PESTICIDE USAGE SURVEY REPORT 263

ARABLE CROPS
IN THE
UNITED KINGDOM
2014

D. Garthwaite, I. Barker, R. Laybourn, A. Huntly, G. P. Parrish, S. Hudson & H. Thygesen

Land Use & Sustainability Team
Fera
Sand Hutton
York
YO41 1LZ

A NATIONAL STATISTICS SURVEY

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• meet identified user needs;
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• are produced according to sound methods; and
• are managed impartially and objectively in the public interest.

Once statistics have been designated as National Statistics it is a statutory requirement that the Code of Practice shall continue to be observed.
If you have any enquiries or feedback on the statistics included in this report they can be directed to the contact given below:

Pesticide Usage Survey Team – e-mail: PUS@fera.co.uk Telephone: 01904 462694

Alternatively please contact: Fera at: science@fera.co.uk

DATA USES

The data are used for a number of purposes including:

- Informing the pesticide risk assessment (authorisation) process;
- Policy, including assessing the economic and/or environmental implications of the introduction of new active substances and the withdrawal/non-authorisation of pesticide products (the data reported to organisations such as the OECD and EU enabling the UK to honour international agreements); evaluating changes in growing methods and Integrated Pest Management where this has an impact on pesticide usage;
- Informing the targeting of monitoring programmes for residues in food and the environment;
- Contributing to assessing the impact of pesticide use, principally as part of the Pesticides Forum's Annual Report;
- Quantifying pesticide usage and changes in the use of active substances over time;
- Responding to enquiries (for example, Parliamentary Questions, correspondence, queries under the Freedom of Information Act or Environmental Information Regulations, etc.);
- Providing information to assist research projects which can support all of the above activities;
- Training/teaching programmes which are designed to improve practice in the use of pesticides by the farming/training industries;
- Informing the Wildlife Incident Investigation Scheme (WIIS) programme to help identify potential misuse of pesticides.

REVISIONS POLICY

This report presents a comprehensive summary of data for arable crops grown and taken to harvest in 2014. We will provide information on any revisions we make to the report or the datasets if any inaccuracies or errors occur. Details of any revisions, including the date upon which they were changed, will appear on the following website:

https://secure.fera.defra.gov.uk/pusstats/surveys/index.cfm

CONTENTS **Page**

EXECUTIVE SUMMARY

This report contains information on arable crops including wheat, barley (spring & winter), oats, rye, triticale, oilseed rape, linseed, ware & seed potatoes, dry harvest peas, field beans and sugar beet. Data on pesticide usage on these crops were collected from 23,032 examples (individual fields of arable crops) grown on 1,201 holdings throughout the United Kingdom (six of which were organic). Herbicide applications made to fallow ground and prior to drilling a harvested crop are included, applications made to failed crops have been excluded. Minor crops encountered, but not included in this report included ahiflower, borage, lupins, mixed corn and poppy.

The sample accounted for 6% of the total area of arable crops grown in the United Kingdom during the 2014 season (autumn 2013 through to harvest in 2014). The area of crops surveyed in each region was proportional to the area of arable crops grown in that region. The data on the area of pesticide treatments and the amount of active substances applied have been raised to give national usage estimates.

Wheat comprised 45% of the area of all arable crops grown in 2014, oilseed rape (spring & winter) 16%, spring barley 15%, winter barley 10%, oats, ware potatoes and sugar beet 3% each, beans 2%, peas 1% and seed potatoes, linseed, rye and triticale less than one percent each. In terms of pesticide area treated, wheat accounted for 53% of the total, oilseed rape (spring & winter) 16%, spring barley 9%, winter barley 8%, ware potatoes 6%, sugar beet 3%, oats and beans 2%, seed potatoes and peas 1% and rye, linseed & triticale less than 1%. By weight, applications to wheat constituted 52% of the total weight of active substances applied, oilseed rape 14%, ware potatoes 10%, winter barley 8%, spring barley 7%, sugar beet 3%, field beans 2%, oats, seed potatoes and peas 1% and rye, triticale & linseed less than 1% each.

Fungicides accounted for 40% of the total pesticide-treated area of arable farm crops grown in the United Kingdom in 2014, herbicides 31%, growth regulators 11%, seed treatments 9%, insecticides & nematicides 8%, molluscicides 2% and sulphur less than 1%. By weight, herbicides accounted for 44% of the pesticide active substances applied, fungicides 34%, growth regulators 17%, insecticides & nematicides, molluscicides & seed treatments 1% each, and sulphur less than 1%.

The most extensively-used fungicide formulations applied as sprays were chlorothalonil, tebuconazole, prothioconazole/tebuconazole and epoxiconazole, with prothioconazole the most widely-used individual active substance. In terms of weight applied, chlorothalonil was the principal formulation used.

The most extensively-used herbicide formulations were glyphosate, diflufenican/flufenacet and iodosulfuron-methyl-sodium/mesosulfuron-methyl. Glyphosate was the herbicide used most extensively by weight applied, accounting for almost 1,800 tonnes of active substance.

The pyrethroids were the most extensively-used insecticides (excluding nematicides), accounting for 93% of the insecticide-treated area, followed by the carbamates 3%, organophosphates and neonicotinoids 1%, and other insecticides 3%. Two insecticides accounted for 64% of the total insecticide-treated area of all arable farm crops: lambda-cyhalothrin 36% and cypermethrin 28%.

The insecticide/fungicide formulation, clothianidin/prothioconazole, was the principal seed treatment formulation used, accounting for 17% of the seed treatment area. Two fungicide formulations, prochloraz/triticonazole and prothioconazole, were used on 13% and 12% of the seed treatment area. Neonicotinoid insecticides alone or in mixtures accounted for 32% of the seed treatment area.

Chlormequat applied alone or in mixtures accounted for 57% of the area of arable crops treated with specific growth regulators.

Metaldehyde (84% by area treated), methiocarb (10%) and ferric phosphate (7%) were the only molluscicides encountered.

The area of all arable crops grown, excluding set-aside, decreased by less than 1% between 2008 and 2014, and by 1% since 2012. Since 2008 there has been an increase in the area treated of 1%, but a decrease in the weight of pesticides applied of 16%, largely driven by a significant reduction in the use of sulphuric acid as a desiccant on potatoes. Since the previous survey in 2012 the area treated increased by less than 1%, with the weight increasing by 4%.

The report shows major increases in the use of chlorothalonil (30% by area treated, 36% by weight applied) and in glyphosate (29% by area treated and 32% by weight applied). Whilst the area treated with metaldehyde increased by 31% between 2012 and 2014, its weight only increased by 4%, reflecting a move towards lower rates and products with lower percentages of active substances. The new fungicide, penthiopyrad, only registered since the previous survey, accounted for almost 0.6 million treated hectares in 2014 or 3% of the fungicide treated area.

INTRODUCTION

The Expert Committee on Pesticides (ECP) advises government on all aspects of pesticide use. In order to discharge this function, the Committee must regularly monitor the usage of all pesticides. It needs accurate data on the usage of individual pesticides. Pesticide usage data are now also required under the EU Statistics Regulation (1185/2009/EC).

As part of the on-going process for obtaining data, the Pesticide Usage Survey Teams of Fera, a joint venture between Capita PLC and the Department for Environment, Food & Rural Affairs (Defra), Science & Advice for Scottish Agriculture (SASA), a division of the Scottish Government's Agriculture, Food and Rural Communities Directorate and the Agri-Food & Biosciences Institute (AFBI), a Non-Departmental Public Body of the Department of Agriculture and Rural Development, Northern Ireland (DARD) conducted surveys of pesticide usage in arable crops in 2013/14 by visiting holdings throughout the United Kingdom during the winter of 2014/15.

Since 2010, all surveys of pesticide usage in agriculture and horticulture have been fully co-ordinated by the survey teams of England & Wales, Scotland and Northern Ireland. The methodology used for sample selection and the collection of data from sample holdings is identical in each region. Reports are produced of pesticide usage throughout the United Kingdom. All teams have undertaken recent United Kingdom Statistics Authority (UKSA) audits and the data are accredited as National Statistics.

This was the third survey of usage on arable crops in the whole of the United Kingdom and the twelfth survey of pesticide usage on arable farm crops carried out by the Great Britain Pesticide Usage Survey Teams. The previous report for the United Kingdom was published in 2013 covering pesticide usage on arable crops in 2012 (Garthwaite et. al., 2013).

Additional data on crop agronomy are collected for all surveys but may not be presented within the report. For additional data relating to the surveys please refer to the contacts below.

Information on all aspects of pesticide usage in the United Kingdom as a whole, or for Wales or the Defra regions of England, may be obtained from the Pesticide Usage Survey Team at the Food & Environment Research Agency, Sand Hutton, York, UK YO41 1LZ.

For further information please contact:

The survey team – e-mail: PUS@fera.co.uk Telephone: 01904 462 694
Or visit the website: https://secure.fera.defra.gov.uk/pusstats/surveys/index.cfm

Alternatively please contact: Fera at: science@fera.co.uk

Further data relating specifically to Scotland may be obtained from the Pesticide Usage Survey Team at Science and Advice for Scottish Agriculture, Edinburgh. Also available at:
http://www.sasa.gov.uk/pesticides/pesticide-usage/pesticide-usage-survey-reports

Copies of reports on pesticide usage in Northern Ireland may be obtained from Her Majesty's Stationery Offices. Also available at:
http://www.afbini.gov.uk/index/services/services-specialist-advice/pesticide-usage-overview/pesticide-reports-table.htm

Recently-published reports for the United Kingdom, Great Britain, England & Wales and Northern Ireland can also be viewed and downloaded on the Internet at:

https://secure.fera.defra.gov.uk/pusstats/surveys/index.cfm

TRENDS

Figure 1 - Changes in the area of arable crops grown in the United Kingdom - 2008 - 2014

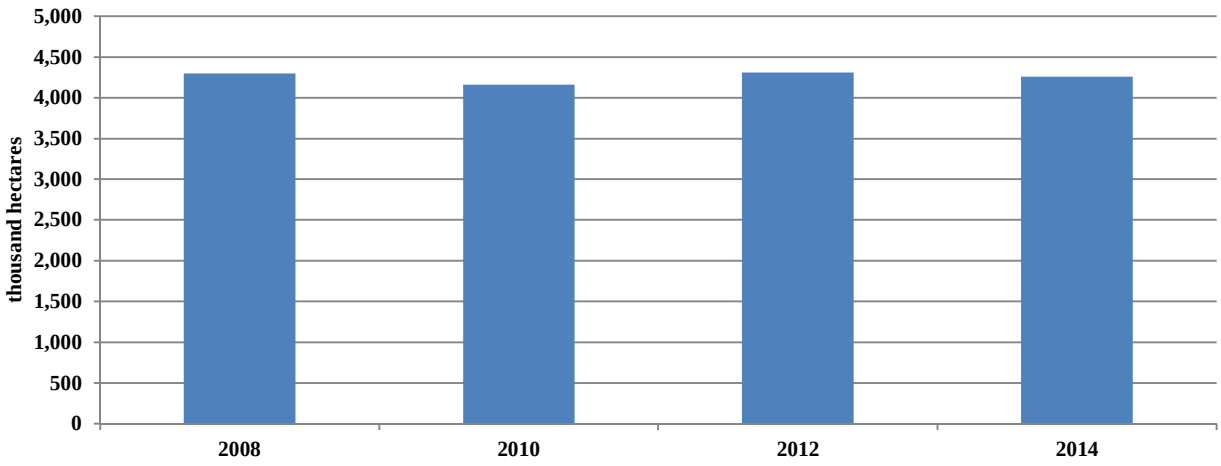


Figure 2 - Changes in the overall treated area of arable crops in the United Kingdom - 2008 - 2014

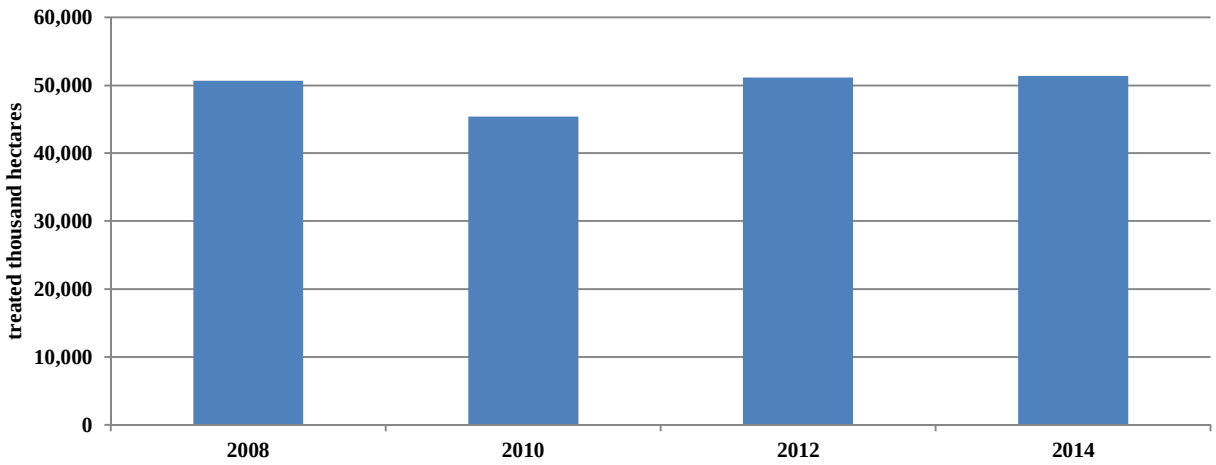
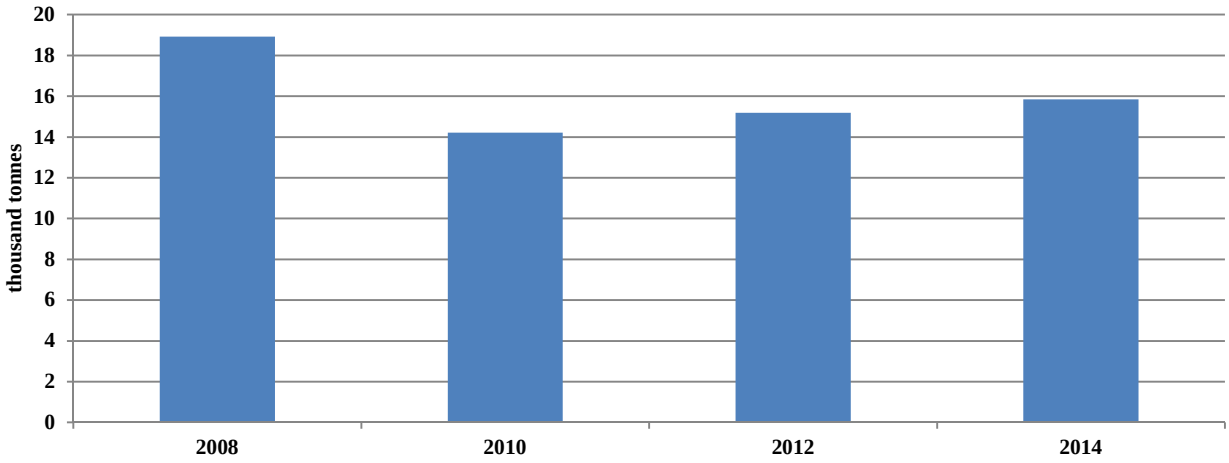


Figure 3 - Changes in the overall weight of pesticides applied to arable crops in the United Kingdom - 2008 - 2014



TRENDS (*cont.*)

Figure 4 - Changes in the area treated of the major pesticide groups applied to arable crops in the United Kingdom - 2008 - 2014

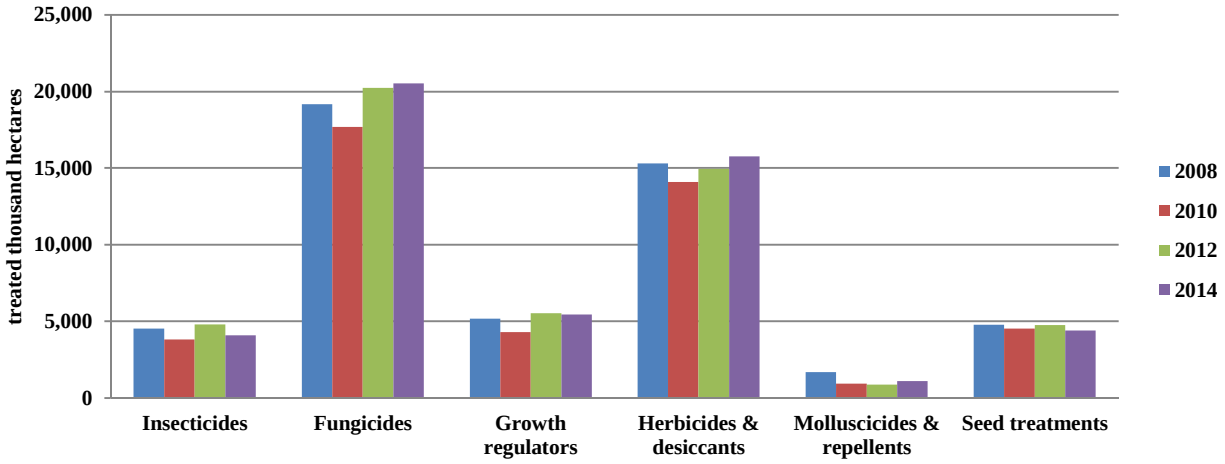
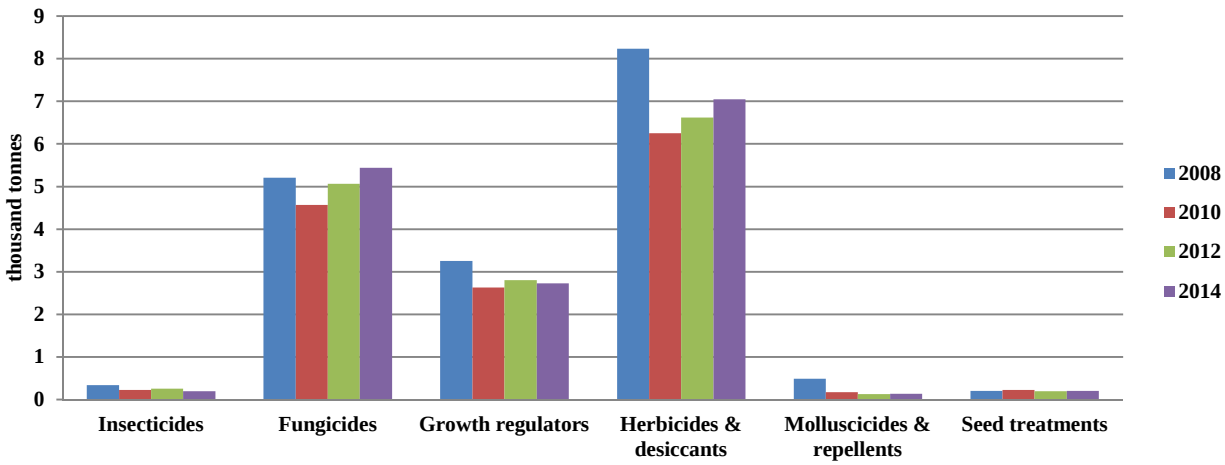


Figure 5 - Changes in the weight of the major pesticide groups applied to arable crops in the United Kingdom - 2008 - 2014



CROPS

Information is given concerning thirteen types of arable crops, comprising wheat; spring & winter barley; oats; rye; triticale; oilseed rape; linseed, ware & seed potatoes; dry harvest peas; field beans; and sugar beet. Data on pesticide usage on these were collected from 23,032 examples (individual fields of arable crops or groups of fields treated identically) grown on 1,201 holdings throughout the United Kingdom. The sample accounted for 6% of the total area of arable crops grown in United Kingdom during the 2014 harvest season.

Figure 6 - Regional distribution of arable crops in the United Kingdom - 2014[1]

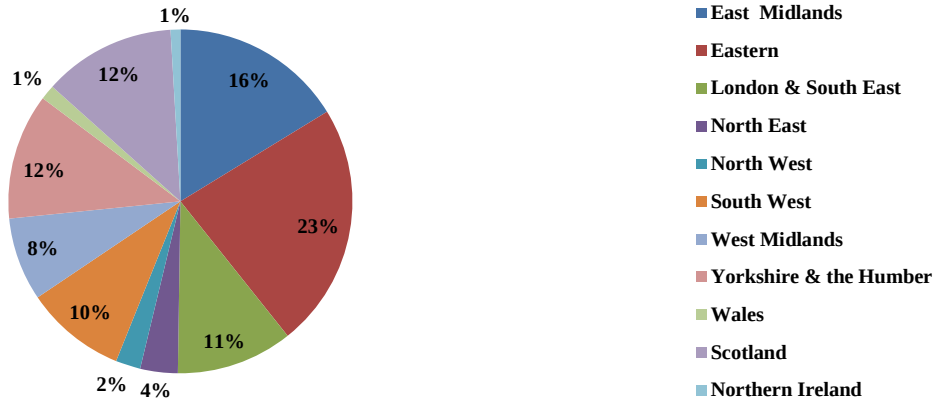


Figure 6a - Relative areas of the different arable crops in the United Kingdom - 2014

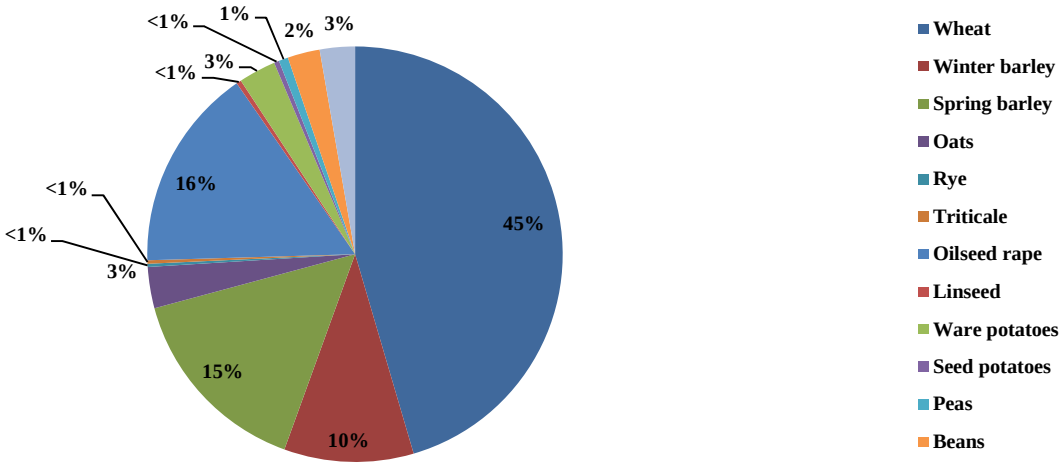
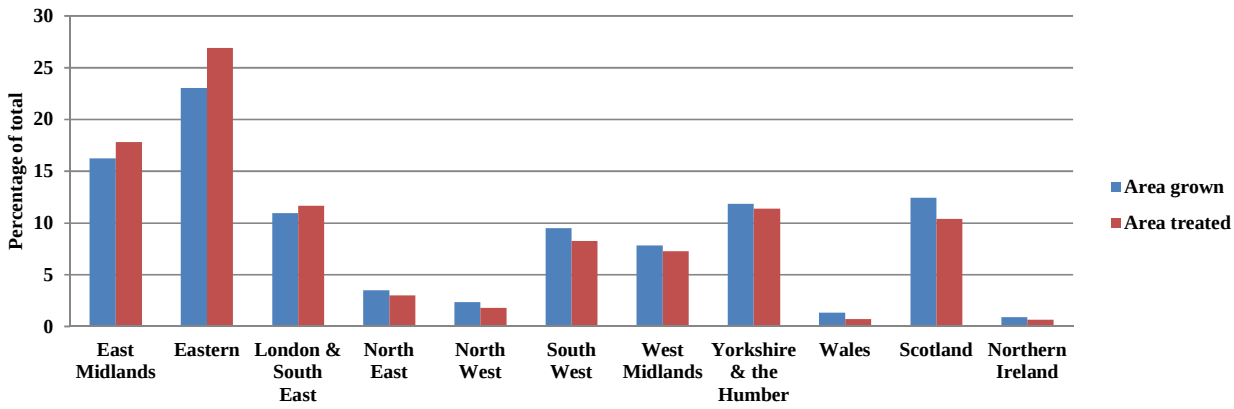


Figure 6b - Comparison of regional distribution and treated area of arable crops in the United Kingdom - 2014



[1]**Please note - All Pie-Charts within this report should be read clockwise from the top, as both the pie segments and the contents of the key appear in the same order.**

PESTICIDE USAGE

Figure 7 - Regional distribution of pesticide usage on arable crops in the United Kingdom - 2014 (area treated)

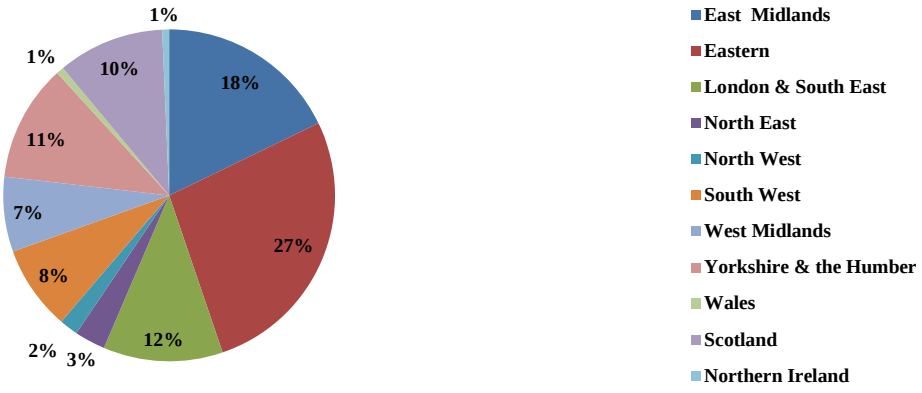


Figure 8 - Usage of pesticides on arable crops in the United Kingdom - 2014

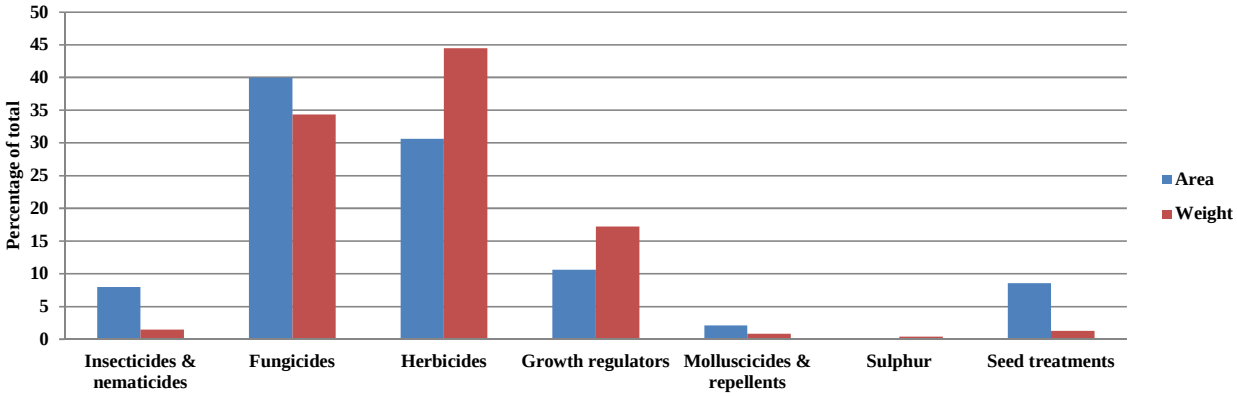
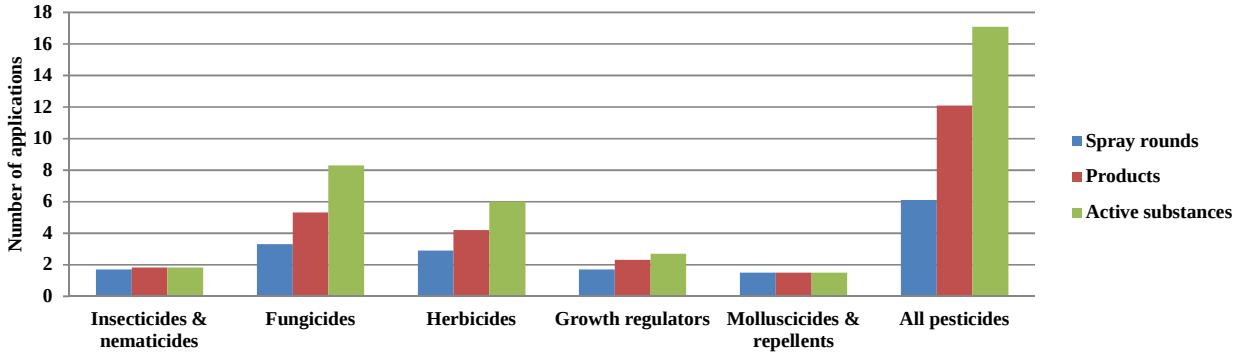


Figure 9 - Average number of applications made to arable crops in the United Kingdom - 2014 (excluding seed treatments)



For maps of the United Kingdom showing individual Government Office regions, please visit the following website:

http://www.ons.gov.uk/ons/guide-method/geography/beginner-s-guide/maps/index.html

PESTICIDE USAGE ON CEREALS

Wheat

- **1,935,737 hectares of wheat grown in the United Kingdom**
- **27,330,089 treated hectares**
- **8,296.3 tonnes applied**
- **0.6% of wheat remained untreated**
- **Wheat received on average 4 fungicides, 3 herbicides, 2 growth regulators, 1 insecticide application and 1 molluscicide**
- **The main varieties encountered included JB Diego, KWS Santiago, Solstice, Cordiale, Gallant, Grafton, Relay and Crusoe**

Figure 10 - Usage of pesticides on wheat - 2014

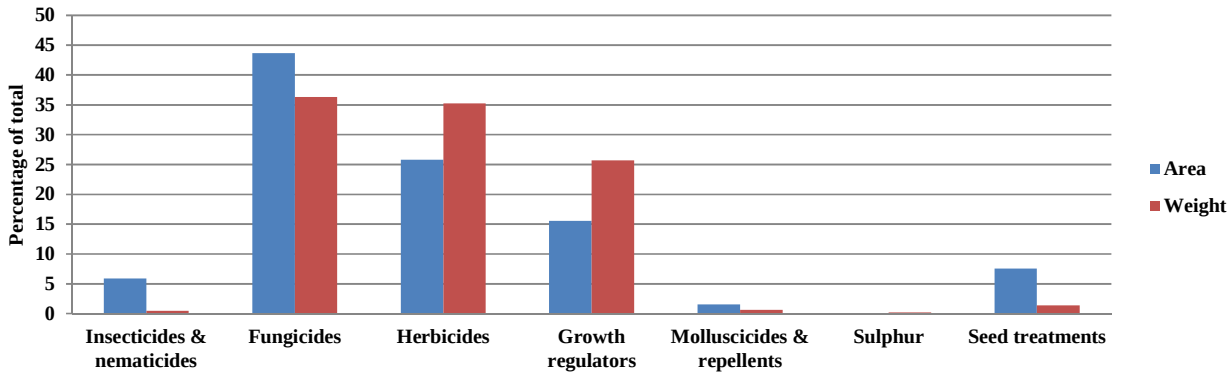
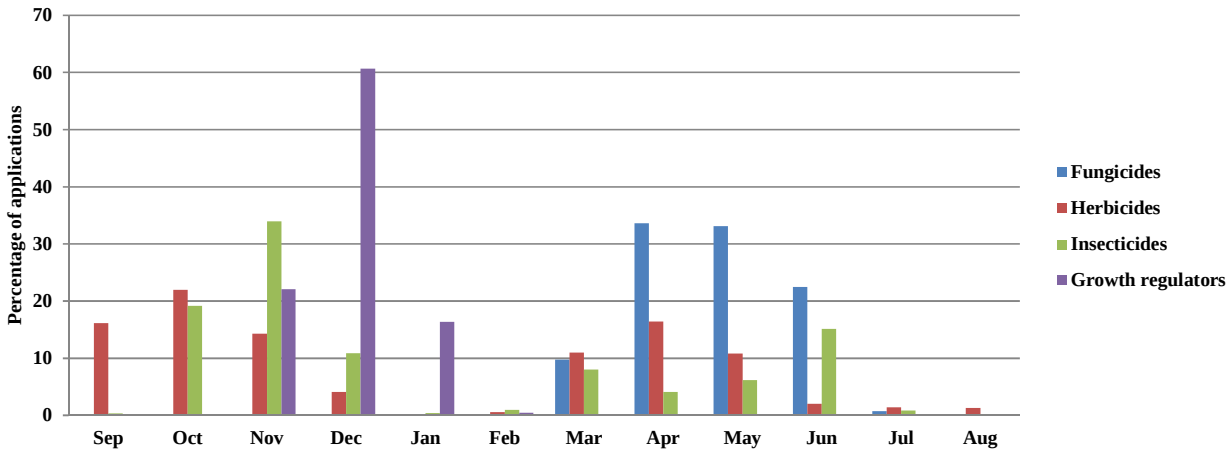


Figure 11 - Timing of pesticide applications on wheat: September 2013 - August 2014

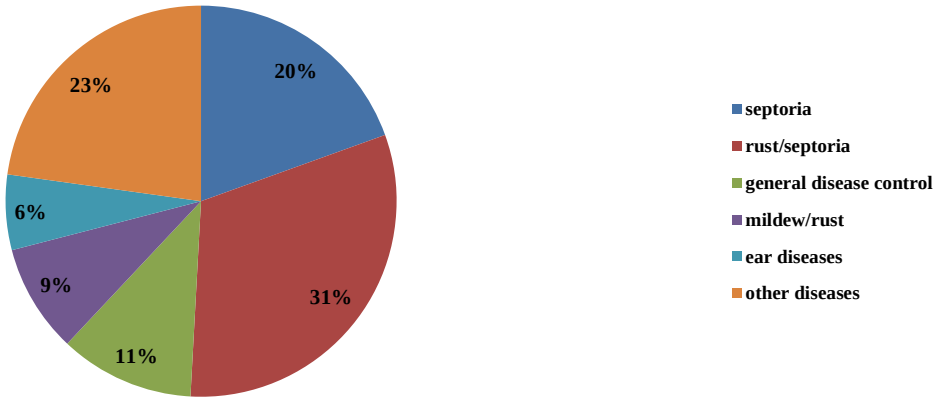


Wheat – Fungicides

- **Formulation area treated: 11,924,954 hectares**
- **Weight of active substances applied: 3,010.4 tonnes**
- **The five most common formulations were:**

	Formulation area treated (ha)	Weight of a.s. applied (kg)	Proportion of fungicide-treated area	Proportion of census area treated	Average number of applications (where applied)	Average proportion of full label rate
Chlorothalonil	1,700,385	807,513	0.14	0.57	1.53	0.47
Epoxiconazole	1,040,177	71,547	0.09	0.41	1.30	0.55
Tebuconazole	873,952	121,493	0.07	0.37	1.20	0.55
Prothioconazole/tebuconazole	636,697	105,705	0.05	0.27	1.20	0.68
Epoxiconazole/metconazole	487,978	34,289	0.04	0.18	1.39	0.36

Figure 12 - Wheat - Reasons for use of fungicides (where given)

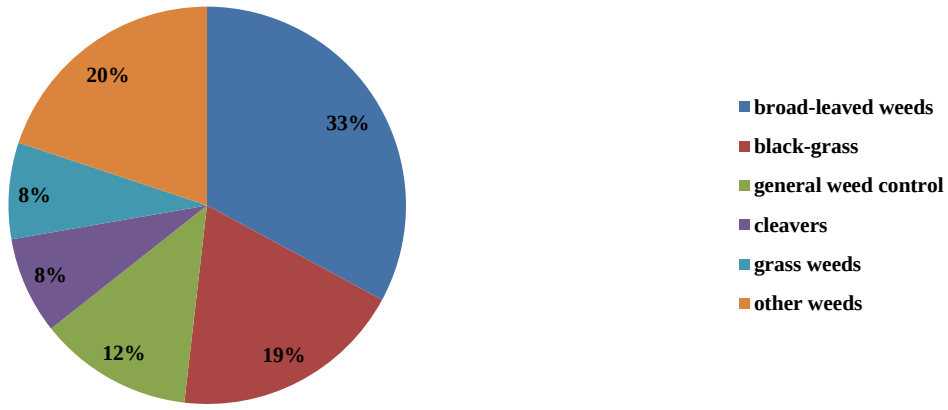


Wheat – Herbicides

- **Formulation area treated: 7,054,903 hectares**
- **Weight of active substances applied: 2,925.0 tonnes**
- **The five most common formulations were:**

	Formulation area treated (ha)	Weight of a.s. applied (kg)	Proportion of herbicide – treated area	Proportion of census area treated	Average number of applications (where applied)	Average proportion of full label rate
Iodosulfuron-methyl-sodium/ mesosulfuron-methyl	824,782	12,239	0.12	0.41	1.04	0.95
Glyphosate	818,381	601,330	0.12	0.35	1.17	0.47
Diflufenican/flufenacet	747,833	173,111	0.11	0.36	1.06	0.84
Fluroxypyr	478,234	64,179	0.07	0.24	1.03	0.38
Flufenacet/pendimethalin	460,346	505,395	0.07	0.23	1.03	0.76

Figure 13 - Wheat - Reasons for use of herbicides (where given)



Wheat – Growth regulators

- **Formulation area treated: 4,250,674 hectares**
- **Weight of active substances applied: 2,132.6 tonnes**
- **The five most common formulations were:**

	Formulation area treated (ha)	Weight of a.s. applied (kg)	Proportion of growth regulator – treated area	Proportion of census area treated	Average number of applications (where applied)	Average proportion of full label rate
Chlormequat	2,228,164	1,818,670	0.52	0.80	1.43	0.53
Trinexapac-ethyl	1,230,796	39,533	0.29	0.50	1.28	0.32
Chlormequat/imazaquin	240,938	120,798	0.06	0.11	1.13	0.54
Mepiquat chloride/ prohexadione-calcium	219,454	32,887	0.05	0.10	1.15	0.29
2-chloroethylphosphonic acid	114,174	21,785	0.03	0.06	1.05	0.53

Wheat – Insecticides

- **Formulation area treated: 1,611,128 hectares**
- **Weight of active substances applied: 40.8 tonnes**
- **The five most common formulations were:**

	Formulation area treated (ha)	Weight of a.s. applied (kg)	Proportion of insecticide – treated area	Proportion of census area treated	Average number of applications (where applied)	Average proportion of full label rate
Lambda-cyhalothrin	611,713	2,926	0.38	0.26	1.20	0.96
Cypermethrin	532,230	13,021	0.33	0.23	1.17	0.98
Esfenvalerate	134,700	485	0.08	0.07	1.05	0.87
Zeta-cypermethrin	110,397	1,205	0.07	0.05	1.16	0.73
Alpha-cypermethrin	105,229	1,414	0.07	0.05	1.11	1.04

Figure 14 - Wheat - Reasons for use of insecticides (where given)

Wheat – Seed Treatments

- **Formulation area treated: 2,063,504 hectares**
- **Weight of active substances applied: 115.0 tonnes**
- **3% of the seed remained untreated**
- **Where specified the most common formulations were:**

	Formulation area treated (ha)	Weight of a.s. applied (kg)	Proportion of seed treatment-treated area	Proportion of census area treated (excluding unspecified treatments)
Clothianidin/prothioconazole	674,230	71,837	0.37	0.40
Prothioconazole	427,687	7,650	0.24	0.25
Prochloraz/triticonazole	229,903	6,655	0.13	0.14
Silthiofam	139,779	6,203	0.08	0.08
Fludioxonil	122,157	1,090	0.07	0.07

Winter barley

- **429,023 hectares of winter barley grown in the United Kingdom**
- **4,302,614 treated hectares**
- **1,315.6 tonnes applied**
- **0.1% of winter barley remained untreated**
- **Winter barley received on average 3 herbicides, 2 fungicides, 2 growth regulators and 1 insecticide application**
- **The main varieties encountered included Cassia, Volume, Venture, KWS Glacier and Cassata**

Figure 15 - Usage of pesticides on winter barley - 2014

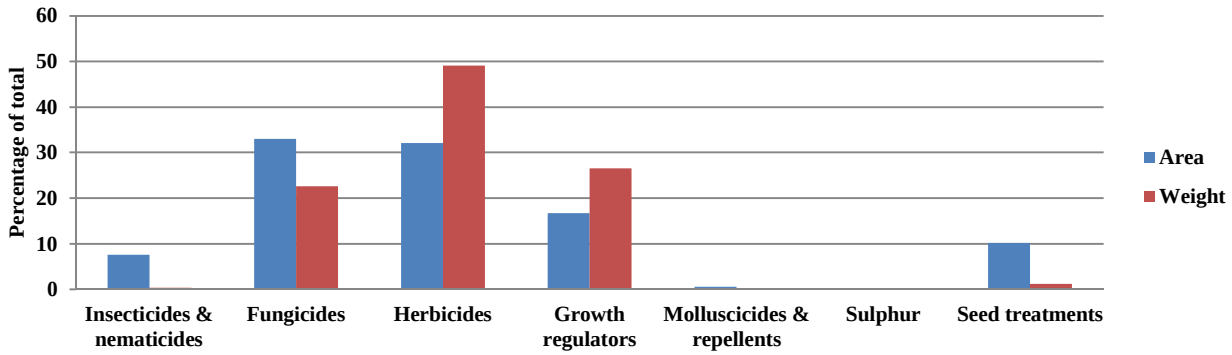
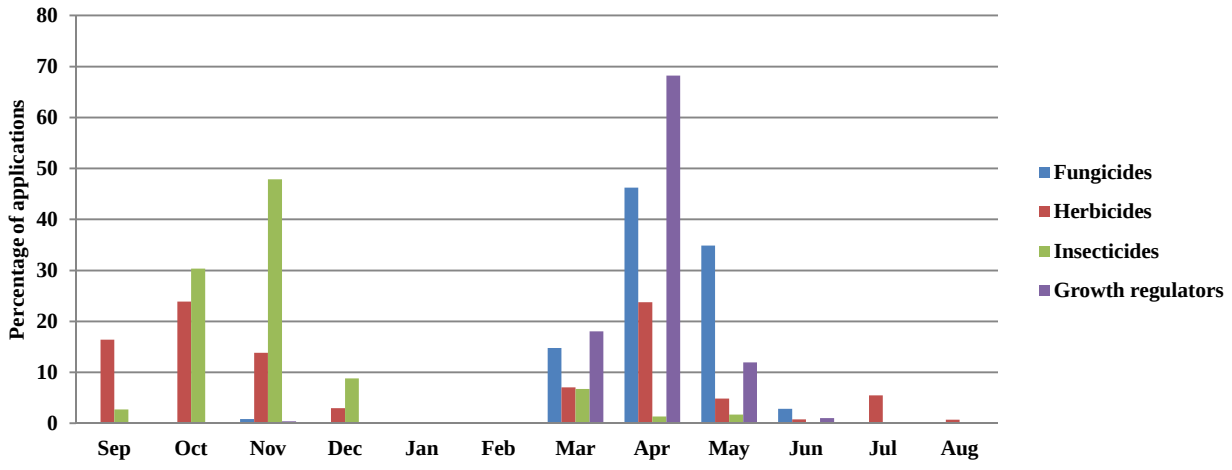


Figure 16 - Timing of pesticide applications on winter barley: September 2013 - August 2014

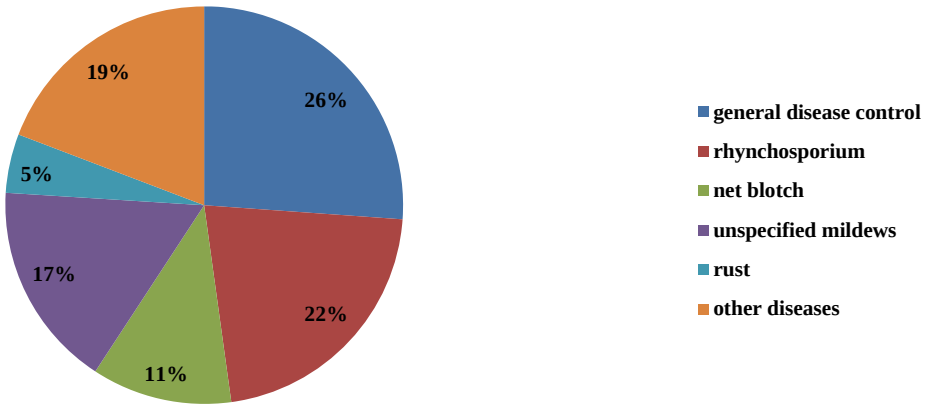


Winter barley – Fungicides

- **Formulation area treated: 1,418,276 hectares**
- **Weight of active substances applied: 297.1 tonnes**
- **The five most common formulations were:**

	Formulation area treated (ha)	Weight of a.s. applied (kg)	Proportion of fungicide-treated area	Proportion of census area treated	Average number of applications (where applied)	Average proportion of full label rate
Bixafen/prothioconazole	150,108	21,296	0.11	0.25	1.41	0.55
Prothioconazole/spiroxamine	112,520	27,117	0.08	0.19	1.39	0.42
Chlorothalonil	98,422	45,060	0.07	0.19	1.23	0.46
Prothioconazole/trifloxystrobin	89,403	14,745	0.06	0.17	1.25	0.74
Fluoxastrobin/prothioconazole/ trifloxystrobin	84,901	12,353	0.06	0.12	1.66	0.61

Figure 17 - Winter barley - Reasons for use of fungicides (where given)

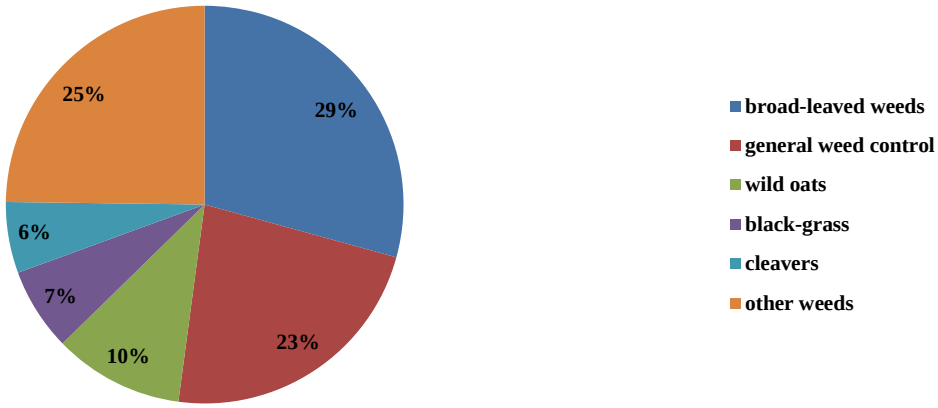


Winter barley – Herbicides

- **Formulation area treated: 1,378,085 hectares**
- **Weight of active substances applied: 645.8 tonnes**
- **The five most common formulations were:**

	Formulation area treated (ha)	Weight of a.s. applied (kg)	Proportion of herbicide – treated area	Proportion of census area treated	Average number of applications (where applied)	Average proportion of full label rate
Glyphosate	187,200	132,040	0.14	0.36	1.21	0.46
Diflufenican/flufenacet	183,808	40,997	0.13	0.42	1.01	0.80
Pinoxaden	166,020	6,042	0.12	0.38	1.03	0.61
Chlorotoluron/diflufenican	90,703	126,632	0.07	0.21	1.02	0.47
Pendimethalin/picolinafen	89,027	67,261	0.06	0.20	1.01	0.69

Figure 18 - Winter barley - Reasons for use of herbicides (where given)



Winter barley – Growth regulators

- **Formulation area treated: 718,501 hectares**
- **Weight of active substances applied: 348.8 tonnes**
- **The five most common formulations encountered were:**

	Formulation area treated (ha)	Weight of a.s. applied (kg)	Proportion of growth regulator – treated area	Proportion of census area treated	Average number of applications (where applied)	Average proportion of full label rate
Chlormequat	328,962	285,618	0.46	0.64	1.19	0.57
Trinexapac-ethyl	200,787	6,778	0.28	0.39	1.19	0.22
Mepiquat chloride/ prohexadione-calcium	59,054	10,493	0.08	0.12	1.11	0.34
2-chloroethylphosphonic acid	54,283	11,090	0.08	0.12	1.02	0.43
2-chloroethylphosphonic acid/ mepiquat	42,839	18,343	0.06	0.10	1.03	0.47

Winter barley – Insecticides

- **Formulation area treated: 325,952 hectares**
- **Weight of active substances applied: 4.6 tonnes**
- **The five most common formulations were:**

	Formulation area treated (ha)	Weight of a.s. applied (kg)	Proportion of insecticide – treated area	Proportion of census area treated	Average number of applications (where applied)	Average proportion of full label rate
Cypermethrin	112,707	2,757	0.35	0.24	1.11	0.98
Lambda-cyhalothrin	107,589	507	0.33	0.23	1.11	0.94
Esfenvalerate	53,841	195	0.17	0.12	1.08	0.88
Alpha-cypermethrin	22,901	320	0.07	0.05	1.02	1.04
Zeta-cypermethrin	16,190	146	0.05	0.03	1.13	0.60

Almost all, 98%, of insecticide applications were for the control of aphids.

Winter barley – Seed Treatments

- **Formulation area treated: 437,360 hectares**
- **Weight of active substances applied: 15.6 tonnes**
- **3% of the seed remained untreated**
- **Where specified the most common formulations were:**

	Formulation area treated (ha)	Weight of a.s. applied (kg)	Proportion of seed treatment-treated area	Proportion of census area treated (excluding unspecified treatments)
Prochloraz/triticonazole	98,840	2,735	0.28	0.29
Clothianidin/prothioconazole	77,327	7,916	0.22	0.22
Fluopyram/prothioconazole/ tebuconazole	70,404	1,118	0.20	0.20
Prothioconazole	39,054	669	0.11	0.11
Fludioxonil/flutriafol	19,500	325	0.06	0.06

Spring barley

- **650,803 hectares of spring barley grown in the United Kingdom**
- **4,425,833 treated hectares**
- **1,029.9 tonnes applied**
- **2.1% of spring barley remained untreated**
- **Spring barley received on average 2 herbicides, 2 fungicides, 1 growth regulator and 1 insecticide**
- **The main varieties encountered included Concerto, Propino, Tipple, Waggon, Westminster and Odyssey**

Figure 19 - Usage of pesticides on spring barley - 2014

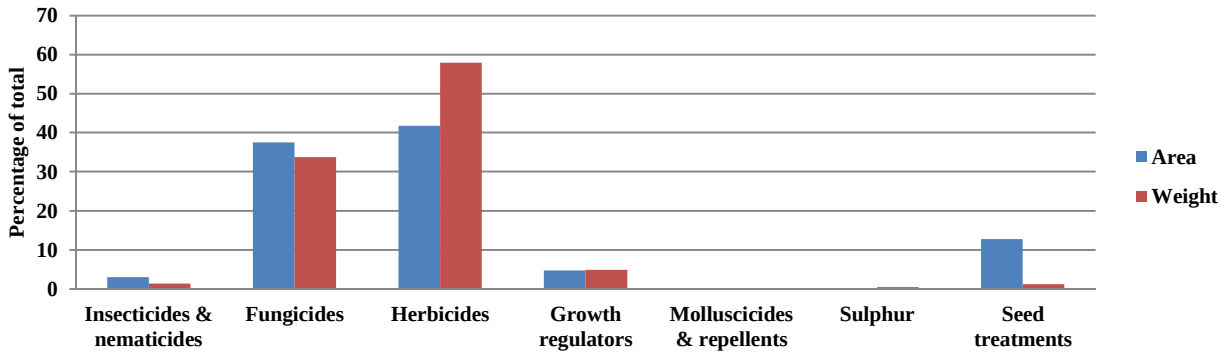
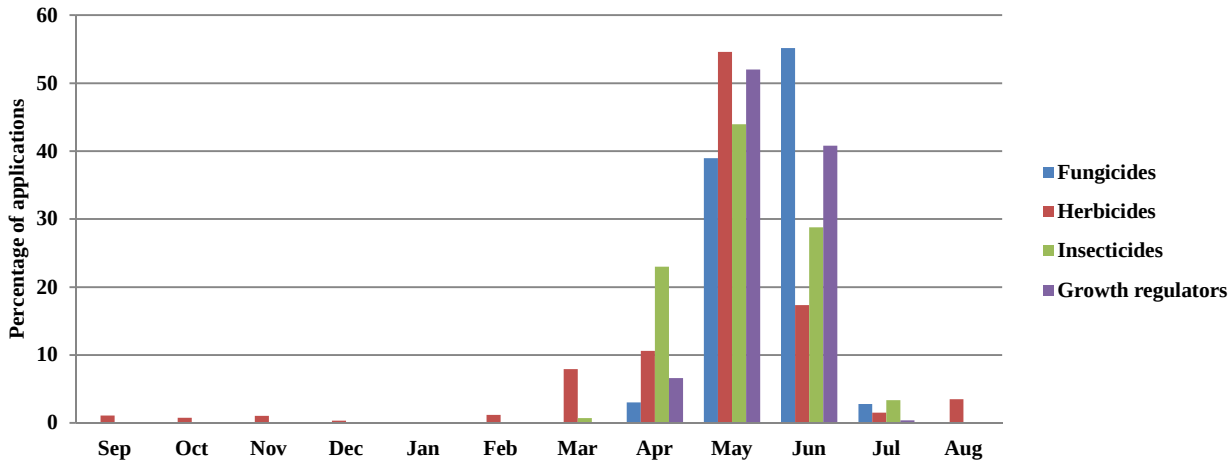


Figure 20 - Timing of pesticide applications on spring barley: September 2013 - August 2014

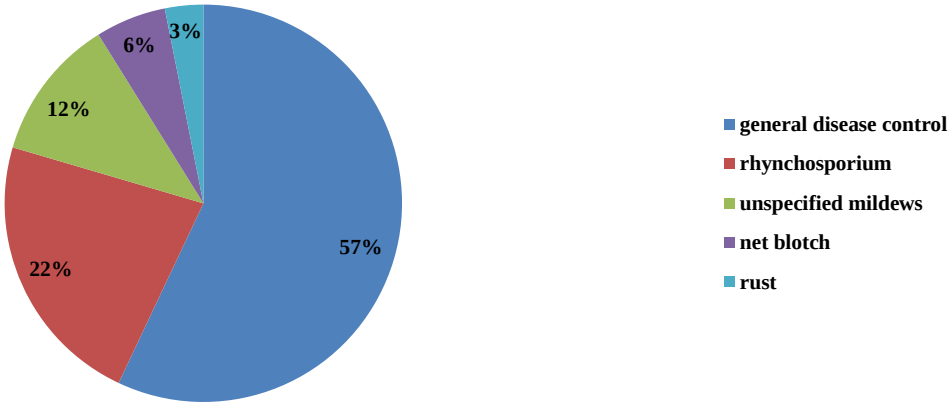


Spring barley – Fungicides

- **Formulation area treated: 1,658,801 hectares**
- **Weight of active substances applied: 347.7 tonnes**
- **The five most common formulations were:**

	Formulation area treated (ha)	Weight of a.s. applied (kg)	Proportion of fungicide-treated area	Proportion of census area treated	Average number of applications (where applied)	Average proportion of full label rate
Prothioconazole/spiroxamine	176,434	39,033	0.11	0.20	1.38	0.38
Chlorothalonil	164,492	71,181	0.10	0.21	1.22	0.43
Bixafen/prothioconazole	154,495	18,197	0.09	0.16	1.47	0.45
Fluoxastrobin/prothioconazole/ trifloxystrobin	103,283	13,430	0.06	0.10	1.60	0.54
Cyprodinil/isopyrazam	84,480	22,358	0.05	0.10	1.24	0.53

Figure 21- Spring barley - Reasons for use of fungicides (where given)

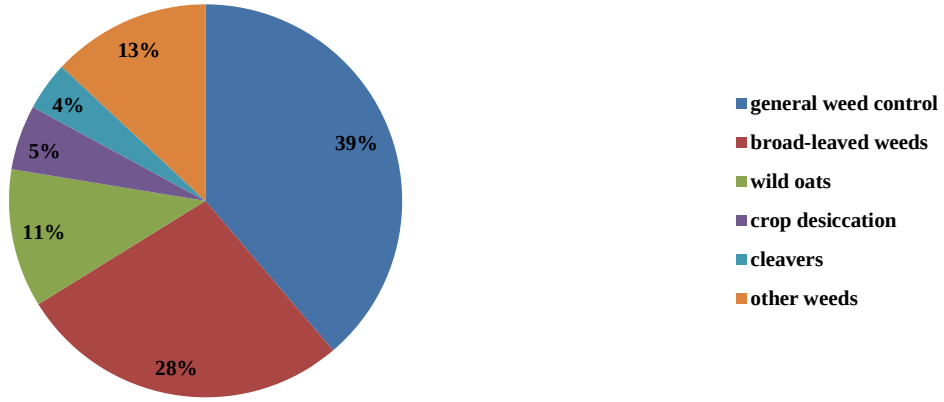


Spring barley – Herbicides

- **Formulation area treated: 1,846,015 hectares**
- **Weight of active substances applied: 596.9 tonnes**
- **The five most common formulations were:**

	Formulation area treated (ha)	Weight of a.s. applied (kg)	Proportion of herbicide – treated area	Proportion of census area treated	Average number of applications (where applied)	Average proportion of full label rate
Metsulfuron-methyl/ thifensulfuron-methyl	254,875	8,024	0.14	0.39	1.01	0.73
Glyphosate	249,856	202,635	0.14	0.32	1.18	0.51
Pinoxaden	218,617	6,866	0.12	0.33	1.01	0.52
Mecoprop-P	205,826	135,335	0.11	0.31	1.00	0.51
Fluroxypyr	153,798	17,456	0.08	0.23	1.01	0.76

Figure 22 - Spring barley - Reasons for use of herbicides (where given)



Spring barley – Growth regulators

- **Formulation area treated: 211,922 hectares**
- **Weight of active substances applied: 51.1 tonnes**
- **The five most common formulations were:**

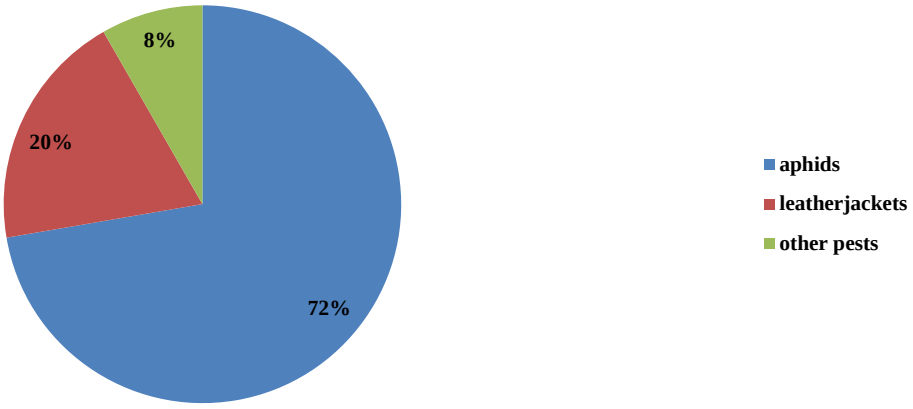
	Formulation area treated (ha)	Weight of a.s. applied (kg)	Proportion of growth regulator – treated area	Proportion of census area treated	Average number of applications (where applied)	Average proportion of full label rate
Trinexapac-ethyl	58,253	1,859	0.27	0.08	1.12	0.26
Chlormequat	44,831	26,575	0.21	0.07	1.01	0.72
2-chloroethylphosphonic acid	41,395	5,964	0.20	0.06	1.01	0.60
2-chloroethylphosphonic acid/mepiquat	23,465	6,463	0.11	0.03	1.04	0.40
Mepiquat chloride/prohexadione-calcium	21,573	2,605	0.10	0.03	1.14	0.23

Spring barley – Insecticides

- **Formulation area treated: 133,130 hectares**
- **Weight of active substances applied: 14.9 tonnes**
- **The five most common formulations were:**

	Formulation area treated (ha)	Weight of a.s. applied (kg)	Proportion of insecticide – treated area	Proportion of census area treated	Average number of applications (where applied)	Average proportion of full label rate
Lambda-cyhalothrin	54,361	240	0.41	0.08	1.04	0.88
Cypermethrin	19,882	480	0.15	0.03	1.00	0.97
Chlorpyrifos	19,578	13,869	0.15	0.03	1.01	0.97
Esfenvalerate	16,514	53	0.12	0.02	1.07	0.78
Alpha-cypermethrin	9,252	125	0.07	0.01	1.00	1.08

Figure 23 - Spring barley - Reasons for use of insecticides (where given)



Spring barley – Seed Treatments

- **Formulation area treated: 567,070 hectares**
- **Weight of active substances applied: 13.0 tonnes**
- **15% of the seed remained untreated**
- **Where specified the most common formulations were:**

	Formulation area treated (ha)	Weight of a.s. applied (kg)	Proportion of seed treatment-treated area	Proportion of census area treated (excluding unspecified treatments)
Prochloraz/triticonazole	212,296	6,588	0.44	0.38
Fluopyram/prothioconazole/ tebuconazole	160,073	2,750	0.33	0.29
Prothioconazole	33,467	641	0.07	0.15
Fludioxonil	20,983	201	0.04	0.06
Fludioxonil/flutriafol	16,912	315	0.04	0.04

Oats

- **136,807 hectares of oats grown in the United Kingdom**
- **922,663 treated hectares**
- **226.2 tonnes applied**
- **4.8% of oats remained untreated**
- **Oats received on average 2 herbicides, 2 fungicides, 1 growth regulator and 1 insecticide**
- **61% of the crop was winter sown**
- **The main varieties encountered included Gerald, Mascani, Canyon, Firth and Dalguise**

Figure 24 - Usage of pesticides on oats - 2014

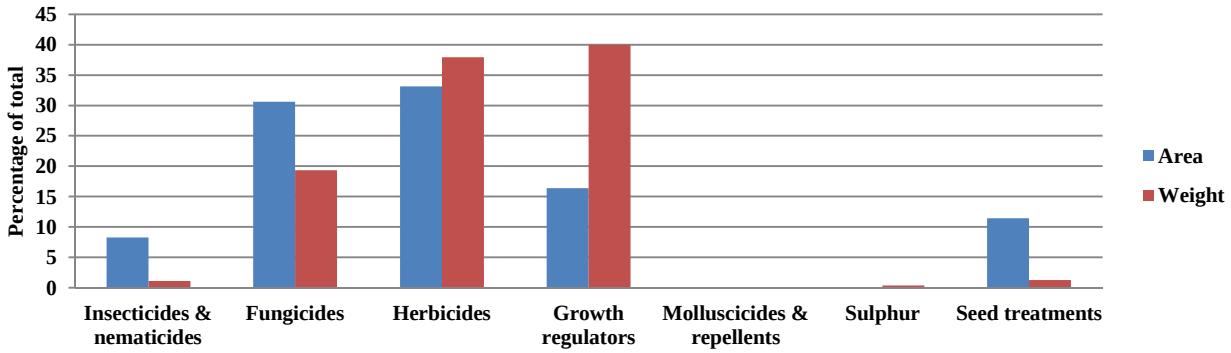
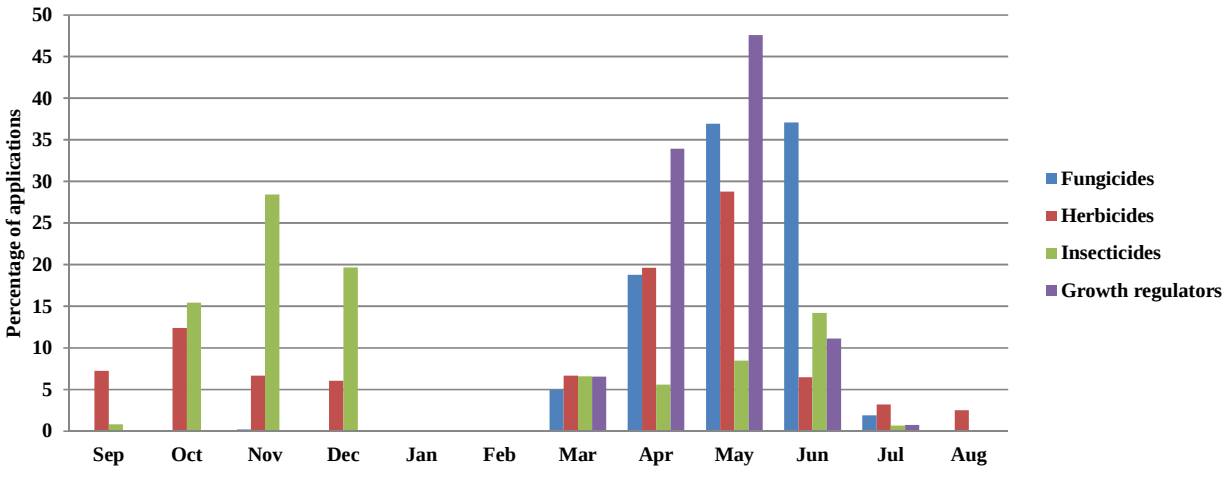


Figure 25 - Timing of pesticide applications on oats: September 2013 - August 2014

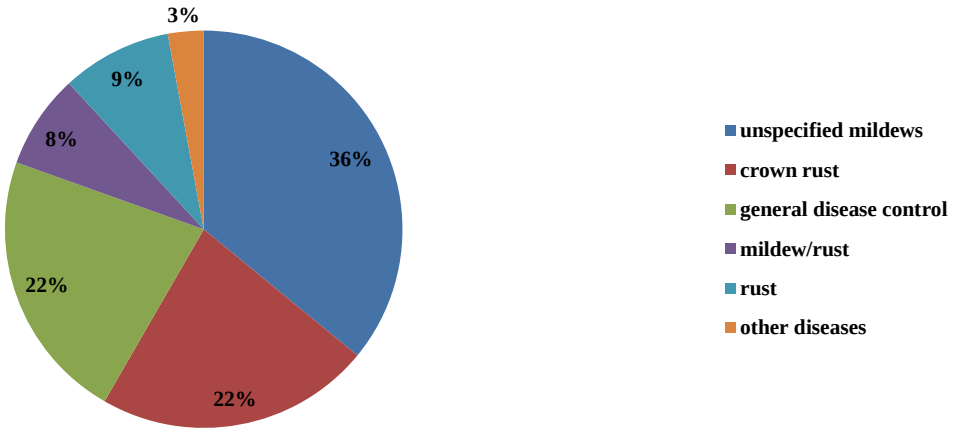


Oats – Fungicides

- **Formulation area treated: 282,507 hectares**
- **Weight of active substances applied: 43.7 tonnes**
- **The five most common formulations were:**

	Formulation area treated (ha)	Weight of a.s. applied (kg)	Proportion of fungicide-treated area	Proportion of census area treated	Average number of applications (where applied)	Average proportion of full label rate
Proquinazid	27,942	790	0.10	0.18	1.15	0.57
Pyraclostrobin	23,677	1,846	0.08	0.13	1.29	0.31
Tebuconazole	21,062	3,122	0.07	0.13	1.17	0.59
Azoxystrobin/cyproconazole	19,303	3,788	0.07	0.11	1.27	0.70
Fenpropimorph	16,973	3,902	0.06	0.11	1.09	0.31

Figure 26 - Oats - Reasons for use of fungicides (where given)

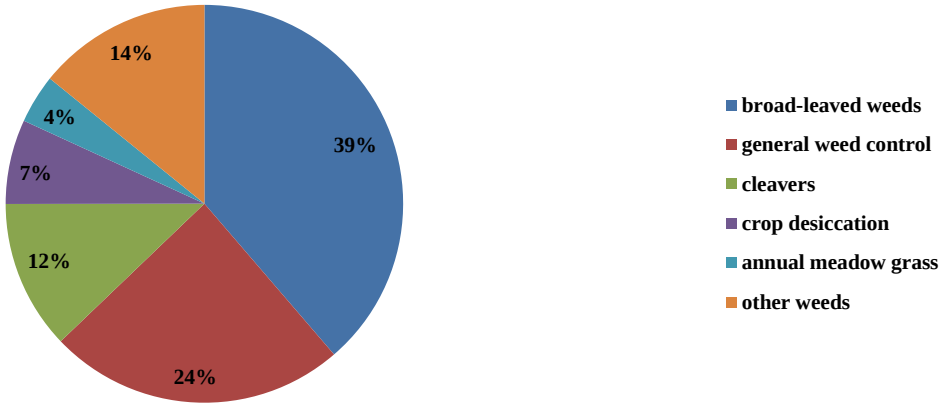


Oats – Herbicides

- **Formulation area treated: 305,993 hectares**
- **Weight of active substances applied: 85.8 tonnes**
- **The five most common formulations were:**

	Formulation area treated (ha)	Weight of a.s. applied (kg)	Proportion of herbicide – treated area	Proportion of census area treated	Average number of applications (where applied)	Average proportion of full label rate
Glyphosate	58,556	42,559	0.19	0.37	1.16	0.45
Fluroxypyr	30,842	4,310	0.10	0.22	1.00	0.76
Mecoprop-P	29,671	18,839	0.10	0.22	1.00	0.49
Florasulam/fluroxypyr	29,168	2,581	0.10	0.21	1.00	0.64
Diflufenican/flupyrsulfuron-methyl	28,834	1,614	0.09	0.21	1.02	0.93

Figure 27 - Oats - Reasons for use of herbicides (where given)



Oats – Growth regulators

- **Formulation area treated: 151,019 hectares**
- **Weight of active substances applied: 90.4 tonnes**
- **The four formulations encountered were:**

	Formulation area treated (ha)	Weight of a.s. applied (kg)	Proportion of growth regulator – treated area	Proportion of census area treated	Average number of applications (where applied)	Average proportion of full label rate
Chlormequat	84,867	86,047	0.56	0.56	1.10	0.64
Trinexapac-ethyl	49,684	1,568	0.33	0.34	1.08	0.31
Mepiquat chloride/ prohexadione-calcium	16,410	2,770	0.11	0.11	1.09	0.32
2-chloroethylphosphonic acid	58	7	0.00	0.00	1.00	0.40

Oats – Insecticides

- **Formulation area treated: 76,051 hectares**
- **Weight of active substances applied: 2.5 tonnes**
- **The five most common formulations were:**

	Formulation area treated (ha)	Weight of a.s. applied (kg)	Proportion of insecticide – treated area	Proportion of census area treated	Average number of applications (where applied)	Average proportion of full label rate
Lambda-cyhalothrin	30,081	148	0.40	0.19	1.15	0.98
Cypermethrin	29,768	729	0.39	0.19	1.11	0.98
Zeta-cypermethrin	12,012	136	0.16	0.08	1.06	0.75
Chlorpyrifos	2,045	1,478	0.03	0.01	1.00	1.00
Esfenvalerate	1,207	4	0.02	0.01	1.00	0.70

Aphid control accounted for 92% of all applications, leatherjackets and other pests 4% each.

Oats – Seed Treatments

- **Formulation area treated: 105,277 hectares**
- **Weight of active substances applied: 2.9 tonnes**
- **29% of the seed remained untreated**
- **Where specified the most common formulations were:**

	Formulation area treated (ha)	Weight of a.s. applied (kg)	Proportion of seed treatment-treated area	Proportion of census area treated (excluding unspecified treatments)
Prochloraz/triticonazole	26,003	716	0.32	0.23
Prothioconazole	22,373	359	0.28	0.20
Fludioxonil	12,567	100	0.16	0.11
Clothianidin/prothioconazole	9,085	827	0.11	0.08
Fluopyram/prothioconazole/ tebuconazole	3,673	64	0.05	0.03

Rye

- **10,967 hectares of rye grown in the United Kingdom**
- **130,421 treated hectares**
- **36.3 tonnes applied**
- **All rye encountered was treated**
- **Rye received on average 3 fungicides, 2 growth regulators, 2 herbicides, 1 insecticide and 1 molluscicide**
- **The main varieties encountered included Mephisto, Phonix, SU Drive, Admiral, Agronom and Magnifico**

Figure 28 - Usage of pesticides on rye - 2014

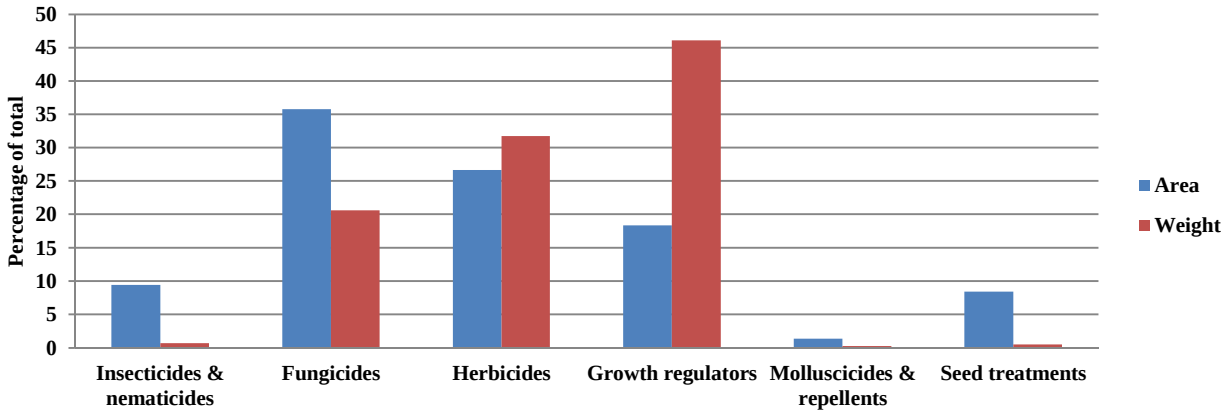
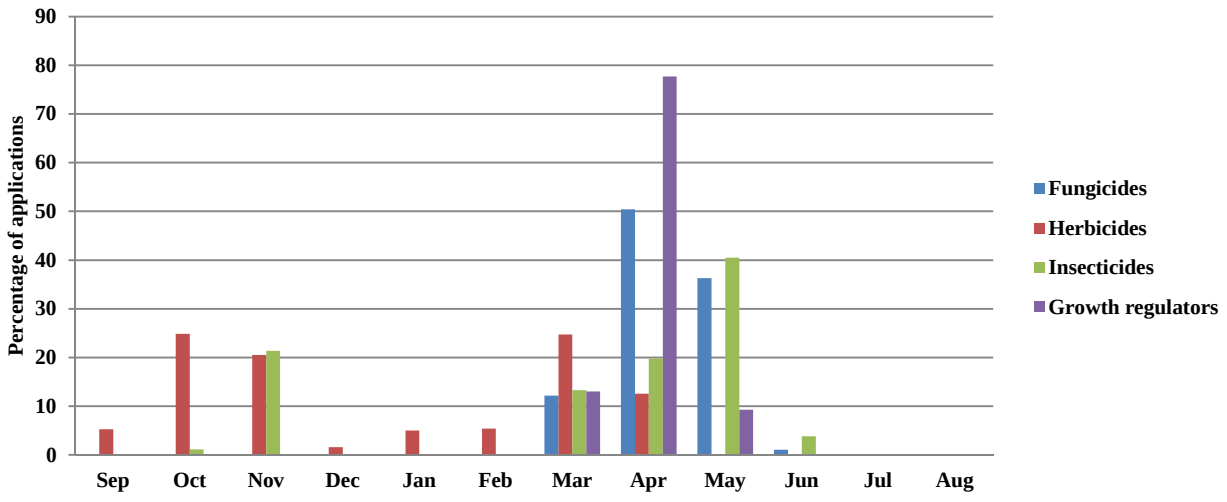


Figure 29 - Timing of pesticide applications on rye: September 2013 - August 2014



Rye – Fungicides

- **Formulation area treated: 46,654 hectares**
- **Weight of active substances applied: 7.5 tonnes**
- **The five most common formulations were:**

	Formulation area treated (ha)	Weight of a.s. applied (kg)	Proportion of fungicide-treated area	Proportion of census area treated	Average number of applications (where applied)	Average proportion of full label rate
Azoxystrobin	10,413	1,400	0.22	0.47	2.00	0.54
Prothioconazole	8,867	1,063	0.19	0.29	2.79	0.61
Tebuconazole	7,281	1,313	0.16	0.46	1.45	0.72
Fluoxastrobin/prothioconazole	4,510	709	0.10	0.23	1.81	0.64
Epoxiconazole/fenpropimorph	3,584	1,103	0.08	0.25	1.33	0.61

Mildew/rust accounted for 72% of the reasons for use of fungicides with brown rust being specified on 19% of the area, and unspecified rusts on 9%.

Rye – Herbicides

- **Formulation area treated: 34,734 hectares**
- **Weight of active substances applied: 11.5 tonnes**
- **The five most common formulations were:**

	Formulation area treated (ha)	Weight of a.s. applied (kg)	Proportion of herbicide – treated area	Proportion of census area treated	Average number of applications (where applied)	Average proportion of full label rate
Diflufenican/flufenacet	7,508	1,427	0.22	0.68	1.00	0.63
Pendimethalin	5,824	5,085	0.17	0.53	1.00	0.66
Diflufenican	5,273	260	0.15	0.48	1.00	0.45
Tribenuron-methyl	3,149	42	0.09	0.29	1.00	0.88
Metsulfuron-methyl/ tribenuron-methyl	2,750	23	0.08	0.25	1.00	0.68

Rye – Growth regulators

- **Formulation area treated: 23,939 hectares**
- **Weight of active substances applied: 16.8 tonnes**
- **The four formulations encountered were:**

	Formulation area treated (ha)	Weight of a.s. applied (kg)	Proportion of growth regulator – treated area	Proportion of census area treated	Average number of applications (where applied)	Average proportion of full label rate
Chlormequat	11,715	13,062	0.49	0.90	1.18	0.70
2-chloroethylphosphonic acid/ mepiquat	6,002	3,244	0.25	0.55	1.00	0.59
Trinexapac-ethyl	5,821	234	0.24	0.50	1.05	0.39
Chlormequat/ 2-chloroethylphosphonic acid	401	211	0.02	0.04	1.00	0.49

Rye – Insecticides

- **Formulation area treated: 12,315 hectares**
- **Weight of active substances applied: 0.3 tonnes**
- **The three formulations encountered were:**

	Formulation area treated (ha)	Weight of a.s. applied (kg)	Proportion of insecticide – treated area	Proportion of census area treated	Average number of applications (where applied)	Average proportion of full label rate
Lambda-cyhalothrin	6,470	32	0.53	0.42	1.39	0.98
Pirimicarb	3,173	159	0.26	0.29	1.00	0.36
Cypermethrin	2,672	67	0.22	0.24	1.00	1.00

Rye – Seed Treatments

- **Formulation area treated: 10,967 hectares**
- **Weight of active substances applied: 0.2 tonnes**
- **No untreated seed was encountered**
- **The three formulations encountered were:**

	Formulation area treated (ha)	Weight of a.s. applied (kg)	Proportion of seed treatment-treated area	Proportion of census area treated (excluding unspecified treatments)
Clothianidin/prothioconazole	1,812	110	0.37	0.37
Fludioxonil	1,639	8	0.34	0.34
Clothianidin	1,430	72	0.29	0.29

Triticale

- **10,719 hectares of triticale grown in the United Kingdom**
- **75,357 treated hectares**
- **27.0 tonnes applied**
- **8.5% of triticale remained untreated**
- **Triticale received on average 2 herbicides, 2 fungicides and 1 growth regulator**
- **The main varieties encountered included Trimour, Ragtac, Tribeca, Agostino and Dublet**
- **57% of the crop was winter sown, with the remaining 43% being sown in the spring**

Figure 30 - Usage of pesticides on triticale - 2014

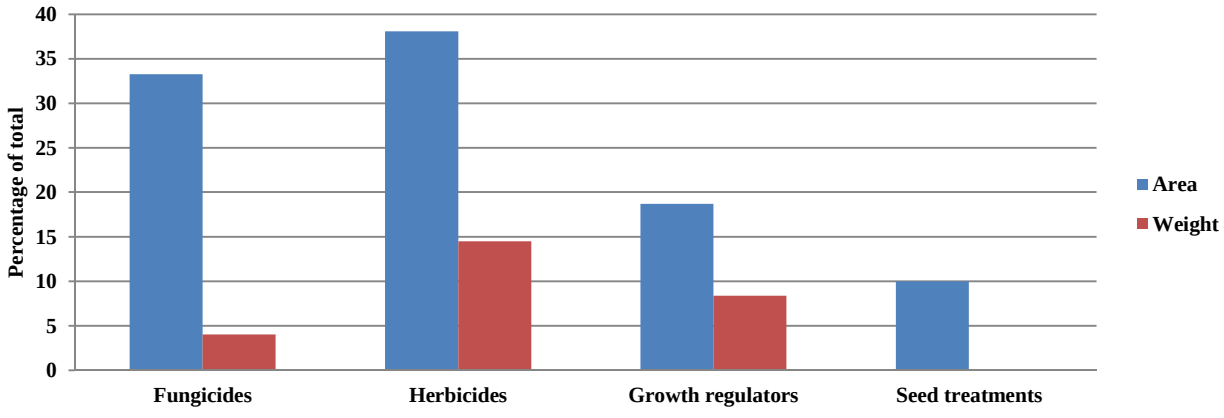
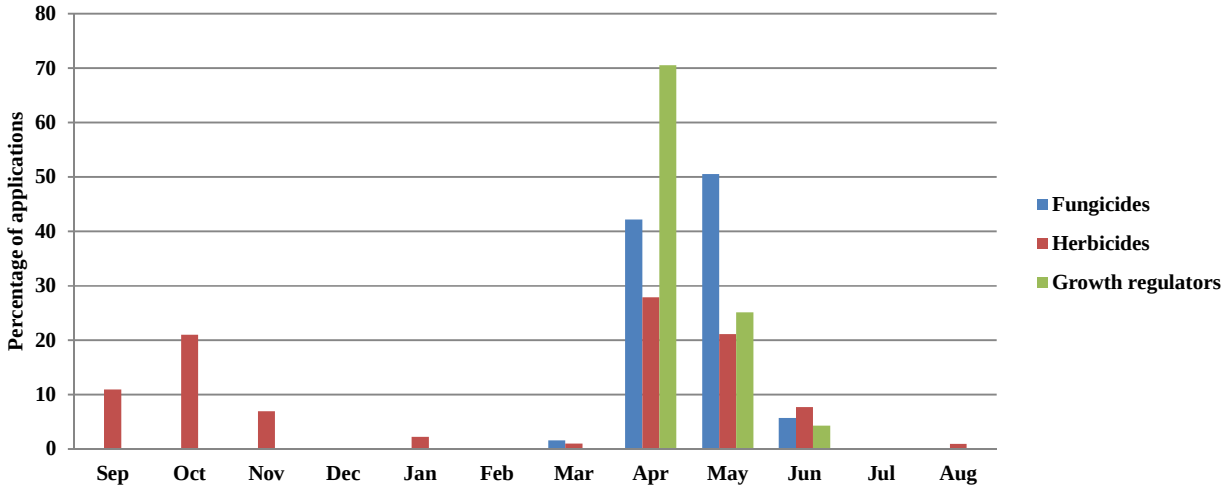


Figure 31 - Timing of pesticide applications on triticale: September 2013 - August 2014



Triticale – Fungicides

- **Formulation area treated: 25,063 hectares**
- **Weight of active substances applied: 4.0 tonnes**
- **The five most common formulations were:**

	Formulation area treated (ha)	Weight of a.s. applied (kg)	Proportion of fungicide-treated area	Proportion of census area treated	Average number of applications (where applied)	Average proportion of full label rate
Epoxiconazole/isopyrazam	4,563	687	0.18	0.21	2.00	0.70
Azoxystrobin	4,563	570	0.18	0.21	2.00	0.50
Epoxiconazole/fenpropimorph/ kresoxim-methyl	4,261	1,065	0.17	0.20	2.00	0.63
Proquinazid	2,278	56	0.09	0.13	1.67	0.49
Fenpropimorph	1,826	277	0.07	0.13	1.33	0.20

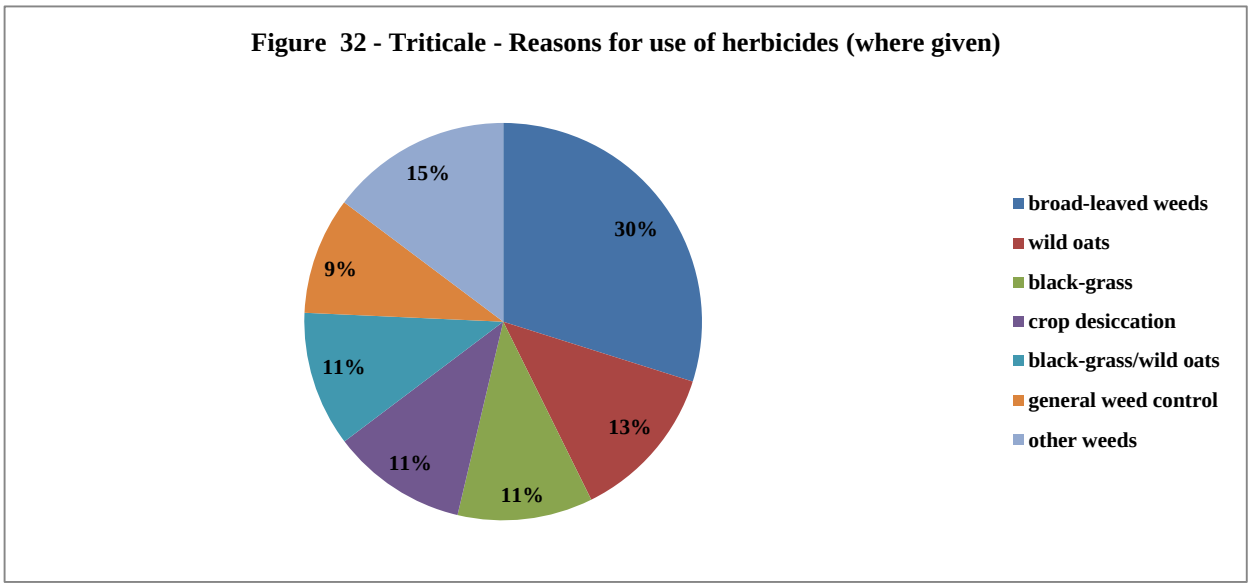
Most fungicides applied to triticale were used for the control of rust, 53%, mildew & rust 13%, Septoria & rust 12%. General disease control comprised the remainder.

Triticale – Herbicides

- **Formulation area treated: 28,688 hectares**
- **Weight of active substances applied: 14.5 tonnes**
- **The five most common formulations were:**

	Formulation area treated (ha)	Weight of a.s. applied (kg)	Proportion of herbicide – treated area	Proportion of census area treated	Average number of applications (where applied)	Average proportion of full label rate
Pendimethalin	4,599	3,164	0.16	0.43	1.00	0.52
Glyphosate	4,048	2,947	0.14	0.33	1.15	0.41
Diflufenican	3,151	115	0.11	0.29	1.00	0.36
Clodinafop-propargyl	2,653	77	0.09	0.25	1.00	0.48
Tri-allate	2,281	5,349	0.08	0.21	1.00	1.00

Figure 32 - Triticale - Reasons for use of herbicides (where given)



Triticale – Growth regulators

- **Formulation area treated: 14,085 hectares**
- **Weight of active substances applied: 8.4 tonnes**
- **The four formulations encountered were:**

	Formulation area treated (ha)	Weight of a.s. applied (kg)	Proportion of growth regulator – treated area	Proportion of census area treated	Average number of applications (where applied)	Average proportion of full label rate
Chlormequat	5,213	6,887	0.37	0.49	1.00	0.82
Trinexapac-ethyl	5,184	204	0.37	0.42	1.16	0.39
Mepiquat chloride/ prohexadione-calcium	2,131	224	0.15	0.20	1.00	0.20
2-chloroethylphosphonic acid/ mepiquat	1,557	1,075	0.11	0.15	1.00	0.75

Triticale – Insecticides

There were no insecticides recorded for triticale.

Triticale – Seed Treatments

- **Formulation area treated: 7,521 hectares**
- **Weight of active substances applied: 0.1 tonnes**
- **45% of the seed remained untreated**
- **The three formulations encountered were:**

	Formulation area treated (ha)	Weight of a.s. applied (kg)	Proportion of seed treatment-treated area	Proportion of census area treated (excluding unspecified treatments)
Prothioconazole	3,022	51	0.77	0.42
Fludioxonil/tefluthrin	672	27	0.17	0.09
Clothianidin/prothioconazole	234	22	0.06	0.03

PESTICIDE USAGE ON OILSEEDS

Oilseed rape

- **674,580 hectares of oilseed rape grown in the United Kingdom (98% of which is winter sown)**
- **8,031,179 treated hectares**
- **2,190.4 tonnes applied**
- **0.2% of oilseed rape remained untreated**
- **Oilseed rape received on average 4 herbicides, 3 fungicides, 2 insecticides and 1 molluscicide (metaldehyde accounted for 89% of all molluscicide usage)**
- **The main winter varieties encountered included DK Cabernet, Extrovert, PR46 W21, Quartz and Excalibur; spring varieties Ability, Tamirin, Doktrin and Mirakel**

Figure 33 - Usage of pesticides on oilseed rape (spring & winter) - 2014

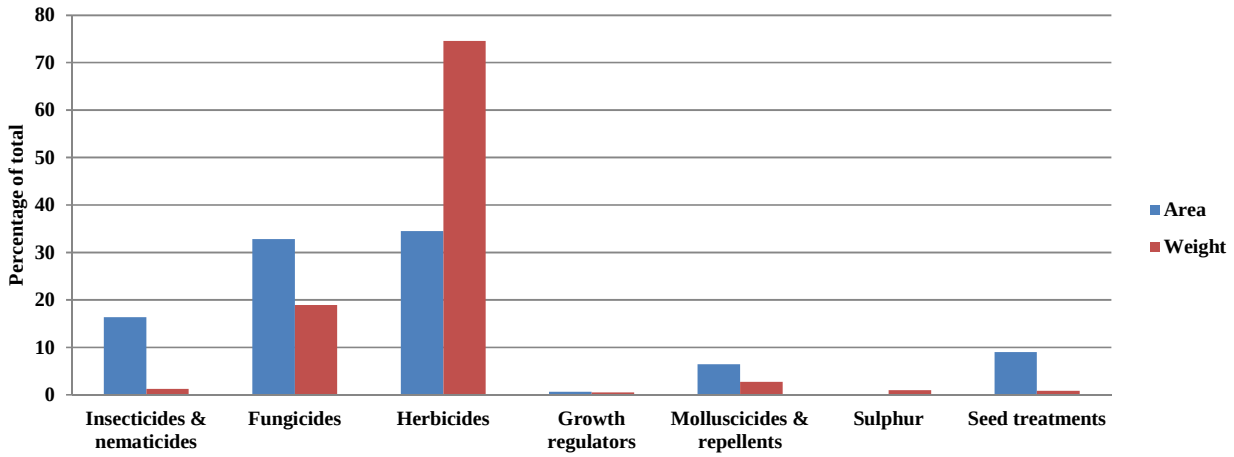
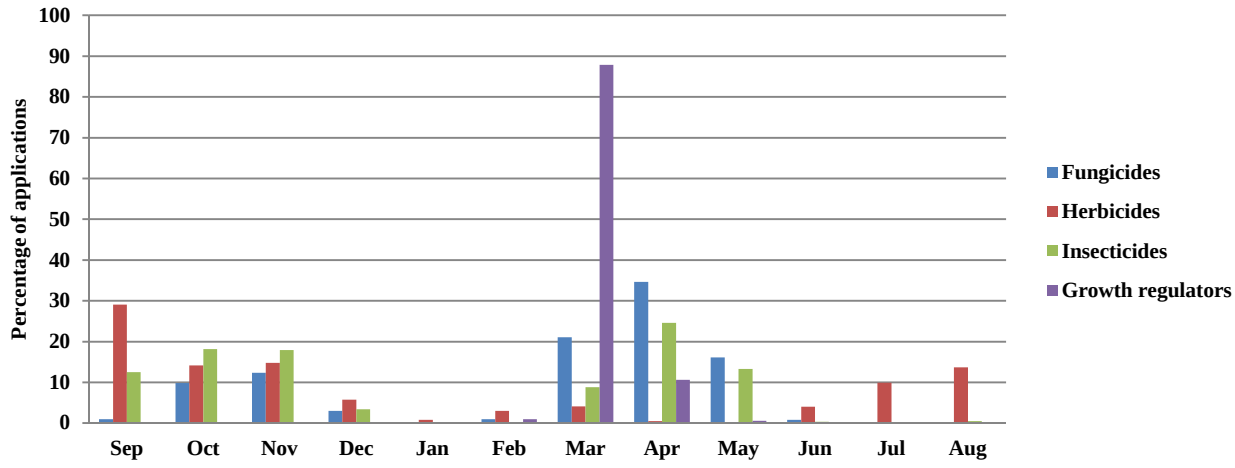


Figure 34 - Timing of pesticide applications on winter oilseed rape: September 2013 - August 2014

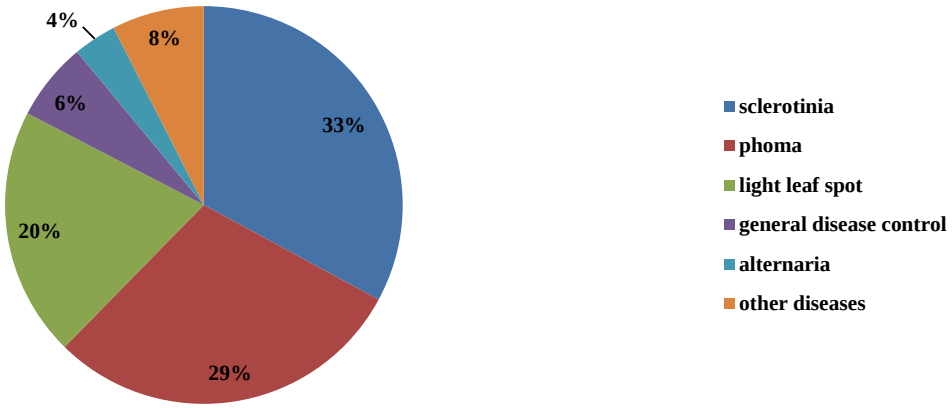


Oilseed rape – Fungicides

- **Formulation area treated: 2,634,832 hectares**
- **Weight of active substances applied: 415.1 tonnes**
- **The five most common formulations were:**

	Formulation area treated (ha)	Weight of a.s. applied (kg)	Proportion of fungicide-treated area	Proportion of census area treated	Average number of applications (where applied)	Average proportion of full label rate
Prothioconazole/tebuconazole	411,070	62,921	0.16	0.37	1.63	0.66
Prothioconazole	313,192	30,848	0.12	0.31	1.47	0.57
Tebuconazole	311,094	49,106	0.12	0.35	1.28	0.63
Azoxystrobin	220,890	32,996	0.08	0.28	1.15	0.60
Boscalid	174,066	24,574	0.07	0.23	1.13	0.56

Figure 35 - Oilseed rape - Reasons for use of fungicides (where given)

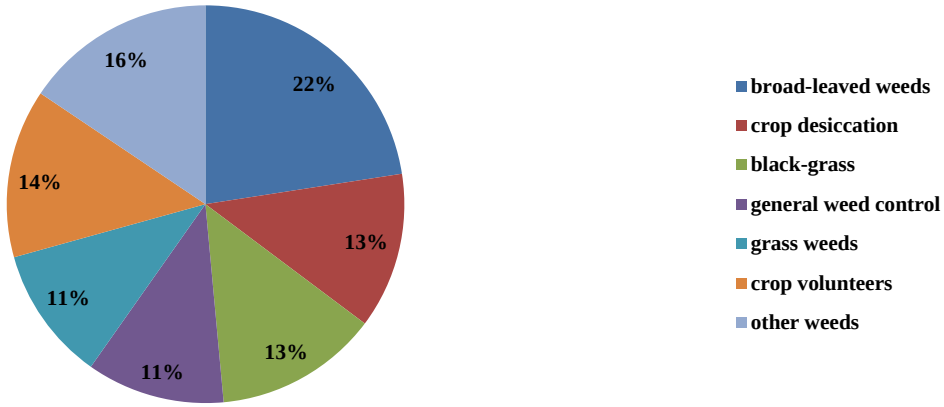


Oilseed rape – Herbicides

- **Formulation area treated: 2,772,835 hectares**
- **Weight of active substances applied: 1,634.0 tonnes**
- **The five most common formulations were:**

	Formulation area treated (ha)	Weight of a.s. applied (kg)	Proportion of herbicide – treated area	Proportion of census area treated	Average number of applications (where applied)	Average proportion of full label rate
Glyphosate	544,891	577,969	0.20	0.64	1.24	0.73
Propyzamide	350,219	267,472	0.13	0.51	1.01	0.91
Propaquizafop	330,711	18,008	0.12	0.46	1.05	0.36
Dimethenamid-P/metazachlor/ quinmerac	188,427	181,128	0.07	0.25	1.12	0.77
Metazachlor/quinmerac	159,644	147,818	0.06	0.22	1.08	0.75

Figure 36 - Oilseed rape - Reasons for use of herbicides (where given)



Oilseed rape – Growth regulators

- **Formulation area treated: 53,114 hectares**
- **Weight of active substances applied: 11.7 tonnes**
- **A single growth regulator was recorded:**

	Formulation area treated (ha)	Weight of a.s. applied (kg)	Proportion of growth regulator – treated area	Proportion of census area treated	Average number of applications (where applied)	Average proportion of full label rate
Mepiquat chloride/metconazole	53,114	11,696	1.00	0.08	1.00	0.66

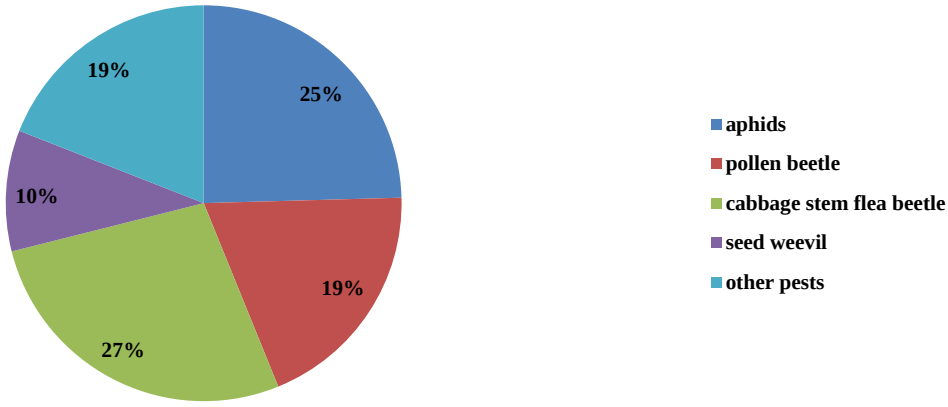
It should be noted that the fungicides metconazole and tebuconazole, both have effective plant growth regulation properties and therefore can have a dual purpose on oilseed rape.

Oilseed rape – Insecticides

- **Formulation area treated: 1,316,529 hectares**
- **Weight of active substances applied: 28.3 tonnes**
- **The five most common formulations were:**

	Formulation area treated (ha)	Weight of a.s. applied (kg)	Proportion of insecticide – treated area	Proportion of census area treated	Average number of applications (where applied)	Average proportion of full label rate
Lambda-cyhalothrin	429,703	2,794	0.33	0.41	1.57	0.87
Cypermethrin	383,209	9,305	0.29	0.37	1.52	0.84
Tau-fluvalinate	262,371	12,048	0.20	0.33	1.17	0.96
Alpha-cypermethrin	101,198	1,242	0.08	0.10	1.46	0.99
Zeta-cypermethrin	86,578	836	0.07	0.10	1.31	0.97

Figure 36 - Oilseed rape - Reasons for use of insecticides (where given)



Oilseed rape – Seed Treatments

- **Formulation area treated: 725,546 hectares**
- **Weight of active substances applied: 18.2 tonnes**
- **5% of the seed remained untreated**
- **Where specified the most common formulations were:**

	Formulation area treated (ha)	Weight of a.s. applied (kg)	Proportion of seed treatment-treated area	Proportion of census area treated (excluding unspecified treatments)
Fludioxonil/metalaxyl-M/ thiamethoxam	311,897	8,744	0.51	0.55
Beta-cyfluthrin/clothianidin	203,960	7,058	0.33	0.36
Prochloraz/thiram	88,532	2,206	0.14	0.16
Thiram	6,613	106	0.01	0.01
Beta-cyfluthrin/imidacloprid	1,680	38	0.00	<0.01

Linseed

- **15,955 hectares of linseed grown in the United Kingdom**
- **96,869 treated hectares**
- **17.8 tonnes applied**
- **There were no untreated crops of linseed recorded**
- **Linseed received on average 3 herbicides, 2 insecticides and 1 fungicide**
- **81% of the crop was spring sown**
- **The main varieties encountered included Duchess, Everest, Altess, Brighton and Juliet**

Figure 37 - Usage of pesticides on linseed - 2014

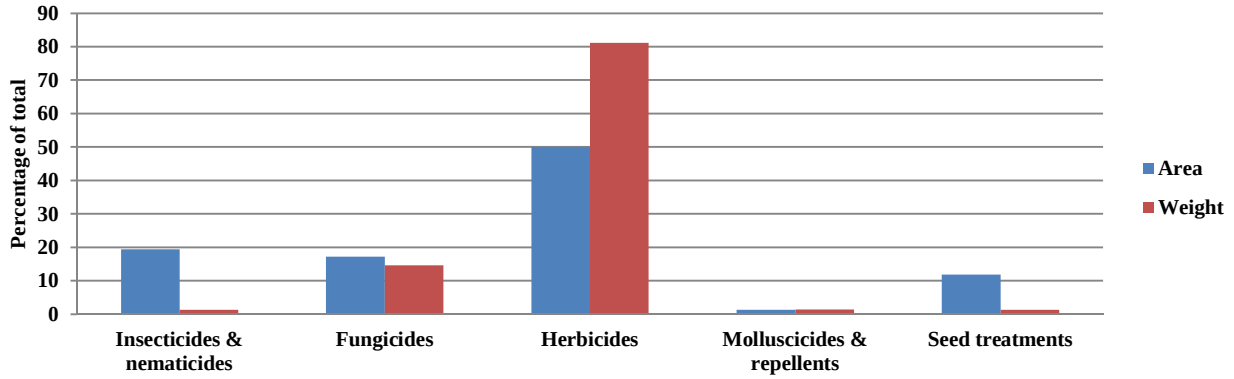
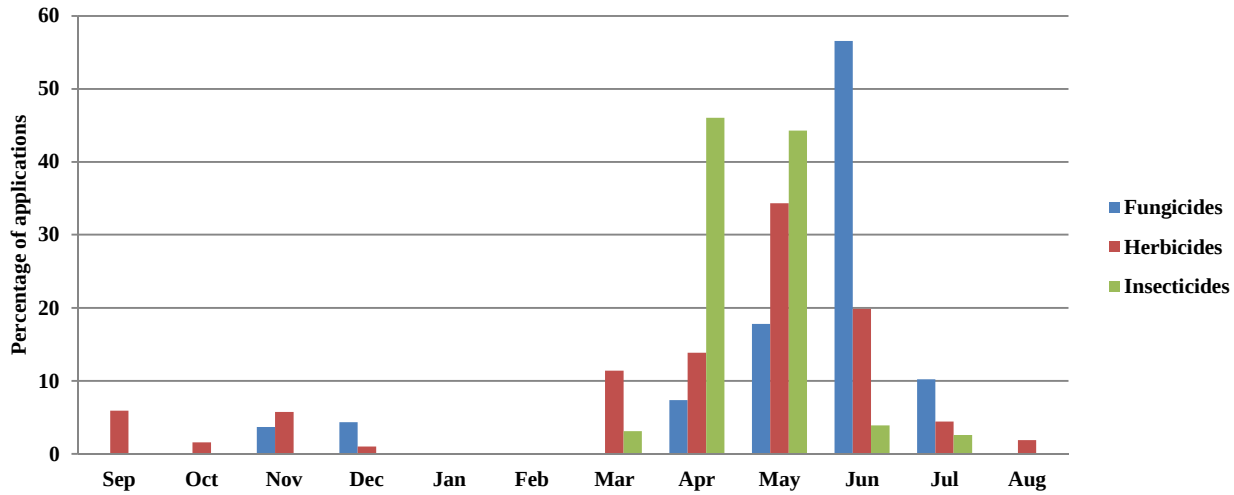


Figure 38 - Timing of pesticide applications on linseed: September 2013 - August 2014

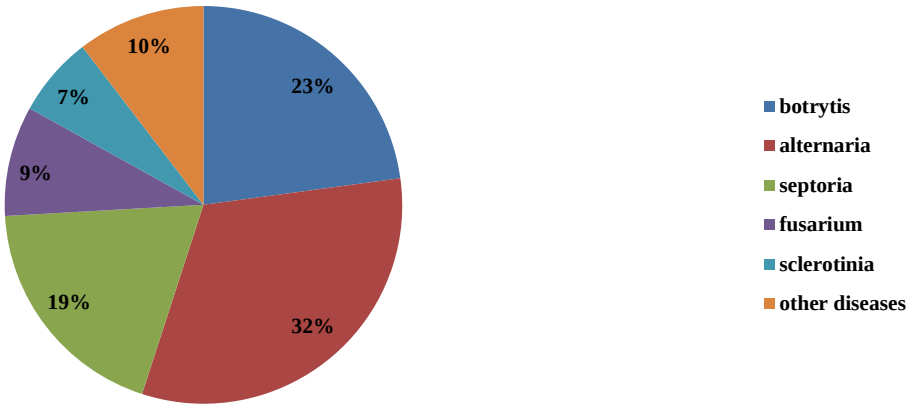


Linseed – Fungicides

- **Formulation area treated: 16,752 hectares**
- **Weight of active substances applied: 2.6 tonnes**
- **The four formulations encountered were:**

	Formulation area treated (ha)	Weight of a.s. applied (kg)	Proportion of fungicide-treated area	Proportion of census area treated	Average number of applications (where applied)	Average proportion of full label rate
Tebuconazole	10,441	2,152	0.62	0.58	1.13	0.82
Metconazole	3,920	272	0.23	0.21	1.14	0.96
Boscalid	2,007	164	0.12	0.13	1.00	0.33
Difenoconazole	386	30	0.02	0.02	1.00	0.62

Figure 39 - Linseed - Reasons for use of fungicides (where given)

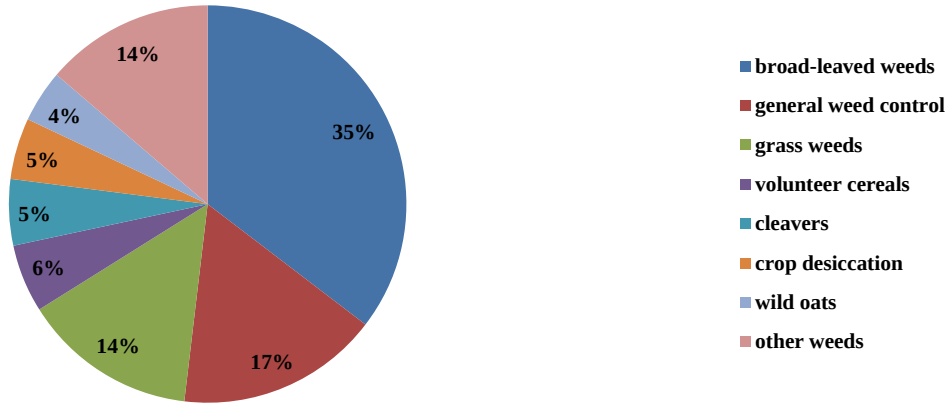


Linseed – Herbicides

- **Formulation area treated: 48,517 hectares**
- **Weight of active substances applied: 14.5 tonnes**
- **The five most common formulations were:**

	Formulation area treated (ha)	Weight of a.s. applied (kg)	Proportion of herbicide – treated area	Proportion of census area treated	Average number of applications (where applied)	Average proportion of full label rate
Glyphosate	10,975	8,566	0.23	0.60	1.14	0.47
Amidosulfuron/ iodosulfuron-methyl-sodium	8,302	220	0.17	0.52	1.01	0.97
Propaquizafop	6,788	509	0.14	0.41	1.00	0.50
Bromoxynil	4,875	1,312	0.10	0.30	1.00	0.67
Tepraloxydim	3,436	187	0.07	0.21	1.01	0.73

Figure 40 - Linseed - Reasons for use of herbicides (where given)



Linseed – Insecticides

- **Formulation area treated: 18,865 hectares**
- **Weight of active substances applied: 0.2 tonnes**
- **The four formulations encountered were:**

	Formulation area treated (ha)	Weight of a.s. applied (kg)	Proportion of insecticide – treated area	Proportion of census area treated	Average number of applications (where applied)	Average proportion of full label rate
Lambda-cyhalothrin	8,303	58	0.44	0.39	1.34	0.95
Zeta-cypermethrin	5,953	60	0.32	0.14	2.74	1.00
Cypermethrin	4,258	106	0.23	0.18	1.49	0.63
Alpha-cypermethrin	350	4	0.02	0.02	1.00	0.60

Control of flax flea beetles accounted for 93% of insecticide usage.

Linseed – Seed Treatments

- **Formulation area treated: 11,452 hectares**
- **Weight of active substances applied: 0.2 tonnes**
- **45% of the seed remained untreated**
- **The three formulations encountered were:**

	Formulation area treated (ha)	Weight of a.s. applied (kg)	Proportion of seed treatment-treated area	Proportion of census area treated (excluding unspecified treatments)
Prochloraz	4,774	95	0.85	0.47
Thiram	638	96	0.11	0.06
Beta-cyfluthrin/imidacloprid	224	45	0.04	0.02

PESTICIDE USAGE ON POTATOES

Ware Potatoes

- **123,317 hectares of ware potatoes were grown in the United Kingdom**
- **2,860,265 treated hectares**
- **1,645.0 tonnes applied**
- **1.6% of ware potatoes remained untreated**
- **Ware potatoes received on average 12 fungicides, 3 herbicides, 3 molluscicides and 2 insecticides (Metaldehyde accounted for 50% of the molluscicide total, methiocarb 37% & ferric phosphate 13%)**
- **The main varieties encountered included Estima, Markies, Maris Piper, Marfona, Maris Peer, Premiere and Accord**

Figure 41 - Usage of pesticides on ware potatoes - 2014

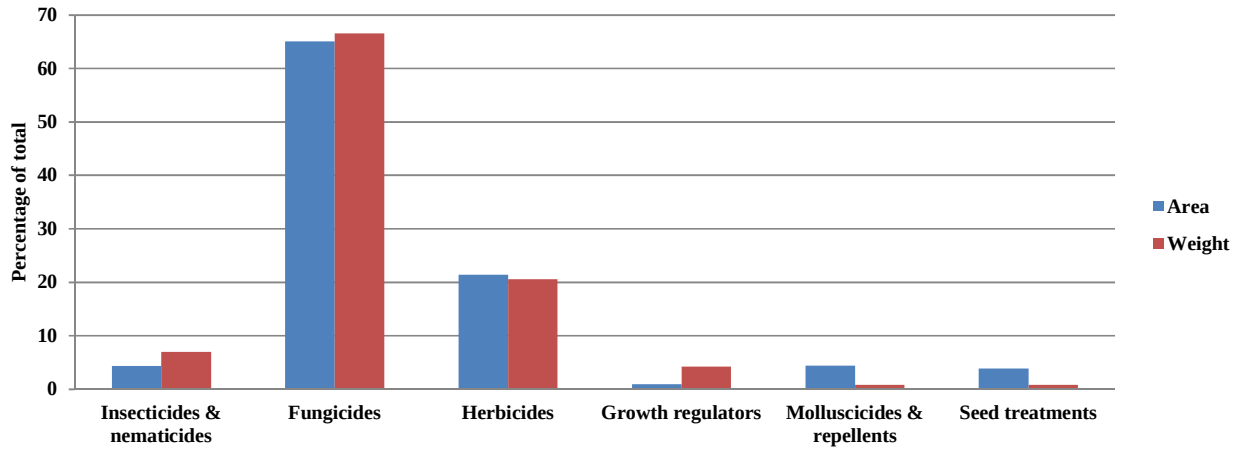
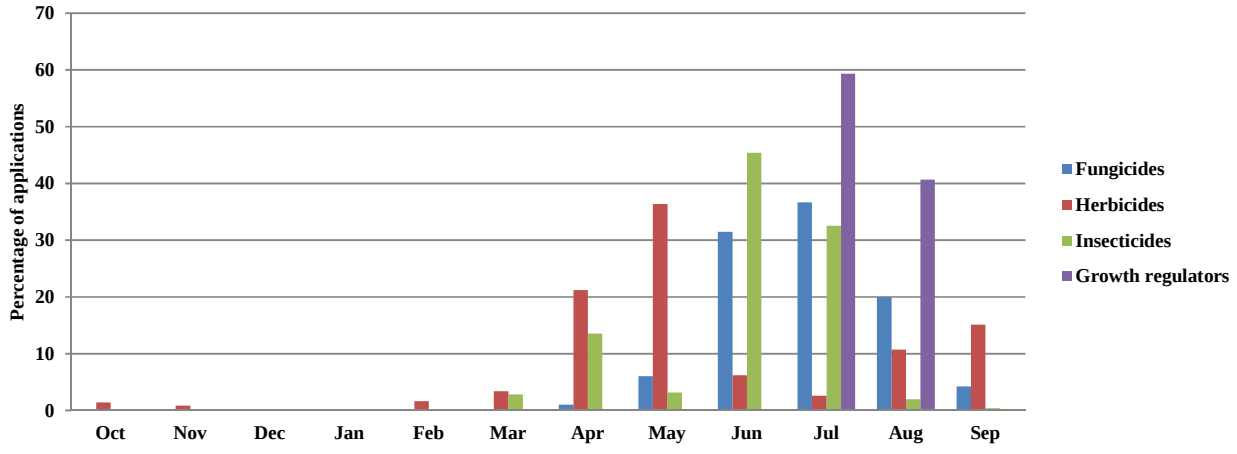


Figure 42 - Timing of pesticide applications on ware potatoes: October 2013 - September 2014

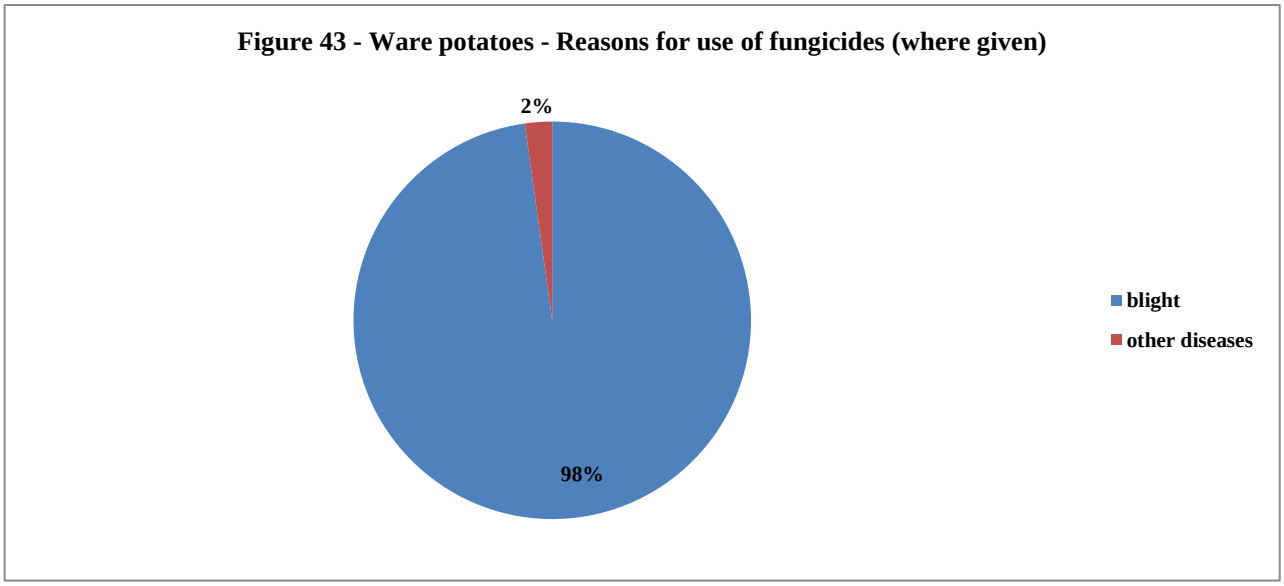


Ware Potatoes – Fungicides

- **Formulation area treated: 1,861,565 hectares**
- **Weight of active substances applied: 1,094.7 tonnes**
- **The five most used formulations encountered were:**

	Formulation area treated (ha)	Weight of a.s. applied (kg)	Proportion of fungicide - treated area	Proportion of census area treated	Average number of applications (where applied)	Average proportion of full label rate
Cymoxanil/mancozeb	378,135	509,808	0.20	0.73	4.12	0.90
Fluazinam	328,194	57,318	0.18	0.86	3.08	0.87
Cyazofamid	234,217	18,890	0.13	0.70	2.71	1.01
Mandipropamid	211,241	30,849	0.11	0.73	2.34	0.97
Cymoxanil	186,516	16,901	0.10	0.49	3.10	0.89

Figure 43 - Ware potatoes - Reasons for use of fungicides (where given)

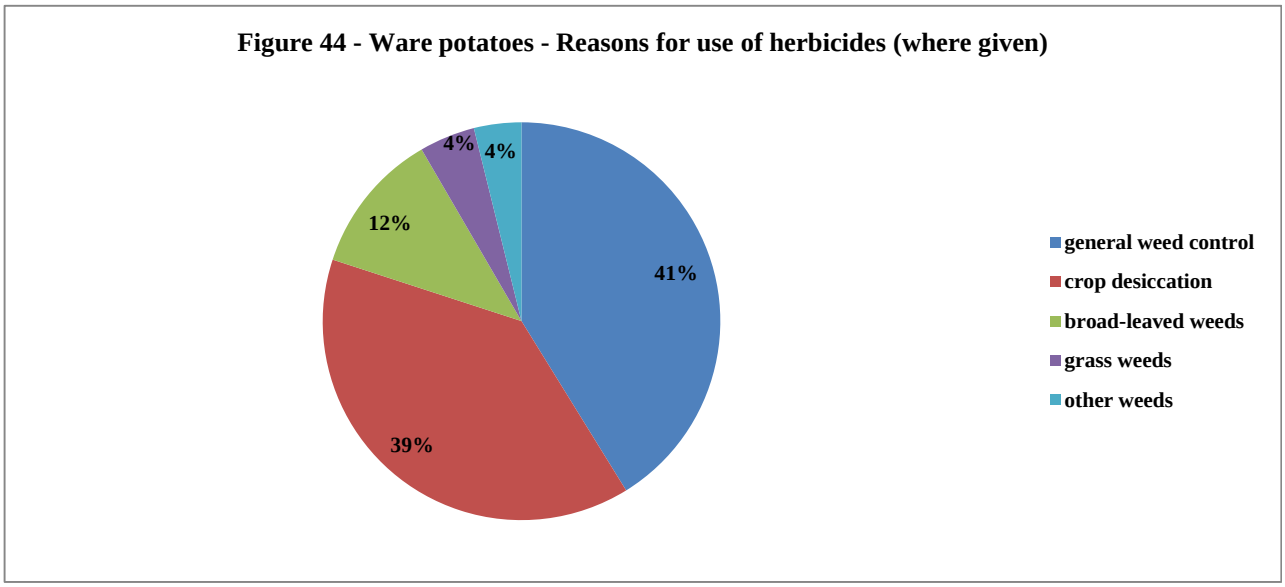


Ware potatoes – Herbicides

- **Formulation area treated: 611,270 hectares**
- **Weight of active substances applied: 338.6 tonnes**
- **The five most used formulations encountered were:**

	Formulation area treated (ha)	Weight of a.s. applied (kg)	Proportion of herbicide – treated area	Proportion of census area treated	Average number of applications (where applied)	Average proportion of full label rate
Diquat	239,604	94,495	0.39	0.96	2.00	0.51
Metribuzin	81,663	32,435	0.13	0.62	1.06	0.54
Linuron	80,492	45,614	0.13	0.65	1.01	0.83
Glyphosate	50,595	45,166	0.08	0.35	1.03	0.52
Carfentrazone-ethyl	45,682	2,017	0.07	0.32	1.15	0.92

Figure 44 - Ware potatoes - Reasons for use of herbicides (where given)



Ware potatoes – Growth regulators

- **Formulation area treated: 27,199 hectares**
- **Weight of active substances applied: 69.4 tonnes**
- **There was a single formulation encountered:**

	Formulation area treated (ha)	Weight of a.s. applied (kg)	Proportion of growth regulator – treated area	Proportion of census area treated	Average number of applications (where applied)	Average proportion of full label rate
Maleic hydrazide	27,199	69,409	1.00	0.22	1.00	0.85

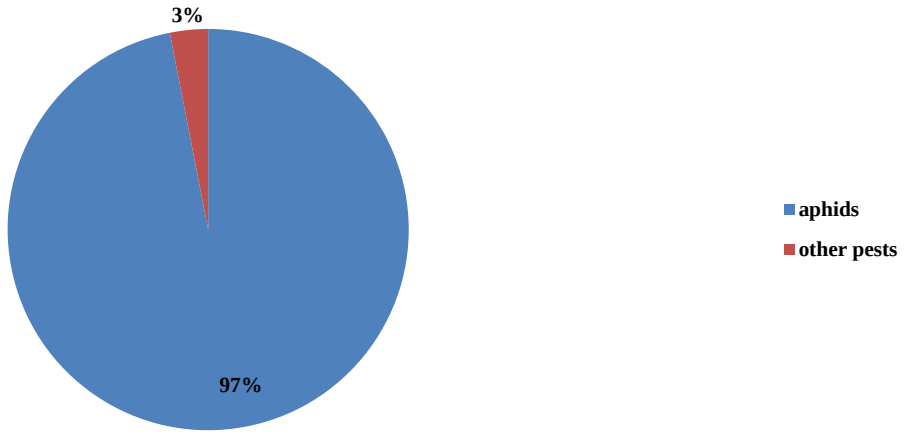
Ware potatoes – Insecticides & nematicides

- **Formulation area treated: 123,752 hectares**
- **Weight of active substances applied: 114.6 tonnes**
- **The five most common formulations were:**

	Formulation area treated (ha)	Weight of a.s. applied (kg)	Proportion of insecticide – treated area	Proportion of census area treated	Average number of applications (where applied)	Average proportion of full label rate
Lambda-cyhalothrin	28,287	194	0.26	0.12	1.87	0.92
Oxamyl	18,433	66,118	0.17	0.15	1.02	0.81
Flonicamid	15,977	1,267	0.14	0.13	1.00	0.99
Thiacloprid	13,645	1,288	0.12	0.10	1.12	0.98
Esfenvalerate	10,471	49	0.09	0.06	1.40	0.94

Please note that oxamyl is primarily used as a nematicide for potato cyst nematode control although it has activity against other soil pests.

Figure 45 - Ware potatoes - Reasons for use of insecticides (where given)



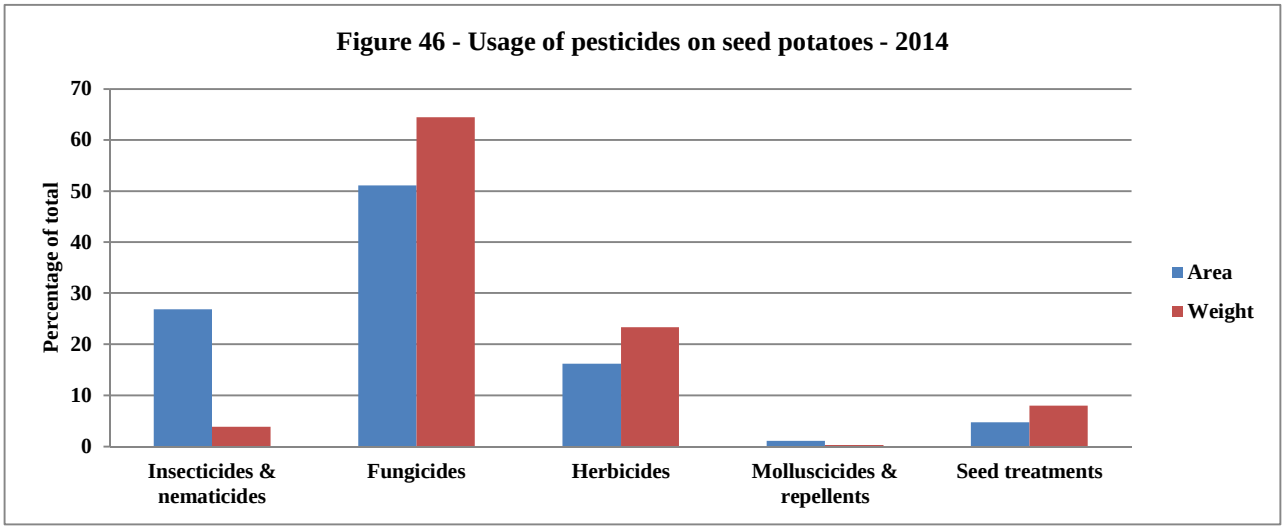
Ware potatoes – Seed Treatments

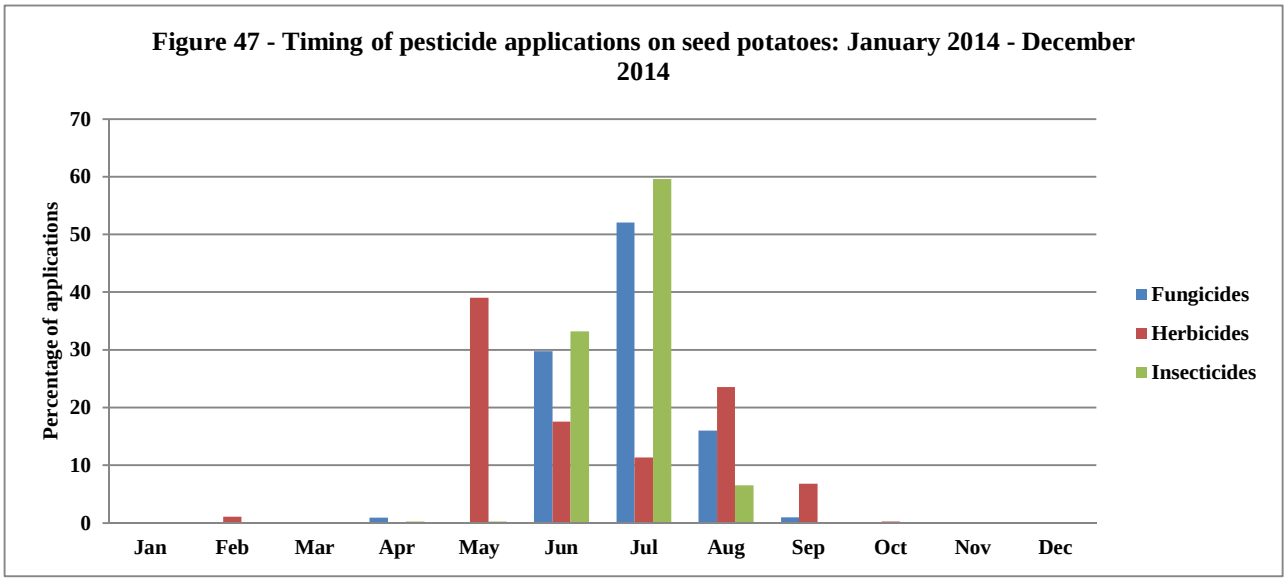
- **Formulation area treated: 110,655 hectares**
- **Weight of active substances applied: 13.7 tonnes**
- **30% of the seed remained untreated, but other fungicides may have been applied at the time of planting**
- **The five formulations encountered were:**

	Formulation area treated (ha)	Weight of a.s. applied (kg)	Proportion of seed treatment-treated area	Proportion of census area treated (excluding unspecified treatments)
Pencycuron	22,730	11,214	0.45	0.36
Imazalil	17,747	445	0.35	0.28
Imazalil/thiabendazole	5,767	580	0.11	0.09
Flutolanil	3,068	782	0.06	0.05
Imazalil/pencycuron	1,453	698	0.03	0.02

Seed Potatoes

- **17,213 hectares of seed potatoes were grown in the United Kingdom**
- **429,364 treated hectares**
- **141.3 tonnes applied**
- **All seed potatoes encountered were treated**
- **Seed potatoes received on average 9 fungicides, 6 insecticides, 2 herbicides and 2 molluscicides**
- **The main varieties encountered included Maris Piper, Cara, Hermes, Wilja and Desiree**



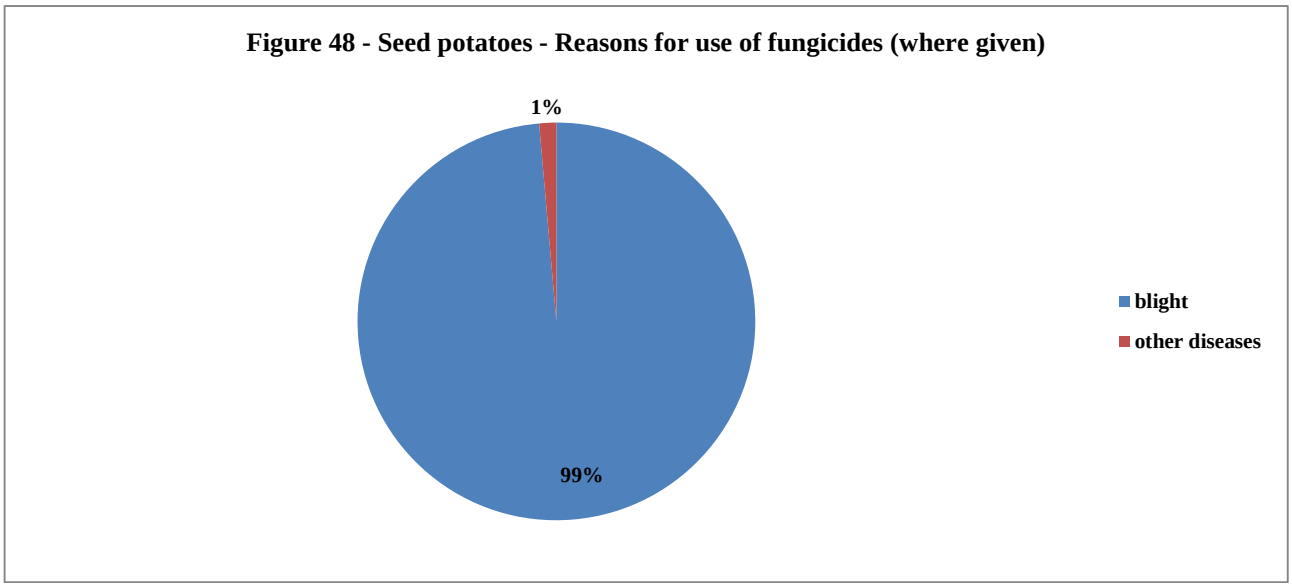


Seed Potatoes – Fungicides

- **Formulation area treated: 219,607 hectares**
- **Weight of active substances applied: 91.1 tonnes**
- **The five most common formulations were:**

	Formulation area treated (ha)	Weight of a.s. applied (kg)	Proportion of fungicide - treated area	Proportion of census area treated	Average number of applications (where applied)	Average proportion of full label rate
Cymoxanil	42,529	3,766	0.19	0.80	3.10	0.86
Cyazofamid	37,046	2,941	0.17	0.88	2.44	0.99
Fluazinam	32,078	5,892	0.15	0.83	2.25	0.51
Cymoxanil/mancozeb	27,361	30,659	0.12	0.52	3.05	0.74
Mandipropamid	26,320	3,908	0.12	0.90	1.70	0.99

Figure 48 - Seed potatoes - Reasons for use of fungicides (where given)

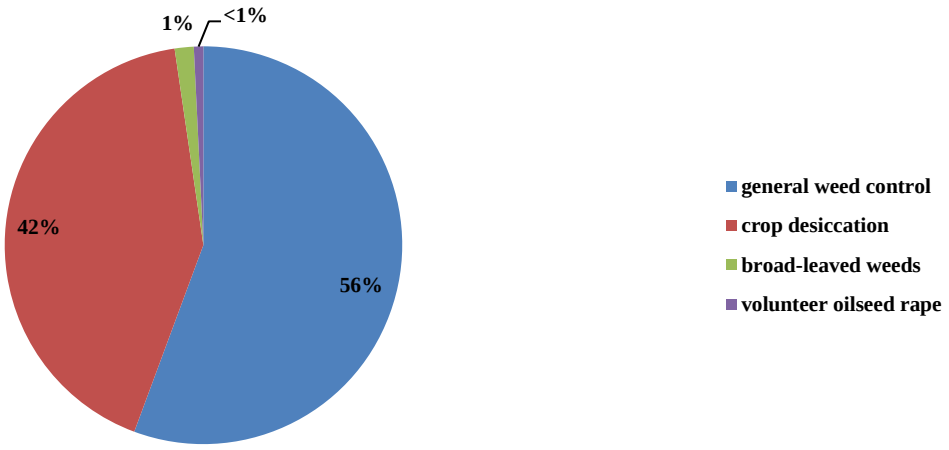


Seed potatoes – Herbicides

- **Formulation area treated: 69,425 hectares**
- **Weight of active substances applied: 33.0 tonnes**
- **The five most common formulations were:**

	Formulation area treated (ha)	Weight of a.s. applied (kg)	Proportion of herbicide – treated area	Proportion of census area treated	Average number of applications (where applied)	Average proportion of full label rate
Diquat	31,267	10,981	0.45	0.88	2.07	0.48
Carfentrazone-ethyl	14,650	607	0.21	0.57	1.50	0.88
Metribuzin	10,953	5,141	0.16	0.62	1.00	0.79
Linuron	6,754	3,666	0.10	0.39	1.00	0.90
Prosulfocarb	3,895	10,991	0.06	0.23	1.00	0.71

Figure 49 - Seed potatoes - Reasons for use of herbicides (where given)



Seed potatoes – Insecticides

- **Formulation area treated: 115,176 hectares**
- **Weight of active substances applied: 5.5 tonnes**
- **The five most common formulations were:**

	Formulation area treated (ha)	Weight of a.s. applied (kg)	Proportion of insecticide – treated area	Proportion of census area treated	Average number of applications (where applied)	Average proportion of full label rate
Lambda-cyhalothrin	42,292	304	0.37	0.74	3.33	0.96
Esfenvalerate	33,600	159	0.29	0.80	2.44	0.94
Thiacloprid	16,808	1,567	0.15	0.59	1.64	0.97
Flonicamid	8,341	645	0.07	0.36	1.34	0.97
Pymetrozine	6,267	908	0.05	0.26	1.42	0.97

Aphids were the main pests controlled, accounting for 71% of insecticide applications. The main reason for the control of the aphids would have been to prevent virus spreading into the plants and resultant tubers.

Seed potatoes – Seed Treatments

- **Formulation area treated: 20,305 hectares**
- **Weight of active substances applied: 11.3 tonnes**
- **2% of the seed remained untreated**
- **The five formulations encountered were:**

	Formulation area treated (ha)	Weight of a.s. applied (kg)	Proportion of seed treatment-treated area	Proportion of census area treated (excluding unspecified treatments)
Pencycuron	13,991	10,265	0.69	0.81
Imazalil/thiabendazole	4,127	817	0.20	0.24
Imazalil	1,393	52	0.07	0.08
Flutolanil	559	116	0.03	0.03
Imazalil/pencycuron	236	82	0.01	0.01

PESTICIDE USAGE ON PULSES

Dry harvest peas

- **31,326 hectares of dry harvest peas grown in the United Kingdom**
- **299,708 treated hectares**
- **109.0 tonnes applied**
- **There were no untreated crops of dry harvest peas encountered**
- **Dry harvest peas received on average 3 herbicides, 3 insecticides and 2 fungicides**
- **The main varieties encountered included Sakura, Prophet, Kabuki and Daytona**
- **All crops encountered were spring-sown**

Figure 50 - Usage of pesticides on dry-harvest peas - 2014

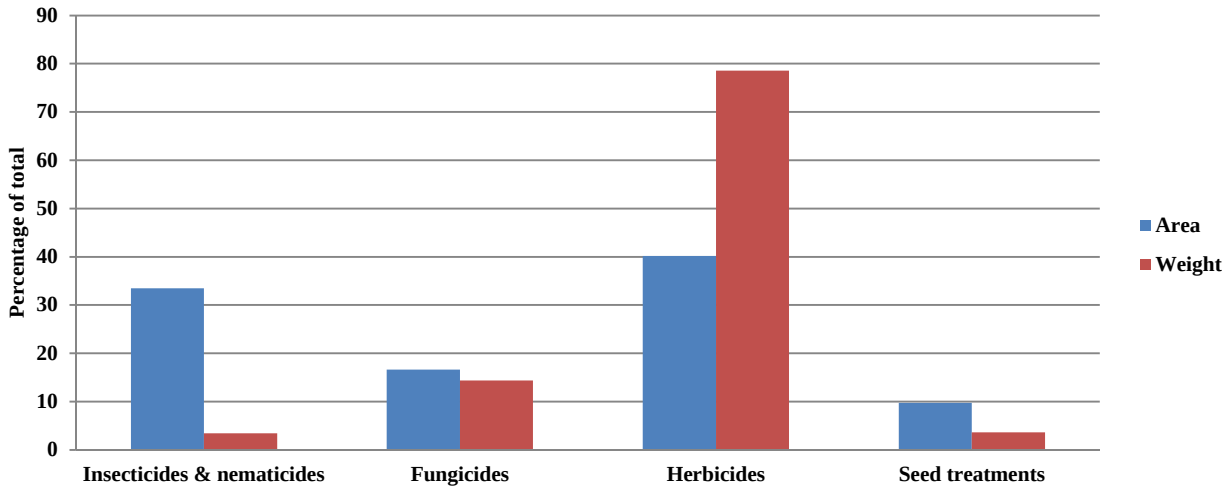
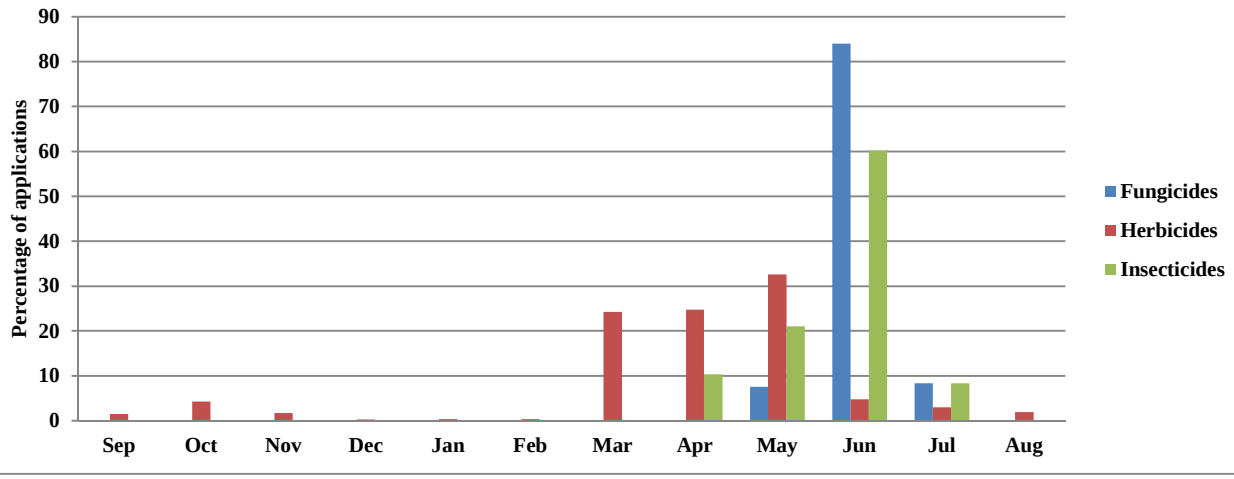


Figure 51 - Timing of pesticide applications on dry-harvest peas: September 2013 - August 2014

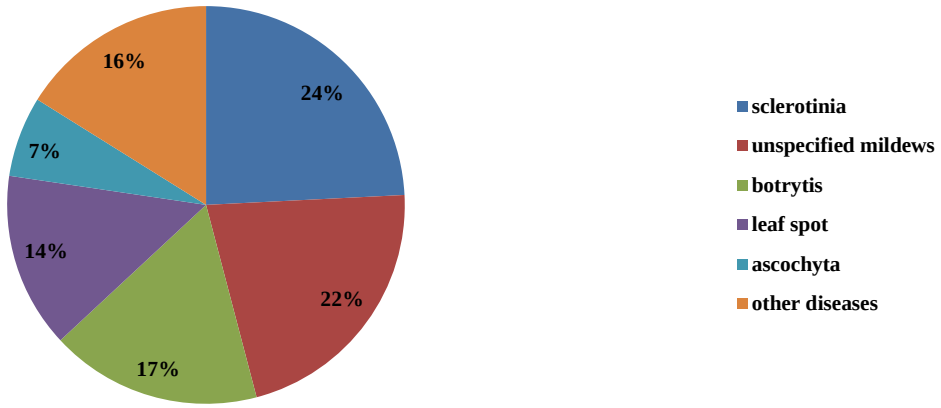


Dry harvest peas – Fungicides

- **Formulation area treated: 49,762 hectares**
- **Weight of active substances applied: 15.7 tonnes**
- **The five most common formulations were:**

	Formulation area treated (ha)	Weight of a.s. applied (kg)	Proportion of fungicide-treated area	Proportion of census area treated	Average number of applications (where applied)	Average proportion of full label rate
Azoxystrobin	18,854	2,369	0.38	0.41	1.48	0.50
Chlorothalonil/cyproconazole	16,504	9,184	0.33	0.46	1.14	0.67
Metconazole	6,021	239	0.12	0.15	1.29	0.55
Chlorothalonil/pyrimethanil	3,818	3,075	0.08	0.11	1.16	0.77
Boscalid/pyraclostrobin	3,622	697	0.07	0.12	1.00	0.58

Figure 52 - Dry harvest peas - Reasons for use of fungicides (where given)

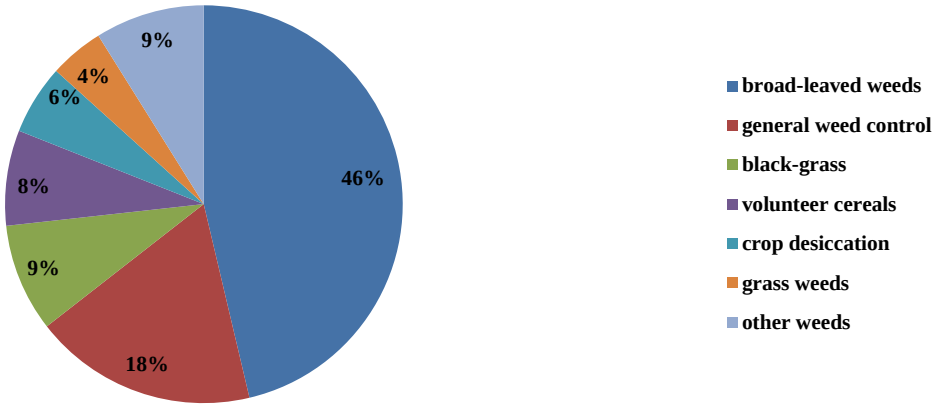


Dry harvest peas – Herbicides

- **Formulation area treated: 120,396 hectares**
- **Weight of active substances applied: 85.7 tonnes**
- **The five most common formulations were:**

	Formulation area treated (ha)	Weight of a.s. applied (kg)	Proportion of herbicide – treated area	Proportion of census area treated	Average number of applications (where applied)	Average proportion of full label rate
Glyphosate	26,331	23,106	0.22	0.66	1.20	0.52
Imazamox/pendimethalin	14,735	14,512	0.12	0.47	1.00	0.82
Bentazone	12,281	10,032	0.10	0.38	1.04	0.57
MCPB	12,081	10,837	0.10	0.38	1.01	0.50
Pendimethalin	11,129	10,354	0.09	0.36	1.00	0.71

Figure 53 - Dry harvest peas - Reasons for use of herbicides (where given)

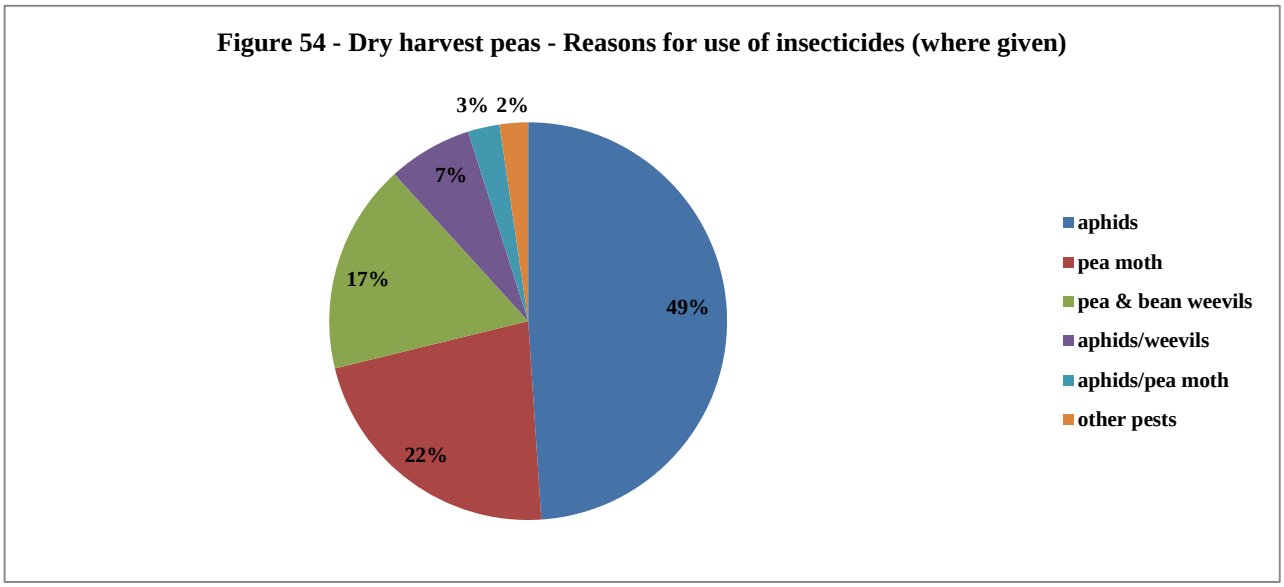


Dry harvest peas – Insecticides

- **Formulation area treated: 100,330 hectares**
- **Weight of active substances applied: 3.7 tonnes**
- **The five most common formulations were:**

	Formulation area treated (ha)	Weight of a.s. applied (kg)	Proportion of insecticide – treated area	Proportion of census area treated	Average number of applications (where applied)	Average proportion of full label rate
Lambda-cyhalothrin	46,115	269	0.46	0.79	1.79	0.78
Pirimicarb	37,754	3,283	0.38	0.76	1.52	0.62
Alpha-cypermethrin	8,458	103	0.08	0.17	1.60	0.94
Zeta-cypermethrin	3,298	39	0.03	0.07	1.46	0.79
Deltamethrin	2,926	21	0.03	0.07	1.28	0.93

Figure 54 - Dry harvest peas - Reasons for use of insecticides (where given)



Dry harvest peas – Seed Treatments

- **Formulation area treated: 29,220 hectares**
- **Weight of active substances applied: 4.0 tonnes**
- **8% of the seed remained untreated**
- **The two formulations encountered were:**

	Formulation area treated (ha)	Weight of a.s. applied (kg)	Proportion of seed treatment-treated area	Proportion of census area treated (excluding unspecified treatments)
Thiram	14,013	2,158	0.56	0.52
Cymoxanil/fludioxonil/metalaxyl-M	10,802	1,804	0.44	0.40

Field beans

- **106,300 hectares of field beans grown in the United Kingdom (79% were spring sown)**
- **833,836 treated hectares**
- **336.7 tonnes applied**
- **0.1% of field beans remained untreated**
- **Field beans received on average 3 herbicides, 3 insecticides and 2 fungicides**
- **The main varieties encountered included Fuego (spring) and Wizard (winter)**

Figure 55 - Usage of pesticides on field beans - 2014

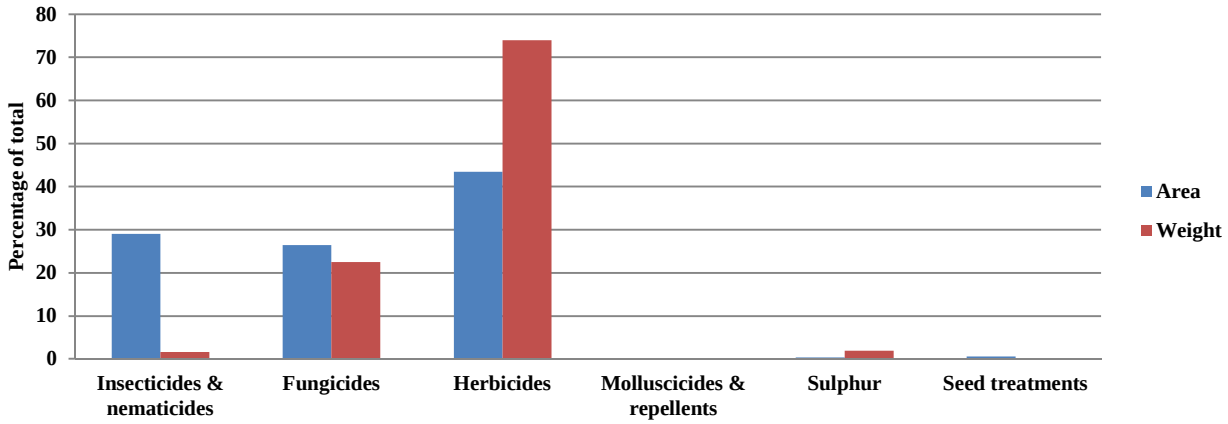


Figure 56a - Timing of pesticide applications on winter field beans: September 2013 - August 2014

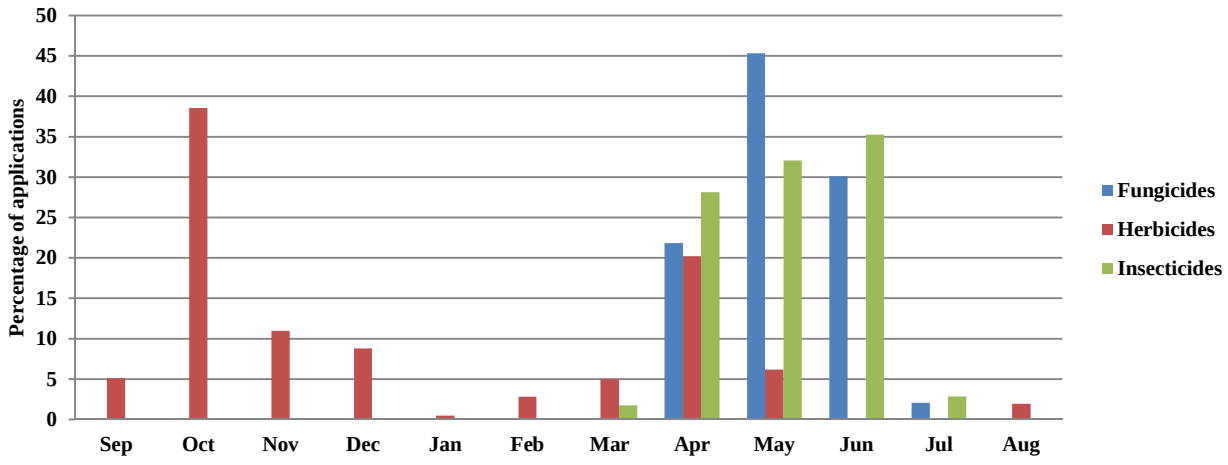
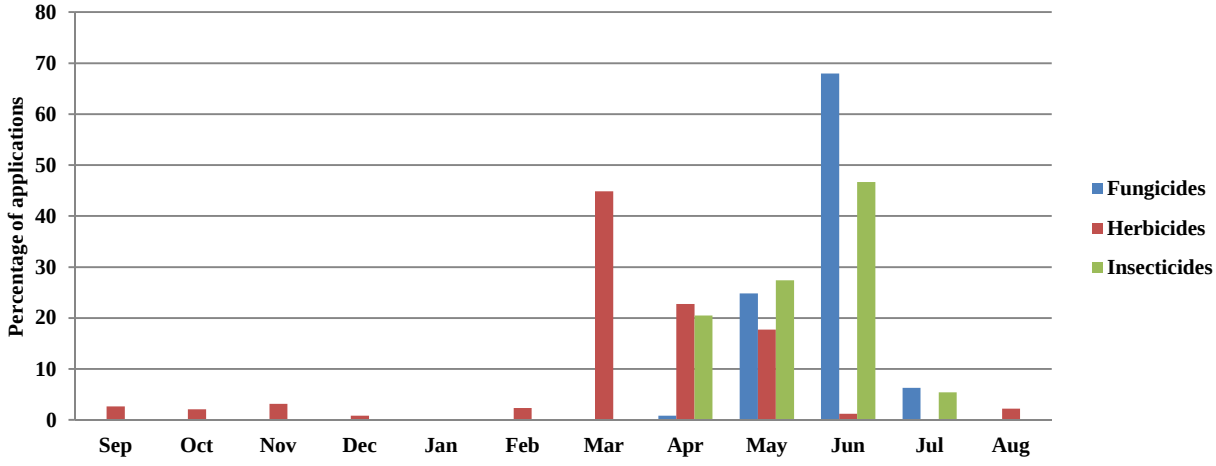


Figure 56b - Timing of pesticide applications on spring field beans: September 2013 - August 2014

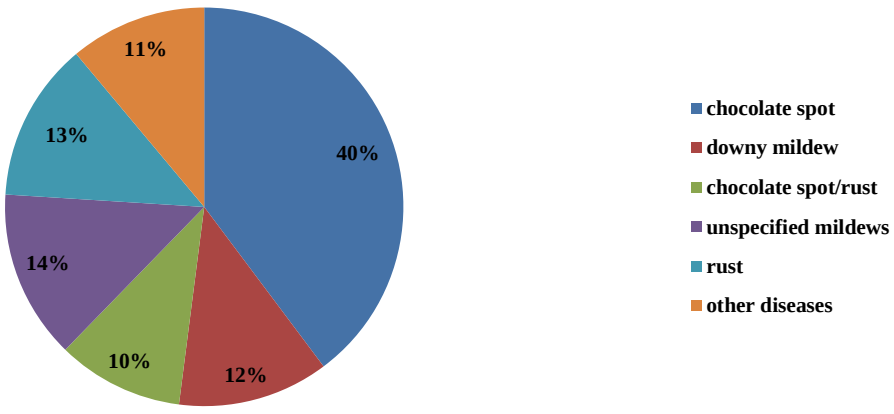


Field beans – Fungicides

- **Formulation area treated: 220,704 hectares**
- **Weight of active substances applied: 75.8 tonnes**
- **The five most common formulations were:**

	Formulation area treated (ha)	Weight of a.s. applied (kg)	Proportion of fungicide-treated area	Proportion of census area treated	Average number of applications (where applied)	Average proportion of full label rate
Chlorothalonil/cyproconazole	88,977	48,870	0.40	0.66	1.27	0.66
Azoxystrobin	36,749	5,053	0.17	0.29	1.19	0.55
Tebuconazole	23,187	3,510	0.11	0.19	1.11	0.60
Boscalid/pyraclostrobin	22,644	4,134	0.10	0.20	1.06	0.55
Metalaxyl-M	19,552	887	0.09	0.17	1.09	0.61

Figure 57 - Field beans - Reasons for use of fungicides (where given)

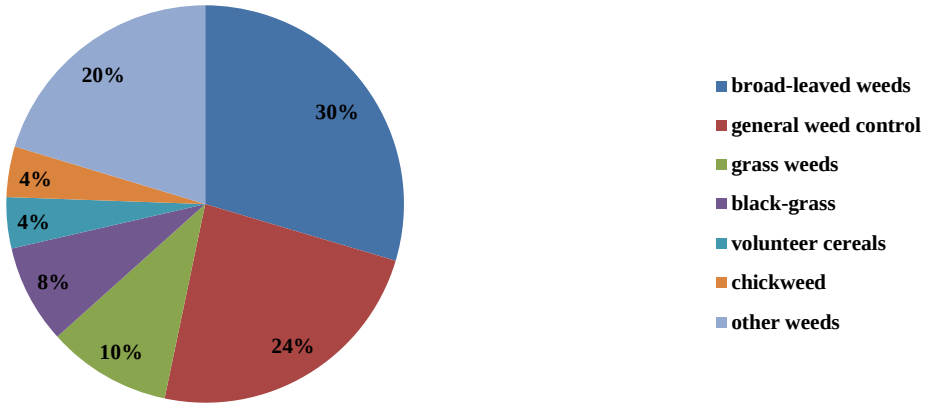


Field beans – Herbicides

- **Formulation area treated: 362,568 hectares**
- **Weight of active substances applied: 249.0 tonnes**
- **The five most common formulations were:**

	Formulation area treated (ha)	Weight of a.s. applied (kg)	Proportion of herbicide – treated area	Proportion of census area treated	Average number of applications (where applied)	Average proportion of full label rate
Glyphosate	85,119	71,908	0.23	0.56	1.43	0.54
Imazamox/pendimethalin	48,456	45,344	0.13	0.45	1.01	0.78
Pendimethalin	44,964	36,811	0.12	0.42	1.00	0.62
Bentazone	37,112	29,654	0.10	0.33	1.05	0.56
Clomazone/linuron	36,813	18,365	0.10	0.34	1.00	0.85

Figure 58 - Field beans - Reasons for use of herbicides (where given)

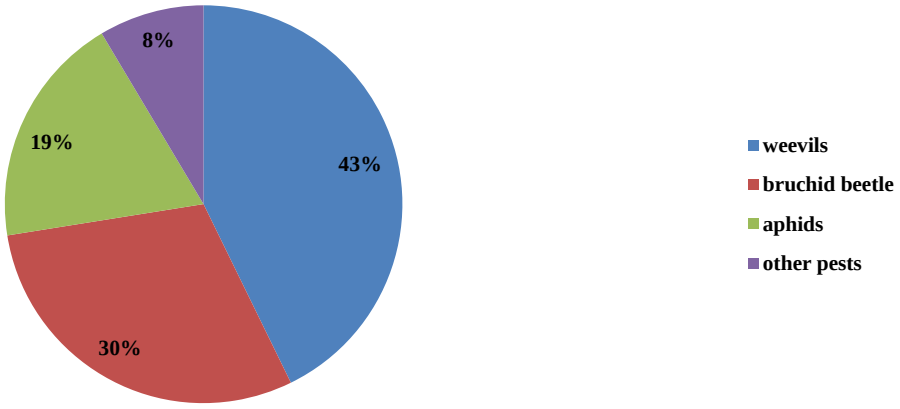


Field beans – Insecticides

- **Formulation area treated: 242,205 hectares**
- **Weight of active substances applied: 5.4 tonnes**
- **The five most common formulations were:**

	Formulation area treated (ha)	Weight of a.s. applied (kg)	Proportion of insecticide – treated area	Proportion of census area treated	Average number of applications (where applied)	Average proportion of full label rate
Lambda-cyhalothrin	125,968	876	0.52	0.70	1.68	0.93
Cypermethrin	41,075	1,011	0.17	0.29	1.31	1.01
Pirimicarb	29,453	2,918	0.12	0.26	1.05	0.71
Zeta-cypermethrin	15,279	205	0.06	0.10	1.39	0.89
Deltamethrin	13,186	94	0.05	0.11	1.16	0.95

Figure 59 - Field beans - Reasons for use of insecticides (where given)



The weevils indicated in the figure above are most likely to be pea & bean weevils *Sitona* spp.

Field beans – Seed Treatments

- **Formulation area treated: 4,782 hectares**
- **Weight of active substances applied: <0.1 tonnes**
- **99% of the seed remained untreated**
- **The only formulation specified was:**

	Formulation area treated (ha)	Weight of a.s. applied (kg)	Proportion of seed treatment-treated area	Proportion of census area treated (excluding unspecified treatments)
Thiram	132	35	1.00	<1

PESTICIDE USAGE ON SUGAR BEET

Sugar beet

- **116,291 hectares of sugar beet grown in the United Kingdom**
- **1,645,082 treated hectares**
- **467.9 tonnes applied**
- **There were no untreated crops of sugar beet recorded**
- **Sugar beet received on average 5 herbicides, 2 fungicides and 1 insecticide**
- **The main varieties encountered included Haydn, Stingray, Cayman and SY Muse**

Figure 60 - Usage of pesticides on sugar beet - 2014

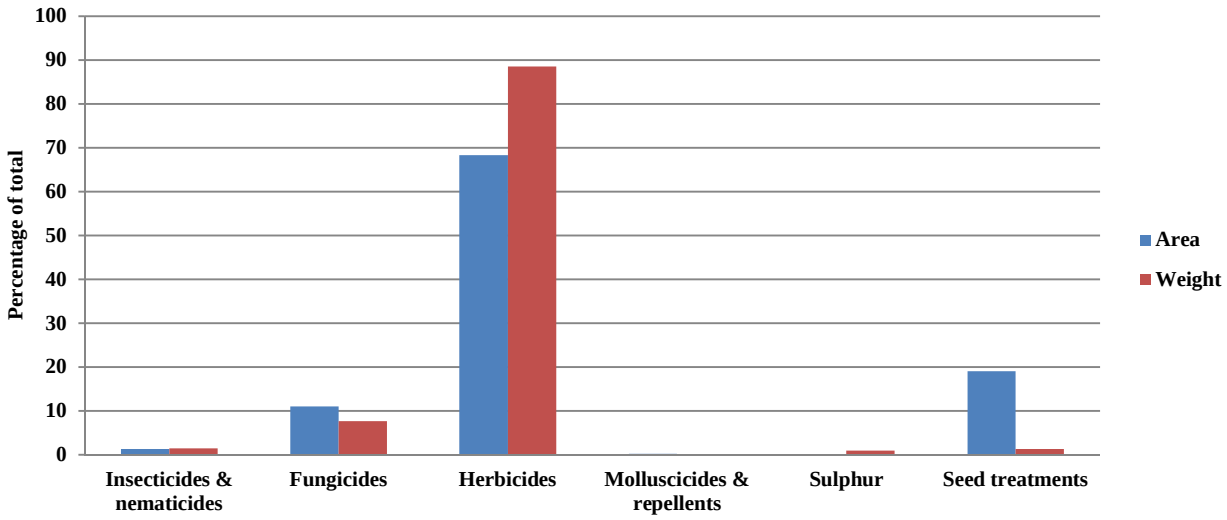
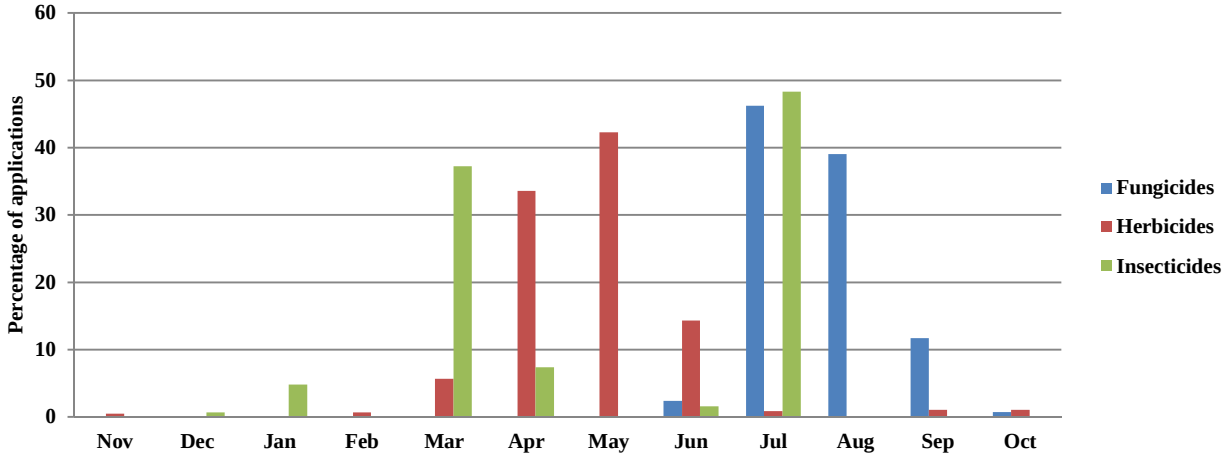


Figure 61 - Timing of pesticide applications on sugar beet: November 2013 - October 2014



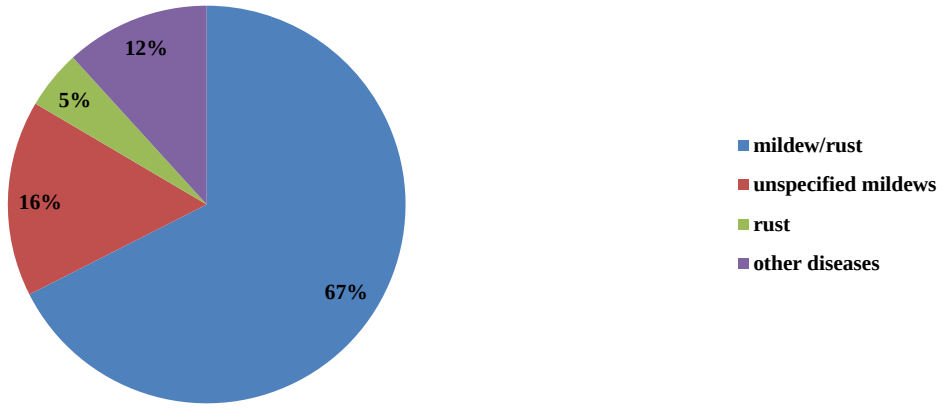
Sugar beet – Fungicides

- **Formulation area treated: 181,422 hectares**
- **Weight of active substances applied: 35.9 tonnes**
- **The five most common formulations were:**

	Formulation area treated (ha)	Weight of a.s. applied (kg)	Proportion of fungicide-treated area	Proportion of census area treated	Average number of applications (where applied)	Average proportion of full label rate
Cyproconazole/trifloxystrobin	135,476	24,134	0.75	0.80	1.46	0.95
Difenoconazole/fenpropidin	21,579	8,802	0.12	0.15	1.21	0.86
Cyproconazole	8,242	307	0.05	0.04	1.63	0.62
Azoxystrobin/cyproconazole	5,741	1,316	0.03	0.04	1.20	0.91
Epoxiconazole/pyraclostrobin	5,062	864	0.03	0.04	1.00	0.93

Usage of sulphur, mainly for powdery mildew control, accounted for less than 1% of the area treated, but 1% of weight applied, reflecting its relatively high rate of application.

Figure 62 - Sugar beet - Reasons for use of fungicides (where given)

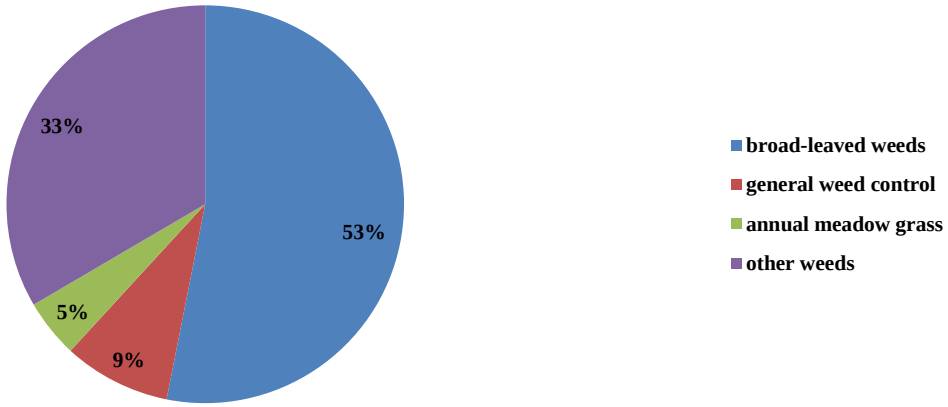


Sugar beet – Herbicides

- **Formulation area treated: 1,123,708 hectares**
- **Weight of active substances applied: 414.1 tonnes**
- **The five most common formulations were:**

	Formulation area treated (ha)	Weight of a.s. applied (kg)	Proportion of herbicide – treated area	Proportion of census area treated	Average number of applications (where applied)	Average proportion of full label rate
Metamitron	213,430	135,336	0.19	0.81	2.25	0.27
Desmedipham/ethofumesate/lenacil/ phenmedipham	107,825	24,476	0.10	0.44	2.09	0.72
Triflusulfuron-methyl	99,983	1,050	0.09	0.51	1.70	0.70
Phenmedipham	77,379	16,827	0.07	0.37	1.71	0.42
Clopyralid	74,280	6,388	0.07	0.38	1.69	0.43

Figure 63 - Sugar beet - Reasons for use of herbicides (where given)



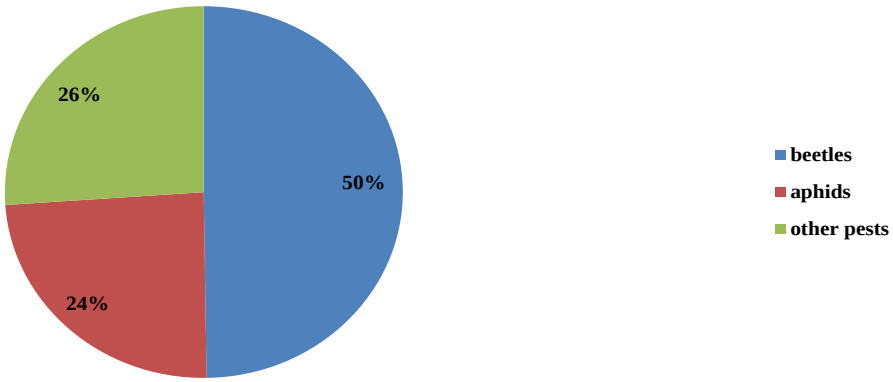
Sugar Beet – Insecticides & nematicides

- **Formulation area treated: 21,260 hectares**
- **Weight of active substances applied: 6.9 tonnes**
- **The five formulations encountered were:**

	Formulation area treated (ha)	Weight of a.s. applied (kg)	Proportion of insecticide – treated area	Proportion of census area treated	Average number of applications (where applied)	Average proportion of full label rate
Oxamyl	9,047	5,728	0.43	0.08	1.00	1.06
Pirimicarb	4,908	517	0.23	0.04	1.00	0.75
Lambda-cyhalothrin	3,856	29	0.18	0.03	1.00	1.00
Cypermethrin	1,824	46	0.09	0.02	1.00	1.00
Chlorpyrifos	1,625	571	0.08	0.01	1.10	0.48

Please note that oxamyl is an insecticide/nematicide primarily used to control free-living nematodes and/or beet cyst nematodes. However, it does control a range of pests including millipedes, pygmy mangold beetle & beet leaf miners. The apparent high rate of oxamyl is an anomaly due to the variability of rates according to row spacing. None of the rates encountered in the survey exceeded the maximum recommended for this product.

Figure 64 - Sugar beet - Reasons for use of insecticides (where given)



Sugar beet – Seed Treatments

- **Formulation area treated: 313,122 hectares**
- **Weight of active substances applied: 6.1 tonnes**
- **No untreated seed was encountered**
- **The area of some of the insecticidal seed treatments is possibly an under-estimate of the total used**

	Formulation area treated (ha)	Weight of a.s. applied (kg)	Proportion of seed treatment-treated area	Proportion of census area treated
Hymexazol	116,220	1,220	0.37	1.00
Thiram	116,220	349	0.37	1.00
Thiamethoxam	43,255	2,595	0.14	0.37
Beta-cyfluthrin/clothianidin	19,704	1,340	0.06	0.17
Tefluthrin	11,888	119	0.04	0.10

APPENDIX 1 – ARABLE APPLICATION TABLES

Table 1 Area of arable crops grown in the United Kingdom 2014 (hectares)

	East Midlands	Eastern	London & South East	North East	North West	South West	West Midlands	Yorkshire & the Humber	Wales	Scotland	Northern Ireland	United Kingdom
Wheat[1]	361,799	500,420	236,795	67,869	35,518	172,286	171,597	250,446	21,486	109,023	8,498	1,935,737
Winter barley	46,420	84,092	29,833	29,426	16,133	46,703	33,666	76,954	6,580	52,507	6,709	429,023
Spring barley	40,507	64,935	50,985	14,743	27,047	77,692	25,996	43,571	14,103	274,377	16,847	650,803
Oats[1]	11,849	9,840	21,025	8,778	4,848	21,490	18,337	8,535	4,969	25,050	2,086	136,807
Rye	1,334	4,233	1,475	99	35	1,434	472	721	1,164	.	.	10,967
Triticale[1]	1,032	1,581	973	185	873	3,452	924	790	.	519	390	10,719
Oilseed rape[1]	158,043	159,393	89,339	24,052	5,092	58,976	51,682	85,003	5,433	37,073	494	674,580
Linseed[1]	2,063	3,159	4,086	147	54	2,837	1,193	1,000	1,416	.	.	15,955
Potatoes	16,154	33,039	3,774	1,355	8,088	7,970	15,771	15,517	2,673	15,211	3,765	123,317
Seed potatoes	.	654	103	161	2	388	192	1,888	102	13,300	423	17,213
Peas	4,400	12,610	6,821	501	154	1,986	2,303	1,935	.	616	.	31,326
Beans[1]	21,353	28,954	20,792	2,717	1,455	8,751	8,929	10,530	.	2,765	54	106,300
Sugar beet	27,042	78,303	214	27	134	326	2,425	7,820	.	.	.	116,291
All arable crops	691,996	981,213	466,215	150,060	99,433	404,291	333,487	504,710	57,926	530,441	39,266	4,259,038

[1] Includes spring and winter sown crops

Table 2 Treated areas of arable crops in the United Kingdom 2014 by crop group (spray hectares)

	Wheat	Winter barley	Spring barley	Oats	Rye	Triticale	Oilseed rape	Linseed	Potatoes ware	Potatoes seed	Peas	Beans	Beet	All crops
Insecticides & nematicides	1,611,128	325,952	133,130	76,051	12,315	.	1,316,529	18,865	123,752	115,176	100,330	242,205	21,260	4,096,693
Fungicides	11,924,954	1,418,276	1,658,801	282,507	46,654	25,063	2,634,832	16,752	1,861,565	219,607	49,762	220,704	181,422	20,540,899
Herbicides	7,054,903	1,378,085	1,846,015	305,993	34,734	28,688	2,772,835	48,517	611,270	69,425	120,396	362,568	1,123,708	15,757,137
Growth regulators	4,250,674	718,501	211,922	151,019	23,939	14,085	53,114	.	27,199	.	.	.	.	5,450,453
Molluscicides & repellents	416,925	24,031	6,071	1,273	1,812	.	515,358	1,283	125,824	4,851	.	976	3,746	1,102,150
Sulphur	8,001	409	2,824	543	.	.	12,965	.	.	.	.	2,601	1,824	29,167
All seed treatments	2,063,504	437,360	567,070	105,277	10,967	7,521	725,546	11,452	110,655	20,305	29,220	4,782	313,122	4,406,781
All pesticides	27,330,089	4,302,614	4,425,833	922,663	130,421	75,357	8,031,179	96,869	2,860,265	429,364	299,708	833,836	1,645,082	51,383,280

Table 2a Weight of pesticides applied to arable crops in the United Kingdom 2014 by crop group (tonnes of active substance)

	Wheat	Winter barley	Spring barley	Oats	Rye	Triticale	Oilseed rape	Linseed	Potatoes ware	Potatoes seed	Peas	Beans	Beet	All crops
Insecticides & nematicides	40.8	4.6	14.9	2.5	0.3	.	28.3	0.2	114.6	5.5	3.7	5.4	6.9	227.8
Fungicides	3,010.4	297.1	347.7	43.7	7.5	4.0	415.1	2.6	1,094.7	91.1	15.7	75.8	35.9	5,441.3
Herbicides	2,925.0	645.8	596.9	85.8	11.5	14.5	1,634.0	14.5	338.6	33.0	85.7	249.0	414.1	7,048.2
Growth regulators	2,132.6	348.8	51.1	90.4	16.8	8.4	11.7	.	69.4	.	.	.	.	2,729.1
Molluscicides & repellents	52.4	2.9	1.0	0.1	0.1	.	60.0	0.3	14.0	0.5	.	0.1	0.5	131.8
Sulphur	20.1	0.7	5.3	0.9	.	.	23.1	.	.	.	.	6.3	4.4	60.7
All seed treatments	115.0	15.6	13.0	2.9	0.2	0.1	18.2	0.2	13.7	11.3	4.0	0.0	6.1	200.4
All pesticides	8,296.3	1,315.6	1,029.9	226.2	36.3	27.0	2,190.4	17.8	1,645.0	141.3	109.0	336.7	467.9	15,839.4

Table 3 Usage of pesticides on arable crops in the United Kingdom 2014 - percentage area of crops treated with pesticides

Crop group	Insecticides	Fungicides	Herbicides	Growth regulators	Molluscicides & repellents	Seed treatments	Not treated
Wheat	60.8	98.4	97.3	89.3	17.3	96.8	0.6
Winter barley	67	98.9	99.2	81.2	5.2	97.6	0.1
Spring barley	19.5	90.5	96.3	25.2	0.8	86.6	2.1
Oats	49.6	86.9	92.4	70.3	0.6	76	4.8
Rye	78.5	99.6	100.0	90.3	16.5	100	0
Triticale	.	91.5	91.5	86	.	70.2	8.5
Oilseed rape	83.1	98.1	98.4	8	55.1	95.8	0.2
Linseed	72.4	62.1	100.0	.	8	71.1	0
Ware potatoes	50.6	98.4	98.0	22.1	39.3	83.5	1.6
Seed potatoes	100	100	92.1	.	15.2	98.1	0
Peas	88.8	82.2	96.8	.	.	93.3	0
Beans	87.7	87.9	95.9	.	0.9	4.3	0.1
Sugar beet	13.3	94.9	100.0	.	3.3	100	0
All crops	57.6	96.2	97.4	57.2	18.6	91.7	0.9

Table 4a Usage of pesticides on arable crops in the United Kingdom 2014 - number of spray rounds applied to crops (excluding seed treatments)

Crop group	Insecticides	Fungicides	Herbicides	Growth regulators	Molluscicides & repellents	All Pesticides
Wheat	1.4	3.7	2.9	1.8	1.2	6.3
Winter barley	1.2	2.4	2.6	1.6	1.1	4.7
Spring barley	1.1	1.9	2.2	1.3	1.2	3.3
Oats	1.1	1.9	2	1.2	1	3.4
Rye	1.3	3	2.1	2.3	1	4.6
Triticale	.	2	2.3	1.1	.	3.9
Oilseed rape	2.4	3.2	3.7	1	1.4	7.1
Linseed	1.5	1.4	2.5	.	1	4.3
Ware potatoes	1.8	11.9	3.3	1	3.2	16.1
Seed potatoes	5.9	9	2.4	.	1.6	11.4
Peas	2.6	1.5	3.2	.	.	5.2
Beans	2.6	1.8	2.8	.	1	5.3
Sugar beet	1.3	1.7	5.1	.	1	6.9
All crops	1.7	3.3	2.9	1.7	1.5	6.1

Table 4b Usage of pesticides on arable crops in the United Kingdom 2014 – number of products (other than seed treatments) applied to crops

Crop group	Insecticides	Fungicides	Herbicides	Growth regulators	Molluscicides & repellents	All pesticides
Wheat	1.4	6.6	4	2.6	1.3	14.1
Winter barley	1.2	3.5	3.6	2.1	1.1	9.7
Spring barley	1.1	2.9	3.2	1.3	1.4	6.7
Oats	1.1	2.5	2.6	1.6	1.9	6.8
Rye	1.3	5	3.1	2.6	1	11.7
Triticale	.	2.6	3.1	1.3	.	7
Oilseed rape	2.4	4.1	4.5	1	1.5	11.4
Linseed	1.5	1.4	2.9	.	1	5
Ware potatoes	1.9	16.1	5.4	1	3.3	24.3
Seed potatoes	7.4	13.5	4.9	.	1.6	26.2
Peas	3.5	2	4.3	.	.	8.8
Beans	2.9	2.4	3.6	.	1	8.3
Sugar beet	1.4	1.8	11	.	1	13
All crops	1.8	5.3	4.2	2.3	1.5	12.1

Table 4c Usage of pesticides on arable crops in the United Kingdom 2014 – number of active substances (other than seed treatments) applied to crops

Crop group	Insecticides	Fungicides	Herbicides	Growth regulators	Molluscicides & repellents	All pesticides
Wheat	1.4	10.6	6.3	3	1.3	20.7
Winter barley	1.2	6	5.3	2.4	1.1	14.2
Spring barley	1.1	5	4.6	1.9	1.4	10.2
Oats	1.1	4	3.7	1.7	1.9	9.4
Rye	1.3	6.7	4	3.5	1	15.1
Triticale	.	4	3.8	1.6	.	9.3
Oilseed rape	2.4	5.5	5.7	2	1.5	14.1
Linseed	1.5	1.4	3.5	.	1	5.5
Ware potatoes	1.9	23	5.6	1	3.3	31.4
Seed potatoes	7.4	17.5	4.9	.	1.6	30.2
Peas	3.5	3	5.2	.	.	10.5
Beans	2.9	3.8	4.4	.	1	10.4
Sugar beet	1.4	3.4	16.7	.	1	20.3
All crops	1.8	8.3	6	2.7	1.5	17.1

Table 5 Usage of pesticides on arable crops grown in the United Kingdom, 2014 (spray hectares)

	Wheat	Winter barley	Spring barley	Oats	Rye	Triticale	Oilseed rape	Linseed	All potatoes	Peas	Beans	Sugar beet	All crops
Fungicides													
Azoxystrobin	128,389	7,103	6,493	7,848	10,413	4,563	220,890	.	10,170	18,854	36,749	.	451,472
Azoxystrobin/chlorothalonil	281,954	12,346	28,640	.	.	.	.	.	1,051	.	.	.	323,991
Azoxystrobin/cyproconazole	4,922	4,967	4,126	19,303	.	1,810	75,969	.	.	.	.	5,741	116,838
Bixafen/fluoxastrobin/prothioconazole	97,698	.	.	298	.	.	.	.	.	.	.	.	97,996
Bixafen/prothioconazole	298,653	150,108	154,495	3,066	.	.	.	.	.	.	.	.	606,322
Bixafen/prothioconazole/spiroxamine	145,711	.	166	.	.	.	.	.	.	.	.	.	145,877
Bixafen/prothioconazole/tebuconazole	255,176	.	134	.	.	.	62,177	.	.	.	.	.	317,487
Boscalid	.	.	.	.	.	.	174,066	2,007	.	.	.	.	176,073
Boscalid/epoxiconazole	349,999	1,725	18,722	3,965	.	957	.	.	.	.	.	.	375,368
Boscalid/epoxiconazole/pyraclostrobin	67,780	.	1,226	.	.	.	.	.	.	.	.	.	69,006
Boscalid/metconazole	.	378	.	.	.	.	75,251	.	.	.	.	.	75,629
Carbendazim	19,402	.	992	150	.	.	131,953	.	.	.	.	.	152,497
Carbendazim/flusilazole	.	612	2,416	.	.	.	125,738	.	.	.	.	195	128,961
Chlorothalonil	1,700,385	98,422	164,492	1,435	.	214	.	.	.	363	5,608	.	1,970,919
Chlorothalonil/cyproconazole	199,321	6,559	2,697	.	.	.	.	.	.	16,504	88,977	.	314,058
Chlorothalonil/cyproconazole/propiconazole	441,695	10,225	11,759	.	.	.	.	.	.	.	.	.	463,679
Chlorothalonil/penthiopyrad	130,626	11,651	13,776	.	.	.	.	.	.	.	.	.	156,053
Chlorothalonil/picoxystrobin	4,845	9,383	49,430	.	.	.	.	.	.	.	.	.	63,658
Chlorothalonil/proquinazid	52,573	14,241	4,938	.	.	.	.	.	.	.	.	.	71,752
Chlorothalonil/tebuconazole	223,706	253	292	.	.	.	.	.	.	.	252	.	224,503
Copper oxychloride	57,851	7,417	7,762	2,998	437	.	372	.	.	.	2,083	.	78,920
Cyazofamid	.	.	.	.	.	.	.	.	271,263	.	.	.	271,263
Cymoxanil	.	.	.	.	.	.	.	.	229,045	.	.	.	229,045
Cymoxanil/mancozeb	.	.	.	.	.	.	.	.	405,496	.	.	.	405,496
Cyproconazole	122,936	287	.	10,294	594	.	868	.	.	.	299	8,242	143,520
Cyproconazole/trifloxystrobin	.	.	.	.	.	.	.	.	.	.	.	135,476	135,476
Cyprodinil	156	57,412	38,492	.	.	.	.	.	.	.	.	.	96,060
Cyprodinil/isopyrazam	70	81,855	84,480	1,092	.	.	.	.	.	.	.	.	167,497
Difenoconazole	1,571	.	.	.	.	.	127,281	386	5,949	.	.	.	135,187
Dimethomorph/mancozeb	.	.	.	.	.	.	.	.	58,393	.	.	.	58,393
Epoxiconazole	1,040,177	7,525	34,819	10,111	1,082	1,310	.	.	.	.	.	3,414	1,098,438
Epoxiconazole/fenpropimorph	40,281	11,935	14,930	4,999	3,584	234	.	.	.	.	.	.	75,963
Epoxiconazole/fenpropimorph/kresoxim-methyl	84,278	2,285	11,668	16,687	1,632	4,261	.	.	.	.	.	.	120,811
Epoxiconazole/fenpropimorph/metrafenone	161,061	14,302	17,243	8,071	1,430	.	.	.	.	.	.	.	202,107
Epoxiconazole/fluxapyroxad	429,764	19,939	8,510	3,435	.	.	.	.	.	.	.	.	461,648
Epoxiconazole/fluxapyroxad/pyraclostrobin	137,434	22,609	19,422	1,757	.	.	.	.	.	.	.	.	181,222
Epoxiconazole/isopyrazam	108,634	15,610	2,693	.	.	4,563	.	.	.	.	.	.	131,500
Epoxiconazole/kresoxim-methyl/pyraclostrobin	43,366	13,565	2,235	4,638	.	.	.	.	.	.	.	.	63,804
Epoxiconazole/metconazole	487,978	11,491	13,290	52	.	.	.	.	.	.	.	.	512,811
Epoxiconazole/metrafenone	81,980	1,303	1,067	10,418	193	.	.	.	.	.	.	.	94,961
Epoxiconazole/prochloraz	214,939	1,184	4,574	298	.	.	.	.	.	.	.	.	220,995
Epoxiconazole/pyraclostrobin	127,103	2,129	2,876	12,352	.	.	.	.	.	.	.	5,062	149,522
Fenpropimorph	52,046	54,939	39,454	16,973	2,894	1,826	.	.	.	.	.	.	168,132
Fenpropimorph/pyraclostrobin	116,566	10,174	17,734	11,477	.	357	.	.	.	.	.	.	156,308

Table 5 (cont.) Usage of pesticides on arable crops grown in the United Kingdom, 2014 (spray hectares)

	Wheat	Winter barley	Spring barley	Oats	Rye	Triticale	Oilseed rape	Linseed	All potatoes	Peas	Beans	Sugar beet	All crops
Fungicides (cont.)													
Fluazinam	.	.	.	.	.	.	708	.	360,272	.	.	.	360,980
Fluopicolide/propamocarb hydrochloride	.	.	.	.	.	.	.	.	168,478	.	.	.	168,478
Fluoxastrobin/prothioconazole	164,067	40,722	40,509	11,999	4,510	.	.	.	.	.	577	.	262,384
Fluoxastrobin/prothioconazole/trifloxystrobin	11,974	84,901	103,283	.	.	.	.	.	.	.	.	.	200,158
Fluquinconazole/prochloraz	732	.	.	.	.	458	.	.	.	.	.	.	1,190
Flusilazole	1,988	2,289	2,080	.	.	.	102,064	.	.	.	.	499	108,920
Fluxapyroxad	265,311	15,168	17,964	.	.	.	.	.	.	.	.	.	298,443
Fluxapyroxad/metconazole	146,179	7,959	4,711	.	.	.	.	.	.	.	.	.	158,849
Folpet	238,475	49,679	66,118	.	.	.	.	.	.	.	.	.	354,272
Isopyrazam	1,455	56,200	44,586	.	.	.	.	.	.	.	.	.	102,241
Mancozeb	27,393	.	395	.	.	.	.	.	69,687	.	.	.	97,475
Mandipropamid	.	.	.	.	.	.	.	.	237,561	.	.	.	237,561
Metconazole	51,530	114	4,005	.	.	.	165,519	3,920	.	6,021	2,390	.	233,499
Penthiopyrad	355,548	18,132	27,898	.	.	.	.	.	.	.	.	.	401,578
Picoxystrobin	841	635	4,540	2,685	.	.	97,697	.	.	.	.	.	106,398
Prochloraz	42,396	5,849	990	.	.	.	24,544	.	.	.	.	.	73,779
Prochloraz/tebuconazole	205,187	1,492	14,282	298	401	.	69,886	.	.	.	.	.	291,546
Proquinazid	100,271	21,332	13,194	27,942	3,337	2,278	.	.	.	.	.	.	168,354
Prothioconazole	284,093	30,708	57,856	1,620	8,867	.	313,192	.	.	.	.	.	696,336
Prothioconazole/spiroxamine	85,279	112,520	176,434	5,588	.	357	.	.	.	.	.	.	380,178
Prothioconazole/spiroxamine/tebuconazole	94,258	11,665	28,373	2,248	.	.	.	.	.	.	.	.	136,544
Prothioconazole/tebuconazole	636,697	61,970	66,733	11,977	.	.	411,070	.	.	.	.	.	1,188,447
Prothioconazole/trifloxystrobin	50,255	89,403	72,365	.	.	31	.	.	.	.	.	.	212,054
Pyraclostrobin	261,825	23,666	23,541	23,677	.	.	.	.	.	.	.	.	332,709
Tebuconazole	873,952	15,850	4,212	21,062	7,281	1,663	311,094	10,441	.	.	23,187	.	1,268,742
Other fungicides[1,2]	314,223	104,086	98,690	21,693	.	183	144,493	.	263,808	8,019	60,582	22,792	1,038,569
All fungicides	**11,924,95**	**1,418,274**	**1,658,802**	**282,506**	**46,655**	**25,065**	**2,634,832**	**16,754**	**2,081,173**	**49,761**	**220,704**	**181,421**	**20,540,902**

[1]Throughout all tables, "Other" refers to chemicals grouped together because they were applied to less than 0.1% of the total area treated with pesticides

[2]Other fungicides include ametoctradin/dimethomorph, amisulbrom, azoxystrobin/fenpropimorph, azoxystrobin/tebuconazole, benthiavalicarb-isopropyl/mancozeb, boscalid/pyraclostrobin, chlorothalonil/cymoxanil, chlorothalonil/flutriafol, chlorothalonil/mancozeb, chlorothalonil/metalaxyl-m, chlorothalonil/propiconazole, chlorothalonil/pyrimethanil, cyazofamid/polyalkyleneoxide modified heptamethyltrisiloxane/cymoxanil, cyflufenamid, cymoxanil/famoxadone, cymoxanil/propamocarb hydrochloride, cyproconazole/picoxystrobin, cyproconazole/propiconazole, cyprodinil/picoxystrobin, difenoconazole/fenpropidin, difenoconazole/mandipropamid, dimethomorph/fluazinam, dimoxystrobin/epoxiconazole, epoxiconazole/fenpropimorph/pyraclostrobin, famoxadone/flusilazole, fenamidone/propamocarb hydrochloride, fenpropidin, fenpropidin/prochloraz/tebuconazole, fenpropimorph/flusilazole, fenpropimorph/kresoxim-methyl, fenpropimorph/quinoxyfen, fluopyram/prothioconazole, fluquinconazole, flutriafol, iprodione/thiophanate-methyl, mancozeb/metalaxyl-m, mancozeb/zoxamide, metalaxyl-m, metrafenone, pencycuron, penthiopyrad/picoxystrobin, prochloraz/propiconazole, prochloraz/proquinazid/tebuconazole, propiconazole, pyriofenone, quinoxyfen, spiroxamine, spiroxamine/tebuconazole, tebuconazole/triadimenol, thiophanate-methyl, trifloxystrobin and unspecified fungicides.

Table 5 (cont.) Usage of pesticides on arable crops grown in the United Kingdom, 2014 (spray hectares)

	Wheat	Winter barley	Spring barley	Oats	Rye	Triticale	Oilseed rape	Linseed	All potatoes	Peas	Beans	Sugar beet	All crops
Herbicides & desiccants													
Amidosulfuron/iodosulfuron-methyl-sodium	51,311	10,284	17,531	.	.	.	.	8,302	.	.	.	.	87,428
Aminopyralid/propyzamide	.	.	.	.	.	.	65,460	.	.	.	.	.	65,460
Bifenox	2,305	350	.	.	.	.	86,525	.	.	.	.	.	89,180
Bromoxynil/ioxynil	24,508	8,351	69,220	3,422	1,840	1,668	.	.	.	.	.	.	109,009
Carbetamide	.	.	.	.	.	.	74,897	.	.	.	3,904	.	78,801
Carfentrazone-ethyl	536	.	66	.	.	.	.	.	60,332	.	.	928	61,862
Chloridazon	.	.	.	.	.	.	.	.	.	.	.	53,838	53,838
Chlorotoluron/diflufenican	79,493	90,703	6,524	.	.	.	.	.	.	.	.	.	176,720
Clethodim	.	.	.	.	.	.	132,513	.	.	.	.	8,611	141,124
Clodinafop-propargyl	164,041	78	.	.	.	2,653	.	.	.	.	.	.	166,772
Clomazone	.	.	.	.	.	.	140,633	.	17,308	5,061	20,317	.	183,319
Clomazone/linuron	.	.	.	.	.	.	.	.	8,191	7,211	36,813	.	52,215
Clopyralid	1,343	.	763	.	.	.	40,361	.	.	.	.	74,280	116,747
Clopyralid/florasulam/fluroxypyr	15,507	4,812	42,023	3,170	.	.	.	.	.	.	.	.	65,512
Clopyralid/picloram	.	.	.	.	.	.	80,688	.	.	.	.	.	80,688
Cycloxydim	.	.	.	.	.	.	34,266	1,375	1,369	5,051	9,484	2,275	53,820
Desmedipham/ethofumesate/lenacil/phenmedipham	.	.	.	.	.	.	.	.	.	.	.	107,825	107,825
Desmedipham/phenmedipham	.	.	.	.	.	.	.	.	.	.	.	72,350	72,350
Dicamba/mecoprop-P	4,720	5,341	80,956	4,306	.	.	.	.	.	.	.	.	95,323
Diflufenican	425,571	57,389	19,322	14,087	5,273	3,151	.	.	.	.	.	.	524,793
Diflufenican/flufenacet	747,833	183,808	51,104	10,007	7,508	2,281	.	.	.	.	.	.	1,002,541
Diflufenican/flufenacet/flurtamone	245,485	8,471	.	.	.	.	.	.	.	.	.	.	253,956
Diflufenican/flupyrsulfuron-methyl	31,447	3,100	.	28,834	.	.	.	.	.	.	.	.	63,381
Diflufenican/iodosulfuron-methyl-sodium/mesosulfuron-methyl	61,791	85	.	.	.	.	.	.	.	.	.	.	61,876
Diflufenican/mecoprop-P	109,091	19,014	.	.	.	.	.	.	.	.	.	.	128,105
Diflufenican/pendimethalin	53,229	13,447	.	.	401	.	.	.	.	.	.	.	67,077
Dimethenamid-P/metazachlor	.	.	.	.	.	.	76,122	.	.	.	.	.	76,122
Dimethenamid-P/metazachlor/quinmerac	.	.	.	.	.	.	188,427	.	.	.	.	.	188,427
Diquat	106	997	32	305	.	.	6,499	2,733	270,871	3,512	2,124	.	287,179
Ethofumesate	.	.	.	.	.	.	.	.	.	.	.	69,775	69,775
Florasulam/fluroxypyr	267,202	66,627	33,926	29,168	1,639	489	.	.	.	.	.	.	399,051
Florasulam/pyroxsulam	196,240	.	.	.	1,812	434	.	.	.	.	.	.	198,486
Fluazifop-P-butyl	.	.	.	.	.	.	100,959	.	.	148	4,665	1,484	107,256
Flufenacet/pendimethalin	460,346	70,737	8,946	.	.	.	.	.	.	.	.	.	540,029
Flupyrsulfuron-methyl	202,002	36,581	267	2,467	1,132	.	.	238	.	.	.	.	242,687

Table 5 (cont.) Usage of pesticides on arable crops grown in the United Kingdom, 2014 (spray hectares)

	Wheat	Winter barley	Spring barley	Oats	Rye	Triticale	Oilseed rape	Linseed	All potatoes	Peas	Beans	Sugar beet	All crops
Herbicides & desiccants (cont.)													
Fluroxypyr	478,234	58,262	153,798	30,842	.	1,694	.	.	.	.	.	.	722,830
Glyphosate	818,381	187,200	249,856	58,556	2,375	4,048	544,891	10,975	51,562	26,331	85,119	57,708	2,097,002
Imazamox/pendimethalin	.	.	.	.	.	.	.	.	.	14,735	48,456	.	63,191
Iodosulfuron-methyl-sodium/mesosulfuron-methyl	824,782	191	30	.	106	53	.	.	.	.	.	.	825,162
Linuron	.	.	.	.	.	.	.	.	87,246	2,768	7,061	.	97,075
MCPA	50,866	6,854	25,389	2,233	.	.	.	.	.	.	.	.	85,342
Mecoprop-P	147,357	29,376	205,826	29,671	.	910	.	.	.	.	.	.	413,140
Metamitron	.	.	.	.	.	.	.	.	.	.	.	213,430	213,430
Metazachlor	.	.	.	.	.	.	126,151	53	.	.	.	.	126,204
Metazachlor/quinmerac	.	.	.	.	.	.	159,644	.	.	.	.	.	159,644
Metribuzin	.	.	.	.	.	.	.	.	92,616	.	.	.	92,616
Metsulfuron-methyl	134,441	35,711	68,448	11,169	.	.	.	2,639	.	.	.	.	252,408
Metsulfuron-methyl/thifensulfuron-methyl	169,613	36,036	254,875	7,592	.	.	.	.	.	.	.	.	468,116
Metsulfuron-methyl/tribenuron-methyl	150,283	43,789	113,778	21,323	2,750	2,044	.	.	.	.	.	.	333,967
Pendimethalin	243,595	47,027	36,993	.	5,824	4,599	.	.	14,752	11,129	44,964	.	408,883
Pendimethalin/picolinafen	241,412	89,027	8,681	.	.	.	.	.	.	.	.	.	339,120
Phenmedipham	.	.	.	.	.	.	.	.	.	.	.	77,379	77,379
Pinoxaden	106,635	166,020	218,617	.	.	.	.	.	.	.	.	.	491,272
Propaquizafop	.	.	1,482	.	.	.	330,711	6,788	4,568	4,061	7,883	26,204	381,697
Propyzamide	.	.	.	.	.	.	350,219	.	.	.	8,632	.	358,851
Prosulfocarb	160,016	24,547	10,361	.	.	910	.	.	33,728	.	4,518	.	234,080
Quizalofop-P-ethyl	.	.	.	.	.	.	54,299	727	.	273	1,562	2,728	59,589
Quizalofop-P-tefuryl	.	.	.	.	.	.	76,540	119	.	2,079	1,269	155	80,162
Tepraloxydim	.	.	.	.	.	.	68,052	3,436	.	9,500	30,464	21,056	132,508
Thifensulfuron-methyl/tribenuron-methyl	26,868	6,506	69,979	8,457	.	1,116	.	.	.	.	.	.	112,926
Tri-allate	96,895	19,801	8,314	.	886	2,281	464	382	.	2,470	2,922	614	135,029
Tribenuron-methyl	38,469	17,426	15,720	9,712	3,149	.	.	.	.	.	.	.	84,476
Triflusulfuron-methyl	.	.	.	.	.	.	.	.	.	.	.	99,983	99,983
Other herbicides[1]	222,948	30,136	73,189	30,672	39	357	34,513	10,751	38,152	26,066	42,411	233,085	742,319
All herbicides	**7,054,902**	**1,378,084**	**1,846,016**	**305,993**	**34,734**	**28,688**	**2,772,834**	**48,518**	**680,695**	**120,395**	**362,568**	**1,123,708**	**15,757,135**

[1]Other herbicides include 2,4-D 2,4-D/MCPA, 2,4-DB, amidosulfuron, bentazone, bromoxynil, bromoxynil/diflufenican/ioxynil, carfentrazone-ethyl/flupyrsulfuron-methyl, carfentrazone-ethyl/mecoprop-P, carfentrazone-ethyl/metsulfuron-methyl, chloridazon/metamitron, chlorotoluron, clodinafop-propargyl/pinoxaden, clodinafop-propargyl/prosulfocarb, clomazone/metazachlor, clomazone/metribuzin, clomazone/pendimethalin, clopyralid/fluroxypyr/triclopyr, desmedipham/ethofumesate/phenmedipham, dicamba/MCPA/mecoprop-P, dichlorprop-P/MCPA/mecoprop-P, diflufenican/flurtamone, diflufenican/isoproturon, diflufenican/metsulfuron-methyl, dimethachlor, ethofumesate/metamitron, ethofumesate/metamitron/phenmedipham, ethofumesate/phenmedipham, fenoxaprop-p-ethyl, florasulam, flufenacet/metribuzin, flumioxazine, flupyrsulfuron-methyl/pyroxsulam, flupyrsulfuron-methyl/thifensulfuron-methyl, glufosinate-ammonium, imazamox/metazachlor, iodosulfuron-methyl-sodium, isoproturon, isoproturon/pendimethalin, lenacil, lenacil/triflusulfuron-methyl, MCPB, mesotrione, napropamide, pendimethalin/pyroxsulam, picolinafen, pinoxaden/cloquintocet-mexyl, propoxycarbazone-sodium, pyridate, pyroxsulam, rimsulfuron, s-metolachlor, sulfosulfuron, thifensulfuron-methyl, thifensulfuron-methyl/tribenuron methyl, tralkoxydim, trifluralin and unspecified herbicides.

Table 5 (cont.) Usage of pesticides on arable crops grown in the United Kingdom, 2014 (spray hectares)

	Wheat	Winter barley	Spring barley	Oats	Rye	Triticale	Oilseed rape	Linseed	All potatoes	Peas	Beans	Sugar beet	All crops
Insecticides & nematicides													
Alpha-cypermethrin	105,229	22,901	9,252	112	.	.	101,198	350	.	8,458	10,473	.	257,973
Chlorpyrifos	31,514	636	19,578	2,045	.	.	1,950	.	165	.	.	1,625	57,513
Cypermethrin	532,230	112,707	19,882	29,768	2,672	.	383,209	4,258	6,610	1,229	41,075	1,824	1,135,464
Deltamethrin	18,973	3,759	2,589	210	.	.	10,956	.	.	2,926	13,186	.	52,599
Esfenvalerate	134,700	53,841	16,514	1,207	.	.	.	.	44,071	550	3,477	.	254,360
Lambda-cyhalothrin	611,713	107,589	54,361	30,081	6,470	.	429,703	8,303	70,579	46,115	125,968	3,856	1,494,738
Pirimicarb	21,409	84	.	61	3,173	.	.	.	9,659	37,754	29,453	4,908	106,501
Tau-fluvalinate	32,814	398	923	.	.	.	262,371	.	.	.	3,295	.	299,801
Zeta-cypermethrin	110,397	16,190	8,650	12,012	.	.	86,578	5,953	434	3,298	15,279	.	258,791
Other insecticides & nematicides[1]	12,149	7,848	1,381	555	.	.	40,564	.	107,411	.	.	9,047	178,955
All insecticides & nematicides	**1,611,128**	**325,953**	**133,130**	**76,051**	**12,315**	**.**	**1,316,529**	**18,864**	**238,929**	**100,330**	**242,206**	**21,260**	**4,096,695**
Molluscicides & repellents													
Ferric phosphate	21,379	5,181	584	501	410	.	28,377	.	17,993	.	.	.	74,425
Metaldehyde	366,618	16,228	4,725	772	1,402	.	460,375	1,283	64,810	.	976	3,128	920,317
Methiocarb	28,859	2,539	762	.	.	.	25,515	.	47,872	.	.	618	106,165
Other molluscicides & repellents[2]	70	82	.	.	.	.	1,090	.	.	.	.	.	1,242
All molluscicides & repellents	**416,926**	**24,030**	**6,071**	**1,273**	**1,812**	**.**	**515,357**	**1,283**	**130,675**	**.**	**976**	**3,746**	**1,102,149**
Sulphur	**8,001**	**409**	**2,824**	**543**	**.**	**.**	**12,965**	**.**	**.**	**.**	**2,601**	**1,824**	**29,167**

[1]Other insecticides and nematicides include acetamiprid, beta-cyfluthrin, dimethoate, flonicamid, fosthiazate, indoxacarb, oxamyl, pymetrozine, thiacloprid and thiamethoxam.

[2]Other molluscicides & repellents include unspecified molluscicides.

Table 5 (cont.) Usage of pesticides on arable crops grown in the United Kingdom, 2014 (spray hectares)

	Wheat	Winter barley	Spring barley	Oats	Rye	Triticale	Oilseed rape	Linseed	All potatoes	Peas	Beans	Sugar beet	All crops
Growth regulators													
2-chloroethylphosphonic acid	114,174	54,283	41,395	58	.	.	.	.	.	.	.	.	209,910
2-chloroethylphosphonic acid/mepiquat	100,393	42,839	23,465	.	6,002	1,557	.	.	.	.	.	.	174,256
Chlormequat	2,228,164	328,962	44,831	84,867	11,715	5,213	.	.	.	.	.	.	2,703,752
Chlormequat/2-chloroethylphosphonic acid	60,402	30,822	12,849	.	401	.	.	.	.	.	.	.	104,474
Chlormequat/imazaquin	240,938	.	66	.	.	.	.	.	.	.	.	.	241,004
Mepiquat chloride/metconazole	.	.	.	.	.	.	53,114	.	.	.	.	.	53,114
Mepiquat chloride/prohexadione-calcium	219,454	59,054	21,573	16,410	.	2,131	.	.	.	.	.	.	318,622
Trinexapac-ethyl	1,230,796	200,787	58,253	49,684	5,821	5,184	.	.	.	.	.	.	1,550,525
Other growth regulators[1]	56,353	1,754	9,491	.	.	.	.	.	27,199	.	.	.	94,797
All growth regulators	**4,250,674**	**718,501**	**211,923**	**151,019**	**23,939**	**14,085**	**53,114**	**.**	**27,199**	**.**	**.**	**.**	**5,450,454**

[1]Other growth regulators include chlormequat chloride/2-chloroethylphosphonic acid, chlormequat chloride/2-chloroethylphosphonic acid/mepiquat chloride, chlormequat chloride/mepiquat chloride and maleic hydrazide.

Table 5 (cont.) Usage of pesticides on arable crops grown in the United Kingdom, 2014 (spray hectares)

	Wheat	Winter barley	Spring barley	Oats	Rye	Triticale	Oilseed rape	Linseed	All potatoes	Peas	Beans	Sugar beet	All crops
Seed treatments													
Fungicide seed treatments													
Fludioxonil	122,157	14,140	20,983	12,567	1,639	.	.	.	.	.	.	.	171,486
Fluopyram/prothioconazole/tebuconazole	.	70,404	160,073	3,673	.	.	.	.	.	.	.	.	234,150
Fluoxastrobin/prothioconazole	31	.	.	.	.	.	.	.	.	.	.	.	31
Fluquinconazole/prochloraz	62,110	1,438	.	.	.	.	.	.	.	.	.	.	63,548
Hymexazol	.	.	.	.	.	.	.	.	.	.	.	116,220	116,220
Prochloraz	.	.	.	.	.	.	.	4,774	.	.	.	.	4,774
Prochloraz/thiram	.	.	.	.	.	.	88,532	.	.	.	.	.	88,532
Prochloraz/triticonazole	229,903	98,840	212,296	26,003	.	.	.	.	.	.	.	.	567,042
Prothioconazole	427,687	39,054	33,467	22,373	.	3,022	.	.	.	.	.	.	525,603
Prothioconazole/tebuconazole	68	.	.	176	.	.	.	.	.	.	.	.	244
Silthiofam	139,779	4,475	123	.	.	.	.	.	.	.	.	.	144,377
Thiram	.	.	.	.	.	.	6,613	638	.	14,013	132	116,220	137,616
Fungicide/insecticide seed treatments													
Clothianidin/prothioconazole	674,230	77,327	7,000	9,085	1,812	234	.	.	.	.	.	.	769,688
Fludioxonil/metalaxyl-M/thiamethoxam	.	.	.	.	.	.	311,897	.	.	.	.	.	311,897
Insecticide seed treatments													
Beta-cyfluthrin/clothianidin	.	.	.	.	.	.	203,960	.	.	.	.	19,704	223,664
Clothianidin	47,642	16,857	.	2,105	1,430	.	.	.	.	.	.	.	68,034
Unspecified seed treatments	238,187	79,209	84,701	24,033	6,086	3,593	110,784	5,817	59,890	4,404	4,429	.	621,133
Other seed treatments[1]	121,712	35,616	48,428	5,262	.	672	3,760	224	71,070	10,802	221	60,978	358,745
All seed treatments	**2,063,506**	**437,360**	**567,071**	**105,277**	**10,967**	**7,521**	**725,546**	**11,453**	**130,960**	**29,219**	**4,782**	**313,122**	**4,406,784**

[1]Other seed treatments include beta-cyfluthrin/imidacloprid, carboxin/thiram, clothianidin/prothioconazole/tebuconazole/triazoxide, cymoxanil/fludioxonil/metalaxyl-M, difenoconazole/fludioxonil, fipronil, fludioxonil/flutriafol, fludioxonil/tefluthrin, fluquinconazole, flutolanil, fuberidazole/imidacloprid/triadimenol, fuberidazole/triadimenol, imazalil, imazalil/ipconazole, imazalil/pencycuron, imazalil/thiabendazole, imidacloprid, imidacloprid/tebuconazole/triazoxide, ipconazole, pencycuron, tefluthrin and thiamethoxam.

Table 6 Usage of pesticides on arable crops grown in the United Kingdom, 2014 (kg of active substances applied)

	Wheat	Winter barley	Spring barley	Oats	Rye	Triticale	Oilseed rape	Linseed	All potatoes	Peas	Beans	Sugar beet	All crops
Fungicides													
Azoxystrobin	14,015	716	490	1,029	1,400	570	32,996	.	6,957	2,369	5,053	.	65,595
Azoxystrobin/chlorothalonil	150,962	6,011	12,484	.	.	.	.	.	487	.	.	.	169,944
Azoxystrobin/cyproconazole	863	690	522	3,788	.	364	14,883	.	.	.	.	1,316	22,426
Bixafen/fluoxastrobin/prothioconazole	23,061	.	.	71	.	.	.	.	.	.	.	.	23,132
Bixafen/prothioconazole	69,175	21,296	18,197	280	.	.	.	.	.	.	.	.	108,948
Bixafen/prothioconazole/spiroxamine	64,669	.	60	.	.	.	.	.	.	.	.	.	64,729
Bixafen/prothioconazole/tebuconazole	77,451	.	15	.	.	.	15,302	.	.	.	.	.	92,768
Boscalid	.	.	.	.	.	.	24,574	164	.	.	.	.	24,738
Boscalid/epoxiconazole	102,786	290	3,124	1,141	.	252	.	.	.	.	.	.	107,593
Boscalid/epoxiconazole/pyraclostrobin	20,261	.	67	.	.	.	.	.	.	.	.	.	20,328
Boscalid/metconazole	.	5	.	.	.	.	11,026	.	.	.	.	.	11,031
Carbendazim	2,147	.	244	38	.	.	30,764	.	.	.	.	.	33,193
Carbendazim/flusilazole	.	114	541	.	.	.	20,532	.	.	.	.	44	21,231
Chlorothalonil	807,513	45,060	71,181	1,009	.	61	.	.	.	91	3,274	.	928,189
Chlorothalonil/cyproconazole	89,007	2,737	1,019	.	.	.	.	.	.	9,184	48,870	.	150,817
Chlorothalonil/cyproconazole/propiconazole	225,513	5,320	7,628	.	.	.	.	.	.	.	.	.	238,461
Chlorothalonil/penthiopyrad	57,068	4,668	4,582	.	.	.	.	.	.	.	.	.	66,318
Chlorothalonil/picoxystrobin	2,132	4,757	24,361	.	.	.	.	.	.	.	.	.	31,250
Chlorothalonil/proquinazid	23,834	5,327	1,646	.	.	.	.	.	.	.	.	.	30,807
Chlorothalonil/tebuconazole	119,435	172	99	.	.	.	.	.	.	.	176	.	119,882
Copper oxychloride	9,612	959	784	337	52	.	20	.	.	.	223	.	11,987
Cyazofamid	.	.	.	.	.	.	.	.	21,831	.	.	.	21,831
Cymoxanil	.	.	.	.	.	.	.	.	20,667	.	.	.	20,667
Cymoxanil/mancozeb	.	.	.	.	.	.	.	.	540,467	.	.	.	540,467
Cyproconazole	4,474	11	.	461	21	.	35	.	.	.	22	307	5,331
Cyproconazole/trifloxystrobin	.	.	.	.	.	.	.	.	.	.	.	24,134	24,134
Cyprodinil	29	11,887	6,586	.	.	.	.	.	.	.	.	.	18,502
Cyprodinil/isopyrazam	17	24,027	22,358	382	.	.	.	.	.	.	.	.	46,784
Difenoconazole	76	.	.	.	.	.	8,719	30	738	.	.	.	9,563
Dimethomorph/mancozeb	.	.	.	.	.	.	.	.	99,809	.	.	.	99,809
Epoxiconazole	71,547	569	1,891	555	70	95	.	.	.	.	.	256	74,983
Epoxiconazole/fenpropimorph	10,782	2,766	3,669	1,597	1,103	78	.	.	.	.	.	.	19,995
Epoxiconazole/fenpropimorph/kresoxim-methyl	26,141	459	1,889	3,842	480	1,065	.	.	.	.	.	.	33,876
Epoxiconazole/fenpropimorph/metrafenone	33,156	3,200	3,695	2,358	284	.	.	.	.	.	.	.	42,693
Epoxiconazole/fluxapyroxad	62,344	2,013	870	317	.	.	.	.	.	.	.	.	65,544
Epoxiconazole/fluxapyroxad/pyraclostrobin	30,870	4,069	2,837	632	.	.	.	.	.	.	.	.	38,408
Epoxiconazole/isopyrazam	18,859	2,261	308	.	.	687	.	.	.	.	.	.	22,115
Epoxiconazole/kresoxim-methyl/pyraclostrobin	6,257	1,868	300	821	.	.	.	.	.	.	.	.	9,246
Epoxiconazole/metconazole	34,289	746	720	3	.	.	.	.	.	.	.	.	35,758
Epoxiconazole/metrafenone	9,139	124	206	1,826	22	.	.	.	.	.	.	.	11,317
Epoxiconazole/prochloraz	39,767	271	940	43	.	.	.	.	.	.	.	.	41,021
Epoxiconazole/pyraclostrobin	16,665	224	290	1,676	.	.	.	.	.	.	.	864	19,719

Table 6 (cont.) Usage of pesticides on arable crops grown in the United Kingdom, 2014 (kg of active substances applied)

	Wheat	Winter barley	Spring barley	Oats	Rye	Triticale	Oilseed rape	Linseed	All potatoes	Peas	Beans	Sugar beet	All crops
Fungicides (cont.)													
Fenpropimorph	16,891	14,079	8,507	3,902	721	277	.	.	.	.	.	.	44,377
Fenpropimorph/pyraclostrobin	35,874	2,846	4,518	3,523	.	85	.	.	.	.	.	.	46,846
Fluazinam	.	.	.	.	.	.	142	.	63,210	.	.	.	63,352
Fluopicolide/propamocarb hydrochloride	.	.	.	.	.	.	.	.	170,873	.	.	.	170,873
Fluoxastrobin/prothioconazole	26,204	6,283	5,092	1,728	709	.	.	.	.	.	43	.	40,059
Fluoxastrobin/prothioconazole/trifloxystrobin	1,484	12,353	13,430	.	.	.	.	.	.	.	.	.	27,267
Fluquinconazole/prochloraz	83	.	.	.	.	21	.	.	.	.	.	.	104
Flusilazole	190	267	186	.	.	.	11,277	.	.	.	.	45	11,965
Fluxapyroxad	14,372	676	617	.	.	.	.	.	.	.	.	.	15,665
Fluxapyroxad/metconazole	15,980	306	368	.	.	.	.	.	.	.	.	.	16,654
Folpet	107,051	21,105	26,336	.	.	.	.	.	.	.	.	.	154,492
Isopyrazam	179	3,301	2,354	.	.	.	.	.	.	.	.	.	5,834
Mancozeb	22,307	.	296	.	.	.	.	.	63,566	.	.	.	86,169
Mandipropamid	.	.	.	.	.	.	.	.	34,757	.	.	.	34,757
Metconazole	2,187	4	201	.	.	.	7,905	272	.	239	115	.	10,923
Penthiopyrad	50,580	2,153	2,380	.	.	.	.	.	.	.	.	.	55,113
Picoxystrobin	42	71	514	364	.	.	19,872	.	.	.	.	.	20,863
Prochloraz	10,297	1,192	201	.	.	.	6,223	.	.	.	.	.	17,913
Prochloraz/tebuconazole	66,182	234	3,905	119	168	.	23,383	.	.	.	.	.	93,991
Proquinazid	2,318	481	275	790	79	56	.	.	.	.	.	.	3,999
Prothioconazole	28,864	2,815	4,497	183	1,063	.	30,848	.	.	.	.	.	68,270
Prothioconazole/spiroxamine	25,601	27,117	39,033	1,556	.	115	.	.	.	.	.	.	93,422
Prothioconazole/spiroxamine/tebuconazole	26,674	2,872	8,294	648	.	.	.	.	.	.	.	.	38,488
Prothioconazole/tebuconazole	105,705	7,588	7,808	1,915	.	.	62,921	.	.	.	.	.	185,937
Prothioconazole/trifloxystrobin	7,459	14,745	9,748	.	.	3	.	.	.	.	.	.	31,955
Pyraclostrobin	18,018	1,809	1,702	1,846	.	.	.	.	.	.	.	.	23,375
Tebuconazole	121,493	1,990	486	3,122	1,313	176	49,106	2,152	.	.	3,510	.	183,348
Other fungicides[1,2]	80,470	20,225	13,334	1,763	.	103	44,618	.	162,450	3,772	14,490	8,923	350,148
All fungicides	**3,010,421**	**297,129**	**347,685**	**43,665**	**7,485**	**4,008**	**415,146**	**2,618**	**1,185,812**	**15,655**	**75,776**	**35,889**	**5,441,289**

[1]Throughout all tables, "Other" refers to chemicals grouped together because they were applied to less than 0.1% of the total area treated with pesticides

[2]Other fungicides include ametoctradin/dimethomorph, amisulbrom, azoxystrobin/fenpropimorph, azoxystrobin/tebuconazole, benthiavalicarb-isopropyl/mancozeb, boscalid/pyraclostrobin, chlorothalonil/cymoxanil, chlorothalonil/flutriafol, chlorothalonil/mancozeb, chlorothalonil/metalaxyl-m, chlorothalonil/propiconazole, chlorothalonil/pyrimethanil, cyazofamid/polyalkyleneoxide modified heptamethyltrisiloxane/cymoxanil, cyflufenamid, cymoxanil/famoxadone, cymoxanil/propamocarb hydrochloride, cyproconazole/picoxystrobin, cyproconazole/propiconazole, cyprodinil/picoxystrobin, difenoconazole/fenpropidin, difenoconazole/mandipropamid, dimethomorph/fluazinam, dimoxystrobin/epoxiconazole, epoxiconazole/fenpropimorph/pyraclostrobin, famoxadone/flusilazole, fenamidone/propamocarb hydrochloride, fenpropidin, fenpropidin/prochloraz/tebuconazole, fenpropimorph/flusilazole, fenpropimorph/kresoxim-methyl, fenpropimorph/quinoxyfen, fluopyram/prothioconazole, fluquinconazole, flutriafol, iprodione/thiophanate-methyl, mancozeb/metalaxyl-m, mancozeb/zoxamide, metalaxyl-m, metrafenone, pencycuron, penthiopyrad/picoxystrobin, prochloraz/propiconazole, prochloraz/proquinazid/tebuconazole, propiconazole, pyriofenone, quinoxyfen, spiroxamine, spiroxamine/tebuconazole, tebuconazole/triadimenol, thiophanate-methyl, trifloxystrobin and unspecified fungicides.

Table 6 (cont.) Usage of pesticides on arable crops grown in the United Kingdom, 2014 (kg of active substances applied)

	Wheat	Winter barley	Spring barley	Oats	Rye	Triticale	Oilseed rape	Linseed	All potatoes	Peas	Beans	Sugar beet	All crops
Herbicides & desiccants													
Amidosulfuron/iodosulfuron-methyl-sodium	994	199	400	.	.	.	.	220	.	.	.	.	1,813
Aminopyralid/propyzamide	.	.	.	.	.	.	53,548	.	.	.	.	.	53,548
Bifenox	1,106	40	.	.	.	.	35,390	.	.	.	.	.	36,536
Bromoxynil/ioxynil	7,125	2,531	17,987	936	572	354	.	.	.	.	.	.	29,505
Carbetamide	.	.	.	.	.	.	121,703	.	.	.	7,745	.	129,448
Carfentrazone-ethyl	5	.	1	.	.	.	.	.	2,624	.	.	17	2,647
Chloridazon	.	.	.	.	.	.	.	.	.	.	.	56,929	56,929
Chlorotoluron/diflufenican	103,446	126,632	7,484	.	.	.	.	.	.	.	.	.	237,562
Clethodim	.	.	.	.	.	.	15,663	.	.	.	.	953	16,616
Clodinafop-propargyl	5,176	3	.	.	.	77	.	.	.	.	.	.	5,256
Clomazone	.	.	.	.	.	.	10,908	.	1,125	387	1,385	.	13,805
Clomazone/linuron	.	.	.	.	.	.	.	.	4,063	4,035	18,365	.	26,463
Clopyralid	86	.	15	.	.	.	4,424	.	.	.	.	6,388	10,913
Clopyralid/florasulam/fluroxypyr	2,603	801	6,480	559	.	.	.	.	.	.	.	.	10,443
Clopyralid/picloram	.	.	.	.	.	.	8,521	.	.	.	.	.	8,521
Cycloxydim	.	.	.	.	.	.	5,837	243	425	938	1,606	586	9,635
Desmedipham/ethofumesate/lenacil/phenmedipham	.	.	.	.	.	.	.	.	.	.	.	24,476	24,476
Desmedipham/phenmedipham	.	.	.	.	.	.	.	.	.	.	.	15,922	15,922
Dicamba/mecoprop-P	1,597	2,505	37,933	1,755	.	.	.	.	.	.	.	.	43,790
Diflufenican	30,449	3,585	978	1,124	260	115	.	.	.	.	.	.	36,511
Diflufenican/flufenacet	173,111	40,997	7,089	1,942	1,427	684	.	.	.	.	.	.	225,250
Diflufenican/flufenacet/flurtamone	94,329	1,788	.	.	.	.	.	.	.	.	.	.	96,117
Diflufenican/flupyrsulfuron-methyl	1,510	120	.	1,614	.	.	.	.	.	.	.	.	3,244
Diflufenican/iodosulfuron-methyl-sodium/mesosulfuron-methyl	3,394	5	.	.	.	.	.	.	.	.	.	.	3,399
Diflufenican/mecoprop-P	50,926	7,366	.	.	.	.	.	.	.	.	.	.	58,292
Diflufenican/pendimethalin	35,554	9,759	.	.	319	.	.	.	.	.	.	.	45,632
Dimethenamid-P/metazachlor	.	.	.	.	.	.	66,354	.	.	.	.	.	66,354
Dimethenamid-P/metazachlor/quinmerac	.	.	.	.	.	.	181,128	.	.	.	.	.	181,128
Diquat	42	426	13	183	.	.	3,575	1,640	105,476	1,993	1,133	.	114,481
Ethofumesate	.	.	.	.	.	.	.	.	.	.	.	14,397	14,397
Florasulam/fluroxypyr	24,631	6,268	2,609	2,581	172	51	.	.	.	.	.	.	36,312
Florasulam/pyroxsulam	4,296	.	.	.	41	10	.	.	.	.	.	.	4,347
Fluazifop-P-butyl	.	.	.	.	.	.	7,894	.	.	11	504	88	8,497
Flufenacet/pendimethalin	505,395	74,886	6,220	.	.	.	.	.	.	.	.	.	586,501
Flupyrsulfuron-methyl	1,699	350	.	16	6	.	.	2	.	.	.	.	2,073

Table 6 (cont.) Usage of pesticides on arable crops grown in the United Kingdom, 2014 (kg of active substances applied)

	Wheat	Winter barley	Spring barley	Oats	Rye	Triticale	Oilseed rape	Linseed	All potatoes	Peas	Beans	Sugar beet	All crops
Herbicides & desiccants (cont.)													
Fluroxypyr	64,179	8,210	17,456	4,310	.	218	.	.	.	.	.	.	94,373
Glyphosate	601,330	132,040	202,635	42,559	1,484	2,947	577,969	8,566	46,318	23,106	71,908	54,603	1,765,465
Imazamox/pendimethalin	.	.	.	.	.	.	.	.	.	14,512	45,344	.	59,856
Iodosulfuron-methyl-sodium/mesosulfuron-methyl	12,239	3	1	.	2	1	.	.	.	.	.	.	12,246
Linuron	.	.	.	.	.	.	.	.	49,280	1,189	3,328	.	53,797
MCPA	45,718	4,416	22,578	3,140	.	.	.	.	.	.	.	.	75,852
Mecoprop-P	91,355	18,561	135,335	18,839	.	556	.	.	.	.	.	.	264,646
Metamitron	.	.	.	.	.	.	.	.	.	.	.	135,336	135,336
Metazachlor	.	.	.	.	.	.	78,098	40	.	.	.	.	78,138
Metazachlor/quinmerac	.	.	.	.	.	.	147,818	.	.	.	.	.	147,818
Metribuzin	.	.	.	.	.	.	.	.	37,576	.	.	.	37,576
Metsulfuron-methyl	550	147	311	46	.	.	.	12	.	.	.	.	1,066
Metsulfuron-methyl/thifensulfuron-methyl	4,515	927	8,024	180	.	.	.	.	.	.	.	.	13,646
Metsulfuron-methyl/tribenuron-methyl	1,548	423	1,135	212	23	24	.	.	.	.	.	.	3,365
Pendimethalin	208,135	37,246	29,626	.	5,085	3,164	.	.	15,074	10,354	36,811	.	345,495
Pendimethalin/picolinafen	199,711	67,261	7,651	.	.	.	.	.	.	.	.	.	274,623
Phenmedipham	.	.	.	.	.	.	.	.	.	.	.	16,827	16,827
Pinoxaden	3,869	6,042	6,866	.	.	.	.	.	.	.	.	.	16,777
Propaquizafop	.	.	74	.	.	.	18,008	509	515	270	561	2,158	22,095
Propyzamide	.	.	.	.	.	.	267,472	.	.	.	6,640	.	274,112
Prosulfocarb	290,461	41,432	20,773	.	.	883	.	.	101,580	.	10,691	.	465,820
Quizalofop-P-ethyl	.	.	.	.	.	.	1,735	23	.	16	66	72	1,912
Quizalofop-P-tefuryl	.	.	.	.	.	.	2,540	4	.	104	57	6	2,711
Tepraloxydim	.	.	.	.	.	.	3,224	187	.	503	1,670	1,130	6,714
Thifensulfuron-methyl/tribenuron-methyl	612	165	1,809	215	.	28	.	.	.	.	.	.	2,829
Tri-allate	221,944	46,211	18,728	.	2,077	5,349	1,087	896	.	5,791	6,852	1,352	310,287
Tribenuron-methyl	314	117	109	98	42	.	.	.	.	.	.	.	680
Triflusulfuron-methyl	.	.	.	.	.	.	.	.	.	.	.	1,050	1,050
Other herbicides[1]	131,009	4,346	36,571	5,474	29	25	21,060	2,111	7,508	22,466	34,357	81,775	346,731
All herbicides	**2,924,963**	**645,808**	**596,891**	**85,783**	**11,539**	**14,486**	**1,633,956**	**14,453**	**371,564**	**85,675**	**249,023**	**414,065**	**7,048,206**

[1]Other herbicides include 2,4-D 2,4-D/MCPA, 2,4-DB, amidosulfuron, bentazone, bromoxynil, bromoxynil/diflufenican/ioxynil, carfentrazone-ethyl/flupyrsulfuron-methyl, carfentrazone-ethyl/mecoprop-P, carfentrazone-ethyl/metsulfuron-methyl, chloridazon/metamitron, chlorotoluron, clodinafop-propargyl/pinoxaden, clodinafop-propargyl/prosulfocarb, clomazone/metazachlor, clomazone/metribuzin, clomazone/pendimethalin, clopyralid/fluroxypyr/triclopyr, desmedipham/ethofumesate/phenmedipham, dicamba/MCPA/mecoprop-P, dichlorprop-P/MCPA/mecoprop-P, diflufenican/flurtamone, diflufenican/isoproturon, diflufenican/metsulfuron-methyl, dimethachlor, ethofumesate/metamitron, ethofumesate/metamitron/phenmedipham, ethofumesate/phenmedipham, fenoxaprop-p-ethyl, florasulam, flufenacet/metribuzin, flumioxazine, flupyrsulfuron-methyl/pyroxsulam, flupyrsulfuron-methyl/thifensulfuron-methyl, glufosinate-ammonium, imazamox/metazachlor, iodosulfuron-methyl-sodium, isoproturon, isoproturon/pendimethalin, lenacil, lenacil/triflusulfuron-methyl, MCPB, mesotrione, napropamide, pendimethalin/pyroxsulam, picolinafen, pinoxaden/cloquintocet-mexyl, propoxycarbazone-sodium, pyridate, pyroxsulam, rimsulfuron, s-metolachlor, sulfosulfuron, thifensulfuron-methyl, thifensulfuron-methyl/tribenuron methyl, tralkoxydim, trifluralin and unspecified herbicides.

Table 6 (cont.) Usage of pesticides on arable crops grown in the United Kingdom, 2014 (kg of active substances applied)

	Wheat	Winter barley	Spring barley	Oats	Rye	Triticale	Oilseed rape	Linseed	All potatoes	Peas	Beans	Sugar beet	All crops
Insecticides & nematicides													
Alpha-cypermethrin	1,414	320	125	2	.	.	1,242	4	.	103	154	.	3,364
Chlorpyrifos	18,376	455	13,869	1,478	.	.	246	.	148	.	.	571	35,143
Cypermethrin	13,021	2,757	480	729	67	.	9,305	106	162	31	1,011	46	27,715
Deltamethrin	97	19	16	1	.	.	69	.	.	21	94	.	317
Esfenvalerate	485	195	53	4	.	.	.	.	208	3	17	.	965
Lambda-cyhalothrin	2,926	507	240	148	32	.	2,794	58	498	269	876	29	8,377
Pirimicarb	1,661	11	.	8	159	.	.	.	1,127	3,283	2,918	517	9,684
Tau-fluvalinate	987	19	23	.	.	.	12,048	.	.	.	145	.	13,222
Zeta-cypermethrin	1,205	146	80	136	.	.	836	60	4	39	205	.	2,711
Other insecticides & nematicides[1]	677	210	34	2	.	.	1,760	.	117,901	.	.	5,728	126,312
All insecticides & nematicides	**40,849**	**4,639**	**14,920**	**2,508**	**258**	**.**	**28,300**	**228**	**120,048**	**3,749**	**5,420**	**6,891**	**227,810**
Molluscicides & repellents													
Ferric phosphate	2,516	563	120	23	37	.	3,262	.	1,850	.	.	.	8,371
Metaldehyde	46,592	2,020	769	113	68	.	54,092	257	7,640	.	97	476	112,124
Methiocarb	3,324	326	86	.	.	.	2,618	.	4,945	.	.	43	11,342
Other molluscicides & repellents[2]	3	4	.	.	.	.	3	.	.	.	.	.	10
All molluscicides & repellents	**52,435**	**2,913**	**975**	**136**	**105**	**.**	**59,975**	**257**	**14,435**	**.**	**97**	**519**	**131,847**
Sulphur	**20,053**	**654**	**5,335**	**869**	**.**	**.**	**23,109**	**.**	**.**	**.**	**6,308**	**4,378**	**60,706**

[1]Other insecticides and nematicides include acetamiprid, beta-cyfluthrin, dimethoate, flonicamid, fosthiazate, indoxacarb, oxamyl, pymetrozine, thiacloprid and thiamethoxam.

[2]Other molluscicides & repellents include unspecified molluscicides.

Table 6 (cont.) Usage of pesticides on arable crops grown in the United Kingdom, 2014 (kg of active substances applied)

	Wheat	Winter barley	Spring barley	Oats	Rye	Triticale	Oilseed rape	Linseed	All potatoes	Peas	Beans	Sugar beet	All crops
Growth regulators													
2-chloroethylphosphonic acid	21,785	11,090	5,964	7	.	.	.	.	.	.	.	.	38,846
2-chloroethylphosphonic acid/mepiquat	39,399	18,343	6,463	.	3,244	1,075	.	.	.	.	.	.	68,524
Chlormequat	1,818,670	285,618	26,575	86,047	13,062	6,887	.	.	.	.	.	.	2,236,859
Chlormequat/2-chloroethylphosphonic acid	26,789	15,754	4,297	.	211	.	.	.	.	.	.	.	47,051
Chlormequat/imazaquin	120,798	.	26	.	.	.	.	.	.	.	.	.	120,824
Mepiquat chloride/metconazole	.	.	.	.	.	.	11,696	.	.	.	.	.	11,696
Mepiquat chloride/prohexadione-calcium	32,887	10,493	2,605	2,770	.	224	.	.	.	.	.	.	48,979
Trinexapac-ethyl	39,533	6,778	1,859	1,568	234	204	.	.	.	.	.	.	50,176
Other growth regulators[1]	32,691	742	3,351	.	.	.	.	.	69,409	.	.	.	106,193
All growth regulators	**2,132,552**	**348,818**	**51,140**	**90,392**	**16,751**	**8,390**	**11,696**	**.**	**69,409**	**.**	**.**	**.**	**2,729,148**

[1]Other growth regulators include chlormequat chloride/2-chloroethylphosphonic acid, chlormequat chloride/2-chloroethylphosphonic acid/mepiquat chloride, chlormequat chloride/mepiquat chloride and maleic hydrazide.

Table 6 (cont.) Usage of pesticides on arable crops grown in the United Kingdom, 2014 (kg of active substances applied)

	Wheat	Winter barley	Spring barley	Oats	Rye	Triticale	Oilseed rape	Linseed	All potatoes	Peas	Beans	Sugar beet	All crops
Seed treatments													
Fungicide seed treatments													
Fludioxonil	1,090	122	201	100	8	.	.	.	.	.	.	.	1,521
Fluopyram/prothioconazole/tebuconazole	.	1,118	2,750	64	.	.	.	.	.	.	.	.	3,932
Fluoxastrobin/prothioconazole	1	.	.	.	.	.	.	.	.	.	.	.	1
Fluquinconazole/prochloraz	9,934	219	.	.	.	.	.	.	.	.	.	.	10,153
Hymexazol	.	.	.	.	.	.	.	.	.	.	.	1,220	1,220
Prochloraz	.	.	.	.	.	.	.	95	.	.	.	.	95
Prochloraz/thiram	.	.	.	.	.	.	2,206	.	.	.	.	.	2,206
Prochloraz/triticonazole	6,655	2,735	6,588	716	.	.	.	.	.	.	.	.	16,694
Prothioconazole	7,650	669	641	359	.	51	.	.	.	.	.	.	9,370
Prothioconazole/tebuconazole	2	.	.	4	.	.	.	.	.	.	.	.	6
Silthiofam	6,203	191	6	.	.	.	.	.	.	.	.	.	6,400
Thiram	.	.	.	.	.	.	106	96	.	2,158	35	349	2,744
Fungicide/insecticide seed treatments													
Clothianidin/prothioconazole	71,837	7,916	802	827	110	22	.	.	.	.	.	.	81,514
Fludioxonil/metalaxyl-M/thiamethoxam	.	.	.	.	.	.	8,744	.	.	.	.	.	8,744
Insecticide seed treatments													
Beta-cyfluthrin/clothianidin	.	.	.	.	.	.	7,058	.	.	.	.	1,340	8,398
Clothianidin	4,232	1,441	.	196	72	.	.	.	.	.	.	.	5,941
Unspecified seed treatments[1]													
Other seed treatments[2]	7,425	1,205	1,986	592	0	27	100	45	25,051	1,804	0	3,239	41,474
All seed treatments	**115,029**	**15,616**	**12,974**	**2,858**	**190**	**100**	**18,214**	**236**	**25,051**	**3,962**	**35**	**6,148**	**200,413**

[1]There is no weight associated with unspecified seed treatments

[2]Other seed treatments include beta-cyfluthrin/imidacloprid, carboxin/thiram, clothianidin/prothioconazole/tebuconazole/triazoxide, cymoxanil/fludioxonil/metalaxyl-M, difenoconazole/fludioxonil, fipronil, fludioxonil/flutriafol, fludioxonil/tefluthrin, fluquinconazole, flutolanil, fuberidazole/imidacloprid/triadimenol, fuberidazole/triadimenol, imazalil, imazalil/ipconazole, imazalil/pencycuron, imazalil/thiabendazole, imidacloprid, imidacloprid/tebuconazole/triazoxide, ipconazole, pencycuron, tefluthrin and thiamethoxam.

Table 7 Estimated area (ha) of application of the fifty most extensively-used active substances on all arable crops surveyed in 2014 in the United Kingdom (excluding seed treatments)

	Active substance	Area treated 2014 (ha)	Area treated 2012 (ha)	% change on 2012	Movement	
1	Prothioconazole	4,287,368	4,386,570	-2		↓
2	Epoxiconazole	3,783,354	4,038,763	-6		↓
3	Chlorothalonil	3,686,183	2,828,998	30	↑	
4	Tebuconazole	3,586,689	3,115,848	15	↑	
5	Chlormequat	3,049,230	3,149,503	-3		↓
6	Diflufenican	2,298,320	2,306,451	0		↓
7	Glyphosate	2,099,261	1,622,028	29	↑	
8	Flufenacet	1,803,105	1,612,041	12	↑	
9	Trinexapac-ethyl	1,550,525	1,635,076	-5		↓
10	Lambda-cyhalothrin	1,494,739	1,473,227	1	↑	
11	Pendimethalin	1,431,060	1,400,956	2	↑	
12	Cyproconazole	1,214,207	1,388,371	-13		↓
13	Fluroxypyr	1,187,401	1,068,369	11	↑	
14	Bixafen	1,167,683	914,451	28	↑	
15	Cypermethrin	1,135,464	1,496,611	-24		↓
16	Fluxapyroxad	1,100,162	571,708	92	↑	
17	Metsulfuron-methyl	1,055,465	1,102,039	-4		↓
18	Metconazole	1,033,903	959,515	8	↑	
19	Iodosulfuron-methyl-sodium	999,494	1,073,099	-7		↓
20	Pyraclostrobin	988,505	1,102,883	-10		↓
21	Metaldehyde	920,319	701,477	31	↑	
22	Azoxystrobin	914,910	893,448	2	↑	
23	Mesosulfuron-methyl	887,038	961,551	-8		↓
24	Fenpropimorph	771,253	965,860	-20		↓
25	Boscalid	724,496	1,190,732	-39		↓
26	Spiroxamine	711,931	807,653	-12		↓
27	Cymoxanil	694,157	848,594	-18		↓
28	Prochloraz	684,227	661,461	3	↑	
29	Florasulam	683,428	585,710	17	↑	
30	Mecoprop-P	679,121	729,001	-7		↓
31	Mancozeb	666,920	648,255	3	↑	
32	Thifensulfuron-methyl	599,578	615,683	-3		↓
33	Trifloxystrobin	584,651	577,344	1	↑	
34	Penthiopyrad[1]	573,332	.	.		
35	Fluoxastrobin	560,538	662,164	-15		↓
36	Metazachlor	559,678	616,188	-9		↓
37	Tribenuron-methyl	531,370	553,148	-4		↓
38	Propiconazole	517,373	609,161	-15		↓
39	2-chloroethylphosphonic acid	511,131	511,881	0		↓
40	Pinoxaden	506,361	428,570	18	↑	
41	Mepiquat chloride	439,261	322,037	36	↑	
42	Propyzamide	424,311	406,025	5	↑	
43	Isopyrazam	401,237	278,699	44	↑	
44	Fluazinam	387,233	378,580	2	↑	
45	Propaquizafop	381,698	339,806	12	↑	
46	Flupyrsulfuron-methyl	365,234	282,117	29	↑	
47	Folpet	354,273	380,795	-7		↓
48	Quinmerac	348,072	344,277	1	↑	
49	Picolinafen	342,350	346,791	-1		↓
50	Phenmedipham	340,772	304,134	12	↑	

[1] – Not encountered in 2012

Table 8 Estimated amount (tonnes) of the 50 active substances, used most by weight, on all arable crops surveyed in 2014 in the United Kingdom (excluding seed treatments)

	Active substance	Amount used 2014 (t)	Amount used 2012 (t)	% change on 2012	Movement	
1	Chlormequat	2,389	2,479	-4		↓
2	Glyphosate	1,767	1,340	32	↑	
3	Chlorothalonil	1,613	1,181	36	↑	
4	Pendimethalin	1,211	1,176	3	↑	
5	Mancozeb	755	761	-1		↓
6	Prosulfocarb	573	695	-18		↓
7	Prothioconazole	419	424	-1		↓
8	Tebuconazole	385	315	22	↑	
9	Mecoprop-P	365	393	-7		↓
10	Flufenacet	330	308	7	↑	
11	Propyzamide	327	317	3	↑	
12	Tri-allate	310	104	198	↑	
13	Metazachlor	306	346	-12		↓
14	Chlorotoluron	231	450	-49		↓
15	Epoxiconazole	227	224	1	↑	
16	Propamocarb hydrochloride	201	159	26	↑	
17	Metamitron	163	137	18	↑	
18	Folpet	154	159	-3		↓
19	Fenpropimorph	143	180	-21		↓
20	Fluroxypyr	135	122	11	↑	
21	Spiroxamine	132	150	-12		↓
22	Prochloraz	130	120	8	↑	
23	Boscalid	130	208	-38		↓
24	Carbetamide	129	125	3	↑	
25	Diflufenican	125	126	-1		↓
26	Diquat	114	108	6	↑	
27	Azoxystrobin	112	111	1	↑	
28	Metaldehyde	112	107	4	↑	
29	Dimethenamid-P	106	84	26	↑	
30	MCPA	94	49	93	↑	
31	2-chloroethylphosphonic acid	80	80	0	↑	
32	Linuron	76	73	4	↑	
33	Penthiopyrad[1]	76	.	.		
34	Pyraclostrobin	74	78	-5		↓
35	Oxamyl	73	78	-6		↓
36	Maleic hydrazide	69	53	30	↑	
37	Bixafen	69	55	26	↑	
38	Fluxapyroxad	69	34	105	↑	
39	Fluazinam	67	69	-3		↓
40	Quinmerac	66	64	3	↑	
41	Cymoxanil	62	76	-19		↓
42	Chloridazon	61	66	-8		↓
43	Mepiquat chloride	61	42	44	↑	
44	Sulphur	61	119	-49		↓
45	Cyproconazole	59	64	-7		↓
46	Cyprodinil	56	49	15	↑	
47	Trinexapac-ethyl	50	56	-10		↓
48	Ethofumesate	48	40	19	↑	
49	Mepiquat	45	51	-10		↓
50	Phenmedipham	43	42	3	↑	

[1] – Not encountered in 2012

Table 9 Pesticides recorded at a significant level in the United Kingdom in 2014 but not in 2012

	Active substance	Area treated 2014 (ha)	Amount used 2014 (t)
1	Penthiopyrad	573,332	76
2	Aminopyralid	65,460	1
3	Fluopyram	43,585	4
4	Dimethachlor	9,724	8
5	S-metolachlor	3,495	3
6	Pyriofenone	3,325	<1
7	Cloquintocet-mexyl	642	<1
8	Trifluralin	23	<1

Table 10 Major increases in the use of individual active substances on arable crops in the United Kingdom since 2012 (area treated- ha)

	Active substance	Area treated 2014 (ha)	Area treated 2012 (ha)	% change on 2012
1	Clethodim	141,125	10,539	1,239
2	Copper oxychloride	78,920	6,007	1,214
3	Dichlorprop-P	20,895	1,733	1,106
4	2,4-D	5,696	754	655
5	Pencycuron	13,729	2,819	387
6	Thiamethoxam	4,870	1,103	342
7	Triadimenol	28,065	7,237	288
8	Ferric phosphate	74,426	22,712	228
9	Mesotrione	2,708	1,006	169
10	MCPA	124,848	57,957	115
11	Tri-allate	135,029	63,636	112
12	Fluxapyroxad	1,100,162	571,708	92
13	Fosthiazate	11,928	6,232	91
14	Imazamox	64,750	36,803	76
15	Bentazone	50,335	28,796	75
16	Flutriafol	19,565	11,851	65
17	Fluquinconazole	1,392	889	57
18	2,4-DB	6,901	4,432	56
19	Pyrimethanil	15,858	10,821	47
20	Prohexadione-calcium	318,623	218,628	46

Table 11 Major decreases in the use of individual active substances on arable crops in the United Kingdom since 2012 (area treated- ha)

	Active substance	Area treated 2014 (ha)	Area treated 2012 (ha)	% change on 2012
1	Tralkoxydim	1,460	28,568	-95
2	Dimethoate	3,112	31,912	-90
3	Sulfosulfuron	351	3,302	-89
4	Unspecified molluscicides	1,024	5,912	-83
5	Triclopyr	8	37	-79
6	Dimoxystrobin	17,688	66,795	-74
7	Acetamiprid	2,777	9,072	-69
8	Indoxacarb	16,833	46,488	-64
9	Pymetrozine	18,314	49,975	-63
10	Famoxadone	63,990	172,294	-63
11	Fenpropidin	82,617	211,547	-61
12	Zoxamide	18,961	47,598	-60
13	Quinoxyfen	5,917	14,459	-59
14	Ametoctradin	27,355	64,887	-58
15	Ethoprophos	1,211	2,626	-54
16	Flusilazole	304,576	659,584	-54
17	Glufosinate-ammonium	6,476	13,982	-54
18	Picloram	80,688	165,146	-51
19	Beta-cyfluthrin	24,327	48,022	-49
20	Cyflufenamid	49,385	92,409	-47

Table 12 – Comparison of pesticide usage in the United Kingdom between 2008 and 2014

	2008			2010			2012			2014	
	Area treated (ha)	**Weight applied (t)**		**Area treated (ha)**	**Weight applied (t)**		**Area treated (ha)**	**Weight applied (t)**		**Area treated (ha)**	**Weight applied (t)**
Insecticides											
Total - all insecticides[1]	4,522,789	338		3,807,619	222		4,800,960	252		4,084,765	194
Biological control agents	1,569	.		.	.		.	.		.	.
Sulphuric acid	7,469	1,033		.	.		.	.		.	.
Fungicides	19,173,509	5,209		17,701,996	4,565		20,252,722	5,061		20,540,899	5,441
Sulphur	69,288	141		39,971	107		33,732	119		29,167	61
Growth regulators	5,172,226	3,252		4,293,759	2,631		5,517,515	2,804		5,450,453	2,729
Herbicides & desiccants	15,291,682	8,236		14,077,040	6,252		14,940,062	6,619		15,757,137	7,048
Molluscicides & repellents	1,687,659	486		926,140	174		877,965	126		1,102,152	132
Nematicides	13,468	33		15,203	36		6,232	14		11,928	34
Seed treatments	4,772,733	199		4,531,578	223		4,744,969	192		4,406,781	200
Total - all registered pesticides	**50,712,483**	**18,927**		**45,393,307**	**14,210**		**51,174,157**	**15,187**		**51,383,282**	**15,839**
Area grown	4,298,900			4,160,983			4,310,390			4,259,083	

[1]Includes oxamyl which has both insecticidal and nematicidal properties

APPENDIX 2 – DEFINITIONS

a) 'Pesticide' is used throughout this report to include commercial formulations containing active substances used as acaricides, biological control agents, defoliants, desiccants, fungicides, growth regulators, herbicides, insecticides, molluscicides, nematicides or urea.

b) 'Treated area' is the gross area treated with a pesticide, including all repeat applications, some of which may have been applied to the land in preparation for planting, or applied to the margins of the crop and thus may appear as an inappropriate use on that crop.

c) Where quoted in the text or within figures, reasons for application are the grower's stated reasons for use of that particular pesticide on that crop and may not always seem entirely appropriate.

d) Where individual active substances are mentioned in the text, they are listed in descending order of use by hectares treated.

e) Throughout all tables, “Other” refers to chemicals grouped together because they were applied to less than 0.1% of the total area treated with pesticides.

f) Throughout all tables, “.” indicates that there was no recorded usage.

g) The term “formulation(s)” used within the text is used here to describe either single active substances or mixtures of active substances contained within an individual **product**. It does not refer to any of the solvents, pH modifiers or adjuvants also contained within a product that contribute to its efficacy.

h) For the purposes of this survey arable crops include the following: wheat; winter barley; spring barley; oats; rye; triticale; oilseed rape; linseed; flax; ware potatoes; seed potatoes; peas for harvesting dry; field beans, sugar beet and other combinable crops including borage, hemp, lupins and poppies.

i) Pesticide applications included those applied prior to planting, or in some cases to crops that failed and were subsequently re-planted, and as these are associated with that crop they may appear as inappropriate uses.

j) Within the seed treatment tables at the end of each crop section, unspecified or unknown seed treatments have been excluded from the last column in order to express the known seed treatment areas as a proportion of the total area of each crop grown. The increased area of unspecified seed treatments within this report has resulted from the extraction of data directly from farm management software reports where seed treatment information has not been included.

k) The average number of applications indicated in the text for each crop, e.g. page 7, is based on the occurrence of a chemical group on at least 10% of the area grown (Table 3). Within tables 4a, b and c, the average number of applications is calculated only on the areas using each chemical group and therefore the minimum number of applications is always going to be 1.

APPENDIX 3 – METHODOLOGY

METHODS

The samples of holdings to be surveyed were selected using data from the Agricultural Census Returns, June 2013 for England & Wales (Anon., 2014a, 2014b), for Scotland (Anon., 2014c) and Northern Ireland (Anon, 2014d).

The samples were drawn from the census returns so as to represent the area of all arable crops grown throughout England, Scotland, Wales and Northern Ireland. For England the sample was selected within each of the eight Government Office Regions (GOR's), the Welsh Assembly Government provided a further sample, which represented the area grown in Wales, and for Scotland the country was divided into 11 land-use regions (Wood, 1931).

For the purposes of this survey the total area of arable farm crops was taken as the sum of the areas of the following crops: wheat; winter barley; spring barley; oats; rye; triticale; oilseed rape; linseed; ware potatoes; seed potatoes; peas for harvesting dry; field beans; and sugar beet. A number of minor combinable crops were encountered in the survey, including ahiflower, borage, lupins, mixed corn and poppies. Together the minor crops accounted for 0.4 % of the total arable area grown in the United Kingdom and data relating to these crops are not presented in this report.

The samples were stratified according to the total area of all arable crops grown in each region and by farm size group based on the total area of arable crops on each farm. The area of arable crops sampled in each size group and each region was proportional to the total area of arable crops grown on holdings of each size group in each region. All three survey teams followed the same methodology for data collection and used the same forms and instructions for their completion. The size groups, based on the total arable area are as follows: <50ha (A); >50-<=100 ha (B); >100-<=150 ha (C); >150-<=250 ha (D); >250-<=500 ha (E) and >500 ha (F).

The 2014 arable survey is the second survey for which the majority of data for holdings in England & Wales were obtained electronically from a commercial research company, GfK Kynetec, who have a long history (over 20 years) of managing arable farm pesticide usage surveys. As part of the agreement with GfK Kynetec and as part of the Memorandum of Understanding (MOU) that Fera had in place with the Health & Safety Executive (HSE) during the period of the survey, they provide data to Fera on pesticide usage for the arable survey. The GfK Kynetec survey has a large (over 1,100 farms in England & Wales) existing panel of farmers who provide data on their arable pesticide usage annually, by not only completing farm record books, but also by speaking to an interviewer twice during the season. A final phone call at the end of the season ensures that any additional data are collected.

The main benefit to this approach is that the burden on the farming community is reduced and 598 farms that would have been contacted as part of the previous Fera pesticide usage survey programme now no longer have to be contacted. It also contributes to the requirements of the UK Statistics Authority Code of Practice for Official Statistics in that it enables a proportionate burden to be placed on those providing the data.

Fera subject all data, including data obtained from GfK Kynetec, Scotland & Northern Ireland, to the same detailed and rigorous checks as they have to those collected previously by the England & Wales survey team.

In order to ensure that the sample was fully representative, sub-samples of 110 larger arable holdings (>250 hectares) within England & Wales were also contacted. Of the 148 arable farms contacted, 26 (18%) were unwilling to help with the survey, a further 12 (8%) either provided data after the deadline or were willing to help at a later date.

Data were collected from 1,201 holdings throughout the United Kingdom in 2014; in 2010 1,736 farms provided data. However, because of improved stratification the sample accounted for the same percentage of the area grown.

One of the requirements placed on growers by their customers is the membership of farm assurance schemes. These schemes require detailed pesticide records (computer based or hand written) which ensure traceability and can be examined by crop assurance auditors at any time, but normally at least once each year. These records are used extensively by those collecting pesticide data.

Of the 1,032 holdings visited in Great Britain (no data were available from Northern Ireland) and where information was available (854 holdings), 95% were members of one or more crop assurance schemes (a further 28 holdings, 3%, were part of livestock assurance schemes only). Six of the holdings (1%) were registered organic on all or part of their farm. However, in terms of area grown, farms with a crop assurance scheme accounted for 98% of the total area surveyed.

Commercial farm management software and in-house electronic record keeping systems are now used extensively, these combined with spray books and agronomists' recommendation sheets provide the main sources of data used by surveyors on farm. Where information was available (110 larger holdings, size groups E & F, in England), electronic record keeping was used by 91% of the holdings contacted in England, with these records accounting for 99% of the total pesticide-treated area. Paper based record keeping accounted for the remainder.

The use of electronic data is now vitally important to maintain accuracy of data collection and reducing the burden on farmers and growers. In total, electronic downloads, normally in the form of CSV files, accounted for 93% of the number of rows of data collected in England (total 109,000 rows of data). All data from GfK, and the Scotland & Northern Ireland survey teams were received electronically.

The Questionnaire

For some of the farms in England & Wales and all of the farms in Scotland & Northern Ireland the questionnaire for the main part of the survey consisted of two forms, which were completed during an interview with the grower.

Form 1 summarised the areas of arable crops grown on the designated holding during the 2013/2014 season (autumn 2013 through to harvest in 2014).

Form 2 dealt with all aspects of pesticide usage on the individual crops grown on the holding and harvested in 2014, a separate form being used for each field/crop combination. These included pesticides applied prior to planting, or in some cases to crops that failed and were subsequently re-planted, as these are associated with that crop they may appear as inappropriate uses. Certain agronomic details that may have influenced pesticide usage (including drilling methods, sowing & harvest times, use of adjuvants and the volume of spray applied) were also recorded on form 2.

The data supplied by GfK Kynetec were derived from the farm spray books provided to their participating farmers and these books meet exactly the same requirements and contain the same level of detail as the forms used by each of the survey teams in England, Wales, Scotland and Northern Ireland.

Raising factors

The pesticide usage data collected from each holding were raised by a ratio of two factors to give an estimate of regional usage using a standard ratio raising statistical technique; the first factor being dependent on farm size group and region (see Appendix 5) and the second dependent on crop area and region. The data were further adjusted by a third factor to compensate for regions in which specific crops were not sampled and to make estimates of total pesticide usage related to the national cropping areas in the United Kingdom (Thomas, 2000).

The raising factors were based on the areas of arable crops grown and harvested in 2014 as recorded in the June Survey of Agriculture and Horticulture for England & Wales (Anon., 2015a, b), Scotland (Anon., 2015c) and Northern Ireland (Anon., 2015d).

Rounding

Due to rounding of figures, the sum of constituent items in the tables may not agree exactly with the totals shown.

Error checking

Extensive checks are made on the data before, at the time of and following data entry. Data checking routines are used to verify the authenticity of the data collected including: the approval status of all crop/pesticide combinations; high and low rates of application; the methods of application used to apply pesticides; crop growth stages at the time of application; the timing of pesticide applications and consistency within a tank mix.

Further checks are made on the integrity of the relational database used to store the raw data collected ensuring that links to product databases are in place prior to the production of the report. The product databases used for the pesticide usage surveys are maintained alongside the commercial product database, *LIAISON*, which is used extensively by agronomists and the major farm management software companies.

Where inconsistencies are found, for example where there are high rates of application or non-approved product usage, these are checked first against the farm records and secondly with the grower and amended if necessary.

Reports are written and checked within the team after which they are sent to reviewers within the Working Party on Pesticide Usage Surveys for their comments and checking.

The final report is pre-announced and published via the ONS Publication Hub and the Fera website in line with the Code of Practice for Official Statistics.

Data limitations and use of data

Our experience (Fera, SASA, AFBI & GfK) has shown that the face to face interview and 'main contact plus reserves approach' delivers the highest quality data and minimises non response bias; no other approach is likely to yield fit for purpose data to meet the quality requirements of the UKSA Code of Practice for Official Statistics. Drawing a fresh stratified random sample each year is clearly an appropriate survey methodology.

As part of this survey Fera has implemented the UK Statistics Authority Code of Practice for Official Statistics, published in 2009. Whilst all eight principles apply, we acknowledge in particular, the following:

- Integrity – in particular that, statistical reports must be issued separately from other statements or comments about the figures, that the public interest prevails.
- Confidentiality – the identity of individuals or their information is not revealed, information is kept secure and respondents are informed how their confidentiality will be protected**.**
- Proportionate burden - seeking participation through informed consent.
- Accessibility – to all users, providing information on the quality and reliability of the statistics, adopting formats that enhance clarity and consistency, disseminate in formats that encourage analysis and re-use.

In accordance with UKSA Code of Practice for Official Statistics, we work with Defra & HSE statisticians to build on our existing extensive and effective relationships with users of the surveys to further enhance user engagement. There are a broad spectrum of users and stakeholders across policy, research, agricultural supply industry (including consultancies), farming and horticultural businesses, NGOs and members of the public. Over the years we have an excellent record of listening to our users and incorporating their feedback into the way we collect and report our statistics.

APPENDIX 4 – ARABLE STANDARD ERRORS

Estimates of standard errors for pesticide usage per crop type and region – arable survey - 2014
Helene Thygesen (Fera), 08-07-2015

Summary: Pesticide usage data from 1,200 farms surveyed, stratified by region and size, were extrapolated to the whole of the UK using area lifting and standard errors were calculated using 10,000 fold non-parametric bootstrapping. The below tables show the following:

- Total ha treated. (e.g. if one hectare is treated twice with a combination of three pesticides, it will count as 3x2 = 6ha)
- SE on the estimate of the above
- Total kg of pesticide applied
- SE on the estimate of the above
- Relative SE, i.e. the SE divided by the estimate

Table S1 – Relative standard errors for individual crops using the total UK cropping areas – arable 2014

Crop	Total ha	Ha SE	Total kg	Kg SE	Rel. SE ha	Rel. SE kg
Sugar beet	987,033	88,438	337,332	31,008	0.090	0.092
Oilseed rape	6,682,134	247,676	2,134,275	67,006	0.037	0.031
Potatoes	2,109,884	227,283	1,189,415	144,392	0.108	0.121
Spring barley	3,873,341	144,629	1,078,309	44,605	0.037	0.041
Winter barley	4,045,069	178,098	1,452,104	69,067	0.044	0.048
Wheat	23,859,574	491,347	8,195,979	177,603	0.021	0.022
Other crops	2,194,820	130,396	794,645	45,541	0.059	0.057
Total	43,375,081	644,978	15,087,451	257,808	0.015	0.017

Table S2 – Relative standard errors for each region using the total UK cropping areas – arable 2014

Region	Total ha	Ha SE	Total kg	Kg SE	Rel. SE ha	Rel. SE kg
East Midlands	8,159,481	269,240	2,695,929	94,617	0.033	0.035
Eastern	12,355,847	368,246	4,159,917	159,526	0.030	0.038
North East	2,231,062	136,664	655,713	43,974	0.061	0.067
Northern Ireland	301,031	14,538	112,948	6,300	0.048	0.056
Scotland	4,610,223	136,049	1,414,406	47,217	0.030	0.033
South East	5,552,429	208,958	1,808,819	73,182	0.038	0.040
South West	3,982,611	217,748	1,279,782	79,106	0.055	0.062
Wales	333,894	33,517	105,393	12,521	0.100	0.119
West Midlands	3,484,808	250,247	1,164,573	121,257	0.072	0.104
Yorkshire & the Humber	5,233,344	216,635	1,684,736	90,840	0.041	0.054

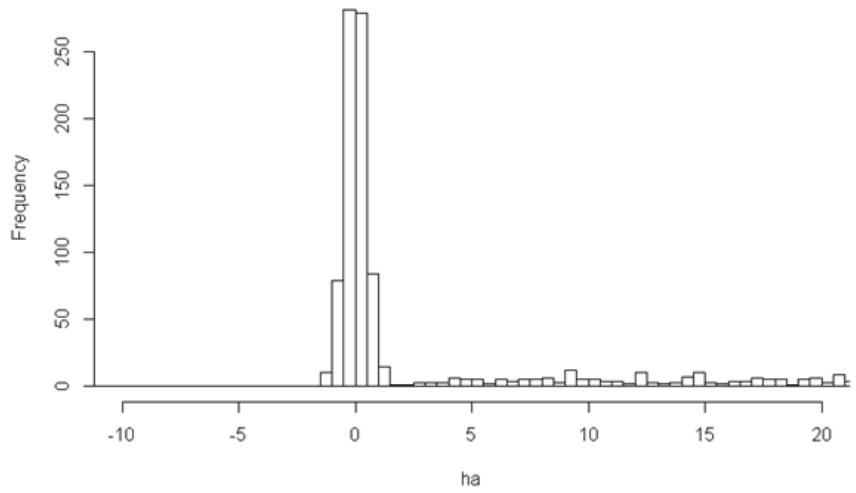
Data: A sample of 1,201 farms reported pesticide usage for six major crop types plus pesticide usage for all crops. For each of these crop categories, three variables were reported: area grown, ha treated (e.g. if one hectare is treated twice with a combination of three pesticides, it will count as 3x2 = 6ha) and weight applied.

This is combined with census data for the area grown for each crop (including an "other crop" category) in 11 different regions. The sample data use the same regions. The 17 census crop categories can be mapped unambiguously to sample crop categories.

Census data per farm size was also available for six different size groups, ranging from <50Ha to >500Ha (A-F).

Data pre-processing: One farm was excluded as only data relating to potatoes were reported for that farm. For the sample data, the pesticide usage for the "other" crop category was calculated by subtracting the data from the individual crops from the data for totals per farm. As seen on the diagram below, this can lead to a number of farms having a negative area for "other" crops. Conveniently, the farms can be divided into two distinct clusters, one with areas for "other" crops between -1.5 and +1.5 and one with larger areas. The area for other crops was set to zero whenever it was below 1.5 ha.

Figure S1 - Sampled data - variation in area of 'other crops' grown



Estimates of population level pesticide usage: The pesticide usage, expressed as area treated and as kg used, was estimated for each region as well as for the UK as a whole, and for each crop (including the "other crop" category) as well as for all crops. This was calculated in the following way: for each (crop, region, size group) combination, the pesticide usage for the farms not in the sample was estimated on the basis of the assumption that the sample was representative of the population of all farms in that region and farm size group in terms of pesticide usage per ha. In other words, the extrapolation to the population of farms not in the samples was based on "area lifting" so that the estimates become unbiased as long as the average pesticide usage per ha is the same in the sample as in the population, even if the sample is biased towards larger farms within each stratum.

Stratification by farm size is important because for most crops, as well as overall, larger farms tend to use more pesticides per ha grown than the smaller farms (see Figure S2).

Figure S2 - Pesticide usage per area of crop grown (kg/ha)

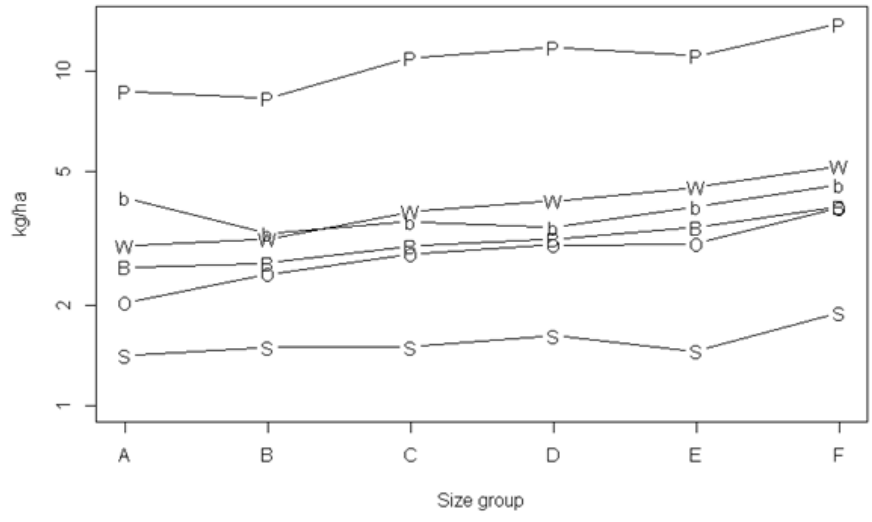
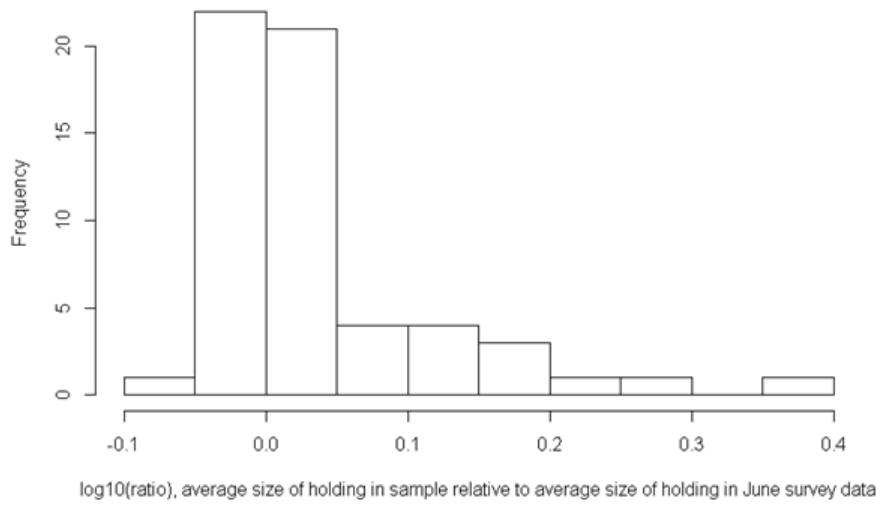


Figure S3 - Histogram of sample biases per region/size group combination



As the above histogram of sample biases in farm sizes shows, there are some region/size group combinations that have a larger average farm size in the sample than in the population. It concerns especially the <50ha stratum in Wales, Northern Ireland, Scotland and South West. If larger farms use more pesticides than the smaller farms within size group A, as it does between strata, then this would cause a small overestimate of the pesticide usage in those regions. Since previous surveys have not attempted to correct for this bias we shall not do so here, since the results need to be comparable with previous years.

Table S3 – Relative standard errors for potatoes and sugar beet – arable survey 2014

Region	Crop	Sample ha	Sample kg	Total ha	Ha SE	Total kg	Kg SE	Rel. SE ha	Rel. SE kg
UK	Potatoes	130,051	77,273	2,109,884	227,283	1,189,415	144,392	0.108	0.121
UK	Sugar beet	82,614	27,950	987,033	88,438	337,332	31,008	0.090	0.092

The above table (S3) shows the estimates and standard errors for pesticide usage on sugar beet and potatoes where the crop has been stratified by region. For both crops the standard errors are quite large due to the small number of regions in which those crops were sampled, and it is probably better to rely on the national figures for these crops. Sugar beet is only grown in a limited number of regions and the sampling reflects these areas, for potatoes an additional sample has been taken, 5 farms, but this will be increased for future surveys.

For the individual regions, pesticide usage gives relative SEs around 0.05 but unfortunately the SE is quite large for Wales which was only represented by a small sample. The total numbers for the UK do not add up to the exact same numbers as the total across crops from the previous table because of a confounding effect between regions and crops, (some regions may not be sampled as thoroughly as others and some crops may be missing from some regions – this is normally due to either smaller areas of arable crops or individual crops in some regions).

The most reliable indicators for UK wide usage are the totals in the per-crop table (Table S1) since this takes this confounding into account.

As mentioned the estimates for potatoes and sugar beet (Table S3) are better taken from the UK wide (not regionally stratified) statistics in Table S1 which gives a somewhat smaller SE.

APPENDIX 5 – FIRST RAISING FACTORS FOR ARABLE CROPS (2014)

Region/Country	*Farm size group*	*rf1*	*Regional area (ha)*	*Area surveyed (ha)*	*Number of farms visited*
East Midlands	A	216.46	51,701	239	8
	B	57.63	90,041	1,562	21
	C	24.78	85,790	3,462	27
	D	23.58	133,504	5,662	29
	E	23.56	175,167	7,435	22
	F	10.49	157,220	14,992	19
Eastern	A	219.49	56,933	259	9
	B	73.26	120,649	1,647	23
	C	29.65	132,161	4,458	37
	D	20.99	205,868	9,807	49
	E	17.08	271,519	15,894	47
	F	6.29	197,568	31,428	35
London & South East	A	214.37	39,061	182	6
	B	95.05	59,401	625	9
	C	50.00	60,779	1,216	10
	D	25.13	99,586	3,962	20
	E	12.52	124,820	9,966	29
	F	5.71	84,613	14,820	17
North East	A	233.46	16,132	69	*
	B	83.61	30,400	364	*
	C	37.89	28,266	746	6
	D	22.77	29,472	1,294	7
	E	11.86	30,201	2,547	8
	F	8.15	15,990	1,963	3
North West	A	226.70	40,755	180	7
	B	67.42	22,848	339	*
	C	47.33	11,743	248	*
	D	17.28	10,702	619	*
	E	13.12	9,216	702	*
Northern Ireland	A	11.24	23,561	2,096	112
	B	3.05	8,055	2,642	40
	C	2.30	3,060	1,328	11
	D	4.93	1,742	354	*
	E	1.00	1,185	1,185	*
Scotland	A	63.18	106,252	1,682	67
	B	21.86	119,645	5,473	75
	C	12.35	93,589	7,580	60
	D	7.62	112,484	14,760	78
	E	6.43	71,975	11,195	35
	F	4.21	27,323	6,487	9
South West	A	196.57	87,794	447	16
	B	83.66	75,013	897	13
	C	35.36	55,056	1,557	13
	D	19.75	70,087	3,548	18
	E	19.47	73,734	3,788	12
	F	7.96	45,465	5,715	8
Wales	A	112.10	23,988	214	8
	B	83.08	12,053	145	*
	C	44.59	5,981	134	*
	D	44.38	8,750	197	*
	E	20.62	6,155	299	*
West Midlands	A	194.86	57,210	294	10
	B	91.72	71,566	780	11
	C	50.41	55,359	1,098	9
	D	25.31	70,263	2,776	15
	E	12.84	51,518	4,014	12
	F	21.94	29,159	1,329	*
Yorkshire & the Humber	A	194.86	57,210	294	10
	B	91.72	71,566	780	11
	C	50.41	55,359	1,098	9
	D	25.31	70,263	2,776	15
	E	12.84	51,518	4,014	12
	F	21.94	29,159	1,329	*

For confidentiality reasons a * has been used where 5 or less holdings have been sampled. The first raising factor (rf1) is the largest of the three raising factors and gives an indication of the robustness of the sample with smaller numbers indicating a larger area sampled within each size group and region.

ACKNOWLEDGEMENTS

Thanks are due to all of the growers who willingly participated in this survey, providing invaluable information upon which this report is based. Many thanks are also due to Jackie Hughes, Stephen Jess, Trudyann Kelly, Michael Lavery, David Matthews, Carol Monie, Gillian Reay, Johan Wardlaw, David Williams and Alan Withers for their role in the collection and provision of data; Yvonne Powell-Wainwright and Josephine Roberts for their role in maintaining the pesticides database; and Jennie Blackburn, Sarah Thompson and John Bleasdale for their help with the cropping areas of arable crops in England & Wales respectively. Thanks also go to the members of the ECP Working Party on Pesticide Usage Surveys, in particular Sarah Cook, Peter Gladders and Mike Lole, for their invaluable comments.

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