

PESTICIDE USAGE SURVEY REPORT 320

ARABLE CROPS IN THE UNITED KINGDOM 2024



T. Chantry, L. Ridley, G. Parrish, A. Richmond, C. Precious, E. Snell, R. MacArthur & D. Garthwaite

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

A NATIONAL STATISTICS SURVEY

National Statistics are produced to high professional standards set out in the Code of Practice for Statistics (<https://www.statisticsauthority.gov.uk/code-of-practice/>). They are free from any political interference. The United Kingdom Statistics Authority (UKSA) has a statutory duty to assess National Statistics for compliance with this Code of Practice. Further information is available from the Office for National Statistics website (<https://www.ons.gov.uk/aboutus>). The statistics undergo regular quality assurance reviews to ensure that they meet customers' needs.

The UKSA has designated these statistics as National Statistics, in accordance with the Statistics and Registration Service Act 2007 and signifying compliance with the Code of Practice for Statistics.

Designation can be broadly interpreted to mean that the statistics:

- meet identified user needs;
- are well explained and readily accessible;
- 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: 0300 100 0321

DATA USES

The data are used for a number of purposes including:

- Quantifying pesticide usage and changes in the use of active substances over time;
- Policy, including assessing the economic and/or environmental implications of the introduction of new active substances and the withdrawal/non-authorisation of pesticide products; evaluating changes in growing methods and Integrated Pest Management where this has an impact on pesticide usage;
- Informing the pesticide risk assessment (authorisation) process;
- 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;
- 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 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 2024. 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://pusstats.fera.co.uk/published-reports>

CONTENTS	Page
Overview of main findings	1
Observations on the 2024 report and changes since 2022	2
Introduction	3
Definitions and approaches used in this report	5
Trends	6
Crops	8
Pesticide Usage	9
Pesticide usage on cereals	
Wheat	11
Winter barley	15
Spring barley	19
Oats	23
Rye	27
Triticale	31
Pesticide usage on oilseeds	
Oilseed rape	35
Linseed	39
Pesticide usage on potatoes	
Ware potatoes	42
Seed potatoes	46
Pesticide usage on pulses	
Dry harvest peas	49
Field beans	53
Pesticide usage on sugar beet	57
Appendix 1 – Arable application tables	61
Appendix 2 – Arable methodology	83
Appendix 3 – Arable standard errors	87
Appendix 4 – First raising factors for arable crops (2024)	98
Acknowledgements	99
References	99

OVERVIEW OF MAIN FINDINGS

This report contains information on arable crops including wheat, barley, oats, rye, triticale, oilseed rape, linseed, ware potatoes, seed potatoes, dry harvest peas, field beans and sugar beet. Data on pesticide usage on these crops were collected from 19,471 fields of arable crops grown on 1,090 holdings throughout the United Kingdom (fourteen of which were organic). Herbicide applications made to fallow ground prior to drilling a harvested crop are included. All applications made to failed crops (approximately 117,807 treated hectares including seed treatments) have been excluded. Minor crops encountered, but not included in this report include ahiflower, borage, canary seed, millet and sunflowers, accounting for 0.2% of the sampled area.

The sample accounted for 6% of the total area of arable crops grown in the United Kingdom during the 2024 season (autumn 2023 through to harvest in 2024). 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 41% of the area of all arable crops grown in 2024, spring barley 22%, winter barley 10%, oilseed rape (spring and winter) 8%, oats 5%, field beans 4%, sugar beet and ware potatoes 3% each, peas 2%, rye 1% and seed potatoes, linseed and triticale less than 1% each. In terms of pesticide area treated, wheat accounted for 50% of the total, spring barley 14%, winter barley 9%, oilseed rape and ware potatoes 7% each, sugar beet 4%, oats 3%, field beans and peas 2% each, seed potatoes and rye 1% and linseed and triticale less than 1%. By weight, applications to wheat constituted 48% of the total weight of active substances applied, ware potatoes 12%, winter barley and spring barley 10% each, oilseed rape 7%, sugar beet 4%, oats 3%, field beans and peas 2% each, seed potatoes and rye 1% and linseed & triticale less than 1% each.

Fungicides accounted for 40% of the total pesticide-treated area of arable farm crops grown in the United Kingdom in 2024, herbicides 34%, growth regulators 12%, seed treatments 7%, insecticides & nematicides 4%, molluscicides 3% and sulphur, fungicide/growth regulators and physical control agents (see page 5 for definition) less than 1% each.

By weight, herbicides accounted for 50% of the pesticide active substances applied, fungicides 29%, growth regulators 17%, molluscicides and insecticides and sulphur 1% each and seed treatments, fungicide/growth regulators and physical control agents less than 1% each.

The most extensively-used fungicide formulations applied as sprays were tebuconazole, prothioconazole, folpet and azoxystrobin, together accounting for 40% of the fungicide-treated area and 38% of the fungicide-weight applied. Tebuconazole was the principal fungicide active substance used by area treated and folpet the principal active substance used by weight applied.

The most extensively used herbicide formulations were glyphosate, diflufenican/flufenacet and fluroxypyr, together accounting for 31% of the herbicide-treated area. Glyphosate was the principal herbicide active substance used by area treated. Glyphosate was also the principal active substance used by weight applied, accounting for 2,260 tonnes of active substance and 35% of the herbicide-weight applied.

The pyrethroids were the most extensively-used foliar applied insecticides (excluding nematicides), accounting for 84% of the insecticide-treated area, followed by carbamates (pirimicarb) and neonicotinoids (acetamiprid), 5%. All other insecticides accounted for less than 1% of the insecticide-treated area. Lambda-cyhalothrin was the principal insecticide active substance used, accounting for 71% of the total insecticide-treated area, followed by esfenvalerate (8%) then pirimicarb and acetamiprid (5% each).

The fungicide formulation fludioxonil was the principal seed treatment formulation used, accounting for 29% of the known seed treatment area (excluding unspecified seed treatments). Imazalil/ipconazole was used on 20% of the area treated and prothioconazole/tebuconazole was used on 12% of the area treated.

The most extensively-used growth regulator formulation was chlormequat, accounting for 42% of the growth regulator treated area in 2024. This was followed by trinexapac-ethyl at 34% of the treated area.

OBSERVATIONS ON THE 2024 REPORT AND CHANGES SINCE PREVIOUS SURVEYS

The area of all arable crops grown in the UK, excluding set-aside, has decreased by 8% since 2022. However, the challenging weather conditions that many growers faced in autumn of 2023 is likely to have contributed to this change.

The challenging weather conditions in autumn 2023 also resulted in an increase in spring cropping and a decrease in winter cropping for the 2023/2024 season. The June Survey figures for the UK show that the area of wheat decreased by 15% between 2022 and 2024, similarly there was an 11% decrease in the area of winter barley grown over the same period. The area of oilseed rape (spring and winter) has continued to decline over recent years, with a 19% decrease in the area grown since 2022 and a decrease of 23% since 2020. The area of dry harvest peas grown increased by 35% between 2022 and 2024. The area of sugar beet grown increased by 13% between 2022 and 2024.

Figures derived from a combination of the June Survey and our sampled areas indicate that the areas of spring barley and spring wheat increased by 21% and 87% respectively since 2022. There was also a 26% increase in the area of spring oats grown in 2024, compared with 2022. However, in contrast, spring sown crops such as spring beans and spring linseed decreased over the same period, with the area of spring beans decreasing by 23% and the area of spring linseed by 35% since 2022. However, the area of winter beans also decreased and was half that of the area grown in 2022.

Since 2022, there has been a 10% decrease in the total area treated and a 14% decrease in the total weight of pesticides applied. However, the decrease in area grown and an increase in spring cropping in 2024 is likely to be the main reason for this decrease in usage. By contrast, since 2020, the area treated increased by 9% and the weight applied increased by 2%. For all comparisons between previous years back to 2016 please refer to the trends charts on page 6 onwards and table 12 on page 82.

Although not presented in this report, there has been a significant increase in the failed crop area in 2024, compared to 2022, which also reflects the challenging conditions faced in autumn 2023. In 2024, there was an estimated treated area of 20,661 ha of failed crops, compared to just 8,060 ha in 2022. However, this was a decrease on the 40,040 ha of failed crops in 2020.

The report shows changes in the use of some major active substances. The area treated with the fungicide prothioconazole increased by 3% since 2022, but the area treated with tebuconazole decreased by 11%. The area treated with folpet dropped by 25% with 1,495,469 treated hectares in 2024 compared with 1,983,333 treated hectares in 2022. Among the herbicides, flufenacet and diflufenican decreased by 41% and 32% respectively. Glyphosate was the principal herbicide active substance used by area treated in 2024. Glyphosate use has increased by 9% in terms of area treated and by 12% in terms of weight applied since 2022, which may in part be due to increased use for crop destruction due to failed crops in 2024. Ferric phosphate is the only approved active substance for molluscicides and was the only molluscicide active encountered in the survey.

The insecticide lambda-cyhalothrin (the principle insecticide active substance) decreased by 28% in terms of area treated and by 25% in terms of weight applied. Esfenvalerate showed a significant decrease in terms of area treated (57%) and by weight applied (56%). There were 141,426 hectares treated with esfenvalerate recorded in 2024, compared to 327,952 treated hectares in 2022. There was also a decrease in use of the growth regulator chlormequat, with a 20% decrease in the area treated and a 21% decrease in the weight applied since 2022. There has also been a change in the timing of insecticide applications on wheat, winter barley and oats, with a higher proportion of spring insecticide applications in 2024 compared to 2022. Please see previous arable reports for timing of application charts in that survey year. This is likely due to the increase in the area of spring sown crops between 2022 and 2024 and also the fact that it was not always possible to make autumn applications in 2023. The decline in insecticide applications is most likely due to adverse weather conditions in autumn 2023.

The use of garlic on sugar beet for nematode control was encountered in 2024 and 2022, but not in 2020. Garlic was responsible for 4% of the insecticide & nematicide area treated for sugar beet, and for 75% of the weight applied, reflecting its relatively high application rates. The use of garlic decreased both in terms of area treated and weight applied since 2022.

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.

As part of the on-going process for obtaining data, the Pesticide Usage Survey Teams of:

- Fera Science Ltd., a joint venture between Bridgepoint Group PLC and the Department for Environment, Food & Rural Affairs (Defra);
- SASA, a division of the Scottish Government's Agriculture and Rural Economy Directorate;
- and the Agri-Food & Biosciences Institute (AFBI), Department of Agriculture, Environment and Rural Affairs (DAERA)

conducted surveys of pesticide usage in arable crops in 2023/24 by collecting data on holdings throughout the United Kingdom during the winter of 2024/25.

This was the eighth survey of usage on arable crops in the whole of the United Kingdom and the seventeenth 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 2023 covering pesticide usage on arable crops in 2022 (Ridley et. al., 2023). Previous UK surveys of arable crops were conducted in 2010, 2012, 2014, 2016, 2018 and 2020. Other surveys of arable crops in Great Britain were conducted every other year between 1988 and 2008.

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 sampled holdings is identical in each country. Reports are produced of pesticide usage throughout the United Kingdom. All teams have undertaken United Kingdom Statistics Authority (UKSA) audits and the data are accredited as National Statistics.

Additional data on crop agronomy are collected for all arable 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 Fera Science Ltd., Sand Hutton, York, UK YO41 1LZ.

For further information please contact:

The survey team – e-mail: PUS@fera.co.uk Telephone: 0300 100 0321

Or visit the website: <https://pusstats.fera.co.uk/home>

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

INTRODUCTION (cont.)

Further data relating specifically to Scotland may be obtained from the Pesticide Usage Survey Team at SASA. 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 His Majesty's Stationery Offices. Also available at:

<https://www.afbini.gov.uk/articles/pesticide-usage-monitoring-reports>

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

<https://pusstats.fera.co.uk/home>

Whilst Scotland, Northern Ireland and Wales are included within the report as individual countries, England is split into Government Office regions. Please visit the following link for more information:

<https://pusstats.fera.co.uk/assets/images/ukMap.svg>

DEFINITIONS AND APPROACHES USED IN THIS REPORT

- a) 'Pesticide' is used throughout this report to include commercial formulations containing active substances used as desiccants, fungicides, growth regulators, herbicides, insecticides, molluscicides or nematicides.
- 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) 'Weight applied' within the figures presented in this report relates to the weight of formulations applied.
- d) Where individual active substances are mentioned in the text, they are listed in descending order of use by hectares treated.
- e) 'Other pesticides', referred to in Tables 5 and 6, include those that are used on less than 0.1% of the total arable treated area.
- f) 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.
- g) The average number of applications indicated in the text for each crop, e.g. page 10, 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.
- h) 'Full product label rate' refers to the maximum rate, in litres or kilograms per hectare, indicated on a product label, permitted on a specific crop.
- i) Within the seed treatment tables at the end of each crop section, unspecified or unknown seed treatments have been excluded.
- j) The use of garlic on sugar beet was encountered in 2024. Garlic is applied as a granular application at the time of drilling for nematode control in sugar beet. Therefore, garlic as a single formulation has been included under the chemical group 'insecticides & nematicides' for this survey. This intended use contrasts with the formulation, garlic/sulphur which was encountered on oilseed rape and has been included under the chemical group 'physical control agents'. This formulation is primarily used as a foliar feed but also has disease and pest control properties.
- k) Use of the formulation Mepiquat chloride/prohexadione-calcium/pyraclostrobin was encountered in 2024. This formulation has a dual purpose on oilseed rape being used as both a growth regulator and for disease control. This formulation has therefore been included in its own chemical group (fungicide/growth regulators) throughout this report. This formulation accounted for less than 1% of the total pesticide-treated area of arable crop in 2024.
- l) Copper oxychloride and sulphur encountered in this survey are both used on arable crops as foliar feeds and for disease control and are therefore included in this report. Data for both copper oxychloride and sulphur have been included in previous reports.
- m) Where quoted in the text or within figures, reasons for application are the grower's stated reasons for use of that pesticide product on that crop and may not always seem entirely appropriate. Reasons for use data were available from 46% of the treated area (excluding seed treatments), and 43% including seed treatments.

TRENDS

Figure 1 - Area of arable crops grown in the United Kingdom - 2016 - 2024

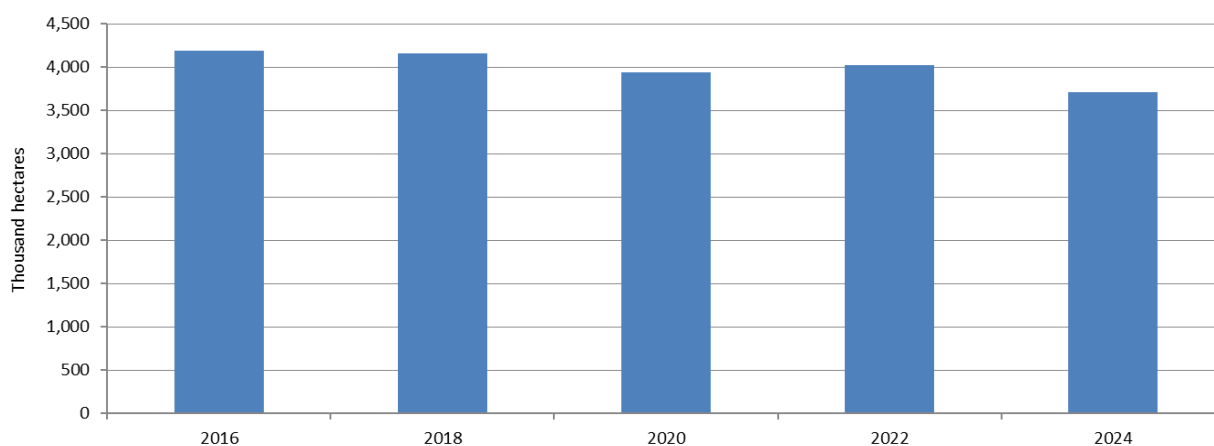


Figure 2 - Overall treated area of arable crops in the United Kingdom - 2016 - 2024

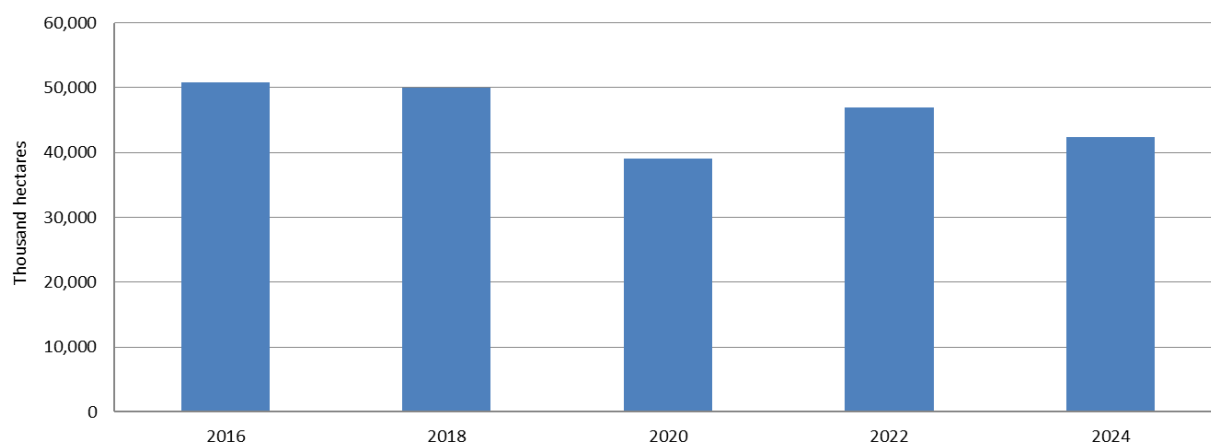
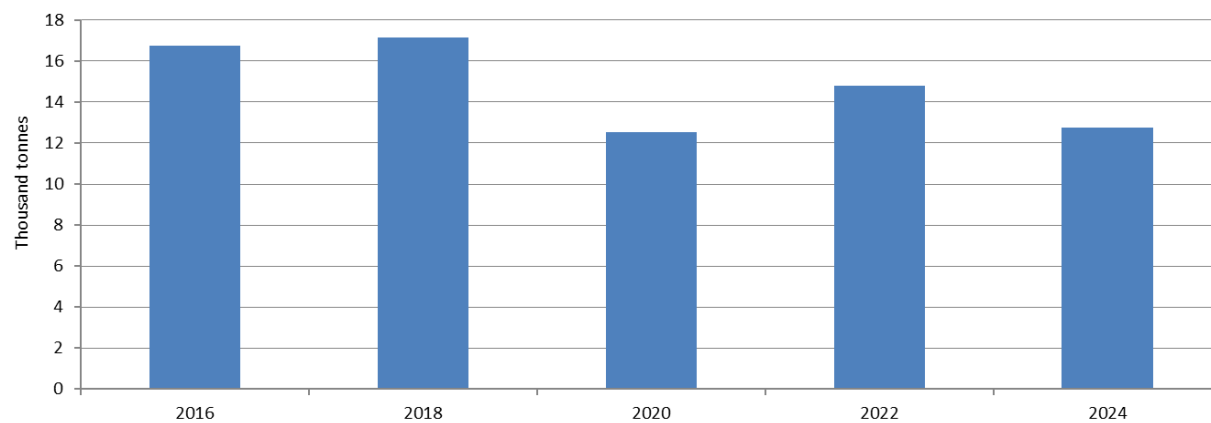
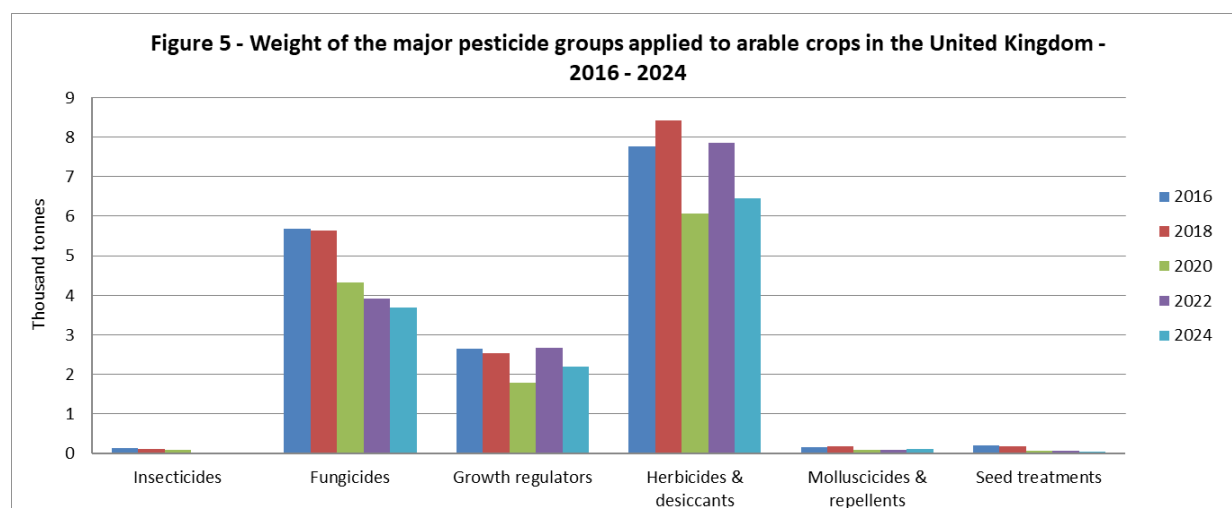
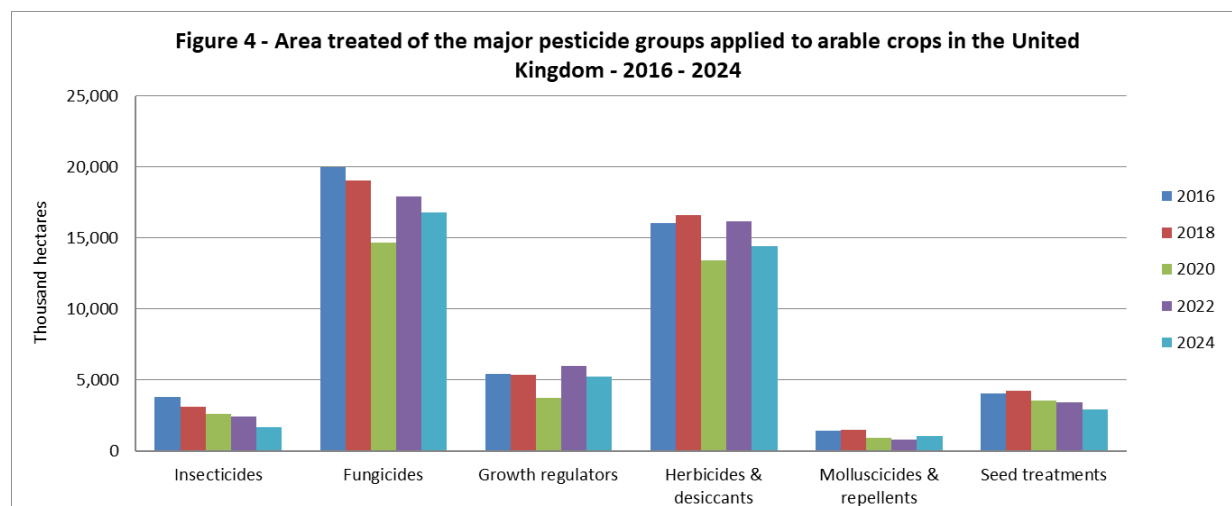


Figure 3 - Overall weight of pesticides applied to arable crops in the United Kingdom - 2016 - 2024



TRENDS (cont.)



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 were collected from 19,471 fields of arable crops grown on 1,090 holdings throughout the United Kingdom. The sample accounted for 6% of the total area of arable crops grown in United Kingdom during the 2024 harvest season.

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.

The charts, Figure 6 and 6a, show the regional distribution and relative area of crops grown in the United Kingdom. Figures are based on 2024 June Survey data for the UK.

Figure 6 - Regional distribution of arable crops in the United Kingdom (total arable area) - 2024

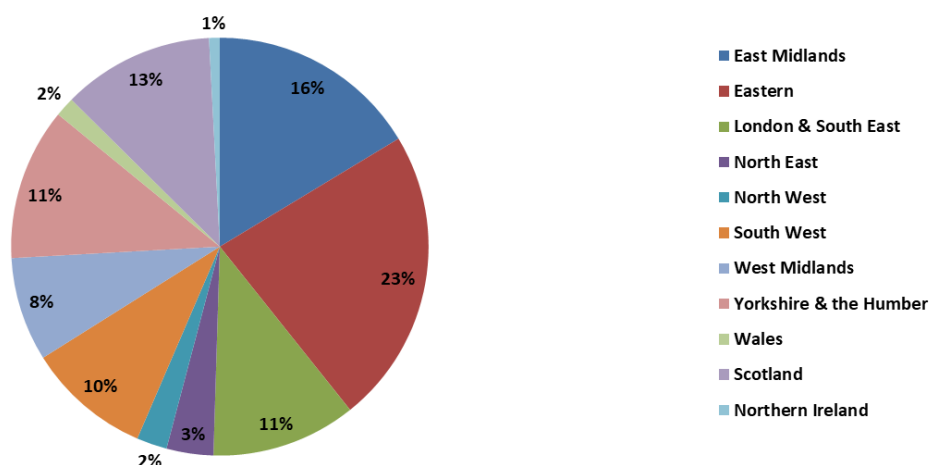
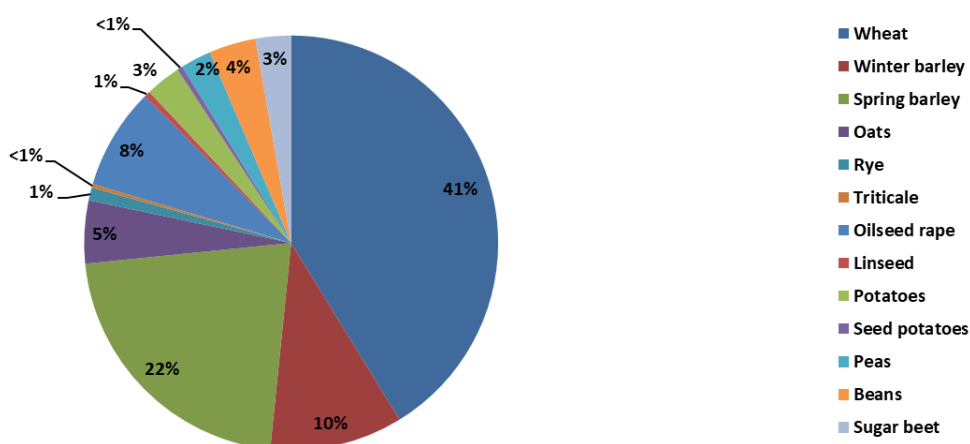


Figure 6a - Relative areas of different crops in the United Kingdom (total arable area) - 2024



PESTICIDE USAGE

Figure 6b includes June Survey data from each region and the estimated total pesticide treated areas in each region. It compares the percentage of the total area of arable crops grown with the percentage of the total treated area of arable crops in the United Kingdom.

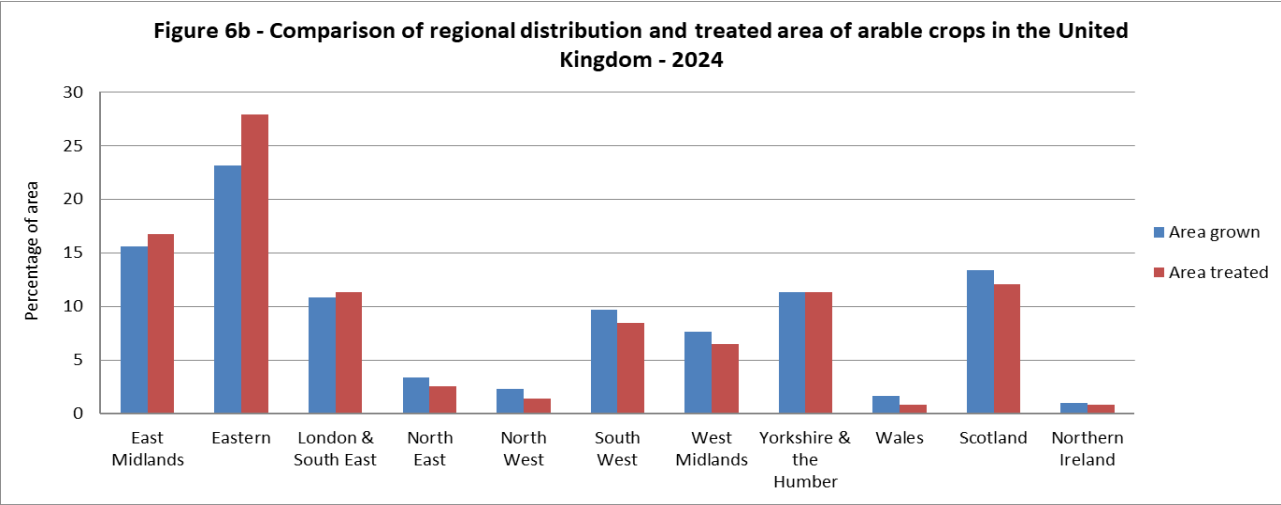


Figure 7 expresses the percentage (also found in Figure 6b) of the estimated total treated area in each region.

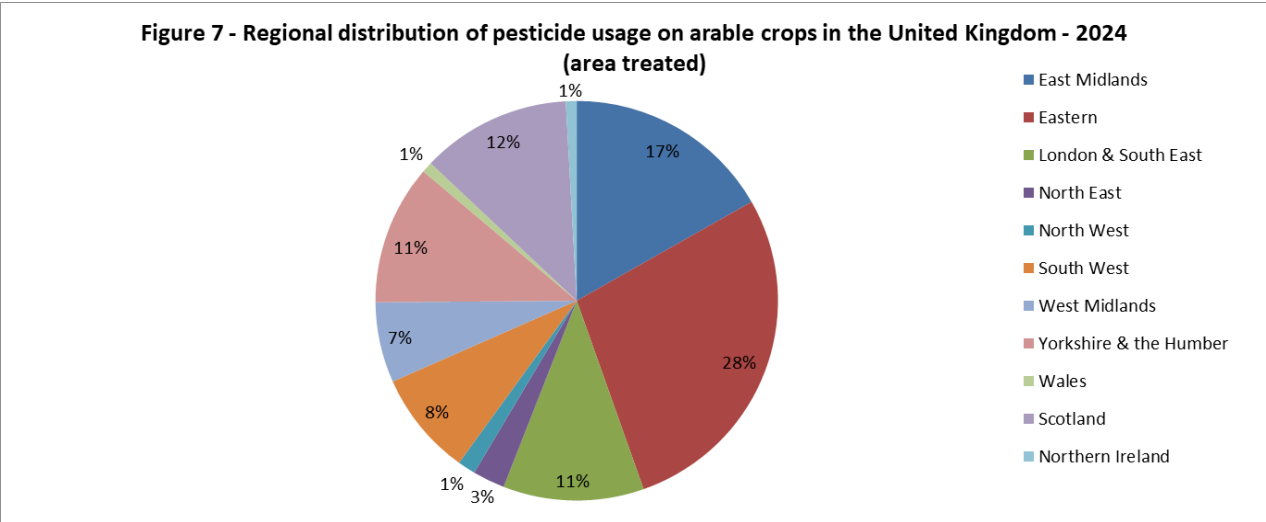


Figure 8 details the distribution and importance of each chemical group as a percentage of the total UK pesticide treated area and weight of pesticides applied.

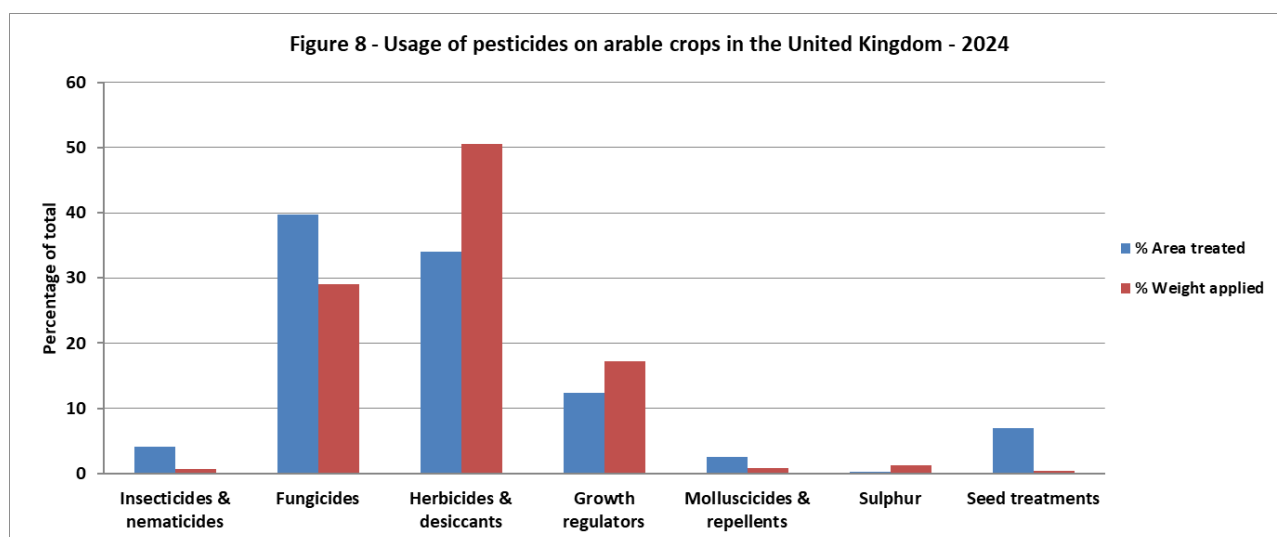
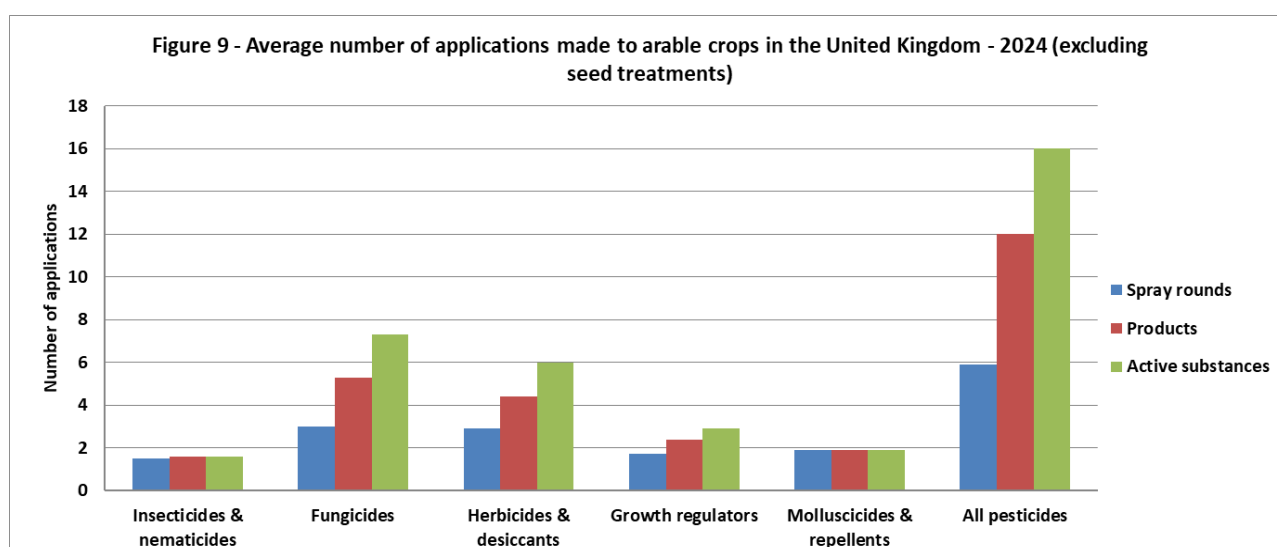


Figure 9 is based on Tables 4a, 4b and 4c (in Appendix 1 to this report) and shows the average number of spray rounds (number of passes of application machinery into a field); pesticide products and number of active substances used on each crop.

Spray rounds can include a single product or a tank mix of several products. These tank mixes can include multiple fungicides, herbicides, growth regulators and insecticides or can include mixtures of all chemical groups. Products can include formulations of more than one active substance.

This explains why, in the chart below, the number of spray rounds is always the smallest number and active substances the largest. The use of tank mixing and multiple spray rounds results in overall treated areas greater than the area grown.

In the introduction for each crop the number of sprays refers to the number of spray rounds applied to the crop.



PESTICIDE USAGE ON CEREALS

Wheat

- 1,531,051 hectares of wheat grown in the United Kingdom
- 21,351,381 treated hectares
- 6,168.4 tonnes applied
- 0.8% of wheat remained untreated
- Wheat received on average 3 fungicide, 3 herbicide, 2 growth regulator, 2 molluscicides and 1 insecticide spray rounds
- The main varieties encountered included KWS Dawsum, KWS Extase, Graham, Skyfall, and Crusoe

Figure 10 - Usage of pesticides on wheat - 2024

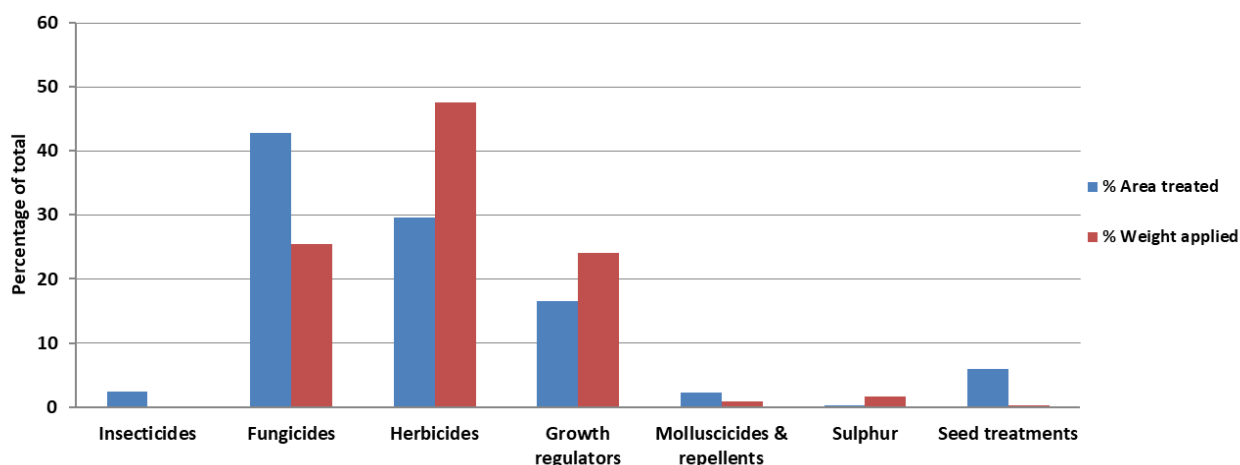
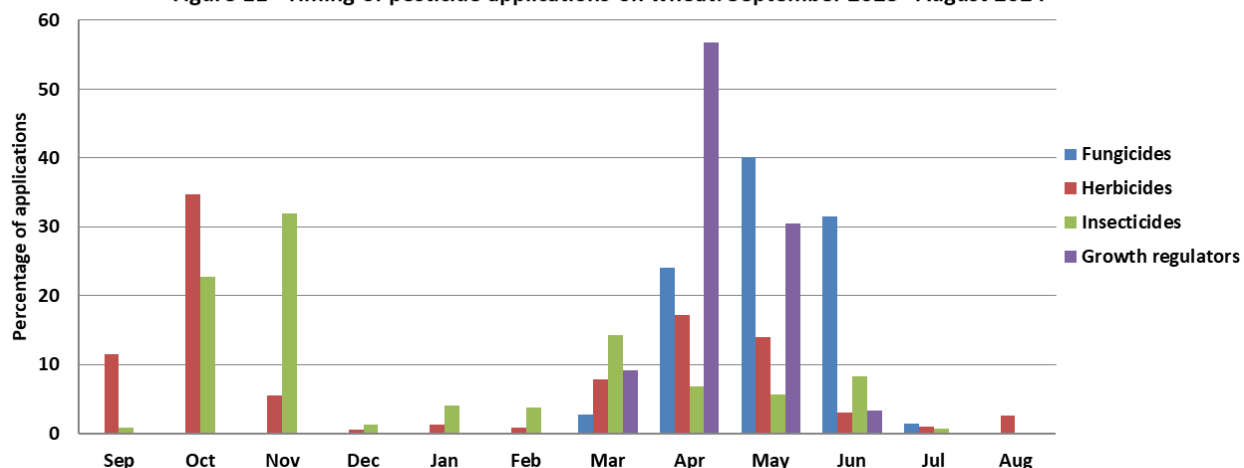


Figure 11 - Timing of pesticide applications on wheat: September 2023 - August 2024

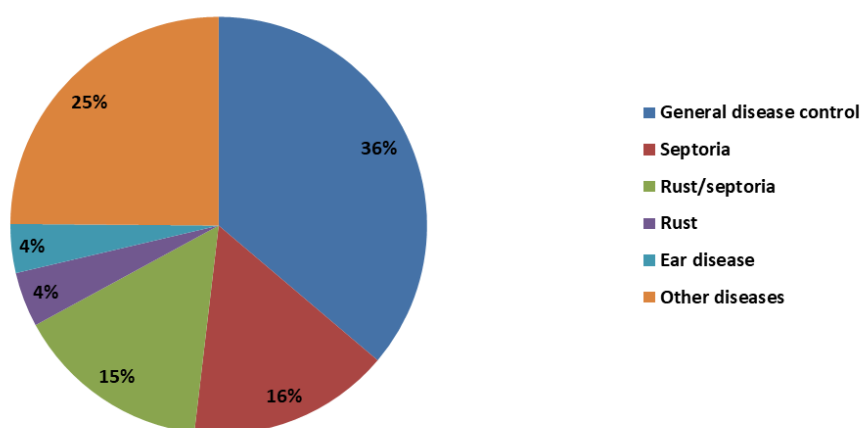


Wheat – Fungicides

- Formulation area treated: 9,139,721 hectares
- Weight of formulations applied: 1,566 tonnes
- The five most common formulations were:

	Formulation area treated (ha)	Weight of formulation applied (kg)	Proportion of fungicide - treated area	Proportion of June Survey area treated	Average number of applications (where applied)	Average proportion of full label rate
Tebuconazole	1,753,404	252,977	0.19	0.66	1.66	0.57
Prothioconazole	975,063	116,175	0.11	0.44	1.39	0.60
Folpet	809,891	402,348	0.09	0.36	1.44	0.66
Prothioconazole/tebuconazole	723,095	125,887	0.08	0.34	1.37	0.71
Azoxystrobin	597,520	74,257	0.07	0.30	1.28	0.50

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



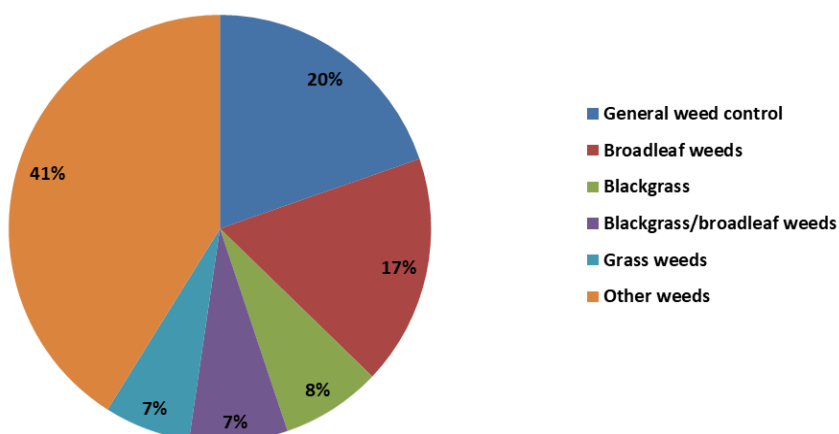
Use of sulphur accounted for 0.3% of the treated area and 1.7% weight applied for wheat.

Wheat – Herbicides

- Formulation area treated: 6,328,975 hectares
- Weight of formulations applied: 2,938.7 tonnes
- The five most common formulations were:

	Formulation area treated (ha)	Weight of formulation applied (kg)	Proportion of herbicide – treated area	Proportion of June Survey area treated	Average number of applications (where applied)	Average proportion of full label rate
Glyphosate	1,011,474	827,083	0.16	0.50	1.26	0.52
Diflufenican/flufofenacet	695,024	176,258	0.11	0.41	1.06	0.82
Fluroxypyr	419,008	52,646	0.07	0.26	1.03	0.59
Pendimethalin	334,684	301,612	0.05	0.21	1.04	0.68
Cinmethylin	276,184	128,221	0.04	0.18	1.01	0.93

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



Wheat – Growth regulators

- Formulation area treated: 3,541,087 hectares
- Weight of formulations applied: 1,486.3 tonnes
- The five most common formulations were:

	Formulation area treated (ha)	Weight of formulation applied (kg)	Proportion of growth regulator – treated area	Proportion of June Survey area treated	Average number of applications (where applied)	Average proportion of full label rate
Chlormequat	1,687,292	1,336,584	0.48	0.76	1.43	0.54
Trinexapac-ethyl	1,311,497	43,092	0.37	0.64	1.34	0.34
Mepiquat chloride/prohexadione-calcium	147,700	22,862	0.04	0.09	1.12	0.29
Prohexadione-calcium/trinexapac-ethyl	129,946	4,606	0.04	0.07	1.33	0.39
2-chloroethylphosphonic acid/mepiquat	97,718	38,873	0.03	0.06	1.06	0.43

Wheat – Insecticides & nematicides

- **Formulation area treated: 527,807 hectares**
- **Weight of formulations applied: 2.6 tonnes**
- **The five most common formulations were:**

	Formulation area treated (ha)	Weight of formulation applied (kg)	Proportion of insecticide – treated area	Proportion of June Survey area treated	Average number of applications (where applied)	Average proportion of full label rate
Lambda-cyhalothrin	461,610	2,182	0.87	0.23	1.25	0.95
Esfenvalerate	58,085	219	0.11	0.04	1.02	0.91
Tau-fluvalinate	3,115	150	0.01	<0.01	1.00	1.00
Cypermethrin	2,151	54	<0.01	<0.01	1.00	1.00
Deltamethrin	2,130	5	<0.01	<0.01	1.00	0.40

The majority of (88%) insecticides applied to wheat were for the control of aphids and the remainder for other pests. The main reason for the control of the aphids would have been to prevent BYDV (barley yellow dwarf virus) spreading into the plants.

Wheat – Seed treatments

- **Formulation area treated: 1,269,353 hectares**
- **Weight of formulations applied: 17.3 tonnes**
- **23.0% of the seed remained untreated**
- **Where specified (excludes unspecified seed treatments) the most common formulations were:**

	Formulation area treated (ha)	Weight of formulation applied (kg)	Proportion of seed treatment-treated area	Proportion of June Survey area treated
Fludioxonil	428,535	3,888	0.47	0.28
Fludioxonil/sedaxane	145,403	2,612	0.16	0.09
Prothioconazole/tebuconazole	119,055	2,468	0.13	0.08
Silthiofam	96,208	4,274	0.11	0.06
Prothioconazole	31,121	563	0.03	0.02

Winter barley

- 385,727 hectares of winter barley grown in the United Kingdom
- 3,989,314 treated hectares
- 1,291.1 tonnes applied
- 0.4% of winter barley remained untreated
- Winter barley received on average 3 herbicide, 2 fungicide, 2 growth regulator, 1 molluscicide and 1 insecticide spray rounds
- The main varieties encountered included KWS Tardis, LG Caravelle, SY Kingsbarn, Craft and Bolton

Figure 14 - Usage of pesticides on winter barley - 2024

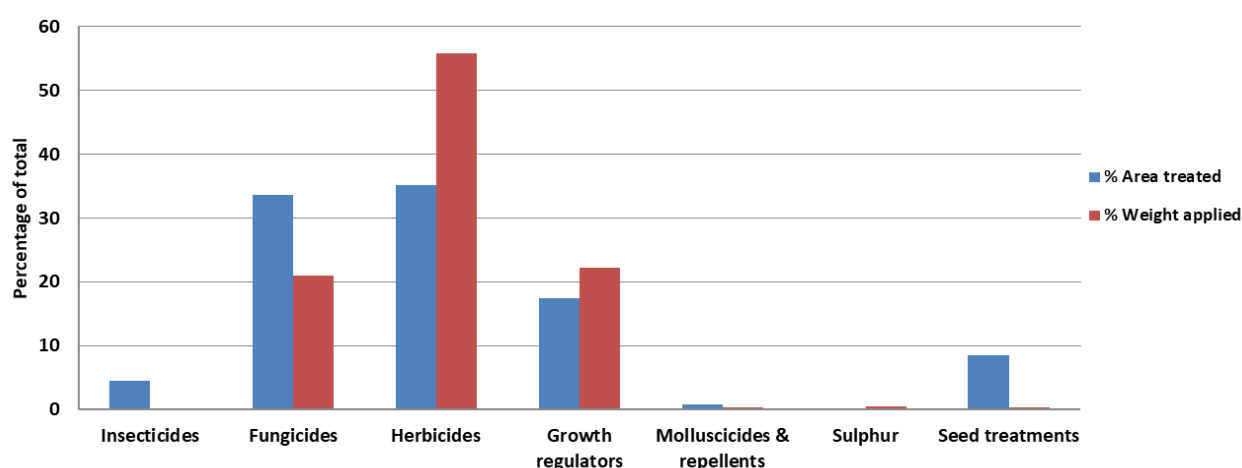
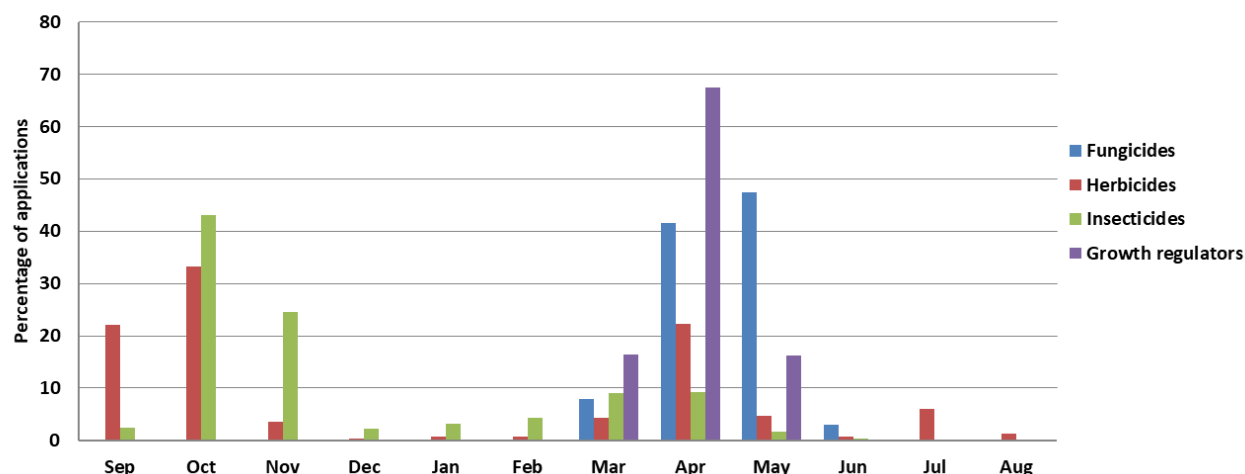


Figure 15 - Timing of pesticide applications on winter barley: September 2023 - August 2024

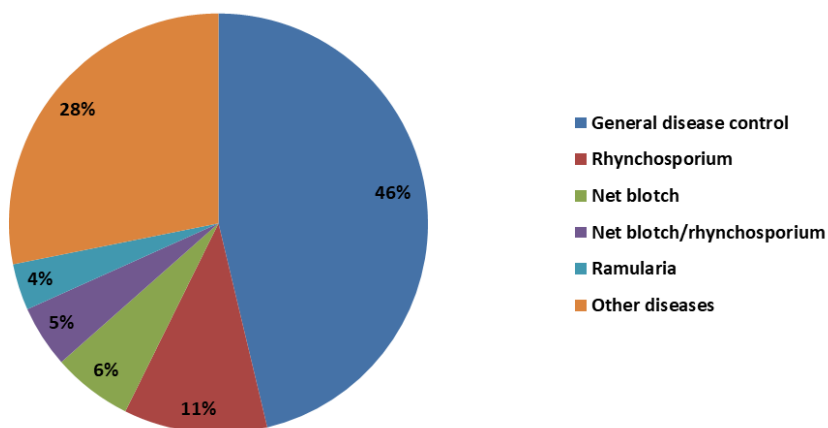


Winter barley – Fungicides

- Formulation area treated: 1,341,185 hectares
- Weight of formulations applied: 269.7 tonnes
- The five most common formulations were:

	Formulation area treated (ha)	Weight of formulation applied (kg)	Proportion of fungicide-treated area	Proportion of June Survey area treated	Average number of applications (where applied)	Average proportion of full label rate
Folpet	234,421	118,656	0.17	0.49	1.24	0.67
Prothioconazole	205,659	23,009	0.15	0.35	1.48	0.56
Bixafen/fluopyram/prothioconazole	89,740	17,160	0.07	0.23	1.01	0.61
Fluxapyroxad/pyraclostrobin	85,678	9,394	0.06	0.16	1.39	0.33
Fluxapyroxad/mefentrifluconazole	75,078	7,520	0.06	0.19	1.00	0.47

Figure 16 - Winter barley - Reasons for use of fungicides (where given)



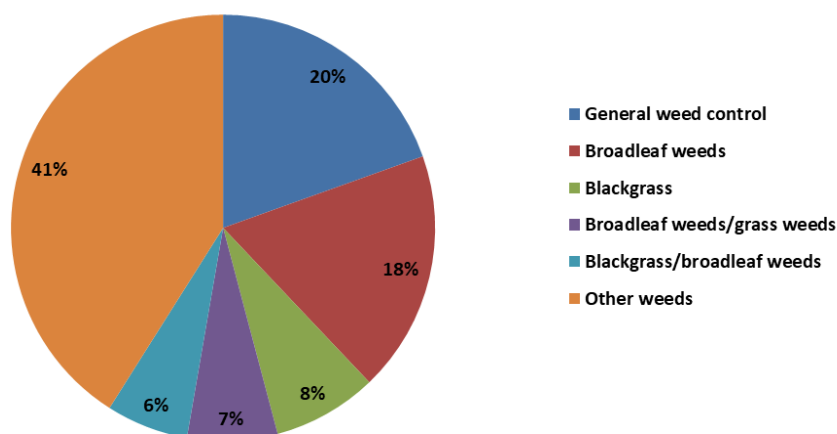
Use of sulphur accounted for 0.1% of the treated area and 0.5% weight applied for winter barley.

Winter barley – Herbicides

- Formulation area treated: 1,403,078 hectares
- Weight of formulations applied: 721.0 tonnes
- The five most common formulations were:

	Formulation area treated (ha)	Weight of formulation applied (kg)	Proportion of herbicide – treated area	Proportion of June Survey area treated	Average number of applications (where applied)	Average proportion of full label rate
Glyphosate	258,608	197,261	0.19	0.48	1.27	0.50
Diflufenican/flufofenacet	191,607	44,277	0.14	0.47	1.02	0.79
Pinoxaden	82,378	3,318	0.06	0.21	1.01	0.67
Pendimethalin	74,743	71,019	0.05	0.19	1.01	0.72
Fluroxypyr	73,219	9,991	0.05	0.18	1.01	0.58

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



Winter barley – Growth regulators

- Formulation area treated: 693,627 hectares
- Weight of formulations applied: 286.2 tonnes
- The five most common formulations encountered were:

	Formulation area treated (ha)	Weight of formulation applied (kg)	Proportion of growth regulator – treated area	Proportion of June Survey area treated	Average number of applications (where applied)	Average proportion of full label rate
Chlormequat	255,807	224,059	0.37	0.58	1.14	0.59
Trinexapac-ethyl	213,999	7,532	0.31	0.49	1.13	0.24
Mepiquat chloride/ prohexadione-calcium	70,170	12,431	0.10	0.16	1.15	0.34
2-chloroethylphosphonic acid/ mepiquat	59,838	23,778	0.09	0.15	1.03	0.43
Prohexadione-calcium/ trinexapac-ethyl	33,993	1,287	0.05	0.07	1.23	0.30

Winter barley – Insecticides & nematicides

- **Formulation area treated: 178,661 hectares**
- **Weight of formulations applied: 0.9 tonnes**
- **The three formulations encountered were:**

	Formulation area treated (ha)	Weight of formulation applied (kg)	Proportion of insecticide – treated area	Proportion of June Survey area treated	Average number of applications (where applied)	Average proportion of full label rate
Lambda-cyhalothrin	137,283	681	0.77	0.29	1.24	0.99
Esfenvalerate	40,406	163	0.23	0.10	1.10	0.98
Tau-fluvalinate	972	47	0.01	<0.01	1.00	1.00

The majority (81%) of insecticides applied to winter barley were to control aphids and the remaining 19% were for other pests. The main reason for the control of the aphids would have been to prevent BYDV (barley yellow dwarf virus) spreading into the plants.

Winter barley – Seed treatments

- **Formulation area treated: 338,489 hectares**
- **Weight of formulations applied: 3.7 tonnes**
- **14.1% of the seed remained untreated**
- **Where specified (excludes unspecified seed treatments) the most common formulations were:**

	Formulation area treated (ha)	Weight of formulation applied (kg)	Proportion of seed treatment-treated area	Proportion of June Survey area treated
Imazalil/ipconazole	92,738	1,134	0.37	0.24
Fluopyram/prothioconazole/tebuconazole	43,214	688	0.17	0.11
Fludioxonil	38,996	343	0.16	0.10
Prothioconazole/tebuconazole	22,650	466	0.09	0.06
Prothioconazole	12,302	210	0.05	0.03

Spring barley

- 809,208 hectares of spring barley grown in the United Kingdom
- 5,987,554 treated hectares
- 1,286.8 tonnes applied
- 2.0% of spring barley remained untreated
- Spring barley received on average 2 herbicide, 2 fungicide, 1 growth regulator, 1 molluscicide and 1 insecticide spray rounds
- The main varieties encountered included Laureate, RGT Planet, Skyway, LG Diablo and KWS Sassy

Figure 18 - Usage of pesticides on spring barley - 2024

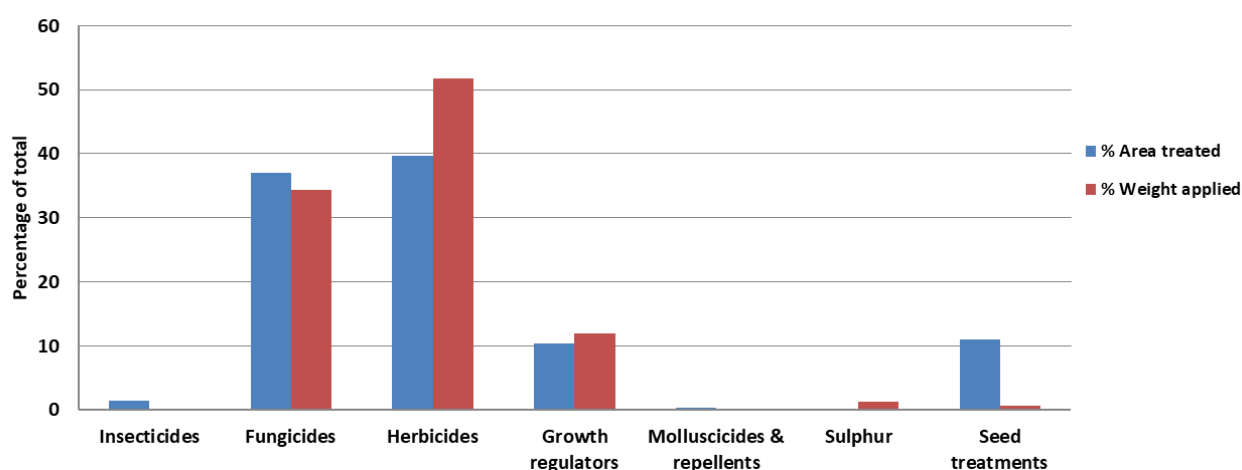
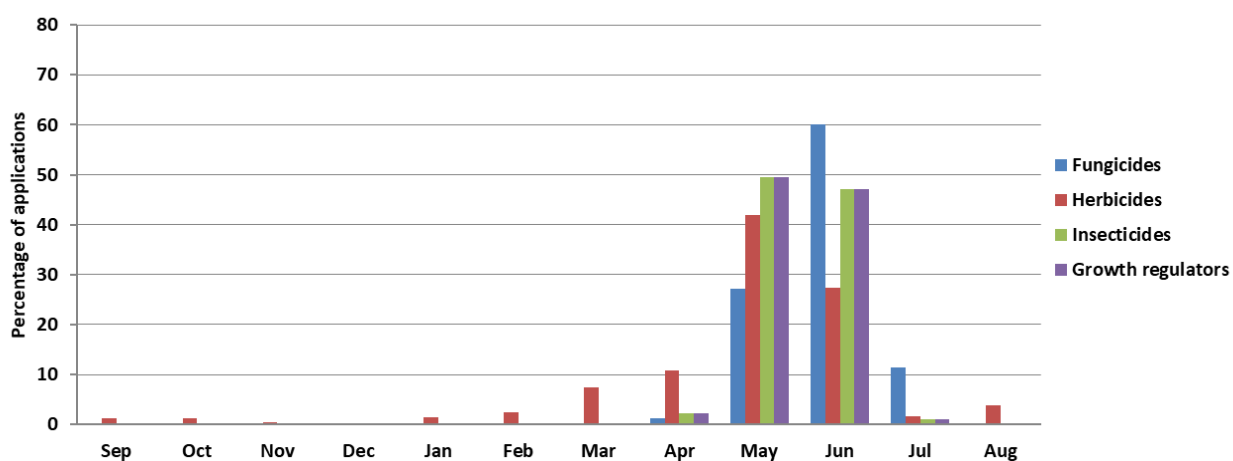


Figure 19 - Timing of pesticide applications on spring barley: September 2023 - August 2024

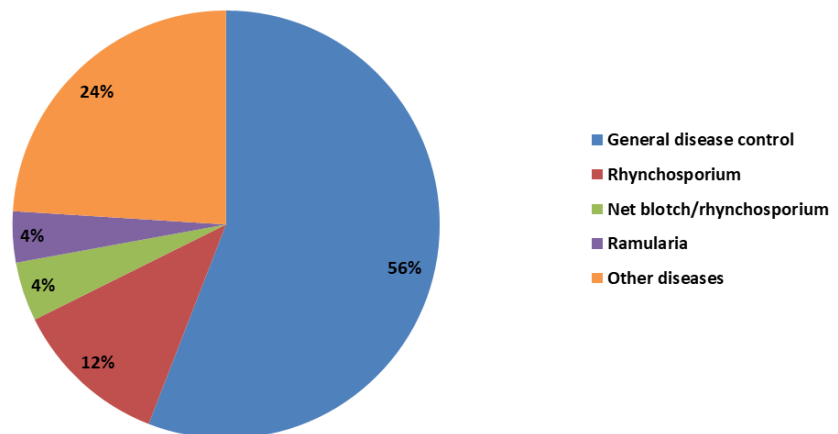


Spring barley – Fungicides

- Formulation area treated: 2,213,193 hectares
- Weight of formulations applied: 441.1 tonnes
- The five most common formulations were:

	Formulation area treated (ha)	Weight of formulation applied (kg)	Proportion of fungicide-treated area	Proportion of June Survey area treated	Average number of applications (where applied)	Average proportion of full label rate
Folpet	442,366	218,484	0.20	0.49	1.12	0.66
Prothioconazole	333,880	34,327	0.15	0.29	1.39	0.51
Bixafen/prothioconazole/spiroxamine	155,112	42,433	0.07	0.15	1.32	0.46
Prothioconazole/trifloxystrobin	142,768	20,702	0.06	0.14	1.24	0.64
Prothioconazole/tebuconazole	110,596	13,117	0.05	0.12	1.17	0.49

Figure 20 - Spring barley - Reasons for use of fungicides (where given)



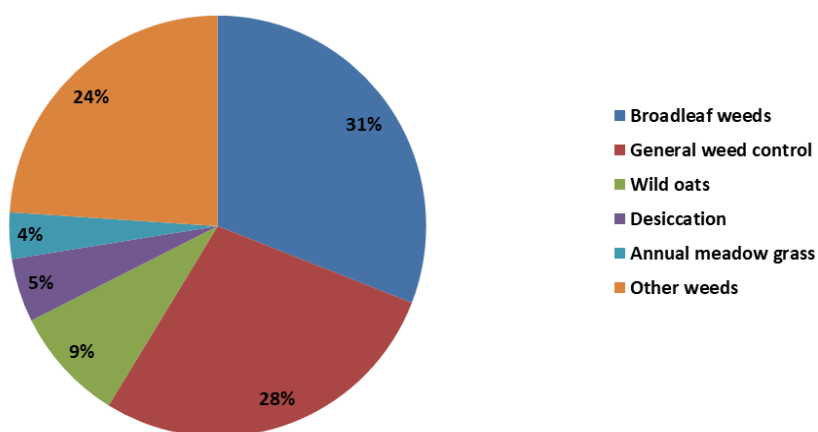
Use of sulphur accounted for 0.1% of the treated area and 1.2% weight applied for spring barley.

Spring barley – Herbicides

- Formulation area treated: 2,380,883 hectares
- Weight of formulations applied: 665.0 tonnes
- The five most common formulations were:

	Formulation area treated (ha)	Weight of formulation applied (kg)	Proportion of herbicide – treated area	Proportion of June Survey area treated	Average number of applications (where applied)	Average proportion of full label rate
Glyphosate	404,699	343,036	0.17	0.42	1.15	0.53
Fluroxypyr	301,371	34,600	0.13	0.36	1.01	0.77
Metsulfuron-methyl/ thifensulfuron-methyl	214,126	6,505	0.09	0.26	1.00	0.71
Pinoxaden	191,821	6,292	0.08	0.24	1.00	0.54
Thifensulfuron-methyl/ tribenuron-methyl	164,359	4,491	0.07	0.20	1.01	0.75

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



Spring barley – Growth regulators

- Formulation area treated: 622,326 hectares
- Weight of formulations applied: 153.6 tonnes
- The five most common formulations were:

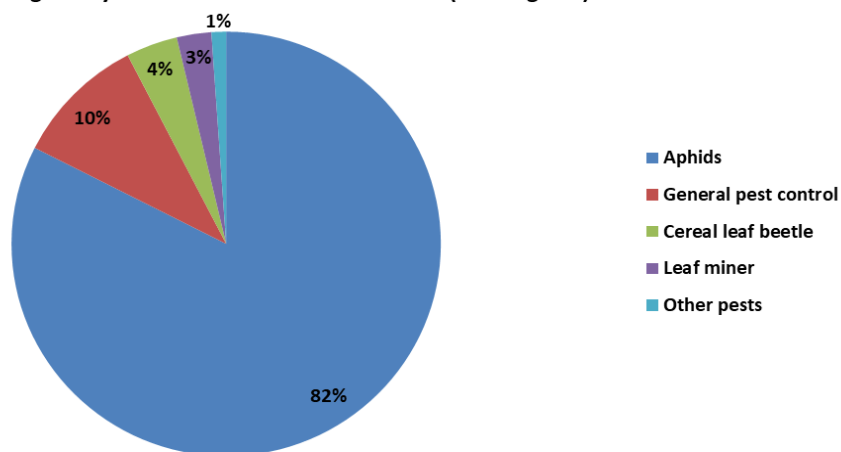
	Formulation area treated (ha)	Weight of formulation applied (kg)	Proportion of growth regulator – treated area	Proportion of June Survey area treated	Average number of applications (where applied)	Average proportion of full label rate
Trinexapac-ethyl	185,382	6,008	0.30	0.22	1.05	0.27
Chlormequat	142,867	88,108	0.23	0.17	1.03	0.67
Mepiquat chloride/prohexadione-calcium	77,328	11,286	0.12	0.09	1.06	0.28
2-chloroethylphosphonic acid/mepiquat	73,554	26,252	0.12	0.09	1.00	0.52
2-chloroethylphosphonic acid	62,727	8,662	0.10	0.07	1.04	0.53

Spring barley – Insecticides & nematicides

- Formulation area treated: 82,696 hectares
- Weight of formulations applied: 0.4 tonnes
- The three formulations encountered were:

	Formulation area treated (ha)	Weight of formulation applied (kg)	Proportion of insecticide – treated area	Proportion of June Survey area treated	Average number of applications (where applied)	Average proportion of full label rate
Lambda-cyhalothrin	74,861	343	0.91	0.08	1.09	0.92
Esfenvalerate	7,053	28	0.09	0.01	1.00	0.96
Tau-fluvalinate	457	11	0.01	<0.01	1.00	0.69

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



The main reason for the control of the aphids would have been to prevent BYDV (barley yellow dwarf virus) spreading into the plants.

Spring barley – Seed treatments

- Formulation area treated: 657,418 hectares
- Weight of formulations applied: 7.8 tonnes
- 18.9% of the seed remained untreated
- Where specified (excludes unspecified seed treatments) the most common formulations were:

	Formulation area treated (ha)	Weight of formulation applied (kg)	Proportion of seed treatment-treated area	Proportion of June Survey area treated
Imazalil/ipconazole	300,854	4,201	0.59	0.37
Prothioconazole/tebuconazole	99,276	2,349	0.20	0.12
Fludioxonil	72,818	717	0.14	0.09
Fludioxonil/sedaxane	16,909	340	0.03	0.02
Prothioconazole	9,241	176	0.02	0.01

Oats

- 182,178 hectares of oats grown in the United Kingdom
- 1,192,648 treated hectares
- 327.1 tonnes applied
- 4.2% of oats remained untreated
- Oats received on average 2 herbicide, 2 fungicide, 2 growth regulator, 1 molluscicide and 1 insecticide spray rounds
- 67% of the crop was spring sown
- The main varieties encountered included WPB Isabel, Mascani, Canyon, Merlin and Dalguise

Figure 23 - Usage of pesticides on oats - 2024

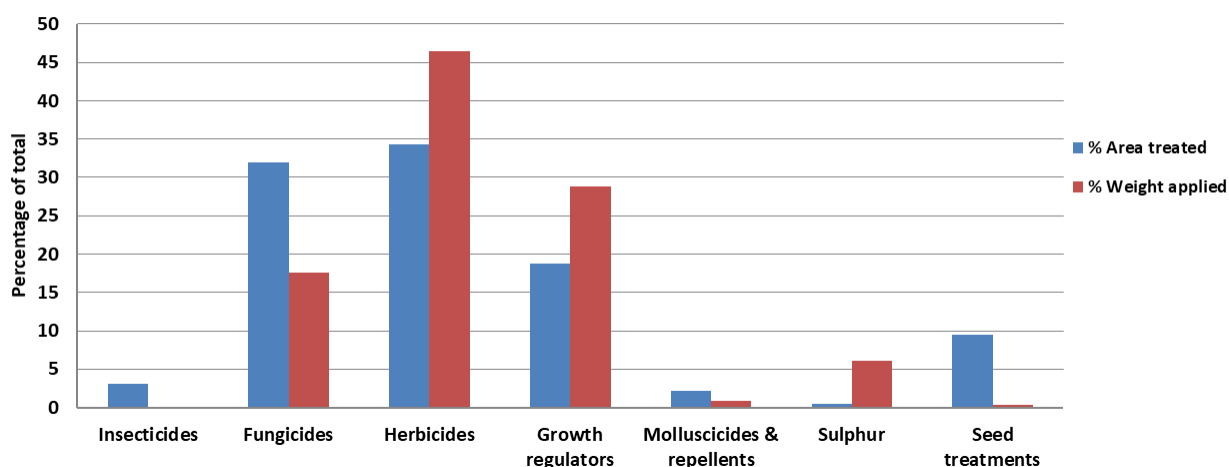
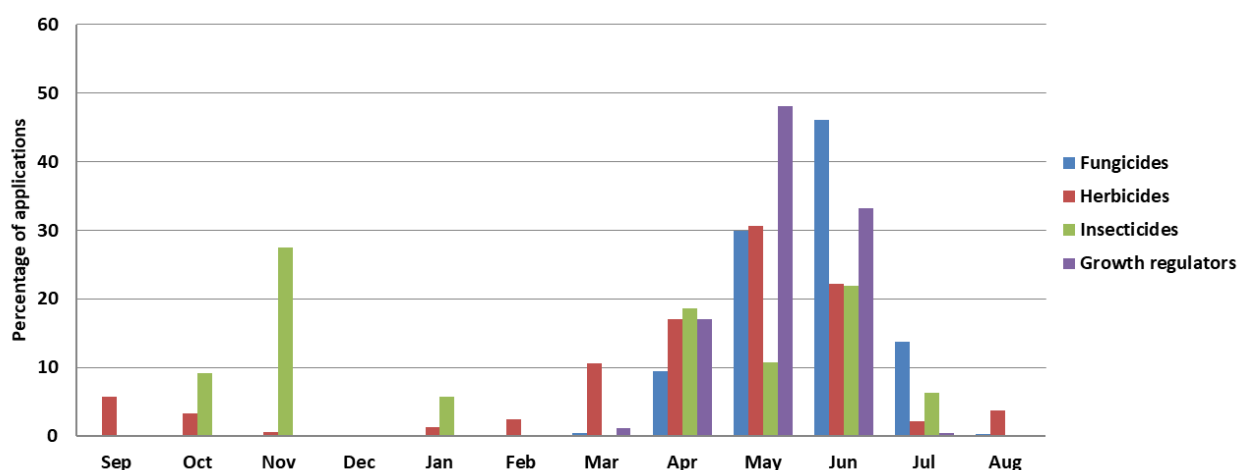


Figure 24 - Timing of pesticide applications on oats: September 2023 - August 2024

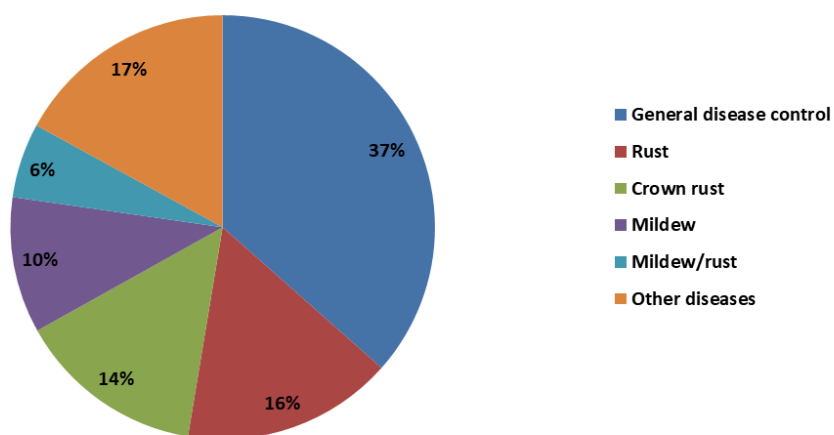


Oats – Fungicides

- Formulation area treated: 380,342 hectares
- Weight of formulations applied: 57.3 tonnes
- The five most common formulations were:

	Formulation area treated (ha)	Weight of formulation applied (kg)	Proportion of fungicide-treated area	Proportion of June Survey area treated	Average number of applications (where applied)	Average proportion of full label rate
Tebuconazole	87,043	13,361	0.23	0.37	1.28	0.61
Azoxystrobin	60,389	7,443	0.16	0.26	1.29	0.49
Prothioconazole	39,912	4,196	0.10	0.15	1.39	0.53
Benzovindiflupyr/prothioconazole	34,436	4,901	0.09	0.18	1.03	0.63
Pyraclostrobin	27,231	2,484	0.07	0.13	1.15	0.36

Figure 25 - Oats - Reasons for use of fungicides (where given)



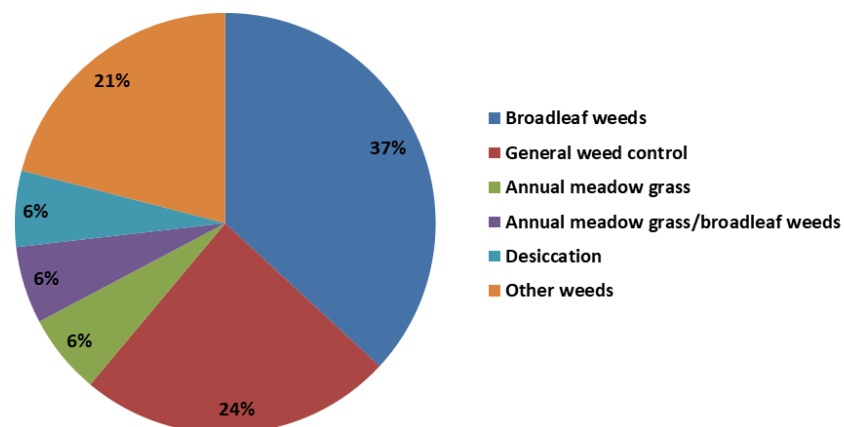
Use of sulphur accounted for 0.5% of the treated area and 6.1% weight applied for oats.

Oats – Herbicides

- Formulation area treated: 409,047 hectares
- Weight of formulations applied: 151.9 tonnes
- The five most common formulations were:

	Formulation area treated (ha)	Weight of formulation applied (kg)	Proportion of herbicide – treated area	Proportion of June Survey area treated	Average number of applications (where applied)	Average proportion of full label rate
Glyphosate	123,415	102,064	0.30	0.48	1.32	0.51
Fluroxypyr	59,608	6,809	0.15	0.32	1.00	0.70
Florasulam/tribenuron-methyl	57,954	994	0.14	0.32	1.00	0.86
Mecoprop-P	37,159	22,261	0.09	0.20	1.01	0.50
Thifensulfuron-methyl/tribenuron-methyl	23,095	519	0.06	0.12	1.02	0.75

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



Oats – Growth regulators

- Formulation area treated: 222,919 hectares
- Weight of formulations applied: 94.3 tonnes
- The five most common formulations were:

	Formulation area treated (ha)	Weight of formulation applied (kg)	Proportion of growth regulator – treated area	Proportion of June Survey area treated	Average number of applications (where applied)	Average proportion of full label rate
Chlormequat	101,536	83,844	0.46	0.46	1.15	0.55
Mepiquat chloride/prohexadione-calcium	49,804	7,895	0.22	0.23	1.23	0.30
Trinexapac-ethyl	47,453	1,516	0.21	0.23	1.07	0.32
Prohexadione-calcium/trinexapac-ethyl	15,862	601	0.07	0.08	1.11	0.54
Prohexadione-calcium	7,986	220	0.04	0.04	1.00	0.37

Oats – Insecticides & nematicides

- **Formulation area treated: 35,869 hectares**
- **Weight of formulations applied: 0.2 tonnes**
- **The only formulation encountered was:**

	Formulation area treated (ha)	Weight of formulation applied (kg)	Proportion of insecticide – treated area	Proportion of June Survey area treated	Average number of applications (where applied)	Average proportion of full label rate
Lambda-cyhalothrin	35,869	181	1.00	0.17	1.17	1.01

Almost all (98%) insecticides applied to oats were to control aphids, the remaining 2% were targeted at general pest control. The main reason for the control of the aphids would have been to prevent BYDV (barley yellow dwarf virus) spreading into the plants. The high rate for lambda-cyhalothrin was due to a single grower using high rates on oats. Lambda-cyhalothrin rates vary significantly between different crops as does the percentage of active substance contained within a given product.

Oats – Seed treatments

- **Formulation area treated: 112,577 hectares**
- **Weight of formulations applied: 0.9 tonnes**
- **38.2% of the seed remained untreated**
- **Where specified (excludes unspecified seed treatments) the most common formulations encountered were:**

	Formulation area treated (ha)	Weight of formulation applied (kg)	Proportion of seed treatment-treated area	Proportion of June Survey area treated
Fludioxonil	46,626	407	0.60	0.26
Prothioconazole/tebuconazole	15,318	314	0.20	0.08
Fludioxonil/sedaxane	13,848	136	0.18	0.08
Prothioconazole	980	17	0.01	0.01
Fludioxonil/fluxapyroxad/triticonazole	291	8	<0.01	<0.01

Rye

- 36,995 hectares of rye grown in the United Kingdom
- 342,922 treated hectares
- 86.9 tonnes applied
- 5.7% of rye remained untreated
- Rye received on average 3 herbicide, 2 fungicide, 2 growth regulator, 2 molluscicide and 1 insecticide spray rounds
- The main varieties encountered included KWS Tayo, Helltop, KWS Serafino, SU Performer and SU Arvid

Figure 27 - Usage of pesticides on rye - 2024

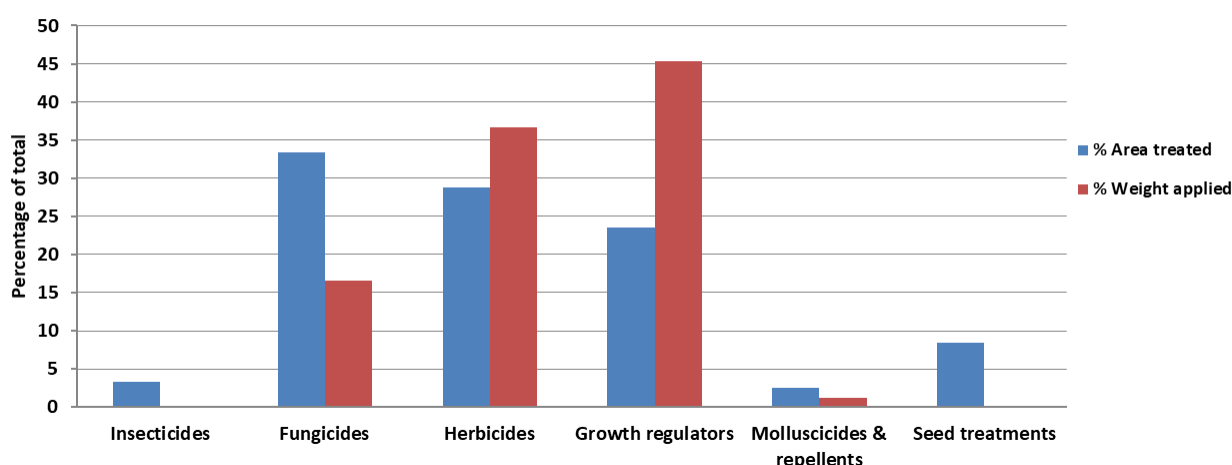
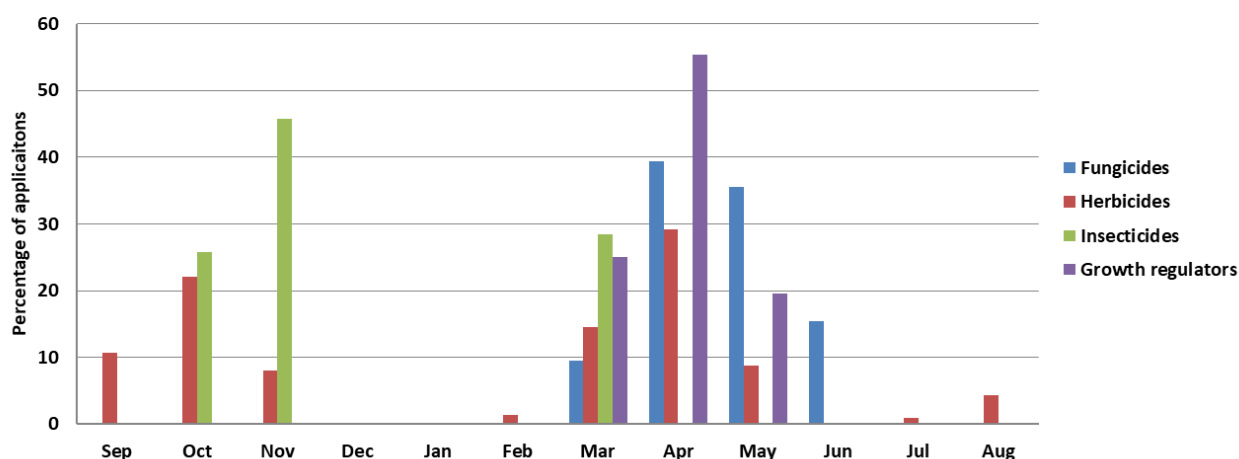


Figure 28 - Timing of pesticide applications on rye: September 2023 - August 2024

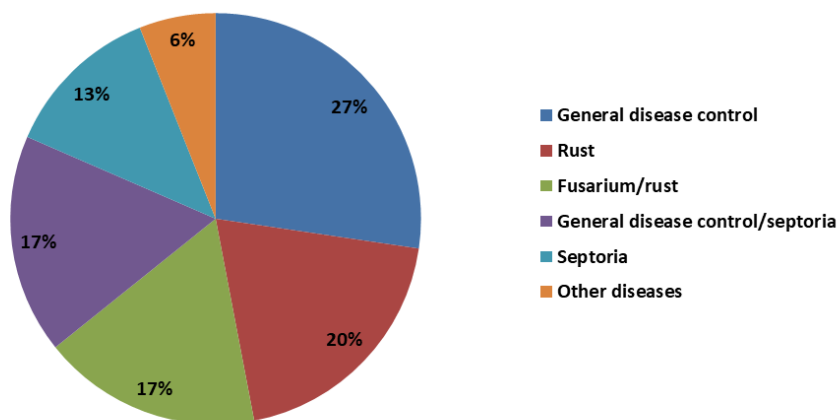


Rye – Fungicides

- Formulation area treated: 114,607 hectares
- Weight of formulations applied: 14.4 tonnes
- The five most common formulations were:

	Formulation area treated (ha)	Weight of formulation applied (kg)	Proportion of fungicide-treated area	Proportion of June Survey area treated	Average number of applications (where applied)	Average proportion of full label rate
Tebuconazole	50,393	6,924	0.44	0.63	1.96	0.55
Azoxystrobin	22,041	3,106	0.19	0.44	1.39	0.56
Prothioconazole/tebuconazole	8,071	884	0.07	0.22	1.00	0.44
Prothioconazole	7,032	743	0.06	0.13	1.42	0.53
Benzovindiflupyr/prothioconazole	6,931	1,030	0.06	0.19	1.00	0.66

Figure 29 - Rye - Reasons for use of fungicides (where given)

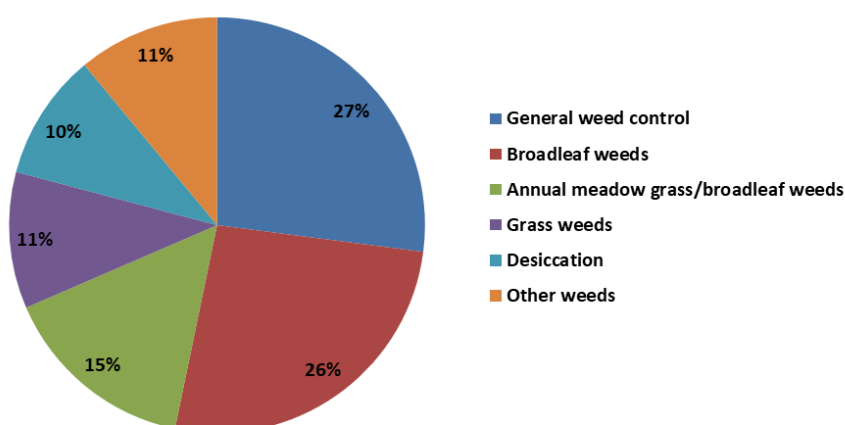


Rye – Herbicides

- Formulation area treated: 98,768 hectares
- Weight of formulations applied: 31.9 tonnes
- The five most common formulations were:

	Formulation area treated (ha)	Weight of formulation applied (kg)	Proportion of herbicide – treated area	Proportion of June Survey area treated	Average number of applications (where applied)	Average proportion of full label rate
Metsulfuron-methyl/tribenuron-methyl	15,836	160	0.16	0.40	1.07	0.85
Diflufenican/flufenacet	13,973	3,822	0.14	0.37	1.01	0.88
Glyphosate	11,113	8,071	0.11	0.28	1.03	0.44
Pendimethalin	9,709	8,290	0.10	0.26	1.02	0.65
Florasulam/pyroxulam	7,961	147	0.08	0.18	1.00	0.82

Figure 30 - Rye - Reasons for use of herbicides (where given)



Rye – Growth regulators

- Formulation area treated: 80,737 hectares
- Weight of formulations applied: 39.3 tonnes
- The five most common formulations were:

	Formulation area treated (ha)	Weight of formulation applied (kg)	Proportion of growth regulator – treated area	Proportion of June Survey area treated	Average number of applications (where applied)	Average proportion of full label rate
Chlormequat	37,093	32,003	0.46	0.75	1.35	0.58
Trinexapac-ethyl	24,822	1,061	0.31	0.57	1.17	0.43
2-chloroethylphosphonic acid/mepiquat	7,943	4,991	0.10	0.21	1.00	0.68
Prohexadione-calcium/trinexapac-ethyl	6,207	370	0.08	0.16	1.06	0.48
Mepiquat chloride/prohexadione-calcium	2,935	565	0.04	0.08	1.00	0.37

Rye – Insecticides & nematocides

- **Formulation area treated: 11,340 hectares**
- **Weight of formulations applied: 0.1 tonnes**
- **The single formulation encountered was:**

	Formulation area treated (ha)	Weight of formulation applied (kg)	Proportion of insecticide – treated area	Proportion of June Survey area treated	Average number of applications (where applied)	Average proportion of full label rate
Lambda-cyhalothrin	11,340	57	1.00	0.21	1.40	0.89

Aphid control was the only recorded reason for insecticide use on rye. The main reason for the control of the aphids would have been to prevent BYDV (barley yellow dwarf virus) spreading into the plants.

Rye – Seed treatments

- **Formulation area treated: 28,975 hectares**
- **Weight of formulations applied: 0.1 tonnes**
- **21.7% of the seed remained untreated**
- **Where specified (excludes unspecified seed treatments) the most common formulations were:**

	Formulation area treated (ha)	Weight of formulation applied (kg)	Proportion of seed treatment-treated area	Proportion of June Survey area treated
Fludioxonil	4,975	28	0.47	0.13
Prothioconazole/tebuconazole	2,515	29	0.24	0.07
Prothioconazole	1,646	16	0.16	0.04
Fludioxonil/sedaxane	645	6	0.06	0.02
Fludioxonil/fluxapyroxad/triticonazole	547	8	0.05	0.01

Triticale

- 10,719 hectares of triticale grown in the United Kingdom
- 66,994 treated hectares
- 16.9 tonnes applied
- 1.3% of triticale remained untreated
- Triticale received on average 2 fungicide, 2 herbicide, 1 growth regulator, 1 molluscicide and 1 insecticide spray rounds
- The main varieties encountered were Dublet, KWS Fido, Hugo, Kasyno and Cyrkon

Figure 31 - Usage of pesticides on triticale - 2024

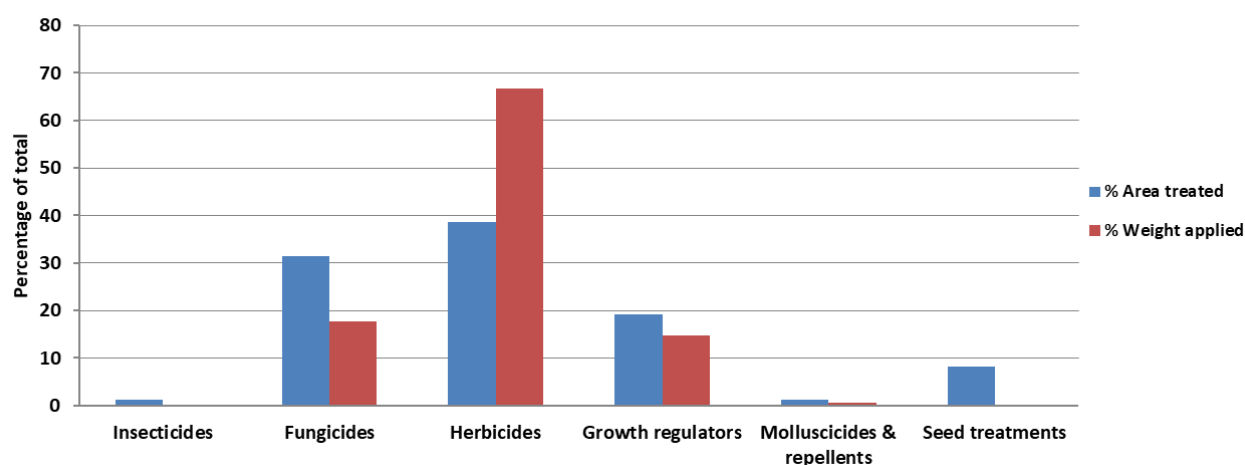
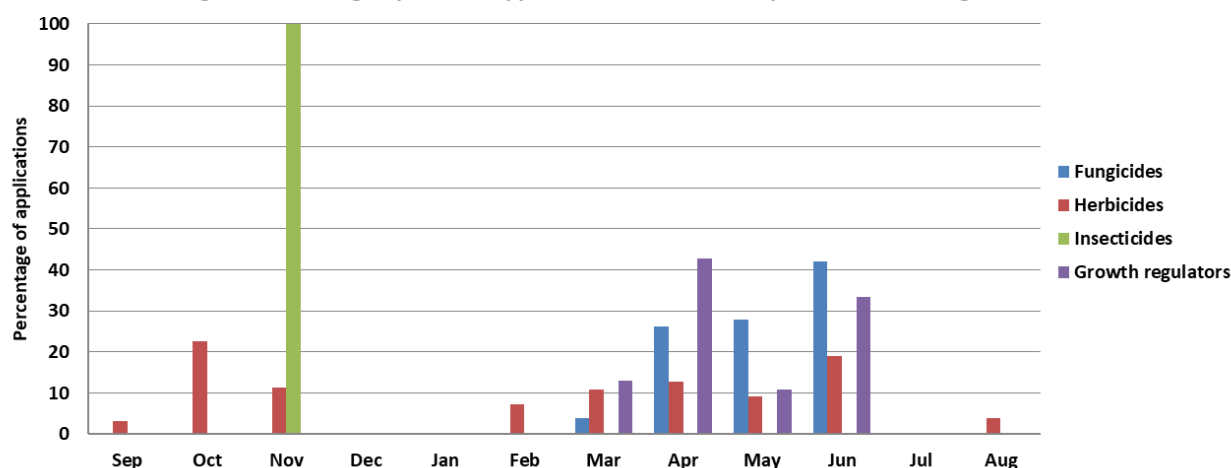


Figure 32 - Timing of pesticide applications on triticale: September 2023 - August 2024

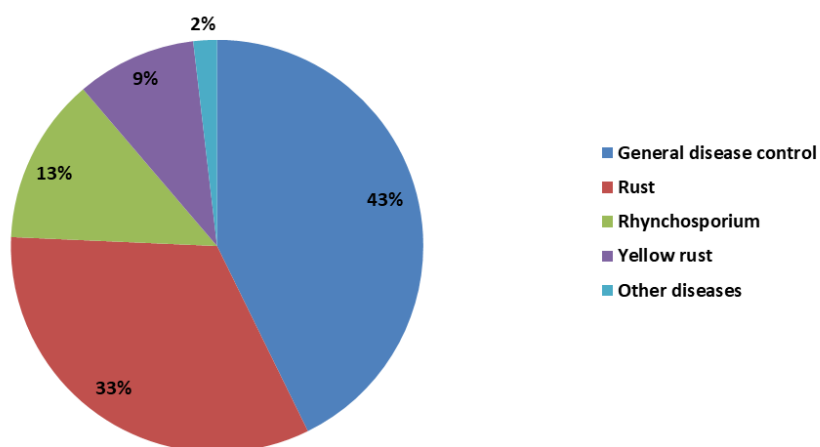


Triticale – Fungicides

- **Formulation area treated: 21,055 hectares**
- **Weight of formulations applied: 3.0 tonnes**
- **The five most common formulations were:**

	Formulation area treated (ha)	Weight of formulation applied (kg)	Proportion of fungicide-treated area	Proportion of June Survey area treated	Average number of applications (where applied)	Average proportion of full label rate
Tebuconazole	7,511	1,375	0.36	0.70	1.00	0.72
Benzovindiflupyr/prothioconazole	5,655	719	0.27	0.53	1.00	0.56
Azoxystrobin	5,058	636	0.24	0.35	1.37	0.50
Cyflufenamid	1,611	8	0.08	0.12	1.27	0.20
Fluoxastrobin/prothioconazole	430	66	0.02	0.04	1.00	0.66

Figure 33 - Triticale - Reasons for use of fungicides (where given)

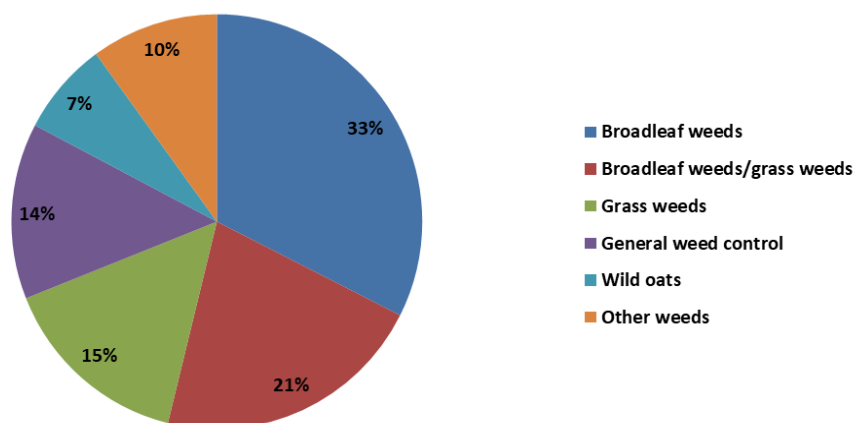


Triticale – Herbicides

- **Formulation area treated: 25,890 hectares**
- **Weight of formulations applied: 11.2 tonnes**
- **The five most common formulations were:**

	Formulation area treated (ha)	Weight of formulation applied (kg)	Proportion of herbicide – treated area	Proportion of June Survey area treated	Average number of applications (where applied)	Average proportion of full label rate
Glyphosate	8,093	6,635	0.31	0.48	1.58	0.48
Metsulfuron-methyl/tribenuron-methyl	3,154	37	0.12	0.29	1.00	0.97
Iodosulfuron-methyl-sodium/mesosulfuron-methyl/thiencarbazone-methyl	2,773	42	0.11	0.26	1.00	0.60
Diflufenican/flufenacet	2,416	770	0.09	0.23	1.00	0.99
Clodinafop-propargyl	1,286	39	0.05	0.12	1.00	0.50

Figure 34 - Triticale - Reasons for use of herbicides (where given)



Triticale – Growth regulators

- **Formulation area treated: 12,849 hectares**
- **Weight of formulations applied: 2.5 tonnes**
- **The three formulations encountered were:**

	Formulation area treated (ha)	Weight of formulation applied (kg)	Proportion of growth regulator – treated area	Proportion of June Survey area treated	Average number of applications (where applied)	Average proportion of full label rate
Trinexapac-ethyl	9,742	361	0.76	0.62	1.35	0.37
Chlormequat	2,555	2,033	0.20	0.22	1.07	0.53
Mepiquat chloride/prohexadione-calcium	551	100	0.04	0.05	1.00	0.35

Triticale – Insecticides & nematicides

- **Formulation area treated: 834 hectares**
- **Weight of formulations applied: less than 0.05 tonnes**
- **The only formulation encountered was:**

	Formulation area treated (ha)	Weight of formulation applied (kg)	Proportion of growth regulator – treated area	Proportion of June Survey area treated	Average number of applications (where applied)	Average proportion of full label rate
Cypermethrin	834	21	1.00	0.08	1.00	1.00

Aphid control was the only recorded reason for insecticide use on triticale. The main reason for the control of the aphids would have been to prevent BYDV (barley yellow dwarf virus) spreading into the plants.

Triticale – Seed treatments

- **Formulation area treated: 5,532 hectares**
- **Weight of formulations applied: less than 0.05 tonnes**
- **48.4% of the seed remained untreated**
- **Where specified (excludes unspecified seed treatments) the three formulations encountered were:**

	Formulation area treated (ha)	Weight of formulation applied (kg)	Proportion of seed treatment-treated area	Proportion of June Survey area treated
Fludioxonil/sedaxane	834	13	0.51	0.08
Difenoconazole/fludioxonil/tebuconazole	435	8	0.27	0.04
Prothioconazole/tebuconazole	372	7	0.23	0.03

PESTICIDE USAGE ON OILSEEDS

Oilseed rape

- 293,807 hectares of oilseed rape grown in the United Kingdom (98% of which is winter sown)
- 2,999,400 treated hectares
- 840.4 tonnes applied
- 0.4% of oilseed rape remained untreated
- Oilseed rape received on average 4 herbicide, 3 fungicide, 2 insecticide, 2 molluscicide and 1 growth regulator spray rounds
- The main winter varieties encountered included Aurelia, Ambassador, Attica, Crome and Ramses; the only spring variety encountered was Lumen

Figure 35 - Usage of pesticides on oilseed rape (spring & winter) - 2024

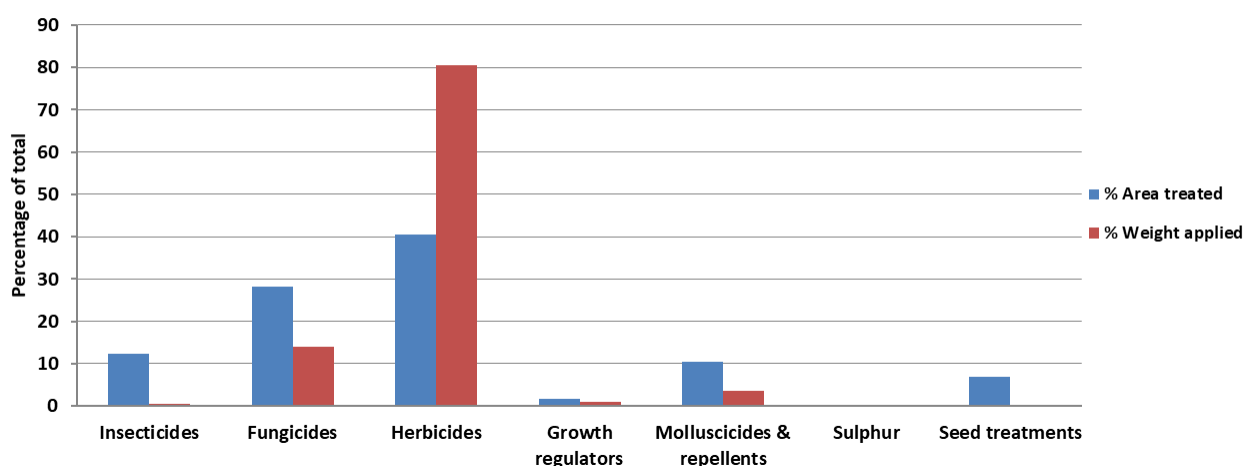
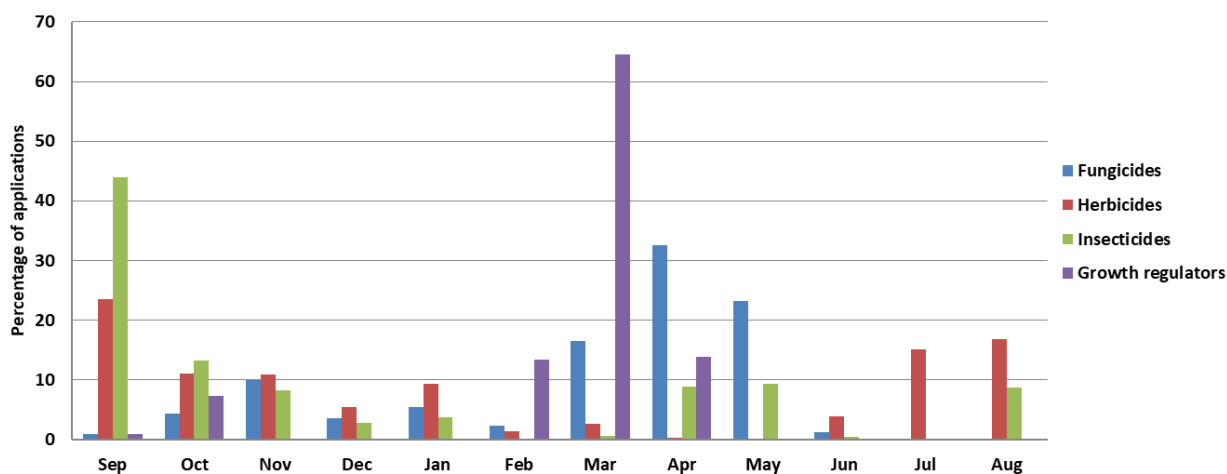


Figure 36 - Timing of pesticide applications on winter oilseed rape: September 2023 - August 2024

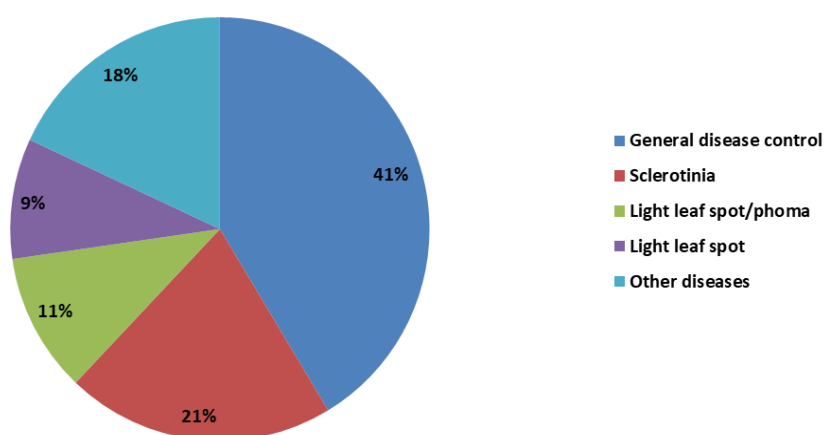


Oilseed rape – Fungicides

- Formulation area treated: 828,470 hectares
- Weight of formulations applied: 115.1 tonnes
- The five most common formulations were:

	Formulation area treated (ha)	Weight of formulation applied (kg)	Proportion of fungicide-treated area	Proportion of June Survey area treated	Average number of applications (where applied)	Average proportion of full label rate
Prothioconazole	261,544	28,210	0.32	0.56	1.57	0.62
Prothioconazole/tebuconazole	110,991	17,429	0.13	0.27	1.40	0.64
Azoxystrobin	107,780	15,768	0.13	0.33	1.08	0.59
Tebuconazole	106,395	16,041	0.13	0.30	1.16	0.60
Bixafen/prothioconazole	30,869	4,811	0.04	0.11	1.00	0.66

Figure 37 - Oilseed rape - Reasons for use of fungicides (where given)



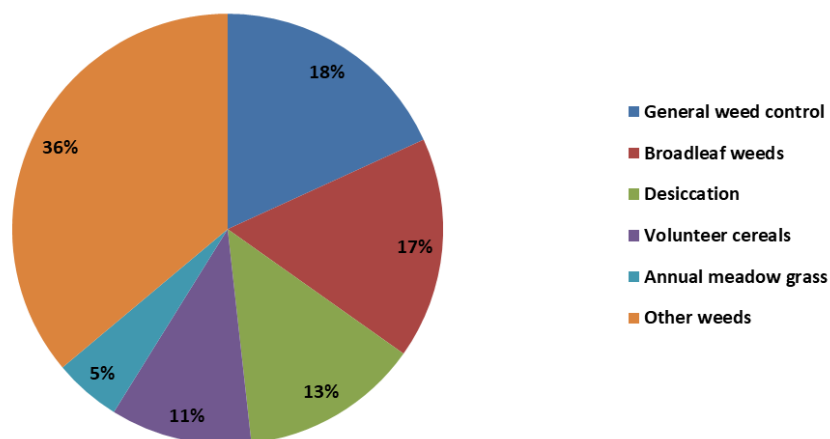
Use of sulphur accounted for 0.1% of the treated area and 0.3% of the weight applied to oilseed rape.

Oilseed rape – Herbicides

- **Formulation area treated: 1,192,831 hectares**
- **Weight of formulations applied: 662.3 tonnes**
- **The five most common formulations were:**

	Formulation area treated (ha)	Weight of formulation applied (kg)	Proportion of herbicide – treated area	Proportion of June Survey area treated	Average number of applications (where applied)	Average proportion of full label rate
Glyphosate	319,784	355,000	0.27	0.76	1.39	0.75
Aminopyralid/propyzamide	173,659	145,622	0.15	0.58	1.02	0.97
Propaquizafop	133,043	8,247	0.11	0.41	1.09	0.41
Clethodim	102,814	12,065	0.09	0.34	1.02	0.97
Propyzamide	67,583	40,968	0.06	0.20	1.04	0.72

Figure 38 - Oilseed rape - Reasons for use of herbicides (where given)



Oilseed rape – Growth regulators

- **Formulation area treated: 48,756 hectares**
- **Weight of formulations applied: 8.8 tonnes**
- **The two formulations encountered were:**

	Formulation area treated (ha)	Weight of formulation applied (kg)	Proportion of growth regulator – treated area	Proportion of June Survey area treated	Average number of applications (where applied)	Average proportion of full label rate
Mepiquat chloride/metconazole	45,659	8,418	0.94	0.15	1.04	0.55
Trinexapac-ethyl	3,097	382	0.06	0.01	1.00	0.33

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.

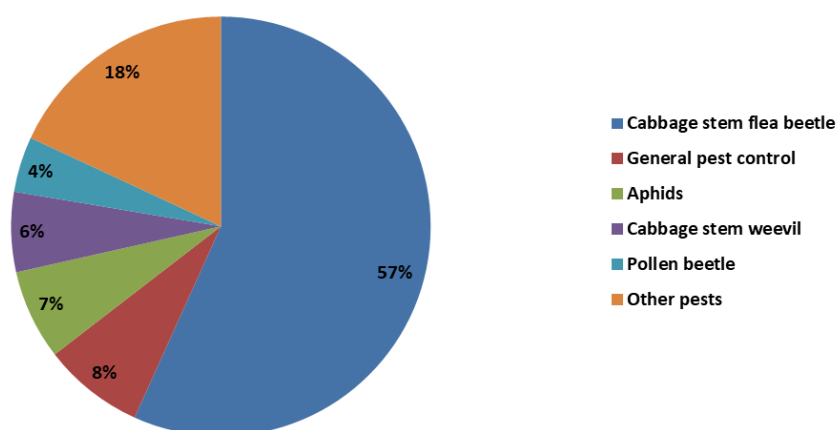
Use of the formulation mepiquat chloride/prohexadione-calcium/pyraclostrobin was also encountered on oilseed rape and accounted for 57,841 treated hectares and 16.2 tonnes of active substance. This formulation has a dual purpose on oilseed rape and can be used as both a growth regulator and for disease control.

Oilseed rape – Insecticides & nematicides

- Formulation area treated: 360,998 hectares
- Weight of formulations applied: 4.8 tonnes
- The five most common formulations were:

	Formulation area treated (ha)	Weight of formulation applied (kg)	Proportion of insecticide – treated area	Proportion of June Survey area treated	Average number of applications (where applied)	Average proportion of full label rate
Lambda-cyhalothrin	294,111	2,139	0.81	0.52	1.83	0.97
Tau-fluvalinate	46,348	2,075	0.13	0.14	1.09	0.93
Cypermethrin	5,965	148	0.02	0.02	1.26	0.98
Acetamiprid	4,599	176	0.01	0.02	1.00	0.96
Flonicamid	3,524	127	0.01	0.01	1.00	0.72

Figure 39 - Oilseed rape - Reasons for use of insecticides (where given)



Oilseed rape – Seed treatments

- Formulation area treated: 201,749 hectares
- Weight of formulations applied: 0.1 tonnes
- 31.3% of the seed remained untreated
- Where specified, the two formulations encountered were:

	Formulation area treated (ha)	Weight of formulation applied (kg)	Proportion of seed treatment-treated area	Proportion of June Survey area treated
<i>Bacillus amyloliquefaciens</i> strain MBI 600	90,160	50	0.99	0.31
Cyantraniliprole	479	29	0.01	<0.01

Linseed

- 17,729 hectares of linseed grown in the United Kingdom
- 80,852 treated hectares
- 29.3 tonnes applied
- There were no untreated crops of linseed recorded
- Linseed received on average 3 herbicide, 1 fungicide, 1 molluscicide and 1 insecticide spray rounds
- 72% of the crop was spring sown
- The five main varieties encountered were Empress, Sideral, VT50, Juliet and Attila

Figure 40 - Usage of pesticides on linseed - 2024

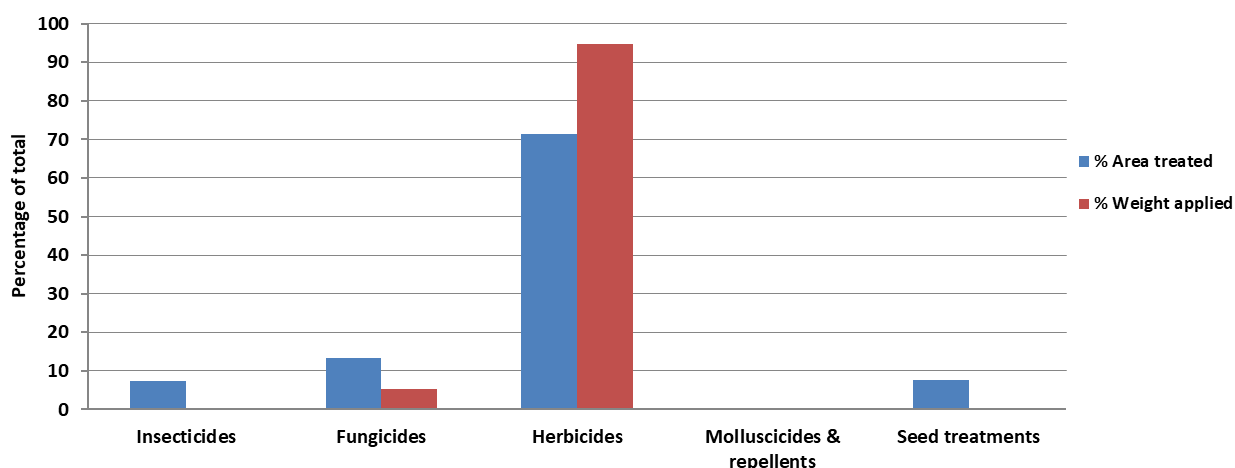
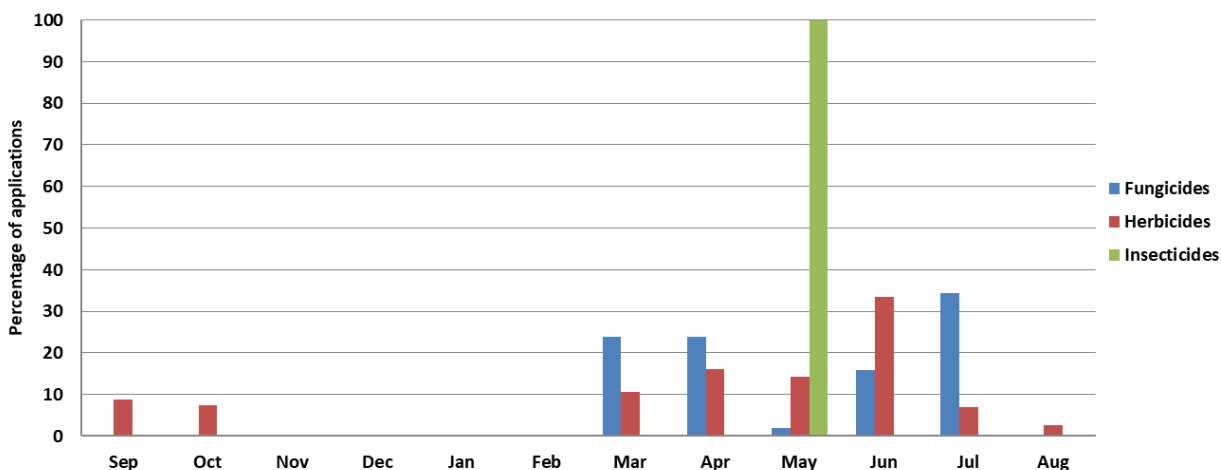


Figure 41 - Timing of pesticide applications on linseed: September 2023 - August 2024



Linseed – Fungicides

- Formulation area treated: 10,799 hectares
- Weight of formulations applied: 1.5 tonnes
- The three formulations encountered were:

	Formulation area treated (ha)	Weight of formulation applied (kg)	Proportion of fungicide-treated area	Proportion of June Survey area treated	Average number of applications (where applied)	Average proportion of full label rate
Tebuconazole	5,643	1,299	0.52	0.32	1.00	0.92
Difenoconazole	2,578	148	0.24	0.15	1.00	0.46
Metconazole	2,578	86	0.24	0.15	1.00	0.46

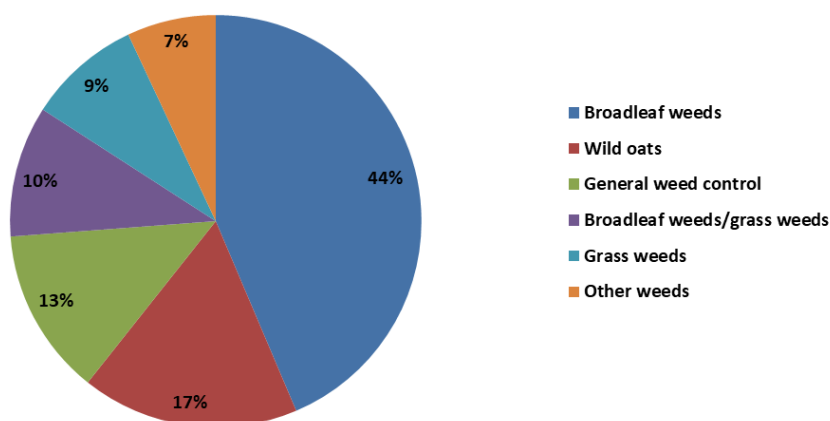
The only recorded reasons for use of fungicides on linseed were general disease control (76%) and Botrytis (24%).

Linseed – Herbicides

- Formulation area treated: 57,790 hectares
- Weight of formulations applied: 27.7 tonnes
- The five most common formulations were:

	Formulation area treated (ha)	Weight of formulation applied (kg)	Proportion of herbicide – treated area	Proportion of June Survey area treated	Average number of applications (where applied)	Average proportion of full label rate
Glyphosate	16,787	15,866	0.29	0.48	1.99	0.60
Metsulfuron-methyl	12,107	67	0.21	0.68	1.00	0.93
Clethodim	9,567	902	0.17	0.43	1.00	0.79
Clopyralid	4,545	444	0.08	0.26	1.00	0.98
Amidosulfuron	3,376	83	0.06	0.19	1.00	0.82

Figure 42 - Linseed - Reasons for use of herbicides (where given)



Linseed – Insecticides & nematicides

- **Formulation area treated: 5,909 hectares**
- **Weight of formulations applied: less than 0.05 tonnes**
- **The only formulation encountered was:**

	Formulation area treated (ha)	Weight of formulation applied (kg)	Proportion of insecticide – treated area	Proportion of June Survey area treated	Average number of applications (where applied)	Average proportion of full label rate
Lambda-cyhalothrin	5,909	44	1.00	0.33	1.00	1.00

Cabbage stem flea beetle control was the only recorded reason for insecticide use on linseed.

Linseed – Seed treatments

- **Formulation area treated: 6,082 hectares (all unspecified seed treatments)**
- **Weight of formulations applied: there is no weight associated with unspecified seed treatments**
- **65.7% of the seed remained untreated**

PESTICIDE USAGE ON POTATOES

Ware Potatoes

- 102,599 hectares of ware potatoes were grown in the United Kingdom
- 2,786,178 treated hectares
- 1,482.1 tonnes applied
- 0.01% of ware potatoes remained untreated
- Ware potatoes received on average 12 fungicide, 4 molluscicide, 3 herbicide, 2 insecticide and 1 growth regulator spray round
- The main varieties encountered included Maris Piper, Sagitta, Tyson, Jazzy and Melody

Figure 43 - Usage of pesticides on ware potatoes - 2024

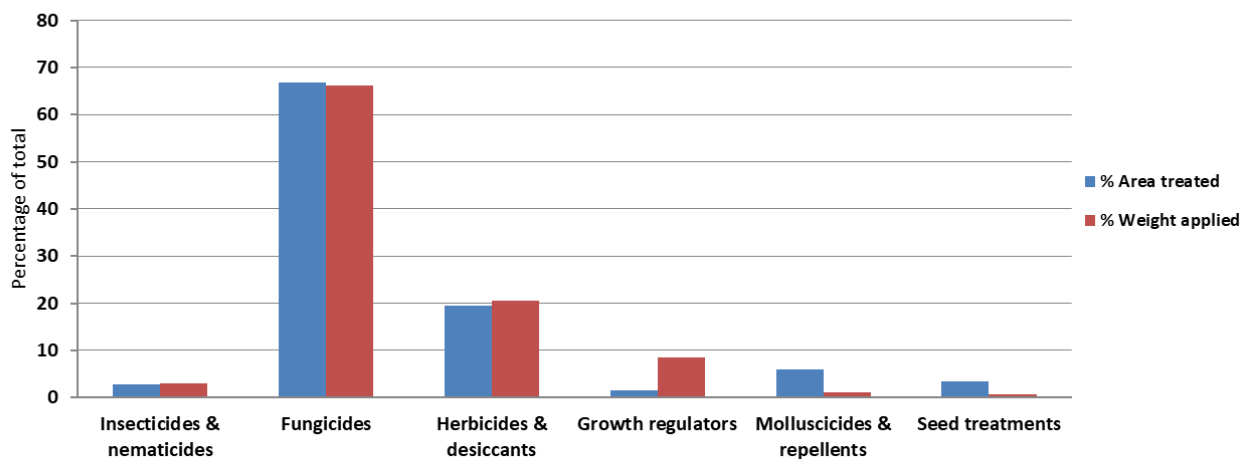
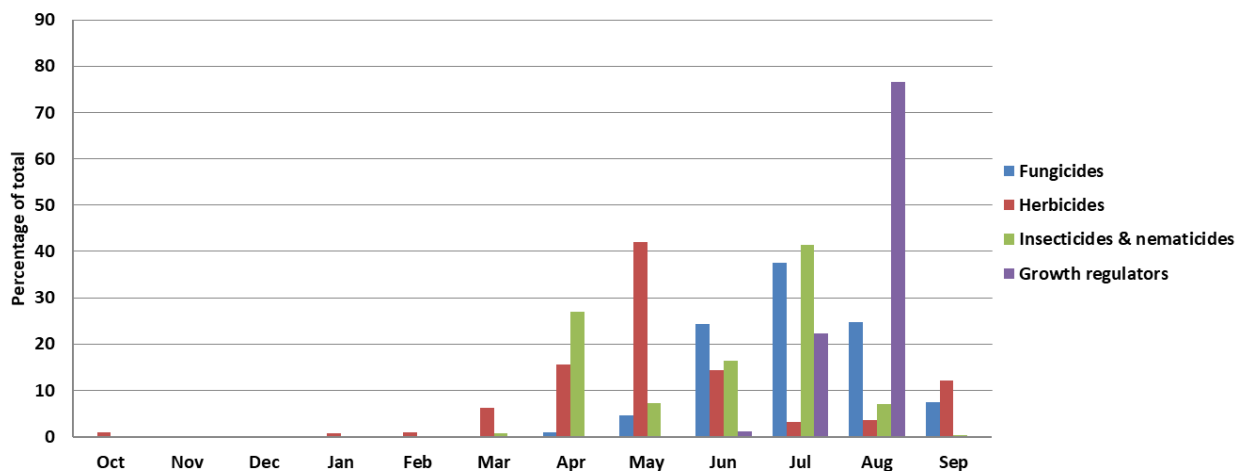


Figure 44 - Timing of pesticide applications on ware potatoes: October 2023 - September 2024



Ware Potatoes – Fungicides

- Formulation area treated: 1,860,199 hectares
- Weight of formulations applied: 981.2 tonnes
- The five most used formulations encountered were:

	Formulation area treated (ha)	Weight of formulation applied (kg)	Proportion of fungicide - treated area	Proportion of June Survey area treated	Average number of applications (where applied)	Average proportion of full label rate
Cymoxanil	311,435	31,109	0.17	0.87	3.48	0.94
Mancozeb	305,562	383,709	0.16	0.75	4.02	0.93
Cyazofamid	279,537	21,984	0.15	0.95	2.87	0.98
Fluopicolide/ propamocarb hydrochloride	168,183	180,166	0.09	0.78	2.09	0.97
Mandipropamid	124,566	18,209	0.07	0.68	1.80	0.97

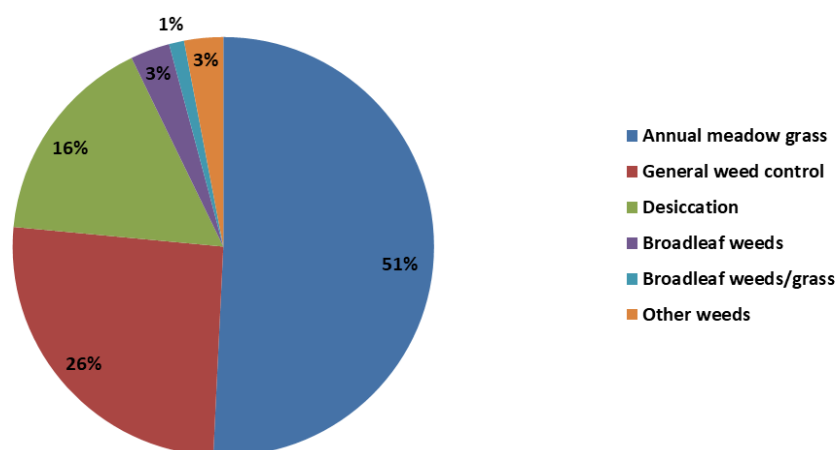
Blight accounted for 85% of the reasons for fungicide usage on ware potatoes and general disease control 15%.

Ware potatoes – Herbicides

- Formulation area treated: 540,779 hectares
- Weight of formulations applied: 304.0 tonnes
- The five most used formulations encountered were:

	Formulation area treated (ha)	Weight of formulation applied (kg)	Proportion of herbicide - treated area	Proportion of June Survey area treated	Average number of applications (where applied)	Average proportion of full label rate
Carfentrazone-ethyl	110,956	4,857	0.25	0.72	1.50	0.92
Metribuzin	75,315	26,189	0.17	0.70	1.03	0.61
Glyphosate	63,066	63,564	0.14	0.50	1.22	0.67
Aclonifen	58,034	58,369	0.13	0.56	1.01	0.95
Prosulfocarb	30,319	71,590	0.07	0.29	1.00	0.59

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



Ware potatoes – Growth regulators

- Formulation area treated: 44,110 hectares
- Weight of formulations applied: 125.5 tonnes
- Where specified, the only formulation encountered was:

	Formulation area treated (ha)	Weight of formulation applied (kg)	Proportion of growth regulator – treated area	Proportion of June Survey area treated	Average number of applications (where applied)	Average proportion of full label rate
Maleic hydrazide	43,639	125,498	0.99	0.41	1.03	0.96

Between 2022 and 2024, the use of maleic hydrazide decreased by 11% in terms of area treated and by 10% in terms of weight applied. The use of maleic hydrazide in the field prevents the sprouting of potatoes in store therefore increasing the length of time the potatoes can be stored.

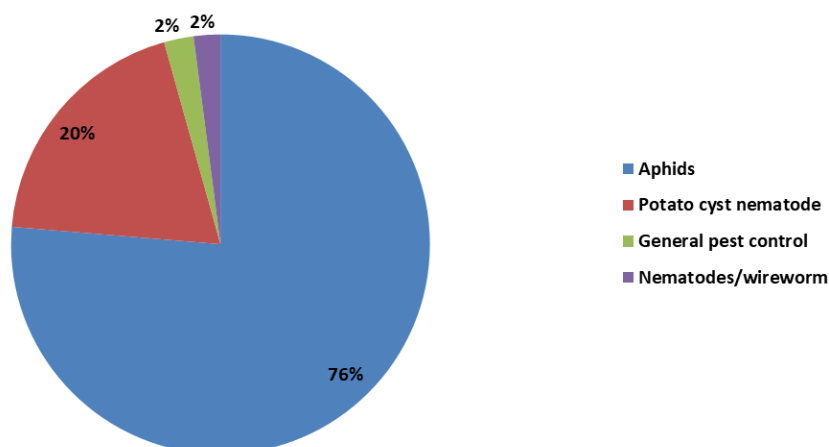
Ware potatoes – Insecticides & nematicides

- Formulation area treated: 79,443 hectares
- Weight of formulations applied: 44.1 tonnes
- The five most common formulations were:

	Formulation area treated (ha)	Weight of formulation applied (kg)	Proportion of insecticide – treated area	Proportion of June Survey area treated	Average number of applications (where applied)	Average proportion of full label rate
Acetamiprid	21,222	1,055	0.27	0.21	1.01	0.99
Lambda-cyhalothrin	19,912	131	0.25	0.15	1.30	0.88
Fosthiazate	14,537	39,314	0.18	0.14	1.00	0.90
Fluopyram	14,025	3,199	0.18	0.14	1.00	0.91
Esfenvalerate	4,618	21	0.06	0.03	1.54	0.93

Please note that fosthiazate is primarily used as a nematicide for potato cyst and free living nematode control, although it also has activity against other soil pests such as wireworm.

Figure 46 - Ware potatoes - Reasons for use of insecticides & nematicides (where given)



Ware potatoes – Seed treatments

- Formulation area treated: 93,784 hectares
- Weight of formulations applied: 11.3 tonnes
- 8.8% of the seed remained untreated, but other fungicides may have been applied at the time of planting
- Where specified, the three formulations encountered were:

	Formulation area treated (ha)	Weight of formulation applied (kg)	Proportion of seed treatment-treated area	Proportion of June Survey area treated
Flutolanil	35,997	9,877	0.56	0.35
Imazalil	14,560	545	0.23	0.14
Fludioxonil	13,850	925	0.22	0.13

Seed Potatoes

- 16,308 hectares of seed potatoes were grown in the United Kingdom
- 443,187 treated hectares
- 171.3 tonnes applied
- 3.5% seed potato crops remained untreated
- Seed potatoes received on average 9 fungicide, 7 insecticide, 2 molluscicide and 2 herbicide spray rounds
- Where information was provided, the main varieties encountered were Cara, Maris Piper, Banba, Barna and Desiree

Figure 47 - Usage of pesticides on seed potatoes - 2024

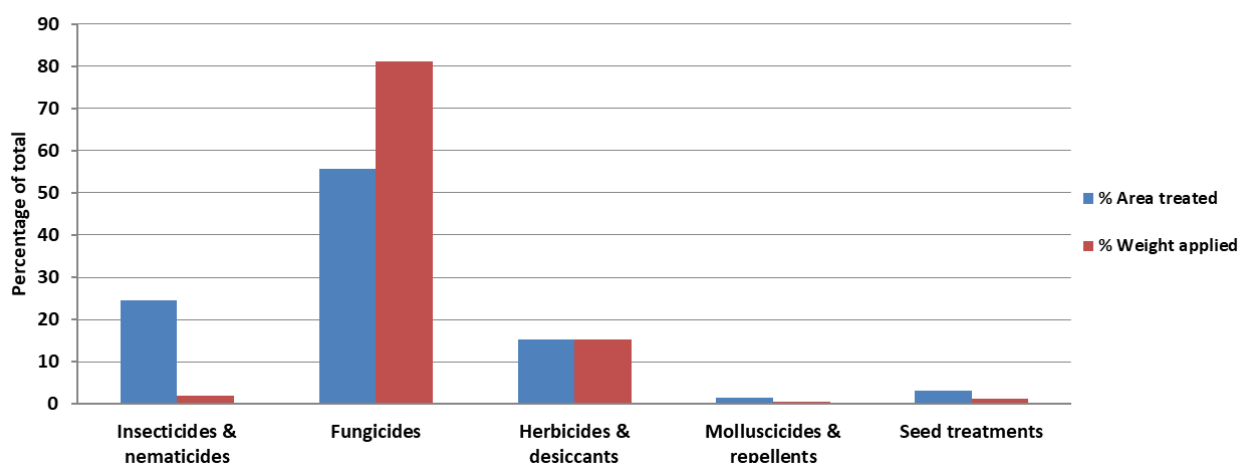
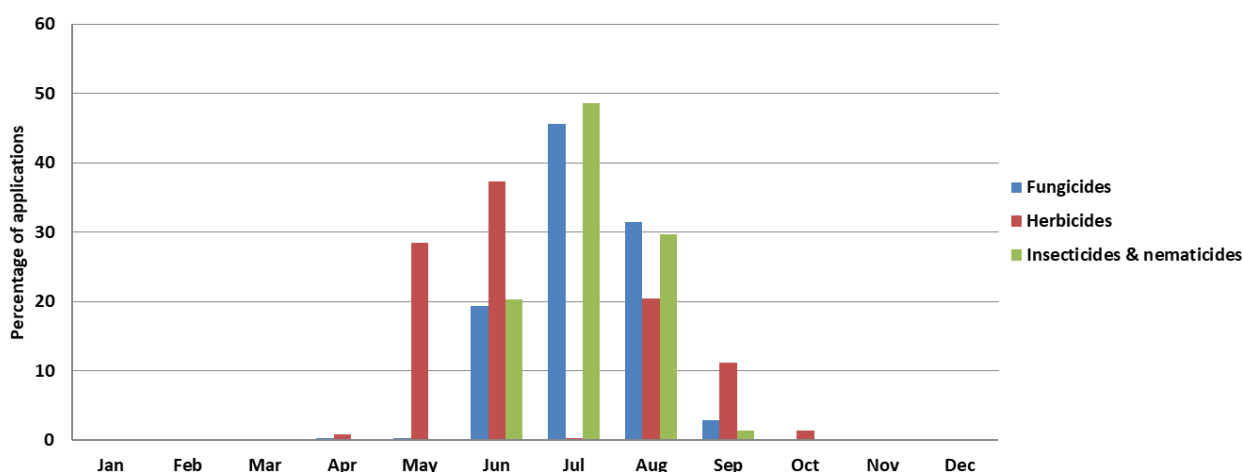


Figure 48 - Timing of pesticide applications on seed potatoes: January 2024 - December 2024



Seed Potatoes – Fungicides

- Formulation area treated: 245,224 hectares
- Weight of formulations applied: 135.1 tonnes
- The five most common formulations were:

	Formulation area treated (ha)	Weight of formulation applied (kg)	Proportion of fungicide - treated area	Proportion of June Survey area treated	Average number of applications (where applied)	Average proportion of full label rate
Mancozeb	52,873	65,287	0.22	0.89	3.68	0.89
Cymoxanil	45,415	4,289	0.19	0.81	3.47	0.90
Cyazofamid	31,255	2,469	0.13	0.93	2.07	0.99
Mandipropamid	25,291	3,718	0.10	0.81	1.88	0.98
Fluopicolide/ propamocarb hydrochloride	16,788	17,080	0.07	0.58	1.75	0.92

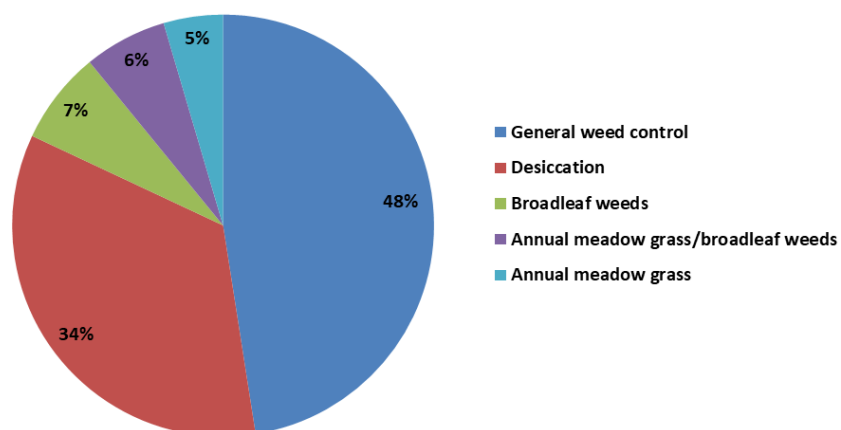
Blight accounted for 99% of the reasons for fungicide usage on seed potatoes and other diseases 1%.

Seed potatoes – Herbicides

- Formulation area treated: 67,269 hectares
- Weight of formulations applied: 25.6 tonnes
- The five most common formulations were:

	Formulation area treated (ha)	Weight of formulation applied (kg)	Proportion of herbicide – treated area	Proportion of June Survey area treated	Average number of applications (where applied)	Average proportion of full label rate
Carfentrazone-ethyl	14,039	713	0.32	0.76	1.10	0.87
Metribuzin	11,209	4,928	0.26	0.69	1.00	0.73
Metobromuron	8,392	9,612	0.19	0.51	1.00	0.57
Flufenacet/metribuzin	3,562	3,050	0.08	0.22	1.00	0.83
Aclonifen	2,974	3,037	0.07	0.18	1.00	0.97

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



Seed potatoes – Insecticides & nematicides

- **Formulation area treated: 108,125 hectares**
- **Weight of formulations applied: 3.1 tonnes**
- **The five most common formulations were:**

	Formulation area treated (ha)	Weight of formulation applied (kg)	Proportion of insecticide – treated area	Proportion of June Survey area treated	Average number of applications (where applied)	Average proportion of full label rate
Lambda-cyhalothrin	38,295	282	0.35	0.84	2.74	0.98
Esfenvalerate	27,865	132	0.26	0.73	2.35	0.95
Acetamiprid	19,413	924	0.18	0.75	1.56	0.95
Flonicamid	18,668	1,418	0.17	0.72	1.59	0.95
Spirotetramat	3,824	152	0.04	0.14	1.64	0.55

Aphid control accounted for 90% of the recorded reason for insecticide use on seed potatoes and general pest control 10%. The physical control agent paraffin oil was encountered for the first time and was used for aphid control.

Seed potatoes – Seed treatments

- **Formulation area treated: 13,928 hectares**
- **Weight of formulations applied: 2.0 tonnes**
- **14.6% of the seed remained untreated, but other fungicides may have been applied at the time of planting**
- **Where specified (excludes unspecified seed treatments) the three formulations encountered were:**

	Formulation area treated (ha)	Weight of formulation applied (kg)	Proportion of seed treatment-treated area	Proportion of June Survey area treated
Fludioxonil	7,060	695	0.65	0.43
Flutolanil	3,581	1,333	0.33	0.22
Imazalil	206	14	0.02	0.01

PESTICIDE USAGE ON PULSES

Dry harvest peas

- 88,397 hectares of dry harvest peas grown in the United Kingdom
- 688,384 treated hectares
- 289.1 tonnes applied
- 0.2% of dry harvest peas remained untreated
- Dry harvest peas received on average 3 herbicide, 2 insecticide, 2 molluscicide and 1 fungicide spray rounds
- The main varieties encountered included Sakura, Carrington, Oasis, Kameleon and Kabuki
- All crops encountered were spring sown

Figure 50 - Usage of pesticides on dry harvest peas - 2024

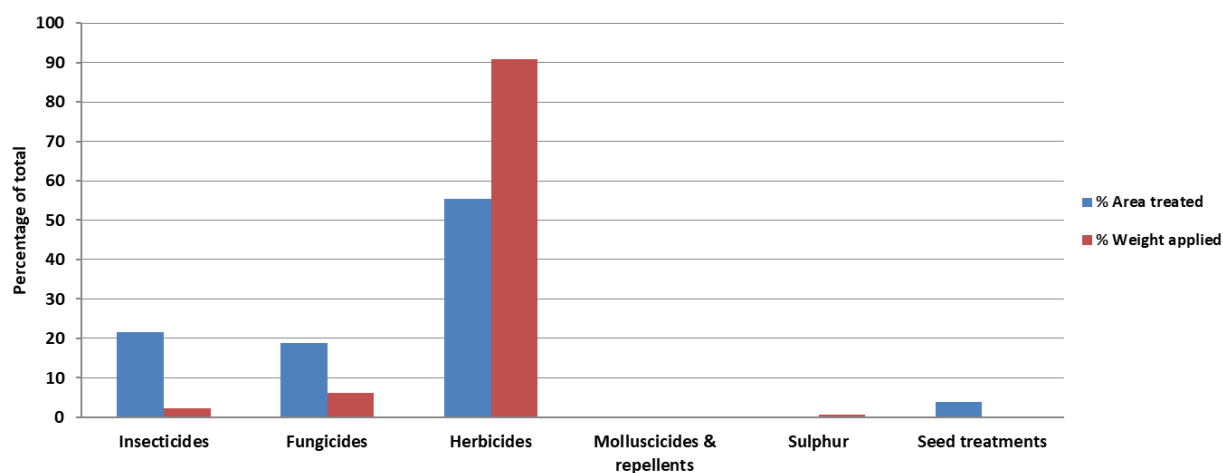
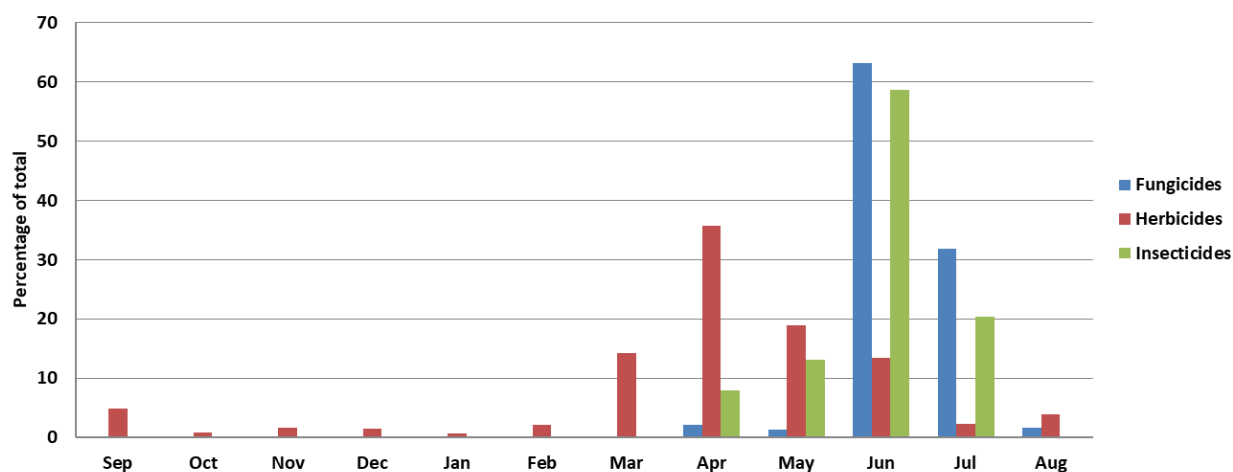


Figure 51 - Timing of pesticide applications on dry harvest peas: September 2023 - August 2024

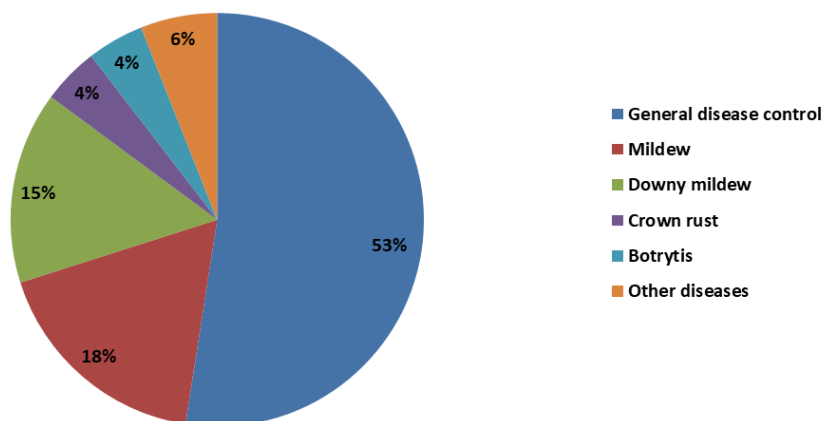


Dry harvest peas – Fungicides

- Formulation area treated: 128,873 hectares
- Weight of formulations applied: 17.7 tonnes
- The five formulations encountered were:

	Formulation area treated (ha)	Weight of formulation applied (kg)	Proportion of fungicide-treated area	Proportion of June Survey area treated	Average number of applications (where applied)	Average proportion of full label rate
Azoxystrobin	86,028	14,102	0.67	0.81	1.20	0.66
Metconazole	23,216	932	0.18	0.23	1.15	0.56
Benzovindiflupyr/prothioconazole	14,455	1,855	0.11	0.16	1.00	0.86
Tebuconazole	2,749	366	0.02	0.02	2.00	0.53
Boscalid/pyraclostrobin	2,426	491	0.02	0.03	1.00	0.61

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



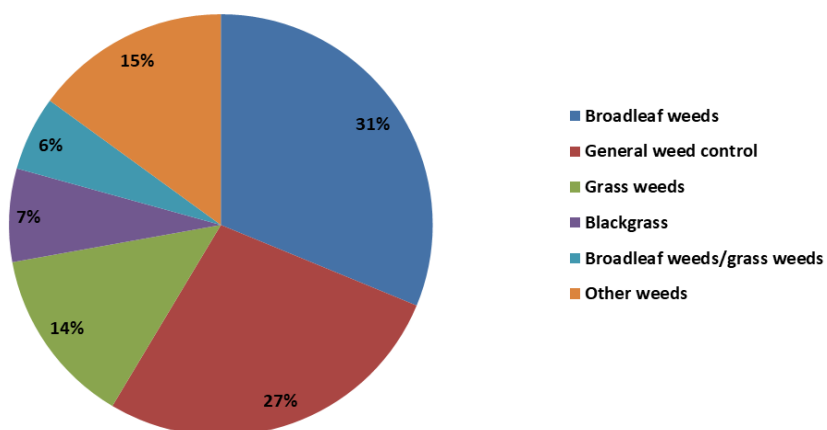
Use of sulphur accounted for 0.1% of the treated area and 0.6% of the weight applied to dry harvest peas.

Dry harvest peas – Herbicides

- Formulation area treated: 381,461 hectares
- Weight of formulations applied: 262.6 tonnes
- The five most common formulations were:

	Formulation area treated (ha)	Weight of formulation applied (kg)	Proportion of herbicide – treated area	Proportion of June Survey area treated	Average number of applications (where applied)	Average proportion of full label rate
Glyphosate	124,204	116,075	0.33	0.81	1.55	0.55
Imazamox/pendimethalin	60,009	52,184	0.16	0.68	1.00	0.72
Clomazone	57,452	4,298	0.15	0.64	1.00	0.83
Cycloxydim	26,005	5,129	0.07	0.29	1.00	0.44
MCPB	24,490	25,827	0.06	0.28	1.00	0.59

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

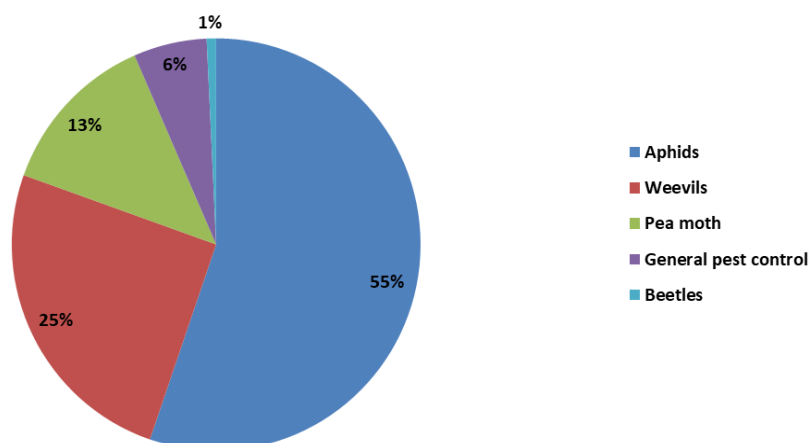


Dry harvest peas – Insecticides & nematicides

- **Formulation area treated: 149,166 hectares**
- **Weight of formulations applied: 6.7 tonnes**
- **The four formulations encountered were:**

	Formulation area treated (ha)	Weight of formulation applied (kg)	Proportion of insecticide – treated area	Proportion of June Survey area treated	Average number of applications (where applied)	Average proportion of full label rate
Lambda-cyhalothrin	96,399	602	0.65	0.69	1.59	0.83
Pirimicarb	51,517	6,009	0.35	0.57	1.00	0.83
Flonicamid	681	48	<0.01	0.01	1.00	1.00
Esfenvalerate	569	2	<0.01	0.01	1.00	0.75

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



Dry harvest peas – Seed treatments

- **Formulation area treated: 26,326 hectares**
- **Weight of formulations applied: 0.1 tonnes**
- **70.2% of the seed remained untreated**
- **Where specified, the only formulation encountered was:**

	Formulation area treated (ha)	Weight of formulation applied (kg)	Proportion of seed treatment-treated area	Proportion of June Survey area treated
Fludioxonil	2,562	65	1.00	0.03

Field beans

- 136,108 hectares of field beans grown in the United Kingdom (64% were spring sown)
- 838,736 treated hectares
- 300.5 tonnes applied
- 1.1% of field beans remained untreated
- Field beans received on average 3 herbicide, 2 fungicide, 1 molluscicide and 1 insecticide spray rounds
- The main varieties encountered included Lynx (spring), Vespa (winter), Tundra (winter), Vertigo (spring) and Fanfare (spring)

Figure 55 - Usage of pesticides on field beans - 2024

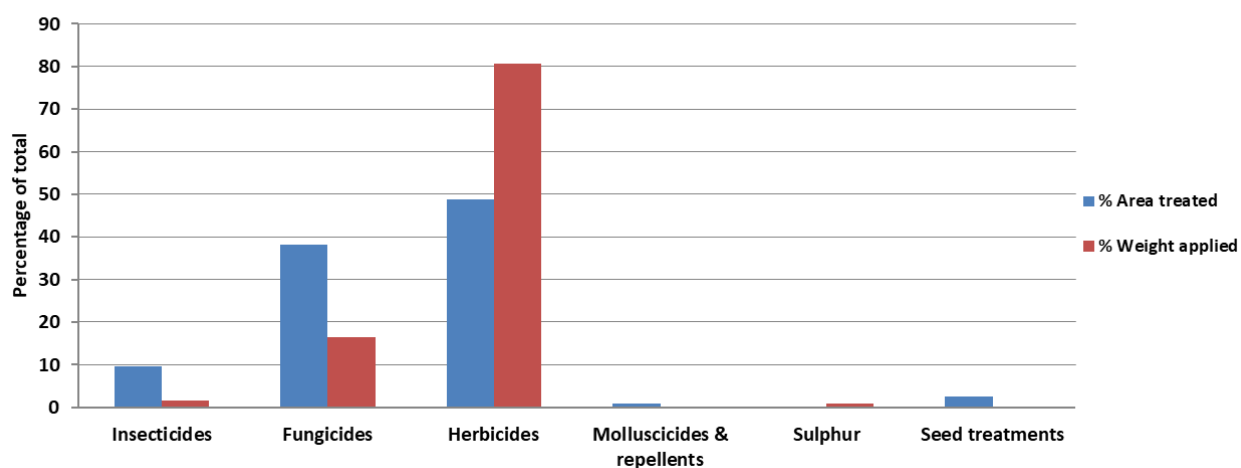
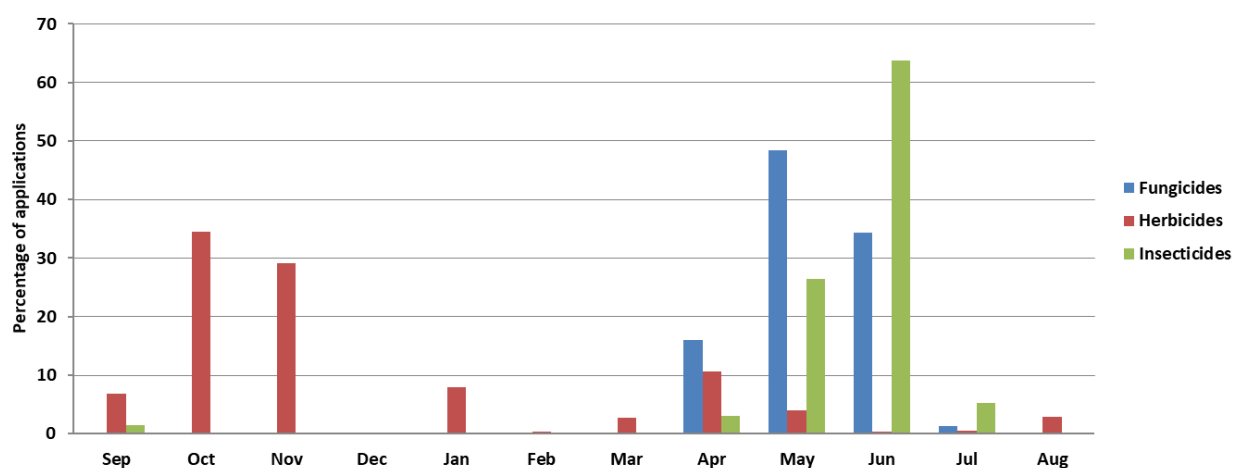
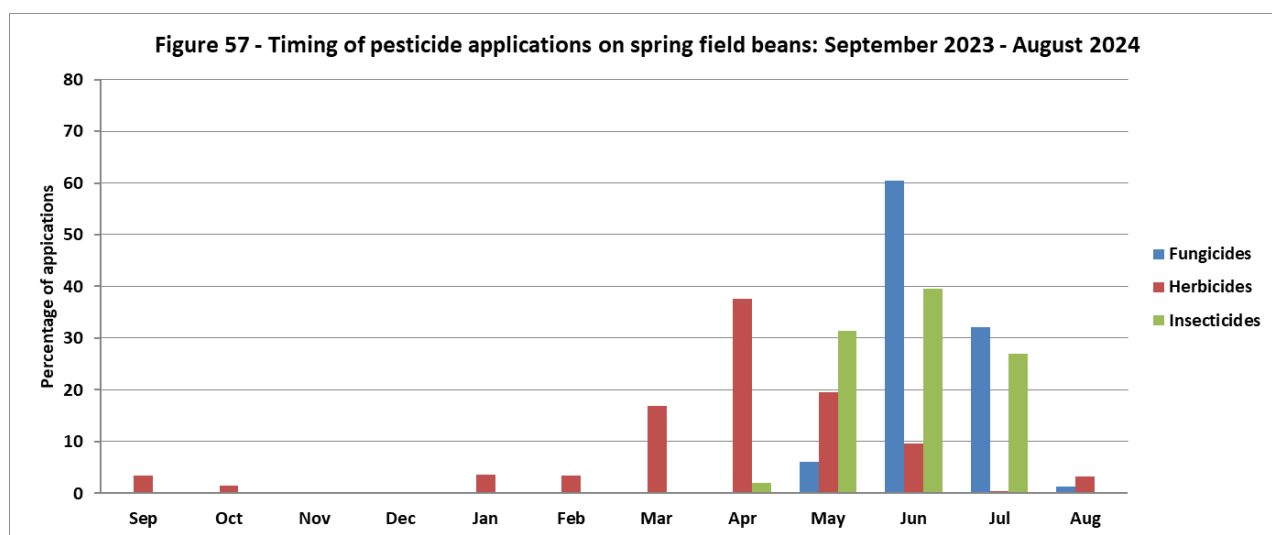


Figure 56 - Timing of pesticide applications on winter field beans: September 2023 - August 2024

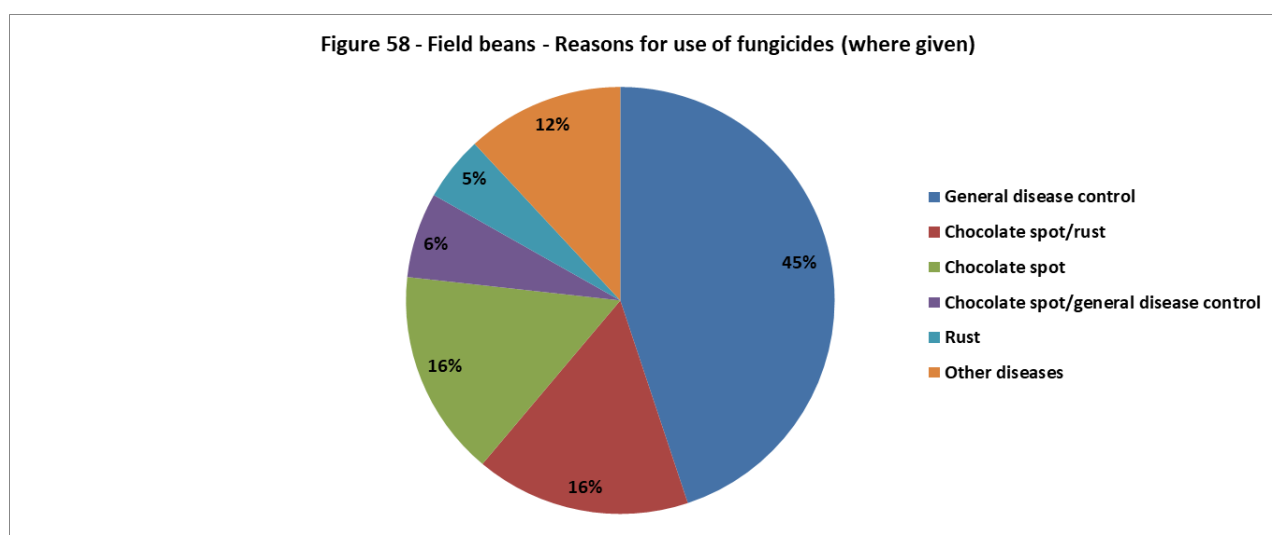




Field beans – Fungicides

- Formulation area treated: 320,351 hectares
- Weight of formulations applied: 49.6 tonnes
- The five most common formulations were:

	Formulation area treated (ha)	Weight of formulation applied (kg)	Proportion of fungicide-treated area	Proportion of June Survey area treated	Average number of applications (where applied)	Average proportion of full label rate
Azoxystrobin	122,068	17,986	0.38	0.63	1.39	0.59
Tebuconazole	106,012	16,698	0.33	0.58	1.29	0.64
Benzovindiflupyr/prothioconazole	51,607	6,748	0.16	0.37	1.02	0.88
Boscalid/pyraclostrobin	21,464	3,963	0.07	0.14	1.08	0.55
Azoxystrobin/tebuconazole	12,005	3,803	0.04	0.08	1.06	0.99



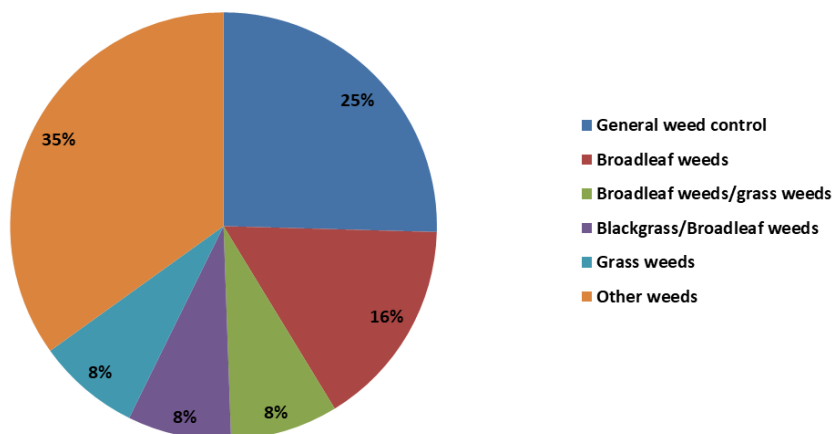
Use of sulphur accounted for 0.2% of the treated area and 0.8% of the weight applied to beans.

Field beans – Herbicides

- Formulation area treated: 408,443 hectares
- Weight of formulations applied: 242.6 tonnes
- The five most common formulations were:

	Formulation area treated (ha)	Weight of formulation applied (kg)	Proportion of herbicide – treated area	Proportion of June Survey area treated	Average number of applications (where applied)	Average proportion of full label rate
Glyphosate	121,891	108,694	0.30	0.57	1.49	0.58
Clomazone	66,876	5,245	0.16	0.49	1.00	0.80
Imazamox/pendimethalin	56,901	46,660	0.14	0.42	1.00	0.68
Propyzamide	30,745	24,691	0.08	0.23	1.00	0.95
Propaquizafop	27,315	2,508	0.07	0.20	1.02	0.61

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

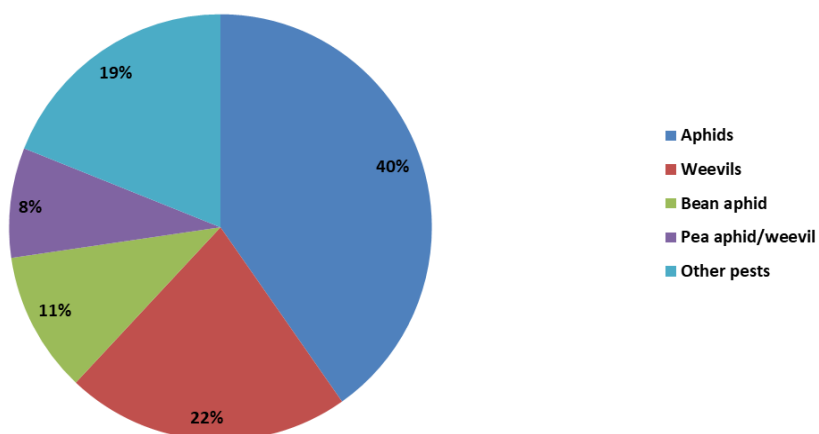


Field beans – Insecticides & nematicides

- Formulation area treated: 81,190 hectares
- Weight of formulations applied: 5.1 tonnes
- The five formulations encountered were:

	Formulation area treated (ha)	Weight of formulation applied (kg)	Proportion of insecticide – treated area	Proportion of June Survey area treated	Average number of applications (where applied)	Average proportion of full label rate
Pirimicarb	39,944	4,824	0.49	0.29	1.00	0.86
Lambda-cyhalothrin	36,752	259	0.45	0.21	1.25	0.94
Esfenvalerate	2,830	12	0.03	0.02	1.03	0.87
Cypermethrin	925	23	0.01	0.01	1.00	1.00
Deltamethrin	738	6	0.01	0.01	1.00	1.00

Figure 60 - Field beans - Reasons for use of insecticides (where given)



Field beans – Seed treatments

- Formulation area treated: 20,195 hectares
- Weight of formulations applied: less than 0.05 tonnes
- 85.2% of the seed remained untreated
- Where specified the only formulation encountered was:

	Formulation area treated (ha)	Weight of formulation applied (kg)	Proportion of seed treatment-treated area	Proportion of June Survey area treated
Fludioxonil	76	2	1.00	<0.05

PESTICIDE USAGE ON SUGAR BEET

Sugar beet

- 102,837 hectares of sugar beet grown in the United Kingdom (England only)
- 1,612,888 treated hectares
- 477.2 tonnes applied
- There were no untreated crops of sugar beet recorded
- Sugar beet received on average 5 herbicide, 2 fungicide, 2 insecticide and 1 molluscicide spray rounds
- The main varieties encountered included BTS 1915, KWS Smart Vesnica, KWS Annatina, Osprey and KWS Katjana

Figure 61 - Usage of pesticides on sugar beet - 2024

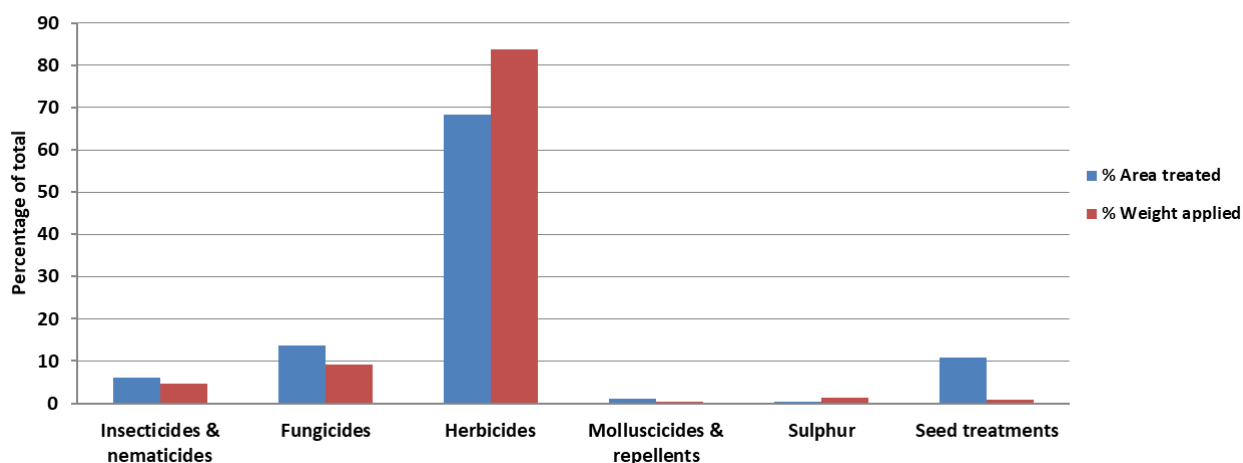
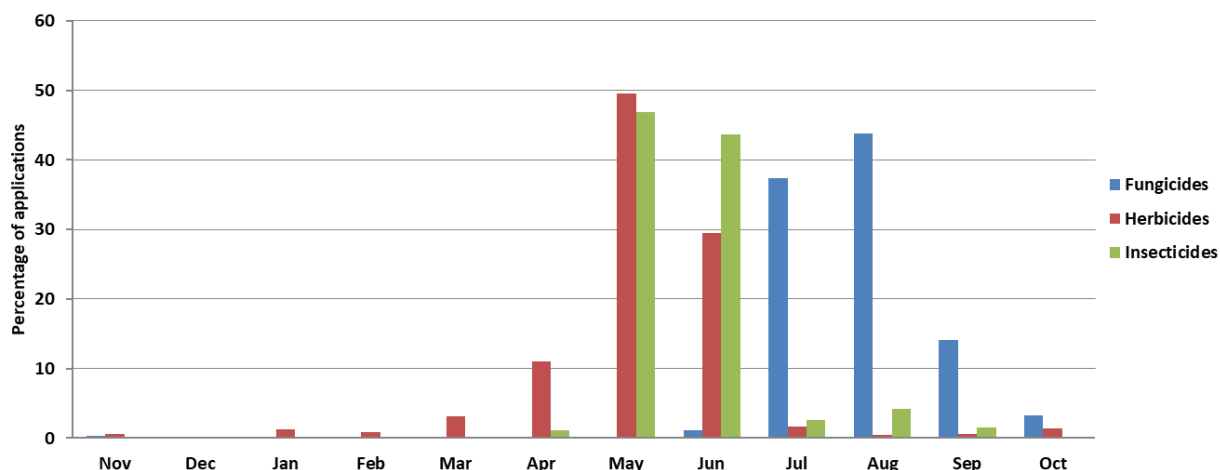


Figure 62 - Timing of pesticide applications on sugar beet: November 2023 - October 2024



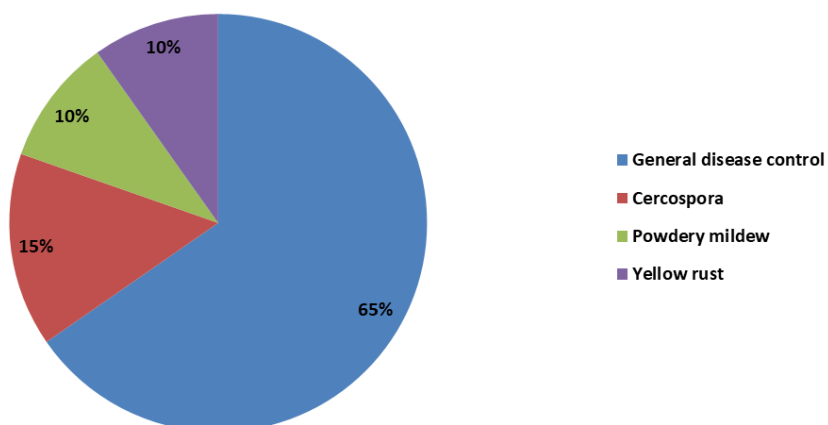
Sugar beet – Fungicides

- Formulation area treated: 218,728 hectares
- Weight of formulations applied: 43.1 tonnes
- The five most common formulations were:

	Formulation area treated (ha)	Weight of formulation applied (kg)	Proportion of fungicide-treated area	Proportion of June Survey area treated	Average number of applications (where applied)	Average proportion of full label rate
Azoxystrobin/difenoconazole	97,163	23,789	0.44	0.77	1.25	0.98
Fluxapyroxad/mefentrifluconazole	90,221	12,726	0.41	0.67	1.30	0.95
Fluopyram/prothioconazole	15,037	3,857	0.07	0.15	1.00	0.85
Copper oxychloride	11,381	2,135	0.05	0.06	1.59	0.80
Trifloxystrobin	4,860	601	0.02	0.05	1.00	0.99

Copper oxychloride would have been used volumetrically, and the rates will vary according to the water volume used.

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



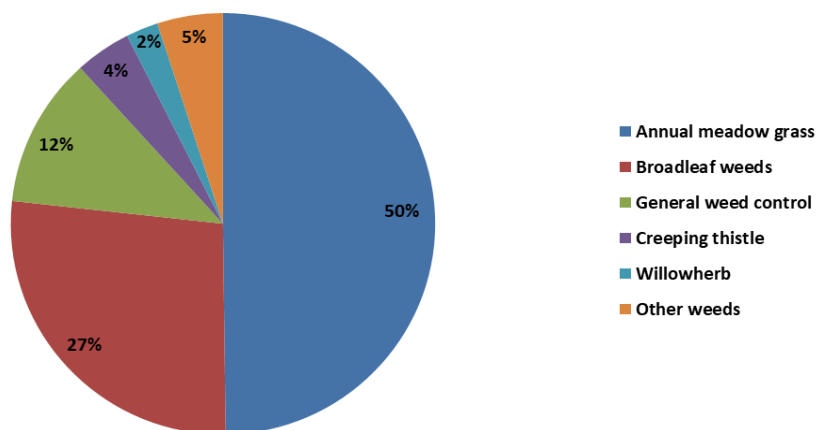
Use of sulphur accounted for 0.3% of the treated area and 1.3% of the weight applied to sugar beet.

Sugar beet – Herbicides

- Formulation area treated: 1,100,342 hectares
- Weight of formulations applied: 400.0 tonnes
- The five most common formulations were:

	Formulation area treated (ha)	Weight of formulation applied (kg)	Proportion of herbicide – treated area	Proportion of June Survey area treated	Average number of applications (where applied)	Average proportion of full label rate
Metamitron	216,036	135,710	0.20	0.80	2.56	0.43
Phenmedipham	156,604	38,069	0.14	0.72	2.10	0.48
Ethofumesate	124,773	25,751	0.11	0.60	1.92	0.37
Ethofumesate/phenmedipham	108,976	46,236	0.10	0.49	2.15	0.74
Triflurosulfuron-methyl	101,831	1,062	0.09	0.64	1.49	0.69

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

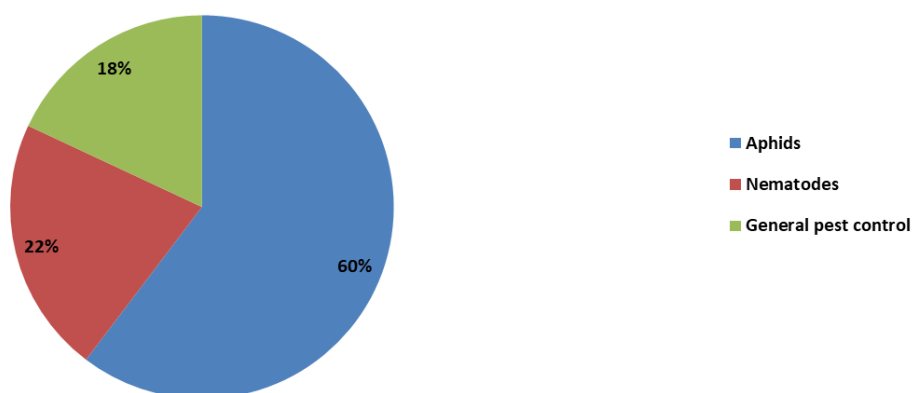


Sugar Beet – Insecticides & nematicides

- **Formulation area treated: 98,186 hectares**
- **Weight of formulations applied: 21.6 tonnes**
- **The five formulations encountered were:**

	Formulation area treated (ha)	Weight of formulation applied (kg)	Proportion of insecticide – treated area	Proportion of June Survey area treated	Average number of applications (where applied)	Average proportion of full label rate
Acetamiprid	45,514	2,264	0.46	0.42	1.07	0.99
Flonicamid	43,515	2,963	0.44	0.42	1.00	0.97
Cypermethrin	3,725	90	0.04	0.04	1.00	0.96
Garlic	3,715	16,316	0.04	0.04	1.00	0.49
Lambda-cyhalothrin	1,716	12	0.02	0.02	1.00	0.91

Figure 65 - Sugar beet - Reasons for use of insecticides (where given)



Sugar beet – Seed treatments

- **Formulation area treated: 175,530 hectares**
- **Weight of formulations applied: 4.4 tonnes**
- **No untreated seed was encountered**
- **The three formulations encountered were:**

	Formulation area treated (ha)	Weight of formulation applied (kg)	Proportion of seed treatment-treated area	Proportion of June Survey area treated
Hymexazol	102,837	2,879	0.59	1.00
Tefluthrin	48,637	486	0.28	0.47
Thiamethoxam	24,056	1,083	0.14	0.23

APPENDIX 1 – ARABLE APPLICATION TABLES

Table 1 Area of arable crops grown in the United Kingdom 2024 (hectares)¹												
	East Midlands	Eastern	London & South East	North East	North West	South West	West Midlands	Yorkshire & the Humber	Wales	Scotland	Northern Ireland	United Kingdom
Wheat ²	269,392	397,260	189,088	56,827	25,987	135,345	135,910	192,137	22,741	98,055	8,309	1,531,051
Winter barley	47,696	85,068	31,241	21,816	12,333	41,385	26,768	59,168	9,039	42,874	8,340	385,727
Spring barley	98,006	120,940	74,279	16,477	27,153	88,255	30,509	67,995	14,974	257,507	13,113	809,208
Oats ²	25,587	26,181	27,493	8,629	4,975	24,267	20,049	11,295	4,190	27,590	1,922	182,178
Rye	4,527	8,958	4,057	732	784	4,073	2,256	4,870	.	6,583	155	36,995
Triticale ²	1,300	1,554	1,159	116	316	1,610	1,762	644	1,806	452	.	10,719
Oilseed rape ²	47,276	51,228	35,544	15,085	3,882	28,209	30,199	38,334	6,005	36,668	1,377	293,807
Linseed ²	3,368	4,960	3,519	91	75	2,592	1,866	1,209	.	49	.	17,729
Ware potatoes	12,117	26,937	2,234	899	4,849	6,045	12,567	14,599	2,799	16,298	3,255	102,599
Seed potatoes	43	505	41	240	4	336	110	1,823	77	12,788	341	16,308
Peas	13,224	32,674	10,950	979	3,458	11,327	8,037	7,206	.	542	.	88,397
Beans ²	33,321	36,118	21,853	4,366	1,554	10,047	10,353	14,105	1,250	2,919	221	136,108
Sugar beet	23,758	66,124	390	180	577	1,336	2,626	7,846	.	.	.	102,837
All arable crops	579,615	858,507	401,848	126,437	85,947	354,827	283,012	421,231	62,881	502,325	37,033	3,713,663

¹Throughout all tables, “.” indicates that there was no recorded area of crops grown or pesticides used

²Includes spring and winter sown crops

Table 2 Treated areas (spray hectares) of arable crops in the United Kingdom 2024 by crop group														
	Wheat	Winter barley	Spring barley	Oats	Rye	Triticale	Oilseed rape	Linseed	Ware potatoes	Seed potatoes	Peas	Beans	Sugar beet	All crops
Insecticides & nematicides	527,807	178,661	82,696	35,869	11,340	834	360,998	5,909	79,443	108,125	149,166	81,190	98,186	1,720,224
Fungicides	9,139,721	1,341,185	2,213,193	380,342	114,607	21,055	828,470	10,799	1,860,199	245,224	128,873	320,351	218,728	16,822,747
Herbicides	6,328,975	1,403,078	2,380,883	409,047	98,768	25,890	1,192,831	57,790	540,779	67,269	381,461	408,443	1,100,342	14,395,556
Growth regulators	3,541,087	693,627	622,326	222,919	80,737	12,849	48,756	.	44,110	.	.	.	.	5,266,411
Molluscicides & repellents	485,969	29,283	24,120	26,200	8,495	834	306,575	272	167,863	6,671	1,911	7,033	15,507	1,080,733
Sulphur	58,469	4,991	6,918	5,694	.	.	1,845	.	.	.	647	1,524	4,595	84,683
Physical control agents	.	.	.	.	.	.	335	.	.	1,970	.	.	.	2,305
Fungicide/growth regulators	.	.	.	.	.	.	57,841	.	.	.	.	.	.	57,841
All seed treatments	1,269,353	338,489	657,418	112,577	28,975	5,532	201,749	6,082	93,784	13,928	26,326	20,195	175,530	2,949,938
All pesticides	21,351,381	3,989,314	5,987,554	1,192,648	342,922	66,994	2,999,400	80,852	2,786,178	443,187	688,384	838,736	1,612,888	42,380,438

Table 2a Weight of pesticides applied (Kg of active substance) to arable crops in the United Kingdom 2024 by crop group														
	Wheat	Winter barley	Spring barley	Oats	Rye	Triticale	Oilseed rape	Linseed	Ware potatoes	Seed potatoes	Peas	Beans	Sugar beet	All crops
Insecticides & nematicides	2,637	891	382	181	57	21	4,773	44	44,101	3,085	6,661	5,124	21,644	89,601
Fungicides	1,565,884	269,720	441,135	57,251	14,427	2,977	115,120	1,533	981,208	135,110	17,746	49,636	43,112	3,694,859
Herbicides	2,938,725	721,011	665,009	151,852	31,926	11,243	662,324	27,717	303,983	25,613	262,568	242,609	400,044	6,444,626
Growth regulators	1,486,279	286,228	153,648	94,269	39,340	2,494	8,800	.	125,498	.	.	.	.	2,196,555
Molluscicides & repellents	53,904	3,132	2,799	2,673	1,091	95	30,073	24	16,005	757	211	734	1,535	113,034
Sulphur	103,630	6,360	15,979	19,993	.	.	2,754	.	.	.	1,805	2,388	6,408	159,316
Physical control agents	.	.	.	.	.	.	282	.	.	4,692	.	.	.	4,974
Fungicide/growth regulators	.	.	.	.	.	.	16,189	.	.	.	.	.	.	16,189
All seed treatments	17,299	3,735	7,815	885	89	28	79	.	11,347	2,042	65	2	4,448	47,835
								.						
All pesticides	6,168,358	1,291,077	1,286,768	327,104	86,930	16,858	840,392	29,318	1,482,142	171,301	289,056	300,493	477,192	12,766,988

Table 3 Usage of pesticides on arable crops in the United Kingdom 2024 - percentage area of crops treated with pesticides							
Crop group	Insecticides & nematicides	Fungicides	Herbicides	Growth regulators	Molluscicides & repellents	Seed treatments	Not treated
Wheat	25.43	98.07	97.03	85.22	19.45	76.92	0.84
Winter barley	36.22	95.24	96.81	80.25	6.10	85.96	0.40
Spring barley	9.59	92.10	95.49	52.70	2.52	81.81	1.98
Oats	17.8	88.70	88.06	67.97	9.85	64.82	4.21
Rye	17.84	87.17	94.34	80.79	13.34	77.43	5.66
Triticale	7.78	71.17	97.04	65.23	7.78	51.61	1.28
Oilseed rape	57.54	91.49	97.13	16.42	57.94	68.85	0.39
Linseed	29.12	43.53	100.00	.	1.70	30.19	.
Ware potatoes	50.22	99.99	97.77	42.28	49.76	91.11	0.01
Seed potatoes	93.75	96.54	94.37	.	26.84	84.74	3.46
Peas	74.09	86.47	99.84	.	2.20	30.34	0.16
Beans	40.86	86.59	93.90	.	4.76	15.87	1.12
Sugar beet	58.54	96.26	100.00	.	12.89	100.00	.
All crops	29.07	94.34	96.29	61.55	16.56	75.03	1.17

Table 4a Usage of pesticides on arable crops in the United Kingdom 2024 - number of spray rounds applied to crops (excluding seed treatments) ¹						
Crop group	Insecticides & nematicides	Fungicides	Herbicides	Growth regulators	Molluscicides & repellents	All pesticides
Wheat	1.2	3.3	3.0	1.8	1.6	6.1
Winter barley	1.3	2.3	2.8	1.7	1.3	4.9
Spring barley	1.1	1.8	2.3	1.4	1.3	3.5
Oats	1.1	1.7	2.0	1.5	1.4	3.7
Rye	1.1	2.3	2.6	2.3	2.3	5.1
Triticale	1.0	1.8	2.1	1.2	1.0	3.4
Oilseed rape	2.1	2.5	3.8	1.0	1.8	7.2
Linseed	1.0	1.1	3.4	.	1.0	4.0
Ware potatoes	1.7	12.0	2.8	1.0	3.9	17.1
Seed potatoes	6.5	9.0	2.1	.	1.9	11.0
Peas	1.9	1.4	3.3	.	1.0	4.9
Beans	1.3	1.9	2.6	.	1.0	4.3
Sugar beet	1.7	2.0	5.1	.	1.4	7.8
All crops	1.5	3.0	2.9	1.7	1.9	5.9

¹Indicates number of passes of application machinery. Each spray round may include multiple products within each chemical group. Parts of a crop may be treated more than once, or one crop may have several different parts visited on different occasions. The number of applications relates only to those crops receiving a treatment with an individual pesticide group. It is important to consider the percentages presented in Table 3 when considering the number of applications in Tables 4a, 4b and 4c

Table 4b Usage of pesticides on arable crops in the United Kingdom 2024 – number of products (other than seed treatments) applied to crops ¹						
Crop group	Insecticides & nematicides	Fungicides	Herbicides	Growth regulators	Molluscicides & repellents	All pesticides
Wheat	1.3	6.3	4.6	2.8	1.6	14.1
Winter barley	1.3	3.8	4.1	2.4	1.3	10.5
Spring barley	1.1	3.1	3.4	1.6	1.3	7.6
Oats	1.1	2.5	2.8	1.9	1.5	6.7
Rye	1.1	3.8	3.4	3.4	2.3	10.6
Triticale	1.0	3.0	2.8	1.4	1.0	7.0
Oilseed rape	2.2	3.3	4.4	1.0	1.8	10.5
Linseed	1.0	1.1	3.7	.	1.0	4.4
Ware potatoes	1.7	19.6	5.1	1.0	3.9	29.2
Seed potatoes	7.6	15.0	3.0	.	1.9	26.9
Peas	2.5	1.9	4.4	.	1.0	7.6
Beans	1.5	2.9	3.5	.	1.1	6.7
Sugar beet	1.7	2.2	12.1	.	1.4	15.4
All crops	1.6	5.3	4.4	2.4	1.9	12.0

Table 4c Usage of pesticides on arable crops in the United Kingdom 2024 – number of active substances (other than seed treatments) applied to crops ¹						
Crop group	Insecticides & nematicides	Fungicides	Herbicides	Growth regulators	Molluscicides & repellents	All pesticides
Wheat	1.3	8.6	6.7	3.2	1.6	18.7
Winter barley	1.3	6.1	5.9	3.2	1.3	15.2
Spring barley	1.1	4.9	4.9	2.2	1.3	11.1
Oats	1.1	3.6	3.8	2.4	1.5	9.0
Rye	1.1	5.0	5.4	4.2	2.3	14.3
Triticale	1.0	3.9	4.3	1.6	1.0	9.5
Oilseed rape	2.2	4.2	5.8	2.0	1.8	13.2
Linseed	1.0	1.1	3.8	.	1.0	4.5
Ware potatoes	1.7	25.2	5.2	1.0	3.9	35.0
Seed potatoes	7.6	18.8	3.1	.	1.9	30.8
Peas	2.5	2.2	5.1	.	1.0	8.5
Beans	1.5	3.6	4.1	.	1.1	8.0
Sugar beet	1.7	4.2	13.8	.	1.4	19.1
All crops	1.6	7.3	6.0	2.9	1.9	16.0

¹Indicates number of passes of application machinery. Parts of a crop may be treated more than once, or one crop may have several different parts visited on different occasions. The number of applications relates only to those crops receiving a treatment with an individual pesticide group. It is important to consider the percentages presented in Table 3 when considering the number of applications in Tables 4a, 4b and 4c

Table 5 Usage of pesticides (spray hectares) on arable crops grown in the United Kingdom 2024¹

	Wheat	Winter barley	Spring barley	Oats	Rye	Triticale	Oilseed rape	Linseed	All potatoes	Peas	Beans	Sugar beet	All crops
Fungicides													
Ametoctradin/potassium phosphonate	.	.	.	.	.	.	.	.	89,911	.	.	.	89,911
Azoxystrobin	597,520	39,826	71,718	60,389	22,041	5,058	107,780	.	58,699	86,028	122,068	.	1,171,126
Azoxystrobin/difenoconazole	.	.	.	.	.	.	5,615	.	.	.	524	97,163	103,302
Benthiavalicarb/oxathiapiprolin	.	.	.	.	.	.	.	.	126,705	.	.	.	126,705
Benzovindiflupyr	280,492	6,822	11,349	.	842	.	.	.	.	.	.	.	299,505
Benzovindiflupyr/prothioconazole	178,501	55,997	85,929	34,436	6,931	5,655	.	.	.	14,455	51,607	.	433,512
Bixafen/fluopyram	106,973	13,867	8,799	.	.	.	.	.	.	.	.	.	129,639
Bixafen/fluopyram/prothioconazole	252,444	89,740	93,915	4,416	.	.	.	.	.	.	.	.	440,515
Bixafen/prothioconazole	41,874	37,044	75,889	717	357	.	30,869	.	.	.	.	.	186,750
Bixafen/prothioconazole/spiroxamine	89,418	60,379	155,112	22,167	.	.	.	.	.	.	.	.	327,076
Boscalid	25,590	.	234	.	.	.	26,784	.	.	.	.	.	52,609
Boscalid/mefentrifluconazole	43,012	.	.	.	.	.	.	.	.	.	.	.	43,012
Bromuconazole/tebuconazole	59,511	.	.	.	842	372	.	.	.	.	.	.	60,725
Copper oxychloride	17,063	2,851	11,193	5,333	.	.	500	.	.	.	.	11,381	48,320
Cyazofamid	.	.	.	.	.	.	.	.	310,791	.	.	.	310,791
Cyflufenamid	42,984	14,916	7,706	25,728	1,597	1,611	.	.	.	.	.	.	94,542
Cymoxanil	.	.	.	.	.	.	.	.	356,850	.	.	.	356,850
Cymoxanil/mancozeb	.	.	.	.	.	.	.	.	75,907	.	.	.	75,907
Cymoxanil/propamocarb hydrochloride	.	.	.	.	.	.	.	.	44,477	.	.	.	44,477
Fenpicoxamid	357,750	.	.	.	.	.	.	.	.	.	.	.	357,750
Fenpicoxamid/prothioconazole	196,923	.	.	.	.	.	.	.	.	.	.	.	196,923
Fluazinam	.	.	.	.	.	.	.	.	125,953	.	.	.	125,953
Fluopicolide/propamocarb hydrochloride	.	.	.	.	.	.	.	.	184,971	.	.	.	184,971
Fluopyram/prothioconazole	.	.	.	.	.	.	22,287	.	14,999	.	.	15,037	52,323
Fluoxastrobin/prothioconazole	128,329	.	.	9,871	3,690	430	.	.	.	.	.	.	142,319
Fluoxastrobin/prothioconazole/trifloxystrobin	282	64,406	92,357	.	.	.	.	.	.	.	.	.	157,045
Fluxapyroxad	213,900	48,622	72,184	6,134	.	118	.	.	11,020	.	.	.	351,978
Fluxapyroxad/mefentrifluconazole	409,687	75,078	95,990	1,523	6,596	300	.	.	.	.	.	90,221	679,396
Fluxapyroxad/metconazole	73,073	4,958	1,141	.	.	.	.	.	.	.	.	.	79,172
Fluxapyroxad/pyraclostrobin	160,245	85,678	110,470	1,689	2,030	.	.	.	.	.	.	.	360,112
Folpet	809,891	234,421	442,366	501	.	.	.	.	.	.	.	.	1,487,178
Isoflucypram	434,350	.	.	.	.	.	.	.	.	.	.	.	434,350
Laminarin	55,282	.	.	.	.	.	.	.	.	.	.	.	55,282
Mancozeb	32,988	635	.	158	.	.	.	.	358,435	.	.	.	392,216
Mandipropamid	.	.	.	.	.	.	.	.	149,857	.	.	.	149,857
Mefentrifluconazole	165,320	1,216	21,934	1,087	.	.	.	.	.	.	.	65	189,622
Mefentrifluconazole/pyraclostrobin	215,790	5,251	14,439	1,035	.	.	.	.	.	.	.	.	236,515
Metconazole	18,566	.	.	.	.	.	16,740	2,578	.	23,216	4,125	.	65,224
Prochloraz/tebuconazole	51,850	.	.	.	.	.	.	.	.	.	.	.	51,850
Prothioconazole	975,063	205,659	333,880	39,912	7,032	.	261,544	.	.	.	.	.	1,823,089
Prothioconazole/spiroxamine	40,861	24,438	40,049	8,395	.	.	.	.	.	.	.	.	113,743
Prothioconazole/spiroxamine/tebuconazole	119,908	13,355	9,613	19,319	201	.	.	.	.	.	.	.	162,396
Prothioconazole/tebuconazole	723,095	34,188	110,596	12,292	8,071	.	110,991	.	.	.	.	.	999,232
Prothioconazole/trifloxystrobin	48,674	65,111	142,768	.	842	.	.	.	.	.	.	.	257,395

Table 5 (cont.) Usage of pesticides (spray hectares) on arable crops grown in the United Kingdom 2024													
	Wheat	Winter barley	Spring barley	Oats	Rye	Triticale	Oilseed rape	Linseed	All potatoes	Peas	Beans	Sugar beet	All crops
Fungicides (cont.)													
Pydiflumetofen	129,154	3,478	16,254	.	.	.	.	.	.	.	.	.	148,885
Pyraclostrobin	200,583	43,063	78,070	27,231	3,143	.	.	.	.	.	.	.	352,089
Tebuconazole	1,753,404	37,404	26,396	87,043	50,393	7,511	106,395	5,643	.	2,749	106,012	.	2,182,949
Trifloxystrobin	1,151	45,847	62,155	.	.	.	.	.	.	.	.	4,860	114,013
Other fungicides ²	88,222	26,936	20,689	10,967	.	.	138,967	2,578	196,847	2,426	36,015	.	523,648
All fungicides	9,139,721	1,341,18	2,213,193	380,342	114,607	21,055	828,471	10,799	2,105,422	128,873	320,351	218,728	16,822,746
Sulphur													
Sulphur	58,470	4,298	6,355	4,545	.	.	1,225	.	.	647	757	2,757	79,053
Other sulphur ³	.	693	563	1,149	.	.	620	.	.	.	768	1,838	5,631
All sulphur	58,470	4,991	6,918	5,694	.	.	1,845	.	.	647	1,524	4,595	84,683

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

²Other fungicides include ametoctradin, ametoctradin/dimethomorph, amisulbrom, amisulbrom/mandipropamid, amisulbrom/oxathiapiprolin, azoxystrobin/fluazinam, azoxystrobin/folpet, azoxystrobin/tebuconazole, benthiavalicarb, bixafen, bixafen/fluoxastrobin/prothioconazole, bixafen/prothioconazole/tebuconazole, bixafen/spiroxamine/trifloxystrobin, boscalid/dimoxystrobin, boscalid/metconazole, boscalid/pyraclostrobin, cymoxanil/mandipropamid, cymoxanil/zoaxamide, cyprodinil, cyprodinil/isopyrazam, difenoconazole, difenoconazole/mandipropamid, difenoconazole/paclobutrazol, dimethomorph, dimethomorph/propamocarb hydrochloride, dimethomorph/zoaxamide, fenpropidin, fluazinam/valifenalate, fluoxastrobin/tebuconazole, flutriafol, isofetamid, mancozeb/metalaxyl-M, metalaxyl-M, metrafenone, prochloraz, proquinazid and unspecified fungicides

³Other sulphur includes ammonium thiosulphate

Table 5 (cont.) Usage of pesticides (spray hectares) on arable crops grown in the United Kingdom 2024

	Wheat	Winter barley	Spring barley	Oats	Rye	Triticale	Oilseed rape	Linseed	All potatoes	Peas	Beans	Sugar beet	All crops
Herbicides													
Aclonifen	202,229	16,939	757	.	.	.	.	.	61,008	17,636	17,313	.	315,882
Amidosulfuron/iodosulfuron-methyl- sodium/mesosulfuron-methyl	135,955	164	.	.	.	.	.	.	.	.	.	.	136,118
Aminopyralid/propyzamide	.	.	.	.	.	.	173,659	.	.	.	.	.	173,659
Carfentrazone-ethyl	.	.	118	.	.	.	.	.	124,995	.	.	746	125,858
Chlorotoluron/diflufenican/pendimethalin	38,510	24,686	11,663	.	3,586	.	.	.	.	.	.	.	78,445
Cinmethylin	276,184	.	5,332	.	.	.	.	.	.	.	.	.	281,516
Clethodim	.	.	.	.	.	.	102,814	9,567	.	4,637	4,456	37,407	158,882
Clodinafop-propargyl	150,601	.	.	.	1,849	1,286	.	.	.	.	.	.	153,736
Clomazone	.	.	.	.	.	.	48,301	.	21,981	57,452	66,876	.	194,610
Clopyralid	8,349	.	3,503	710	.	.	10,140	4,545	.	.	.	87,260	114,505
Cycloxydim	.	.	.	.	.	.	5,173	.	850	26,005	25,819	484	58,330
Diflufenican	261,963	53,411	19,651	7,574	3,058	865	.	.	.	.	.	.	346,522
Diflufenican/flufenacet	695,024	191,607	152,568	2,154	13,973	2,416	1,375	.	.	.	957	.	1,060,074
Diflufenican/flufenacet/metribuzin	91,479	43,774	.	.	.	.	.	.	.	.	.	.	135,253
Ethofumesate	2,147	.	.	.	.	.	.	.	.	.	.	124,773	126,920
Ethofumesate/phenmedipham	.	.	.	.	.	.	.	.	.	.	.	108,976	108,976
Fenoxaprop-P-ethyl	7,215	3,367	59,227	.	.	.	.	.	.	.	.	.	69,809
Florasulam	92,636	24,100	18,971	16,889	.	.	.	.	.	.	.	.	152,595
Florasulam/fluroxypyr	81,988	19,030	33,249	5,433	259	182	.	.	.	.	.	.	140,141
Florasulam/halauxifen-methyl	136,016	38,759	108,599	2,049	5,894	173	.	.	.	.	.	.	291,490
Florasulam/pyroxsulam	167,500	.	.	.	7,961	427	.	.	.	.	.	.	175,888
Florasulam/tribenuron-methyl	42,425	18,960	47,710	57,954	3,978	.	.	.	.	.	.	.	171,028
Fluazifop-P-butyl	.	.	.	.	.	.	48,661	1,607	.	4,202	10,870	3,155	68,495
Flufenacet	128,205	39,150	13,715	.	920	.	.	.	.	.	.	.	181,990
Flufenacet/pendimethalin	105,476	53,426	126	.	823	601	.	.	.	.	.	.	160,452
Flufenacet/picolinafen	121,017	39,027	71	.	1,965	.	.	.	.	.	.	.	162,080
Fluroxypyr	419,008	73,219	301,371	59,608	4,391	555	.	.	.	.	.	.	858,152
Fluroxypyr/halauxifen-methyl	71,613	8,786	142,508	4,555	1,369	.	.	.	.	.	.	.	228,830
Glyphosate	1,011,474	258,608	404,699	123,415	11,113	8,094	319,784	16,787	64,557	124,204	121,891	98,881	2,563,507
Halauxifen-methyl/picloram	.	.	.	.	.	.	62,402	.	.	.	.	.	62,402
Imazamox/pendimethalin	.	.	.	.	.	.	61	.	.	60,009	56,901	.	116,971
Iodosulfuron-methyl-sodium/mesosulfuron- methyl	188,349	.	.	.	2,850	1,064	.	.	.	.	.	.	192,262
Iodosulfuron-methyl-sodium/mesosulfuron- methyl/thiencarbazone-methyl	78,764	.	.	.	.	2,773	.	.	.	.	.	.	81,537
Lenacil	.	.	.	.	.	.	.	.	.	.	.	71,155	71,155
MCPA	25,551	1,709	18,453	1,165	.	.	.	.	.	.	544	.	47,421

Table 5 (cont.) Usage of pesticides (spray hectares) on arable crops grown in the United Kingdom 2024													
	Wheat	Winter barley	Spring barley	Oats	Rye	Triticale	Oilseed rape	Linseed	All potatoes	Peas	Beans	Sugar beet	All crops
Herbicides (cont.)													
Mecoprop-P	55,617	6,522	66,435	37,159	.	.	.	.	.	.	.	.	165,733
Metamitron	.	.	.	.	.	.	.	.	.	.	.	216,036	216,036
Metazachlor	.	.	.	.	.	.	51,068	.	.	.	13	.	51,081
Metribuzin	.	.	.	.	.	.	.	.	86,525	.	.	.	86,525
Metsulfuron-methyl	183,473	36,285	91,323	16,939	87	946	.	12,107	.	.	.	.	341,159
Metsulfuron-methyl/thifensulfuron-methyl	147,965	34,567	214,127	3,736	.	340	.	.	.	.	.	.	400,734
Metsulfuron-methyl/tribenuron-methyl	223,485	38,264	128,101	15,888	15,836	3,154	.	.	.	.	.	.	424,727
Pendimethalin	334,684	74,743	49,197	705	9,709	1,098	.	.	26,576	20,390	5,109	.	522,212
Pendimethalin/picolinafen	135,291	56,399	28,255	.	1,398	372	.	.	.	.	.	.	221,714
Phenmedipham	.	.	.	.	.	.	.	.	.	.	.	156,604	156,604
Pinoxaden	35,580	82,378	191,821	.	.	.	.	.	.	.	.	.	309,779
Propaquizafop	.	.	.	.	.	.	133,043	1,553	2,740	11,637	27,315	25,816	202,104
Propyzamide	.	.	.	.	.	.	67,583	.	.	.	30,745	.	98,328
Prosulfocarb	163,596	29,703	298	.	.	601	.	2,578	31,636	.	.	.	228,412
Pyraflufen-ethyl	716	6,604	.	.	842	.	.	.	111,688	.	.	.	119,850
Thifensulfuron-methyl/tribenuron-methyl	72,513	25,745	164,359	23,095	1,531	.	.	.	.	.	.	.	287,242
Tri-allate	211,146	73,182	19,958	.	863	.	.	1,884	.	.	.	.	307,032
Triflusaluron-methyl	.	.	.	.	.	.	.	.	.	.	.	101,831	101,831
Other herbicides & desiccants	225,230	29,966	84,721	30,020	4,513	946	168,767	7,163	75,494	55,288	39,633	67,219	788,961
All herbicides & desiccants	6,328,974	1,403,078	2,380,883	409,047	98,768	25,890	1,192,831	57,790	608,048	381,461	408,442	1,100,342	14,395,555

¹Other herbicides include 2,4-D, 2,4-D/glyphosate, 2,4-D/MCPA, amidosulfuron, amidosulfuron/iodosulfuron-methyl-sodium, aminopyralid/metazachlor/picloram, bentazone, bifenox, carfentrazone-ethyl/mecoprop-P, clomazone/metazachlor, clomazone/pendimethalin, clopyralid/florasulam/fluroxypyr, clopyralid/halauxifen-methyl, clopyralid/picloram, dicamba/MCPA/mecoprop-P, dicamba/mecoprop-P, dichlorprop-P/MCPA/mecoprop-P, diflufenican/iodosulfuron-methyl-sodium/mesosulfuron-methyl, diflufenican/pendimethalin, dimethenamid-P/metazachlor, dimethenamid-P/metazachlor/quinmerac, dimethenamid-P/quinmerac, ethofumesate/metamitron, flufenacet/metribuzin, fluroxypyr/metsulfuron-methyl, foramsulfuron/thiencarbazon-methyl, halauxifen-methyl/pyroxsulam, imazamox/metazachlor, imazamox/quinmerac, lenacil/triflusaluron-methyl, MCPB, mesosulfuron-methyl/propoxycarbazon-sodium, mesosulfuron-methyl/thiencarbazon-methyl, mesotrione, metamitron/quinmerac, metazachlor/napropamide/quinmerac, metazachlor/quinmerac, metobromuron, pyroxsulam, quizalofop-ethyl, quizalofop-P-ethyl, quizalofop-P-tefuryl, rimsulfuron, sulfosulfuron, thifensulfuron-methyl, thifensulfuron-methyl/tribenuron methyl, tribenuron-methyl and unspecified herbicides

Table 5 (cont.) Usage of pesticides (spray hectares) on arable crops grown in the United Kingdom 2024													
	Wheat	Winter barley	Spring barley	Oats	Rye	Triticale	Oilseed rape	Linseed	All potatoes	Peas	Beans	Sugar beet	All crops
Insecticides & nematicides													
Acetamiprid	.	.	.	.	.	.	4,599	.	40,636	.	.	45,514	90,750
Esfenvalerate	58,085	40,406	7,053	.	.	.	.	.	32,483	569	2,830	.	141,426
Flonicamid	716	.	.	.	.	.	3,525	.	23,192	681	.	43,516	71,628
Lambda-cyhalothrin	461,610	137,283	74,861	35,869	11,340	.	294,111	5,909	58,207	96,399	36,752	1,716	1,214,059
Pirimicarb	.	.	.	.	.	.	.	.	.	51,517	39,944	.	91,462
Tau-fluvalinate	3,115	972	457	.	.	.	46,348	.	.	.	.	.	50,891
Other insecticides & nematicides	4,281	.	325	.	.	834	12,415	.	33,050	.	1,664	7,440	60,009
All insecticides & nematicides	527,807	178,661	82,696	35,869	11,340	834	360,998	5,909	187,567	149,166	81,190	98,186	1,720,224
Molluscicides & repellents									.				
Ferric phosphate	485,969	29,283	24,120	26,200	8,495	834	306,575	272	174,534	1,911	7,033	15,507	1,080,733
All molluscicides and repellents	485,969	29,283	24,120	26,200	8,495	834	306,575	272	174,534	1,911	7,033	15,507	1,080,733
Physical control agents													
Garlic/sulphur	.	.	.	.	.	.	335	.	.	.	.	.	335
Paraffin oil (CAS 72623-86-0)	.	.	.	.	.	.	.	.	1,970	.	.	.	1,970
All physical control agents	.	.	.	.	.	.	335	.	1,970	.	.	.	2,305

¹Other insecticides and nematicides include cypermethrin, deltamethrin, fluopyram, fosthiazate, garlic, indoxacarb, spirotetramat and unspecified insecticides

Table 5 (cont.) Usage of pesticides (spray hectares) on arable crops grown in the United Kingdom 2024													
	Wheat	Winter barley	Spring barley	Oats	Rye	Triticale	Oilseed rape	Linseed	All potatoes	Peas	Beans	Sugar beet	All crops
Growth regulators													
2-chloroethylphosphonic acid	94,403	32,368	62,727	30	1,101	.	.	.	.	.	.	.	190,629
2-chloroethylphosphonic acid/mepiquat	97,719	59,838	73,554	.	7,943	.	.	.	.	.	.	.	239,053
Chlormequat	1,687,292	255,807	142,867	101,536	37,093	2,555	.	.	.	.	.	.	2,227,150
Chlormequat/2-chloroethylphosphonic acid	45,166	22,212	34,439	.	.	.	.	.	.	.	.	.	101,817
Maleic hydrazide	.	.	.	.	.	.	.	.	43,639	.	.	.	43,639
Mepiquat chloride/metconazole	.	.	.	.	.	.	45,659	.	.	.	.	.	45,659
Mepiquat chloride/prohexadione-calcium	147,700	70,170	77,328	49,804	2,935	552	.	.	.	.	.	.	348,489
Prohexadione-calcium/trinexapac-ethyl	129,946	33,993	37,060	15,862	6,207	.	.	.	.	.	.	.	223,068
Trinexapac-ethyl	1,311,497	213,999	185,382	47,453	24,822	9,742	3,097	.	.	.	.	.	1,795,993
Other growth regulators ¹	27,364	5,241	8,970	8,233	636	.	.	.	471	.	.	.	50,914
All growth regulators	3,541,087	693,627	622,326	222,919	80,738	12,849	48,756	.	44,110	.	.	.	5,266,411
Other fungicide/growth regulators²	.	.	.	.	.	.	57,841	.	.	.	.	.	57,777

¹Other growth regulators include 2-chloroethylphosphonic acid/mepiquat chloride, chlormequat chloride, chlormequat chloride/2-chloroethylphosphonic acid, prohexadione-calcium and unspecified growth regulators

²Other fungicide/growth regulators include mepiquat chloride/prohexadione-calcium/pyraclostrobin

Table 5 (cont.) Usage of pesticides (spray hectares) on arable crops grown in the United Kingdom 2024

	Wheat	Winter barley	Spring barley	Oats	Rye	Triticale	Oilseed rape	Linseed	All potatoes	Peas	Beans	Sugar beet	All crops
Seed treatments													
Fungicide seed treatments													
<i>Bacillus amyloliquefaciens</i> strain MBI 600 ¹	.	.	.	.	.	.	90,160	.	.	.	.	.	90,160
Fludioxonil	428,535	38,996	72,818	46,626	4,975	.	.	.	20,910	2,562	76	.	615,499
Fludioxonil/sedaxane	145,403	11,544	16,909	13,848	645	834	.	.	.	.	.	.	189,182
Fluopyram/prothioconazole/tebuconazole	.	43,214	.	.	.	.	.	.	.	.	.	.	43,214
Hymexazol	.	.	.	.	.	.	.	.	.	.	.	102,837	102,837
Imazalil/ipconazole	30,983	92,738	300,854	.	.	.	.	.	.	.	.	.	424,576
Prothioconazole	31,122	12,303	9,241	980	1,646	.	.	.	.	.	.	.	55,291
Prothioconazole/tebuconazole	119,055	22,650	99,276	15,318	2,515	372	.	.	.	.	.	.	259,186
Silthiofam	96,208	8,285	.	.	.	.	.	.	.	.	.	.	104,493
Insecticide seed treatments													
Tefluthrin	.	.	.	.	.	.	.	.	.	.	.	48,637	48,637
Unspecified seed treatments	335,099	84,165	143,572	33,221	18,398	3,892	107,988	6,082	31,163	23,629	20,119	.	807,328
Other seed treatments ²	61,734	20,192	8,292	509	796	435	479	.	54,345	.	.	24,056	170,838
All seed treatments	1,269,353	338,489	657,418	112,577	28,975	5,532	201,749	6,082	107,712	26,326	20,195	175,530	2,949,939

¹This active substance may also have insecticidal properties as a result of the stimulation of plant natural defences

²Other seed treatments include cyantraniliprole, cypermethrin, thiamethoxam, difenoconazole/fludioxonil, difenoconazole/fludioxonil/tebuconazole, fludioxonil/fluxapyroxad/triticonazole, fludioxonil/tebuconazole, flutolanil, imazalil and ipconazole

Table 6 Usage of pesticides (kg of active substances applied) on arable crops grown in the United Kingdom 2024 ¹													
	Wheat	Winter barley	Spring barley	Oats	Rye	Triticale	Oilseed rape	Linseed	All potatoes	Peas	Beans	Sugar beet	All crops
Fungicides													
Ametoctradin/potassium phosphonate	.	.	.	.	.	.	.	.	150,151	.	.	.	150,151
Azoxystrobin	74,258	5,468	7,863	7,443	3,106	636	15,768	.	12,221	14,102	17,986	.	158,851
Azoxystrobin/difenoconazole	.	.	.	.	.	.	1,071	.	.	.	22	23,790	24,883
Benthiavalicarb/oxathiapiprolin	.	.	.	.	.	.	.	.	4,957	.	.	.	4,957
Benzovindiflupyr	13,725	353	482	.	52	.	.	.	.	.	.	.	14,612
Benzovindiflupyr/prothioconazole	28,630	8,187	10,208	4,901	1,030	719	.	.	.	1,855	6,748	.	62,277
Bixafen/fluopyram	14,898	1,491	677	.	.	.	.	.	.	.	.	.	17,066
Bixafen/fluopyram/prothioconazole	64,615	17,160	14,808	660	.	.	.	.	.	.	.	.	97,243
Bixafen/prothioconazole	6,508	4,515	9,352	113	85	.	4,811	.	.	.	.	.	25,385
Bixafen/prothioconazole/spiroxamine	39,743	19,168	42,433	6,918	.	.	.	.	.	.	.	.	108,262
Boscalid	4,970	.	6	.	.	.	3,652	.	.	.	.	.	8,629
Boscalid/mefentrifluconazole	12,211	.	.	.	.	.	.	.	.	.	.	.	12,211
Bromuconazole/tebuconazole	12,542	.	.	.	187	122	.	.	.	.	.	.	12,851
Copper oxychloride	2,972	404	1,695	2,567	.	.	34	.	.	.	.	2,135	9,806
Cyazofamid	.	.	.	.	.	.	.	.	24,452	.	.	.	24,452
Cyflufenamid	320	120	57	214	8	8	.	.	.	.	.	.	727
Cymoxanil	.	.	.	.	.	.	.	.	35,398	.	.	.	35,398
Cymoxanil/mancozeb	.	.	.	.	.	.	.	.	100,284	.	.	.	100,284
Cymoxanil/propamocarb hydrochloride	.	.	.	.	.	.	.	.	45,766	.	.	.	45,766
Fenpicoxamid	20,581	.	.	.	.	.	.	.	.	.	.	.	20,581
Fenpicoxamid/prothioconazole	29,350	.	.	.	.	.	.	.	.	.	.	.	29,350
Fluazinam	.	.	.	.	.	.	.	.	24,111	.	.	.	24,111
Fluopicolide/propamocarb hydrochloride	.	.	.	.	.	.	.	.	197,246	.	.	.	197,246
Fluopyram/prothioconazole	.	.	.	.	.	.	4,713	.	1,864	.	.	3,857	10,434
Fluoxastrobin/prothioconazole	18,727	.	.	1,377	156	66	.	.	.	.	.	.	20,326
Fluoxastrobin/prothioconazole/trifloxystrobin	45	10,358	12,669	.	.	.	.	.	.	.	.	.	23,072
Fluxapyroxad	9,010	1,849	2,561	256	.	7	.	.	2,645	.	.	.	16,328
Fluxapyroxad/mefentrifluconazole	58,584	7,520	8,695	180	261	45	.	.	.	.	.	12,726	88,010
Fluxapyroxad/metconazole	6,862	298	123	.	.	.	.	.	.	.	.	.	7,283
Fluxapyroxad/pyraclostrobin	20,470	9,394	10,665	239	321	.	.	.	.	.	.	.	41,088
Folpet	402,348	118,656	218,484	421	.	.	.	.	.	.	.	.	739,909
Isoflucypram	21,911	.	.	.	.	.	.	.	.	.	.	.	21,911
Laminarin	1,589	.	.	.	.	.	.	.	.	.	.	.	1,589
Mancozeb	27,592	638	.	119	.	.	.	.	448,996	.	.	.	477,345
Mandipropamid	.	.	.	.	.	.	.	.	21,927	.	.	.	21,927
Mefentrifluconazole	13,495	81	1,039	58	.	.	.	.	.	.	.	4	14,677
Mefentrifluconazole/pyraclostrobin	38,548	633	1,575	180	.	.	.	.	.	.	.	.	40,936
Metconazole	744	.	.	.	.	.	595	86	.	932	266	.	2,622
Prochloraz/tebuconazole	17,185	.	.	.	.	.	.	.	.	.	.	.	17,185
Prothioconazole	116,175	23,009	34,327	4,196	743	.	28,210	.	.	.	.	.	206,661
Prothioconazole/spiroxamine	13,801	5,587	9,628	2,373	.	.	.	.	.	.	.	.	31,389
Prothioconazole/spiroxamine/tebuconazole	41,824	3,670	2,544	6,778	41	.	.	.	.	.	.	.	54,857
Prothioconazole/tebuconazole	125,887	4,941	13,117	2,105	884	.	17,429	.	.	.	.	.	164,362
Prothioconazole/trifloxystrobin	8,847	10,655	20,702	.	156	.	.	.	.	.	.	.	40,360

Table 6 (cont.) Usage of pesticides (kg of active substances applied) on arable crops grown in the United Kingdom 2024													
	Wheat	Winter barley	Spring barley	Oats	Rye	Triticale	Oilseed rape	Linseed	All potatoes	Peas	Beans	Sugar beet	All crops
Fungicides (cont.)													
Pydiflumetofen	12,624	260	1,165	.	.	.	.	.	.	.	.	.	14,048
Pyraclostrobin	15,867	3,001	4,672	2,484	474	.	.	.	.	.	.	.	26,498
Tebuconazole	252,977	4,663	3,056	13,361	6,924	1,375	16,041	1,299	.	366	16,698	.	316,760
Trifloxystrobin	65	4,263	5,070	.	.	.	.	.	.	.	.	601	9,999
Other fungicides ²	15,384	3,379	3,463	309	.	.	22,795	148	46,299	491	7,916	.	100,185
All fungicides	1,565,883	269,720	441,136	57,251	14,427	2,977	115,119	1,533	1,116,318	17,746	49,636	43,112	3,694,858
Sulphur													
Sulphur	103,630	6,007	15,692	18,528	.	.	2,121	.	.	1,805	1,703	4,298	153,783
Other sulphur ³	.	354	287	1,465	.	.	633	.	.	.	685	2,110	5,532
All sulphur	103,630	6,360	15,979	19,993	.	.	2,754	.	.	1,805	2,388	6,408	159,316

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

²Other fungicides include ametoctradin, ametoctradin/dimethomorph, amisulbrom, amisulbrom/mandipropamid, amisulbrom/oxathiapiprolin, azoxystrobin/fluazinam, azoxystrobin/folpet, azoxystrobin/tebuconazole, benthiavalicarb, bixafen, bixafen/fluoxastrobin/prothioconazole, bixafen/prothioconazole/tebuconazole, bixafen/spiroxamine/trifloxystrobin, boscalid/dimoxystrobin, boscalid/metconazole, boscalid/pyraclostrobin, cymoxanil/mandipropamid, cymoxanil/zoxamide, cyprodinil, cyprodinil/isopyrazam, difenoconazole, difenoconazole/mandipropamid, difenoconazole/paclobutrazol, dimethomorph, dimethomorph/propamocarb hydrochloride, dimethomorph/zoxamide, fenpropidin, fluazinam/valifenalate, fluoxastrobin/tebuconazole, flutriafol, isofetamid, mancozeb/metalaxyl-M, metalaxyl-M, metrafenone, prochloraz, proquinazid and unspecified fungicides

³Other sulphur includes ammonium thiosulphate

Table 6 (cont.) Usage of pesticides (kg of active substances applied) on arable crops grown in the United Kingdom 2024													
	Wheat	Winter barley	Spring barley	Oats	Rye	Triticale	Oilseed rape	Linseed	All potatoes	Peas	Beans	Sugar beet	All crops
Herbicides													
Aclonifen	163,887	10,032	636	.	.	.	.	.	61,406	14,165	13,436	.	263,562
Amidosulfuron/iodosulfuron-methyl- sodium/mesosulfuron-methyl	5,867	7	.	.	.	.	.	.	.	.	.	.	5,874
Aminopyralid/propyzamide	.	.	.	.	.	.	145,622	.	.	.	.	.	145,622
Carfentrazone-ethyl	.	.	2	.	.	.	.	.	5,571	.	.	15	5,587
Chlorotoluron/diflufenican/pendimethalin	43,044	23,904	12,961	.	3,681	.	.	.	.	.	.	.	83,590
Cinmethylin	128,221	.	2,437	.	.	.	.	.	.	.	.	.	130,658
Clethodim	.	.	.	.	.	.	12,065	902	.	546	542	4,549	18,604
Clodinafop-propargyl	5,269	.	.	.	86	39	.	.	.	.	.	.	5,393
Clomazone	.	.	.	.	.	.	3,568	.	1,166	4,298	5,245	.	14,277
Clopyralid	495	.	229	50	.	.	1,281	444	.	.	.	8,598	11,097
Cycloxydim	.	.	.	.	.	.	978	.	207	5,129	4,748	97	11,160
Diflufenican	17,679	3,576	1,049	711	182	52	.	.	.	.	.	.	23,250
Diflufenican/flufenacet	176,258	44,277	21,911	375	3,823	770	368	.	.	.	239	.	248,020
Diflufenican/flufenacet/metribuzin	21,448	10,790	.	.	.	.	.	.	.	.	.	.	32,238
Ethofumesate	260	.	.	.	.	.	.	.	.	.	.	25,751	26,010
Ethofumesate/phenmedipham	.	.	.	.	.	.	.	.	.	.	.	46,236	46,236
Fenoxaprop-P-ethyl	470	230	3,134	.	.	.	.	.	.	.	.	.	3,833
Florasulam	411	118	61	53	.	.	.	.	.	.	.	.	642
Florasulam/fluroxypyr	7,241	1,529	2,506	385	22	19	.	.	.	.	.	.	11,701
Florasulam/halauxifen-methyl	1,043	321	783	12	45	2	.	.	.	.	.	.	2,206
Florasulam/pyroxsulam	3,591	.	.	.	147	10	.	.	.	.	.	.	3,747
Florasulam/tribenuron-methyl	728	313	803	994	78	.	.	.	.	.	.	.	2,916
Fluazifop-P-butyl	.	.	.	.	.	.	4,174	212	.	589	1,328	311	6,614
Flufenacet	19,797	6,773	1,778	.	159	.	.	.	.	.	.	.	28,507
Flufenacet/pendimethalin	124,009	58,681	102	.	181	432	.	.	.	.	.	.	183,405
Flufenacet/picolinafen	25,719	8,588	18	.	342	.	.	.	.	.	.	.	34,667
Fluroxypyr	52,646	9,991	34,600	6,809	624	68	.	.	.	.	.	.	104,737
Fluroxypyr/halauxifen-methyl	7,537	1,044	15,031	448	160	.	.	.	.	.	.	.	24,220
Glyphosate	827,083	197,261	343,036	102,064	8,071	6,635	355,000	15,866	64,686	116,075	108,694	93,638	2,238,109
Halauxifen-methyl/picloram	.	.	.	.	.	.	1,146	.	.	.	.	.	1,146
Imazamox/pendimethalin	.	.	.	.	.	.	73	.	.	52,184	46,660	.	98,917
Iodosulfuron-methyl-sodium/mesosulfuron- methyl	2,607	.	.	.	34	15	.	.	.	.	.	.	2,656
Iodosulfuron-methyl-sodium/mesosulfuron- methyl/thiencarbazone-methyl	1,859	.	.	.	.	42	.	.	.	.	.	.	1,902
Lenacil	.	.	.	.	.	.	.	.	.	.	.	9,911	9,911
MCPA	19,705	1,868	18,533	698	.	.	.	.	.	.	1,019	.	41,823

Table 6 (cont.) Usage of pesticides (kg of active substances applied) on arable crops grown in the United Kingdom 2024

	Wheat	Winter barley	Spring barley	Oats	Rye	Triticale	Oilseed rape	Linseed	All potatoes	Peas	Beans	Sugar beet	All crops
Herbicides (cont.)													
Mecoprop-P	35,555	4,612	42,445	22,261	.	.	.	.	.	.	.	.	104,873
Metamitron	.	.	.	.	.	.	.	.	.	.	.	135,710	135,710
Metazachlor	.	.	.	.	.	.	30,942	.	.	.	10	.	30,952
Metribuzin	.	.	.	.	.	.	.	.	31,118	.	.	.	31,118
Metsulfuron-methyl	821	175	396	78	<1	2	.	67	.	.	.	.	1,540
Metsulfuron-methyl/thifensulfuron-methyl	5,014	1,011	6,505	153	.	5	.	.	.	.	.	.	12,689
Metsulfuron-methyl/tribenuron-methyl	2,217	379	1,288	145	160	37	.	.	.	.	.	.	4,226
Pendimethalin	301,612	71,019	40,731	386	8,290	1,279	.	.	24,341	20,394	5,159	.	473,211
Pendimethalin/picolinafen	109,468	42,448	20,351	.	1,235	376	.	.	.	.	.	.	173,878
Phenmedipham	.	.	.	.	.	.	.	.	.	.	.	38,069	38,069
Pinoxaden	1,464	3,318	6,292	.	.	.	.	.	.	.	.	.	11,074
Propaquizafop	.	.	.	.	.	.	8,247	139	314	917	2,508	2,176	14,301
Propyzamide	.	.	.	.	.	.	40,968	.	.	.	24,691	.	65,660
Prosulfocarb	341,713	58,453	476	.	.	1,441	.	6,187	74,195	.	.	.	482,465
Pyraflufen-ethyl	3	40	.	.	4	.	.	.	1,608	.	.	.	1,655
Thifensulfuron-methyl/tribenuron-methyl	2,615	817	4,491	519	53	.	.	.	.	.	.	.	8,495
Tri-allate	430,661	143,812	40,796	.	1,941	.	.	3,291	.	.	.	.	620,500
Triflusalufuron-methyl	.	.	.	.	.	.	.	.	.	.	.	1,062	1,062
Other herbicides & desiccants	50,712	15,626	41,626	15,712	2,609	19	57,891	610	64,985	48,272	28,328	33,923	360,313
All herbicides & desiccants	2,938,725	721,012	665,009	151,852	31,925	11,243	662,324	27,717	329,596	262,568	242,609	400,045	6,444,626

¹Other herbicides include 2,4-D, 2,4-D/glyphosate, 2,4-D/MCPA, amidosulfuron, amidosulfuron/iodosulfuron-methyl-sodium, aminopyralid/metazachlor/picloram, bentazone, bifenox, carfentrazone-ethyl/mecoprop-P, clomazone/metazachlor, clomazone/pendimethalin, clopyralid/florasulam/fluroxypyr, clopyralid/haloxifen-methyl, clopyralid/picloram, dicamba/MCPA/mecoprop-P, dicamba/mecoprop-P, dichlorprop-P/MCPA/mecoprop-P, diflufenican/iodosulfuron-methyl-sodium/mesosulfuron-methyl, diflufenican/pendimethalin, dimethenamid-P/metazachlor, dimethenamid-P/metazachlor/quinmerac, dimethenamid-P/quinmerac, ethofumesate/metamitron, flufenacet/metribuzin, fluroxypyr/metsulfuron-methyl, foramsulfuron/thiencarbazone-methyl, haloxifen-methyl/pyroxulam, imazamox/metazachlor, imazamox/quinmerac, lenacil/triflusalufuron-methyl, MCPB, mesosulfuron-methyl/propoxycarbazone-sodium, mesosulfuron-methyl/thiencarbazone-methyl, mesotrione, metamitron/quinmerac, metazachlor/napropamide/quinmerac, metazachlor/quinmerac, metobromuron, pyroxulam, quizalofop-ethyl, quizalofop-P-ethyl, quizalofop-P-tefuryl, rimsulfuron, sulfosulfuron, thifensulfuron-methyl, thifensulfuron-methyl/tribenuron methyl, tribenuron-methyl and unspecified herbicides.

Table 6 (cont.) Usage of pesticides (kg of active substances applied) on arable crops grown in the United Kingdom 2024													
	Wheat	Winter barley	Spring barley	Oats	Rye	Triticale	Oilseed rape	Linseed	All potatoes	Peas	Beans	Sugar beet	All crops
Insecticides & nematicides													
Acetamiprid	.	.	.	.	.	.	176	.	1,979	.	.	2,264	4,419
Esfenvalerate	219	163	28	.	.	.	.	.	154	2	12	.	578
Flonicamid	27	.	.	.	.	.	127	.	1,755	48	.	2,964	4,920
Lambda-cyhalothrin	2,182	681	343	181	57	.	2,139	44	414	602	259	12	6,914
Pirimicarb	.	.	.	.	.	.	.	.	.	6,010	4,824	.	10,833
Tau-fluvalinate	150	47	11	.	.	.	2,075	.	.	.	.	.	2,283
Other insecticides & nematicides ¹	59	.	.	.	.	21	255	.	42,885	.	29	16,405	59,654
All insecticides & nematicides	2,637	891	382	181	57	21	4,773	44	47,187	6,661	5,124	21,645	89,601
Molluscicides & repellents													
Ferric phosphate	53,904	3,132	2,799	2,673	1,091	95	30,073	24	16,763	211	734	1,535	113,034
All molluscicides and repellents	53,904	3,132	2,799	2,673	1,091	95	30,073	24	16,763	211	734	1,535	113,034
Physical control agents													
Garlic/sulphur	.	.	.	.	.	.	282	.	.	.	.	.	282
Paraffin oil (CAS 72623-86-0)	.	.	.	.	.	.	.	.	.	.	.	.	4,692
All physical control agents	.	.	.	.	.	.	282	.	4,692	.	.	.	4,974

¹Other insecticides and nematicides include cypermethrin, deltamethrin, fluopyram, fosthiazate, garlic, indoxacarb, spirotetramat and unspecified insecticides

Table 6 (cont.) Usage of pesticides (kg of active substances applied) on arable crops grown in the United Kingdom 2024													
	Wheat	Winter barley	Spring barley	Oats	Rye	Triticale	Oilseed rape	Linseed	All potatoes	Peas	Beans	Sugar beet	All crops
Growth regulators													
2-chloroethylphosphonic acid	17,863	5,951	8,662	7	165	.	.	.	.	.	.	.	32,648
2-chloroethylphosphonic acid/mepiquat	38,873	23,778	26,252	.	4,991	.	.	.	.	.	.	.	93,894
Chlormequat	1,336,584	224,059	88,108	83,844	32,003	2,033	.	.	.	.	.	.	1,766,631
Chlormequat/2-chloroethylphosphonic acid	20,036	10,032	11,751	.	.	.	.	.	.	.	.	.	41,819
Maleic hydrazide	.	.	.	.	.	.	.	.	125,498	.	.	.	125,498
Mepiquat chloride/metconazole	.	.	.	.	.	.	8,418	.	.	.	.	.	8,418
Mepiquat chloride/prohexadione-calcium	22,862	12,431	11,286	7,895	565	100	.	.	.	.	.	.	55,140
Prohexadione-calcium/trinexapac-ethyl	4,606	1,287	1,363	601	370	.	.	.	.	.	.	.	8,227
Trinexapac-ethyl	43,092	7,532	6,008	1,516	1,061	361	382	.	.	.	.	.	59,952
Other growth regulators	2,363	1,158	218	406	184	.	.	.	.	.	.	.	4,329
All growth regulators	1,486,279	286,228	153,648	94,269	39,340	2,494	8,800	.	125,498	.	.	.	2,196,555
Other fungicide/growth regulators²	.	.	.	.	.	.	16,189	.	.	.	.	.	16,189

¹Other growth regulators include 2-chloroethylphosphonic acid/mepiquat chloride, chlormequat chloride, chlormequat chloride/2-chloroethylphosphonic acid, prohexadione-calcium and unspecified growth regulators

²Other fungicide/growth regulators include mepiquat chloride/prohexadione-calcium/pyraclostrobin

Table 6 (cont.) Usage of pesticides (kg of active substances applied) on arable crops grown in the United Kingdom 2024													
	Wheat	Winter barley	Spring barley	Oats	Rye	Triticale	Oilseed rape	Linseed	All potatoes	Peas	Beans	Sugar beet	All crops
Seed treatments													
Fungicide seed treatments													
<i>Bacillus amyloliquefaciens</i> strain MBI 600 ¹	.	.	.	.	.	.	50	.	.	.	.	.	50
Fludioxonil	3,888	343	717	407	28	.	.	.	1,620	65	2	.	7,069
Fludioxonil/sedaxane	2,612	207	341	136	6	13	.	.	.	.	.	.	3,315
Fluopyram/prothioconazole/tebuconazole	.	688	.	.	.	.	.	.	.	.	.	.	688
Hymexazol	.	.	.	.	.	.	.	.	.	.	.	2,879	2,879
Imazalil/ipconazole	389	1,134	4,201	.	.	.	.	.	.	.	.	.	5,724
Prothioconazole	563	210	177	17	16	.	.	.	.	.	.	.	983
Prothioconazole/tebuconazole	2,468	466	2,349	314	29	7	.	.	.	.	.	.	5,633
Silthiofam	4,274	348	.	.	.	.	.	.	.	.	.	.	4,622
Insecticide seed treatments													
Tefluthrin	.	.	.	.	.	.	.	.	.	.	.	486	486
Unspecified seed treatments²	.	.	.	.	.	.	.	.	.	.	.	.	.
Other seed treatments ³	3,104	338	32	11	10	8	29	.	11,769	.	.	1,083	16,386
All seed treatments	17,298	3,735	7,815	885	89	28	79	.	13,389	65	2	4,448	47,835

¹This active substance may also have insecticidal properties as a result of the stimulation of plant natural defences

²There is no weight associated with unspecified seed treatments

³Other seed treatments include cyantraniliprole, cypermethrin, thiamethoxam, difenoconazole/fludioxonil, difenoconazole/fludioxonil/tebuconazole, fludioxonil/fluxapyroxad/triticonazole, fludioxonil/tebuconazole, flutolanil, imazalil and ipconazole

Table 7 Estimated area treated (hectares) of application of the fifty most extensively used active substances on all arable crops surveyed in 2024 in the United Kingdom (excluding seed treatments)

	Active substance	Area treated 2024 (ha)	Area treated 2022 (ha)	% change on 2022
1	Prothioconazole	5,349,818	5,176,394	3
2	Tebuconazole	3,527,651	3,981,721	-11
3	Glyphosate	2,601,807	2,379,503	9
4	Chlormequat	2,328,967	2,904,226	-20
5	Trinexapac-ethyl	2,019,061	2,229,979	-9
6	Flufenacet	1,724,154	2,919,664	-41
7	Diflufenican	1,686,009	2,488,059	-32
8	Folpet	1,495,469	1,983,333	-25
9	Fluxapyroxad	1,470,659	1,923,676	-24
10	Azoxystrobin	1,298,280	1,195,491	9
11	Fluroxypyr	1,288,178	1,296,109	-1
12	Lambda-cyhalothrin	1,214,059	1,693,239	-28
13	Metsulfuron-methyl	1,199,699	1,020,754	18
14	Pendimethalin	1,163,059	1,715,423	-32
15	Bixafen	1,150,886	1,557,452	-26
16	Mefentrifluconazole	1,148,544	1,496,525	-23
17	Ferric phosphate	1,080,733	760,005	42
18	Pyraclostrobin	1,046,372	1,407,477	-26
19	Florasulam	959,118	914,437	5
20	Tribenuron-methyl	915,921	697,283	31
21	Benzovindiflupyr	733,017	771,118	-5
22	Thifensulfuron-methyl	696,477	603,084	15
23	Prohexadione-calcium	662,273	648,399	2
24	Fluopyram	636,501	649,814	-2
25	Halauxifen-methyl	624,649	632,394	-1
26	Spiroxamine	603,373	763,604	-21
27	Fenpicoxamid	554,673	674,647	-18
28	2-chloroethylphosphonic acid	544,931	433,143	26
29	Trifloxystrobin	528,611	538,902	-2
30	Cymoxanil	504,820	464,072	9
31	Mancozeb	468,728	439,414	7
32	Mepiquat chloride	463,977	516,898	-10
33	Iodosulfuron-methyl-sodium	456,507	469,135	-3
34	Mesosulfuron-methyl	454,589	467,658	-3
35	Isoflucypram	434,350	.	.
36	Picolinafen	383,794	624,957	-39
37	Fluoxastrobin	336,521	368,713	-9
38	Aclonifen	315,882	278,077	14
39	Cyazofamid	310,791	260,070	20
40	Pinoxaden	309,779	316,544	-2
41	Tri-allate	307,032	415,922	-26
42	Cinmethylin	281,516	.	-
43	Propyzamide	271,987	395,429	-31
44	Phenmedipham	265,580	261,583	2
45	Ethofumesate	254,207	265,970	-4
46	Metamitron	247,758	247,083	0
47	Metribuzin	246,083	246,191	0
48	Mepiquat	239,053	151,846	57
49	Propamocarb hydrochloride	236,563	198,303	19
50	Mecoprop-P	229,430	248,295	-8

Table 8 Estimated amount used (tonnes) of application of the fifty most extensively used active substances on all arable crops surveyed in 2024 in the United Kingdom (excluding seed treatments)

	Active substance	Amount used 2024 (tonnes)	Amount used 2022 (tonnes)	% change on 2022
1	Glyphosate	2,260	2,011	12
2	Chlormequat	1,794	2,279	-21
3	Pendimethalin	981	1,491	-34
4	Folpet	744	966	-23
5	Tri-allate	621	868	-28
6	Mancozeb	572	549	4
7	Prothioconazole	541	510	6
8	Prosulfocarb	482	1,070	-55
9	Tebuconazole	417	490	-15
10	Flufenacet	313	531	-41
11	Aclonifen	264	238	11
12	Propamocarb hydrochloride	227	184	24
13	Propyzamide	209	298	-30
14	Azoxystrobin	174	162	7
15	Metamitron	158	151	5
16	Sulphur	154	68	126
17	Fluroxypyr	146	152	-4
18	Cinmethylin	131	.	.
19	Potassium phosphonate (phosphite)	129	.	.
20	Mecoprop-P	129	141	-9
21	Maleic hydrazide	125	140	-10
22	Spiroxamine	118	155	-24
23	Ferric phosphate	113	76	48
24	Mefentrifluconazole	97	121	-20
25	Diflufenican	91	139	-35
26	Pyraclostrobin	83	122	-32
27	2-chloroethylphosphonic acid	79	61	31
28	Fluxapyroxad	66	92	-29
29	Mepiquat chloride	65	72	-9
30	Trinexapac-ethyl	65	68	-5
31	Mepiquat	62	38	65
32	Phenmedipham	62	61	1
33	MCPA	57	35	62
34	Bixafen	57	81	-30
35	Metazachlor	55	59	-7
36	Ethofumesate	52	54	-3
37	Cymoxanil	50	46	11
38	Metribuzin	46	47	-3
39	Fluopyram	41	45	-9
40	Fosthiazate	39	57	-31
41	Metobromuron	39	56	-31
42	Chlorotoluron	35	46	-23
43	Benzovindiflupyr	35	36	-2
44	Ametoctradin	33	18	83
45	Trifloxystrobin	32	37	-14
46	Fenpicoxamid	30	40	-24
47	Bentazone	28	47	-40
48	MCPB	26	25	5
49	Boscalid	25	27	-7
50	Mandipropamid	25	25	-1

Table 9 Pesticides recorded at a significant level in the United Kingdom in 2024 but not in 2022

	Active substance	Area treated 2024 (ha)	Amount used 2024 (tonnes)
1	Isoflucypram	434,350	22
2	Cinmethylin	281,516	131
3	Pydiflumetofen	148,885	14
4	Potassium phosphonate (phosphite)	89,911	129
5	Ammonium thiosulphate	5,631	6
6	Isofetamid	5,565	1
7	Valifenalate	3,325	<1
8	Fenpropidin	30	<1

Table 10 Major increases in the use of individual active substances on arable crops in the United Kingdom since 2022 (area treated - ha)

	Active substance	Area treated 2024 (ha)	Area treated 2022 (ha)	% change on 2022
1	Napropamide	1,013	72	1309
2	Spirotetramat	4,429	1,433	209
3	Thiencarbazone-methyl	118,067	44,068	168
4	Foramsulfuron	23,752	10,408	128
5	Sulphur	79,053	39,756	99
6	Ametoctradin	142,804	75,847	88
7	Zoxamide	18,199	10,301	77
8	Mepiquat	239,053	151,846	57
9	Fluazinam	129,482	84,909	52
10	Ferric phosphate	1,080,733	760,005	42
11	Quizalofop-P-ethyl	28,187	20,152	40
12	Imazamox	128,700	92,522	39
13	Amisulbrom	60,267	43,893	37
14	Fluopicolide	184,971	139,350	33
15	MCPA	72,242	54,976	31
16	Tribenuron-methyl	915,921	697,283	31
17	Acetamiprid	90,749	69,826	30
18	2-chloroethylphosphonic acid	544,931	433,143	26
19	Dicamba	51,844	41,392	25
20	Cyazofamid	310,791	260,070	20

Table 11 Major decreases in the use of individual active substances on arable crops in the United Kingdom since 2022 (area treated - ha)

	Active substance	Area treated 2024 (ha)	Area treated 2022 (ha)	% change on 2022
1	Chlormequat chloride	2,171	36,448	-94
2	Isopyrazam	340	4,539	-93
3	Metalaxyl-M	3,151	25,597	-88
4	Paclobutrazol	3,014	18,130	-83
5	Flutriafol	15,211	70,381	-78
6	Cypermethrin	13,600	62,635	-78
7	Sulfosulfuron	748	2,995	-75
8	Mesotrione	3,283	12,641	-74
9	Quizalofop-ethyl	3,991	14,415	-72
10	Bromuconazole	60,725	194,236	-69
11	Metrafenone	5,047	14,071	-64
12	Prochloraz	66,605	176,200	-62
13	Propoxycarbazone-sodium	5,971	14,654	-59
14	Deltamethrin	6,002	14,604	-59
15	Esfenvalerate	141,426	327,952	-57
16	Prosulfocarb	228,412	500,211	-54
17	Proquinazid	23,541	51,163	-54
18	Garlic	3,715	7,632	-51
19	Cyflufenamid	94,542	179,614	-47
20	Tau-fluvalinate	50,891	95,661	-47

Table 12 Comparison of pesticide usage in the United Kingdom between 2016 and 2024											
	2016		2018		2020		2022		2024		
	Area treated (ha)	Weight applied (t) ²	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 ¹	3,785,202	128	3,151,425	111	2,603,979	92	2,420,886	34	1,687,888	31	
Fungicides	19,985,893	5,684	19,076,479	5,644	14,669,068	4,316	17,915,242	3,923	16,822,746	3,695	
Sulphur	33,828	94	9,872	20	33,496	77	39,756	68	84,683	160	
Growth regulators	5,414,402	2,639	5,357,557	2,547	3,740,219	1,799	6,009,031	2,672	5,266,411	2,197	
Fungicide/growth regulators	.	.	.	.	.	.	46,401	14	57,841	16	
Herbicides	16,069,663	7,770	16,619,402	8,414	13,430,123	6,072	16,186,877	7,848	14,395,555	6,447	
Molluscicides & repellents	1,429,606	160	1,513,538	174	961,498	96	843,343	85	1,080,733	113	
Nematicides	17,879	49	11,503	32	15,379	39	53,545	96	32,336	59	
Seed treatments	4,076,797	207	4,247,366	192	3,554,828	59	3,410,839	59	2,949,939	48	
Total - all registered pesticides	50,813,270	16,731	49,987,143	17,134	39,008,960	12,552	46,926,671	14,798	42,380,436	12,767	
Area grown	4,190,628		4,161,255		3,935,953		4,025,570		3,713,663		

¹Includes oxamyl which has both insecticidal and nematicidal properties

²Weight applied in tonnes (t)

APPENDIX 2 – ARABLE METHODOLOGY

METHODS

The samples of holdings to be surveyed were selected using data from the June Survey Agricultural Returns, June 2023 for England & Wales (Anon., 2023a, 2023b), Scotland (Anon., 2023c) and Northern Ireland (Anon., 2023d).

The samples were drawn from the June Survey 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 (GORs), 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, canary seed, millet and sunflowers. Together the minor crops accounted for 0.2% 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 2024 arable survey is the seventh survey for which the majority of data for holdings in England & Wales were obtained electronically from a commercial research company, Kynetec, who have a long history (over 30 years) of managing arable farm pesticide usage surveys. As part of the agreement with Kynetec and as part of the Long Term Service Agreement (LTSA) 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 Kynetec survey has a large 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 470 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 Statistics in that it enables a proportionate burden to be placed on those providing the data.

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

Data were collected from 1,090 holdings throughout the United Kingdom in 2024. In order to ensure that the sample was fully representative, in addition to data collected on 470 holdings by Kynetec, an additional sample of 222 larger arable holdings (>250 hectares) within England & Wales was collected by Fera Science Ltd. A total of 487 arable farms were initially contacted to provide this supplementary data. Of these, 105 (22%) were unwilling to help with the survey. Data from 313 holdings in Scotland and 85 holdings in Northern Ireland were also provided by SASA and AFBI respectively.

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 1,005 holdings visited in Great Britain (no data were available from Northern Ireland) and where information was available (799 holdings), 97% were members of one or more crop assurance schemes. However, in terms of area grown, farms with a crop assurance scheme accounted for 99% of the total area surveyed. Fourteen of the holdings (2%) were registered organic on all or part of their farm.

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 (222 larger holdings, size groups E & F, in England), electronic record keeping was used by 93% of the holdings contacted in England, with these records accounting for 98% of the total pesticide-treated area. Paper based record keeping and records relayed over the phone 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 over 99% of the number of rows of data collected in England (total 145,658 rows of data). All data from Kynetec and the Scotland & Northern Ireland survey teams were received electronically.

All data for the 2024 survey were collected via email, post and over the telephone. The fact that a large proportion of arable farmers now use electronic record keeping means that they are able to send their pesticide usage records via email. A follow up telephone call or email is usually all that is required to obtain any additional information, such as seed dressings and agronomic information.

The Questionnaire

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

Form 1 summarised the areas of arable crops grown on the designated holding during the 2023/2024 season (autumn 2023 through to harvest in 2024).

Form 2 dealt with all aspects of pesticide usage on the individual crops grown on the holding and harvested in 2024, 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-drilled; 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 Kynetec were derived from the farm spray books provided to their participating farmers and these books meet 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, 1999).

The raising factors were based on the areas of arable grown and harvested in 2024 as recorded in the June Survey of Agriculture and Horticulture for England & Wales (Anon., 2024a, b), Scotland (Anon., 2024c) and Northern Ireland (Anon., 2024d).

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 authorisation and 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 Government statistics release calendar and the Fera Science Ltd. website in line with the Code of Practice for Statistics.

Data limitations and use of data

Our experience (Fera, SASA, AFBI & Kynetec) has shown that the '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 Statistics. Drawing a fresh stratified random sample each year is clearly an appropriate survey methodology.

As part of this survey Fera Science Ltd. has implemented the UK Statistics Authority Code of Practice for Statistics, published in 2009 and revised in 2018. For information, version 3.0 of the Code has just been launched recently. Please see the following link: <https://code.statisticsauthority.gov.uk/> Whilst all three pillars and 14 principles of Version 2 apply, we acknowledge the following:

- Honesty and integrity: people in organisations that release statistics should be truthful, impartial, and independent, and meet consistent standards of behaviour that reflect the wider public good.
- Data governance: organisations should look after people's information securely and manage data in ways that are consistent with relevant legislation and serve the public good.
- Efficiency and proportionality: statistics and data should be published in forms that enable their reuse. Producers should use existing data wherever possible and only ask for more where justified.

- Accessibility: statistics and data should be equally available to all, not given to some people before others. They should be published at a sufficient level of detail and remain publicly available.

In accordance with UKSA Code of Practice for Statistics, we work with Defra and HSE statisticians to build on our existing extensive and effective relationships with users of the surveys to further enhance user engagement. There is a broad spectrum of users and stakeholders across policy, research, agricultural supply industry (including consultancies), farming and horticultural businesses, civil society organisations 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.

A review has been conducted of the statistical validity of collecting independent annual samples, as is Fera's standard practice, versus sampling from a panel, as is Kynetec's approach. The review, conducted by Fera and submitted to HSE, concluded that there is no particular reason why moving from taking a sample each year to sampling from a panel should require any change in the method used to estimate the quantity of pesticides used and their standard errors as long as certain assumptions hold (see the link below).

The full review is available at

<https://pusstats.fera.co.uk/documentation/pesticideAnalysis.pdf>

APPENDIX 3 – ARABLE STANDARD ERRORS

Analysis of 2024 Arable pesticide usage survey

The aim of the analysis of the results was to provide an estimate of the pesticide usage associated arable crops by region and nationally.

Estimates are derived from pesticide usage survey data which are stratified by region and holding size within each crop type. The survey reports the mass of pesticide applied and the area of crop to which it is applied. The survey information is combined with the total area cultivated with the crop within each stratum to provide an estimate of the total mass of pesticide used on that crop type by region and nationally, and of the area sprayed. Each estimate (E) is provided with a standard error (se). In general, we expect with approximately 95% confidence, that the true quantity of pesticide used will lie within the interval:

$$E \pm 1.96 \times se$$

Estimation method

We are provided with information about holdings in J regions. Holdings are assigned one of K size classes. L holdings are surveyed within each stratum (j,k). In addition, the total area cultivated with crop and number of holdings in each stratum from which samples have been taken is reported. Hence, we are given:

$H_{j,k}$: the total area of the stratum (in holdings of size class k, in region j)

$N_{j,k}$: the total number of holdings in the stratum

$L_{j,k}$: number of holdings surveyed within the stratum

$h_{j,k,l}$: area of each holding surveyed within the stratum

$a_{l,j,k,l}$: area of each holding sprayed within the surveyed stratum

$m_{j,k,l}$: mass of pesticide applied to each holding in the surveyed stratum

Then we estimate:

$r_{a_{j,k}}$: mean area sprayed per area surveyed within the stratum

$r_{m_{j,k}}$: mean mass applied per area surveyed within the stratum

$s_{a_{j,k}}$: the between-holding standard deviation of the area sprayed per area surveyed within the stratum

$s_{m_{j,k}}$: the between holding standard deviation of the mass sprayed per area surveyed within the stratum

A_j : estimated total area sprayed in a region

se_{A_j} : standard error of estimated total area sprayed in a region

M_j : estimated total mass applied in a region

se_{M_j} : standard error of estimated total mass applied in a region

A : estimated total area sprayed nationally

se_A : standard error of estimated total area sprayed nationally

M : estimated total mass applied nationally

se_M : standard error of estimated total mass applied nationally

Estimates are provided using the following formulas:

Estimators

$r_{a_{j,k,l}} = \frac{a_{j,k,l}}{h_{j,k,l}}$	<i>Equation 1</i>
$r_{m_{j,k,l}} = \frac{m_{j,k,l}}{h_{j,k,l}}$	<i>Equation 2</i>
$r_{a_{j,k}} = \text{mean}(r_{a_{j,k,l}}), l = 1, 2 \dots L_{j,k}$	<i>Equation 3</i>
$r_{m_{j,k}} = \text{mean}(r_{m_{j,k,l}}), l = 1, 2 \dots L_{j,k}$	<i>Equation 4</i>
$s_{a_{j,k}} = \text{sd}(r_{a_{j,k,l}}), l = 1, 2 \dots L_{j,k}$	<i>Equation 5</i>
$s_{m_{j,k}} = \text{sd}(r_{m_{j,k,l}}), l = 1, 2 \dots L_{j,k}$	<i>Equation 6</i>
$A_j = \sum_{k=1}^{k=K} H_{j,k} \cdot r_{a_{j,k}}$	<i>Equation 7</i>
$M_j = \sum_{k=1}^{k=K} H_{j,k} \cdot r_{m_{j,k}}$	<i>Equation 8</i>
$se_{A_j} = \sqrt{\sum_{k=1}^{k=K} H_{j,k}^2 \cdot \frac{s_{a_{j,k}}^2}{L_{j,k}} \cdot \frac{N_{j,k} - L_{j,k}}{N_{j,k} - 1}}$	<i>Equation 9</i>
$se_{M_j} = \sqrt{\sum_{k=1}^{k=K} H_{j,k}^2 \cdot \frac{s_{m_{j,k}}^2}{L_{j,k}} \cdot \frac{N_{j,k} - L_{j,k}}{N_{j,k} - 1}}$	<i>Equation 10</i>
$A = \sum_{j=1}^{j=J} A_j$	<i>Equation 11</i>
$M = \sum_{j=1}^{j=J} M_j$	<i>Equation 12</i>

$se_A = \sqrt{\sum_{j=1}^{j=J} se_{A_j}^2}$	Equation 13
$se_M = \sqrt{\sum_{j=1}^{j=J} se_{M_j}^2}$	Equation 14

Standard errors se_A , se_M , se_{A_j} and se_{M_j} are estimated by a first order Taylor approximation ^[i] (Equations 9,10,13,14) with a finite population ^[ii] correction (Equations 9 and 10)

95% confidence intervals for estimates A_j , M_j , A and M as estimated as mean $\pm$ 1.96 $\times$ standard error.

Estimates of use derived from this survey were based on a stratification by region and size. Some size strata within regions and some regions were combined where there were fewer than five observations per stratum, or where estimates of crop areas and number of holdings were not available for individual strata. Upper and lower confidence intervals were not reported where the relative standard error was estimated to be larger than 30%. Estimates of area of application and mass applied by region and size group are provided in Tables S1 and S2. Estimates of the total area of application and mass applied are given in Tables S3 and S4.

Assumptions

- 1) The survey is unbiased. This means that there is no correlation between the use of pesticides on the holding and the probability of any holdings in the UK being included or excluded from a survey. The simplest way of achieving this is to sample holdings at random from the population of holdings within a stratum.
- 2) Samples are not correlated between strata. This means that if by chance the holdings sampled from one stratum have a higher average pesticide use than the population within the stratum, then this provides no information about the relation between samples and populations in other strata.
- 3) The values of number of holdings per strata are correct.
- 4) The size of the potential error in estimates of the total area of holdings [se(H)] within each stratum is small compared with the standard error of the estimates for the ratios “mean area sprayed per area surveyed within the stratum” and “mean mass applied per area surveyed within the stratum” [se(R)]. For uncorrelated errors “small” might mean $rse(H) < 0.3 \times rse(R)$ ¹
- 5) The error associated with estimates A_j , M_j , A , and M is assumed to be described by a normal distribution.
- 6) The areas reported in the June Survey give an estimate of the total area of crops grown on a holding within the year.

¹ If given estimates of relative standard errors (rse) $rse(R)=1$ and $rse(H)=0.3$ then $rse(R.H)=1.04$

Table S1: Estimates of area of application by crop and region group

Crop	Region	Area	Number of holdings	Number of holdings surveyed	Estimate (Ha)	RSE area (%)	Lower end 95% CI (Ha)	Upper end 95% CI (Ha)
allcrops	East Midlands	583,083	5,124	111	6,924,477	3.5	6,451,293	7,397,661
allcrops	Eastern	866,225	6,348	157	11,256,208	2.4	10,733,220	11,779,195
allcrops	London & South East	405,799	3,569	98	4,941,442	3.4	4,614,928	5,267,956
allcrops	North East	127,800	1,458	28	1,088,602	4.7	988,633	1,188,571
allcrops	North West	73,181	2,333	18	478,315	8.7	397,157	559,474
allcrops	Northern Ireland	37,033	2,288	85	354,635	5.1	318,918	390,352
allcrops	Scotland	502,359	9,254	313	4,804,258	1.7	4,647,332	4,961,183
allcrops	South West	363,292	6,606	78	4,083,525	6.3	3,575,780	4,591,271
allcrops	Wales	42,788	1,990	13	242,186	15.8	167,231	317,140
allcrops	West Midlands	286,784	4,522	72	2,558,620	5.4	2,290,033	2,827,207
allcrops	Yorkshire & the Humber	423,957	4,785	117	4,473,394	3.7	4,152,937	4,793,852
oats	East Midlands	23,311	556	25	171,435	6.9	148,390	194,479
oats	Eastern	26,181	684	24	201,282	9.1	165,569	236,995
oats	London & South East	25,052	562	39	206,025	6.8	178,373	233,677
oats	North East / North West	10,774	398	15	68,087	7.9	57,557	78,617
oats	Northern Ireland	1,922	NK	15	13,595	11.9	10,434	16,756
oats	Scotland	27,590	1,552	76	185,993	5.5	165,953	206,034
oats	South West	24,267	1,084	19	145,056	11.5	112,320	177,792
oats	West Midlands / Wales	23,194	1,255	34	114,942	6.4	100,601	129,283
oats	Yorkshire & the Humber	11,295	579	25	65,423	10.8	51,556	79,290

Crop	Region	Area	Number of holdings	Number of holdings surveyed	Estimate (Ha)	RSE area (%)	Lower end 95% CI (Ha)	Upper end 95% CI (Ha)
oilseed rape	East Midlands	47,276	1,527	46	468,664	5.6	417,002	520,326
oilseed rape	Eastern	49,024	1,371	64	578,303	4.4	528,302	628,304
oilseed rape	London & South East	34,050	781	45	389,650	5.1	350,809	428,492
oilseed rape	North East / North West	15,508	463	15	116,446	8.9	96,175	136,716
oilseed rape	Northern Ireland	1,377	NK	12	10,444	9.0	8,611	12,277
oilseed rape	Scotland	36,668	1,212	110	327,663	2.8	309,370	345,955
oilseed rape	South West	26,026	754	20	229,567	8.9	189,615	269,518
oilseed rape	West Midlands / Wales	32,891	1,399	39	262,459	8.3	219,735	305,183
oilseed rape	Yorkshire & the Humber	38,333	1,633	53	375,557	6.1	330,813	420,302
potatoes	East Midlands / North East / West Midlands / North West	17,935	1,020	20	502,335	9.1	412,624	592,046
potatoes	Eastern	18,932	454	8	563,392	9.2	461,305	665,479
potatoes	London & South East / South West	3,995	166	7	134,639	5.1	121,204	148,074
potatoes	Northern Ireland	3,596	NK	15	57,395	10.1	46,052	68,738
potatoes	Scotland	29,085	2,820	90	717,496	3.3	670,965	764,027
potatoes	Yorkshire & the Humber	14,341	676	8	379,563	12.8	284,394	474,732
spring barley	East Midlands	98,006	2330	75	774,840	3.9	715,735	833,946
spring barley	Eastern	120,940	2,979	112	1,000,153	3.2	937,814	1,062,492
spring barley	London & South East	74,279	1,394	57	622,738	4.6	566,486	678,991
spring barley	North East	16,477	628	18	107,500	4.9	97,127	117,874
spring barley	North West	22,870	1,300	15	121,351	12.0	92,923	149,779
spring barley	Northern Ireland	13,113	NK	55	102,992	5.4	92,075	113,909
spring barley	Scotland	257,507	7,012	275	1,810,475	2.0	1,740,650	1,880,301
spring barley	South West	88,255	3,287	45	608,243	8.2	509,915	706,570
spring barley	Wales	13,541	1,059	8	60,895	17.5	40,023	81,767
spring barley	West Midlands	30,508	1,458	29	159,822	7.1	137,567	182,078
spring barley	Yorkshire & the Humber	67,995	2,446	80	498,998	4.5	454,698	543,299

Crop	Region	Area	Number of holdings	Number of holdings surveyed	Estimate (Ha)	RSE area (%)	Lower end 95% CI (Ha)	Upper end 95% CI (Ha)
sugar beet	East Midlands	211,318	1,611	22	3,036,428	5.1	2,732,187	3,340,668
sugar beet	Eastern	397,260	5,262	51	5,911,415	5.0	5,335,501	6,487,328
sugar beet	Yorkshire & the Humber / West Midlands / South West	159,974	3,150	6	2,238,972	18.1	1,445,385	3,032,560
wheat	East Midlands	269,392	4,084	101	3,875,109	2.8	3,658,870	4,091,348
wheat	Eastern	397,260	5,262	145	6,107,984	2.4	5,826,613	6,389,355
wheat	London & South East	189,088	2,774	96	2,773,585	3.6	2,577,344	2,969,827
wheat	North East	56,827	1,110	26	589,912	5.7	523,723	656,100
wheat	North West	21,375	1,047	9	190,934	12.6	143,635	238,234
wheat	Northern Ireland	8,309	NK	39	91,617	4.2	84,000	99,235
wheat	Scotland	98,055	2,524	175	1,332,365	2.1	1,278,399	1,386,332
wheat	South West	135,345	3,809	68	1,758,790	4.2	1,615,052	1,902,529
wheat	Wales	12,505	523	7	90,175	22.1	51,141	129,210
wheat	West Midlands	135,910	3,378	67	1,417,500	5.2	1,272,448	1,562,552
wheat	Yorkshire & the Humber	192,137	3,797	105	2,395,715	3.2	2,243,600	2,547,829
winter barley	East Midlands	47,695	1,680	48	511,155	5.7	454,452	567,857
winter barley	Eastern	85,068	2,523	80	1,107,612	2.9	1,044,908	1,170,317
winter barley	London & South East	31,242	958	34	351,140	4.8	318,119	384,161
winter barley	North East	18,376	509	18	167,569	5.9	148,058	187,080
winter barley	North West	10,523	789	10	77,963	14.6	55,590	100,335
winter barley	Northern Ireland	8,340	NK	46	71,870	5.0	64,768	78,972
winter barley	Scotland	42,874	1,894	116	453,174	2.6	430,450	475,898
winter barley	South West	41,384	2,218	40	443,425	6.2	389,447	497,403
winter barley	Wales	7,509	550	7	38,012	18.6	24,169	51,855
winter barley	West Midlands	26,768	1,542	32	222,495	7.5	189,788	255,202
winter barley	Yorkshire & the Humber	59,168	2,552	90	564,508	4.2	518,352	610,664

Table S2: Estimates of mass applied by crop and region

Crop	Region	Area	Number of holdings	Number of holdings surveyed	Estimate (Kg)	RSE mass (%)	Lower end 95% CI (Kg)	Upper end 95% CI (Kg)
all crops	East Midlands	583,083	5,124	111	2,141,388	5.0	1,933,511	2,349,265
all crops	Eastern	866,225	6,348	157	3,332,015	3.0	3,137,421	3,526,609
all crops	London & South East	405,799	3,569	98	1,518,998	4.7	1,379,595	1,658,402
all crops	North East	127,800	1,458	28	281,780	9.1	231,670	331,890
all crops	North West	73,181	2,333	18	89,816	15.0	63,335	116,296
all crops	Northern Ireland	37,033	2,288	85	108,162	7.9	91,469	124,855
all crops	Scotland	502,359	9,254	313	1,186,984	2.5	1,128,028	1,245,939
all crops	South West	363,292	6,606	78	1,273,734	9.7	1,032,427	1,515,042
all crops	Wales	42,788	1,990	13	60,605	26.4	29,192	92,019
all crops	West Midlands	286,784	4,522	72	851,544	8.5	709,246	993,842
all crops	Yorkshire & the Humber	423,957	4,785	117	1,322,594	6.3	1,158,887	1,486,301
oats	East Midlands	23311	556	25	50059	9.5	40749	59369
oats	Eastern	26181	684	24	49763	10.0	40052	59473
oats	London & South East	25052	562	39	59220	7.5	50474	67966
oats	North East / North West	10774	398	15	13305	16.1	9110	17499
oats	Northern Ireland	1922	NK	15	2798	19.1	1749	3848
oats	Scotland	27590	1552	76	42577	6.9	36804	48350
oats	South West	24267	1084	19	36728	14.4	26375	47082
oats	West Midlands / Wales	23194	1255	34	37244	12.8	27871	46617
oats	Yorkshire & the Humber	11295	579	25	14261	14.3	10250	18271

Crop	Region	Area	Number of holdings	Number of holdings surveyed	Estimate (Kg)	RSE mass (%)	Lower end 95% CI (Kg)	Upper end 95% CI (Kg)
oilseed rape	East Midlands	47,276	1,527	46	141,138	4.8	127,806	154,470
oilseed rape	Eastern	49,024	1,371	64	157,784	4.1	145,227	170,342
oilseed rape	London & South East	34,050	781	45	109,507	5.0	98,818	120,197
oilseed rape	North East North West	15,508	463	15	32,718	11.5	25,352	40,084
oilseed rape	Northern Ireland	1,377	NK	12	4,063	8.5	3,382	4,744
oilseed rape	Scotland	36,668	1,212	110	94,489	3.0	89,010	99,968
oilseed rape	South West	26,026	754	20	61,976	9.2	50,807	73,145
oilseed rape	West Midlands Wales	32,891	1,399	39	77,253	8.7	64,094	90,413
oilseed rape	Yorkshire & the Humber	38,333	1,633	53	99,884	6.6	86,997	112,770
potatoes	East Midlands / North East / West Midlands / North West	17,935	1,020	20	306,806	11.3	238,636	374,976
potatoes	Eastern	18,932	454	8	294,069	12.0	224,702	363,437
potatoes	London & South East / South West	3,995	166	7	75,244	4.6	68,402	82,086
potatoes	Northern Ireland	3,596	NK	15	28,090	7.3	24,055	32,125
potatoes	Scotland	29,085	2,820	90	305,051	4.3	279,300	330,802
potatoes	Yorkshire & the Humber	14,341	676	8	199,612	18.8	125,904	273,320
spring barley	East Midlands	98,006	2,330	75	176,010	6.3	154,166	197,854
spring barley	Eastern	120,940	2,979	112	246,484	5.5	219,916	273,052
spring barley	London & South East	74,279	1,394	57	155,501	7.3	133,291	177,711
spring barley	North East	16,477	628	18	18,696	12.1	14,275	23,116
spring barley	North West	22,870	1,300	15	15,662	20.3	9,423	21,900
spring barley	Northern Ireland	13,113	NK	55	21,637	9.7	17,523	25,752
spring barley	Scotland	257,507	7,012	275	338,515	3.6	314,324	362,706
spring barley	South West	88,255	3,287	45	155,934	11.6	120,585	191,282
spring barley	Wales	13,542	1,059	8	14,442	20.8	8,541	20,344
spring barley	West Midlands	30,508	1,458	29	34,633	16.7	23,294	45,972
spring barley	Yorkshire & the Humber	67,995	2,446	80	107,427	7.4	91,897	122,958

Crop	Region	Area	Number of holdings	Number of holdings surveyed	Estimate (Kg)	RSE mass (%)	Lower end 95% CI (Kg)	Upper end 95% CI (Kg)
sugar beet	East Midlands	211,318	1,611	22	923,406	7.6	785,654	1,061,158
sugar beet	Eastern	397,260	5,262	51	1,798,657	6.8	1,559,018	2,038,297
sugar beet	Yorkshire & the Humber / West Midlands / South West	159,974	3,150	6	658,714	27.2	307,358	1,010,071
wheat	East Midlands	269,392	4,084	101	1,096,522	3.5	1,020,618	1,172,426
wheat	Eastern	397,260	5,262	145	1,737,261	3.0	1,634,616	1,839,905
wheat	London & South East	189,088	2,774	96	860,399	5.6	765,494	955,305
wheat	North East	56,827	1,110	26	158,343	12.5	119,396	197,290
wheat	North West	21,375	1,047	9	40,031	16.7	26,936	53,126
wheat	Northern Ireland	8,309	NK	39	24,651	7.3	21,118	28,185
wheat	Scotland	98,055	2,524	175	348,136	2.8	329,217	367,055
wheat	South West	135,345	3,809	68	508,441	6.1	447,467	569,414
wheat	Wales	12,505	523	7	21,348	42.6	NA	NA
wheat	West Midlands	135,910	3,378	67	415,250	9.1	340,822	489,678
wheat	Yorkshire & the Humber	192,137	3,797	105	638,421	4.3	584,583	692,259
winter barley	East Midlands	47,695	1,680	48	179,824	8.6	149,500	210,147
winter barley	Eastern	85,068	2,523	80	401,707	4.6	365,526	437,889
winter barley	London & South East	31,242	958	34	118,987	7.7	100,957	137,017
winter barley	North East	18,376	509	18	45,343	10.9	35,683	55,004
winter barley	North West	10,523	789	10	14,687	22.6	8,181	21,193
winter barley	Northern Ireland	8,340	NK	46	22,128	8.5	18,429	25,827
winter barley	Scotland	42,874	1,894	116	128,742	3.2	120,630	136,854
winter barley	South West	41,384	2,218	40	145,057	9.6	117,810	172,303
winter barley	Wales	7,509	550	7	9,822	28.3	4,383	15,261
winter barley	West Midlands	26,768	1,542	32	64,797	14.4	46,487	83,107
winter barley	Yorkshire & the Humber	59,168	2,552	90	193,543	5.5	172,785	214,301

Table S3: Estimates of total area of application for each crop

Crop	Area treated (Ha)	SE area treated (Ha)	RSE area treated (%)	Lower end 95% CI (Ha)	Upper end 95% CI (Ha)
oats	1,171,839	34,465	2.9	1,104,288	1,239,390
oilseed rape	2,758,753	57,836	2.1	2,645,394	2,872,111
potatoes	2,354,820	88,372	3.8	2,181,611	2,528,029
spring barley	5,868,009	86,909	1.5	5,697,667	6,038,351
sugar beet	11,186,815	523,803	4.7	10,160,160	12,213,469
wheat	20,623,688	250,152	1.2	20,133,390	21,113,985
winter barley	4,008,923	64,518	1.6	3,882,468	4,135,377
all crops	41,205,662	531,389	1.3	40,164,140	42,247,184

Table S4: Estimates of total mass applied for each crop

Crop	Mass applied (Kg)	SE mass applied (Kg)	RSE mass applied (%)	Lower end 95% CI (Kg)	Upper end 95% CI (Kg)
oats	305,955	11,641	3.8	283,138	328,772
oilseed rape	778,812	16,121	2.1	747,214	810,410
potatoes	1,208,872	63,761	5.3	1,083,900	1,333,844
spring barley	1,284,941	32,232	2.5	1,221,767	1,348,116
sugar beet	3,380,778	228,087	6.7	2,933,728	3,827,828
wheat	5,848,803	101,833	1.7	5,649,211	6,048,395
winter barley	1,324,638	33,483	2.5	1,259,010	1,390,265
all crops	12,167,620	235,880	1.9	11,705,296	12,629,945

APPENDIX 4 – FIRST RAISING FACTORS FOR ARABLE CROPS (2024)

<i>Region/Country</i>	<i>Farm size group</i>	<i>rf1</i>	<i>Regional area (ha)</i>	<i>Area surveyed (ha)</i>	<i>Number of farms visited</i>
East Midlands	A	112	52,832	471	15
	B	65	69,849	1,071	14
	C	29	62,655	2,195	17
	D	36	106,765	2,993	16
	E	19	141,428	7,287	19
	F	6	149,554	26,283	30
Eastern	A	109	59,003	540	15
	B	63	92,346	1,472	20
	C	52	103,738	1,988	16
	D	28	161,471	5,680	29
	E	16	223,762	13,803	41
	F	7	225,905	30,802	36
London & South East	A	195	36,104	185	6
	B	48	51,703	1,077	14
	C	21	45,299	2,209	18
	D	16	67,519	4,290	22
	E	14	127,292	9,404	27
	F	8	77,882	10,065	11
North East	A	179	16,838	94	*
	B	61	23,518	387	*
	C	14	17,980	1,261	10
	D	30	27,462	905	*
	E	27	26,127	971	*
	F	7	15,875	2,393	*
North West	A	168	34,191	203	9
	B	56	18,610	333	*
	D	20	11,290	561	*
	E	23	9,090	400	*
Northern Ireland	A	23	21,568	934	51
	B	5	7,343	1,549	22
	C	4	2,947	819	7
	D	4	1,517	414	*
	E	4	3,658	1,022	*
Scotland	A	53	92,411	1,750	66
	B	19	103,708	5,453	74
	C	13	86,553	6,875	57
	D	7	106,068	15,197	77
	E	7	80,349	12,168	36
	F	17	33,270	1,958	*
South West	A	132	83,717	635	23
	B	41	61,902	1,501	21
	C	31	45,393	1,470	12
	D	24	56,657	2,345	12
	E	55	74,687	1,369	*
	F	10	40,936	3,910	6
Wales	A	94	24,635	263	9
	B	54	11,229	207	*
	C	48	6,924	145	*
West Midlands	A	108	57,606	532	16
	B	36	61,305	1,726	24
	C	32	40,793	1,281	11
	D	22	50,522	2,288	12
	E	21	45,662	2,145	7
	F	12	30,896	2,484	*
Yorkshire & the Humber	A	104	53,902	518	17
	B	47	71,986	1,540	20
	C	23	63,600	2,777	22
	D	14	87,829	6,182	32
	E	16	95,696	5,924	17
	F	7	50,944	7,581	9

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 growers who willingly participated in this survey, providing invaluable information upon which this report is based. Many thanks are also due to: the SASA Pesticide Survey Unit for their role in the collection and provision of data (including estimates of cropping areas) from Scotland and Michael Lavery, Amanda Browne, Trudyann Kelly, Lesley Haddock and Ivan Forsythe for their role in the collection and provision of data (including estimates of cropping areas) from Northern Ireland; Yvonne Powell-Wainwright and Josephine Roberts for their role in maintaining the pesticides database; and Jayne Brigham and Sarah Thompson for their help with the frequency distributions of arable crops. Thanks also go to the members of the ECP Working Party on Pesticide Usage Surveys for their invaluable comments.

REFERENCES

Anon. (2023a) Agricultural Statistics in England 2023. London: HMSO

Anon. (2023b) Agricultural Statistics in Wales 2023. London: HMSO

Anon. (2023c) Agricultural Statistics in Scotland 2023. London: HMSO

Anon. (2023d) Agricultural Statistics, Northern Ireland 2023. Belfast: HMSO

Anon. (2024a) Agricultural Statistics in England 2024. London: HMSO

Anon. (2024b) Agricultural Statistics in Wales 2024. London: HMSO

Anon. (2024c) Agricultural Statistics in Scotland 2024. London: HMSO

Anon. (2024d) Agricultural Statistics, Northern Ireland 2024. Belfast: HMSO

SASA (2023) Pesticide Usage in Scotland: Arable crops and Potato stores 2022. <https://www.gov.scot/publications/pesticide-usage-scotland-arable-crops-potato-stores-2022/> (last accessed 03.10.2025)

Ridley, L., Parrish, G., Chantry, T., Richmond, A., MacArthur, R. & Garthwaite, D. (2023) Pesticide Usage Survey Report 309 - Arable Crops in the United Kingdom, 2022. London: Defra

Thomas, M. R., (1999), Guidelines for the Collection of Pesticide Usage Statistics within Agriculture and Horticulture, OECD, Eurostat, <https://pusstats.fera.co.uk/backend/documentation/guide.pdf> [online] (last accessed 01.10.2025)

Wood, H.J. (1931) An Agricultural Atlas of Scotland. London: George Gill & Sons

LINKS TO JUNE SURVEY DATA

June Survey – England: <https://www.gov.uk/government/statistical-data-sets/structure-of-the-agricultural-industry-in-england-and-the-uk-at-june> (last accessed 15.09.2025)

June Survey – Wales: <https://gov.wales/survey-agriculture-and-horticulture> (last accessed 15.09.2025)

June Survey – Scotland: <https://www2.gov.scot/Topics/Statistics/Browse/Agriculture-Fisheries/Publications/JuneAgriculturalCensus> (last accessed 15.09.2025)

June Survey – Northern Ireland: <https://www.daera-ni.gov.uk/articles/agricultural-census-northern-ireland> - (last accessed 15.09.2025)