PESTICIDE USAGE IN SCOTLAND

SURVEY REPORT 77

ARABLE CROPS
1988

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SUMMARY

This was the fourth survey of pesticide usage on arable crops. Changes in cropping since the 1982 survey included increases in winter barley, wheat and oats, and decreases in spring barley, turnips and swedes. Oilseed rape increased dramatically, and peas for combining was a crop new to this survey. Potato crops were not included in this survey.

Usage (spray area) of insecticides increased more than 4-fold since 1982. More than half the usage was chlorpyrifos against leatherjackets, a particular problem in 1987/88, and demeton-S-methyl against aphids. Slugs were also prevalent, and treatment with molluscicides increased from 500 to 33,000 sp ha.

A feature of this survey was the large number of farmers spraying on advisers' recommendations and their not being able to define the reasons for treatments, especially with fungicides. There were large increases in the usage of fungicides especially on wheat, where there was a 4-fold increase since 1982. Usage on winter barley more than doubled. As in 1982, fenpropimorph remained the principal fungicide.

Overall, herbicide usage was very similar to that found in 1982. MCPA remained the most popular, but its usage was roughly halved by the introduction of metsulfuron-methyl.

Growth regulator usage increased more than 7-fold. As in 1982, chlormequat was the most commonly used.

INTRODUCTION

This is the fourth survey of pesticides used on arable crops. The previous three were in 1974, 1977 and 1982 (references 1, 2 and 3). Crops surveyed included cereals, oilseed rape (surveyed separately in 1982, reference 4) and peas for combining (a crop new since 1982), but excluded potatoes and stockfeeding crops, other than turnips and swedes, which have been surveyed separately (references 5 and 6).

DEFINITIONS AND NOTES

Basic area (or basic ha) is the planted area of crop which was treated with a given pesticide, irrespective of the number of times it was applied to that area.

Spray area (or spray ha) is the basic area of a crop treated with a given pesticide multiplied by the number of treatments that area received.

Demeton-S-methyl sulphone and oxydemeton-methyl are both referred to as demeton-S-methyl because growers do not always differentiate between the two compounds.

Similarly, mecoprop and mecoprop-p are both referred to as mecoprop, and 2-methoxyethylmercury acetate and phenylmercury acetate as organo-mercury.

Due to rounding, there may be slight differences in totals both within and between tables.

METHOD

Using the 1987 Agricultural Census (reference 7), two samples were drawn representing the whole of Scotland. The first sample was selected from holdings growing any of the major cereal crops and the second from holdings growing turnips and/or swedes. This was necessary to provide adequate coverage of turnips and swedes, as the distribution of these over the country was different from that of cereal crops.

The country was divided into 11 land-use regions (Fig 1, reference 8) and the samples were drawn from Census returns of holdings growing at least 1 ha of the relevant crops. Holdings were stratified by land-use region and by farm size group. Sampling fractions within size groups were based on area of crops grown rather than number of holdings, so that smaller size groups would not dominate the sample.

Data were obtained by personal interview for the cereal sample (but included information on turnips and swedes, if grown). Data from the second sample were collected mainly by use of postal questionaires. In both cases, the survey period was from the end of the 1987 harvest to the end of the 1988 harvest.

Details of the numbers of holdings visited for the first sample are given in Table 1 and the numbers of holdings from which data were collected for turnips and swedes are given in Table 6.

For all crops except turnips and swedes (see below), sample data were raised to give national estimates of pesticide usage using raising factors (Table 3). These were based on the number of holdings growing cereals in the 1988 Agricultural Census (reference 9) within regions and size groups (Table 2). Land-use regions 1 and 2 were amalgamated, as were regions 10 and 11. Adjustments were made for each crop within each region by applying the first adjustment factors (Table 4) to the sample area of each crop grown and comparing this with the area from the 1988 Census. A second adjustment was made for crops where no holdings were sampled in one or more regions (Table 5).

Sample data for turnips and swedes were raised separately. Raising and adjustment factors are shown in Tables 8 and 9 respectively.

PESTICIDE USAGE

The area of each crop grown in each region is shown in Table 10 along with the total area of crops grown in 1982 for comparison.

The proportions of crops not treated with the various types of pesticides are given in Table 11. Since 1982 there had been little change except that all Winter wheat was treated in 1988, whereas 13% had not been in 1982 and for the oat crop the reverse was found, 7% not being treated in 1988 compared with 2% in 1982.

A feature of this survey was the difficulty that growers had in defining precise reasons for using pesticides, especially fungicides. It would appear that this is partly a result of an increase in farmers' use of professional advice, either from independent or trade sources, also an increase in the use of protective or 'insurance' treatments to maximize yield. In addition to this was the use of a larger number of fungicide products, but at reduced rates, in each tank mix. These facts and the

incidence of rust were thought to be the main reasons for the large increase in spray area treated with fungicides, especially on wheat where there was a 4-fold increase since 1982, and on winter barley where usage more than doubled. Because of the frequent use of reduced application rates, however, the quantities of active ingredient per spray hectare of the 3 most used fungicides, fenpropimorph, tridemorph and carbendazim had reduced by 15-25% since 1982.

A summary of the areas of each crop treated with each formulation is shown in Tables 46, 47 and 48, with each active ingredient in Tables 49, 50 and 51 and of the estimated quantities applied in Tables 52, 53 and 54. The principal 50 chemicals ordered both by total spray area and by tonnes of active ingredient are shown in tables 55 and 56. These 2 tables include seed dressings data.

WINTER BARLEY

The area grown 69,240 hectares was just over 25,000 hectares more than in 1982. The 1977 survey had recorded only 2 winter sown crops.

Insecticides and molluscicides (Tables 12, 49)

The proportion of the crop treated increased from 3% in 1982 to 6% in 1988.

Chlorpyrifos was used on around 1% of the crop to control leatherjackets. This compares with 1982 when both chlorpyrifos and DDT, the only insecticides recorded, had also been used for this purpose. Other insecticides recorded in 1988 were deltamethrin and demeton-S-methyl which, with chlorpyrifos, were each used on less than 0.5% of the crop to control aphids.

Methiocarb was used on 3% of the crop to control slugs and a further area, less than 0.5%, was treated with unspecified molluscicides.

Fungicides (Tables 13, 50)

The proportion of the crop treated increased from 90% in 1982 to 96% in 1988. The total spray area of fungicides increased more than 3-fold from 80,000 sp ha to 264,000 sp ha compared with only a 57% increase in area grown.

Of the diseases specified the principal one was mildew accounting for 32% of the spray area, 73% in 1982, followed by Rhynchosporium, 7%. Insurance treatments accounted for 21% of the spray area and treatments for which no reason was given, other than it was on advisers recommendation, 34%.

The most used fungicides were tridemorph and carbendazim, either alone or in mixtures, and accounted for 23% and 22% respectively of the fungicide spray area. Tridemorph alone was used mainly against mildew while the mixtures were used for a variety of reasons and often specified as insurance or advisers' recommendations.

Fenpropimorph alone (13%) and propiconazole, alone and in mixtures (12%), were also widely used. In 1982, propiconazole had been the most commonly used fungicide accounting for 39% of the total spray area,

mainly against mildew, followed by tridemorph (15%), carbendazim (15%) and fenpropimorph (12%).

Herbicides and growth regulators (Tables 14, 51)

The proportion of the crop treated with herbicides increased from 93% in 1982 to 97% in 1988, although the total spray area increased by only 20% from 104,000 sp ha to 125,000 sp ha despite the 57% increase in area grown.

The main reason for use was to control annual weeds and these accounted for 75% of the spray area. The main herbicide involved, as in 1982, was mecoprop and accounted for 20% of the total spray area (28% in 1982), followed by metsulfuron-methyl (11%) which had not been available in 1982. The use of pendimethalin (9%) and isoproturon (9%) for the control of annual broad-leaved and grass weeds had increased considerably since 1982. MCPA, trifluralin, ioxynil and bromoxynil were the main alternatives in both surveys.

Chlormequat and 2-chloroethylphosphonic acid were the main growth regulators used on this crop. In all, usage increased more than 6-fold since 1982.

The percentage of crop area treated at different times of year with each of the formulations is shown in Table 15 and the percentage of basic area treated more than once with each formulation in Table 16.

Seed dressings (Tables 44, 45)

As in 1982, nearly all the seed was treated. 61% received an organo-mercury compound (80% in 1982), 20% fuberidazole/triadimenol (7% in 1982), 16% ethirimol/flutriafol/thiabendazole (not recorded in 1982). Ethirimol alone was used on 3% of the crop.

SPRING BARLEY

The area grown was 319,258 hectares, a reduction of over 90,000 hectares since 1982.

Insecticides and molluscicides (Tables 17, 49)

The proportion of the crop treated increased considerably from 1% in 1982 to 10% in 1988.

Chlorpyrifos was the most used (7% of the crop), 80% for leatherjacket control and most of the remainder for aphid control. Demeton-S-methyl was used on about 2% of the crop, almost entirely against aphids. In 1982, 75% of the insecticide spray area had been with DDT, very largely for control of leatherjackets.

Methiocarb was the only molluscicide recorded, on 1% of the crop. No molluscicide had been recorded in 1982.

Fungicides (Tables 18, 50)

Usage in 1988 was broadly similar to that in 1982 at around 81% of the crop treated. Since 1982, the total spray area had decreased by 74,000 sp ha, or 14%, compared with a 22% reduction in area grown.

The main reason for using fungicides was to control mildew, and, as in 1982, the principal fungicide involved was fenpropimorph accounting for 34% of the total spray area, followed by tridemorph, 24%, also common in 1982. Fenpropodin (13%) had not been available in 1982; there has been little change in the usage of propiconazole (12%). Triadimefon, the second most popular fungicide in 1982 (27%) was little used in 1988.

Preventative treatments accounted for 21% of the total spray area and no reason was specified for a further 22% except that treatment had been carried out on advisers' recommendations.

Herbicides and growth regulators (Tables 19, 51)

Usage of herbicides in 1988 was broadly similar to that in 1982 at around 98% of the crop treated. The total spray area of 740,491 sp ha was a reduction of 16% on 1982 (886,509 sp ha) compared with a reduction in crop area of 22%.

The main reason for use of herbicides was annual weed control. As in 1982, MCPA, alone and in mixtures, was the most used, accounting for 54% of the crop area (81% in 1982), and 24% of the total spray area (38% in 1982). Its popularity has been reduced mainly by the introduction of metsulfuron-methyl, alone or with thifensulfuron-methyl, which accounted for 41% of the crop area and 18% of the spray area. Usage of mecoprop was slightly reduced from 19% to 15%.

The use of wild oat herbicides had reduced from around 26,600 sp ha in 1982 to just over 8,200 and flamprop-M-isopropyl (L-flamprop isopropyl in 1982) and difenzoquat were the only herbicides recorded for this purpose. In 1982, difenzoquat had been by far the most used followed by barban and tri-allate.

The growth regulators chlormequat and 2-chloroethylphosphonic acid (alone or with mepiquat chloride) were used on 50,971 sp ha and 33,019 sp ha respectively. The same chemicals had been used in 1982 when chlormequat was the most used on 11,895 sp ha.

Dates of application and the percentage of area treated are shown in Table 20. The percentage of basic area treated more than once is shown in Table 21.

Seed dressings (Tables 44, 45)

Almost all the seed was treated compared with 95% in 1982. Organo-mercury dressing was applied to 79% of the seed, a slightly higher proportion than that recorded in 1982. Ethirimol/flutriafol/ thiabendazole and fuberidazole/triadimenol (9% in 1982) formulations were each applied to 8% of the seed. Small quantities of seed received either ethirimol alone or gamma-HCH with fungicide.

WINTER WHEAT

The area of winter wheat 98,608 hectares had more than doubled since 1982 when it was 40,241 hectares.

Insecticides and molluscicides (Tables 22, 49)

The proportion of the crop treated increased dramatically from 2% in 1982 to 30% in 1988.

Although no molluscicides had been recorded in 1982, the prevalence of slugs in 1987/88 necessitated the need for control, and 17% of the crop was treated. Methiocarb was the main molluscicide, 18,750 sp ha, while metaldehyde was used in smaller quantities.

The main reason for insecticide usage was to control aphids and pirimicarb was the chemical most used for this purpose followed by demeton-S-methyl, and dimethoate. This last chemical had not been recorded in 1982. Chlorpyrifos, 992 sp ha, and gamma-HCH, 114 sp ha, were used for leatherjacket control.

Overall, pirimicarb was the most used insecticide accounting for 35% of the total insecticide spray area (17,006 sp ha) followed by dimethoate 20%, demeton-S-methyl, 19%, and chlorpyrifos, also 19%.

Fungicides (Tables 23, 50)

Almost all (99%) of the crop was treated in 1988, compared with only 77% in 1982. The total spray area increased nearly 10-fold from 55,796 sp ha to 540,220 sp ha in 1988, while area grown increased only $2\frac{1}{2}$ times.

The main specified reasons for fungicide use were mildew accounting for 19% of the total spray area and and rust 10%. Insurance and unspecified treatments accounted for 65%.

Chlorothalonil and carbendazim, each with 16% of the total spray area, were the most widely used in 1988, followed by tridemorph (11%), fenpropimorph (11%) and propiconazole (10%). In 1982, propiconazole (38%) had been far the most popular, followed by tridemorph (16%) and carbendazim (14%).

Herbicides and growth regulators (Tables 24, 51)

The proportion of the crop treated with herbicides increased significantly from 82% of the crop in 1982 to 96% in 1988. The total spray area also increased, over 3-fold from 65,783 to 225,591 sp ha.

By far the biggest reason for herbicide usage was annual weed control. Overall, mecoprop and metsulfuron-methyl, both alone and in mixtures, were the two most used herbicides and accounted for 27% and 25% respectively of the total spray area. In 1982, mecoprop (32%) had been the most popular. In both surveys, ioxynil and bromoxynil, in mixtures, were the main alternatives.

The total spray area of growth regulators also increased, over 8-fold from 16,179 sp ha to 137,376 sp ha. As in 1982, chlormequat was the most used, followed by 2- chloroethylphosphonic acid, and mepiquat chloride.

The percentage of areas treated with each formulation at specified times of year are shown in Table 25, and the number of times treated in Table 26.

Seed dressings (Tables 44, 45)

All seed was treated compared with 97% in 1982. Organo-mercury was by far the most common dressing (86%) mostly alone or with fonofos (2%). In 1982, organo-mercury alone (76%) or with gamma-HCH (12%) had been the most popular. 15% of seed was treated with fuberidazole/triadimenol (4% in 1982), while small quantities received ethirimol/flutriafol/ thiabendazole or chlorfenvinphos.

OATS

The area grown had risen slightly since 1982 from 30,670 ha to 35,030 ha, and as then, all crops sampled were spring sown.

Insecticides and molluscicides (Tables 27, 49)

In 1988, nearly 10% of the crop was treated with insecticides; none had been recorded in 1982.

Chlorpyrifos was used mainly to control leatherjackets on 8% of the crop area and cypermethrin to control aphids on 1%.

As in 1982, no molluscicide usage was recorded.

Fungicides (Tables 27, 50)

The proportion of the crop treated increased from 19% in 1982 to 25% in 1988. Since 1982, the total spray area treated with fungicides more than doubled from 5,643 sp ha to 12,169 sp ha, while the area grown increased by only 14%. The principal fungicide in 1982, triadimefon, was not recorded in 1988 when tridemorph was the most used, accounting for 44% of the total spray area.

Mildew was the main specified reason for fungicide usage, 65% of the spray area, followed by insurance, 17%, and no reason given, 19%.

Herbicides and growth regulators (Tables 28, 51)

The proportion of the crop treated with herbicides decreased slightly from 98% in 1982 to 92% in 1988. The total spray area receiving herbicides increased by only 4% from 60,566 sp ha to 62,711 sp ha, despite the 14% increase in area grown.

Nearly all herbicide treatment was for annual weed control. As in 1982, MCPA, alone and in mixtures, was the most used herbicide, accounting for 35% of the total spray area (40% in 1982). Metsulfuron-methyl (18%), followed by mecoprop (13%), were also used.

Growth regulators were used on 30% of the crop area, chlormequat accounting for 29% (21% in 1982).

Application dates and the numbers of times treated are given in Tables 29 and 30.

Seed dressings (Tables 44, 45)

89% of oat seed received a seed dressing compared with 80% in 1982.

These proportions are smaller than any of the other cereals. 79% received organo-mercury mostly alone, or with gamma-HCH (1%). Small quantities of ethirimol/flutriafol/thiabendazole were also used. In 1982, organo-mercury alone (60%) or with gamma-HCH (16%) had been the most popular.

TRITICALE

Only a few crops were found in this survey. The data collected cannot be raised to national level, but the chemicals used are listed below:-

Fungicides - sulphur

Herbicides - mecoprop, metsulfuron-methyl, pendimethalin

Growth regulators - 2-chloroethylphosphonic acid, chlormequat

PEAS

The area grown in 1988 was 8,624 ha. Only 2 crops had been found in 1982 and had not been included in the 1982 report.

Insecticides (Tables 31, 49)

The only insecticide recorded was pirimicarb, used on 1% of the crop area to control aphids.

Fungicides (Tables 31, 50)

60% of the crop was treated with fungicides. These were used mostly to control mildew, 18% of the spray area, and Botrytis 11%, but 8% had been treated for insurance purposes and 60% on advice for which no specific reason was given.

Chlorothalonil was the most used, 37% of the crop area being treated, followed by vinclozolin, 22%, benomyl, 20%, and iprodione, 17%.

Herbicides and growth regulators (Tables 32, 51)

Herbicides, including desiccants, were used on 100% of the crop. The most used herbicide was diquat, used entirely as a desiccant on 78% of the crop area. Glyphosate was also used as a desiccant as well as for grass weed control on a total of 12% of the crop area. The principal herbicides for weed control were terbuthylazine mixed with terbutryn followed by bentazone/MCPB for control of annual weeds and cyanazine followed by bentazone/MCPB mixture for mixed weeds.

Overall, diquat accounted for 25% of the total spray area followed by terbuthylazine and terbutryn (both 15%) and cyanazine 10%.

The only growth regulator recorded was chlormequat used on 4% of the crop area. Di-1-p-menthene was used to prevent pod shatter on 2%.

Dates of application of each formulation and the number of times used where appropriate are shown in tables 33 and 34.

Seed dressings (Tables 44, 45)

Detailed information could not be obtained for almost half the pea seed. 38% of seed received drazoxolon, while captan/fosetyl-aluminium/ thiabendazole (7%), thiabendazole/thiram (4%), thiram alone (4%) and metalaxyl (3%) were also used.

OILSEED RAPE

The area grown, 41,514 ha, was considerably more than at the last survey 1981-82 (reference 4), 1,606 ha, when this was a comparatively new crop in Scotland. Nearly all the crops were winter sown.

Insecticides and molluscicides (Tables 35, 49)

Molluscicides were used on 20% of the crop. Methiocarb was the only molluscicide recorded. Metaldehyde had also been recorded in 1982.

The principal insecticide was alphacypermethrin used on 8% of the crop, mainly for unspecified reasons, followed by deltamethrin on 2%, entirely against pollen beetle. The only other insecticide recorded, malathion, was also used against this pest. All insecticide applications were in the spring and none was recorded applied after June (Table 37). In 1982 the main reason for the use of insecticides had been pollen beetle and a mixture of azinphos-methyl and demeton-S-methyl the main insecticides used. Gamma-HCH and triazophos had also been used then.

Fungicides (Tables 36, 50)

A total of 142,501 sp ha of fungicides was applied to 92% of the crop.

The most used was carbendazim, alone and in mixtures, accounting for 30% of the total fungicide spray area, mainly on advisers' recommendations or for insurance purposes, but also specifically against light leaf spot. This was followed by sulphur and vinclozolin (both 11%). In 1982, iprodione had been the only fungicide recorded, used entirely against Alternaria.

Herbicides and growth regulators (Tables 37, 51)

Metazachlor was the most used herbicide applied to 43% of the crop followed by benazolin/clopyralid mixture to 39%. Diquat and glyphosate were used as desiccants. Chlormequat was the only growth regulator recorded, used on 9% of the crop. Di-1-p-menthene was used on 1% of the crop to prevent pod shatter. In 1982 the most used herbicide had been TCA-sodium followed by propyzamide and clopyralid, the latter being used in mixtures with benazolin and propyzamide, but in 1988 it was also used alone on 3% of the crop area.

Dates of application of each formulation and the number of times used where appropriate are shown in tables 38 and 39.

Seed dressings (Tables 44, 45)

Detailed information on seed dressings proved very difficult to obtain. Fenpropimorph/gamma-HCH/thiabendazole and captan/gamma-HCH formulations were the most common dressings recorded.

TURNIPS AND SWEDES

The area of these crops grown in 1988 was 30,620 ha, a reduction of 23% since 1982.

Insecticides, molluscicides and fungicides (Tables 40, 49, 50)

There was little change in the use of insecticides and molluscicides from 23% of the crop area in 1982 to 22% in 1988.

Insecticides were used mainly to control flea beetle, root fly and leatherjackets, chlorpyrifos being the most used, on 10% of the crop, followed by gamma-HCH on 5%. In 1982, carbofuran, DDT and gamma-HCH had been the most popular.

Methiocarb was the only molluscicide recorded, used on 1% of the crop. No molluscicide had been recorded in 1982.

Sulphur, the only fungicide recorded, was applied to control mildew on 2% of the crop. In 1982, tridemorph only was recorded, on 1% of the crop.

Herbicides (Tables 41, 51)

The proportion of the crop treated increased from 88% in 1982 to 93% in 1988. The range of herbicides had increased from 7 in 1982 to 10 in 1988 though trifluralin was still the principal herbicide, accounting for 48% of the total spray area compared with 40% in 1982, followed by propachlor, 26%, (20% in 1982). Paraquat was used on 530 ha to kill pasture before ploughing.

In 1977 the range of herbicides had also been similar, but smaller proportions of the crop had been treated.

The dates of application for each formulation and the number of times used where appropriate are given in tables 42 and 43.

Seed dressings (Tables 44, 45)

Nearly all seed had been treated, mainly with captan/gamma-HCH (77%), either alone or with iprodione (12%).

ACKNOWLEDGEMENTS

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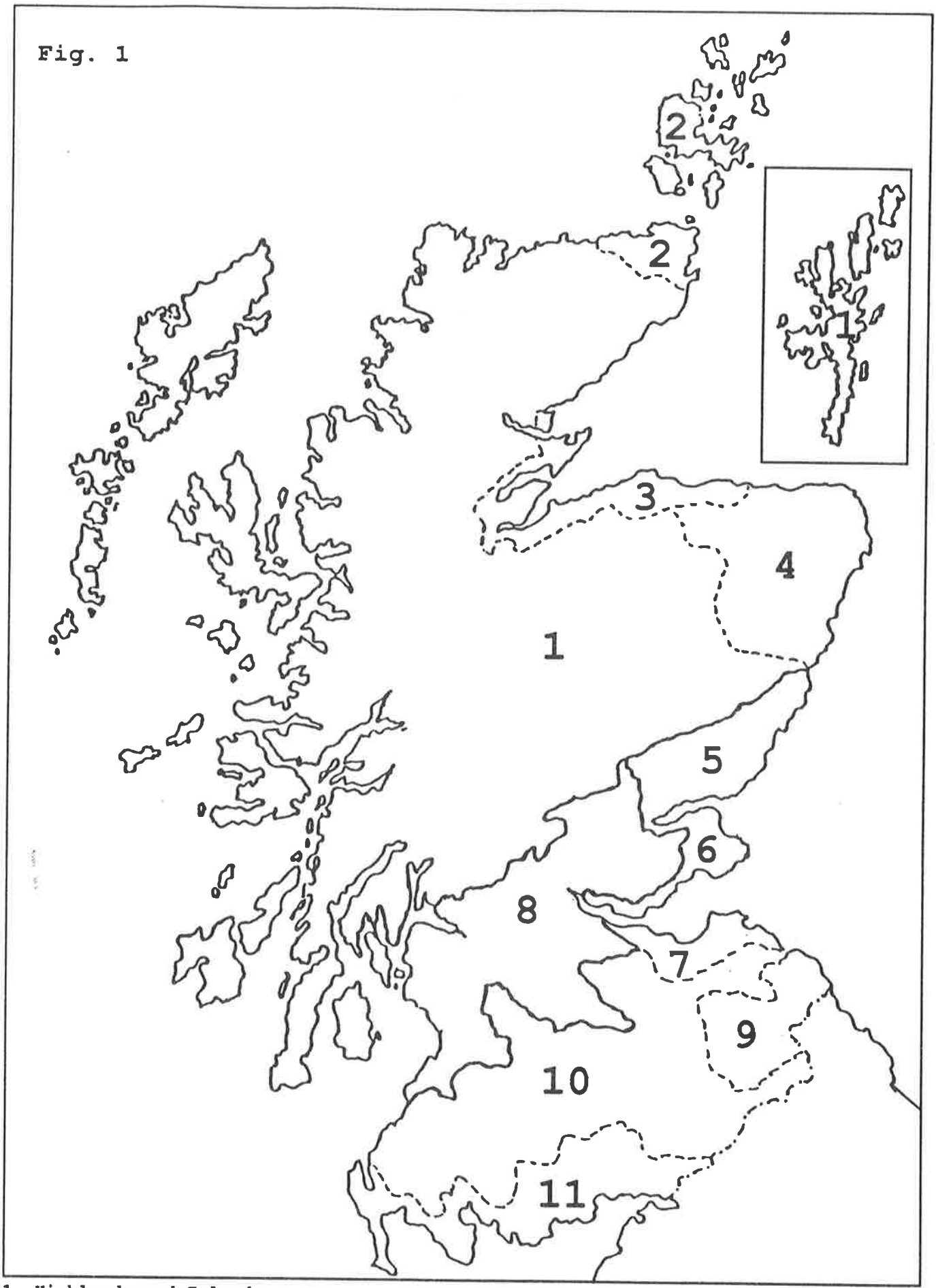
Fig. 1



1. Highlands and Islands
2. Caithness/Orkney
3. Moray Firth
4. Aberdeen
5. Angus
6. E Fife
7. Lothian
8. Central Lowlands
9. Tweed Valley
10. Southern Uplands
11. Solway

TABLE 1 Number of holdings sampled in each Region and size group (excluding turnips and swedes)

Size group (ha)	High & Islands	Caith & Orkney	Moray Firth	Abdn	Angus	East Fife	Lothian	Central Lowlands	Tweed Valley	South Uplands	Solway	Scotland
1-19.9	3	3	5	9	4	0	0	10	1	1	5	41
20-49.9	2	0	9	26	6	4	2	12	1	1	8	71
50-99.9	1	0	10	18	11	10	6	13	7	1	1	78
100-149.9	0	0	5	9	12	5	8	5	3	0	0	47
150+	0	0	10	9	7	10	11	2	9	1	0	59
All	6	3	39	71	40	29	27	42	21	4	14	296

TABLE 2 Number of holdings growing cereal(s) in Scotland in 1988

Size group (ha)	High & Islands	Caith & Orkney	Moray Firth	Abdn	Angus	East Fife	Lothian	Central Lowlands	Tweed Valley	South Uplands	Solway	Scotland
1-19.9	807	907	701	1573	392	99	126	1240	158	264	663	6930
20-49.9	97	90	385	1003	451	157	103	634	148	85	280	3433
50-99.9	35	27	205	505	450	216	120	314	184	41	67	2164
100-149.9	8	2	92	167	161	86	107	75	120	13	8	839
150+	2	2	60	95	138	64	96	47	128	8	7	647
All	949	1028	1443	3343	1592	622	552	2310	738	411	1025	14013

TABLE 3 Raising factors (for crops other than turnips and swedes)

Size group (ha)	Highlands & Islands Caithness & Orkney	Moray Firth	Abdn	Angus	East Fife	Lothian	Central Lowlands	Tweed Valley	South Uplands & Solway
1-19.9	285.67	140.20	174.78	98.00	.	.	124.00	158.00	154.50
20-49.9	93.50	42.78	38.58	75.17	39.25	51.50	52.83	148.00	40.56
50-99.9	62.00	20.50	28.06	40.91	21.60	20.00	24.15	26.29	54.00
100-149.9	.	18.40	18.56	13.42	17.20	13.38	15.00	40.00	.
150+	.	6.00	10.56	19.71	6.40	8.73	23.50	14.22	15.00

TABLE 4 First Adjustment factors (for crops other than turnips and swedes)

	Highlands & Islands Caithness & Orkney	Moray Firth	Abdn	Angus	East Fife	Lothian	Central Lowlands	Tweed Valley	South Uplands & Solway
Winter Barley	.	1.49	0.77	0.72	0.97	1.01	0.67	0.79	1.36
Spring Barley	0.76	0.87	0.94	0.98	1.14	0.90	0.85	0.82	0.91
Winter Wheat	.	0.95	0.88	0.93	0.67	1.23	0.70	1.57	2.54
Spring Oats	1.89	0.74	1.58	0.79	1.41	1.65	1.27	1.76	0.73
Peas	.	0.64	1.09	2.90	0.96	1.15	0.87	1.85	.
Oilseed Rape	.	0.86	0.95	1.08	1.24	1.16	1.27	0.86	0.53

TABLE 5 Second Adjustment factors - for crop areas

Winter Barley	Spring Barley	Winter Wheat	Spring Oats	Peas	Oilseed Rape
1.014	1.000	1.015	1.006	1.011	1.017

TABLE 6 Number of holdings which provided information on turnips and swedes

Size group (ha)	High & Islands	Caith & Orkney	Moray Firth	Abdn	Angus	East Fife	Lothian	Central Lowlands	Tweed Valley	South Uplands	Solway	Scotland
1-4.9	5	2	22	44	10	7	6	12	5	5	3	121
5-9.9	3	0	16	20	6	3	3	7	9	4	3	74
10+	0	2	7	18	7	2	1	3	8	2	0	50
All	8	4	45	82	23	12	10	22	22	11	6	245

TABLE 7 Number of holdings growing turnips and swedes in Scotland in 1988

Size group (ha)	High & Islands	Caith & Orkney	Moray Firth	Abdn	Angus	East Fife	Lothian	Central Lowlands	Tweed Valley	South Uplands	Solway	Scotland
1-4.9	404	184	620	1213	418	120	66	539	164	150	209	4087
5-9.9	123	26	245	475	199	59	45	130	137	83	55	1577
10+	20	10	81	188	53	14	25	39	104	48	13	595
All	547	220	946	1876	670	193	136	708	405	281	277	6259

TABLE 8 Raising factors for turnips and swedes

Size group (ha)	High & Islands	Caith & Orkney	Moray Firth	Abdn	Angus	East Fife	Lothian	Central Lowlands	Tweed Valley	South Uplands	Solway
1-4.9	80.80	92.00	28.18	27.57	41.80	17.14	11.00	44.92	32.80	30.00	69.67
5-9.9	41.00	.	15.31	23.75	33.17	19.67	15.00	18.57	15.22	20.75	18.33
10+	.	5.00	11.57	10.44	7.57	7.00	25.00	13.00	13.00	24.00	.

TABLE 9 Adjustment factors for turnips and swedes

High & Islands	Caith & Orkney	Moray Firth	Abdn	Angus	East Fife	Lothian	Central Lowlands	Tweed Valley	South Uplands	Solway
1.01	2.35	1.00	0.91	1.04	0.94	0.94	0.88	1.00	0.77	1.22

TABLE 10 Area of Arable crops grown in Scotland in 1988 (hectares)

	High & Islands	Caith & Orkney	Moray Firth	Aberdeen	Angus	East Fife	Lothian	Central Lowlands	Tweed Valley	South Uplands	Solway	Scotland 1988	Scotland 1982
Winter Barley	653	287	5969	15838	11861	6251	6729	6476	11030	1194	2953	69240	44213
Spring Barley	8175	7426	32115	72452	53826	21904	18880	50291	28641	8956	16581	319258	410709
Winter Wheat	411	81	8358	17161	18752	11739	16012	7521	16830	809	934	98608	40241
Spring Oats	1989	2285	7050	7931	4174	1541	1015	4683	3173	216	974	35030	30679
Peas	62	4	1443	350	2005	825	1472	746	1688	16	13	8624	.
Oilseed Rape	244	210	3391	11040	11215	4704	3028	3199	3984	245	257	41514	1606
Turnips & Swedes	2230	779	4547	9315	3316	929	816	2837	3039	1663	1148	30620	39680

TABLE 11 Proportions of crop grown not treated with pesticides (%)

	Winter barley	Spring barley	Winter wheat	Spring oats	Peas	Oilseed rape	Turnips & swedes
Insecticides, molluscicides	94	90	70	90	99	70	78
Fungicides	4	19	1	75	40	8	98
Herbicides	3	2	4	8	0	2	7
Growth regulators	39	80	24	70	96	87	100
Any pesticide	1	1	0	7	0	1	7

TABLE 12 Winter barley: usage of insecticides and molluscicides, the reasons for their use (spray hectares of formulations) and the percentage of the crop treated

	Leather jackets	Aphids	Slugs	Total spray area	% crop treated
INSECTICIDES					
SYNTHETIC PYRETHROID					
Deltamethrin	.	275	.	275	+
SYSTEMIC ORGANOPHOSPHATE					
Demeton-S-methyl	.	242	.	242	+
NON-SYSTEMIC ORGANOPHOSPHATE					
Chlorpyrifos	658	244	.	902	1
MOLLUSCICIDES					
Methiocarb	.	.	1758	1758	3
Unknown molluscicide	.	.	289	289	+
Total spray areas	658	761	2047	3466	
Area Planted (Ha)					69240

'+' = less than 0.5%

TABLE 13 Winter barley: usage of fungicides, the reasons for their use (spray hectares of formulations) and the percentage of the crop treated

	Mainly mildew	Mainly rhyncho	Mainly eyespot	Mainly rust	Other diseases	Insurance	No Reason given	Total spray area	% crop treated
Benodanil	.	.	.	.	1157	.	.	1157	2
Carbendazim	2939	7733	1417	348	.	9369	13373	35179	40
Carbendazim/chlorothalonil	.	224	115	.	.	.	.	339	+
Carbendazim/flutriafol	1360	212	.	.	.	292	2825	4689	7
Carbendazim/mancozeb	.	.	.	.	.	804	294	1098	2
Carbendazim/maneb	277	282	319	.	.	.	.	878	1
Carbendazim/maneb/tridemorph	2685	434	.	135	.	2069	6552	11875	13
Carbendazim/prochloraz	.	408	709	.	.	.	568	1685	2
Carbendazim/propiconazole	797	.	.	.	.	1159	988	2944	4
Carbendazim/triadimefon	553	.	.	.	.	.	.	553	1
Chlorothalonil	99	869	.	.	646	2241	5560	9415	11
Fenpropidin	1647	416	.	968	.	976	3744	7751	8
Fenpropimorph	9564	809	.	1385	.	11466	11313	34537	35
Mancozeb	.	.	.	.	.	.	921	921	1
Maneb	.	706	.	77	.	2394	1455	4632	5
Nuarimol	.	328	.	.	.	.	.	328	+
Prochloraz	2073	1294	370	.	1243	6772	7308	19060	24
Propiconazole	6191	1377	.	1918	370	4536	8038	22430	27
Propiconazole/tridemorph	2276	123	.	.	.	2240	594	5233	8
Sulphur	.	.	.	.	.	388	1996	2384	3
Thiophanate-methyl	268	.	.	.	.	.	1793	2061	2
Triadimefon	752	.	.	.	.	.	.	752	1
Triadimenol	117	.	.	270	.	.	1143	1530	2
Triadimenol/tridemorph	3282	.	.	.	439	566	3845	8132	11
Tridemorph	34354	482	.	.	.	168	.	35004	42
Unknown fungicide	444	.	.	.	.	.	.	444	1
Total spray area	69678	15697	2930	5101	3855	45440	72310	215011	
Area Planted (Ha)									69240

'+' = less than 0.5%

TABLE 14 Winter barley: usage of herbicides and growth regulators, the reasons for their use (spray hectares of formulations) and the percentage of the crop treated

	Mainly annual weeds	Mainly grass weeds	Mixed weeds	Wild oats	Desiccation	Growth Reg	Total spray area	% crop treated
HERBICIDES								
Benazolin/bromoxynil/ioxynil	1099	.	.	.	.	.	1099	2
Bifenox/isoproturon	.	.	1265	.	.	.	1265	2
Bromoxynil/chlorsulfuron/ioxynil	239	.	.	.	.	.	239	+
Bromoxynil/dichlorprop	257	.	.	.	.	.	257	+
Bromoxynil/fluroxypyr/ioxynil	2618	.	.	.	.	.	2618	4
Bromoxynil/ioxynil	2559	.	.	.	.	.	2559	4
Bromoxynil/ioxynil/mecoprop	191	.	.	.	.	.	191	+
Chlorotoluron	.	1373	.	.	.	.	1373	2
Chlorsulfuron/metsulfuron-methyl	252	.	.	.	.	.	252	+
Clopyralid/fluroxypyr/ioxynil	236	.	.	.	.	.	236	+
Clopyralid/ioxynil	232	.	.	.	.	.	232	+
Cyanazine	316	.	921	.	.	.	1237	2
Dicamba/MCPA/mecoprop	279	.	.	.	.	.	279	+
Dichlorprop/MCPA	1160	.	.	.	.	.	1160	2
Diflufenican/isoproturon	2850	.	3907	220	.	.	6977	10
Flamprop-M-isopropyl	.	.	.	533	.	.	533	1
Fluroxypyr	2071	.	.	.	.	.	2071	3
Glyphosate	.	.	457	.	2297	.	2754	4
Isoproturon	.	843	.	.	.	.	843	1
Isoproturon/trifluralin	.	.	1903	.	.	.	1903	3
Isoxaben	1189	.	.	.	.	.	1189	2
Linuron	.	235	.	.	.	.	235	+
Linuron/trietazine/trifluralin	388	.	120	.	.	.	508	1
Linuron/trifluralin	1247	.	3427	.	.	.	4674	7
MCPA	6801	.	.	.	.	.	6801	10
Mecoprop	23944	.	.	.	.	.	23944	34
Methabenzthiazuron	.	.	711	.	.	.	711	1
Metsulfuron-methyl	12901	.	.	.	.	.	12901	19

continued

TABLE 14 cont'd	Mainly annual weeds	Mainly grass weeds	Mixed weeds	Wild oats	Desiccation	Growth Reg	Total spray area	% crop treated
HERBICIDES Cont'd								
Metsulfuron-methyl/thifensulfuron-methyl	642	.	.	.	.	.	642	1
Pendimethalin	3097	787	7440	.	.	.	11324	16
Terbutryn	1071	.	.	.	.	.	1071	2
Trifluralin	444	.	112	.	.	.	556	1
Unknown herbicide	1066	.	.	.	.	.	1066	2
Total spray area	67149	3238	20263	753	2297	.	93700	
GROWTH REGULATORS								
2-chlorethylphosphonic acid	.	.	.	.	.	4634	4634	7
2-chlorethylphosphonic acid/mepiquat chloride	.	.	.	.	.	24607	24607	33
Chlormequat	.	.	.	.	.	47905	47905	51
Unknown growth regulator	.	.	.	.	.	444	444	1
Total spray area	.	.	.	.	.	77590	77590	
Area Planted (Ha)								69240

Formulations used on less than 0.1% of the total spray area were benazolin/bromoxynil/ioxynil/mecoprop, diquat, ioxynil/isoproturon/mecoprop, tri-allate.

'+' = less than 0.5%

TABLE 15 Winter barley: dates of application - % of area treated

	1987					1988					
	Sept	Oct	Nov	Dec/ Feb	Mar	Apr	May	June	July	Aug	Spray area (ha)
INSECTICIDES											
SYNTHETIC PYRETHROID											
Deltamethrin	100	.	.	.	.	.	.	.	.	.	275
SYSTEMIC ORGANOPHOSPHATE											
Demeton-S-methyl	.	.	.	.	.	.	.	100	.	.	242
NON-SYSTEMIC ORGANOPHOSPHATE											
Chlorpyrifos	.	.	3	19	.	51	.	.	27	.	902
MOLLUSCICIDES											
Methiocarb	43	57	.	.	.	.	.	.	.	.	1758
Unknown molluscicide	.	100	.	.	.	.	.	.	.	.	289
FUNGICIDES											
Benodanil	.	.	54	46	.	.	.	.	.	.	1157
Carbendazim	.	.	3	5	30	33	20	8	.	.	35179
Carbendazim/chlorothalonil	.	.	.	.	.	.	100	.	.	.	339
Carbendazim/flutriafol	.	.	.	.	32	65	3	.	.	.	4689
Carbendazim/mancozeb	.	.	.	.	.	.	73	27	.	.	1098
Carbendazim/maneb	.	.	.	.	.	68	12	20	.	.	878
Carbendazim/maneb/tridemorph	.	5	17	5	42	22	9	.	.	.	11875
Carbendazim/prochloraz	.	.	.	.	.	76	24	.	.	.	1685
Carbendazim/propiconazole	.	.	.	.	.	86	14	.	.	.	2944
Carbendazim/triadimefon	.	.	.	.	100	.	.	.	.	.	553
Chlorothalonil	.	.	.	7	16	33	13	30	.	.	9415
Fenpropidin	.	7	.	10	2	15	43	24	.	.	7751
Fenpropimorph	.	1	1	1	12	25	28	31	1	.	34537
Mancozeb	.	.	.	.	.	100	.	.	.	.	921
Maneb	.	.	.	.	40	17	32	11	.	.	4632
Nuarimol	.	.	.	100	.	.	.	.	.	.	328
Prochloraz	.	5	.	.	8	44	33	11	.	.	19060

continued

TABLE 15 cont'd

	1987				1988						
	Sept	Oct	Nov	Dec/ Feb	Mar	Apr	May	June	July	Aug	Spray area (ha)
FUNGICIDES (cont'd)											
Propiconazole	.	2	11	.	11	16	39	19	2	.	22430
Propiconazole/tridemorph	.	6	.	.	4	22	65	2	.	.	5233
Sulphur	.	.	.	.	25	29	46	.	.	.	2384
Thiophanate-methyl	.	.	.	13	.	58	29	.	.	.	2061
Triadimefon	.	.	.	.	.	63	14	23	.	.	752
Triadimenol	.	.	.	.	.	9	27	64	.	.	1530
Triadimenol/tridemorph	.	.	.	3	.	21	60	10	2	3	8132
Tridemorph	.	2	7	5	23	35	17	6	5	.	35004
Unknown fungicide	.	.	.	.	.	.	100	.	.	.	444
HERBICIDES											
Benazolin/bromoxynil/ioxynil	.	.	.	.	82	18	.	.	.	.	1099
Benazolin/bromoxynil/ioxynil/ mecoprop	.	.	.	.	.	100	.	.	.	.	35
Bifenox/isoproturon	.	31	69	.	.	.	.	.	.	.	1265
Bromoxynil/chlorsulfuron/ioxynil	.	.	.	.	100	.	.	.	.	.	239
Bromoxynil/dichlorprop	.	.	.	.	.	100	.	.	.	.	257
Bromoxynil/fluroxypyr/ioxynil	.	.	.	.	9	91	.	.	.	.	2618
Bromoxynil/ioxynil	.	.	6	.	16	51	21	5	.	.	2559
Bromoxynil/ioxynil/mecoprop	.	100	.	.	.	.	.	.	.	.	191
Chlorotoluron	14	.	86	.	.	.	.	.	.	.	1373
Chlorsulfuron/metsulfuron-methyl	.	72	28	.	.	.	.	.	.	.	252
Clopyralid/fluroxypyr/ioxynil	.	.	.	.	.	5	95	.	.	.	236
Clopyralid/ioxynil	.	.	.	.	100	.	.	.	.	.	232
Cyanazine	.	18	82	.	.	.	.	.	.	.	1237
Dicamba/MCPA/mecoprop	.	.	.	.	.	.	100	.	.	.	279
Dichlorprop/MCPA	.	.	.	.	.	31	69	.	.	.	1160
Diflufenican/isoproturon	18	28	50	5	.	.	.	.	.	.	6977
Diquat	.	.	.	.	.	.	.	.	.	100	81

continued

TABLE 15 cont'd

	1987					1988					
	Sept	Oct	Nov	Dec/ Feb	Mar	Apr	May	June	July	Aug	Spray area (ha)
HERBICIDES (cont'd)											
Flamprop-M-isopropyl	.	.	.	.	.	31	69	.	.	.	553
Fluroxypyr	.	.	.	.	11	38	51	.	.	.	2071
Glyphosate	.	1	.	.	.	.	.	.	69	30	2754
Ioxynil/isoproturon/mecoprop	.	.	.	.	100	.	.	.	.	.	130
Isoproturon	.	92	8	.	.	.	.	.	.	.	843
Isoproturon/trifluralin	6	94	.	.	.	.	.	.	.	.	1903
Isoxaben	58	.	42	.	.	.	.	.	.	.	1189
Linuron	.	.	100	.	.	.	.	.	.	.	235
Linuron/trietazine/trifluralin	51	.	49	.	.	.	.	.	.	.	508
Linuron/trifluralin	71	8	6	.	.	15	.	.	.	.	4674
MCPA	.	.	9	.	52	39	.	.	.	.	6801
Mecoprop	.	6	13	.	21	56	3	.	.	.	23944
Methabenzthiazuron	.	100	.	.	.	.	.	.	.	.	711
Metsulfuron-methyl	.	.	6	2	20	60	11	.	.	.	12901
Metsulfuron-methyl/ thifensulfuron-methyl	.	.	.	.	.	100	.	.	.	.	642
Pendimethalin	38	59	3	.	.	.	.	.	.	.	11324
Terbutryn	.	100	.	.	.	.	.	.	.	.	1071
Tri-allate	.	.	.	.	100	.	.	.	.	.	91
Trifluralin	80	.	.	20	.	.	.	.	.	.	556
Unknown herbicide	.	83	17	.	.	.	.	.	.	.	1066
GROWTH REGULATORS											
2-chloroethylphosphonic acid	.	.	.	.	.	6	72	22	.	.	4634
2-chloroethylphosphonic acid/ mepiquat chloride	.	.	.	.	.	19	58	20	3	.	24607
Chlormequat	.	.	14	2	24	45	14	1	.	.	47905
Unknown growth regulator	.	.	.	.	.	.	100	.	.	.	444

TABLE 16 Repeated use of pesticides on Winter barley (percentage of the basic area treated more than once)

	Once	Twice	Three times	Four or more	Basic area (ha)
FUNGICIDES					
Carbendazim	79	18	1	2	27747
Carbendazim/maneb/tridemorph	66	34	.	.	8848
Chlorothalonil	79	21	.	.	7795
Fenpropidin	61	39	.	.	5588
Fenpropimorph	62	33	3	1	24235
Maneb	74	26	.	.	3676
Prochloraz	85	15	.	.	16628
Propiconazole	80	20	.	.	18659
Sulphur	85	15	.	.	2071
Thiophanate-methyl	59	41	.	.	1458
Triadimenol	90	10	.	.	1396
Triadimenol/tridemorph	93	4	3	.	7443
Tridemorph	80	19	1	.	28910
HERBICIDE AND GROWTH REGULATORS					
Mecoprop	97	3	.	.	23336
2-chloroethylphosphonic acid/ mepiquat chloride	94	6	.	.	23170
Chlormequat	63	36	1	.	34881

TABLE 17 Spring barley: usage of insecticides and molluscicides, the reasons for their use (spray hectares of formulations) and the percentage of the crop treated

	Leather jackets	Frit fly	Aphids	Slugs	No reason given	Total spray area	% crop treated
INSECTICIDES							
SYNTHETIC PYRETHROIDS							
Deltamethrin	.	249	.	.	.	249	+
Fenvalerate	.	.	.	.	127	127	+
SYSTEMIC ORGANOPHOSPHATES							
Demeton-S-methyl	.	.	5965	.	1031	6996	2
Dimethoate	.	.	601	.	.	601	+
NON-SYSTEMIC ORGANOPHOSPHATES							
Chlorpyrifos	17755	.	4227	.	395	22377	7
Phosalone	.	.	506	.	.	506	+
Quinalphos	98	.		.	.	98	+
ORGANOCHLORINE							
gamma-HCH	1589	.	.	.	.	1589	+
OTHER							
Unknown insecticide	.	.	45	.	162	206	+
MOLLUSCICIDE							
Methiocarb	.	.	.	1978	.	1978	1
Total spray area	19442	249	11344	1978	1715	34727	
Area Planted (Ha)							319258

'+' = less than 0.5%

TABLE 18 Spring barley: usage of fungicides, the reasons for their use (spray hectares of formulations) and the percentage of the crop treated

	Mainly mildew	Mainly rhyncho	Mainly rust	Other diseases	Insurance	No reason given	Total spray area	% crop treated
Carbendazim	1083	247	120	.	607	7209	9266	2
Carbendazim/flutriafol	662	.	.	.	.	.	662	+
Carbendazim/maneb/sulphur	.	.	.	.	716	.	716	+
Carbendazim/prochloraz	.	.	.	.	.	1196	1196	+
Chlorothalonil	.	346	.	.	723	11	1080	+
Fenpropidin	30514	.	649	.	15205	14134	60502	17
Fenpropimorph	73994	3337	5046	.	45098	24842	152317	38
Maneb	.	1350	.	.	.	2233	3583	1
Nuarimol	997	.	.	.	.	.	997	+
Prochloraz	4044	.	.	.	6270	4521	14835	5
Propiconazole	16436	1026	965	1557	9245	15111	44340	13
Propiconazole/tridemorph	3887	.	.	346	1340	4053	9626	3
Sulphur	.	.	.	.	175	7552	7727	2
Thiophanate-methyl	.	.	.	.	.	2099	2099	1
Triadimenol	366	.	1128	.	.	487	1981	1
Triadimenol/tridemorph	9701	.	.	595	6005	7261	23562	7
Tridemorph	74225	.	.	.	3506	.	77731	21
Unknown fungicide	1809	.	.	.	.	1642	3451	1
Total spray area	217718	6306	7908	2498	88890	92351	415671	
Area planted (Ha)								319258

Formulations used on less than 0.1% of the total spray area were carbendazim/maneb/tridemorph, carbendazim/propiconazole, triadimefon.

'+' = less than 0.5%

TABLE 19 Spring barley: usage of herbicides and growth regulators, the reasons for their use (spray hectares of formulations) and the percentage of the crop treated

	Mainly annual weeds	Mainly grass weeds	Mixed weeds	Wild oats	Desiccation	Growth reg	Total spray area	% crop treated
HERBICIDES								
2,4-D	2491	.	1743	.	.	.	4234	1
2,4-DB/benazolin/MCPA	9750	.		.	.	.	9750	3
2,4-DB/bentazone/cyanazine	934	.	1154	.	.	.	2088	1
2,4-DB/linuron/MCPA	12502	.		.	.	.	12502	4
2,4-DB/MCPA	2661	.	229	.	.	.	2890	1
Benazolin/bromoxynil/ioxynil	1228	.	.	.	.	.	1228	+
Bentazone/MCPA/MCPB	6810	.	.	.	.	.	6810	2
Bromoxynil/chlorsulfuron/ioxynil	1147	.	.	.	.	.	1147	+
Bromoxynil/dichlorprop/ioxynil/MCPA	6341	.	789	.	.	.	7130	2
Bromoxynil/fluroxypyr	708	.	.	.	.	.	708	+
Bromoxynil/fluroxypyr/ioxynil	10532	.	2930	.	.	.	13462	4
Bromoxynil/ioxynil	15547	.	612	.	.	.	16159	5
Bromoxynil/ioxynil/isoproturon	284	.	1113	.	.	.	1397	+
Bromoxynil/ioxynil/isoproturon/ mecoprop	234	.	858	.	.	.	1092	+
Clopyralid/cyanazine	3727	.	.	.	.	.	3727	1
Clopyralid/dichlorprop/MCPA	6400	.	.	.	.	.	6400	2
Clopyralid/mecoprop	1275	.	.	.	.	.	1275	+
Dicamba/dichlorprop/ioxynil	8152	.	.	.	.	.	8152	2
Dicamba/MCPA/mecoprop	5690	.	.	.	.	.	5690	2
Dicamba/mecoprop	9007	.	.	.	.	.	9007	3
Dichlorprop	3571	.	.	.	.	.	3571	1
Dichlorprop/MCPA	16031	.	5382	.	.	.	21413	7
Difenzoquat	.	.	.	2349	.	.	2349	1
Diquat	.	.	.	.	1058	.	1058	+
Flamprop-M-isopropyl	.	.	.	5899	.	.	5899	2
Fluroxypyr	2844	.	.	.	.	.	2844	1
Glyphosate	51	7601	2078	.	3650	.	13380	4

continued

TABLE 19 cont'd

	Mainly annual weeds	Mainly grass weeds	Mixed weeds	Wild oats	Desiccation	Growth reg	Total spray area	% crop treated
HERBICIDES (cont'd)								
Ioxynil/isoproturon/mecoprop	922	.	.	.	.	.	922	+
Linuron/trifluralin	1819	.	.	.	.	.	1819	1
MCPA	92202	.	12852	.	.	.	105054	31
MCPB	2541	.	2578	.	.	.	5119	2
Mecoprop	80839	.	8811	.	.	.	89650	28
Metsulfuron-methyl	106670	.	12084	.	.	.	118754	37
Metsulfuron-methyl/ thifensulfuron-methyl	12464	.	239	.	.	.	12703	4
Paraquat	897	.	.	.	.	.	897	+
Total spray area	426271	7601	53452	8248	4708	.	500280	
GROWTH REGULATORS								
2-chloroethylphosphonic acid	.	.	.	.	.	11950	11950	4
2-chloroethylphosphonic acid/ mepiquat chloride	.	.	.	.	.	21069	21069	7
Chlormequat	.	.	.	.	.	50971	50971	15
Total spray area	.	.	.	.	.	83990	83990	
Area Planted (Ha)								319258

Formulations used on less than 0.1% of the total spray area were barban, bromoxynil/clopyralid/fluroxypyr/ioxynil, bromoxynil/ioxynil/mecoprop, clopyralid, clopyralid/fluroxypyr/ioxynil, clopyralid/ioxynil, cyanazine, diflufenican/isoproturon, MCPA/MCPB.

'+' = less than 0.5%

TABLE 20 Spring barley: dates of application - % of area treated

	1987					1988						
	Sept	Oct	Nov	Dec/ Feb	Mar	Apr	May	June	July	Aug	Sept	Spray area (ha)
INSECTICIDES												
SYNTHETIC PYRETHROIDS												
Deltamethrin	.	.	.	.	.	100	.	.	.	.	.	249
Fenvalerate	.	.	.	.	.	.	.	.	100	.	.	127
SYSTEMIC ORGANOPHOSPHATES												
Demeton-S-methyl	.	.	.	.	.	.	.	19	81	.	.	6996
Dimethoate	.	.	.	.	.	.	.	100	.	.	.	601
NON-SYSTEMIC ORGANOPHOSPHATES												
Chlorpyrifos	.	.	.	13	.	30	38	.	18	.	.	22377
Phosalone	.	.	.	.	.	.	.	.	100	.	.	506
Quinalphos	.	.	.	.	.	100	.	.	.	.	.	98
ORGANOCHLORINE												
gamma-HCH	.	.	.	.	.		100	.	.	.	.	1589
OTHER												
Unknown insecticide	.	.	.	.	.	.	78	.	22	.	.	206
MOLLUSCICIDE												
Methiocarb	.	.	.	94	4	.	2	.	.	.	.	1978
FUNGICIDES												
Carbendazim	.	.	.	.	.	17	46	30	7	.	.	9266
Carbendazim/flutriafol	.	.	.	.	.	100	.	.	.	.	.	662
Carbendazim/maneb/sulphur	.	.	.	.	.	.	.	.	100	.	.	716
Carbendazim/maneb/tridemorph	.	.	.	.	.	.	.	100	.	.	.	366
Carbendazim/prochloraz	.	.	.	.	.	.	.	100	.	.	.	1196
Carbendazim/propiconazole	.	.	.	.	.	43	.	.	57	.	.	346
Chlorothalonil	.	.	.	.	.	.	99	1	.	.	.	1080
Fenpropidin	.	.	.	.	.	4	31	55	10	.	.	60502
Fenpropimorph	.	.	.	.	.	3	34	51	11	.	.	152317
Maneb	.	.	.	.	.	.	.	69	31	.	.	3583

continued

TABLE 20 cont'd

	1987					1988						
	Sept	Oct	Nov	Dec/ Feb	Mar	Apr	May	June	July	Aug	Sept	Spray area (ha)
FUNGICIDES (cont'd)												
Nuarimol	.	.	.	.	.	100	.	.	.	.	.	997
Prochloraz	.	.	.	.	.	.	52	35	13	.	.	14835
Propiconazole	.	.	.	.	.	1	43	44	11	1	.	44340
Propiconazole/tridemorph	.	.	.	.	.	.	53	47	.	.	.	9626
Sulphur	.	.	.	.	.	12	53	35	.	.	.	7727
Thiophanate-methyl	.	.	.	.	.	8	92	.	.	.	.	2099
Triadimefon	.	.	.	.	.	.	100	.	.	.	.	323
Triadimenol	.	.	.	.	.	.	75	25	.	.	.	1981
Triadimenol/tridemorph	.	.	.	.	.	7	56	35	2	.	.	23562
Tridemorph	.	.	.	.	1	5	56	29	8	.	.	77731
Unknown fungicide	.	.	.	.	.	.	28	72	.	.	.	3451
HERBICIDES												
2,4-D	.	.	.	.	.	.	76	24	.	.	.	4234
2,4-DB/benazolin/MCPA	.	.	.	.	.	23	34	32	11	.	.	9750
2,4-DB/bentazone/cyanazine	.	.	.	.	.	.	87	13	.	.	.	2088
2,4-DB/linuron/MCPA	.	.	.	.	.	2	71	27	.	.	.	12502
2,4-DB/MCPA	.	.	.	.	.	.	62	38	.	.	.	2890
Barban	.	.	.	.	.	.	100	.	.	.	.	155
Benazolin/bromoxynil/ioxynil	.	.	.	.	.	3	97	.	.	.	.	1228
Bentazone/MCPA/MCPB	.	.	.	.	.	12	35	53	.	.	.	6810
Bromoxynil/chlorsulfuron/ioxynil	.	.	.	.	.	.	100	.	.	.	.	1147
Bromoxynil/clopyralid/ fluroxypyr/ioxynil	.	.	.	.	.	12	88	.	.	.	.	660
Bromoxynil/dichlorprop/ioxynil/ MCPA	.	.	.	.	.	.	98	2	.	.	.	7130
Bromoxynil/fluroxypyr	.	.	.	.	.	.	100	.	.	.	.	708
Bromoxynil/fluroxypyr/ioxynil	.	.	.	.	.	21	63	17	.	.	.	13462
Bromoxynil/ioxynil	.	.	.	.	.	.	79	21	.	.	.	16159

continued

TABLE 20 cont'd

	1987					1988						
	Sept	Oct	Nov	Dec/ Feb	Mar	Apr	May	June	July	Aug	Sept	Spray area (ha)
HERBICIDES (cont'd)												
Bromoxynil/ioxynil/isoproturon	.	.	.	.	.	14	86	.	.	.	.	1397
Bromoxynil/ioxynil/isoproturon/ mecoprop	.	.	.	.	.	.	100	.	.	.	.	1092
Bromoxynil/ioxynil/mecoprop	.	.	.	.	.	.	94	6	.	.	.	652
Clopyralid	.	.	.	.	.	.	54	46	.	.	.	128
Clopyralid/cyanazine	.	.	.	.	.	.	100	.	.	.	.	3727
Clopyralid/dichlorprop/MCPA	.	.	.	.	.	22	46	32	.	.	.	6400
Clopyralid/fluroxypyr/ioxynil	.	.	.	.	.	.	100	.	.	.	.	527
Clopyralid/ioxynil	.	.	.	.	.	100	.	.	.	.	.	249
Clopyralid/mecoprop	.	.	.	.	.	.	100	.	.	.	.	1275
Cyanazine	.	.	.	.	.	.	100	.	.	.	.	253
Dicamba/dichlorprop/ioxynil	.	.	.	.	.	7	56	36	.	.	.	8152
Dicamba/MCPA/mecoprop	.	.	.	.	.	.	60	40	.	.	.	5690
Dicamba/mecoprop	.	.	.	.	1	14	62	23	.	.	.	9007
Dichlorprop	.	.	.	.	.	.	100	.	.	.	.	3571
Dichlorprop/MCPA	.	.	.	.	.	.	81	19	.	.	.	21413
Difenzoquat	.	.	.	.	.	4	60	37	.	.	.	2349
Diflufenican/isoproturon	.	.	.	.	.	100	.	.	.	.	.	482
Diquat	.	.	.	.	.	.	.	.	.	43	57	1058
Flamprop-M-isopropyl	.	.	.	.	.	.	37	63	.	.	.	5899
Fluroxypyr	.	.	.	.	.	5	90	5	.	.	.	2844
Glyphosate	6	9	.	.	.	.	.	.	1	76	8	13380
Ioxynil/isoproturon/mecoprop	.	.	.	.	.	.	100	.	.	.	.	922
Linuron/trifluralin	.	.	.	.	.	.	100	.	.	.	.	1819
MCPA	.	.	.	.	.	2	68	28	1	.	.	105054
MCPA/MCPB	.	.	.	.	.	.	100	.	.	.	.	130
MCPB	.	.	.	.	.	.	91	9	.	.	.	5119
Mecoprop	.	.	.	.	.	6	74	19	1	.	.	89650

continued

TABLE 20 cont'd

	1987				1988							
	Sept	Oct	Nov	Dec/ Feb	Mar	Apr	May	June	July	Aug	Sept	Spray area (ha)
HERBICIDES (cont'd)												
Metsulfuron-methyl	.	.	.	.	.	11	78	11	.	.	.	118754
Metsulfuron-methyl/ thifensulfuron-methyl	.	.	.	.	.	29	65	7	.	.	.	12703
Paraquat	.	.	.	100	.	.	.	.	.	.	.	897
GROWTH REGULATORS												
2-chloroethylphosphonic acid	.	.	.	.	.	.	24	76	.	.	.	11950
2-chloroethylphosphonic acid/ mepiquat chloride	.	.	.	.	.	.	11	73	16	.	.	21069
Chlormequat	.	.	.	.	1	6	60	28	4	1	.	50971

TABLE 21 Repeated use of pesticides on Spring barley (percentage of the basic area treated more than once)

	Once	Twice	Three times	Four or more	Basic area (ha)
FUNGICIDES					
Carbendazim	80	20	.	.	7752
Fenpropidin	86	14	.	.	53159
Fenpropimorph	80	16	4	.	122704
Maneb	55	45	.	.	2467
Propiconazole	90	9	1	.	39927
Thiophanate-methyl	96	4	.	.	2014
Triadimenol/tridemorph	95	5	.	.	22397
Tridemorph	88	8	4	.	66790
HERBICIDES AND GROWTH REGULATORS					
Dicamba/dichlorprop/ioxynil	83	17	.	.	6957
MCPA	96	2	2	.	99491
Mecoprop	99	1	.	.	88696
2-chloroethylphosphonic acid/ mepiquat chloride	99	1	.	.	20850
Chlormequat	94	4	2	.	47630

TABLE 22 Winter wheat: use of insecticides and molluscicides, the reasons for their use (spray hectares of formulations) and the percentage of the crop treated

	Aphids	Leather jackets	Frit fly	Wheat bulb fly	Slugs	Total spray area	% crop treated
INSECTICIDES							
NON-SYSTEMIC ORGANOPHOSPHATES							
Chlorpyrifos	1448	992	763	.	.	3203	3
Phosalone	348	.	.	.	.	348	+
SYSTEMIC ORGANOPHOSPHATES							
Demeton-S-methyl	3227	.	.	.	.	3227	3
Dimethoate	3088	.	.	338	.	3426	3
ORGANOCHLORINE							
gamma-HCH	.	114	.	.	.	114	+
CARBAMATE							
Pirimicarb	5895	.	.	.	.	5895	6
OTHER							
Unknown insecticide	793	.	.	.	.	793	1
MOLLUSCICIDES							
Metaldehyde	.	.	.	.	808	808	1
Methiocarb	.	.	.	.	18752	18752	16
Total spray area	14799	1106	763	338	19560	36566	
Area Planted (Ha)							98608

'+' = less than 0.5%

TABLE 23 Winter wheat: usage of fungicides, the reasons for their use (spray hectares of formulations) and the percentage of the crop treated

	Mainly mildew	Mainly rhynco	Mainly septoria	Mainly eyespot	Mainly rust	Ear diseases	Insurance	No reason given	Total spray area	% crop treated
Benomyl	.	.	551	184	.	.	.	469	1204	1
Captafol	.	.	.	.	.	.	616	.	616	1
Captafol/triadimefon	184	.	.	.	.	66	2763	1466	4479	4
Carbendazim	1040	1238	2148	3462	399	980	11238	16917	37422	27
Carbendazim/chlorothalonil	.	.	698	.	.	.	152	947	1797	2
Carbendazim/flutriafol	334	.	546	478	.	.	2799	3225	7382	7
Carbendazim/mancozeb	.	.	.	.	892	1170	3845	2631	8538	8
Carbendazim/maneb	177	.	.	.	3761	877	1560	1788	8163	7
Carbendazim/maneb/sulphur	.	.	876	.	1019	1558	635	5111	9199	9
Carbendazim/maneb/tridemorph	1113	.	.	.	.	.	.	.	1113	1
Carbendazim/prochloraz	629	.	.	1162	.	.	985	4277	7053	7
Carbendazim/propiconazole	416	.	.	186	.	.	1379	1314	3295	3
Chlorothalonil	3195	587	10618	1486	965	3468	26974	24293	71586	40
Chlorothalonil/flutriafol	3024	.	.	.	4096	4175	1293	2896	15484	13
Fenpropidin	1680	.	265	.	2554	.	1449	798	6746	6
Fenpropimorph	15730	.	360	259	4431	3025	12862	18343	55010	35
Fenpropimorph/iprodione	441	.	.	.	48	.	300	551	1340	1
Fenpropimorph/prochloraz	.	.	575	.	647	.	.	.	1222	1
Ferbam/maneb/zineb	.	.	.	.	.	.	.	579	579	1
Mancozeb	160	.	499	.	1930	2027	1316	501	6433	5
Maneb	927	.	.	.	5885	2715	6065	13555	29147	23
Maneb/zinc	.	.	.	.	.	.	.	1545	1545	1
Maneb/zineb	.	.	.	.	1223	.	.	.	1223	1
Prochloraz	2375	209	1799	2073	688	176	11332	7714	26366	25
Propiconazole	8584	.	701	.	4614	1354	10794	12167	38214	34
Propiconazole/tridemorph	703	.	.	.	3750	.	2922	3696	11071	9
Sulphur	.	.	.	.	.	152	.	6901	7053	6
Thiophanate-methyl	.	.	.	.	.	.	.	1515	1515	2
Triadimefon	370	.	.	.	.	.	614	1340	2324	2

continued

TABLE 23 cont'd

	Mainly mildew	Mainly rhynco	Mainly septoria	Mainly eyespot	Mainly rust	Ear diseases	Insurance	No reason given	Total spray area	% crop treated
Triadimenol	1222	.	138	.	1858	.	5019	5597	13834	10
Triadimenol/tridemorph	3273	.	.	.	1935	543	1175	6248	13174	12
Tridemorph	34848	.	.	.	.	.	400	.	35248	29
Zineb poly	.	.	361	.	934	.	.	.	1295	1
Unknown fungicide	.	.	.	.	148	413	385	793	1739	2
Total spray area	80425	2034	20135	9290	41777	22699	108872	147177	432410	
Area Planted (Ha)										98608

Formulations used on less than 0.1% of the total spray area was iprodione.

TABLE 24 Winter wheat: usage of herbicides and growth regulators, the reasons for their use (spray hectares of formulations) and the percentage of the crop treated

	Mainly annual weeds	Mainly grass weeds	Mixed weeds	Wild oats	Desiccation	Growth Reg	Total spray area	% crop treated
HERBICIDES								
Benazolin/bromoxynil/ioxynil	1483	.	.	.	.	.	1483	1
Bifenox/isoproturon	290	.	520	.	.	.	810	1
Bromoxynil/clopyralid/fluroxypyr/ ioxynil	1280	.	.	.	.	.	1280	1
Bromoxynil/fluroxypyr/ioxynil	4411	.	.	.	.	.	4411	4
Bromoxynil/ioxynil	7786	.	616	.	.	.	8402	8
Bromoxynil/ioxynil/isoproturon/ mecoprop	166	64	538	.	.	.	768	1
Chlorotoluron	.	441	.	172	.	.	613	1
Chlorsulfuron/metsulfuron-methyl	328	.	609	.	.	.	937	1
Cyanazine	2321	.	.	.	.	.	2321	2
Dicamba/MCPA/mecoprop	436	.	.	.	.	.	436	+
Dicamba/mecoprop	1228	.	.	.	.	.	1228	1
Dichlorprop/MCPA	524	.	.	.	.	.	524	1
Difenzoquat	.	.	.	860	.	.	860	1
Diflufenican/isoproturon	2831	.	2490	.	.	.	5321	5
Flamprop-M-isopropyl	.	.	.	2834	.	.	2834	3
Fluroxypyr	2452	.	875	.	.	.	3327	3
Glyphosate	.	3657	101	.	1972	.	5730	6
Ioxynil/isoproturon/mecoprop	276	.	26	.	.	.	302	+
Isoproturon/pendimethalin	.	.	.	566	.	.	566	1
Isoxaben	371	.	.	.	.	.	371	+
Linuron/trietazine/trifluralin	209	.	2243	.	.	.	2452	2
Linuron/trifluralin	755	.	1404	.	.	.	2159	2
MCPA	8272	.	187	.	.	.	8459	8
Mecoprop	52182	.	6001	.	.	.	58183	55
Metsulfuron-methyl	45119	.	6647	.	.	.	51766	52

continued

TABLE 24 cont'd

	Mainly annual weeds	Mainly grass weeds	Mixed weeds	Wild oats	Desiccation	Growth Reg	Total spray area	% crop treated
HERBICIDES (cont'd)								
Metsulfuron-methyl/ thifensulfuron-methyl	3240	.	793	.	.	.	4033	4
Pendimethalin	1547	866	1377	.	.	.	3790	4
Unknown herbicide	632	.	.	.	.	.	632	1
Total spray area	138139	5028	24427	4432	1972	.	173998	
GROWTH REGULATORS								
2-chloroethylphosphonic acid	.	.	.	.	.	8518	8518	8
2-chloroethylphosphonic acid/ mepiquat chloride	.	.	.	.	.	22344	22344	22
Chlormequat	.	.	.	.	.	84170	84170	73
Total spray area	.	.	.	.	.	115032	115032	
Area Planted (Ha)								98608

Formulations used on less than 0.1% of the total spray area were benazolin/bromoxynil/ioxynil/mecoprop, benzoylprop-ethyl, bromoxynil/ioxynil/isoproturon, bromoxynil/ioxynil/mecoprop, clopyralid/dichlorprop/MCPA, clopyralid/ioxynil, isoproturon, isoproturon/trifluralin, linuron, propyzamide.

'+' = less than 0.5%

TABLE 25 Winter wheat: dates of application - % of area treated

	1987							1988				
	Sept	Oct	Nov	Dec/ Feb	Mar	Apr	May	June	July	Aug	Sept	Spray area (ha)
INSECTICIDES												
NON-SYSTEMIC ORGANOPHOSPHATES												
Chlorpyrifos	.	.	9	.	6	18	21	.	45	.	.	3203
Phosalone	.	.	.	.	.	.	.	.	100	.	.	348
SYSTEMIC ORGANOPHOSPHATES												
Demeton-S-methyl	.	.	.	.	.	.	.	38	33	29	.	3227
Dimethoate	.	.	.	.	10	.	.	10	81	.	.	3426
ORGANOCHLORINE												
gamma-HCH	.	.	.	100	.	.	.	.	.	.	.	114
CARBAMATE												
Pirimicarb	.	.	.	.	.	.	.	37	41	22	.	5895
OTHER												
Unknown insecticide	.	.	.	.	.	.	.	100	.	.	.	793
MOLLUSCICIDES												
Metaldehyde	68	.	32	.	.	.	.	.	.	.	.	808
Methiocarb	5	34	36	7	5	13	.	.	.	.	.	18752
FUNGICIDES												
Benomyl	.	5	.	.	73	7	15	.	.	.	.	1204
Captafol	.	.	.	.	.	.	.	100	.	.	.	616
Captafol/triadimefon	.	.	.	.	.	.	47	53	.	.	.	4479
Carbendazim	.	.	.	.	7	40	17	13	22	1	.	37422
Carbendazim/chlorothalonil	.	.	.	.	.	47	.	.	53	.	.	1797
Carbendazim/flutriafol	.	.	.	.	4	58	38	.	.	.	.	7382
Carbendazim/mancozeb	.	.	.	.	.	.	.	11	34	55	.	8538
Carbendazim/maneb	.	.	.	.	.	.	10	42	44	3	.	8163
Carbendazim/maneb/sulphur	.	.	.	.	.	.	8	66	23	2	.	9199
Carbendazim/maneb/tridemorph	.	.	.	.	.	.	27	.	73	.	.	1113
Carbendazim/prochloraz	.	.	.	.	9	40	44	6	.	.	.	7053
Carbendazim/propiconazole	.	.	.	.	.	74	26	.	.	.	.	3295
Chlorothalonil	.	.	.	.	6	30	24	30	10	.	.	71586

continued

TABLE 25 cont'd

	1987				1988							
	Sept	Oct	Nov	Dec/ Feb	Mar	Apr	May	June	July	Aug	Sept	Spray area (ha)
FUNGICIDES (cont'd)												
Chlorothalonil/flutriafol	.	.	.	.	.	4	14	57	25	.	.	15484
Fenpropidin	.	.	.	.	1	2	29	63	.	5	.	6746
Fenpropimorph	.	.	.	.	.	12	28	49	11	.	.	55010
Fenpropimorph/iprodione	.	.	.	.	.	41	.	45	4	10	.	1340
Fenpropimorph/prochloraz	.	.	.	.	.	.	20	80	.	.	.	1222
Ferbam/maneb/zineb	.	.	.	.	.	.	.	74	.	.	26	579
Iprodione	.	.	.	.	.	.	.	100	.	.	.	265
Mancozeb	.	.	.	.	.	14	34	26	27	.	.	6433
Maneb	.	.	.	.	.	13	11	34	37	5	.	29147
Maneb/zinc	.	.	.	.	.	.	.	73	27	.	.	1545
Maneb/zineb	.	.	.	.	.	.	70	30	.	.	.	1223
Prochloraz	.	.	.	.	1	38	51	9	.	1	.	26366
Propiconazole	.	.	.	.	1	7	17	56	12	6	.	38214
Propiconazole/tridemorph	.	.	1	.	.	8	50	41	.	.	.	11071
Sulphur	.	3	3	.	12	35	44	.	2	.	.	7053
Thiophanate-methyl	.	.	.	.	.	78	.	22	.	.	.	1515
Triadimefon	.	.	.	.	.	16	49	35	.	.	.	2324
Triadimenol	.	.	.	.	1	21	26	45	7	.	.	13834
Triadimenol/tridemorph	.	.	.	.	.	12	37	27	23	.	.	13174
Tridemorph	.	.	.	.	1	10	20	49	19	.	.	35248
Zineb poly	.	.	.	.	.	.	28	72	.	.	.	1295
Unknown fungicide	.	.	.	.	.	.	46	9	24	22	.	1739
HERBICIDES												
Benazolin/bromoxynil/ioxynil	.	.	.	.	.	88	12	.	.	.	.	1483
Benazolin/bromoxynil/ioxynil/ mecoprop	.	.	.	.	.	100	.	.	.	.	.	173
Benzoylprop-ethyl	.	.	.	.	.	.	65	35	.	.	.	62
Bifenox/isoproturon	.	.	64	.	.	36	.	.	.	.	.	810

continued

TABLE 25 cont'd

	1987					1988						
	Sept	Oct	Nov	Dec/ Feb	Mar	Apr	May	June	July	Aug	Sept	Spray area (ha)
HERBICIDES (cont'd)												
Bromoxynil/clopyralid/ fluroxypyr/ioxynil	.	.	.	.	.	40	60	.	.	.	.	1280
Bromoxynil/fluroxypyr/ioxynil	.	.	.	.	3	58	39	.	.	.	.	4411
Bromoxynil/ioxynil	.	7	.	.	6	71	17	.	.	.	.	8402
Bromoxynil/ioxynil/isoproturon	.	.	.	.	100	.	.	.	.	.	.	306
Bromoxynil/ioxynil/isoproturon/ mecoprop	.	.	22	.	.	.	78	.	.	.	.	768
Bromoxynil/ioxynil/mecoprop	.	.	.	.	.	100	.	.	.	.	.	94
Chlorotoluron	.	28	72	.	.	.	.	.	.	.	.	613
Chlorsulfuron/metsulfuron-methyl	.	.	.	35	.	65	.	.	.	.	.	937
Clopyralid/dichlorprop/MCPA	.	.	.	.	100	.	.	.	.	.	.	81
Clopyralid/ioxynil	.	.	100	.	.	.	.	.	.	.	.	137
Cyanazine	.	.	5	.	.	95	.	.	.	.	.	2321
Dicamba/MCPA/mecoprop	.	.	.	.	.	100	.	.	.	.	.	436
Dicamba/mecoprop	.	.	.	.	.	14	86	.	.	.	.	1228
Dichlorprop/MCPA	.	.	.	.	.	.	100	.	.	.	.	524
Difenzoquat	.	.	.	.	.	.	100	.	.	.	.	860
Diflufenican/isoproturon	.	34	46	3	6	11	.	.	.	.	.	5321
Flamprop-M-isopropyl	.	.	.	.	.	17	83	.	.	.	.	2834
Fluroxypyr	.	13	.	.	15	27	45	.	.	.	.	3327
Glyphosate	4	9	.	.	.	.	.	.	4	53	31	5730
Ioxynil/isoproturon/mecoprop	.	.	.	.	.	9	91	.	.	.	.	302
Isoproturon	.	.	100	.	.	.	.	.	.	.	.	253
Isoproturon/pendimethalin	.	.	100	.	.	.	.	.	.	.	.	566
Isoproturon/trifluralin	.	72	28	.	.	.	.	.	.	.	.	167
Isoxaben	.	.	100	.	.	.	.	.	.	.	.	371
Linuron	.	.	.	.	.	.	100	.	.	.	.	239
Linuron/trietazine/trifluralin	.	81	19	.	.	.	.	.	.	.	.	2452
Linuron/trifluralin	75	25	.	.	.	.	.	.	.	.	.	2159

continued

TABLE 25 cont'd

	1987							1988				
	Sept	Oct	Nov	Dec/ Feb	Mar	Apr	May	June	July	Aug	Sept	Spray area (ha)
HERBICIDES (cont'd)												
MCPA	.	19	2	.	4	47	28	.	.	.	.	8459
Mecoprop	.	4	1	.	5	68	20	2	.	.	.	58183
Metsulfuron-methyl	.	1	.	1	6	64	28	.	.	.	.	51766
Metsulfuron-methyl/ thifensulfuron-methyl	.	3	.	.	.	58	40	.	.	.	.	4033
Pendimethalin	54	23	23	.	.	.	.	.	.	.	.	3790
Propyzamide	100	.	.	.	.	.	.	.	.	.	.	5
Unknown herbicide	.	100	.	.	.	.	.	.	.	.	.	632
GROWTH REGULATORS												
2-chloroethylphosphonic acid	.	.	.	.	.	4	11	74	.	11	.	8518
2-chloroethylphosphonic acid mepiquat chloride	.	.	.	.	.	.	17	74	8	1	.	22344
Chlormequat	.	.	.	1	6	49	34	8	1	1	.	84170
OTHER												
Aluminium ammonium sulphate	.	.	.	.	100	.	.	.	.	.	.	14

TABLE 26 Repeated use of pesticides on Winter wheat (percentage of the basic area treated more than once)

	Once	Twice	Three times	Four or more	Basic area (ha)
INSECTICIDES etc					
Chlorpyrifos	98	2	.	.	3126
Dimethoate	89	11	.	.	3088
Methiocarb	82	17	1	.	15700
FUNGICIDES					
Carbendazim	62	37	.	1	26536
Carbendazim/mancozeb	96	4	.	.	8234
Carbendazim/maneb	81	19	.	.	6862
Carbendazim/prochloraz	99	1	.	.	6974
Chlorothalonil	45	35	14	5	39656
Chlorothalonil/flutriafol	84	16	.	.	13371
Fenpropidin	84	16	.	.	5812
Fenpropimorph	60	24	14	2	34964
Mancozeb	81	19	.	.	5421
Maneb	76	20	4	.	22842
Maneb/zinc	63	37	.	.	1125
Prochloraz	93	7	.	.	24657
Propiconazole	87	12	1	.	33499
Propiconazole/tridemorph	81	19	.	.	9278
Sulphur	85	11	4	.	5911
Triadimenol	84	10	.	6	10219
Triadimenol/tridemorph	94	5	.	1	12135
Tridemorph	81	17	2	.	29037
HERBICIDES AND GROWTH REGULATORS					
Glyphosate	99	1	.	.	5647
Mecoprop	95	5	.	.	55156
2-chloroethylphosphonic acid	99	1	.	.	8454
2-chloroethylphosphonic acid/ mepiquat chloride	99	1	.	.	22180
Chlormequat	81	19	.	.	71742

TABLE 27 Spring oats: usage of insecticides and fungicides, the reasons for their use (spray hectares of formulations) and the percentage of the crop treated

	Aphids	Leather jackets	Frit fly	Mainly mildew	Insurance	No reason given	Total Spray area	% crop treated
INSECTICIDES								
SYNTHETIC PYRETHROID								
Cypermethrin	511	.	.	.	.	.	511	1
NON-SYSTEMIC ORGANOPHOSPHATE								
Chlorpyrifos	.	2545	263	.	.	.	2808	8
Total spray area							3319	
FUNGICIDES								
Fenpropidin	.	.	.	385	1536	.	1921	5
Fenpropimorph	.	.	.	1764	.	212	1976	6
Maneb	.	.	.	.	394	1694	2088	6
Sulphur	.	.	.	.	86	361	447	1
Tridemorph	.	.	.	5736	.	.	5736	12
Total spray area	511	2545	263	7885	2016	2267	12168	
Area Planted (Ha)								35030

TABLE 28 Spring oats: usage of herbicides and growth regulators, the reasons for their use (spray hectares of formulations) and the percentage of the crop treated

	Mainly annual weeds	Mixed weeds	Growth reg	Desiccation	Total spray area	% crop treated
HERBICIDES						
2,4-D	454	.	.	.	454	1
2,4-DB/bentazone/cyanazine	928	.	.	.	928	3
2,4-DB/linuron/MCPA	603	.	.	.	603	2
Benazolin/bromoxynil/ioxynil	217	.	.	.	217	1
Benazolin/bromoxynil/ioxynil/ mecoprop	331	.	.	.	331	1
Bentazone/MCPA/MCPB	204	.	.	.	204	1
Bromoxynil/dichlorprop/ioxynil/MCPA	381	.	.	.	381	1
Bromoxynil/fluroxypyr	1108	.	.	.	1108	3
Bromoxynil/ioxynil	1379	.	.	.	1379	4
Clopyralid/cyanazine	571	.	.	.	571	2
Clopyralid/dichlorprop/MCPA	617	.	.	.	617	2
Dicamba/dichlorprop/ioxynil	392	.	.	.	392	1
Dicamba/MCPA/mecoprop	1555	.	.	.	1555	4
Dichlorprop	790	.	.	.	790	2
Dichlorprop/MCPA	1141	.	.	.	1141	3
Diquat	.	.	.	516	516	1
Fluroxypyr	326	.	.	.	326	1
MCPA	17298	.	.	.	17298	49
MCPA/MCPB	185	.	.	.	185	1
Mecoprop	6342	.	.	.	6342	18
Metsulfuron-methyl	11277	.	.	.	11277	32
Trifluralin	.	88	.	.	88	+
Unknown herbicide	250	.	.	.	250	1
Total spray area	46349	88	.	516	46953	

continued

TABLE 28 cont'd

	Mainly annual weeds	Mixed weeds	Growth reg	Desiccation	Total spray area	% crop treated
GROWTH REGULATORS						
2-chloroethylphosphonic acid	.	.	216	.	216	1
Chlormequat	.	.	11802	.	11802	29
Total spray area	.	.	12018	.	12018	
Area Planted (Ha)						35030

Formulations used on less than 0.1% of the total spray area were bromoxynil/fluroxypyr/ioxynil, dicamba/mecoprop, glyphosate.

'+' = less than 0.5%

TABLE 29 Spring oats: dates of application - % of area treated

	1987					1988						
	Sept	Oct	Nov	Dec/ Feb	Mar	Apr	May	June	July	Aug	Sept	Spray area (ha)
INSECTICIDES												
SYNTHETIC PYRETHROID												
Cypermethrin	.	.	.	.	.	.	.	.	.	100	.	511
NON-SYSTEMIC ORGANOPHOSPHATE												
Chlorpyrifos	.	.	.	.	.	75	15	9	.	.	.	2808
FUNGICIDES												
Fenpropidin	.	.	.	.	.	.	.	100	.	.	.	1921
Fenpropimorph	.	.	.	.	.	.	.	74	.	26	.	1976
Maneb	.	.	.	.	.	.	.	100	.	.	.	2088
Sulphur	.	.	.	.	.	.	68	32	.	.	.	447
Tridemorph	.	.	.	.	.	6	33	36	24	.	.	5736
HERBICIDES												
2,4-D	.	.	.	.	.	.	100	.	.	.	.	454
2,4-DB/bentazone/cyanazine	.	.	.	.	.	.	100	.	.	.	.	928
2,4-DB/linuron/MCPA	.	.	.	.	.	68	.	32	.	.	.	603
Benazolin/bromoxynil/ioxynil	.	.	.	.	.	.	100	.	.	.	.	217
Benazolin/bromoxynil/ioxynil/ mecoprop	.	.	.	.	.	.	100	.	.	.	.	331
Bentazone/MCPA/MCPB	.	.	.	.	.	.	.	100	.	.	.	204
Bromoxynil/dichlorprop/ioxynil/ MCPA	.	.	.	.	.	100	.	.	.	.	.	381
Bromoxynil/fluroxypyr	.	.	.	.	.	.	100	.	.	.	.	1108
Bromoxynil/fluroxypyr/ioxynil	.	.	.	.	.	.	100	.	.	.	.	40
Bromoxynil/ioxynil	.	.	.	.	.	.	88	12	.	.	.	1379
Clopyralid/cyanazine	.	.	.	.	.	.	100	.	.	.	.	571
Clopyralid/dichlorprop/MCPA	.	.	.	.	.	21	.	79	.	.	.	617
Dicamba/dichlorprop/ioxynil	.	.	.	.	.	.	55	45	.	.	.	392
Dicamba/MCPA/mecoprop	.	.	.	.	.	.	100	.	.	.	.	1555

continued

TABLE 29 cont'd

	1987						1988					
	Sept	Oct	Nov	Dec/ Feb	Mar	Apr	May	June	July	Aug	Sept	Spray area (ha)
Dicamba/mecoprop	.	.	.	.	.	.	100	.	.	.	.	40
Dichlorprop	.	.	.	.	.	.	100	.	.	.	.	790
Dichlorprop/MCPA	.	.	.	.	.	62	38	.	.	.	.	1141
Diquat	.	.	.	.	.	.	.	.	.	.	100	516
Fluroxypyr	.	.	.	.	.	100	.	.	.	.	.	326
Glyphosate	.	100	.	.	.	.	.	.	.	.	.	9
MCPA	.	.	.	.	4	15	62	19	.	.	.	17298
MCPA/MCPB	.	.	.	.	.	.	.	100	.	.	.	185
Mecoprop	.	.	.	.	.	39	54	7	.	.	.	6342
Metsulfuron-methyl	.	.	.	.	.	30	65	4	.	.	.	11277
Trifluralin	.	.	.	.	100	.	.	.	.	.	.	88
Unknown herbicide	.	.	.	.	.	.	.	100	.	.	.	250
GROWTH REGULATORS												
2-chloroethylphosphonic acid	.	.	.	.	.	.	100	.	.	.	.	216
Chlormequat	.	.	.	.	.	11	41	44	4	.	.	11802

TABLE 30 Repeated use of pesticides on spring oats (percentage of the basic area treated more than once)

	Once	Twice	Three times	Four or more	Basic area (ha)
FUNGICIDE					
Tridemorph	58	42	.	.	4041
GROWTH REGULATOR					
Chlormequat	85	15	.	.	10253

TABLE 31 Peas: usage of insecticides and fungicides, the reasons for their use (spray hectares of formulations) and the percentage of the crop treated

	Aphids	Mainly mildew	Botrytis	Insurance	No reason given	Total spray area	% crop treated
INSECTICIDE							
CARBAMATE							
Pirimicarb	81	.	.	.	.	81	1
FUNGICIDES							
Benomyl	.	236	.	221	1331	1788	20
Carbendazim	.	508	.	.	780	1288	12
Carbendazim/maneb	.	.	212	.	311	523	6
Chlorothalonil	.	661	821	221	2263	3966	37
Iprodione	.	604	155	214	512	1485	17
Maneb	.	.	.	.	353	353	4
Sulphur	.	264	.	.	766	1030	10
Thiophanate-methyl	.	.	.	.	107	107	1
Vinclozolin	.	.	182	335	1368	1885	22
Total spray area		2273	1370	991	7791	12425	
Area Planted (Ha)							8624

TABLE 32 Peas: usage of herbicides and growth regulators, the reasons for their use (spray hectares of formulations) and the percentage of the crop treated

	Mainly annual weeds	Mainly grass weeds	Mixed weeds	Wild oats	Desiccation	Growth reg	Pod shatter	No reason given	Total spray area	% crop treated
HERBICIDES										
Bentazone/MCPB	1321	.	604	.	.	.	.	.	1925	22
Cyanazine	586	.	2046	.	.	.	.	.	2632	28
Diclofop-methyl	.	.	.	148	.	.	.	.	148	2
Diquat	.	.	.	.	6702	.	.	.	6702	78
Glyphosate	.	615	.	.	506	.	.	.	1121	12
MCPA/MCPB	461	.	.	.	.	.	.	.	461	5
MCPB	30	.	.	.	.	.	.	.	30	+
Pendimethalin	309	182	436	.	.	.	.	.	927	11
Simazine/trietazine	658	.	.	.	.	.	.	.	658	8
Terbuthylazine/terbutryn	2279	.	161	.	.	.	.	1504	3944	46
Unknown herbicide	423	.	.	.	.	.	.	.	423	2
Total spray area	6067	797	3247	148	7208	.	.	1504	18971	
GROWTH REGULATOR										
Chlormequat	.	.	.	.	.	348	.	.	348	4
OTHER										
Di-1-p-menthene	.	.	.	.	.	.	182	.	182	2
Area Planted (Ha)										8624

'+' = less than 0.5%

TABLE 33 Peas: dates of application - % of area treated

	1988							
	Mar	Apr	May	June	July	Aug	Sept	Spray area (ha)
INSECTICIDE								
CARBAMATE								
Pirimicarb	.	.	.	.	100	.	.	81
FUNGICIDES								
Benomyl	.	.	.	73	27	.	.	1788
Carbendazim	.	.	22	33	36	8	.	1288
Carbendazim/maneb	.	.	.	60	40	.	.	523
Chlorothalonil	.	.	15	43	39	3	.	3966
Iprodione	.	.	21	31	34	14	.	1485
Maneb	.	.	.	62	38	.	.	353
Sulphur	.	.	23	59	19	.	.	1030
Thiophanate-methyl	.	.	.	100	.	.	.	107
Vinclozolin	.	.	11	34	55	.	.	1885
HERBICIDES								
Bentazone/MCPB	.	.	51	49	.	.	.	1925
Cyanazine	12	18	41	29	.	.	.	2632
Diclofop-methyl	.	.	100	.	.	.	.	148
Diquat	.	.	.	.	.	85	15	6702
Glyphosate	.	.	.	.	.	71	29	1121
MCPA/MCPB	.	.	66	34	.	.	.	461
MCPB	.	.	.	100	.	.	.	30
Pendimethalin	32	47	21	.	.	.	.	927
Simazine/trietazine	63	37	.	.	.	.	.	658
Terbuthylazine/terbutryn	47	48	5	.	.	.	.	3944
Unknown herbicide	.	.	100	.	.	.	.	423

continued

TABLE 33 cont'd

	1988							
	Mar	Apr	May	June	July	Aug	Sept	Spray area (ha)
GROWTH REGULATOR								
Chlormequat	.	.	100	.	.	.	.	348
OTHER								
Di-1-p-menthene	.	.	.	.	.	100	.	182

TABLE 34 Repeated use of pesticides on peas (percentage of the basic area treated more than once)

	Once	Twice	Three times	Four or more	Basic area (ha)
FUNGICIDES					
Benomyl	95	5	.	.	1706
Carbendazim	71	29	.	.	998
Chlorothalonil	75	25	.	.	3170
Sulphur	79	21	.	.	848
HERBICIDES					
Cyanazine	93	7	.	.	2450
Glyphosate	89	11	.	.	1014

TABLE 35 Oilseed rape: usage of insecticides and molluscicides, the reasons for their use (spray hectares) and the percentage of the crop treated

	Aphids	Pollen beetle	Seed weevil	Slugs	No reason given	Total spray area	% crop treated
INSECTICIDES							
SYNTHETIC PYRETHROIDS							
Alphacypermethrin	340	53	171	.	2972	3536	8
Deltamethrin	.	628	.	.	.	628	2
NON-SYSTEMIC ORGANOPHOSPHATE							
Malathion	.	57	.	.	.	57	+
MOLLUSCICIDE							
Methiocarb	.	.	.	9322	.	9322	20
Total spray area	340	738	171	9322	2972	13543	
Area Planted (Ha)							41514

'+' = less than 0.5%

TABLE 36 Oilseed rape: usage of fungicides, the reasons for their use (spray hectares of formulations) and the percentage of the crop treated

	Mainly mildew	Light leaf spot	Alternaria	Other diseases	Insurance	No reason given	Total spray area	% crop treated
Benomyl	122	987	.	.	656	1003	2768	4
Carbendazim	1367	11284	.	124	8603	17428	38806	66
Carbendazim/mancozeb	.	534	.	.	.	.	534	1
Carbendazim/maneb	.	1095	.	149	.	451	1695	4
Carbendazim/maneb/sulphur	.	1114	.	.	.	360	1474	2
Carbendazim/prochloraz	.	.	.	.	741	.	741	1
Chlorothalonil	.	.	711	.	760	2953	4424	11
Fenpropimorph	.	274	.	.	.	.	274	1
Ferbam/maneb/zineb	.	434	.	.	.	1065	1499	2
Iprodione	206	1020	2643	771	1078	906	6624	16
Iprodione/thiophanate-methyl	.	187	1362	290	1007	709	3555	8
Mancozeb	1810	684	.	.	.	2821	5315	8
Mancozeb/metalaxyl	.	.	.	.	996	2124	3120	7
Maneb	625	489	1256	.	996	3576	6942	15
Prochloraz	364	3110	166	.	2060	4685	10385	24
Propiconazole	.	371	.	.	.	.	371	1
Sulphur	.	942	.	.	2444	11387	14773	32
Thiophanate-methyl	340	3172	.	.	.	1368	4880	8
Triadimefon	.	210	.	.	.	.	210	1
Vinclozolin	.	1891	1856	1056	4746	6457	16006	37
Zineb poly	909	.	.	.	.	1118	2027	5
Unknown fungicide	.	.	.	.	.	484	484	1
Total spray area	5743	27798	7994	2390	24087	58895	126907	
Area Planted (Ha)								41514

TABLE 37 Oilseed rape: usage of herbicides and growth regulators, the reasons for their use (spray hectares of formulations) and the percentage of the crop treated

	Mainly annual weeds	Mainly grass weeds	Mixed weeds	Wild oats	Desiccation	No reason given	Growth reg	Pod shatter	Total spray area	% crop treated
HERBICIDES										
Benazolin/clopyralid	14962	.	1621	.	.	328	.	.	16911	39
Carbetamide	169	392	1262	362	.	1780	.	.	3965	10
Carbetamide/dimefuron	537	.	.	.	.	.	.	.	537	1
Clopyralid	1070	312	.	.	.	.	.	.	1382	3
Clopyralid/propyzamide	801	.	1155	.	.	.	.	.	1956	5
Cyanazine	708	.	1237	.	.	.	.	.	1945	5
Diquat	.	.	.	.	7204	.	.	.	7204	17
Fluazifop-P-butyl	.	818	.	326	.	.	.	.	1144	3
Glyphosate	.	1046	57	.	2950	.	.	.	4053	10
Metazachlor	10828	176	6986	.	.	.	.	.	17990	43
Propyzamide	2237	978	5918	.	.	2455	.	.	11588	28
Quizalfop-ethyl	.	1836	.	.	.	.	.	.	1836	4
TCA-sodium	.	284	.	.	.	.	.	.	284	1
Tebutam	328	.	.	.	.	61	.	.	389	1
Trifluralin	474	.	1062	.	.	.	.	.	1536	4
Unknown herbicide	124	.	.	.	.	130	.	.	254	1
Total spray area	32238	5842	19298	688	10154	4754	.	.	72974	
GROWTH REGULATOR										
Chlormequat	.	.	.	.	.	.	3776	.	3776	9
OTHER										
Di-1-p-menthene	.	.	.	.	.	.	.	359	359	1
Area Planted (Ha)										41514

Formulation used on less than 0.1% of the total spray area was paraquat.

TABLE 38 Oilseed rape: dates of application - % of chemical applied each month

	1987					1988							
	Aug	Sept	Oct	Nov	Dec/ Feb	Mar	Apr	May	June	July	Aug	Sept	Spray area (ha)
INSECTICIDES													
SYNTHETIC PYRETHROIDS													
Alphacypermethrin	.	.	.	.	.	.	1	42	57	.	.	.	3536
Deltamethrin	.	.	.	.	.	.	.	.	100	.	.	.	628
NON-SYSTEMIC ORGANOPHOSPHATE													
Malathion	.	.	.	.	.	.	.	.	100	.	.	.	57
MOLLUSCICIDE													
Methiocarb	14	32	22	11	.	11	2	.	.	9	.	.	9322
FUNGICIDES													
Benomyl	.	15	22	.	.	48	15	.	.	.	.	.	2768
Carbendazim	.	.	12	16	7	29	24	9	2	.	.	.	38806
Carbendazim/mancozeb	.	.	.	.	.	.	22	.	.	78	.	.	534
Carbendazim/maneb	.	.	.	.	10	9	73	.	.	9	.	.	1695
Carbendazim/maneb/sulphur	.	.	.	.	.	.	56	22	22	.	.	.	1474
Carbendazim/prochloraz	.	.	.	.	.	37	.	63	.	.	.	.	741
Chlorothalonil	.	.	.	7	.	47	25	11	.	9	.	.	4424
Fenpropimorph	.	.	.	.	.	.	.	100	.	.	.	.	274
Ferbam/maneb/zineb	.	.	.	.	.	54	46	.	.	.	.	.	1499
Iprodione	.	.	.	.	.	.	.	14	38	45	2	.	6624
Iprodione/thiophanate-methyl	.	.	.	.	.	.	37	45	5	5	7	.	3555
Mancozeb	.	.	30	13	19	31	7	.	.	.	.	.	5315
Mancozeb/metalaxyl	.	.	68	32	.	.	.	.	.	.	.	.	3120
Maneb	.	.	2	46	16	20	17	.	.	.	.	.	6942
Prochloraz	.	.	5	10	1	14	49	21	.	.	.	.	10385
Propiconazole	.	.	.	.	.	100	.	.	.	.	.	.	371
Sulphur	.	.	1	1	.	46	41	8	2	.	.	.	14773
Thiophanate-methyl	.	11	5	.	27	51	6	.	.	.	.	.	4880
Triadimefon	.	.	.	.	.	.	.	100	.	.	.	.	210

continued

TABLE 38 cont'd

	1987					1988							
	Aug	Sept	Oct	Nov	Dec/ Feb	Mar	Apr	May	June	July	Aug	Sept	Spray area (ha)
FUNGICIDES (cont'd)													
Vinclozolin	.	.	.	.	.	.	.	74	19	7	.	.	16006
Zineb poly	.	20	29	19	16	.	16	.	.	.	.	.	2027
Unknown fungicide	.	.	.	.	.	26	74	.	.	.	.	.	484
HERBICIDES													
Benazolin/clopyralid	.	8	50	26	2	4	6	4	.	.	.	.	16911
Carbetamide	45	.	39	16	.	.	.	.	.	.	.	.	3965
Carbetamide/dimefuron	.	100	.	.	.	.	.	.	.	.	.	.	537
Clopyralid	.	.	12	37	12	.	39	.	.	.	.	.	1382
Clopyralid/propyzamide	.	.	41	59	.	.	.	.	.	.	.	.	1956
Cyanazine	.	.	.	41	.	25	33	.	.	.	.	.	1945
Diquat	.	.	.	.	.	.	.	.	.	12	78	10	7204
Fluazifop-P-butyl	.	24	20	56	.	.	.	.	.	.	.	.	1144
Glyphosate	.	.	1	.	.	.	.	.	9	30	59	.	4053
Metazachlor	18	19	35	22	.	.	4	2	.	.	.	.	17990
Paraquat	.	.	.	.	.	.	100	.	.	.	.	.	71
Propyzamide	2	7	48	24	14	1	4	.	.	.	.	.	11588
Quizalfop-ethyl	.	41	8	22	.	21	.	8	.	.	.	.	1835
TCA-sodium	.	22	.	.	.	78	.	.	.	.	.	.	284
Tebutam	.	16	.	84	.	.	.	.	.	.	.	.	389
Trifluralin	27	.	65	.	.	.	8	.	.	.	.	.	1536
Unknown herbicide	51	.	.	49	.	.	.	.	.	.	.	.	254
GROWTH REGULATOR													
Chlormequat	.	.	.	.	.	9	91	.	.	.	.	.	3776
OTHER													
Di-1-p-menthene	.	.	.	.	.	.	.	.	.	34	66	.	359

TABLE 39 Repeated use of pesticides on Oilseed rape (percentage of the basic area treated more than once)

	Once	Twice	Three times	Four or more	Basic area (ha)
INSECTICIDES etc					
Methiocarb	91	9	.	.	8540
FUNGICIDES					
Benomyl	41	59	.	.	1742
Carbendazim	60	39	1	.	27460
Carbendazim/maneb	90	10	.	.	1546
Carbendazim/maneb/sulphur	60	.	40	.	819
Carbendazim/prochloraz	40	60	.	.	464
Ferbam/maneb/zineb	15	85	.	.	810
Iprodione/thiophanate-methyl	91	9	.	.	3252
Mancozeb	41	59	.	.	3346
Maneb	88	12	.	.	6213
Prochloraz	97	3	.	.	10048
Sulphur	88	12	.	.	13188
Thiophanate-methyl	45	55	.	.	3145
Vinclozolin	97	3	.	.	15593
HERBICIDES					
Benazolin/clopyralid	96	4	.	.	16254
Clopyralid	86	14	.	.	1209

TABLE 40 Turnips and swedes: the use of insecticides, molluscicides, fungicides (spray hectares of formulations) and the percentage of the crop treated

	Flea beetle	Aphids	Root fly	Leather jackets	Slugs	Mildew	No reason given	Total spray area	% crop treated
INSECTICIDES									
SYNTHETIC PYRETHROIDS									
Cypermethrin	226	.	68	.	.	.	.	294	1
Deltamethrin	304	.	.	.	.	.	.	304	1
Fenvalerate	190	.	.	.	.	.	.	190	1
NON-SYSTEMIC ORGANOPHOSPHATES									
Chlorfenvinphos			162	.				162	1
Chlorpyrifos	1431	311	204	1047	.		350	3343	10
CARBAMATES									
Aldicarb	286	.	.	.	.	.	.	286	1
Carbofuran	158	.	609	.	.	.	139	906	3
ORGANOCHLORINE									
gamma-HCH	793	.	635	.	.	.	.	1428	5
MOLLUSCICIDE									
Methiocarb	.	.	.	.	154	.	.	154	1
Total spray area	3388	311	1678	1047	154	.	.	7067	
FUNGICIDE									
Sulphur	.	.	.	.	.	275	188	463	2
Area Planted (Ha)									30620

TABLE 41 Turnips and swedes: the use of herbicides (spray hectares of formulations) and the percentage of the crop treated

	Mainly annual weeds	Mainly grass	Mixed weeds	Pasture kill	No reason given	Total spray area	% crop treated
HERBICIDES							
Chlorthal-dimethyl	294	.	.	.	.	294	1
Flamprop-M-isopropyl	.	.	.	.	63	63	+
Glyphosate	90	49	.	.	.	139	+
Metazachlor	3320	.	.	.	1359	4679	15
Napropamide/trifluralin	210	.	.	.	.	210	1
Paraquat	123	.	.	530	.	653	1
Propachlor	6757	.	2300	.	1134	10191	33
TCA-sodium	.	2916	.	.	570	3486	11
Tebutam	438	.	87	.	117	642	2
Trifluralin	12852	79	3462	.	2290	18683	61
Total spray area	24084	3044	5849	530	5533	39040	
Area Planted (Ha)							30620

'+' = less than 0.5%

TABLE 42 Turnips and swedes: dates of application - % area treated

	1988									
	Unknown	Jan/ Feb	Mar	Apr	May	Jun	Jul	Aug	Sep/ Dec	Spray area (ha)
INSECTICIDES										
SYNTHETIC PYRETHROIDS										
Cypermethrin	31	.	.	.	46	.	23	.	.	294
Deltamethrin	100	.	.	.	.	.	.	.	.	304
Fenvalerate	56	.	.	.	44	.	.	.	.	190
NON-SYSTEMIC ORGANOPHOSPHATES										
Chlorfenvinphos	.	.	.	.	.	60	.	40	.	162
Chlorpyrifos	52	.	.	.	7	35	5	.	.	3343
CARBAMATES										
Aldicarb	.	.	.	51	49	.	.	.	.	286
Carbofuran	48	.	.	.	39	13	.	.	.	906
ORGANOCHLORINE										
gamma-HCH	67	.	.	.	23	10	.	.	.	1428
MOLLUSCICIDE										
Methiocarb	100	.	.	.	.	.	.	.	.	154
FUNGICIDE										
Sulphur	59	.	.	.	.	.	16	25	.	463
HERBICIDES										
Chlorthal-dimethyl	.	.	.	.	100	.	.	.	.	294
Flamprop-M-isopropyl	.	.	.	.	100	.	.	.	.	63
Glyphosate	.	.	.	.	35	65	.	.	.	139
Metazachlor	32	.	.	9	57	2	.	.	.	4679
Napropamide/trifluralin	100	.	.	.	.	.	.	.	.	210
Paraquat	100	.	.	.	.	.	.	.	.	653
Propachlor	47	.	1	4	47	.	1	.	.	10191
TCA-sodium	42	.	2	16	40	.	.	.	.	3486
Tebutam	77	.	.	.	23	.	.	.	.	642
Trifluralin	50	.	.	9	40	.	.	.	.	18683

TABLE 43 Repeated use of pesticides on turnips and swedes (percentage of the basic area treated more than once)

	Once	Twice	Three times	Four or more	Basic area (ha)
INSECTICIDE					
Chlorpyrifos	92	8	.	.	3095
HERBICIDES					
Metazachlor	97	3	.	.	4547
Paraquat	32	68	.	.	388

TABLE 44 Areas (ha) and proportions (%) of arable crops treated with seed dressings

	Winter barley	Spring barley	Winter wheat	Spring oats	Peas	Oilseed rape	Turnips & swedes	All crops
Captan/fosetyl-aluminium/ thiabendazole	.	.	.	.	579 (7)	.	.	579 (+)
Captan/gamma-HCH	.	.	.	.	.	2329 (6)	23680 (77)	26009 (4)
Carbosulfan	.	.	.	.	.	209 (1)	.	209 (+)
Chlorfenvinphos	.	.	263 (+)	.	.	.	.	263 (+)
Drazoxolon	.	.	.	.	3319 (38)	.	.	3319 (1)
Ethirimol	1744 (3)	349 (+)	.	.	.	.	.	2093 (+)
Ethirimol/flutriafol/ thiabendazole	10245 (15)	25985 (8)	609 (1)	187 (1)	.	.	.	37026 (6)
Fenpropimorph/gamma-HCH/ thiram	.	.	.	.	.	4889 (12)	.	4889 (1)
Fonofos	.	.	1905 (2)	.	.	.	.	1905 (+)
Fuberidazole/triadimenol	13936 (20)	27042 (8)	14480 (15)	.	.	.	.	55458 (9)
Gamma-HCH	.	303 (+)	.	.	.	.	.	303 (+)
Gamma-HCH/organo-mercury	.	.	.	388 (1)	.	.	.	388 (+)
Iprodione	.	.	.	.	.	.	3617 (12)	3617 (1)
Metalaxyl/thiabendazole	.	.	.	.	254 (3)	.	.	254 (+)
Organo-mercury	42321 (61)	253632 (79)	85070 (86)	27499 (79)	.	.	.	408522 (68)
Thiabendazole/thiram	.	.	.	.	335 (4)	.	.	335 (+)
Thiram	.	.	.	.	311 (4)	209 (1)	.	520 (+)
Unknown fungicide	.	.	616 (1)	.	361 (4)	6759 (16)	811 (3)	8547 (1)
Unknown insecticide	.	.	361 (+)	.	.	.	1277 (4)	1638 (+)
Unknown seed dressing	1583 (2)	9964 (3)	698 (1)	2942 (8)	3765 (44)	27545 (66)	3905 (13)	50402 (8)

'+' = less than 0.5%

TABLE 45 Quantities of active ingredients (kg) used in arable crop seed dressings

	Winter barley	Spring barley	Winter wheat	Spring oats	Peas	Oilseed rape	Turnips & swedes	All crops
Captan	.	.	.	.	74	69	38	181
Carbosulfan	.	.	.	.	.	+	.	+
Chlorfenvinphos	.	.	59	.	.	.	.	59
Drazoxolon	.	.	.	.	419	.	.	419
Ethirimol	5950	12077	306	94	.	.	.	18427
Fenpropimorph	.	.	.	.	.	33	.	33
Flutriafol	346	883	23	7	.	.	.	1259
Fonofos	.	.	491	.	.	.	.	491
Fosetyl-aluminium	.	.	.	.	228	.	.	228
Fuberidazole	104	183	115	.	.	.	.	402
Gamma-HCH	.	16	.	42	.	941	288	1287
Iprodione	.	.	.	.	.	.	3	3
Organo-mercury	222	1270	453	191	.	.	.	2136
Metalaxyl	.	.	.	.	37	.	.	37
Thiabendazole	115	294	8	2	107	.	.	526
Thiram	.	.	.	.	42	56	.	98
Triadimenol	868	1525	958	.	.	.	.	3351

'+' = unknown small quantity used on imported seed

TABLE 46 Usage of insecticides and molluscicides on arable crops (spray hectares of formulations)

	Winter barley	Spring barley	Winter wheat	Spring oats	Peas	Oilseed rape	Turnips & swedes	All crops
INSECTICIDES								
SYNTHETIC PYRETHROIDS								
Alphacypermethrin	.	.	.	.	.	3536	.	3536
Cypermethrin	.	.	.	511	.	.	294	805
Deltamethrin	275	249	.	.	.	628	304	1456
Fenvalerate	.	127	.	.	.	.	190	317
ORGANOCHLORINE								
gamma-HCH	.	1589	114	.	.	.	1428	3131
SYSTEMIC ORGANOPHOSPHATES								
Demeton-S-methyl	242	6997	3227	.	.	.	.	10466
Dimethoate	.	601	3426	.	.	.	.	4027
NON-SYSTEMIC ORGANOPHOSPHATES								
Chlorfenvinphos	.	.	.	.	.	.	162	162
Chlorpyrifos	902	22376	3203	2808	.	.	3344	32633
Malathion	.	.	.	.	.	57	.	57
Phosalone	.	506	348	.	.	.	.	854
Quinalphos	.	98	.	.	.	.	.	98
CARBAMATES								
Aldicarb	.	.	.	.	.	.	286	286
Carbofuran	.	.	.	.	.	.	907	907
Pirimicarb	.	.	5895	.	81	.	.	5976
OTHER INSECTICIDE								
Unknown insecticide	.	206	793	.	.	.	.	999
All insecticides	1419	32749	17006	3319	81	4221	6915	65710

continued

TABLE 46 cont'd

	Winter barley	Spring barley	Winter wheat	Spring oats	Peas	Oilseed rape	Turnips & swedes	All crops
MOLLUSCICIDES								
Metaldehyde	.	.	808	.	.	.	.	808
Methiocarb	1758	1978	18752	.	.	9322	154	31964
Unknown molluscicide	289	.	.	.	.	.	.	289
All molluscicides	2047	1978	19560	.	.	9322	154	33061
OTHER CHEMICALS								
Aluminium ammonium sulphate	.	.	14	.	.	68	.	82
Di-1-p-menthene	.	.	.	.	182	359	.	541
All other	.	.	14	.	182	427	.	623

TABLE 47 Usage of fungicide on arable crops (spray hectares of formulations)

	Winter barley	Spring barley	Winter wheat	Spring oats	Peas	Oilseed rape	Turnips & swedes	All crops
Benodanil	1157	.	.	.	.	.	.	1157
Benomyl	.	.	1203	.	1787	2768	.	5758
Captafol	.	.	616	.	.	.	.	616
Captafol/triadimefon	.	.	4479	.	.	.	.	4479
Carbendazim	35179	9266	37420	.	1288	38806	.	121959
Carbendazim/chlorothalonil	340	.	1798	.	.	.	.	2138
Carbendazim/flutriafol	4688	662	7383	.	.	.	.	12733
Carbendazim/mancozeb	1098	.	8537	.	.	534	.	10169
Carbendazim/maneb	878	.	8162	.	523	1695	.	11258
Carbendazim/maneb/sulphur	.	716	9198	.	.	1475	.	11389
Carbendazim/maneb/tridemorph	11875	366	1113	.	.	.	.	13354
Carbendazim/prochloraz	1685	1196	7053	.	.	741	.	10675
Carbendazim/propiconazole	2944	346	3296	.	.	.	.	6586
Carbendazim/triadimefon	553	.	.	.	.	.	.	553
Chlorothalonil	9415	1080	71586	.	3966	4424	.	90471
Chlorothalonil/flutriafol	.	.	15484	.	.	.	.	15484
Fenpropidin	7751	60503	6747	1922	.	.	.	76923
Fenpropimorph	34537	152318	55011	1975	.	274	.	244115
Fenpropimorph/iprodione	.	.	1340	.	.	.	.	1340
Fenpropimorph/prochloraz	.	.	1222	.	.	.	.	1222
Ferbam/maneb/zineb	.	.	579	.	.	1499	.	2078
Iprodione	.	.	265	.	1485	6623	.	8373
Iprodione/thiophanate-methyl	.	.	.	.	.	3555	.	3555
Mancozeb	921	.	6434	.	.	5315	.	12670
Mancozeb/metalaxyl	.	.	.	.	.	3120	.	3120
Maneb	4631	3583	29147	2089	353	6942	.	46745
Maneb+zinc	.	.	1545	.	.	.	.	1545
Maneb/zineb	.	.	1223	.	.	.	.	1223
Nuarimol	328	997	.	.	.	.	.	1325
Prochloraz	19060	14836	26365	.	.	10385	.	70646

continued

TABLE 47 Cont'd

	Winter barley	Spring barley	Winter wheat	Spring oats	Peas	Oilseed rape	Turnips & swedes	All crops
Propiconazole	22430	44340	38214	.	.	371	.	105355
Propiconazole/tridemorph	5233	9625	11071	.	.	.	.	25929
Sulphur	2384	7727	7053	447	1029	14772	463	33875
Thiophanate-methyl	2061	2099	1515	.	107	4881	.	10663
Triadimefon	752	323	2323	.	.	210	.	3608
Triadimenol	1531	1981	13834	.	.	.	.	17346
Triadimenol/tridemorph	8131	23561	13174	.	.	.	.	44866
Tridemorph	35003	77731	35248	5736	.	.	.	153718
Vinclozolin	.	.	.	.	1885	16007	.	17892
Zineb poly	.	.	1296	.	.	2027	.	3323
Unknown fungicide	444	3451	1739	.	.	484	.	6118
All fungicides	215009	416707	432673	12169	12423	126908	463	1216352

TABLE 48 Usage of herbicides and growth regulators on arable crops (spray hectares of formulations)

	Winter barley	Spring barley	Winter wheat	Spring oats	Peas	Oilseed rape	Turnips & swedes	All crops
2,4-D	.	4234	.	454	.	.	.	4688
2,4-DB/benazolin/MCPA	.	9750	.	.	.	.	.	9750
2,4-DB/bentazone/cyanazine	.	2088	.	928	.	.	.	3016
2,4-DB/linuron/MCPA	.	12502	.	603	.	.	.	13105
2,4-DB/MCPA	.	2890	.	.	.	.	.	2890
Barban	.	155	.	.	.	.	.	155
Benazolin/bromoxynil/ioxynil	1099	1228	1483	217	.	.	.	4027
Benazolin/bromoxynil/ioxynil /mecoprop	35	.	173	331	.	.	.	539
Benazolin/clopyralid	.	.	.	.	.	16911	.	16911
Bentazone/MCPA/MCPB	.	6810	.	204	.	.	.	7014
Bentazone/MCPB	.	.	.	.	1924	.	.	1924
Benzoylprop-ethyl	.	.	62	.	.	.	.	62
Bifenox/isoproturon	1265	.	810	.	.	.	.	2075
Bromoxynil/chlorsulfuron/ioxynil	239	1147	.	.	.	.	.	1386
Bromoxynil/clopyralid /fluroxypyr/ioxynil	.	660	1280	.	.	.	.	1940
Bromoxynil/dichlorprop	257	.	.	.	.	.	.	257
Bromoxynil/dichlorprop/ioxynil /MCPA	.	7130	.	381	.	.	.	7511
Bromoxynil/fluroxypyr	.	708	.	1108	.	.	.	1816
Bromoxynil/fluroxypyr/ioxynil	2618	13462	4411	40	.	.	.	20531
Bromoxynil/ioxynil	2559	16159	8402	1379	.	.	.	28499
Bromoxynil/ioxynil/isoproturon	.	1397	306	.	.	.	.	1703
Bromoxynil/ioxynil/isoproturon /mecoprop	.	1092	767	.	.	.	.	1859
Bromoxynil/ioxynil/mecoprop	191	652	94	.	.	.	.	937
Carbetamide	.	.	.	.	.	3965	.	3965
Carbetamide/dimefuron	.	.	.	.	.	537	.	537
Chlorotoluron	1373	.	613	.	.	.	.	1986
Chlorsulfuron/metsulfuron-methyl	253	.	937	.	.	.	.	1190

continued

TABLE 48 Cont'd

	Winter barley	Spring barley	Winter wheat	Spring oats	Peas	Oilseed rape	Turnips & swedes	All crops
Clopyralid	.	128	.	.	.	1382	.	1510
Clopyralid/cyanazine	.	3727	.	571	.	.	.	4298
Clopyralid/dichlorprop/MCPA	.	6400	81	617	.	.	.	7098
Clopyralid/fluroxypyr/ioxynil	236	527	.	.	.	.	.	763
Clopyralid/ioxynil	232	249	137	.	.	.	.	618
Clopyralid/mecoprop	.	1275	.	.	.	.	.	1275
Clopyralid/propyzamide	.	.	.	.	.	1956	.	1956
Chlorthal-dimethyl	.	.	.	.	.	.	294	294
Cyanazine	1237	253	2321	.	2632	1945	.	8388
Dicamba/dichlorprop/ioxynil	.	8152	.	392	.	.	.	8544
Dicamba/MCPA/mecoprop	279	5690	436	1555	.	.	.	7960
Dicamba/mecoprop	.	9007	1228	40	.	.	.	10275
Dichlorprop	.	3571	.	790	.	.	.	4361
Dichlorprop/MCPA	1160	21413	524	1141	.	.	.	24238
Diclofop-methyl	.	.	.	.	148	.	.	148
Difenzoquat	.	2349	860	.	.	.	.	3209
Diflufenican/isoproturon	6977	482	5322	.	.	.	.	12781
Diquat	81	1058	.	516	6702	7204	.	15561
Flamprop-M-isopropyl	533	5899	2834	.	.	.	63	9328
Fluazifop-P-butyl	.	.	.	.	.	1144	.	1144
Fluroxypyr	2071	2844	3327	326	.	.	.	8568
Glyphosate	2753	13380	5731	9	1121	4053	139	27185
Ioxynil/isoproturon/mecoprop	130	922	302	.	.	.	.	1354
Isoproturon	843	.	253	.	.	.	.	1096
Isoproturon/pendimethalin	.	.	566	.	.	.	.	566
Isoproturon/trifluralin	1903	.	167	.	.	.	.	2070
Isoxaben	1189	.	371	.	.	.	.	1560
Linuron	235	.	239	.	.	.	.	474
Linuron/trietazine/trifluralin	507	.	2452	.	.	.	.	2959
Linuron/trifluralin	4673	1819	2159	.	.	.	.	8651
MCPA	6801	105054	8459	17295	.	.	.	137609
MCPA/MCPB	.	130	.	185	461	.	.	776

continued

TABLE 48 Cont'd

	Winter barley	Spring barley	Winter wheat	Spring oats	Peas	Oilseed rape	Turnips & swedes	All crops
MCPB	.	5119	.	.	30	.	.	5149
Mecoprop	23945	89650	58183	6342	.	.	.	178120
Metazachlor	.	.	.	.	.	17990	4679	22669
Methabenzthiazuron	711	.	.	.	.	.	.	711
Metsulfuron-methyl	12901	118754	51766	11277	.	.	.	194698
Metsulfuron-methyl /thifensulfuron-methyl	642	12703	4033	.	.	.	.	17378
Napropamide/trifluralin	.	.	.	.	.	.	210	210
Paraquat	.	897	.	.	.	71	653	1621
Pendimethalin	11324	.	3790	.	927	.	.	16041
Propachlor	.	.	.	.	.	.	10191	10191
Propyzamide	.	.	5	.	.	11588	.	11593
Quizalfop-ethyl	.	.	.	.	.	1835	.	1835
Simazine/trietazine	.	.	.	.	658	.	.	658
TCA-sodium	.	.	.	.	.	284	3486	3770
Tebutam	.	.	.	.	.	389	642	1031
Terbuthylazine/terbutryn	.	.	.	.	3943	.	.	3943
Terbutryn	1071	.	.	.	.	.	.	1071
Tri-allate	91	.	.	.	.	.	.	91
Trifluralin	556	.	.	88	.	1535	18683	20862
Unknown herbicide	1066	.	632	250	423	254	.	2625
All herbicides	94036	503516	175516	47039	18969	73043	39040	951159
GROWTH REGULATORS								
2-chloroethylphosphonic acid	4634	11950	8518	216	.	.	.	25318
2-chloroethylphosponic acid /mepiquat chloride	24607	21069	22344	.	.	.	.	68020
Chlormequat	47905	50971	84170	11802	348	3776	.	198972
Unknown growth regulator	444	.	.	.	.	.	.	444
All growth regulators	77590	83990	115032	12018	348	3776	.	292754

TABLE 49 Usage of insecticides and molluscicides on arable crops (spray hectares of active ingredients)

	Winter barley	Spring barley	Winter wheat	Spring oats	Peas	Oilseed rape	Turnips & swedes	All crops	All crops (excluding potatoes) 1982
INSECTICIDES									
SYNTHETIC PYRETHROIDS									
Alphacypermethrin	.	.	.	.	.	3536	.	3536	.
Cypermethrin	.	.	.	511	.	.	294	805	.
Deltamethrin	275	249	.	.	.	628	304	1456	.
Fenvalerate	.	127	.	.	.	.	190	317	.
ORGANOCHLORINE									
gamma-HCH	.	1589	114	.	.	.	1428	3131	1937
SYSTEMIC ORGANOPHOSPHATES									
Demeton-S-methyl	242	6997	3227	.	.	.	.	10466	749
Dimethoate	.	601	3426	.	.	.	.	4027	.
NON-SYSTEMIC ORGANOPHOSPHATES									
Chlorfenvinphos	.	.	.	.	.	.	162	162	241
Chlorpyrifos	902	22376	3203	2808	.	.	3344	32633	695
Malathion	.	.	.	.	.	57	.	57	.
Phosalone	.	506	348	.	.	.	.	854	.
Quinalphos	.	98	.	.	.	.	.	98	.
CARBAMATES									
Aldicarb	.	.	.	.	.	.	286	286	.
Carbofuran	.	.	.	.	.	.	907	907	3293
Pirimicarb	.	.	5895	.	81	.	.	5976	292
OTHER INSECTICIDE									
Unknown insecticide	.	206	793	.	.	.	.	999	.
All insecticides	1419	32749	17006	3319	81	4221	6915	65710	

continued

TABLE 49 cont'd

	Winter barley	Spring barley	Winter wheat	Spring oats	Peas	Oilseed rape	Turnips & swedes	All crops	All crops (excluding potatoes) 1982
MOLLUSCICIDES									
Metaldehyde	.	.	808	.	.	.	.	808	.
Methiocarb	1758	1978	18752	.	.	9322	154	31964	520
Unknown molluscicide	289	.	.	.	.	.	.	289	.
All molluscicides	2047	1978	19560	.	.	9322	154	33061	
OTHER CHEMICALS									
Aluminium ammonium sulphate	.	.	14	.	.	68	.	82	.
Di-1-p-menthene	.	.	.	.	182	359	.	541	70
All other	.	.	14	.	182	427	.	623	

TABLE 50 Usage of fungicides on arable crops (spray hectares of active ingredients)

	Winter barley	Spring barley	Winter wheat	Spring oats	Peas	Oilseed rape	Turnips & swedes	All crops	All Crops (excluding potatoes) 1982
Benodanil	1157	.	.	.	.	.	.	1157	.
Benomyl	.	.	1203	.	1787	2768	.	5758	8449
Captafol	.	.	5095	.	.	.	.	5095	968
Carbendazim	59240	12552	83960	.	1811	43251	.	200814	39463
Chlorothalonil	9755	1080	88868	.	3966	4424	.	108093	9836
Fenpropidin	7751	60503	6747	1922	.	.	.	76923	.
Fenpropimorph	34537	152318	57573	1975	.	274	.	246677	210485
Ferbam	.	.	579	.	.	1499	.	2078	.
Flutriafol	4688	662	22867	.	.	.	.	28217	.
Iprodione	.	.	1605	.	1485	10178	.	13269	82
Mancozeb	2019	.	14971	.	.	8969	.	25959	.
Maneb	17384	4665	49422	2089	876	11611	.	86047	23080
Manbe + zinc	.	.	1545	.	.	.	.	1545	
Metalaxyl	.	.	.	.	.	3120	.	3120	.
Nuarimol	328	997	.	.	.	.	.	1325	.
Prochloraz	20745	16032	34640	.	.	11126	.	82543	2359
Propiconazole	30607	54311	52581	.	.	371	.	137870	123320
Sulphur	2384	8443	16251	447	1029	16247	462	45263	910
Thiophanate-methyl	2061	2099	1515	.	107	8436	.	14218	6421
Triadimefon	1305	323	6802	.	.	210	.	8640	159228
Triadimenol	9662	25542	27008	.	.	.	.	62212	.
Tridemorph	60242	111283	60606	5736	.	.	.	237867	84777
Vinclozolin	.	.	.	.	1885	16007	.	17892	.
Zineb	.	.	1802	.	.	1499	.	3301	.
Zineb poly	.	.	1296	.	.	2027	.	3323	.
Unknown fungicide	444	3451	1739	.	.	484	.	6118	.
All fungicides	264309	454261	540220	12169	12946	142501	462	1426869	

TABLE 51 Usage of herbicides and growth regulators on arable crops (spray hectares of active ingredients)

	Winter barley	Spring barley	Winter wheat	Spring oats	Peas	Oilseed rape	Turnips & swedes	All crops	All crops (excluding potatoes) 1982
2,4-D	.	4234	.	454	.	.	.	4688	8825
2,4-DB	.	27230	.	1531	.	.	.	28761	18540
Barban	.	155	.	.	.	.	.	155	1890
Benazolin	1134	10978	1656	548	.	16911	.	31227	9454
Bentazone	.	8898	.	1132	1924	.	.	11954	8193
Benzoylprop-ethyl	.	.	62	.	.	.	.	62	137
Bifenox	1265	.	810	.	.	.	.	2075	1310
Bromoxynil	6998	41948	16916	3456	.	.	.	69318	58314
Carbetamide	.	.	.	.	.	4502	.	4502	.
Chlorotoluron	1373	.	613	.	.	.	.	1986	156
Chlorthal-dimethyl	.	.	.	.	.	.	294	294	1084
Chlorsulfuron	492	1147	937	.	.	.	.	2576	.
Clopyralid	468	12966	1498	1188	.	20249	.	36369	16486
Cyanazine	1237	6068	2321	1499	2632	1945	.	15702	12241
Dicamba	279	22849	1664	1987	.	.	.	26779	81714
Dichlorprop	1417	46666	605	3321	.	.	.	52009	85912
Diclofop-methyl	.	.	.	.	148	.	.	148	.
Difenzoquat	.	2349	860	.	.	.	.	3209	20448
Diflufenican	6977	482	5322	.	.	.	.	12781	.
Dimefuron	.	.	.	.	.	537	.	537	29
Diquat	81	1058	.	516	6702	7204	.	15561	669
Flamprop-M-isopropyl	533	5899	2834	.	.	.	63	9328	1799
Fluazifop-P-butyl	.	.	.	.	.	1144	.	1144	582
Fluroxypyr	4925	18201	9018	1474	.	.	.	33618	.
Glyphosate	2753	13380	5731	9	1121	4053	138	27185	38120
Ioxynil	7339	52777	17355	2740	.	.	.	80211	64396
Isoproturon	11118	3893	8493	.	.	.	.	23504	8249
Isoxaben	1189	.	371	.	.	.	.	1560	.
Linuron	5415	14321	4850	603	.	.	.	25189	14854
MCPA	8240	177769	9500	21981	461	.	.	217951	382377
MCPB	.	12059	.	389	2415	.	.	14863	21377

continued

TABLE 51 cont'd

	Winter barley	Spring barley	Winter wheat	Spring oats	Peas	Oilseed rape	Turnips & swedes	All crops	All crops (excluding potatoes) 1982
Mecoprop	24580	108288	61183	8268	.	.	.	202319	226452
Metazachlor	.	.	.	.	.	17990	4679	22669	.
Methabenzthiazuron	711	.	.	.	.	.	.	711	145
Metsulfuron-methyl	13796	131457	56736	11277	.	.	.	213266	.
Napropamide	.	.	.	.	.	.	210	210	9592
Paraquat	.	897	.	.	.	71	653	1621	1575
Pendimethalin	11324	.	4356	.	927	.	.	16607	1947
Propachlor	.	.	.	.	.	.	10192	10192	11593
Propyzamide	.	.	5	.	.	13544	.	13549	765
Quizalfop-ethyl	.	.	.	.	.	1835	.	1835	.
Simazine	.	.	.	.	658	.	.	658	.
TCA-sodium	.	.	.	.	.	284	3486	3770	10967
Tebutam	.	.	.	.	.	389	642	1031	.
Terbuthylazine	.	.	.	.	3943	.	.	3943	.
Terbutryn	1071	.	.	.	3943	.	.	5014	10059
Thifensulfuron-methyl	642	12703	4033	.	.	.	.	17378	.
Tri-allate	91	.	.	.	.	.	.	91	3773
Trietazine	507	.	2452	.	658	.	.	3617	.
Trifluralin	7639	1819	4778	88	.	1535	18894	34753	34679
Unknown herbicide	1066	.	632	250	423	254	.	2625	.
All herbicides	124660	740491	225591	62711	25955	92447	39251	1311106	
2-chloroethylphosphonic acid	29241	33019	30862	216	.	.	.	93338	4852
Chlormequat	47905	50971	84170	11802	348	3776	.	198972	38729
Mepiquat chloride	24607	21069	22344	.	.	.	.	68020	6636
Unknown growth regulator	444	.	.	.	.	.	.	444	.
All growth regulators	102197	105059	137376	12018	348	3776	.	360774	

TABLE 52 Quantities (kg) of insecticide, molluscicide and repellent active ingredients

	Winter barley	Spring barley	Winter wheat	Spring oats	Peas	Oilseed rape	Turnips & swedes	All crops
INSECTICIDES								
SYNTHETIC PYRETHROIDS								
Alphacypermethrin	.	.	.	.	.	37	.	37
Cypermethrin	.	.	.	13	.	.	4	17
Deltamethrin	2	2	.	.	.	7	4	15
Fenvalerate	.	4	.	.	.	.	5	9
ORGANOCHLORINE								
gamma-HCH	.	1779	137	.	.	.	265	2182
SYSTEMIC ORGANOPHOSPHATES								
Demeton-S-methyl	59	1240	672	.	.	.	.	1970
Dimethoate	.	180	1346	.	.	.	.	1527
NON-SYSTEMIC ORGANOPHOSPHATES								
Chlorfenvinphos	.	.	.	.	.	.	382	382
Chlorpyrifos	523	12816	1377	1786	.	.	2006	18507
Malathion	.	.	.	.	.	72	.	72
Phosalone	.	248	171	.	.	.	.	419
Quinalphos	.	49	.	.	.	.	.	49
CARBAMATES								
Aldicarb	.	.	.	.	.	.	739	739
Carbofuran	.	.	.	.	.	.	1004	1004
Pirimicarb	.	.	539	.	4	.	.	543
MOLLUSCICIDES								
Metaldehyde	.	.	761	.	.	.	.	761
Methiocarb	385	435	3369	.	.	1670	34	5893
VERTEBRATE REPELLENT								
Aluminium ammonium sulphate	.	.	13	.	.	60	.	73
All insecticides etc	969	16753	8385	1799	4	1846	4443	34199

TABLE 53 Quantities (kg) of fungicide active ingredients

	Winter barley	Spring barley	Winter wheat	Spring oats	Peas	Oilseed rape	Turnips & swedes	All crops
Benodanil	1055	.	.	.	.	.	.	1055
Benomyl	.	.	356	.	1104	1221	.	2681
Captafol	.	.	6650	.	.	.	.	6650
Carbendazim	9766	2209	14379	.	378	9583	.	36315
Chlorothalonil	6903	1338	58795	.	3497	3603	.	74136
Fenpropidin	4775	37957	4892	1441	.	.	.	49065
Fenpropimorph	18810	103938	31858	1093	.	205	.	155904
Ferbam	.	.	58	.	.	75	.	133
Flutriafol	509	78	2029	.	.	.	.	2616
Iprodione	.	.	506	.	862	5977	.	7345
Mancozeb	2471	.	19384	.	.	8792	.	30647
Maneb	18810	5658	58319	3342	1047	12102	.	99278
Maneb + zinc	.	.	1822	.	.	.	.	1822
Metalaxyl	.	.	.	.	.	160	.	160
Nuarimol	15	22	.	.	.	.	.	37
Prochloraz	6814	6103	11810	.	.	3766	.	28493
Propiconazole	4236	6439	6635	.	.	46	.	17356
Sulphur	12104	37057	33354	3231	3696	77270	2871	169583
Thiophanate-methyl	826	1330	581	.	75	4459	.	7271
Triadimefon	203	20	1273	.	.	26	.	1522
Triadimenol	1047	2911	2771	.	.	.	.	6729
Tridemorph	23477	48532	25612	2271	.	.	.	99892
Vinclozolin	.	.	.	.	1141	9695	.	10836
Zineb	.	.	1036	.	.	75	.	1111
Zineb poly	.	.	1643	.	.	3008	.	4651
All fungicides	111821	253592	283763	11378	11800	140063	2871	815288

TABLE 54 Quantities (kg) of herbicide growth regulator and other active ingredients

	Winter barley	Spring barley	Winter wheat	Spring oats	Peas	Oilseed rape	Turnips & swedes	All crops
2,4-D	.	4776	.	511	.	.	.	5287
2,4-DB	.	28935	.	1336	.	.	.	30271
Barban	.	18	.	.	.	.	.	18
Benazolin	113	1828	116	46	.	5186	.	7289
Bentazone	.	8690	.	1039	1774	.	.	11503
Benzoylprop-ethyl	.	.	70	.	.	.	.	70
Bifenox	809	.	463	.	.	.	.	1272
Bromoxynil	1717	8804	3084	712	.	.	.	14317
Carbetamide	.	.	.	.	.	9453	.	9453
Chlorotoluron	3925	.	1374	.	.	.	.	5299
Chlorsulfuron	9	12	18	.	.	.	.	39
Chlorthal-dimethyl	.	.	.	.	.	.	992	992
Clopyralid	17	656	72	56	.	1170	.	1971
Cyanazine	1356	5412	2901	1968	2789	1567	.	15993
Dicamba	25	1662	136	170	.	.	.	1993
Dichlorprop	2012	66175	1162	5710	.	.	.	75059
Diclofop-methyl	.	.	.	.	196	.	.	196
Difenzoquat	.	1762	645	.	.	.	.	2407
Diflufenican	668	48	508	.	.	.	.	1224
Dimefuron	.	.	.	.	.	376	.	376
Diquat	32	423	.	206	3058	3058	.	6777
Flamprop-M-isopropyl	215	3032	1528	.	.	.	25	4800
Fluazifop-P-butyl	.	.	.	.	.	187	.	187
Fluroxypyr	886	2890	1214	235	.	.	.	5205
Glyphosate	2363	18425	6688	16	1168	5126	180	33966
Ioxynil	1592	9833	2820	360	.	.	.	14605
Isoproturon	12704	4310	9306	.	.	.	.	26320
Isoxaben	48	.	19	.	.	.	.	67
Linuron	2593	2031	1799	63	.	.	.	6486
MCPA	8684	146737	8295	21691	64	.	.	185471
MCPB	.	18362	.	577	2213	.	.	21152
Mecoprop	42472	158685	96656	12517	.	.	.	310330
Metazachlor	.	.	.	.	.	18069	4490	22559

continued

TABLE 54 Cont'd

	Winter barley	Spring barley	Winter wheat	Spring oats	Peas	Oilseed rape	Turnips & swedes	All crops
Methabenzthiazuron	1145	.	.	.	.	.	.	1145
Metsulfuron-methyl	56	612	264	57	.	.	.	989
Napropamide	.	.	.	.	.	.	176	176
Paraquat	.	251	.	.	.	40	509	800
Pendimethalin	16210	.	5279	.	1005	.	.	22494
Propachlor	.	.	.	.	.	.	37153	37153
Propyzamide	.	.	7	.	.	12099	.	12106
Quizalfop-ethyl	.	.	.	.	.	199	.	199
Simazine	.	.	.	.	115	.	.	115
TCA-sodium	.	.	.	.	.	1806	39892	41698
Tebutam	.	.	.	.	.	1402	2312	3714
Terbuthylazine	.	.	.	.	1656	.	.	1656
Terbutryn	1606	.	.	.	3864	.	.	5470
Thifensulfuron-methyl	24	632	296	.	.	.	.	952
Tri-allate	155	.	.	.	.	.	.	155
Trietazine	155	.	750	.	796	.	.	1701
Trifluralin	7654	1746	5255	98	.	1172	20258	36183
All herbicides	109225	497575	151622	47368	18698	60910	100300	985698
2-chloroethylsphonic acid	7518	10305	8203	104	.	.	.	26130
Chlormequat	44310	49665	93009	16131	491	5995	.	209601
Mepiquat chloride	11194	11998	10399	.	.	.	.	33591
All growth regulators	63022	71968	111611	16235	491	5995	.	269322
Di-1-p-menthene	.	.	.	.	23	45	.	68
All other chemicals	.	.	.	.	23	45	.	68

TABLE 55 Estimated area (sp. 1000ha) treated with the fifty most extensively used active ingredients including seed dressings, on all the arable crops surveyed.

1	Organo-mercury	409
2	Fenpropimorph	252
3	Tridemorph	238
4	MCPA	218
5	Metsulfuron-methyl	213
6	Mecoprop	202
7	Carbendazim	201
8	Chlormequat	199
9	Propiconazole	138
10	Triadimenol	118
11	Chlorothalonil	108
12	2-chloroethylphosphonic acid	93
13	Maneb	86
14	Prochloraz	83
15	Ioxynil	80
16	Fenpropidin	77
17	Bromoxynil	71
18	Mepiquat chloride	68
19	Flutriafol	65
20	Fuberidazole	55
21	Dichlorprop	52
22	Sulphur	45
23	Ethirimol	39
24	Thiabendazole	37
25	Clopyralid	36
26	Gamma-HCH	35
27	Trifluralin	35
28	Fluroxypyr	34
29	Chlorpyrifos	33
30	Methiocarb	32
31	Benazolin	31
32	2,4-DB	29
33	Glyphosate	27
34	Dicamba	27
35	Captan	27
36	Mancozeb	26
37	Linuron	25
38	Isoproturon	24
39	Metazachlor	23
40	Vinclozolin	18
41	Thifensulfuron-methyl	17
42	Iprodione	17
43	Pendimethalin	17
44	Cyanazine	16
45	Diquat	16
46	MCPB	15
47	Thiophanate-methyl	14
48	Propyzamide	14
49	Diflufenican	13
50	Bentazone	12

TABLE 56 Estimated amount (tonnes) of the fifty active ingredients including seed dressings used most by weight, on all the arable crops surveyed.

1	Mecoprop	310
2	Chlormequat	210
3	MCPA	185
4	Sulphur	170
5	Fenpropimorph	156
6	Tridemorph	100
7	Maneb	99
8	Dichlorprop	75
9	Chlorothalonil	74
10	Fenpropidin	49
11	TCA-sodium	42
12	Propachlor	37
13	Carbendazim	36
14	Trifluralin	36
15	Glyphosate	34
16	Mepiquat chloride	34
17	Mancozeb	31
18	2,4-DB	30
19	Prochloraz	28
20	Isoproturon	26
21	2-chloroethylphosphonic acid	26
22	Metazachlor	23
23	Pendimethalin	22
24	MCPB	21
25	Chlorpyrifos	19
26	Ethirimol	18
27	Propiconazole	17
28	Cyanazine	16
29	Ioxynil	15
30	Bromoxynil	14
31	Propyzamide	12
32	Bentazone	12
33	Vinclozolin	11
34	Triadimenol	10
35	Carbetamide	9
36	Iprodione	7
37	Benazolin	7
38	Thiophanate-methyl	7
39	Diquat	7
40	Captafol	7
41	Linuron	6
42	Methiocarb	6
43	Terbutryn	5
44	Chlorotoluron	5
45	2,4-D	5
46	Fluroxypyr	5
47	Flamprop-M-isopropyl	5
48	Zineb poly	5
49	Flutriafol	4
50	Benomyl	3