenican/flufenacet	.	.	.	315	.	.	.	315	315	94
Diflufenican/iodosulfron-methyl-sodium/mesosulfuron-methyl	.	101	.	546	.	.	.	648	580	39
Florasulam/pyroxsulam	.	.	.	20	.	.	.	20	20	0
Flufenacet/pendimethalin	.	101	.	.	.	.	.	101	101	146
Fluroxypyr	.	.	.	724	.	95	.	819	819	143
Glyphosate	54	.	27	38	591	.	144	854	854	945
Iodosulfron-methyl-sodium	.	.	.	372	.	.	.	372	372	3
MCPA	.	.	.	112	.	.	.	112	112	8
Mecoprop-P	.	203	.	562	.	.	.	765	765	636
Metsulfuron-methyl	.	.	.	158	.	.	.	158	158	1
Metsulfuron-methyl/thifensulfuron-methyl	.	.	.	169	.	.	.	169	169	9
Pendimethalin	.	.	.	30	.	.	.	30	30	39
Pinoxaden	.	.	.	135	.	.	.	135	135	4
Thifensulfuron-methyl/tribenuron-methyl	.	.	.	56	.	.	.	56	56	2
All herbicides	**54**	**406**	**27**	**3,635**	**591**	**179**	**144**	**5,037**	**.**	**2,367**

Table 18 (contd) **Arable silage: pesticide-treated area (spha), basic treated area (ha), quantity applied (kg) and growers 'stated' reasons for use.**

	Reasons for treatment						
Pesticide group and active substance	**Aphids**	**General insect control**	**Growth regulation**	**Seed treatment**	**Total treated area (spha)**	**Basic treated area (ha)**	**Quantity applied (kg)**
Insecticides							
Deltamethrin	64	.	.	.	64	64	<1
Esfenvalerate	573	.	.	.	573	530	2
Lambda-cyhalothrin	.	382	.	.	382	382	2
All insecticides	**638**	**382**	**.**	**.**	**1,020**	**.**	**4**
Growth Regulators							
Chlormequat	.	.	441	.	441	441	322
Mepiquat chloride/prohexadione-calcium	.	.	188	.	188	188	82
Prohexadione-calcium/trinexapac-ethyl	.	.	74	.	74	74	3
Trinexapac-ethyl	.	.	764	.	764	697	49
All growth regulators	**.**	**.**	**1,468**	**.**	**1,468**	**.**	**456**
Seed treatments							
Clothianidin/prothioconazole	.	.	.	1,154	1,154	1,154	125
Fludioxonil	.	.	.	860	860	860	7
Fluopyram/prothioconazole/tebuconazole	.	.	.	51	51	51	1
Prochloraz/triticonazole	.	.	.	240	240	240	7
Silthiofam	.	.	.	51	51	51	2
All seed treatments	**.**	**.**	**.**	**2,355**	**2,355**	**.**	**142**

Table 19 **Arable silage (undersown): pesticide-treated area (spha), basic treated area (ha), quantity applied (kg) and growers 'stated' reasons for use.**

	Reasons for treatment							
Pesticide group and active substance	**General fungal control**	**Burnoff**	**Chickweed**	**General weed control**	**Ground preparation**	**Total treated area (spha)**	**Basic treated area (ha)**	**Quantity applied (kg)**
Fungicides								
Boscalid/epoxiconazole	41	.	.	.	.	41	41	40
Chlorothalonil	143	.	.	.	.	143	143	112
Epoxiconazole	101	.	.	.	.	101	101	13
Epoxiconazole/fenpropimorph/kresoxim-methyl	155	.	.	.	.	155	155	51
Epoxiconazole/fenpropimorph/metrafenone	23	.	.	.	.	23	23	11
Epoxiconazole/metconazole	23	.	.	.	.	23	23	4
Prothioconazole/trifloxystrobin	101	.	.	.	.	101	101	33
Unknown fungicide	54	.	.	.	.	54	54	.
All fungicides	**641**	**.**	**.**	**.**	**.**	**641**	**.**	**263**
Herbicides								
2,4-DB	.	.	.	60	.	60	60	47
Clopyralid/florasulam/fluroxypyr	.	.	.	54	.	54	54	5
Glyphosate	.	38	.	.	118	155	155	153
MCPA	.	.	.	86	.	86	86	116
Tribenuron-methyl	.	.	68	41	.	109	109	1
Unknown herbicide	.	.	.	54	.	54	54	.
All herbicides	**.**	**38**	**68**	**295**	**118**	**518**	**.**	**321**

Table 19 (contd) **Arable silage (undersown): pesticide-treated area (spha), basic treated area (ha), quantity applied (kg) and growers 'stated' reasons for use.**

	Reasons for treatment					
Pesticide group and active substance	**Growth regulation**	**Aphids**	**Seed treatment**	**Total treated area (spha)**	**Basic treated area (ha)**	**Quantity applied (kg)**
Insecticides						
Esfenvalerate	.	101	.	101	101	1
All insecticides	**.**	**101**	**.**	**101**	**.**	**1**
Growth Regulators						
Chlormequat	23	.	.	23	23	14
All growth regulators	**23**	**.**	**.**	**23**	**.**	**14**
Seed treatments						
Fludioxonil	.	.	433	433	433	3
Fluopyram/prothioconazole/tebuconazole	.	.	137	137	137	2
Prochloraz/triticonazole	.	.	45	45	45	1
Unknown seed treatment	.	.	45	45	45	.
All seed treatments	**.**	**.**	**661**	**661**	**.**	**6**

Table 20 Grass reseed: pesticide-treated area (spha), basic treated area (ha), quantity applied (kg and growers 'stated' reasons for use.

	Reasons for treatment												
Pesticide group and active substance	**General fungal control**	**Burnoff**	**Chickweed**	**Docks**	**Docks and chickweed**	**Docks and thistles**	**General weed control**	**Ground preparation**	**Rushes**	**Aphids**	**Total treated area (spha)**	**Basic treated area (ha)**	**Quantity applied (kg)**
Fungicides													
Boscalid/epoxiconazole	217	.	.	.	.	.	.	.	.	.	217	217	208
Chlorothalonil	404	.	.	.	.	.	.	.	.	.	404	404	242
Epoxiconazole	187	.	.	.	.	.	.	.	.	.	187	187	23
Epoxiconazole/fenpropimorph/kresoxim-methyl	312	.	.	.	.	.	.	.	.	.	312	312	100
Prothioconazole/trifloxystrobin	187	.	.	.	.	.	.	.	.	.	187	187	61
All fungicides	**1,308**	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**1,308**	**.**	**634**
Herbicides													
2,4-DB	.	.	.	.	.	.	419	.	.	.	419	419	286
Aminopyralid/triclopyr	.	.	.	1,559	679	.	.	.	.	.	2,238	2,238	925
Clopyralid/florasulam/fluroxypyr	.	.	.	.	.	.	125	.	.	.	125	125	11
Clopyralid/fluroxypyr/triclopyr	.	.	.	.	.	22	.	.	.	.	22	22	19
Dicamba/MCPA/mecoprop-P	.	.	.	.	.	95	.	.	.	.	95	95	146
Fluroxypyr	.	.	205	.	.	.	.	.	.	.	205	205	82
Fluroxypyr/triclopyr	.	.	.	3,063	683	.	.	.	.	.	3,745	3,288	1,887
Glyphosate	.	276	.	.	.	.	.	2,178	.	.	2,454	2,454	2,252
MCPA	.	.	.	.	.	.	388	.	1,749	.	2,137	2,137	1,836
Thifensulfuron-methyl/tribenuron-methyl	.	.	.	.	.	.	98	.	.	.	98	98	3
Tribenuron-methyl	.	.	484	.	.	.	321	.	.	.	805	805	4
All herbicides	**.**	**276**	**689**	**4,622**	**1,362**	**117**	**1,352**	**2,178**	**1,749**	**.**	**12,344**	**.**	**7,452**
Insecticides													
Esfenvalerate	.	.	.	.	.	.	.	.	.	187	187	187	1
All insecticides	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**187**	**187**	**.**	**1**

Table 21 **Fodder maize: pesticide-treated area (spha), basic treated area (ha), quantity applied (kg) and growers 'stated' reasons for use.**

	Reasons for treatment							
Pesticide group and active substance	**General weed control**	**Ground preparation**	**Pre-emergence weed control**	**Scutch grass**	**Seed treatment**	**Total treated area (spha)**	**Basic treated area (ha)**	**Quantity applied (kg)**
Herbicides								
Bromoxynil/terbuthylazine	41	.	527	.	.	569	569	698
Dimethenamid-P/pendimethalin	.	.	303	.	.	303	303	561
Flufenacet/isoxaflutole	.	.	69	.	.	69	69	32
Glyphosate	.	120	.	.	.	120	120	109
Mesotrione/terbuthylazine	500	.	97	.	.	597	597	280
Nicosulfuron	388	.	98	28	.	513	513	18
Pendimethalin	41	.	647	.	.	689	689	1,036
All herbicides	**971**	**120**	**1,741**	**28**	**.**	**2,860**	**.**	**2,735**
Seed treatments								
Methiocarb	.	.	.	.	1,190	1,190	1,190	161
All seed treatments	**.**	**.**	**.**	**.**	**1,190**	**1,190**	**.**	**161**

Table 22 **Other fodder crops: pesticide-treated area (spha), basic treated area (ha), quantity applied (kg) and growers 'stated' reasons for use.**

	Reasons for treatment								
Pesticide group and active substance	**General insect control**	**General weed control**	**Ground preparation**	**Pre-emergence weed control**	**Sealer**	**Seed treatment**	**Total treated area (spha)**	**Basic treated area (ha)**	**Quantity applied (kg)**
Herbicides									
Desmedipham/ethofumesate/phenmedipham	.	412	.	.	.	.	412	280	156
Florasulam/fluroxypyr	.	.	.	45	.	.	45	45	5
Glyphosate	.	36	110	.	.	.	146	146	187
Lenacil	.	109	.	.	.	.	109	36	7
Metamitron	.	382	.	.	.	.	382	250	436
Triflusulfuron-methyl	.	109	.	108	.	.	217	144	2
Unknown herbicide	.	.	.	48	28	.	75	62	N/K
All herbicides	**.**	**1,049**	**110**	**201**	**28**	**.**	**1,387**	**.**	**793**
Insecticides									
Unknown insecticide	14	.	.	.	.	.	14	14	N/K
All seed treatments	**14**	**.**	**.**	**.**	**.**	**.**	**14**	**.**	**N/K**
Seed treatments									
Tefluthrin	.	.	.	.	.	167	167	167	3
Unknown seed treatment	.	.	.	.	.	184	184	184	N/K
All seed treatments	**.**	**.**	**.**	**.**	**.**	**351**	**351**	**.**	**3**

Table 23 **Comparison of the area (ha) of grassland and fodder crops grown in Northern Ireland, 1989-2017.**

	Survey year							
Crop type	1989 Area grown (ha)	1993 Area grown (ha)	1997 Area grown (ha)	2003 Area grown (ha)	2005 Area grown (ha)	2009 Area grown (ha)	2013 Area grown (ha)	2017 Area grown (ha)
Established grassland crops								
Enclosed grazing	481,059	476,209	512,819	537,735	517,045	484,223	427,889	449,622
Grass silage	243,149	252,502	422,650	430,542	409,704	487,520	646,533	507,039
Hay	66,001	33,017	32,303	11,997	16,744	9,861	20,079	5,353
Rough grazing	212,930	173,239	165,005	162,330	148,586	141,926	181,633	140,400
All established grassland crops	**1,003,139**	**934,967**	**1,132,777**	**1,142,603**	**1,092,079**	**1,123,530**	**1,276,133**	**1,102,414**
Sown crops								
Arable silage	3,762	.	766	8,720	2,667	1,638	2,334	3,021
Arable silage (undersown)	.	2,073	3,308	6,512	2,683	1,937	1,929	795
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	76,751
All sown crops	**45,409**	**13,360**	**19,830**	**46,600**	**25,197**	**17,376**	**23,910**	**80,567**
Fodder crops								
Fodder beet	.	.	70	.	85	.	.	296
Fodder kale	.	72	45	335	17	.	.	406
Fodder kale (undersown)	.	.	58	.	.	.	.	.
Fodder maize	.	.	10	1,463	2,423	3,455	1,918	1,381
Fodder rape	.	.	99	157	192	.	.	177
Fodder turnip	371	.	250	464	375	.	.	96
All fodder (excluding maize)	371	72	522	956	669	1,024	769	975
All fodder crops	**371**	**72**	**532**	**2,419**	**3,092**	**4,480**	**2,687**	**2,356**
All crops	**1,048,919**	**948,400**	**1,153,138**	**1,191,622**	**1,120,368**	**1,145,386**	**1,302,730**	**1,185,337**

Table 24 **Comparison of pesticide usage on grassland and fodder crops in Northern Ireland, 1989-2017, area treated (spha) and weight applied (t).**

	Survey year															
	1989		1993		1997		2003		2005		2009		2013		2017	
Crop type	Area (spha)	Weight (t)	Area (spha)	Weight (t)	Area (spha)	Weight (t)	Area (spha)	Weight (t)	Area (spha)	Weight (t)	Area (spha)	Weight (t)	Area (spha)	Weight (t)	Area (spha)	Weight (t)
Established grassland crops																
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	38,369	27.89
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	59,771	40.36
Hay	2,673	2.82	490	0.57	843	1.34	238	0.23	260	0.34	.	.	701	0.78	942	0.59
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	9,404	13.64
All established grassland crops	**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**	**108,486**	**82.48**
Sown crops																
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	14,701	4.44
Arable silage (undersown)	.	.	3,632	0.38	2,830	0.15	9,186	2.40	4301.4	1.86	5,192	2.84	5,459	2.87	1,943	0.60
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	13,839	8.09
All sown crops	**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**	**30,484**	**13.13**
Fodder crops																
Fodder beet	.	.	.	.	227	0.09	.	.	170	0.61	.	.	.	.	1,323	0.66
Fodder kale	.	.	98	0.02	105	0.21	670	0.78	.		.	.	.	.	98	0.07
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	4,050	2.90
Fodder rape	.	.	.	.	164	0.25	157	0.00	59	0.00	.	.	.	.	139	N/K
Fodder swede	.	.	.	.	.	.	.	.	.	.	.	.	.	.	191	0.07
Fodder turnip	621	0.33	.	.	651	0.35	.	.	.		.	.	.	.	.	.
All fodder (excluding maize)	621	0.33	98	0.02	1,350	1.15	827	0.78	229	0.61	2,952	2.29	513	0.52	1,752	0.80
All fodder crops	**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**	**5,802**	**3.69**
All crops	**109,875**	**122.47**	**91,529**	**134.87**	**119,978**	**169.55**	**178,149**	**102.61**	**128,786**	**85.85**	**101,999**	**75.24**	**123,354**	**86.95**	**144,772**	**99.31**

Table 25 **Comparison of pesticide usage on grassland and fodder crops in Northern Ireland, 1989-2017, area treated (spha), weight applied (kg) and the area grown (ha).**

	Survey year															
	1989		1993		1997		2003		2005		2009		2013		2017	
Pesticide type	Area (spha)	Weight (kg)	Area (spha)	Weight (kg)	Area (spha)	Weight (kg)	Area (spha)	Weight (kg)	Area (spha)	Weight (kg)	Area (spha)	Weight (kg)	Area (spha)	Weight (kg)	Area (spha)	Weight (kg)
Fungicides	251	235	180	59	421	161	7,933	2,417	1,776	502	4,737	1,106	4,471	1,704	6,771	2,369
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	130,631	96,148
Insecticides																
Carbamates	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Organochlorines	.	.	.	.	8	4	.	.	.	.	.	.	.	.	.	.
Organophosphates	91	51	.	.	.	.	415	379	1,268	647	298	159	14,399	10,369	.	.
Pyrethroids	258	4	.	.	.	.	558	14	960	21	2,623	16	912	6	1,322	6
Unknown insecticides	.	.	.	.	.	.	.	.	269	.	.	.	.	.	.	.
All insecticides	349	55	.	.	8	4	974	393	2,498	667	2,922	176	15,311	10,375	1,322	6
Growth regulators	.	.	.	.	176	42	1,870	1,369	486	159	1,973	715	1,742	793	1,490	470
Seed treatments	35,635	1,624	6,199	129	10,121	793	17,741	458	5,527	304	12,193	730	5,631	370	4,557	313
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	144,772	99,306
Area grown (ha)	1,048,919		948,400		1,153,138		1,191,622		1,120,368		1,145,386		1,302,730		1,185,438	

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Northern Ireland Pesticide Usage Survey Published Reports Appendix 1

Report No.	Report title	ISBN
99	Grassland & Fodder Crops 1989	1-855 27 079 X
105	Arable Crops 1990	1-855 27 130 3
106	Soft Fruit Crops 1990	1-855 27 149 4
109	Vegetable Crops 1991	1-855 27 137 0
110	Protected Crops 1991 (edible & ornamental)	1-855 27 283 0
111	Mushroom Crops 1991	1-855 27 150 8
117	Arable Crops 1992	1-855 27 193 1
118	Top Fruit Crops 1992	1-855 27 194 X
124	Grassland & Fodder crops 1993	1-855 27 221 0
131	Forestry 1993	1-855 27 282 2
132	Arable Crops 1994	1-855 27 314 4
139	Vegetable Crops 1995	1-855 27 346 2
140	Mushroom Crops 1995	1-855 27 347 0
146	Arable Crops 1996	1-855 27 469 8
147	Top fruit 1996	1-855 27 470 1
156	Grassland & Fodder Crops 1997	1-855 27 506 6
157	Sheep Treatments 1997	1-855 27 425 6
167	Soft Fruit 1998	1-855 27 540 6
168	Arable Crops 1998	1-855 27 536 8
169	Vegetable Crops 1999	1-855 27 561 9
170	Mushroom Crops 1999	1-855 27 549 X
177	Arable Crops 2000	1-855 27 670 4
178	Top Fruit Crops 2002	1-855 27 618 6
194	Arable Crops 2002	1-855 27 674 7
198	Grassland & Fodder Crops 2003	1-855 27 797 2
199	Hardy Nursery Stock Crops 2003	1-855 27 789 1
201	Protected Ornamental Crops 2003	1-855 27 739 5
206	Arable Crops 2004	1-855 27 833 2
207	Vegetable crops 2004	1-855 27 869 3
208	Grassland & Fodder Crops 2005	1-855 27 998 8
209	Sheep Treatments 2005	1-855 27 999 5

Northern Ireland Pesticide Usage Survey Published Reports Appendix 1 (cont.)

Report No.	Report title	ISBN
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
258	Grassland & Fodder Crops 2013	1-84807-485-9
259	Vegetable Crops 2013	1-84807-486-6
260	Arable Crops 2014	1-84807-552-8
261	Top Fruit Crops 2014	1-84807-553-5
262	Soft Fruit Crops 2014	1-84807-571-9
267	Edible Protected Crops 2015	1-84807-684-6
268	Outdoor Vegetable Crops 2015	1-84807-685-3
275	Arable Crops 2016	1-84807-808-6
276	Soft Fruit Crops 2016	1-84807-809-3
277	Top Fruit Crops 2016	1-84807-810-9

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