

**PESTICIDE USAGE
IN NORTHERN IRELAND**

Survey Report 177

**Arable Crops
2000**

A National Statistics Publication



Department of
**Agriculture and
Rural Development**

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PESTICIDE USAGE SURVEY REPORT 177

NORTHERN IRELAND ARABLE CROPS

2000

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The County Regions Of Northern Ireland



SUMMARY

This is the sixth survey of pesticide usage practices conducted in the arable sector in Northern Ireland, providing comparative data to that obtained in the previous surveys in 1990, (Jess *et al.*, 1992), 1992 (Jess *et al.*, 1995), 1994 (Jess *et al.*, 1997), 1996 (Jess *et al.*, 2000) and 1998 (Jess *et al.*, 2002).

Due to restrictions imposed by the foot and mouth outbreak of February 2001 and the inability to complete farm visits, the sample size was reduced by over one third. Consequently, information on pesticide usage was collected from 196 holdings throughout the province. Due to the reduced sample size, data collected on the use of pesticide on potatoes, both grown and stored, was unreliable and had to be omitted from this report. This report represents 15% of the total area of arable crops grown compared with 19% in the previous report.

For the purpose of this report the term 'arable' refers to all arable crops except early, maincrop and seed potatoes.

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

The total area of arable crops grown in Northern Ireland in 2000 was 43,447 hectares, representing a 5% decrease to that recorded in 1998 and similar to that recorded in 1994. During the period 1998 to 2000, the area of crops treated with pesticides increased by 4% to 219,504 spray hectares. The most notable increases were recorded in the use of molluscicides, 33%, and insecticides, 51%. The use of fungicides and herbicides remained similar with regard to treated-area. However, the quantity applied reduced to 14t and 43t representing a 41% and 9% reduction, respectively. Seed treatment area increased by 8% while growth regulator use reduced by 9%. Application of molluscicides to cereal crops, especially spring barley and winter wheat, contributed significantly to the overall increase in the use of this pesticide type. Organophosphate insecticides, applied to cereal crops, accounted for the increase in insecticide use, despite a 94% reduction in the use of carbamates. The principal organophosphate insecticide recorded was chlorpyrifos. The total quantity of pesticides applied to arable crops reduced by 15% from 88.2 tonnes in 1998 to 75.3 tonnes in 2000 although the area to which pesticides were applied increased by 4%.

During 2000, regional pesticide usage was directly related to the areas of arable crops grown in each county. As in previous years, County Down represented the largest area of arable crops with 18,352ha, followed by County Londonderry and County Antrim with 10,538ha and 8,263ha, respectively and this was reflected in the area treated with pesticides. Pesticides were applied to 95% of the total area of arable crops grown in Northern Ireland in 2000, with a range of 1.0 - 3.0 applications, depending on pesticide group and crop type.

Fungicides were applied to nearly 30% of the pesticide-treated area, accounting for 18% of the total quantity of pesticides used. Herbicides and desiccants were applied to 33% of the total pesticide-treated area, representing 57% of the total quantity of pesticides used. Insecticides accounted for 13% of the total pesticide-treated area of arable crops, representing 3% of the

weight of pesticides used. Molluscicides represented less than 1% of both area of application and quantity of pesticides used. Growth regulator usage accounted for less than 8% of the total pesticide-treated area and 17% of the weight of active ingredients used. Seed treatments applied to arable crops accounted for 16% of the total pesticide-treated area, while representing 3% of the quantity of active ingredients applied.

As in 1998, the most frequently applied herbicide, used exclusively on cereal crops, principally spring barley, was metsulfuron-methyl. This single active ingredient represented 32% of the total herbicides/desiccants-treated area and 10% of total pesticide treated area used, but less than 1% of quantity of pesticide applied. Glyphosate was the most commonly applied herbicide/desiccant by quantity applied with 38%, representing 20% of the total herbicide/desiccant-treated area. The use of organophosphorus insecticides on arable crops increased, with this group accounting for 13% of the insecticide-treated area. Pyrethroids, accounted for 80% of the insecticide-treated area of arable crops but, owing to low application rates associated with this pesticide group, they represented less than 9% of the weight of insecticide active ingredients applied. Lambda-cyhalothrin was the most extensively used insecticide active ingredient, primarily on spring barley, winter barley and winter wheat crops for the control of aphids, accounting for 47% of the insecticide-treated area.

Cultivation of pea and bean crops was recorded for the first time in 1998 and both were recorded again in 2000. Although the area grown increased from 199ha to 273ha the pesticide treated area reduced by 53% with quantity of pesticide applied reducing by 60%.

A total of 201 products, comprising 95 active ingredients, were recorded in use on field crops in the survey.

DEFINITIONS AND NOTES

- ‘Basic area’ refers to the actual planted area of crop, which was treated with a given pesticide.
- ‘Treated area’ refers to the total area treated with a pesticide, which includes all repeated applications to the basic area. This is measured in ‘spray hectares’.
- ‘Reasons for use’ refers to the perceived reasons reported by the farmer for the use of a particular pesticide. These reasons may sometimes be inappropriate.
- ‘Rounding’; due to rounding of figures there may be slight differences in totals both within and between tables.
- ‘Arable’; For the purpose of this report the term ‘arable’ refers to all arable crops except early, maincrop and seed potatoes.
- ‘Comparison tables’; for the purpose of this report comparisons are made after all data relating to potato crops has been removed from previous reports.

INTRODUCTION

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

This is the sixth survey of pesticide usage on arable crops grown in Northern Ireland. Previous surveys reported on pesticide usage on arable crops grown in 1990 (Jess *et al.*, 1992), 1992 (Jess *et al.*, 1995), 1994 (Jess *et al.*, 1997), 1996 (Jess *et al.*, 2000), 1998 (Jess *et al.*, 2002). Data from previous surveys are included in the report for comparative purposes.

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

METHODS

The sample of holdings to be surveyed was selected from each of the six counties, on the basis of the total area of arable crops grown, using data from the Northern Ireland Agricultural Census, June 2000 (Anon., 2001). However, due to sampling procedures and the distribution of arable crops in Northern Ireland, no holdings were visited in County Fermanagh. The arable crops surveyed comprised of the following; barley, wheat, oats, oilseed rape, peas and beans and triticale.

The sample was stratified into six size groups, according to the total area of arable crops grown in each region. Holdings were selected at random within each of the size groups, the number of holdings being proportional to the total area of arable crops grown.

The purpose of the survey was explained to the occupiers of the selected holdings in preliminary correspondence. A total of 196 holdings were visited during November 2000 to January 2001 and data collected by personal interview. The data collected included; the area of crops grown, area treated, target crop, pesticides used and number of treatments applied. The growers perceived reasons for pesticide use were also included, but may not always seem appropriate. Holdings selected in the original sample which were unable to provide data were replaced with those from the same county and size group held on a reserve list. During analysis, the sample data were raised to the total population level using raising factors calculated from the ratio of the number of farms sampled to the number of farms in the population within each region and size group. A further adjustment factor corrected the data in accordance with the areas of arable crops published in the Northern Ireland Agricultural Census, June 2000 (Anon., 2001). The total number of farms in each size group and the number of farms sampled are shown in Table 1.

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

RESULTS AND DISCUSSION

CROPS

The number and area of arable crops in the survey, together with the proportion of each crop area surveyed, are shown in Table 2. Data from 196 farms provided information on 628 examples of 12 crop types. The total area of crops sampled in the survey represented 15% of the area of arable crops grown in Northern Ireland in 2000. The areas of arable crops grown in the six counties were estimated from survey data (Table 3, Figure 1) using raising factors discussed previously. Approximately 42% of the area of arable crops were grown in County Down, 24% in County Londonderry, 19% in County Antrim, 8% in County Tyrone, 7% in County Armagh. There was no significant area of arable cropping in County Fermanagh.

Barley crops, including spring barley (55%), undersown barley (8%) and winter barley (12%) were grown on 75% of the total arable area (Table 3, Figure 2). A further 11% of the arable area comprised of spring and winter wheat crops, 6% was spring, winter and undersown oats while minor crops, including oilseed rape, triticale, peas and beans accounted for 1% of the total arable area. Set-aside accounted for the remaining 6%.

REGIONAL PESTICIDE USAGE

Overall, regional pesticide usage closely approximated to the areas of arable crops grown in each county (Table 4, Figure 3). County Down accounted for 42%, County Londonderry 28%, County Antrim 17%, County Armagh 6% and County Tyrone 7% of the total pesticide-treated area. County Tyrone accounted for more than 50% of total molluscicide usage with only two other counties, Down and Londonderry, using molluscicides representing 31% and 18% of the total, respectively. The most frequently used pesticide groups within each of the counties were fungicides and herbicides. County Londonderry and County Tyrone accounted for approximately 30% of these pesticide groups each. Counties Antrim, Down and Armagh contributed 38%, 33% and 31% of herbicide usage, respectively.

PESTICIDE USAGE ON CROPS

The basic area of individual crops treated with pesticides approximated to the areas grown (Tables 3 & 5). Collectively, barley crops accounted for 73% of the total pesticide-treated area and 68% of the total quantity of pesticides applied (Tables 5 & 6). Barley crops also accounted for 77% of the insecticide-treated area of arable crops and 85% of the total quantity of insecticide active ingredients applied. In addition, applications of herbicides and desiccants to barley crops accounted for 78% of the herbicide/desiccant-treated area of arable crops and 75% of the quantity of this pesticide group applied. Fungicide application to barley crops represented 68% of the total area of arable crops treated with this pesticide group and 68% of the quantity of fungicide active ingredients applied. Application of growth regulators to barley crops accounted for 64% of the total area of arable crops treated with this pesticide group and 50% of the quantity of growth regulator active ingredients applied. Furthermore, barley crops represented 77% of the area of seed treatment applications and 55% of the quantity of seed treatment active ingredients applied.

Pest and disease control on winter wheat crops incurred 19% of the total pesticide-treated area of arable crops. Winter wheat crops accounted for 14% of arable crops treated with insecticides and 24% receiving growth regulators. These crops also represented 22% and 12% of the arable area treated with fungicides and herbicides/desiccants, respectively.

PROPORTION OF CROPS TREATED

The proportional areas of crops treated with different pesticide groups, together with the number of spray applications are shown in Table 7. Pesticides were applied to over 95% of the total area of arable crops grown and all crop types received a minimum of one application from one of the pesticide groups. The total area grown for winter barley, undersown oats and triticale received some form of pesticide application.

Fungicides were applied to 65% of the area of arable crops grown in 2000. Approximately 90% of spring wheat and 88% of winter wheat crops received fungicide treatment with 84%, 62% and 50% of winter, spring and undersown barley respectively being treated with this pesticide group.

Herbicides and desiccants were applied to 78% of arable crops grown. All crop types received herbicide and/or desiccant treatment, with 100% of undersown oats and triticale being treated. Oilseed rape had an average of three applications of this pesticide group.

Insecticide and molluscicide treatments were generally provided in one application of a single active ingredient, while other pesticide groups were generally applied in formulation. Overall, single insecticide treatments were applied to 51% of the area of arable crops grown, 83% of winter oats received treatment with this pesticide group whereas undersown oats, oilseed rape and triticale received no treatment at all. When comparing spring and winter sown cereals in monoculture 59% and 74% were treated with insecticides, respectively. Only 2% of the total area of arable crops grown received molluscicide treatment with 50% of oilseed rape crops being treated.

Growth regulators were generally applied as single applications to 31% of the total area of arable crops. More than 94% of winter oat crops and 78% of winter wheat crops received an application of growth regulators on at least one occasion. With the exception of undersown oats, a proportion of all cereal crop types received growth regulator treatments.

Pre-planting seed treatments were applied to 80% of all arable crops. All undersown oats and triticale crops were grown from treated seed, compared with only 39% of the pea and bean crops.

TOTAL PESTICIDE USAGE

Approximately 75 tonnes of pesticide active ingredients were applied to 219,504 spray hectares.

Fungicides were applied to 29% of the pesticide-treated area accounting for 19% of the total quantity of pesticides used (Tables 8 & 9). Azoxystrobin, as a single active ingredient and in a formulation with fenpropimorph, was the most extensively used fungicide compound, accounting for 17% of the fungicide-treated area and 16% of the weight of fungicide active ingredients applied. As a single active ingredient it represented 13% of the area treated and 6% of the quantity used on spring barley. Winter wheat crops were treated principally with azoxystrobin accounting for 28% of its fungicide-treated area. The active ingredient fenpropimorph, on its own and in formulations, accounted for 19% of the total area-treated with fungicides.

Herbicides and desiccants were applied to 33% of the pesticide-treated area accounting for 57% of the total quantity of pesticides used. The sulfonylurea metsulfuron-methyl, as a single active ingredient and used for general weed control, accounted for 32% of the area-treated with herbicides/desiccants. Owing to the low application rate for metsulfuron-methyl, the quantity of this active ingredient applied represented less than 1% of the total quantity of herbicides/desiccants used. Use of the non-selective herbicide glyphosate, particularly for pre-cultivation purposes on barley crops, represented 20% of the total area of cereal crops treated with herbicide/desiccant active ingredients and 38% of the quantity used.

Insecticides accounted for 14% of the pesticide-treated area of arable crops, representing 4% of the weight of pesticides used. Molluscicides, applied principally to barley and wheat, accounted for less than 1% in both area of application and quantity of pesticides applied. Pyrethroid active ingredients accounted for 80% the insecticide-treated area, but only 9% of the quantity of insecticides used. Lambda-cyhalothrin was the most commonly used active ingredient, applied to arable crops, accounting for 47% of the insecticide-treated area. Methiocarb was the only molluscicide active ingredient recorded.

Growth regulator usage accounted for 8% of the pesticide-treated area and 17% of the weight of active ingredients used. Growth regulators were applied primarily to winter wheat, winter barley and spring barley. Chlormequat was the most commonly used growth regulator active ingredient and as a single active ingredient accounted for 66% of the growth regulator-treated area and 88% of the weight of growth regulators applied. Formulations of 2-chloroethylphosphonic acid and mepiquat chloride and the single active ingredient trinexapac-ethyl were also used more extensively on spring barley than other cereals.

Seed treatments applied to arable crops accounted for 16% of the pesticide-treated area, representing 3% of the quantity of active ingredients applied. The formulation tebuconazole/triazoxide was the most extensively used with 34% of seed treated area followed by guazatine/imazalil with 21%. These formulations represented 40% and 33% for quantity of seed treatment applied, respectively.

The areas of each crop treated with pesticides and the quantities of pesticide active ingredients applied to each crop type are shown in Tables 8 and 9, respectively. The fifty most commonly used active ingredients prioritised by spray area and weight are shown in Tables 10 and 11, respectively.

PESTICIDE USAGE ON CEREALS

Spring barley (Table 12)

Applications of herbicides/desiccants to spring barley accounted for 38% of the pesticide-treated area (63% of the weight of pesticides applied), fungicides 24% (18%), seed treatments 17% (3%), insecticides 15% (7%), growth regulators 6% (8%). Molluscicides were used infrequently on spring barley crops during 2000 (Tables 5 & 6).

Propiconazole, applied primarily as a single active ingredient, but also in formulations with fenpropimorph and fenpropidin, was used on 22% of the fungicide-treated area and was the most extensively used fungicide active ingredient. Fenpropimorph, applied as a single active ingredient or in five formulations with azoxystrobin, flusilazole, kresoxim-methyl, and propiconazole accounted for 21% of the fungicide-treated area. Azoxystrobin, applied as a single active ingredient, accounted for 11% of fungicide treated area.

An estimated 67% of all fungicide applied to spring barley was for general disease control.

The most extensively used herbicide was metsulfuron-methyl, applied as a single active ingredient or in formulation with thifensulfuron-methyl. The reason for its use was primarily given as 'general weed control'. Because of its low application rate per hectare, the quantity of metsulfuron-methyl used represented only 1% of the weight of herbicide active ingredients applied to spring barley, but accounted for 50% of the herbicide-treated area of this crop. Glyphosate, which represented 20% of the herbicide treated area and 52% of the quantity of pesticide applied was most commonly used as a post-harvest stubble treatment/ground preparation, and harvest-aid/desiccator. The principal perceived reason for all herbicide use was 'general weed control' rather than particular weeds being specified.

The primary target for insecticide application to spring barley was aphids, with more than 79% of applications of pyrethroid and organophosphate active ingredients directed at this pest group. The most commonly used active ingredient was the pyrethroid, lambda-cyhalothrin with pyrethroids generally accounting for 69% of insecticide applications to this crop. The organophosphate insecticide chlorpyrifos was the principal insecticide applied for the control leatherjackets (*Tipula* spp.). Methiocarb was the only molluscicide applied on this crop and was used to treat leatherjackets (*Tipula* spp.) and slugs.

Approximately 20% of the area of spring barley was treated with growth regulators. Chlormequat, applied as a single active ingredient or in formulation with 2-chloroethylphosphonic acid, accounted for 49% of the growth regulator-treated area. Formulations of 2-chloroethylphosphonic acid, mepiquat chloride and chlormequat, represented 5% of this treated area with 2-chloroethylphosphonic acid used as a single active ingredient representing 25%.

Approximately 80% of spring barley was grown from treated seed. The formulation tebuconazole/triazoxide represented 41% of the seed treated area and 7% of the quantity of seed treatments used (Tables 8 & 9). Guazatine/imazalil accounted for a further 28% of the area of spring barley treated with seed treatment and 69% of the weight of seed treatment active ingredients.

Undersown barley (Table 13)

Herbicides/desiccants accounted for 38% of the pesticide-treated area of undersown barley (82% of the weight of pesticides applied), seed treatments 26% (3%), fungicides 23% (10%). Insecticide usage on undersown barley represented 11% (1%). Growth regulators represented less than 2% of the treated area and 4% of the quantity of pesticides applied. The use of molluscicides on undersown barley crops was not recorded in 2000 (Tables 5 & 6).

Propiconazole was the most extensively used fungicide active ingredient on undersown barley crops, used primarily for general disease control. Flusilazole, was also frequently used, particularly for the control of *Rhynchosporium*.

2,4-DB/linuron/MCPA was the most frequently used herbicide formulation with the main reason for use being 'general weed control'. Glyphosate was the most frequently used single active ingredient representing 24% of both the herbicide treated area and quantity applied. The reason given for 72% of herbicide applications was 'general weed control'.

The pyrethroids were the principal insecticides used for the control of aphids with lambda-cyhalothrin accounting for 83% of the insecticide-treated area. The only non-pyrethroid insecticide recorded was the organophosphate chlorpyrifos, which was used on 5% of the treated area for the control of leatherjackets (*Tipula* spp.).

Two growth regulators were recorded in use. Chormequat was the more common applied to 82% of the treated area whilst trinexapac-ethyl was applied to the remaining 18%. This represented less than 250 spray hectares in total.

A formulation of tebuconazole/triazoxide accounted for 44% of the area sown with treated seed, and 9% of the weight of seed treatment active ingredients applied to undersown barley crops. However, guazatine/imazalil represented 63% of the quantity of seed treatment active ingredients applied and only 24% of the area sown with treated seed (Tables 8 & 9).

Winter barley (Table 14)

Fungicides accounted for 36% of the area of winter barley treated with pesticides, herbicides/desiccants 27%, seed treatments 12%, growth regulators 12% and insecticides 13%. However, herbicides/desiccants accounted for 56% of the total weight of pesticide active ingredients applied, fungicides 17%, growth regulators 25%, seed treatments 1% and insecticides 1%. Molluscicides accounted for less than 1% in both area of application and quantity of pesticides applied (Tables 5 & 6).

Fenpropimorph, applied as single active ingredient and in formulations, was applied to 20% of the fungicide-treated area. Azoxystrobin was the most frequently used single active ingredient with both 14% of fungicide treated area and quantity used. 'General disease control' was the primary reason given for 69% of fungicide applications.

Isoproturon, as a single active ingredient or in formulation was the most commonly used herbicide, accounting for 22% of the herbicide/desiccant-treated area and 32% of the weight of herbicide/desiccant active ingredients applied. Glyphosate accounted for 16% of the area of application and 27% of the quantity applied. 'General weed control' was the reason given for 77% of herbicide applications to winter barley crops.

Pyrethroid insecticide active ingredients collectively accounted for 97% of the insecticide-treated area with lambda-cyhalothrin representing 68%. Chlorpyrifos was applied to 119 spray hectares of winter barley. Aphid control was the main reason for use of insecticides.

Methiocarb, used for slug control, was the only molluscicide recorded and was used on less than 1% of the area of winter barley grown in 2000.

Chlormequat, principally applied as a single active ingredient but also in formulation with choline chloride, accounted for 75% of the area treated with growth regulators and 90% of the quantity applied. The growth regulator 2-chloroethylphosphonic acid, as a single active ingredient or in formulation with mepiquat chloride, accounted for 16% of the area treated. Trinexapac-ethyl represented 8% of the treated area.

Approximately 92% of the area of winter barley was grown from treated seed (Table 7). The most extensively used seed dressing was the formulation of tebuconazole/triazoxide accounting for 57% of the area of winter barley sown with treated seed and 16% of the weight of seed treatments used. Guazatine/imazalil represented 11% of the area sown with treated seed but 35% of the quantity applied. Carboxin/thiram accounted for 8% of the area treated and 43% of the quantity applied. (Tables 8 & 9).

Spring wheat (Table 15)

A total area of 863 hectares of spring wheat was grown in Northern Ireland in 2000, with the majority (77%) grown in County Down and County Armagh. This represented a 100% increase compared to 1998 with over 6 times the area grown when compared with 1996. In common with 1998, no undersown spring wheat was recorded in 2000. Fungicides accounted for 47% of the pesticide treated area and 43% of the quantity applied, while herbicide/desiccant applications represented 20% and 37%, respectively. Growth regulators represented 1% of the pesticide-treated area and 4% of the quantity of active ingredients used. While treated seed was used on 18% of the pesticide-treated area of spring wheat, the weight of active ingredients represented 14% of the pesticides applied to this crop. Seed dressed with carboxin/thiram accounted for 64% of the treated area of spring wheat (Tables 8 & 9). Insecticide usage represented 15% of the pesticide-treated area and less than 1% of the total quantity of pesticides used. Lambda-cyhalothrin was the principal contributor providing 85% of the insecticide treated area and 22% of the quantity applied.

‘General disease control’ was the reason attributed to 83% of the fungicide-treated area of spring wheat crops. Fenpropimorph, applied as a single active ingredient, and also in formulations with azoxystrobin and quinoxifen, accounted for 37% of the fungicide treated area and 41% of the quantity of fungicide active ingredients applied to this crop. Propiconazole applied as a single active ingredient contributed 10% of the fungicide-treated area

‘General weed control’ was the principal reason given for herbicide and desiccant usage, with 78% of the treated area receiving an application for annual and perennial weeds. Metsulfuron-methyl, applied as a single active ingredient, accounted for 25% of the herbicide/desiccant-treated area of spring wheat crops, applied for ‘general weed control’ and cleavers (*Galium* spp). Mecoprop and mecoprop-P accounted for 17% and 16% of herbicide treated area with 22% and 29% of quantity applied, respectively. Lambda-cyhalothrin accounted for 86% of the insecticide treated area. In relation to area treated, the main target for insecticides was aphid control, although the greatest quantity used was the organophosphate chlorpyrifos representing 70% of the total. This was used entirely for leatherjacket (*Tipula* spp.) control.

Chlormequat was the only growth regulator used on 46 hectares of spring wheat and methiocarb was the only molluscicide recorded as applied to 13 hectares.

Approximately 94% of spring wheat crops were sown with treated seed (Table 7). The formulation of carboxin/thiram was most frequently used, accounting for 64% of the area grown from treated seed.

Winter wheat (Table 16)

While fungicides accounted for 39% of the pesticide-treated area of winter wheat crops and 18% of the quantity used, herbicides/desiccants represented 25% of the pesticide-treated area and 49% of the weight of pesticides applied. Insecticide treatments accounted for 12% of the pesticide-treated area and 1% of the weight used. Growth regulators accounted for 12% of the pesticide-treated area and 29% of the weight applied. Seed treatments represented 11% of the pesticide-treated area and only 3% of the quantity of pesticides applied. Molluscicides represented less than 1% in both area of application and quantity of pesticides applied (Tables 5 & 6).

‘General disease control’ accounted for 60% of the fungicide-treated area of winter wheat and 29% of the area was treated as a preventative measure. Azoxystrobin, as a single active ingredient or in formulation with fenpropimorph, was the fungicide active ingredient most extensively used, accounting for 31% of the fungicide-treated area. Fluquinconazole, as single active ingredient or in formulation with prochloraz, was used on 15% of the treated area.

The most extensively used herbicide/desiccant, applied as a single active ingredient or in formulation, was isoproturon. Applications of this active ingredient accounted for 22% of the winter wheat area treated and 41% of the quantity with this pesticide group. Glyphosate was applied to 19% of the treated area and contributed 25% of the quantity applied. Approximately 73% of herbicide/desiccant applications were for ‘general weed control’.

Insecticides were applied as single active ingredients, principally to control aphids (93%). The pyrethroid insecticide lambda-cyhalothrin was the most extensively used insecticide representing 56% of the insecticide-treated area, but comprising only 7% of the quantity applied. The molluscicide methiocarb was used on 241 hectares of winter wheat to control slugs and leatherjackets (*Tipula* spp.).

Chlormequat, primarily used as a single active ingredient but also in formulations with choline chloride and 2-chloroethylphosphonic acid, accounted for 77% of the growth regulator-treated area of winter wheat.

Spring oats (Table 17)

The area of spring oats grown in 2000 was 1920 hectares, a two-fold increase over the area grown in 1998.

Fungicides accounted for 25% of the pesticide-treated area of spring oats, representing 30% of the total quantity of pesticides used. Herbicides and desiccants accounted for 36% of the pesticide-treated area of spring oats, representing 33% of the quantity applied. The area sown with treated seed represented 19% of the pesticide-treated area and 8% of the weight applied. Growth regulators accounted for 10% and 22% of the pesticide-treated area and quantity applied, respectively. Insecticides represented 11% and 6% of the pesticide-treated area and quantity applied, respectively. No molluscicides were applied to spring oats in 2000 (Tables 5 & 6).

An estimated 49% of fungicide applications were to control mildew (*Blumeria graminis*). Fenpropimorph was the most commonly used fungicide active ingredient.

Metsulfuron-methyl, used for 'general weed control', accounted for 51% of the herbicide-treated area of spring oats. Owing to its low application rate this represented less than 1% of the weight of herbicides applied. An estimated 701kg of mecoprop-P was applied representing 53% of the total quantity of herbicides and desiccants.

Chlormequat, as a single active ingredient, was applied to 97% of the area grown of spring oats.

Pyrethroid insecticides were applied to spring oats solely to control aphids, with esfenvalerate, zeta-cypermethrin and lambda-cyhalothrin contributing equally to total usage. The organophosphate chlorpyrifos was used to control leatherjackets (*Tipula* spp.)

Approximately 94% of the area of spring oats was grown from treated seed. Formulations of carboxin/thiram, guazatine/imazalil and bitertanol/fuberidazole were the only identified seed dressing recorded (Tables 8 & 9).

Undersown oats (Table 18)

Only 25 hectares of undersown oats were grown. This represented less than 1% of the area of arable crops in Northern Ireland in 2000. The herbicide formulation 2,4-DB/MCPA was the only pesticide used the reason for use being 'general weed control'.

Approximately 50% of the area of undersown oats was grown from treated seed. The seed dressing was unidentified (Tables 8 & 9).

Winter oats (Table 19)

Herbicides/desiccants accounted for 26% of the pesticide-treated area of winter oats and 14% of the quantity applied. Fungicides accounted for 31% of the pesticide treated area representing 21% of the weight of pesticide active ingredients used. Growth regulators and seed treatments each accounted for 15% of the pesticide-treated area, while representing 61% and 4% of the quantity applied, respectively. Insecticide usage represented 13% of the pesticide-treated area, less than 1% of the quantity of pesticides used (Tables 5 & 6).

Quinoxifen, as a single active ingredient and in formulation with fenpropimorph, was the most extensively used fungicide, accounting for 42% of the fungicide-treated area and 20% of the quantity applied. This single active ingredient, alone and in formulation, was used extensively to control mildew (*B. graminis*).

Approximately 58% of herbicide and desiccant applications were for 'general weed control' with 16% used in ground preparation and 15% to control annual dicotyledon weeds. The formulation carfentrazone-ethyl/flypyrsulfuron-methyl accounted for 27% of the area treated and 10% of quantity applied. Metsulfuron-methyl applied as a single active ingredient accounted for 25% of the treated area but less than 1% of the quantity. Glyphosate, used primarily for 'ground preparation', was used on 24% of the herbicide-treated area and contributed 78% to the quantity applied. Amidosulfuron was also commonly used, accounting for 20% of the treated area.

All insecticides were applied to winter oats for aphid control. In common with 1998, pyrethroid insecticide active ingredients accounted for 100% of the insecticide-treated area of this crop with no organophosphates recorded. Cypermethrin, lambda-cyhalothrin, zeta-cypermethrin and permethrin were all recorded.

Chlormequat, used as a single active ingredient and in formulation with choline chloride, accounted for 93% of the area of winter oats treated with growth regulators, representing 97% of the weight of growth regulator active ingredients applied. Trinexapac-ethyl was the only other growth regulator recorded in use on winter oats.

Approximately 97% of the area of winter oats grown in Northern Ireland in 2000 were sown with treated seed. The formulation, bitertanol/fuberidazole, was the most extensively used, representing 39% of the treated area. The single active ingredient fludioxonil was used on 21% of the treated area.

PESTICIDE USAGE ON MINOR CROPS:

OILSEED RAPE (Table 20)

During 2000, 131 hectares of oilseed rape were grown in Northern Ireland.

Herbicides/desiccants were applied to 50% of the pesticide-treated area of oilseed rape (accounting for 20% of the quantity of pesticides applied), fungicides 33% (80%) and seed treatments 17%. No molluscicides, insecticides or growth regulators were used (Tables 5 & 6).

Approximately 50% of fungicide applications were applied for broad-spectrum disease control. The active ingredient was tebuconazole. The remainder was for the addition of the trace element, sulphur. Sulphur accounted for 98% of the weight of fungicides applied to this crop.

The single active ingredients diquat and propaquizafop along with the formulation metazachlor/quinmerac were the only herbicides used on oilseed rape. They were used on an equal basis with regard to spray area but the formulation metazachlor/quinmerac provided 74% of the quantity applied. Diquat was used as a desiccant while the others were used for 'general weed control'.

Approximately 94% of the area of oilseed rape was grown from treated seed. The seed treatment used was not identified.

Peas & Beans (Table 21)

Peas and beans were recorded in Northern Ireland for the first time in 1998 with 199 hectares grown. In 2000 this figure increased to 273 ha, of which 193 ha were grown in County Down (Table 3). Approximately 367kg of pesticides were used on these crops.

Herbicides and desiccants accounted for 43%, fungicides 30%, insecticides 4% and seed treatments 23% of the pesticide-treated area.

Chlorothalonil, carbendazim and tebuconazole were the main fungicide active ingredients used, with 'general disease control' the main reason for application.

The residual dinitroaniline herbicide pendimethalin was the most extensively used, being applied to 37% of the herbicide treated area and providing 59% of the quantity applied. The reason for its application was recorded as 'general weed control'.

Pirimicarb was the only insecticide used. Aphids were the reason given for the usage of this insecticide.

No molluscicides or growth regulators were recorded in use on this crop.

Triticale (Table 22)

An estimated 64 hectares of triticale were grown in Northern Ireland in 2000, all in County Londonderry.

Azoxystrobin and bromuconazole were the only fungicide active ingredients used for 'general disease control'.

Isoproturon was the only herbicide used.

Chlormequat was the only growth regulator used on this crop.

The molluscicide methiocarb was applied to 50% of the sown area.

The formulation metalaxyl/thiabendazole/thiram was the principal seed treatment applied.

No insecticides were applied to this crop.

PESTICIDE USAGE ON SET-ASIDE (Table 23)

Set aside was recorded in Northern Ireland for the first time in 2000, at an estimated 2,451 hectares.

Only herbicides were used on this area. The single active ingredient glyphosate and the formulations 2,4-DB/benazolin/MCPA and linuron/2,4-DB/MCPA were used, principally for 'general weed control'.

COMPARISON WITH PREVIOUS SURVEYS OF PESTICIDE USAGE ON THE AREAS OF ARABLE CROPS GROWN (Table 24)

The area of arable crops grown in Northern Ireland in 2000 reduced by approximately 5% from that recorded in the 1998 survey. This represented a 12% reduction in the area of arable crops grown when compared to that recorded in 1990 and was similar to the area grown in 1994.

Spring cereal production, which had been previously experiencing a decline, increased, particularly for spring wheat, which increased significantly. The area of winter cereals decreased by an average of 36%.

The oilseed rape crop area in 2000 decreased significantly from 1998 reducing by 82% from 738 hectares to 131 hectares.

Triticale crops, recorded an almost 300% increase in area grown compared to 1998.

Peas and beans were recorded for the second time in 2000 and showed a 37% increase in area grown from 1998.

Set aside land was recorded for the first time in Northern Ireland.

TRENDS IN PESTICIDE USAGE

- Comparisons with previous surveys

ARABLE (Tables 25 & 26)

Overall, a 5% decrease in the area of arable crops grown was recorded between 1998 and 2000. During this period, the quantity of pesticides applied to arable crops decreased by 15%. However, the total area of pesticide application increased by 4%.

There was a 51% increase in the area treated with insecticides compared with 1998 and a more than six-fold increase when compared with 1990. The quantity of insecticide active ingredients used increased by almost 200%. Organophosphate usage, in both area treated and quantity applied, exceeded levels recorded during any previous survey. The use of pyrethroids also increased significantly but the use of carbamates reduced by 94% and 88% in both area and quantity applied respectively.

Application of molluscicides continued to increase in both quantity and area treated

Fungicide usage, by area of application, was at a similar level to 1998. However, a 41% reduction was recorded in the quantity applied.

The area of application and quantity of growth regulator active ingredients used, decreased by approximately 10% from 1998 levels. The area of arable crops grown from treated seed in 2000 increased by 8% and the quantity of seed treatment applied increased by 42% in comparison with the previous survey.

CEREALS (Tables 27& 28)

The total pesticide application area increased by 5% when compared with 1998. However, the quantity of pesticides applied to cereal crops decreased by 15%.

The area treated with fungicides remained approximately similar to 1998 but the quantity of fungicide applied reduced by 42%. This was due to a reduction of quantity applied to winter cereals.

The steadily decreasing trend which had been observed in the quantity of insecticides applied which was evident from previous years data, appears to have ended. The quantity of insecticides applied to cereal crops in 2000 increased by 187% compared with 1998 along with a 53% increase in application area.

A significant increase in both quantity applied and area treated with molluscicides to cereal crops was recorded with a more than seven-fold increase in application area and quantity applied.

The area treated with herbicides/desiccants had a marginal reduction of 2%, with the quantity applied decreasing by 10%.

The quantity of growth regulators applied returned to the level of 1996 which was contrary to the increasing trend experienced between 1990 and 1998. The area of application also reduced to 17,237 spray hectares which was a 9% decrease from 1998.

The quantity of seed treatment active ingredients applied to cereals increased by 36% when compared with 1998 levels but was 3% less than in 1996. The treated area increased by 8% over levels recorded in the previous survey.

COMPARISON OF PESTICIDE USAGE ON OILSEED RAPE (Tables 29& 30)

There has been a 82% decrease in the area of oilseed rape grown in Northern Ireland in 2000 compared with 1998. This was the smallest area of oilseed rape grown since these surveys began. The significant reduction in area grown was reflected in large reductions in both treated area and quantity applied of most pesticide types except for the quantity of fungicide active ingredients applied which increased by 6% when compared with 1998.

COMPARISON OF PESTICIDE USAGE ON PEAS AND BEANS (Tables 31& 32)

The growing of peas and beans in Northern Ireland was first recorded in the 1998 arable survey with 199 hectares being grown. In 2000, 273 hectares were grown which represents a 37% increase. Overall, pesticide usage decreased, with a 47% and 40% reduction for treated area and quantity applied, respectively.

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Figure 1 The regional distribution of arable crops grown in Northern Ireland in 2000

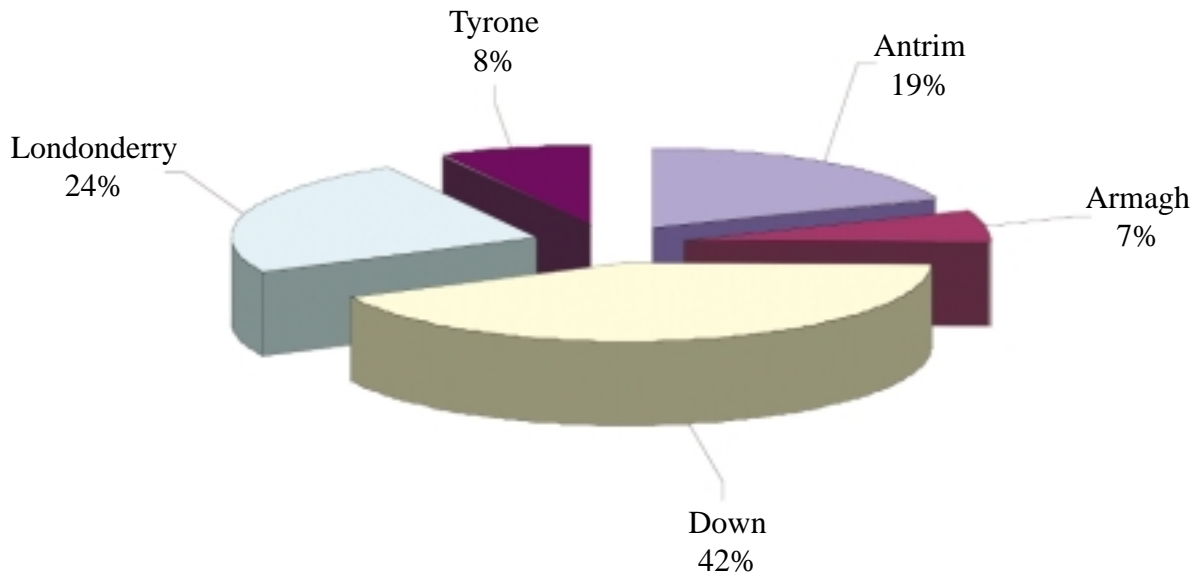


Figure 2 Utilization of arable land in Northern Ireland in 2000

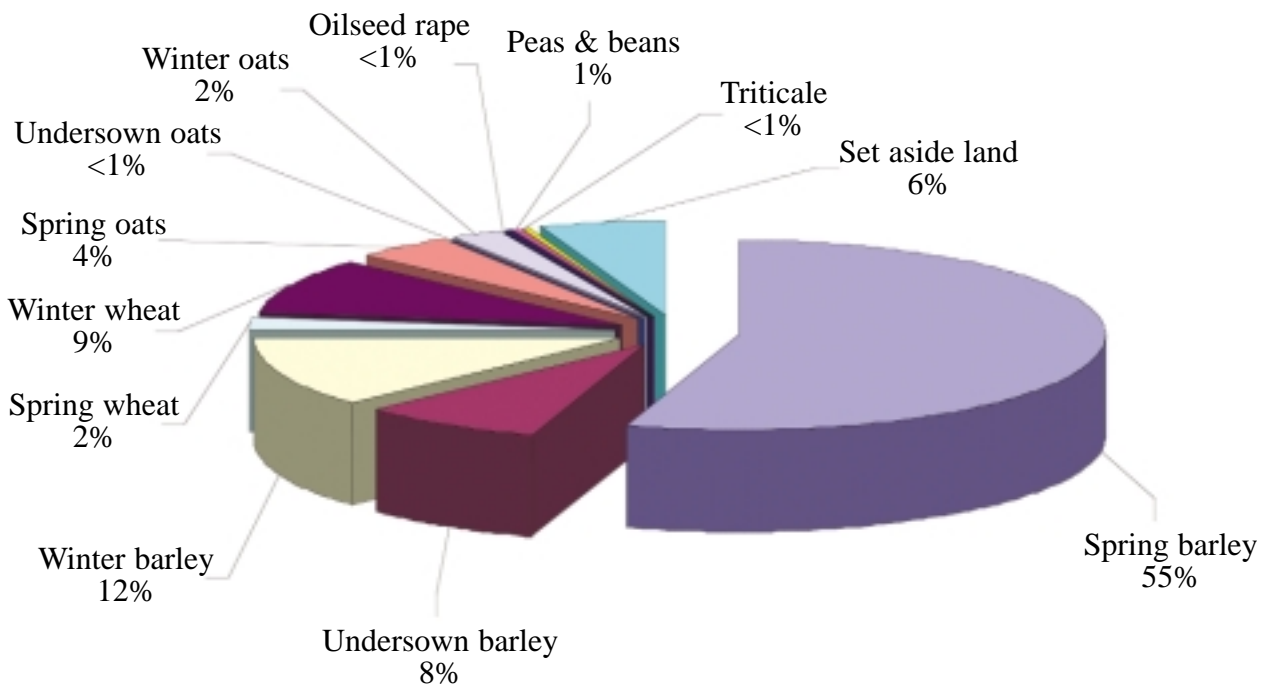


Figure 3 The areas of arable crops treated (spray hectares) with each pesticide type in the county regions of Northern Ireland

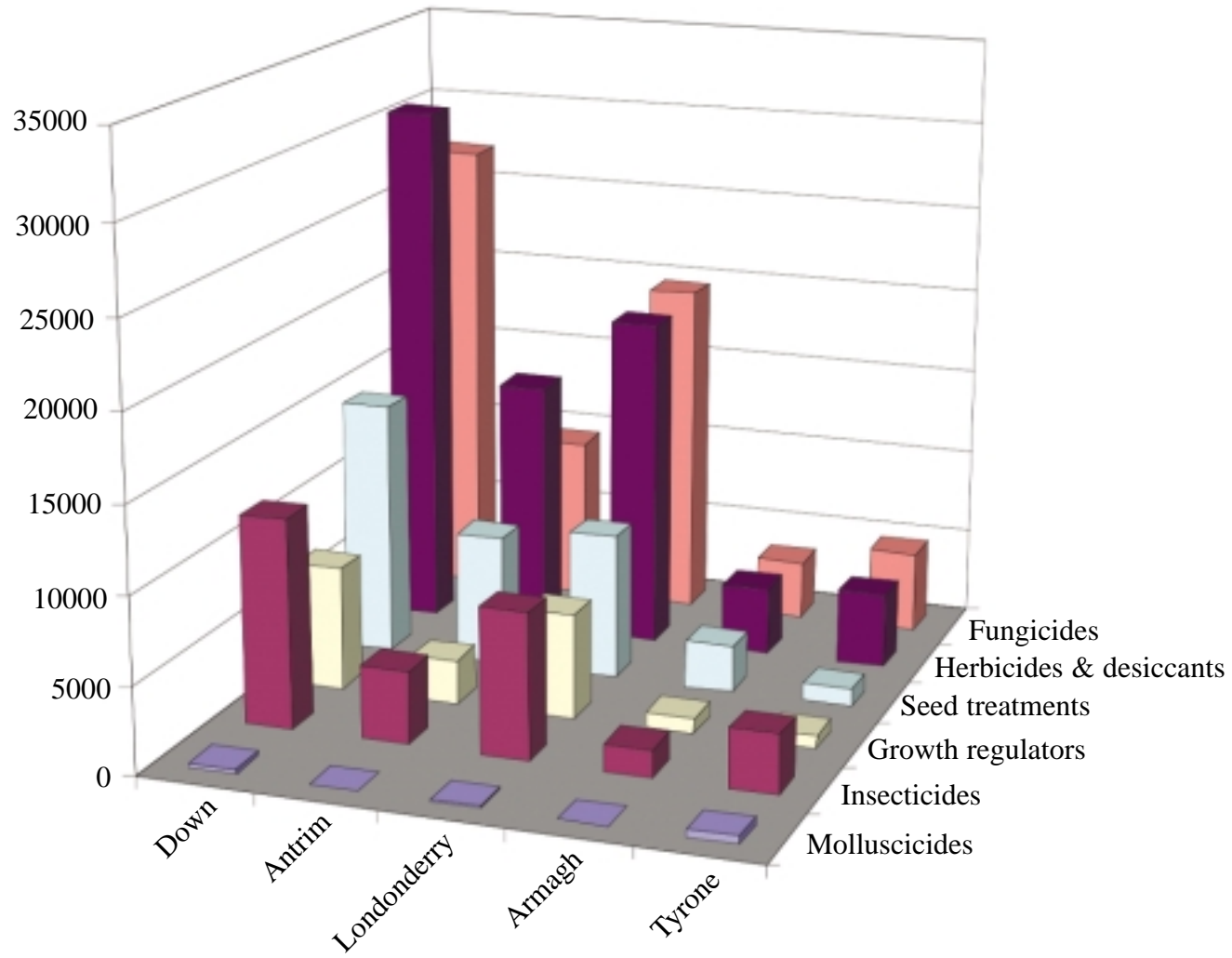


Table 1 Number of farms in each size class with arable crops in the Northern Ireland June 2000 census and the number of samples from each class.

County	Size group (hectares)												Total	
	< 2		2 < 5		5 < 10		10 < 20		20 < 40		40+		Holdings	Holdings
	Holdings in strata	Holdings sampled	Holdings in strata	Holdings sampled	Holdings in strata	Holdings sampled	Holdings in strata	Holdings sampled	Holdings in strata	Holdings sampled	Holdings in strata	Holdings sampled	in strata	sampled
Antrim	144	1	301	5	242	2	178	5	83	11	28	8	976	32
Armagh	60	1	111	0	75	4	49	0	19	2	10	1	324	8
Down	248	6	433	10	354	16	327	26	138	26	100	40	1,600	124
Fermanagh	20	0	3	0	2	0	4	0	0	0	0	0	29	0
Londonderry	127	1	293	1	237	4	190	6	89	4	64	11	1,000	27
Tyrone	100	0	169	0	119	1	82	0	26	2	14	2	510	5
Northern Ireland	699	9	1,310	16	1,029	27	830	37	355	45	216	62	4,439	196

Table 2 The total number and area (hectares) of crops sampled, and the proportion (%) of the total area of arable crops surveyed in Northern Ireland, 2000.

CROP	Number of crops surveyed	Survey area (ha)	Proportion of crops surveyed (%)
Spring barley	206	2,365	10
Undersown barley	36	196	6
Winter barley	109	1,329	26
Spring wheat	20	148	17
Winter wheat	125	1,640	40
Spring oats	16	65	3
Undersown oats	1	2	8
Winter oats	16	228	24
Oilseed rape	3	27	21
Peas & beans	11	35	13
Triticale	1	12	19
Set-aside land	84	545	22
All crops	628	6,592	15

Table 3 Estimated area (hectares) of arable crops grown regionally in Northern Ireland 2000.

CROP	County					Northern Ireland
	Antrim	Armagh	Down	Londonderry	Tyrone	
Spring barley	4,347	1,621	9,698	5,723	2,511	23,901
Undersown barley	869	.	1,087	1,576	.	3,532
Winter barley	811	142	2,566	1,301	374	5,194
Spring wheat	71	312	353	127	.	863
Winter wheat	853	25	2,169	877	202	4,125
Spring oats	601	581	660	.	77	1,920
Undersown oats	.	.	25	.	.	25
Winter oats	331	.	603	33	.	967
Oilseed rape	122	.	9	.	.	131
Peas & beans	.	37	193	.	43	273
Triticale	.	.	.	64	.	64
Set-aside land	258	96	987	836	274	2,451
All crops	8,263	2,814	18,352	10,538	3,480	43,447

Table 4 Estimated area (spray hectares) of arable crops treated regionally with each pesticide type in Northern Ireland 2000.

Pesticide type	County					Northern Ireland
	Antrim	Armagh	Down	Londonderry	Tyrone	
Fungicides	9,487	3,386	27,111	19,577	4,688	64,249
Herbicides & desiccants	14,742	3,917	30,680	19,137	4,351	72,828
Insecticides	4,260	1,569	12,097	8,407	3,366	29,699
Molluscicides	.	.	268	155	442	865
Growth regulators	2,493	872	7,117	6,013	806	17,301
Seed treatments	7,612	2,718	14,770	8,438	1,024	34,562
All crops	38,594	12,462	92,043	61,727	14,677	219,504

Table 5 The total area (spray hectares) and the basic area (hectares), (in parentheses), of arable crops treated, in Northern Ireland 2000, with each pesticide type.

CROP	Pesticide type													
	Fungicides		Herbicides & desiccants		Insecticides		Molluscicides		Growth regulators		Seed treatments		All pesticides	
	Sp ha	(ha)	Sp ha	(ha)	Sp ha	(ha)	Sp ha	(ha)	Sp ha	(ha)	Sp ha	(ha)	Sp ha	(ha)
Spring barley	26,538	(14,823)	41,323	(18,724)	16,478	(11,983)	369	(369)	6,078	(4,753)	19,059	(19,059)	109,845	(23,813)
Undersown barley	2,603	(1,766)	4,372	(3,216)	1,216	(1,166)	.	.	248	(248)	2,948	(2,948)	11,386	(3,465)
Winter barley	14,325	(4,345)	10,773	(4,422)	5,271	(3,651)	109	(109)	4,793	(3,078)	4,767	(4,767)	40,038	(5,194)
Spring wheat	2,130	(780)	894	(480)	670	(670)	13	(13)	54	(46)	812	(812)	4,573	(812)
Winter wheat	13,851	(3,648)	8,835	(3,325)	4,190	(2,872)	342	(342)	4,195	(3,244)	3,901	(3,901)	35,315	(4,125)
Spring oats	2,355	(1,724)	3,446	(1,873)	1,020	(965)	.	.	958	(958)	1,806	(1,806)	9,586	(1,873)
Undersown oats	.	.	25	(25)	.	.	.	.	.	.	25	(25)	51	(25)
Winter oats	1,937	(957)	1,612	(888)	836	(803)	.	.	911	(911)	941	(941)	6,238	(960)
Oilseed rape	244	(122)	366	(122)	.	.	.	.	.	.	123	(123)	732	(123)
Peas & beans	138	(69)	199	(122)	18	(18)	.	.	.	.	105	(105)	460	(141)
Triticale	128	(64)	64	(64)	.	.	32	(32)	64	(64)	64	(64)	352	(64)
Set-aside land	.	.	919	(788)	.	.	.	.	.	.	10	(10)	928	(795)
All crops	64,249	(28,298)	72,828	(34,050)	29,699	(22,129)	865	(865)	17,301	(13,304)	34,562	(34,562)	219,504	(41,390)

Table 6 Total quantities (kilograms) of each pesticide type used on arable crops in Northern Ireland, 2000.

CROP	Fungicides		Herbicides & desiccants		Insecticides		Molluscicides		Growth regulators		Seed treatments		All Pesticides	
Spring barley	5,479		19,191		2,174		73		2,354		1,011		30,282	
Undersown barley	563		4,592		51		.		240		151		5,596	
Winter barley	2,583		8,680		127		17		3,821		182		15,412	
Spring wheat	418		361		14		1		35		137		965	
Winter wheat	2,591		7,174		150		53		4,189		449		14,605	
Spring oats	1,209		1,327		221		.		880		330		3,966	
Undersown oats	.		50		.		.		.		.		50	
Winter oats	475		306		19		.		1,356		83		2,239	
Oilseed rape	642		163		.		.		.		.		805	
Peas & beans	54		197		5		.		.		112		367	
Triticale	18		96		.		7		48		.		168	
Set-aside land	.		866		.		.		.		.		866	
All crops	14,030		43,002		2,759		152		12,922		2,455		75,319	

Table 7 The proportional area (%) of each crop treated with pesticides and the number of spray applications (in parentheses) in Northern Ireland, 2000.

CROP	Fungicides		Herbicides & desiccants		Insecticides		Molluscicides		Growth regulators		Seed treatments		All pesticides	
	%	Sp apps	%	Sp apps	%	Sp apps	%	Sp apps	%	Sp apps	%		%	
Spring barley	62.0	(1.5)	78.3	(1.5)	50.1	(1.1)	1.5	(1.0)	19.9	(1.2)	79.7		99.6	
Undersown barley	50.0	(1.5)	91.0	(1.3)	33.0	(1.0)			7.0	(1.0)	83.5		98.1	
Winter barley	83.7	(2.1)	85.1	(2.2)	70.3	(1.2)	2.1	(1.0)	59.3	(1.4)	91.8		100.0	
Spring wheat	90.3	(2.5)	55.6	(1.7)	77.6	(1.0)	1.5	(1.0)	5.4	(1.4)	94.1		94.1	
Winter wheat	88.4	(2.7)	80.6	(2.0)	69.6	(1.4)	8.3	(1.0)	78.6	(1.3)	94.6		100.0	
Spring oats	89.8	(1.5)	97.6	(1.7)	50.3	(1.1)	.		49.9	(1.0)	94.1		97.6	
Undersown oats	.		100.0	(1.0)	.		.		.		100.0		100.0	
Winter oats	99.0	(1.8)	91.9	(1.3)	83.0	(1.1)	.		94.2	(1.0)	97.3		99.3	
Oilseed rape	93.1	(2.0)	93.1	(3.0)	.		.		.		93.9		93.9	
Peas & beans	25.3	(2.0)	44.8	(1.5)	6.7	(1.0)	.		.		38.4		51.5	
Triticale	100.0	(2.0)	100.0	(1.0)	.		50.0	(1.0)	100.0	(1.0)	100.0		100.0	
Set-aside land	.		32.2	(1.2)	.		.		.		0.4		32.4	
Total	65.1	(2.0)	78.4	(1.7)	50.9	(1.2)	2.0	(1.0)	30.6	(1.2)	79.5		95.3	

Table 8 Estimated area (spray hectares) of arable crops treated with pesticide formulations in Northern Ireland in 2000.

Pesticide type and formulation	Spring barley	Under -sown barley	Winter barley	Spring wheat	Winter wheat	Spring oats	Under -sown oats	Winter oats	Oilseed rape	Peas and beans	Triticale	Set-aside	All crops
Fungicides													
Azoxystrobin	2,732	.	1,947	167	3,861	430	.	339	.	.	64	.	9,538
Azoxystrobin/fenpropimorph	383	49	366	385	416	.	.	.	.	.	.	.	1,599
Bromuconazole	786	.	457	60	860	.	.	49	.	.	64	.	2,277
Carbendazim	.	.	25	.	.	.	.	.	.	18	.	.	43
Carbendazim/chlorothalonil	.	.	.	.	46	.	.	.	.	.	.	.	46
Carbendazim/flusilazole	1,710	246	983	120	233	30	.	33	.	.	.	.	3,355
Carbendazim/flutriafol	.	.	.	.	58	.	.	.	.	.	.	.	58
Carbendazim/prochloraz	.	.	94	.	17	.	.	.	.	.	.	.	111
Carbendazim/propiconazole	.	.	35	.	.	.	.	.	.	.	.	.	35
Chlorothalonil	152	.	.	60	332	.	.	62	.	84	.	.	691
Chlorothalonil/flutriafol	.	.	.	.	64	.	.	.	.	.	.	.	64
Cyproconazole/prochloraz	273	.	136	.	23	.	.	.	.	.	.	.	432
Cyproconazole/propiconazole	.	.	79	.	80	.	.	.	.	.	.	.	159
Cyprodinil	1,839	27	427	.	296	.	.	.	.	.	.	.	2,589
Epoxiconazole	1,570	69	412	40	851	364	.	.	.	.	.	.	3,305
Epoxiconazole/kresoxim-methyl	1,697	123	1,091	8	637	.	.	.	.	.	.	.	3,555
Famoxadone/flusilazole	72	.	.	.	.	.	.	.	.	.	.	.	72
Fenbuconazole	.	.	63	.	184	.	.	.	.	.	.	.	247
Fenpropidin	467	41	343	65	225	.	.	.	.	.	.	.	1,141
Fenpropidin/fenpropimorph	.	136	.	.	.	.	.	.	.	.	.	.	136
Fenpropidin/propiconazole	231	.	.	.	111	.	.	.	.	.	.	.	342
Fenpropidin/tebuconazole	.	.	146	86	34	.	.	.	.	.	.	.	266
Fenpropimorph	1,278	.	1,442	327	152	932	.	70	.	.	.	.	4,201
Fenpropimorph/flusilazole	297	205	346	.	60	.	.	.	.	.	.	.	908
Fenpropimorph/kresoxim-methyl	239	83	52	.	.	.	.	.	.	.	.	.	374
Fenpropimorph/propiconazole	2,161	176	271	.	9	.	.	.	.	.	.	.	2,617
Fenpropimorph/quinoxifen	1,201	.	369	77	97	30	.	89	.	.	.	.	1,864
Fluquinconazole	152	.	.	326	1,601	.	.	31	.	.	.	.	2,110
Fluquinconazole/prochloraz	.	.	.	28	479	.	.	.	.	.	.	.	506
Flusilazole	1,113	283	1,552	58	590	.	.	.	.	.	.	.	3,596
Mancozeb	.	.	.	9	9	.	.	.	.	.	.	.	18
Prochloraz	.	.	.	.	325	.	.	.	.	.	.	.	325
Prochloraz/tebuconazole	.	.	29	.	38	.	.	.	.	.	.	.	68
Propiconazole	3,421	779	1,123	208	224	.	.	62	.	.	.	.	5,817
Propiconazole/tridemorph	.	.	27	.	.	.	.	.	.	.	.	.	27
Quinoxifen	.	.	75	.	.	166	.	723	.	.	.	.	964

Table 8 (cont.) Estimated area (spray hectares) of arable crops treated with pesticide formulations in Northern Ireland in 2000.

Pesticide type and formulation	Spring barley	Under-sown barley	Winter barley	Spring wheat	Winter wheat	Spring oats	Under-sown oats	Winter oats	Oilseed rape	Peas and beans	Triticale	Set-aside	All crops
Fungicides (cont.)													
Spiroxamine	76	.	.	.	.	.	.	.	.	.	.	.	76
Sulphur	80	.	.	.	.	58	.	52	122	.	.	.	312
Tebuconazole	922	103	322	48	943	289	.	338	122	36	.	.	3,123
Tebuconazole/triadimenol	550	.	391	52	485	.	.	74	.	.	.	.	1,552
Tetraconazole	96	.	.	.	.	.	.	.	.	.	.	.	96
Triadimenol/tridemorph	.	.	.	.	.	56	.	.	.	.	.	.	56
Tridemorph	237	.	6	.	.	.	.	.	.	.	.	.	242
Trifloxystrobin	1,677	283	1,508	8	230	.	.	16	.	.	.	.	3,721
Unknown fungicide	1,130	.	210	.	279	.	.	.	.	.	.	.	1,618
All fungicides	26,538	2,603	14,325	2,130	13,851	2,355	.	1,937	244	138	128	.	64,249
Herbicides & desiccants													
Amidosulfuron	20	.	264	.	252	.	.	322	.	.	.	.	858
Benazolin/Bromoxynil/ioxynil	1,414	136	306	13	107	.	.	.	.	.	.	.	1,975
Benazolin/2,4-DB/MCPA	.	117	.	.	.	.	.	.	.	.	.	.	155
Bentazone/MCPB	.	.	.	.	.	.	.	.	.	22	.	.	22
Bromoxynil/diflufenican/ioxynil	.	.	.	.	117	.	.	.	.	.	.	.	117
Bromoxynil/ioxynil	59	.	.	.	.	.	.	.	.	.	.	.	59
Bromoxynil/ioxynil/mecoprop-P	8	.	191	.	.	.	.	.	.	.	.	.	199
Carfentrazone-ethyl/ flupyrsulfuron-methyl	.	.	.	.	.	.	.	436	.	.	.	.	436
Clopyralid/fluroxypyr/triclopyr	.	.	231	.	.	.	.	.	.	.	.	.	231
Cyanazine	.	.	.	.	.	.	.	.	.	22	.	.	22
Cycloxydim	.	.	.	.	.	.	.	.	.	15	.	.	15
2,4-D	.	41	.	.	.	.	.	.	.	.	.	.	41
2,4-DB/linuron/MCPA	177	1,069	.	120	.	.	.	.	.	.	.	.	1,400
2,4-DB/MCPA	.	157	.	.	.	.	25	.	.	.	.	.	183
Dicamba/MCPA/mecoprop	438	393	.	.	.	73	.	.	.	.	.	.	904
Dicamba/MCPA/mecoprop-P	798	.	.	.	.	.	.	.	.	.	.	.	798
Dichlorprop	187	.	340	.	.	.	.	.	.	.	.	.	527
Dichlorprop/MCPA	.	283	.	.	.	.	.	.	.	.	.	.	283
Diclofop-methyl/fenoxaprop-P-ethyl	68	.	112	.	3	.	.	.	.	.	.	.	184
Diflufenican/flurtamone	.	.	166	.	61	.	.	49	.	.	.	.	276
Diflufenican/Isoproturon	.	.	1,054	.	563	.	.	.	.	.	.	.	1,617
Diflufenican/terbuthylazine	.	.	452	24	271	.	.	.	.	.	.	.	747

Table 8 (cont.) Estimated area (spray hectares) of arable crops treated with pesticide formulations in Northern Ireland in 2000.

Pesticide type and formulation	Spring barley	Under-sown barley	Winter barley	Spring wheat	Winter wheat	Spring oats	Under-sown oats	Winter oats	Oilseed rape	Peas and beans	Triticale	Set-aside	All crops
Herbicides & desiccants (cont.)													
Diflufenican/trifluralin	.	.	.	.	17	.	.	.	.	.	.	.	17
Diquat	36	.	.	.	11	.	.	.	122	.	.	.	168
Fenoxaprop ethyl	.	.	.	.	17	.	.	.	.	.	.	.	17
Fenoxaprop-P-ethyl	.	.	.	.	64	.	.	.	.	.	.	.	64
Flamprop-M-isopropyl	274	.	15	.	28	.	.	.	.	.	.	.	317
Florasulam	148	.	59	.	383	.	.	.	.	.	.	.	590
Fluroxypyr	519	136	168	6	187	.	.	.	.	.	.	.	1,016
Glyphosate	8,352	1,052	1,758	68	1,710	123	.	380	.	33	.	.	14,322
Isoproturon	1,068	.	2,379	24	1,985	.	.	.	.	.	64	.	5,519
Isoproturon/pendimethalin	.	.	489	.	276	.	.	.	.	.	.	.	765
Isoproturon/trifluralin	.	.	130	.	198	.	.	.	.	.	.	.	328
MCPA	513	.	.	.	46	364	.	.	.	.	.	.	923
MCPB	.	205	.	.	.	.	.	.	.	.	.	.	205
Mecoprop	2,471	213	93	150	106	123	.	18	.	.	.	.	3,174
Mecoprop-P	2,596	93	.	146	199	963	.	.	.	.	.	.	3,996
Metazachlor/quinmerac	.	.	.	.	.	.	.	.	122	.	.	.	122
Metsulfuron-methyl	18,346	431	1,067	223	1,032	1,763	.	407	.	.	.	.	23,270
Metsulfuron-methyl/ thifensulfuron-methyl	2,276	.	24	43	94	.	.	.	.	.	.	.	2,437
Metsulfuron-methyl/tribenuron-methyl	311	.	75	.	96	.	.	.	.	.	.	.	482
Paraquat	57	.	.	.	17	.	.	.	.	6	.	.	80
Pendimethalin	.	.	199	.	42	.	.	.	.	73	.	.	314
Propaquizafop	.	.	.	.	.	.	.	.	122	.	.	.	122
Simazine	.	.	.	.	.	.	.	.	.	10	.	.	10
terbuthylazine/terbutryn	.	.	.	.	.	.	.	.	.	18	.	.	18
Thifensulfuron-methyl/ tribenuron-methyl	980	.	47	68	51	.	.	.	.	.	.	.	1,146
Tralkoxydim	34	.	41	.	.	.	.	.	.	.	.	.	75
Trifluralin	.	.	436	.	537	.	.	.	.	.	.	.	974
Unknown herbicide	177	47	677	9	365	37	.	.	.	.	.	.	1,311
All herbicides & desiccants	41,323	4,372	10,774	894	8,835	3,447	25	1,612	366	199	64	.	72,828

Table 8 (cont.) Estimated area (spray hectares) of arable crops treated with pesticide formulations in Northern Ireland in 2000.

Pesticide type and formulation	Spring barley	Under -sown barley	Winter barley	Spring wheat	Winter wheat	Spring oats	Under -sown oats	Winter oats	Oilseed rape	Peas and beans	Triticale	Set-aside	All crops
Insecticides													
Chlorpyrifos	2,864	62	119	14	140	301	.	.	.	.	.	.	3,498
Cypermethrin	922	.	490	15	595	.	.	384	.	.	.	.	2,406
Deltamethrin	430	35	36	.	.	.	.	.	.	.	.	.	501
Dimethoate	182	.	.	.	92	.	.	.	.	.	.	.	275
Esfenvalerate	2,399	111	567	8	512	63	.	.	.	.	.	.	3,660
Lambda-cyhalothrin	6,148	1,009	3,583	574	2,347	56	.	162	.	.	.	.	13,878
Permethrin	357	.	99	.	72	.	.	52	.	.	.	.	580
Pirimicarb	.	.	.	.	.	.	.	.	.	18	.	.	18
Zeta-cypermethrin	1,048	.	321	60	324	601	.	238	.	.	.	.	2,592
Unknown insecticide	2,126	.	56	.	108	.	.	.	.	.	.	.	2,290
All insecticides	16,478	1,216	5,271	670	4,190	1,021	.	836	.	18	.	.	29,699
Molluscicides													
Methiocarb	369	.	89	13	241	.	.	.	.	.	32	.	745
Unknown molluscicide	.	.	20	.	101	.	.	.	.	.	.	.	121
All molluscicides	369	.	109	13	342	.	.	.	.	.	32	.	866
Growth regulators													
Chlormequat	2,900	204	3,597	54	3,051	928	.	592	.	.	64	.	11,390
Chlormequat with choline chloride	.	.	18	.	139	.	.	257	.	.	.	.	414
Chlormequat/ 2-chloroethylphosphonic acid	146	.	.	.	19	.	.	.	.	.	.	.	165
2-chloroethylphosphonic acid	1,488	.	411	.	230	.	.	.	.	.	.	.	2,128
2-chloroethylphosphonic acid/ mepiquat chloride	174	.	358	.	71	.	.	.	.	.	.	.	604
Trinexapac-ethyl	1,107	44	374	.	530	30	.	62	.	.	.	.	2,147
Unknown growth regulator	264	.	35	.	155	.	.	.	.	.	.	.	454
All growth regulators	6,078	248	4,793	54	4,195	958	.	911	.	.	64	.	17,301

Table 8 (cont.) Estimated area (spray hectares) of arable crops treated with pesticide formulations in Northern Ireland in 2000.

Pesticide type and formulation	Spring barley	Under-sown barley	Winter barley	Spring wheat	Winter wheat	Spring oats	Under-sown oats	Winter oats	Oilseed rape	Peas and beans	Triticale	Set-aside	All crops
Seed treatments													
Bitertanol/fuberidazole	.	.	.	152	957	345	.	371	.	.	.	.	1,825
Carboxin/thiram	841	.	360	522	811	918	.	145	.	.	.	.	3,596
Fludioxonil	.	.	.	.	140	.	.	195	.	.	.	.	335
Fuberidazole/triadimenol	229	.	109	.	303	.	.	.	.	.	.	.	641
Guazatine	84	337	38	.	487	.	.	105	.	.	.	.	1,050
Guazatine/imazalil	5,362	695	519	.	145	543	.	52	.	.	.	.	7,317
Metalaxyl/thiabendazole/thiram	.	.	.	.	.	.	.	.	.	33	.	.	33
Tebuconazole/triazoxide	7,751	1,288	2,722	.	.	.	.	.	.	.	.	.	11,761
Unknown seed treatment	4,793	627	1,019	138	1,059	.	25	74	123	72	64	.	8,003
All seed treatments	19,060	2,948	4,767	812	3,901	1,806	25	941	123	105	64	.	34,562
All pesticides	109,845	11,386	40,038	4,573	35,315	9,586	51	6,238	732	460	352	.	219,504

Table 9 Estimated quantities (kilograms) of pesticide formulations used on arable crops in Northern Ireland in 2000.

Pesticide type and formulation	Spring barley	Under-sown barley	Winter barley	Spring wheat	Winter wheat	Spring oats	Under-sown oats	Winter oats	Oilseed rape	Peas and beans	Triticale	Set-aside	All crops
Fungicides													
Azoxystrobin	449	.	353	31	621	58	.	49	.	.	11	.	1,572
Azoxystrobin/fenpropimorph	172	26	147	104	161	.	.	.	.	.	.	.	610
Bromuconazole	117	.	40	14	128	.	.	8	.	.	6	.	313
Carbendazim	.	.	6	.	.	.	.	.	.	4	.	.	10
Carbendazim/chlorothalonil	.	.	.	.	13	.	.	.	.	.	.	.	13
Carbendazim/flusilazole	394	56	151	27	48	7	.	5	.	.	.	.	688
Carbendazim/flutriafol	.	.	.	.	18	.	.	.	.	.	.	.	18
Prochloraz/carbendazim	.	.	26	.	8	.	.	.	.	.	.	.	34
Carbendazim/propiconazole	.	.	0	.	.	.	.	.	.	.	.	.	0
Chlorothalonil	152	.	.	42	166	.	.	62	.	43	.	.	465
Chlorothalonil/flutriafol	.	.	.	.	55	.	.	.	.	.	.	.	55
Cyproconazole/prochloraz	91	.	55	.	7	.	.	.	.	.	.	.	153
Cyproconazole/propiconazole	.	.	16	.	13	.	.	.	.	.	.	.	29
Cyprodinil	435	5	166	.	131	.	.	.	.	.	.	.	737
Epoxiconazole	99	2	31	2	64	24	.	.	.	.	.	.	222
Epoxiconazole/kresoxim-methyl	140	9	136	1	118	.	.	.	.	.	.	.	404
Flusilazole/famoxadone	4	.	.	.	.	.	.	.	.	.	.	.	4
Fenbuconazole	.	.	3	.	7	.	.	.	.	.	.	.	10
Fenpropidin	189	31	183	22	101	.	.	.	.	.	.	.	525
Fenpropidin/fenpropimorph	.	20	.	.	.	.	.	.	.	.	.	.	20
Fenpropidin/propiconazole	98	.	.	.	38	.	.	.	.	.	.	.	136
Fenpropidin/tebuconazole	.	.	44	29	6	.	.	.	.	.	.	.	78
Fenpropimorph	408	.	200	30	59	542	.	29	.	.	.	.	1,266
Fenpropimorph/flusilazole	145	111	116	.	31	.	.	.	.	.	.	.	402
Fenpropimorph/kresoxim-methyl	75	38	16	.	.	.	.	.	.	.	.	.	129
Fenpropimorph/propiconazole	669	89	117	.	5	.	.	.	.	.	.	.	879
Fenpropimorph/quinoxifen	190	.	76	37	12	5	.	24	.	.	.	.	343
Fluquinconazole	19	.	.	12	116	.	.	13	.	.	.	.	161
Fluquinconazole/prochloraz	.	.	.	5	100	.	.	.	.	.	.	.	105
Flusilazole	120	28	127	8	84	.	.	.	.	.	.	.	367
Mancozeb	.	.	.	7	7	.	.	.	.	.	.	.	15
Prochloraz	.	.	.	.	94	.	.	.	.	.	.	.	94
Prochloraz/tebuconazole	.	.	50	.	65	.	.	.	.	.	.	.	114
Propiconazole	341	89	131	25	18	.	.	4	.	.	.	.	608
Propiconazole/tridemorph	.	.	7	.	.	.	.	.	.	.	.	.	7
Quinoxifen	.	.	5	.	.	16	.	73	.	.	.	.	94

Table 9 (cont.) Estimated quantities (kilograms) of pesticide formulations used on arable crops in Northern Ireland in 2000.

Pesticide type and formulation	Spring barley	Under-sown barley	Winter barley	Spring wheat	Winter wheat	Spring oats	Under-sown oats	Winter oats	Oilseed rape	Peas and beans	Triticale	Set-aside	All crops
Fungicides (cont.)													
Spiroxamine	11	.	.	.	.	.	.	.	.	.	.	.	11
Sulphur	642	.	.	.	.	457	.	145	627	.	.	.	1,870
Tebuconazole	184	24	41	4	133	72	.	40	15	7	.	.	519
Tebuconazole/triadimenol	112	.	133	17	130	.	.	21	.	.	.	.	412
Tetraconazole	12	.	.	.	.	.	.	.	.	.	.	.	12
Triadimenol/tridemorph	.	.	.	.	.	28	.	.	.	.	.	.	28
Tridemorph	44	.	1	.	.	.	.	.	.	.	.	.	46
Trifloxystrobin	170	35	207	1	35	.	.	2	.	.	.	.	450
<i>All fungicides</i>	5,479	563	2,583	418	2,591	1,209	.	475	642	54	18	.	14,030
Herbicides & desiccants													
Amidosulfuron	1	.	5	.	4	.	.	3	.	.	.	.	13
Benazolin/Bromoxynil/ioxynil	435	49	129	3	36	.	.	.	.	.	.	.	652
Benazolin/2,4-DB/MCPA	.	226	.	.	.	.	.	.	.	.	.	.	309
Bentazone/MCPB	.	.	.	.	.	.	.	.	.	18	.	.	18
Bromoxynil/diflufenican/ioxynil	.	.	.	.	32	.	.	.	.	.	.	.	32
Bromoxynil/ioxynil	35	.	.	.	.	.	.	.	.	.	.	.	35
Bromoxynil/ioxynil/mecoprop-P	11	.	301	.	.	.	.	.	.	.	.	.	312
Carfentrazone-ethyl/ flupyrsulfuron-methyl	.	.	.	.	.	.	.	30	.	.	.	.	30
Clopyralid/fluroxypyr/triclopyr	.	.	208	.	.	.	.	.	.	.	.	.	208
Cyanazine	.	.	.	.	.	.	.	.	.	4	.	.	4
Cycloxydim	.	.	.	.	.	.	.	.	.	2	.	.	2
2,4-D	.	144	.	.	.	.	.	.	.	.	.	.	144
2,4-DB/linuron/MCPA	173	743	.	88	.	.	.	.	.	.	.	.	1,029
2,4-DB/MCPA	.	308	.	.	.	.	50	.	.	.	.	.	358
Dicamba/MCPA/mecoprop	294	358	.	.	.	113	.	.	.	.	.	.	764
Dicamba/MCPA/mecoprop-P	876	.	.	.	.	.	.	.	.	.	.	.	876
Dichlorprop	525	.	258	.	.	.	.	.	.	.	.	.	783
Dichlorprop/MCPA	.	708	.	.	.	.	.	.	.	.	.	.	708
Diclofop-methyl/fenoxaprop-P-ethyl	32	.	59	.	2	.	.	.	.	.	.	.	93
Diflufenican/flurtamone	.	.	58	.	22	.	.	20	.	.	.	.	100
Diflufenican/Isoproturon	.	.	708	.	554	.	.	.	.	.	.	.	1,262
Diflufenican/terbuthylazine	.	.	79	3	62	.	.	.	.	.	.	.	144
Diflufenican/trifluralin	.	.	.	.	8	.	.	.	.	.	.	.	8

Table 9 (cont.) Estimated quantities (kilograms) of pesticide formulations used on arable crops in Northern Ireland in 2000.

Pesticide type and formulation	Spring barley	Under -sown barley	Winter barley	Spring wheat	Winter wheat	Spring oats	Under -sown oats	Winter oats	Oilseed rape	Peas and beans	Triticale	Set-aside	All crops
Herbicides & desiccants (cont.)													
Diquat	22	.	.	.	6	.	.	.	37	.	.	.	65
Fenoxaprop ethyl	.	.	.	.	2	.	.	.	.	.	.	.	2
Fenoxaprop-P-ethyl	.	.	.	.	2	.	.	.	.	.	.	.	2
Flamprop-M-isopropyl	86	.	11	.	11	.	.	.	.	.	.	.	108
Florasulam	1	.	0	.	1	.	.	.	.	.	.	.	2
Fluroxypyr	61	14	46	1	32	.	.	.	.	.	.	.	152
Glyphosate	10,057	1,090	2,362	62	1,779	87	.	240	.	24	.	.	16,459
Isoproturon	1,335	.	2,798	18	2,948	.	.	.	.	.	96	.	7,195
Isoproturon/pendimethalin	.	.	710	.	420	.	.	.	.	.	.	.	1,131
Isoproturon/trifluralin	.	.	224	.	350	.	.	.	.	.	.	.	574
MCPA	513	.	.	.	32	319	.	.	.	.	.	.	864
MCPB	.	573	.	.	.	.	.	.	.	.	.	.	573
Mecoprop	2,491	250	161	78	150	99	.	12	.	.	.	.	3,241
Mecoprop-P	1,986	128	.	104	181	701	.	.	.	.	.	.	3,099
Metazachlor/quinmerac	.	.	.	.	.	.	.	.	121	.	.	.	121
Metsulfuron-methyl	147	2	5	1	5	9	.	2	.	.	.	.	170
Metsulfuron-methyl/ thifensulfuron-methyl	74	.	2	1	5	.	.	.	.	.	.	.	81
Metsulfuron-methyl/ tribenuron-methyl	2	.	1	.	1	.	.	.	.	.	.	.	3
Paraquat	6	.	.	.	10	.	.	.	.	4	.	.	19
Pendimethalin	.	.	216	.	66	.	.	.	.	116	.	.	398
Propaquizafop	.	.	.	.	.	.	.	.	6	.	.	.	6
Simazine	.	.	.	.	.	.	.	.	.	6	.	.	6
terbuthylazine/terbutryn	.	.	.	.	.	.	.	.	.	23	.	.	23
Thifensulfuron-methyl/ tribenuron-methyl	23	.	4	2	5	.	.	.	.	.	.	.	33
Tralkoxydim	8	.	7	.	.	.	.	.	.	.	.	.	15
Trifluralin	.	.	330	.	449	.	.	.	.	.	.	.	779
Unknown herbicide	0	.	.	.	.	.	.	.	.	.	.	.	0
All herbicides & desiccants	19,191	4,592	8,680	361	7,174	1,327	50	306	163	197	96	.	43,002

Table 9 (cont.) Estimated quantities (kilograms) of pesticide formulations used on arable crops in Northern Ireland in 2000.

Pesticide type and formulation	Spring barley	Under-sown barley	Winter barley	Spring wheat	Winter wheat	Spring oats	Under-sown oats	Winter oats	Oilseed rape	Peas and beans	Triticale	Set-aside	All crops
Insecticides													
Chlorpyrifos	1,994	44	80	10	95	211	.	.	.	.	.	.	2,435
Cypermethrin	22	.	12	0	14	.	.	13	.	.	.	.	62
Deltamethrin	8	0	0	.	.	.	.	.	.	.	.	.	8
Dimethoate	51	.	.	.	20	.	.	.	.	.	.	.	71
Esfenvalerate	10	0	2	0	4	0	.	.	.	.	.	.	17
Lambda-cyhalothrin	35	6	22	3	10	0	.	1	.	.	.	.	77
Permethrin	28	.	6	.	4	.	.	3	.	.	.	.	41
Pirimicarb	.	.	.	.	.	.	.	.	.	5	.	.	5
Zeta-cypermethrin	25	.	4	1	4	9	.	2	.	.	.	.	45
All insecticides	2,174	51	127	14	150	221	.	19	.	5	.	.	2,759
Molluscicides													
Methiocarb	73	.	17	2	53	.	.	.	.	.	7	.	152
All molluscicides	73	.	17	2	53	.	.	.	.	.	7	.	152
Growth regulators													
Chlormequat	1,930	238	3,433	35	3,849	876	.	902	.	.	48	.	11,311
Chlormequat with choline chloride	.	.	28	.	211	.	.	412	.	.	.	.	652
Chlormequat/ 2-chloroethylphosphonic acid	79	.	.	.	10	.	.	.	.	.	.	.	89
2-chloroethylphosphonic acid	202	.	137	.	34	.	.	.	.	.	.	.	374
2-chloroethylphosphonic acid/ mepiquat chloride	40	.	204	.	49	.	.	.	.	.	.	.	293
Trinexapac-ethyl	103	2	19	.	35	4	.	41	.	.	.	.	204
All growth regulators	2,354	240	3,821	35	4,189	880	.	1,356	.	.	48	.	12,922

Table 9 (cont.) Estimated quantities (kilograms) of pesticide formulations used on arable crops in Northern Ireland in 2000.

Pesticide type and formulation	Spring barley	Under -sown barley	Winter barley	Spring wheat	Winter wheat	Spring oats	Under -sown oats	Winter oats	Oilseed rape	Peas and beans	Triticale	Set-aside	All crops
Seed treatments													
Bitertanol/fuberidazole	.	.	.	18	105	42	.	39	.	.	.	.	204
Carboxin/thiram	212	.	78	118	176	189	.	29	.	.	.	.	802
Fludioxonil	.	.	.	.	6	.	.	2	.	.	.	.	7
Fuberidazole/triadimenol	17	.	7	.	31	.	.	.	.	.	.	.	55
Guazatine	7	42	4	.	113	.	.	9	.	.	.	.	175
Guazatine/imazalil	702	95	65	.	19	99	.	5	.	.	.	.	984
Metalaxyl/thiabendazole/thiram	.	.	.	.	.	.	.	.	.	112	.	.	112
Tebuconazole/triazoxide	73	14	28	.	.	.	.	.	.	.	.	.	115
unknown seed treatment	.	.	.	.	.	.	.	.	.	.	.	.	0
All seed treatments	1,011	151	182	137	449	330	.	83	.	112	.	.	2,455
All pesticides	30,282	5,596	15,412	965	14,605	3,966	50	2,239	805	367	168	.	75,319

Table 10 The fifty active ingredients most extensively used on crops in Northern Ireland in 2000, prioritised by area treated (spray hectares).

	Active ingredient	Treated area (sp ha)
1	Metsulfuron-methyl	26,189
2	Tebuconazole	16,770
3	Glyphosate	14,322
4	Lambda-cyhalothrin	13,878
5	Triazoxide	11,761
6	Fenpropimorph	11,698
7	Chlormequat	11,555
8	Azoxystrobin	11,138
9	Propiconazole	8,996
10	Guazatine	8,367
11	Isoproturon	8,229
12	Flusilazole	7,931
13	Imazalil	7,317
14	Epoxiconazole	6,861
15	Mecoprop-P	4,993
16	MCPA	4,646
17	Mecoprop	4,078
18	Kresoxim-methyl	3,929
19	Trifloxystrobin	3,721
20	Esfenvalerate	3,660
21	Carbendazim	3,648
22	Thiram	3,630
23	Carboxin	3,596
24	Thifensulfuron-methyl	3,583
25	Chlorpyrifos	3,498
26	2-chloroethylphosphonic acid	2,897
27	Quinoxifen	2,827
28	Diflufenican	2,774
29	Fluquinconazole	2,616
30	Zeta-cypermethrin	2,592
31	Cyprodinil	2,589
32	Fuberidazole	2,466
33	Cypermethrin	2,406
34	Bromoxynil	2,349
35	Ioxynil	2,349
36	Bromuconazole	2,277
37	Triadimenol	2,249
38	Trinexapac-ethyl	2,147
39	Benazolin	2,131
40	Fenpropidin	1,885
41	Bitertanol	1,825
42	2,4-DB	1,738
43	Dicamba	1,702
44	Tribenuron-methyl	1,628
45	Prochloraz	1,442
46	Linuron	1,400
47	Trifluralin	1,319
48	Fluroxypyr	1,246
49	Pendimethalin	1,079
50	Amidosulfuron	858

Table 11 The fifty active ingredients most extensively used on arable crops in Northern Ireland in 2000, prioritised by quantity (kilograms).

	Active ingredient	Quantity (kg)
1	Glyphosate	16,459
2	Chlormequat	11,370
3	Isoproturon	9,081
4	Mecoprop-P	3,490
5	Mecoprop	3,340
6	Fenpropimorph	3,018
7	MCPA	2,526
8	Chlorpyrifos	2,435
9	Sulphur	1,870
10	Azoxystrobin	1,733
11	2,4-DB	1,354
12	Dichlorprop	1,250
13	Pendimethalin	1,076
14	Guazatine	1,069
15	Trifluralin	1,015
16	Flusilazole	941
17	Tebuconazole	917
18	Propiconazole	881
19	Cyprodinil	736
20	Fenpropidin	692
21	Chlormequat with choline chloride	652
22	MCPB	582
23	Chlorothalonil	524
24	2-chloroethylphosphonic acid	502
25	Trifloxystrobin	450
26	Bromoxynil	443
27	Thiram	426
28	Epoxiconazole	424
29	Prochloraz	408
30	Carboxin	401
31	Bromuconazole	313
32	Carbendazim	268
33	Diflufenican	253
34	Ioxynil	247
35	Kresoxim-methyl	245
36	Fluroxypyr	222
37	Trinexapac-ethyl	204
38	Triadimenol	198
39	Mepiquat chloride	194
40	Bitertanol	194
41	Fluquinconazole	185
42	Metsulfuron-methyl	181
43	Quinoxifen	166
44	Benazolin	166
45	Methiocarb	152
46	2,4-D	144
47	Dicamba	132
48	Linuron	110
49	Flamprop-M-isopropyl	108
50	Terbutylazine	102

Table 12 Spring barley: pesticide-treated area (spray hectares), quantities of pesticides applied (kilograms) and reasons for use.

Pesticide type & formulation	Mildew	General weed control	Aphids	General disease control	Growth regulation	Trace element	Rhyncho-sporium	Mildew/rhyncho-sporium	Disease prevention	All reasons	Basic area (ha) of treatment	Quantity (kgs)
Fungicides												
Azoxystrobin	154	193	.	2,082	.	.	.	.	302	2,732	2,368	449
Azoxystrobin/fenpropimorph	.	64	33	33	.	.	.	.	254	383	258	172
Bromuconazole	.	.	.	522	.	.	.	.	265	786	710	117
Carbendazim/flusilazole	.	25	.	1,351	.	.	246	.	88	1,710	1,710	394
Chlorothalonil	.	.	.	152	.	.	.	.	.	152	152	152
Cyproconazole/prochloraz	.	.	.	273	.	.	.	.	.	273	273	91
Cyprodinil	.	54	.	1,199	.	.	173	292	121	1,839	1,547	435
Epoxiconazole	69	.	.	1,466	.	.	.	.	35	1,570	1,415	99
Epoxiconazol/kresoxim-methyl	.	.	.	1,075	125	.	.	404	92	1,697	1,308	140
Famoxadon/flusilazole	.	.	.	.	.	.	.	.	72	72	72	4
Fenpropidin	74	.	.	302	.	.	.	.	91	467	467	189
Fenpropidin/propiconazole	.	.	.	121	.	.	.	.	110	231	171	98
Fenpropimorph	237	.	.	859	.	.	.	.	182	1,278	920	408
Fenpropimorph/flusilazole	.	.	.	297	.	.	.	.	.	297	297	145
Fenpropimorph/kresoxim-methyl	.	.	.	.	.	.	.	239	.	239	239	75
Fenpropimorph/propiconazole	.	.	.	1,378	.	.	.	650	133	2,161	2,161	669
Fenpropimorph/propiconazole	386	.	.	776	.	.	.	.	39	1,201	1,201	190
Fluquinconazole	.	.	.	152	.	.	.	.	.	152	152	19
Flusilazole	.	.	.	662	.	.	.	.	451	1,113	755	120
Propiconazole	260	.	.	2,313	237	.	.	.	611	3,421	3,421	341
Spiroxamine	76	.	.	.	.	.	.	.	.	76	76	11
Sulphur	.	.	.	.	.	80	.	.	.	80	80	642
Tebuconazole	304	.	.	337	.	.	.	.	281	922	922	184
Tebuconazole/triadimenol	.	.	.	520	.	.	.	.	30	550	550	112
Tetraconazole	.	.	.	96	.	.	.	.	.	96	96	12
Tridemorph	.	.	.	.	.	.	237	.	.	237	237	44
Trifloxystrobin	.	.	.	1,100	.	.	.	.	578	1,677	1,677	170
Unknown fungicide	242	.	.	638	.	.	.	.	251	1,130	1,130	.
All fungicides	1,801	336	33	17,701	362	80	656	1,585	3,984	26,538	24,362	5,479

Table 12 (cont.) Spring barley: pesticide-treated area (spray hectares), quantities of pesticides applied (kilograms) and reasons for use.

Pesticide type & formulation	General	Annual dicotyledons	Cleavers	Harvest		Stubble		Wild oats	Ground		Disease prevention	Corn marigold	Volunteer potatoes	All reasons	Basic	Quantity	
	weed control			aid	Desiccation	treatment	Docks		preparation	Chickweed					Couch		area (ha) of treatment
Herbicides & desiccants																	
Amidosulfuron	20	.	.	.	.	.	.	.	.	.	.	.	.	20	20	1
Benazolin/Bromoxynil/ioxynil	607	807	.	.	.	.	.	.	.	.	.	.	.	1,414	1,414	435
Bromoxynil/ioxynil	.	59	.	.	.	.	.	.	.	.	.	.	.	59	59	35
Bromoxynil/ioxynil/mecoprop-P	.	8	.	.	.	.	.	.	.	.	.	.	.	8	8	11
2,4-DB/linuron/MCPA	177	.	.	.	.	.	.	.	.	.	.	.	.	177	177	173
Dicamba/MCPA/mecoprop	438	.	.	.	.	.	.	.	.	.	.	.	.	438	438	294
Dicamba/MCPA/mecoprop-P	698	.	.	.	.	.	101	.	.	.	.	.	.	798	653	876
Dichlorprop	187	.	.	.	.	.	.	.	.	.	.	.	.	187	187	525
Diclofop-methyl/fenoxaprop-P-ethyl	.	.	.	.	.	.	.	68	.	.	.	.	.	68	68	32
Diquat	.	.	.	.	33	.	.	.	.	.	.	3	.	36	36	22
Flamprop-M-isopropyl	.	.	.	.	.	.	.	274	.	.	.	.	.	274	274	86
Florasulam	148	.	.	.	.	.	.	.	.	.	.	.	.	148	148	1
Fluroxypyr	182	.	260	.	.	.	.	.	.	.	.	.	77	519	519	61
Glyphosate	1,063	.	.	1,829	1,217	1,275	.	.	2,645	.	230	93	.	8,352	8,059	10,057	
Isoproturon	1,068	.	.	.	.	.	.	.	.	.	.	.	.	1,068	1,068	1,335
MCPA	513	.	.	.	.	.	.	.	.	.	.	.	.	513	513	513
Mecoprop	2,471	.	.	.	.	.	.	.	.	.	.	.	.	2,471	2,471	2,491
Mecoprop-P	2,438	.	.	.	.	.	.	.	.	158	.	.	.	2,596	2,565	1,986
Metsulfuron-methyl	17,696	.	.	.	.	.	.	.	.	.	.	650	.	18,346	18,346	147
Metsulfuron-methyl/ thifensulfuron-methyl	2,276	.	.	.	.	.	.	.	.	.	.	.	.	2,276	2,245	74
Metsulfuron-methyl/ tribenuron-methyl	311	.	.	.	.	.	.	.	.	.	.	.	.	311	311	2
Paraquat	57	.	.	.	.	.	.	.	.	.	.	.	.	57	57	6
Thifensulfuron-methyl/ tribenuron-methyl	980	.	.	.	.	.	.	.	.	.	.	.	.	980	980	23
Tralkoxydim	10	.	.	.	.	.	.	24	.	.	.	.	.	34	34	8
Unknown herbicide	177	.	.	.	.	.	.	.	.	.	.	.	.	177	177	0
All Herbicides & desiccants	31,514	873	260	1,829	1,250	1,275	101	366	2,645	158	230	93	653	77	41,323	40,823	19,191

Table 12 (cont.) Spring barley: pesticide-treated area (spray hectares), quantities of pesticides applied (kilograms) and reasons for use.

Pesticide type & formulation	General weed control	Aphids	General disease control	BYDV*	Leatherjackets	All reasons	Basic area (ha) of treatment	Quantity (kgs)
Insecticides								
Chlorpyrifos	.	152	511	.	2,202	2,864	2,864	1,994
Cypermethrin	.	806	.	117	.	922	878	22
Deltamethrin	.	158	273	.	.	430	430	8
Dimethoate	.	182	.	.	.	182	182	51
Esfenvalerate	59	2,323	.	17	.	2,399	2,379	10
Lambda-cyhalothrin	.	5,993	.	154	.	6,148	5,506	35
Permethrin	.	357	.	.	.	357	357	28
Zeta-cypermethrin	.	1,048	.	.	.	1,048	912	25
Unknown insecticide	.	1,999	.	.	127	2,126	2,126	.
All insecticides	59	13,018	783	288	2,329	16,478	15,635	2,174

* Barley yellow dwarf virus

Pesticide type & formulation	Leatherjackets	Slugs	All reasons	Basic area (ha) of treatment	Quantity (kgs)
Molluscicides					
Methiocarb	77	292	369	369	73
All molluscicides	77	292	369	369	73

Pesticide type & formulation	General weed control	Growth regulation	Leatherjackets	All reasons	Basic area (ha) of treatment	Quantity (kgs)
Growth regulators						
Chlormequat	35	2,741	125	2,900	2,725	1,930
Chlormequat/2-chloroethylphosphonic acid	.	146	.	146	146	79
2-chloroethylphosphonic acid	.	1,488	.	1,488	1,488	202
2-chloroethylphosphonic acid/Mepiquat chloride	.	174	.	174	174	40
Trinexapac-ethyl	.	1,107	.	1,107	1,107	103
Unknown growth regulator	.	264	.	264	264	.
All growth regulators	35	5,918	125	6,078	5,903	2,354

Table 13 Undersown Barley: pesticide-treated area (spray-hectares), quantities of pesticides applied (kilograms) and reason for use.

Pesticide type & formulation	General weed		General disease		Annual dicotyledons	Harvest aid	Desiccation	Stubble treatment	Ryncho -sporium	Ground preparation	Mildew/ rhyngo -sporium	Disease prevention	All reasons	Basic area (ha) of treatment	Quantity (kgs)
	Mildew control	Aphids control													
Fungicides															
Azoxystrobin/fenpropimorph	49	49	49	26
Carbendazim/flusilazole	246	.	.	.	246	246	56
Cyprodinil	27	.	.	.	27	27	5
Epoxiconazole	.	.	69	.	.	.	.	.	.	.	.	.	69	35	2
Epoxiconazole/kresoxim-methyl	123	.	123	62	9
Fenpropidin	.	.	41	.	.	.	.	.	.	.	.	.	41	41	31
Fenpropidin/fenpropimorph	.	.	136	.	.	.	.	.	.	.	.	.	136	136	20
Fenpropimorph/flusilazole	.	.	205	.	.	.	.	.	.	.	.	.	205	205	111
Fenpropimorph/kresoxim-methyl	.	.	83	.	.	.	.	.	.	.	.	.	83	83	38
Fenpropimorph/propiconazole	176	.	176	176	89
Flusilazole	283	283	283	28
Propiconazole	.	.	583	.	.	.	.	.	.	.	.	196	779	779	89
Tebuconazole	103	.	.	.	.	.	.	.	.	.	.	.	103	103	24
Trifloxystrobin	283	283	283	35
All fungicides	103	.	136	982	.	.	.	.	273	.	299	811	2,603	2,507	563
Herbicides & desiccants															
Benazolin/Bromoxynil/ioxynil	.	136	.	.	.	.	.	.	.	.	.	.	136	136	49
Benazolin/2,4-DB/MCPA	.	117	.	.	.	.	.	.	.	.	.	.	117	117	226
2,4-D	.	41	.	.	.	.	.	.	.	.	.	.	41	41	144
2,4-DB/linuron/MCPA	.	765	.	.	304	.	.	.	.	.	.	.	1,069	1,069	743
2,4-DB/MCPA	.	157	.	.	.	.	.	.	.	.	.	.	157	157	308
Dicamba/MCPA/mecoprop	.	393	.	.	.	.	.	.	.	.	.	.	393	393	358
Dichlorprop/MCPA	.	283	.	.	.	.	.	.	.	.	.	.	283	283	708
Fluroxypyr	.	136	.	.	.	.	.	.	.	.	.	.	136	136	14
Glyphosate	.	144	.	.	.	11	176	210	.	512	.	.	1,052	1,052	1,090
MCPB	.	205	.	.	.	.	.	.	.	.	.	.	205	205	573
Mecoprop	.	213	.	.	.	.	.	.	.	.	.	.	213	213	250
Mecoprop-P	.	93	.	.	.	.	.	.	.	.	.	.	93	93	128
Metsulfuron-methyl	.	431	.	.	.	.	.	.	.	.	.	.	431	431	2
Unknown herbicide	.	47	.	.	.	.	.	.	.	.	.	.	47	47	.
All herbicides & desiccants	.	3,160	.	.	304	11	176	210	.	512	.	.	4,372	4,372	4,592

Table 13 (cont.) Undersown Barley: pesticide-treated area (spray-hectares), quantities of pesticides applied (kilograms) and reason for use.

Pesticide type & formulation	Aphids	Growth regulation	Leatherjackets	All reasons	Basic area (ha) of treatment	Quantity (kgs)
Insecticides						
Chlorpyrifos	.	.	62	62	62	44
Deltamethrin	35	.	.	35	35	0
Esfenvalerate	111	.	.	111	111	0
Lambda-cyhalothrin	1,009	.	.	1,009	959	6
<i>All insecticides</i>	1,154	.	62	1,216	1,166	51
Growth regulators						
Chloromequat	.	204	.	204	204	238
Trinexapac-ethyl	.	44	.	44	44	2
<i>All growth regulators</i>	.	248	.	248	248	240

Table 14 Winter Barley: pesticide-treated area (spray-hectares), quantities of pesticides applied (kilograms) and reason for use.

Pesticide type & formulation	Mildew	Aphids	General disease control	Eyespot	Rhyncho-sporium	Eyespot/mildew	Mildew/rust	Mildew/rhyncho-sporium	Disease prevention	All reasons	Basic area (ha) of treatment	Quantity (kgs)
Fungicides												
Azoxystrobin	.	.	1,069	.	.	.	.	.	877	1,947	1,592	353
Azoxystrobin/fenpropimorph	.	.	208	.	.	.	.	.	159	366	183	147
Bromuconazole	.	.	125	.	.	.	.	.	332	457	457	40
Carbendazim	.	.	.	25	.	.	.	.	.	25	25	6
Carbendazim/flusilazole	.	.	972	.	.	.	.	.	11	983	650	151
Carbendazim/prochloraz	94	94	94	26
Carbendazim/propiconazole	35	.	.	.	.	35	35	0
Cyproconazole/prochloraz	.	.	83	.	.	.	.	.	53	136	136	55
Cyproconazole/propiconazole	.	.	79	.	.	.	.	.	.	79	79	16
Cyprodinil	.	.	338	.	.	6	.	.	84	427	427	166
Epoxiconazole	91	.	114	.	.	.	.	.	207	412	333	31
Epoxiconazole/kresoxim-methyl	.	.	1,008	.	.	.	.	.	83	1,091	763	136
Fenbuconazole	63	63	63	3
Fenpropidin	.	.	206	.	.	.	75	.	63	343	343	183
Fenpropidin/tebuconazole	.	.	130	.	.	.	.	.	16	146	146	44
Fenpropimorph	.	44	1,303	.	.	.	.	.	94	1,442	662	200
Fenpropimorph/flusilazole	.	.	122	.	.	.	.	66	159	346	346	116
Fenpropimorph/kresoxim-methyl	52	.	52	52	16
Fenpropimorph/propiconazole	.	.	235	.	36	.	.	.	.	271	271	117
Fenpropimorph/quinoxifen	323	.	35	.	.	.	.	.	11	369	369	76
Flusilazole	.	.	1,391	.	.	.	.	.	161	1,552	772	127
Prochloraz/tebuconazole	.	.	29	.	.	.	.	.	.	29	29	50
Propiconazole	424	.	367	.	.	.	.	.	332	1,123	906	131
Propiconazole/tridemorph	.	.	27	.	.	.	.	.	.	27	27	7
Quinoxifen	75	.	.	.	.	.	.	.	.	75	75	5
Tebuconazole	.	.	256	.	.	.	.	.	66	322	322	41
Tebuconazole/triadimenol	.	.	356	.	.	.	.	.	36	391	391	133
Tridemorph	.	.	6	.	.	.	.	.	.	6	6	1
Trifloxystrobin	.	.	1,155	.	232	.	.	.	121	1,508	1,279	207
Unknown fungicide	.	.	210	.	.	.	.	.	.	210	128	.
All fungicides	913	44	9,822	25	303	6	75	118	3,021	14,325	10,961	2,583

Table 14 (cont.) Winter Barley: pesticide-treated area (spray-hectares), quantities of pesticides applied (kilograms) and reason for use.

Pesticide type & formulation	General	General	Annual	Harvest	Stubble	Wild	Ground	Disease	All	Basic	Quantity (kgs)				
	weed control	Aphids	disease control	dicotyledons	Cleavers	aid	Desiccation	treatment	oats	preparation		Couch	prevention	reasons	area (ha) of treatment
Herbicides & desiccants															
Amidosulfuron	120	.	.	.	144	.	.	.	.	.	.	.	264	264	5
Benazolin/Bromoxynil/ioxynil	.	.	.	306	.	.	.	.	.	.	.	.	306	306	129
Bromoxynil/ioxynil/mecoprop-P	144	.	.	39	.	.	.	.	.	8	.	.	191	191	301
Dichlorprop	231	109	.	.	.	.	.	.	.	.	.	.	340	224	258
Diclofop-methyl/fenoxaprop-P-ethyl	.	83	.	.	.	.	.	.	.	29	.	.	112	112	59
Diflufenican/flurtamone	62	.	104	.	.	.	.	.	.	.	.	.	166	166	58
Diflufenican/Isoproturon	1,025	.	29	.	.	.	.	.	.	.	.	.	1,054	1,054	708
Diflufenican/terbuthylazine	452	.	.	.	.	.	.	.	.	.	.	.	452	452	79
Clopyralid/fluroxypyr/triclopyr	231	.	.	.	.	.	.	.	.	.	.	.	231	116	208
Flamprop-M-isopropyl	.	.	.	.	.	.	.	.	.	15	.	.	15	15	11
Florasulam	59	.	.	.	.	.	.	.	.	.	.	.	59	59	0
Fluroxypyr	124	.	.	.	44	.	.	.	.	.	.	.	168	98	46
Glyphosate	237	.	.	.	.	212	401	137	.	757	14	.	1,758	1,757	2,362
Isoproturon	2,327	.	.	.	.	.	.	.	.	.	.	52	2,379	2,379	2,798
Isoproturon/pendimethalin	489	.	.	.	.	.	.	.	.	.	.	.	489	489	710
Isoproturon/trifluralin	130	.	.	.	.	.	.	.	.	.	.	.	130	130	224
Mecoprop	93	.	.	.	.	.	.	.	.	.	.	.	93	93	161
Metsulfuron-methyl	1,062	.	6	.	.	.	.	.	.	.	.	.	1,067	1,067	5
Metsulfuron-methyl/ thifensulfuron-methyl	24	.	.	.	.	.	.	.	.	.	.	.	24	24	2
Metsulfuron-methyl/ tribenuron-methyl	75	.	.	.	.	.	.	.	.	.	.	.	75	75	1
Pendimethalin	199	.	.	.	.	.	.	.	.	.	.	.	199	199	216
Thifensulfuron-methyl/ tribenuron-methyl	47	.	.	.	.	.	.	.	.	.	.	.	47	47	4
Tralkoxydim	.	.	.	.	.	.	.	.	.	41	.	.	41	41	7
Trifluralin	436	.	.	.	.	.	.	.	.	.	.	.	436	436	330
Unknown herbicide	677	.	.	.	.	.	.	.	.	.	.	.	677	538	.
All herbicides & desiccants	8,243	192	139	345	189	212	401	137	85	765	14	52	10,774	10,332	8,680

Table 14 (cont.) Winter Barley: pesticide-treated area (spray-hectares), quantities of pesticides applied (kilograms) and reason for use.

Pesticide type & formulation	Aphids	General disease control	BYDV*	Leatherjackets	All reasons	Basic area (ha) of treatment	Quantity (kgs)
Insecticides							
Chlorpyrifos	.	.	.	119	119	119	80
Cypermethrin	490	.	.	.	490	490	12
Deltamethrin	36	.	.	.	36	36	0
Esfenvalerate	567	.	.	.	567	567	2
Lambda-cyhalothrin	3,492	.	91	.	3,583	2,669	22
Permethrin	99	.	.	.	99	99	6
Zeta-cypermethrin	321	.	.	.	321	321	4
Unknown insecticide	20	36	.	.	56	56	.
All insecticides	5,026	36	91	119	5,271	4,357	127

* Barley yellow dwarf virus

Pesticide type & formulation	Slugs	All reasons	Basic area (ha) of treatment	Quantity (kgs)
Molluscicides				
Methiocarb	89	89	89	17
Unknown molluscicide	20	20	20	.
All molluscicides	109	109	109	17

Pesticide type & formulation	General disease control	Growth regulation	All reasons	Basic area (ha) of treatment	Quantity (kgs)
Growth regulators					
Chlormequat	.	3,597	3,597	2,595	3,433
Chlormequat with choline chloride	.	18	18	18	28
2-chloroethylphosphonic acid	6	405	411	411	137
2-chloroethylphosphonic acid/mepiquat chloride	.	358	358	358	204
Trinexapac-ethyl	.	374	374	283	19
Unknown growth regulator	.	35	35	35	.
All growth regulators	6	4,787	4,793	3,699	3,821

Table 15 Spring wheat: pesticide-treated area (spray-hectares), quantities of pesticides applied (kilograms) and reason for use.

Pesticide type & formulation	Mildew	General disease control	Growth regulation	Septoria	Disease prevention	All reasons	Basic area (ha) of treatment	Quantity (kgs)
Fungicides								
Azoxystrobin	.	139	.	.	28	167	129	31
Azoxystrobin/fenpropimorph	.	312	.	.	73	385	385	104
Bromuconazole	60	60	60	14
Carbendazim/flusilazole	.	120	.	.	.	120	120	27
Chlorothalonil	.	60	.	.	.	60	60	42
Epoxiconazole	.	40	.	.	.	40	40	2
Epoxiconazole/kresoxim-methyl	.	.	8	.	.	8	8	1
Fenpropidin	.	24	.	.	41	65	65	22
Fenpropidin/tebuconazole	.	86	.	.	.	86	43	29
Fenpropimorph	.	327	.	.	.	327	320	30
Fenpropimorph/quinoxifen	77	.	.	.	.	77	38	37
Fluquinconazole	.	312	.	.	13	326	326	12
Fluquinconazole/prochloraz	28	28	28	5
Flusilazole	.	51	.	.	8	58	51	8
Mancozeb	.	.	.	9	.	9	9	7
Propiconazole	.	193	.	.	15	208	118	25
Tebuconazole	.	48	.	.	.	48	24	4
Tebuconazole/triadimenol	.	38	.	.	13	52	52	17
Trifloxystrobin	.	8	.	.	.	8	8	1
All fungicides	77	1,758	8	9	278	2,130	1,882	418

Table 15 (cont.) Spring wheat: pesticide-treated area (spray-hectares), quantities of pesticides applied (kilograms) and reason for use.

Pesticide type & formulation	General weed control	Aphids	Annual dicotyledons	Cleavers	Harvest aid	Growth regulation	Desiccation	Leatherjackets	Ground preparation	Couch	All reasons	Basic area (ha) of treatment	Quantity (kgs)
Herbicides & desiccants													
Benazolin/Bromoxynil/ioxynil	13	.	.	.	.	.	.	.	.	.	13	13	3
2,4-DB/linuron/MCPA	.	.	120	.	.	.	.	.	.	.	120	120	88
Diflufenican/terbuthylazine	24	.	.	.	.	.	.	.	.	.	24	24	3
Fluroxypyr	6	.	.	.	.	.	.	.	.	.	6	6	1
Glyphosate	.	.	.	.	28	.	24	.	15	1	68	53	62
Isoproturon	24	.	.	.	.	.	.	.	.	.	24	24	18
Mecoprop	150	.	.	.	.	.	.	.	.	.	150	150	78
Mecoprop-P	146	.	.	.	.	.	.	.	.	.	146	146	104
Metsulfuron-methyl	214	.	.	9	.	.	.	.	.	.	223	223	1
Metsulfuron-methyl/ thifensulfuron-methyl	43	.	.	.	.	.	.	.	.	.	43	43	1
Thifensulfuron-methyl/ tribenuron-methyl	68	.	.	.	.	.	.	.	.	.	68	68	2
Unknown herbicide	9	.	.	.	.	.	.	.	.	.	9	9	.
All herbicides & desiccants	697	.	120	9	28	.	24	.	15	1	894	879	361
Insecticides													
Chlorpyrifos	.	.	.	.	.	.	.	14	.	.	14	14	10
Cypermethrin	.	15	.	.	.	.	.	.	.	.	15	15	0
Esfenvalerate	.	8	.	.	.	.	.	.	.	.	8	8	0
Lambda-cyhalothrin	.	574	.	.	.	.	.	.	.	.	574	574	3
Zeta-cypermethrin	.	60	.	.	.	.	.	.	.	.	60	60	1
All insecticides	.	656	.	.	.	.	.	14	.	.	670	670	14
Molluscicides													
Methiocarb	.	.	.	.	.	.	.	13	.	.	13	13	2
All molluscicides	.	.	.	.	.	.	.	13	.	.	13	13	2
Growth regulators													
Chlormequat	.	.	.	.	.	46	.	8	.	.	54	46	35
All growth regulators	.	.	.	.	.	46	.	8	.	.	54	46	35

Table 16 Winter wheat: pesticide-treated area (spray-hectares), quantities of pesticides applied (kilograms) and reason for use.

Pesticide type & formulation	General weed		General disease		Rhyncho		Leatherjackets	Septoria	Eyespot/ mildew	Septoria/ eyespot	Rust	Mildew/ rust	Mildew/ rhyncho -sporium	Disease prevention	Take all	All reasons	Basic area (ha) of treatment	Quantity (kgs)
	Mildew	control	Aphids	control	Eyespot	-sporium												
Fungicides																		
Azoxystrobin	.	.	.	2,654	20	.	.	.	.	.	.	.	.	1,188	.	3,861	2,655	621
Azoxystrobin/fenpropimorph	.	.	.	286	.	.	.	.	.	.	.	.	.	130	.	416	374	161
Bromuconazole	.	179	.	681	.	.	.	.	.	.	.	.	.	.	.	860	587	128
Carbendazim/chlorothalonil	.	.	.	.	.	.	.	46	.	.	.	.	.	.	.	46	15	13
Carbendazim/flusilazole	.	.	.	233	.	.	.	.	.	.	.	.	.	.	.	233	205	48
Carbendazim/flutriafol	.	.	.	3	.	.	.	.	.	.	.	.	.	55	.	58	58	18
Carbendazim/prochloraz	.	.	.	17	.	.	.	.	.	.	.	.	.	.	.	17	17	8
Chlorothalonil	.	.	.	160	.	.	.	46	.	.	.	.	.	126	.	332	302	166
Chlorothalonil/flutriafol	.	.	.	64	.	.	.	.	.	.	.	.	.	.	.	64	64	55
Cyproconazole/prochloraz	.	.	.	15	.	.	.	.	.	.	.	.	.	8	.	23	23	7
Cyproconazole/propiconazole	.	.	.	80	.	.	.	.	.	.	.	.	.	.	.	80	80	13
Cyprodinil	35	16	.	209	.	.	.	.	38	.	.	.	.	.	.	296	277	131
Epoxiconazole	64	.	.	545	87	.	.	.	.	.	.	.	.	154	.	851	689	64
Epoxiconazole/kresoxim-methyl	.	76	.	317	.	.	.	.	.	.	.	.	.	244	.	637	613	118
Fenbuconazole	.	.	.	115	.	.	.	.	.	.	.	.	.	69	.	184	184	7
Fenpropidin	.	.	.	53	.	.	.	.	.	.	.	.	.	172	.	225	225	101
Fenpropidin/propiconazole	.	.	.	111	.	.	.	.	.	.	.	.	.	.	.	111	56	38
Fenpropidin/tebuconazole	.	.	.	34	.	.	.	.	.	.	.	.	.	.	.	34	17	6
Fenpropimorph	.	.	.	60	.	.	.	.	.	.	.	92	.	.	.	152	76	59
Fenpropimorph/flusilazole	.	.	.	.	.	.	.	.	.	.	.	.	55	5	.	60	60	31
Fenpropimorph/propiconazole	.	.	.	9	.	.	.	.	.	.	.	.	.	.	.	9	9	5
Fenpropimorph/quinoxifen	81	.	16	.	.	.	.	.	.	.	.	.	.	.	.	97	75	12
Fluquinconazole	20	.	.	922	.	.	75	.	.	.	64	.	.	520	.	1,601	1,079	116
Fluquinconazole/prochloraz	.	.	.	164	.	.	.	.	.	64	56	.	.	195	.	479	416	100
Flusilazole	51	26	.	353	.	.	.	.	.	.	.	.	.	160	.	590	450	84
Mancozeb	.	.	.	.	.	.	.	9	.	.	.	.	.	.	.	9	9	7
Prochloraz	.	.	.	27	.	.	.	.	.	.	.	.	.	299	.	325	325	94
Prochloraz/tebuconazole	.	.	.	38	.	.	.	.	.	.	.	.	.	.	.	38	38	65
Propiconazole	.	.	.	87	.	.	.	.	.	.	.	.	.	137	.	224	201	18
Tebuconazole	18	.	.	531	.	20	.	.	.	.	.	.	.	374	.	943	887	133
Tebuconazole/triadimenol	.	.	.	273	.	.	.	.	.	.	.	.	.	212	.	485	459	130
Trifloxystrobin	.	.	.	166	.	.	.	64	.	.	.	.	.	.	.	230	230	35
Unknown fungicide	59	.	.	107	.	.	.	.	.	.	.	.	.	.	113	279	279	.
All fungicides	327	297	16	8,314	107	20	75	165	38	64	64	148	55	4,048	113	13,851	11,034	2,591

Table 16 (cont.) Winter wheat: pesticide-treated area (spray-hectares), quantities of pesticides applied (kilograms) and reason for use.

Pesticide type & formulation	General	General	Annual	Harvest			Yellow	Stubble	Wild	Ground	Volunteer	All	Basic	Quantity			
	weed control	Aphids	disease control	dicotyledons	Cleavers	aid	Desiccation	treatment	Docks	oats preparation	Chickweed	oats reasons	area (ha) of treatment	(kgs)			
Herbicides & desiccants																	
Amidosulfuron	119	.	.	.	133	.	.	.	.	.	.	252	252	4
Benazolin/Bromoxynil/ioxynil	47	.	.	60	.	.	.	.	.	.	.	107	107	36
Bromoxynil/diflufenican/ioxynil	.	117	.	.	.	.	.	.	.	.	.	117	117	32
Diclofop-methyl/fenoxaprop-P-ethyl	.	.	.	.	.	.	.	.	3	.	.	3	3	2
Diflufenican/flurtamone	61	.	.	.	.	.	.	.	.	.	.	61	61	22
Diflufenican/Isoproturon	563	.	.	.	.	.	.	.	.	.	.	563	563	554
Diflufenican/terbuthylazine	271	.	.	.	.	.	.	.	.	.	.	271	271	62
Diflufenican/trifluralin	17	.	.	.	.	.	.	.	.	.	.	17	17	8
Diquat	11	.	.	.	.	.	.	.	.	.	.	11	11	6
Fenoxaprop ethyl	.	.	.	.	.	.	.	.	17	.	.	17	17	2
Fenoxaprop-P-ethyl	.	.	.	.	.	.	.	.	64	.	.	64	64	2
Flamprop-M-isopropyl	.	.	.	.	.	.	.	.	28	.	.	28	28	11
Florasulam	383	.	.	.	.	.	.	.	.	.	.	383	383	1
Fluroxypyr	75	.	.	.	112	.	.	.	.	.	.	187	187	32
Glyphosate	217	.	.	.	.	574	526	11	.	382	.	1,710	1,628	1,779
Isoproturon	1,929	.	33	17	.	.	.	5	1,985	1,946	2,948		
Isoproturon/pendimethalin	276	.	.	.	.	.	.	.	.	.	.	276	276	420
Isoproturon/trifluralin	198	.	.	.	.	.	.	.	.	.	.	198	198	350
MCPA	.	.	46	.	.	.	.	.	.	.	.	46	46	32
Mecoprop	106	.	.	.	.	.	.	.	.	.	.	106	106	150
Mecoprop-P	199	.	.	.	.	.	.	.	.	.	.	199	199	181
Metsulfuron-methyl	1,004	.	19	.	9	.	.	.	.	.	.	1,032	964	5
Metsulfuron-methyl/ thifensulfuron-methyl	56	38	.	94	94	5		
Metsulfuron-methyl/ tribenuron-methyl	64	.	32	96	96	1		
Paraquat	17	17	17	10		
Pendimethalin	42	42	42	66		
Thifensulfuron-methyl/ tribenuron-methyl	51	51	51	5		
Trifluralin	537	537	537	449		
Unknown herbicide	193	59	.	113	.	365	327	.		
All herbicides & desiccants	6,435	117	130	60	254	574	526	17	11	59	113	382	151	5	8,835	8,609	7,174

Table 16 (cont.) Winter wheat: pesticide-treated area (spray-hectares), quantities of pesticides applied (kilograms) and reason for use.

Pesticide type & formulation	General weed control	Aphids	General disease control	Yellow dwarf virus	Leatherjackets	Slugs	Disease prevention	All reasons	Basic area (ha) of treatment	Quantity (kgs)
Insecticides										
Chlorpyrifos	.	43	.	.	93	5	.	140	140	95
Cypermethrin	.	595	.	.	.	.	.	595	541	14
Dimethoate	.	92	.	.	.	.	.	92	15	20
Esfenvalerate	18	494	.	.	.	.	.	512	422	4
Lambda-cyhalothrin	38	2,174	17	64	.	.	54	2,347	1,644	10
Permethrin	.	72	.	.	.	.	.	72	72	4
Zeta-cypermethrin	.	324	.	.	.	.	.	324	324	4
Unknown insecticide	.	108	108	108	.
<i>All insecticides</i>	55	3,908	17	64	93	5	54	4,190	3,267	150

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Pesticide type & formulation	Leatherjackets	Slugs	All reasons	Basic area (ha) of treatment	Quantity (kgs)
Molluscicides					
Methiocarb	19	222	241	241	53
Unknown molluscicide	.	101	101	101	.
<i>All molluscicides</i>	19	323	342	342	53

Pesticide type & formulation	Growth regulation	All reasons	Basic area (ha) of treatment	Quantity (kgs)
Growth regulators				
Chlormequat	3,051	3,051	2,806	3,849
Chlormequat with choline chloride	139	139	139	211
Chlormequat/2-chloroethylphosphonic acid	19	19	19	10
2-chloroethylphosphonic acid	230	230	230	34
2-chloroethylphosphonic acid/mepiquat chloride	71	71	71	49
Trinexapac-ethyl	530	530	465	35
Unknown growth regulator	155	155	155	.
<i>All growth regulators</i>	4,195	4,195	3,885	4,189

Table 17 Spring Oats: pesticide-treated area (spray-hectares), quantities of pesticides applied (kilograms) and reason for use.

Pesticide type & formulation	Mildew	General	General	Seed	Harvest	Growth	Leatherjackets	Rust	Ground	Disease	Plant	All	Basic	Quantity
		weed	disease	Weevil	aid	regulation			preparation	prevention	nutrition				reasons	area (ha)	of	(kgs)
		control	control										treatment	
Fungicides														
Azoxystrobin	.	.	430	.	.	.	.	.	.	.	.	430	430	58
Carbendazim/flusilazole	.	.	30	.	.	.	.	.	.	.	.	30	30	7
Epoxiconazole	.	.	364	.	.	.	.	.	.	.	.	364	364	24
Fenpropimorph	694	.	.	.	.	.	.	65	.	172	.	932	932	542
Fenpropimorph/quinoxyfen	.	.	30	.	.	.	.	.	.	.	.	30	30	5
Quinoxyfen	166	.	.	.	.	.	.	.	.	.	.	166	166	16
Sulphur	58	58	58	457
Tebuconazole	289	.	.	.	.	.	.	.	.	.	.	289	289	72
Triadimenol/tridemorph	56	.	56	56	28
All fungicides	1,150	.	855	.	.	.	.	65	.	228	58	2,355	2,355	1,209
Herbicides & desiccants														
Dicamba/MCPA/mecoprop	.	73	.	.	.	.	.	.	.	.	.	73	73	113
Glyphosate	65	.	.	.	58	.	.	123	123	87
MCPA	.	364	.	.	.	.	.	.	.	.	.	364	364	319
Mecoprop	.	123	.	.	.	.	.	.	.	.	.	123	123	99
Mecoprop-P	.	963	.	.	.	.	.	.	.	.	.	963	963	701
Metsulfuron-methyl	.	1,763	.	.	.	.	.	.	.	.	.	1,763	1,763	9
Unknown herbicide	.	37	.	.	.	.	.	.	.	.	.	37	37	.
All herbicides & desiccants	.	3,323	.	.	.	65	.	.	58	.	.	3,447	3,447	1,327
Insecticides														
Chlorpyrifos	301	.	.	.	.	301	301	211
Esfenvalerate	.	.	63	.	.	.	.	.	.	.	.	63	63	0
Lambda-cyhalothrin	.	.	56	.	.	.	.	.	.	.	.	56	56	0
Zeta-cypermethrin	.	.	58	.	543	.	.	.	.	.	.	601	601	9
All insecticides	.	.	177	.	543	.	301	.	.	.	.	1,021	1,021	221
Growth regulators														
Chlormequat	928	.	.	.	.	.	928	928	876
Trinexapac-ethyl	30	.	.	.	.	.	30	30	4
All growth regulators	958	.	.	.	.	.	958	958	880

Table 18 Undersown Oats: pesticide-treated area (spray-hectares), quantities of pesticides applied (kilograms) and reason for use.

Pesticide type & formulation	General weed control	All reasons	Basic area (ha) of treatment	Quantity (kgs)
Herbicides & desiccants				
2,4-DB/MCPA	25	25	25	50
<i>All herbicides & desiccants</i>	25	25	25	50

Table 19 Winter Oats: pesticide-treated area (spray-hectares), quantities of pesticides applied (kilograms) and reason for use.

Pesticide type & formulation	Mildew	General weed control	Aphids	General disease control	Annual dictyledons	Cleavers	Plant Nutrition	Desiccation	Stubble treatment	Ground preparation	Mildew/rust	Disease prevention	All reasons	Basic area (ha) of treatment	Quantity (kgs)
Fungicides															
Azoxystrobin	.	52	.	271	.	.	.	.	.	.	.	16	339	305	49
Bromuconazole	.	.	.	33	.	.	.	.	.	.	.	16	49	49	8
Carbendazim/flusilazole	.	.	.	33	.	.	.	.	.	.	.	.	33	33	5
Chlorothalonil	.	.	.	62	.	.	.	.	.	.	.	.	62	62	62
Fenpropimorph	.	.	.	70	.	.	.	.	.	.	.	.	70	70	29
Fenpropimorph/quinoxifen	16	.	.	74	.	.	.	.	.	.	.	.	89	89	24
Fluquinconazole	.	.	.	31	.	.	.	.	.	.	.	.	31	31	13
Propiconazole	.	.	.	62	.	.	.	.	.	.	.	.	62	62	4
Quinoxifen	576	.	52	95	.	.	.	.	.	.	.	.	723	723	73
Sulphur	51	.	.	.	.	.	52	52	145
Tebuconazole	.	.	.	100	.	.	.	.	.	.	238	.	338	338	40
Tebuconazole/triadimenol	.	.	.	74	.	.	.	.	.	.	.	.	74	74	21
Trifloxystrobin	16	16	16	2
All fungicides	592	52	52	905	.	.	51	.	.	.	238	47	1,937	1,904	475
Herbicides & desiccants															
Amidosulfuron	.	22	.	.	238	62	.	.	.	.	.	.	322	322	3
Carfentrazone-ethyl/ flupyrsulfuron-methyl	.	436	.	.	.	.	.	.	.	.	.	.	436	436	30
Diflufenican/flurtamone	.	49	.	.	.	.	.	.	.	.	.	.	49	49	20
Glyphosate	62	62	256	.	.	380	380	240
Mecoprop	.	18	.	.	.	.	.	.	.	.	.	.	18	18	12
Metsulfuron-methyl	.	407	.	.	.	.	.	.	.	.	.	.	407	407	2
All herbicides & desiccants	.	932	.	.	238	62	.	62	62	256	.	.	1,612	1,612	306

Table 19 (cont.) Winter Oats: pesticide-treated area (spray-hectares), quantities of pesticides applied (kilograms) and reason for use.

Pesticide type & formulation	Aphids	Growth regulation	Yellow dwarf virus	All reasons	Basic area (ha) of treatment	Quantity (kgs)
Insecticides						
Cypermethrin	384	.	.	384	384	13
Lambda-cyhalothrin	162	.	.	162	129	1
Permethrin	52	.	.	52	52	3
Zeta-cypermethrin	.	.	238	238	238	2
<i>All insecticides</i>	598	.	238	836	803	19
Growth regulators						
Chlormequat	.	592	.	592	592	902
Chlormequat with choline chloride	.	257	.	257	257	412
Trinexapac-ethyl	.	62	.	62	62	41
<i>All growth regulators</i>	.	911	.	911	911	1,356

Table 20 Undersown Oats: pesticide-treated area (spray-hectares), quantities of pesticides applied (kilograms) and reason for use.

Pesticide type & formulation	General weed control	Trace element	Desiccation	All reasons	Basic area (ha) of treatment	Quantity (kgs)
Fungicides						
Sulphur	.	122	.	122	122	627
Tebuconazole	122	.	.	122	122	15
<i>All fungicides</i>	122	122	.	244	244	642
Herbicides & desiccants						
Diquat	.	.	122	122	122	37
Metazachlor/quinmerac	122	.	.	122	122	121
Propaquizafop	122	.	.	122	122	6
<i>All herbicides & desiccants</i>	244	.	122	366	366	163

Table 21 Peas & beans: pesticide-treated area (spray-hectares), quantities of pesticides applied (kilograms) and reason for use.

Pesticide type & formulation	General weed control	Aphids	General disease control	Harvest aid	Wild oats	Ground preparation	Disease prevention	All reasons	Basic area (ha) of treatment	Quantity (kgs)
Fungicides										
Carbendazim	.	.	.	.	.	.	18	18	18	4
Chlorothalonil	.	.	66	.	.	.	18	84	69	43
Tebuconazole	.	.	36	.	.	.	.	36	36	7
<i>All fungicides</i>	.	.	102	.	.	.	37	138	123	54
Herbicides & desiccants										
Bentazone/MCPB	22	.	.	.	.	.	.	22	22	18
Cyanazine	22	.	.	.	.	.	.	22	22	4
Cycloxydim	.	.	.	.	15	.	.	15	15	2
Glyphosate	.	.	.	33	.	.	.	33	33	24
Paraquat	.	.	.	.	.	6	.	6	6	4
Pendimethalin	73	.	.	.	.	.	.	73	73	116
Simazine	10	.	.	.	.	.	.	10	10	6
Terbuthylazine/terbutryn	18	.	.	.	.	.	.	18	18	23
<i>All herbicides & desiccants</i>	144	.	.	33	15	6	.	199	199	197
Insecticides										
Pirimicarb	.	18	.	.	.	.	.	18	18	5
<i>All insecticides</i>	.	18	.	.	.	.	.	18	18	5

Table 22 Triticale: pesticide-treated area (spray-hectares), quantities of pesticides applied (kilograms) and reason for use.

Pesticide type & formulation	General weed control	General disease control	Growth regulation	Slugs	All reasons	Basic area (ha) of treatment	Quantity (kgs)
Fungicides							
Azoxystrobin	.	64	.	.	64	64	11.2
Bromuconazole	.	64	.	.	64	64	6.4
<i>All fungicides</i>	.	128	.	.	128	128	17.6
Herbicides & desiccants							
Isoproturon	64	.	.	.	64	64	96
<i>All herbicides & desiccants</i>	64	.	.	.	64	64	96
Molluscicides							
Methiocarb	.	.	.	32	32	32	7
<i>All molluscicides</i>	.	.	.	32	32	32	7
Growth regulators							
Chlormequat	.	.	64	.	64	64	47.6
<i>All growth regulators</i>	.	.	64	.	64	64	47.6

Table 23 Set-aside: pesticide-treated area (spray-hectares), quantities of pesticides applied (kilograms) and reason for use.

Pesticide type & formulation	General weed control	General disease control	Ground preparation	All reasons	Basic area (ha) of treatment	Quantity (kgs)
Herbicides & desiccants						
Benazolin/2,4-DB/MCPA	38	.	.	38	38	83
2,4-DB/Linuron/MCPA	35	.	.	35	35	24
Glyphosate	643	33	170	846	750	759
<i>All herbicides & desiccants</i>	715	33	170	919	823	866

Table 24 Comparison of the area of arable crops grown (hectares) in Northern Ireland, 1990-2000.

Crop	Survey Year						% differences between:				
	1990	1992	1994	1996	1998	2000	2000-1990	2000-1992	2000-1994	2000-1996	2000-1998
Cereals											
Spring barley	29,893	24,729	20,890	21,256	23,066	23,901	-20	-3	14	12	4
Undersown barley	5,800	5,759	6,542	4,875	4,035	3,532	-39	-39	-46	-28	-12
Winter barley	3,670	5,721	5,832	7,166	7,720	5,194	42	-9	-11	-28	-33
Spring wheat	348	136	32	129	400	863	148	535	2598	568	116
Undersown wheat	27	.	42	.	.	.	.	.	.	.	.
Winter wheat	5,827	6,839	6,952	6,543	6,745	4,125	-29	-40	-41	-37	-39
Spring oats	2,220	1,257	953	858	978	1,920	-14	53	101	124	96
Undersown oats	117	221	337	130	102	25	-78	-88	-92	-80	-75
Winter oats	673	1,008	1,125	1,481	1,523	967	44	-4	-14	-35	-37
All cereals	48,575	45,670	42,704	42,438	44,569	40,528	-17	-11	-5	-5	-9
Oilseed rape	906	1,063	610	193	739	131	-86	-88	-79	-32	-82
Linseed	.	158	.	.	.	.	.	.	.	.	.
Maize	.	45	.	.	.	.	.	.	.	.	.
Peas & beans	.	.	.	.	199	273	.	.	.	.	37
Triticale	37	.	.	.	17	64	73	.	.	.	285
Set-aside	.	.	.	.	.	2,451	.	.	.	.	.
All crops	49,518	46,936	43,314	42,631	45,523	43,447	-12	-7	0	2	-5

Table 25 The area (spray hectares) of arable crops (excluding potatoes) treated with pesticides in Northern Ireland 1990-2000.

Pesticide type	Survey Year						% differences between:				
	1990 sp ha	1992 sp ha	1994 sp ha	1996 sp ha	1998 sp ha	2000 sp ha	2000-1990 sp ha	2000-1992 sp ha	2000-1994 sp ha	2000-1996 sp ha	2000-1998 sp ha
Fungicides	34,210	38,112	42,603	57,106	65,166	64,248	88	69	51	13	-1
Herbicides & desiccants	53,984	54,625	56,798	63,364	74,577	72,828	35	33	28	15	-2
Insecticides											
Carbamates	.	88	167	492	297	18	.	-80	-89	-96	-94
Organochlorines	.	79	255	222	.	.	.	.	.	.	.
Organophosphates	1,164	2,426	2,036	2,473	1,464	3,773	224	56	85	53	158
Pyrethroids	2,383	2,800	3,267	7,050	16,731	23,617	891	743	623	235	41
Unknown insecticides	465	694	193	815	1,218	2,290	392	230	1087	181	88
All insecticides	4,011	6,087	5,919	11,053	19,714	29,699	640	388	402	169	51
Molluscicides	834	871	243	239	651	866	4	-1	256	262	33
Growth regulators	8,681	10,594	12,836	13,953	19,049	17,301	99	63	35	24	-9
Seed treatments	42,683	41,223	36,605	35,665	32,066	34,562	-19	-16	-6	-3	8
All pesticides	144,402	151,513	155,019	181,380	211,223	219,504	52	45	42	21	4
Area grown (ha)	49,520	46,935	43,314	42,631	45,523	43,447	-12	-7	0	2	-5

Table 26 The quantity (tonnes) of pesticides applied to arable crops in Northern Ireland 1990-2000.

Pesticide type	Survey Year						% differences between:				
	1990 tonnes	1992 tonnes	1994 tonnes	1996 tonnes	1998 tonnes	2000 tonnes	2000-1990 tonnes	2000-1992 tonnes	2000-1994 tonnes	2000-1996 tonnes	2000-1998 tonnes
Fungicides	15.50	18.48	15.00	24.81	23.63	14.03	-9	-24	-6	-43	-41
Herbicides & desiccants	56.42	40.61	36.28	43.07	47.42	43.00	-24	6	19	0	-9
Insecticides											
Carbamates	.	0.01	0.02	0.06	0.04	0.01	.	-50	-75	-92	-88
Organochlorines	.	0.09	0.29	0.23	.	.	.	.	.	.	.
Organophosphates	0.51	0.70	0.57	1.25	0.75	2.50	390	257	339	100	235
Pyrethroids	0.04	0.05	0.07	0.13	0.18	0.25	523	398	261	92	38
All insecticides	0.55	0.86	0.97	1.67	0.97	2.76	402	221	184	65	185
Molluscicides	0.33	0.27	0.12	0.05	0.08	0.15	-54	-44	28	206	101
Growth regulators	10.60	9.35	10.86	12.84	14.43	12.92	22	38	19	1	-10
Seed treatments	0.38	1.06	3.86	2.42	1.72	2.45	545	131	-36	1	42
All pesticides	83.79	70.64	67.07	84.89	88.24	75.32	-10	7	12	-11	-15
Area grown (ha)	49,520	46,935	43,314	42,631	45,523	43,447	-12	-7	0	2	-5

Table 27 The area (spray hectares) of cereal crops treated with pesticides in Northern Ireland 1990-2000.

Pesticide type	Survey Year						% differences between:				
	1990 sp ha	1992 sp ha	1994 sp ha	1996 sp ha	1998 sp ha	2000 sp ha	2000-1990 sp ha	2000-1992 sp ha	2000-1994 sp ha	2000-1996 sp ha	2000-1998 sp ha
Fungicides	33,741	37,584	42,517	56,880	64,171	63,739	89	70	50	12	-1
Herbicides & desiccants	52,342	52,872	56,201	63,072	72,911	71,281	36	35	27	13	-2
Insecticides											
Carbamates	.	88	167	493	249	.	.	.	.	.	.
Organochlorines	.	79	255	222	.	.	.	.	.	.	.
Organophosphates	1,164	2,359	1,857	2,447	1,440	3,773	224	60	103	54	162
Pyrethroids	2,381	2,670	3,267	7,047	16,481	23,617	892	785	623	235	43
Unknown insecticides	465	694	207	816	1,207	2,290	392	230	1006	181	90
All insecticides	4,010	5,890	5,754	11,028	19,377	29,681	640	404	416	169	53
Molluscicides	24	.	27	168	129	833	3373	.	2987	396	546
Growth regulators	8,607	10,509	12,836	13,953	18,998	17,237	100	64	34	24	-9
Seed treatments	41,739	39,958	35,995	35,525	31,728	34,260	-18	-14	-5	-4	8
All pesticides	140,465	146,819	153,330	180,624	207,314	217,031	55	48	42	20	5
Area grown (ha)	48,575	45,670	42,703	42,438	44,570	40,528	-17	-11	-5	-5	-9

Table 28 The quantity (tonnes) of pesticides applied to cereal crops in Northern Ireland 1990-2000.

Pesticide type	Survey Year						% differences between:				
	1990 tonnes	1992 tonnes	1994 tonnes	1996 tonnes	1998 tonnes	2000 tonnes	2000-1990 tonnes	2000-1992 tonnes	2000-1994 tonnes	2000-1996 tonnes	2000-1998 tonnes
Fungicides	14.97	18.43	14.96	24.52	22.82	13.32	-11	-28	-11	-46	-42
Herbicides & desiccants	55.07	39.43	35.67	42.87	46.26	41.68	-24	6	17	-3	-10
Insecticides											
Carbamates	.	0.01	0.021	0.07	0.029	.	.	.	.	.	.
Organochlorines	.	0.09	0.29	0.23	.	.	.	.	.	.	.
Organophosphates	0.51	0.68	0.49	1.24	0.737	2.51	392	269	412	102	240
Pyrethroids	0.04	0.04	0.069	0.13	0.193	0.26	550	550	277	100	35
All insecticides	0.55	0.83	0.88	1.66	0.96	2.75	400	231	214	66	187
Molluscicides	0.01	.	0.0064	0.04	0.02	0.14	1300	.	2088	250	741
Growth regulators	10.51	9.32	10.86	12.84	14.41	12.87	22	38	19	0	-11
Seed treatments	0.33	0.94	3.8	2.41	1.72	2.34	609	149	-38	-3	36
All pesticides	81.44	68.94	66.17	84.35	86.19	73.11	-10	6	10	-13	-15
Area grown (ha)	48,575	45,670	42,703	42,438	44,570	40,528	-17	-11	-5	-5	-9

Table 29 The area (spray hectares) of oilseed rape treated with pesticides in Northern Ireland 1990-2000.

Pesticide type	Survey Year						% differences between:				
	1990 sp ha	1992 sp ha	1994 sp ha	1996 sp ha	1998 sp ha	2000 sp ha	2000-1990 sp ha	2000-1992 sp ha	2000-1994 sp ha	2000-1996 sp ha	2000-1998 sp ha
Fungicides	467	525	86	226	664	244	-48	-54	185	8	-63
Herbicides & desiccants	1,603	1,343	597	292	1,171	366	-77	-73	-39	25	-69
Insecticides											
Carbamates	.	.	.	.	29	.	.	.	.	.	.
Organochlorines	.	.	.	.	.	.	.	.	.	.	.
Organophosphates	.	67	180	25	5	.	.	.	.	.	.
Pyrethroids	.	131	.	.	190	.	.	.	.	.	.
Unknown insecticides	.	.	.	.	10	.	.	.	.	.	.
All insecticides	.	198	180	25	234	.	.	.	.	.	.
Molluscicides	810	871	216	72	522	.	.	.	.	.	.
Growth regulators	.	84	.	.	.	.	.	.	.	.	.
Seed treatments	906	1,063	610	140	339	123	-86	-88	-80	-12	-64
All pesticides	3,786	4,084	1,689	755	2,931	732	-81	-82	-57	-3	-75
Area grown (ha)	906	1,062	610	193	739	131	-86	-88	-79	-32	-82

Table 30 The quantity (tonnes) of pesticides applied to oilseed rape in Northern Ireland 1990-2000.

Pesticide type	Survey Year						% differences between:				
	1990 tonnes	1992 tonnes	1994 tonnes	1996 tonnes	1998 tonnes	2000 tonnes	2000-1990 tonnes	2000-1992 tonnes	2000-1994 tonnes	2000-1996 tonnes	2000-1998 tonnes
Fungicides	0.53	0.06	0.03	0.30	0.60	0.64	21	967	1834	113	6
Herbicides & desiccants	1.31	0.98	0.62	0.20	0.74	0.16	-88	-84	-74	-20	-78
Insecticides											
Carbamates	.	.	.	.	0.00	.	.	.	.	.	.
Organochlorines	.	.	.	.	.	.	.	.	.	.	.
Organophosphates	.	0.02	0.08	0.01	0.004	.	.	.	.	.	.
Pyrethroids	.	0.01	.	.	0.001	.	.	.	.	.	.
All insecticides	.	0.03	0.08	0.01	0.01	.	.	.	.	.	.
Molluscicides	0.32	0.27	0.11	0.01	0.06	.	.	.	.	.	.
Growth regulators	.	0.04	.	.	.	.	.	.	.	.	.
Seed treatments	0.05	0.11	0.06	0.02	0.005	.	.	.	.	.	.
All pesticides	2.21	1.49	0.90	0.54	1.41	0.81	-63	-46	-10	50	-43
Area grown (ha)	906	1,062	610	193	739	131	-86	-88	-79	-32	-82

Table 31 The area (spray hectares) of peas and beans treated with pesticides in Northern Ireland 1998-2000.

Pesticide type	Survey Year		% differences between: 2000-1998 sp ha
	1998 sp ha	2000 sp ha	
Fungicides	314	138	-56
Herbicides & desiccants	444	199	-55
Insecticides			
Carbamates	19	18	-4
Organochlorines	.	.	.
Organophosphates	22	.	.
Pyrethroids	64	.	.
Unknown insecticides	.	.	.
All insecticides	105	18	-83
Molluscicides	.	.	.
Growth regulators	.	.	.
Seed treatments		105	.
All pesticides	863	460	-47
Area grown (ha)	199	273	37

Table 32 The quantity (tonnes) of pesticides applied to peas and beans in Northern Ireland 1998-2000.

Pesticide type	Survey Year		% differences between: 2000-1998 tonnes
	1998 tonnes	2000 tonnes	
Fungicides	0.20	0.05	-73
Herbicides & desiccants	0.41	0.20	-52
Insecticides			
Carbamates	0.003	0.005	67
Organochlorines	.	.	.
Organophosphates	0.002	.	.
Pyrethroids	<.001	.	.
All insecticides	0.006	0.005	-17
Molluscicides	.	.	.
Growth regulators	.	.	.
Seed treatments	.	0.112	.
All pesticides	0.614	0.367	-40
Area grown (ha)	199	273	37

Report No.	Report title	ISBN
99	Grassland & Fodder Crops 1989	1-855 27 079 X
105	Arable Crops 1990	1-855 27 130 3
106	Soft Fruit Crops 1990	1-855 27 149 4
109	Vegetable Crops 1991	1-855 27 137 0
110	Protected Crops 1991 (edible & ornamental)	1-855 27 283 0
111	Mushroom Crops 1991	1-855 27 150 8
117	Arable Crops 1992	1-855 27 193 1
118	Top Fruit Crops 1992	1-855 27 194 X
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