PESTICIDE USAGE IN SCOTLAND

SOFT FRUIT 1998

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SUMMARY

This report presents information from a survey of pesticide usage on soft fruit crops in Scotland, covering the 12 month period October 1997 to September 1998. Data were collected during visits to 56 holdings, representing 39% of the total area of soft fruit crops grown in Scotland. The data have been raised to give estimates of national pesticide usage.

The total area of soft fruit crops grown in Scotland during 1998 was 2,215 hectares, a slight reduction of 3% compared with the previous survey in 1994. There were reductions in the areas of raspberries and blackcurrants and increases in the areas of strawberries and 'other soft fruit' crops.

Overall usage of pesticides, as measured by spray area of formulations, increased by 20% compared with the last survey, with increases in all three major pesticide groups, insecticides, fungicides and herbicides.

The spray area of insecticide/acaricide formulations increased by 24%. Organophosphates remained the main insecticide/acaricide group, accounting for 55% of the total spray area of all formulations within this type, followed by pyrethroids, accounting for 21%. Fenitrothion, applied primarily to raspberries, remained the dominant insecticide, although its spray area declined compared with 1994.

There was a 16% increase in the total spray area of fungicide formulations. Dichlofluanid, for *Botrytis* control, remained by far the dominant fungicide, the spray area increasing compared with 1994.

The spray area of herbicide formulations increased by 23%. Paraquat, alone and in formulation with diquat, replaced simazine as the principal herbicide active ingredient, the spray area increasing by almost 70% compared with the last survey.

INTRODUCTION

This is the sixth survey of pesticide usage on soft fruit crops in Scotland, the previous surveys being in 1975, 1980, 1986, 1990 and 1994 (References 1, 2, 3, 4 and 5).

DEFINITIONS AND NOTES

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

Some treatments to soft fruit crops are restricted either to the plants themselves or to the ground between the plants. In this report, no attempt has been made to calculate the precise area of land treated; if a field or crop is treated, it is assumed that the entire field or crop has received pesticide. The only exception to this is where spot treatments have been carried out.

The term formulation refers to one or more active ingredients characterising a product.

When viewing the pesticide tables for the individual crops it should be borne in mind that some of the herbicides may not have been applied directly to the crop itself but as inter-row treatments or pre-planting clean up treatments.

Strawberries grown under protection (glasshouses, polytunnels etc.) were not included in the survey; these are included in the Protected Crops survey. However, strawberries grown under temporary tunnel structures (French or Spanish tunnels) were included in the survey.

The reasons presented in the tables for the uses of pesticides were those given by growers and may sometimes not reflect label recommendations.

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

Data from the 1994 survey are provided for comparison purposes in some of the tables, although it should be borne in mind that there may be minor differences in the range of crops surveyed, together with changes in areas of each of the crops grown.

METHOD

Using the June 1997 Agricultural Census (Reference 6) a sample was drawn representing the whole of Scotland and was selected from holdings growing any of the soft fruit crops.

The country was divided into 11 land-use regions as shown in Figure 1 (Reference 7). Holdings were stratified by land-use region and by size group (based on the total area of soft fruit crops grown on the holding). The number of holdings sampled in each size group was based on the total area of soft fruit crops grown in each size group. Sampling within size groups was based on numbers of soft fruit growers within the 11 land-use regions which were later amalgamated into four: North, which included the fruit growing areas bordering the Moray Firth; East Central, which included the main Scottish soft fruit growing areas; West Central; and South which included Lothian, Tweed Valley and the South-West. Slight adjustments were made to the numbers of holdings sampled in each of the size groups to improve the precision of the component of estimates from the smaller size groups. Corresponding reductions were made in the number of holdings sampled from the largest size group, which would otherwise have been almost totally enumerated.

The period of the survey covered pesticide applications to soft fruit crops in the 12 months from 1 October 1997 to 30 September 1998. As well as recording treatments to the actual crop itself, data were also collected on pre-planting treatments.

With a few exceptions, each grower was visited by a surveyor, following an introductory letter and telephone call. A small number of growers in remote areas had to be interviewed by telephone, again by prior arrangement. In all, information was obtained from 56 holdings. Details of the numbers of holdings visited and their distribution are shown in Table 2.

The total area of soft fruit crops surveyed within each region and size group is shown in Table 28. For all soft fruit crops, sample data were raised to give estimates of national pesticide usage using raising factors (Table 30). These were based on the areas growing soft fruit crops in the 1998 Agricultural Census (Reference 8) within regions and size groups (Table 29). Adjustments (Table 31) were made for each crop within each region by applying the raising factors to the sample area of each crop grown and comparing this with the area from the 1998 Agricultural Census. A second adjustment was made for crops where no holdings were sampled in one or more regions (Table 32).

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RASPBERRIES

The area of raspberries declined by 6% compared with the previous survey to 1,311 hectares. They accounted for almost 60% of the total area of soft fruit crops grown in Scotland in 1998. It was estimated that 91% of the raspberries were fruiting.

Insecticides and molluscicides (Tables 3 and 4)

The proportion of crop treated with insecticide was 85%, the same as that recorded in the previous survey. The main specified reasons for insecticide use were against raspberry beetle, raspberry cane midge and aphids.

As in the previous survey fenitrothion was the dominant insecticide, used on 70% of the crop, a similar percentage to that recorded in the last survey.

Also widely used were chlorpyrifos on 37% of the crop, mainly against raspberry cane midge, and pirimicarb for aphid control, applied to 18% of the crop.

A small proportion (2%) of the crop was treated with molluscicide, similar to that recorded in the previous survey.

Fungicides and soil sterilants (Tables 3 and 5)

Ninety-two percent of the crop was treated with fungicide, slightly more than the 87% recorded in the previous survey.

As in the previous survey dichlofluanid was by far the dominant fungicide. It was applied to 88% of the crop for the control of grey mould (*Botrytis cinerea*) and accounted for over half of the total spray area of fungicide formulations.

The mancozeb/oxadixyl formulation, used solely for the control of *Phytophthora* root rot, was applied to 43% of the crop, the same as that recorded in the previous survey.

Triadimefon was the main fungicide for mildew control, applied to 38% of the crop.

Also widely used were iprodione on 29% of the crop, carbendazim on 28% and chlorothalonil on 25%. Iprodione and chlorothalonil were used mainly against *Botrytis* while carbendazim was used primarily for cane disease.

The soil sterilant dazomet was used pre-planting on a small proportion (1%) of the crop, similar to that recorded in the previous survey.

Herbicides (Tables 3 and 6)

Nearly all (96%) of the raspberry crop received herbicide, the same as that recorded in the previous survey. Annual broad-leaved weed control was the main specified reason for herbicide use. Groundsel in particular was cited as a problem in many raspberry plantations.

The main herbicide active ingredient was paraquat for general weed control. It was applied in formulation with diquat to 54% of the crop and alone to 40% of the crop.

Simazine, the main herbicide in the previous survey, was still widely reported in the present survey on 42% of the crop.

There were substantial increases in the use of napropamide and sodium monochloroacetate compared with the previous survey. They were used on 35% of the crop and 31% respectively, the latter for sucker control.

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STRAWBERRIES

There was a sizable 14% increase in the area of strawberries compared with the last survey to 573 hectares. They accounted for 26% of the total area of soft fruit crops grown in Scotland in 1998. It was estimated that 96% of the strawberries were fruiting.

Insecticides/acaricides and molluscicides (Tables 3 and 7)

Sixty-five percent of the crop was treated with insecticide/acaricide, compared with 73% recorded in the previous survey.

The most widely used insecticide/acaricide was bifenthrin, used mainly against red spider mite. It was applied to 38% of the crop, a substantial increase on its use in the previous survey.

Chlorpyrifos, the principal insecticide/acaricide in the previous survey, was applied to 26% of the crop for the control of a range of pests.

There was a substantial increase in the proportion of crop treated with molluscicide from 19% in the previous survey to 58%. Thirty-four percent of the crop was treated with methiocarb and 26% with metaldehyde.

Fungicides and soil sterilants (Tables 3 and 8)

There was a reduction in the proportion of crop treated with fungicide from 98% in the previous survey to 85%. The main specified reasons for fungicide use were *Botrytis* and mildew.

As in the previous survey dichlofluanid was the most widely used fungicide, applied to 72% of the crop for *Botrytis* control.

Also widely used were myclobutanil and iprodione, on 68% of the crop and 65% respectively. Myclobutanil, which was not recorded in the previous survey, was applied primarily for mildew control and iprodione for *Botrytis* control.

Triadimefon, used on 69% of the crop in the last survey, mainly for mildew control, was not recorded at all in the present survey.

The soil sterilant methyl bromide was used pre-planting on a very small proportion (<0.5%) of the crop. A small area was treated in the previous survey.

Herbicides (Tables 3 and 9)

There was a slight reduction in the proportion of crop treated with herbicide from 93% recorded in the previous survey to 86%.

As in the previous survey simazine was the most widely used herbicide formulation. It was applied to 49% of the crop mainly for general weed control.

Paraquat was the main herbicide active ingredient. It was applied alone to 33% of the crop, mainly for runner control, and in formulation with diquat, also to 33%, for weed and runner control.

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BLACKCURRANTS

The area of blackcurrants declined by 21% compared with the previous survey to 261 hectares. They accounted for 12% of the total area of soft fruit crops grown in Scotland in 1998. It was estimated that 85% of the blackcurrants were fruiting.

Insecticides/acaricides and molluscicides (Tables 3 and 10)

Nearly all (99%) of the crop was treated with insecticide/acaricide, similar to that in the previous survey. The main specified reason for their use was against big bud mite.

The main insecticide/acaricide was fenpropathrin used on 87% of the crop, accounting for over half of the total spray area of all insecticide/acaricide formulations.

Endosulfan, the principal insecticide/acaricide in the last survey, applied to 99% of the crop, was used on 56% in the present survey, for the control of big bud mite.

Fenitrothion was the main insecticide/acaricide used against aphids and the blackcurrant leaf midge and was applied to 33% of the crop.

Metaldehyde was the only molluscicide recorded, used on 22% of the crop, a reduction compared with the last survey when it was used on 44%.

Fungicides (Tables 3 and 11)

As in the previous survey all the crop was treated with fungicide. The main specified reasons for fungicide use were for the control of *Botrytis*, mildew and leaf spot.

The principal fungicide formulation was sulphur, applied to nearly all (99%) of the crop, but its main use was for the control of big bud mite rather than disease control. Sulphur was not recorded in the last survey.

The main fungicides for disease control were myclobutanil on 89% of the crop and dichlofluanid and chlorothalonil both on 82% of the crop. Myclobutanil, which was not recorded in the previous survey, was used for leaf spot and mildew control. Both dichlofluanid and chlorothalonil were widely used in the last survey, the former was used for *Botrytis* control and the latter for a range of diseases.

Herbicides (Tables 3 and 12)

All the crop was treated with herbicide in the present survey, compared with 91% in the previous survey.

Simazine remained the principal herbicide, applied to 79% of the crop, similar to the percentage recorded in the previous survey.

Dichlobenil was the second most widely used herbicide, applied to 54% of the crop, a large increase compared with the previous survey when it was used on only 16% of the crop.

There was a large reduction in the use of the diquat/paraquat formulation compared with the last survey, its use falling from 44% of the crop treated to only 8%.

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OTHER SOFT FRUIT

The 'other soft fruit' crops consisted of gooseberries, redcurrants, whitecurrants, blueberries, tayberries and other hybrid berries, totalling 70 hectares, a 12% increase compared with the previous survey. The 'other soft fruit' crops accounted for only 3% of the total area of soft fruit crops grown in Scotland in 1998. All crops recorded in the survey were fruiting.

Insecticides/acaricides (Tables 3 and 13)

There was a large reduction in the proportion of crop treated with insecticide/acaricide down from 93% recorded in the previous survey to 46%.

Chlorpyrifos was the main insecticide/acaricide, applied to 27% of the crop compared with 12% in the previous survey.

Fenitrothion, which was the main insecticide/acaricide recorded in the previous survey was used on only 2% of the crop.

Pirimicarb, which was not recorded in the last survey, was applied to 16% of the crop for aphid control.

Fungicides (Tables 3 and 14)

Eighty percent of the crop was treated with fungicide compared with 90% in the previous survey.

The main fungicides were bupirimate, on 58% of the crop for mildew control, and dichlofluanid, on 53% for control of *Botrytis*. Dichlofluanid was the main fungicide recorded in the last survey.

Herbicides (Tables 3 and 15)

Eighty-two percent of the crop was treated with herbicide compared with the total area being treated in the previous survey.

Simazine remained the principal herbicide formulation applied to 57% of the crop.

Paraquat was the main herbicide active ingredient. It was applied in formulation with diquat to 31% of the crop and alone to 26%.

Isoxaben was also widely used on 36% of the crop, a rise from 15% recorded in the previous survey.

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COMPARISONS WITH PREVIOUS SURVEYS

The total area of soft fruit crops grown in Scotland during 1998 was 2,215 hectares, a slight reduction of 3% compared with the previous survey in 1994. There were reductions in the areas of raspberries and blackcurrants, by 6% and 21% respectively, and increases in the areas of strawberries and 'other soft fruit' crops, by 14% and 12% respectively.

Comparisons in the usage of pesticides in terms of spray hectares of formulations and weight applied between the current and previous surveys are presented in Table 27.

Overall usage of pesticides, as measured by spray area of formulations, increased by 20% compared with the last survey despite the slight reduction in the area of soft fruit crops grown. This increase continues the trend observed between 1990 and 1994. There was a 7% increase in the weight of pesticides applied compared with the last survey.

Insecticide/acaricide use, as measured by the spray area of formulations, increased by 24% compared with the previous survey, however, there was a 7% reduction in the weight of insecticides/acaricides applied. The reduction in weight applied is mainly due to the absence of any recorded use of the nematicide, 1,3-dichloropropene, which in 1994 was applied to only 7 hectares of strawberries, although at a very high rate.

Organophosphates remained the main insecticide/acaricide group, accounting for 55% of the total spray area of all insecticide/acaricide formulations, although their use had remained fairly static compared with 1994. Fenitrothion remained the dominant insecticide, applied primarily to raspberries, but its spray area had declined by 22% compared with the previous survey.

There was an increase in the use of pyrethroids, the second most used insecticide/acaricide group, now accounting for 21% of the total spray area of all insecticide/acaricide formulations. Part of this increase was due to increased usage of bifenthrin, applied mainly to strawberries for the control of red spider mite.

There was a substantial 81% increase in the area treated with molluscicides, and a 57% increase in weight applied, compared with 1994. This is perhaps a reflection of the very wet summer in 1998 with conditions being particularly favourable for slug activity.

There was a 16% increase in the total spray area of fungicide formulations compared with 1994 and a 9% increase in the weight applied. Dichlofluanid, for *Botrytis* control, remained by far the dominant fungicide formulation. Its spray area had increased by 17% compared with 1994. The second most widely used fungicide in 1998 was myclobutanil, which was not recorded in the previous survey. It was used mainly on strawberries for mildew control and on blackcurrants for mildew and leaf spot control.

Herbicide usage, as measured by the spray area of formulations, increased by 23% compared with 1994, while there was a 33% increase in the weight applied. Paraquat, alone and in formulation with diquat, was the principal herbicide active ingredient, its spray area increasing by almost 70% compared with 1994. The spray area of simazine, which was the main herbicide used on soft fruit crops in 1994, declined by 26%.

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Figure 1 Land-Use Regions of Scotland

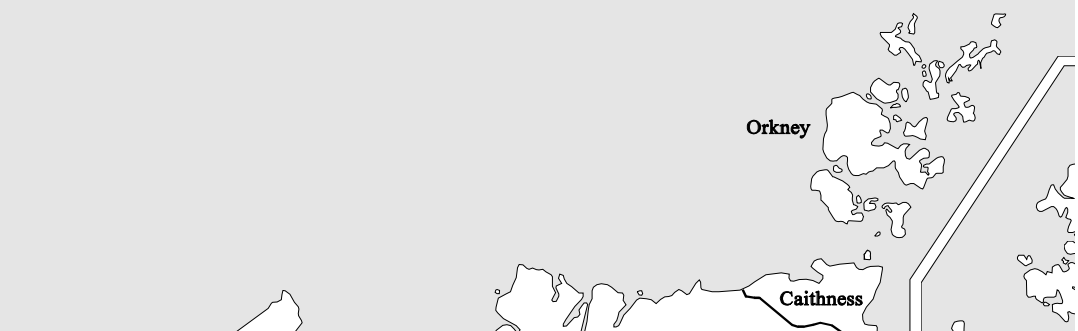

Figure 2 Soft fruit areas grown in 1998
Total area grown was 2,215 hectares

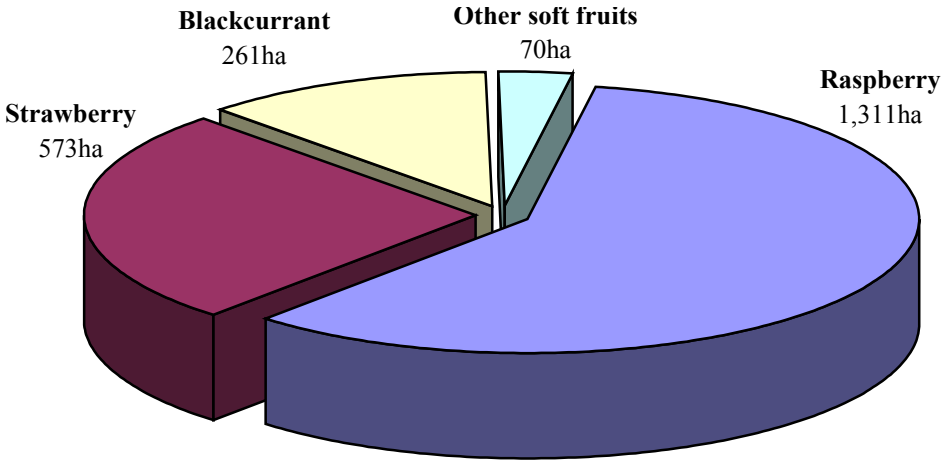

Figure 3 Percentages of soft fruit crops treated with pesticides

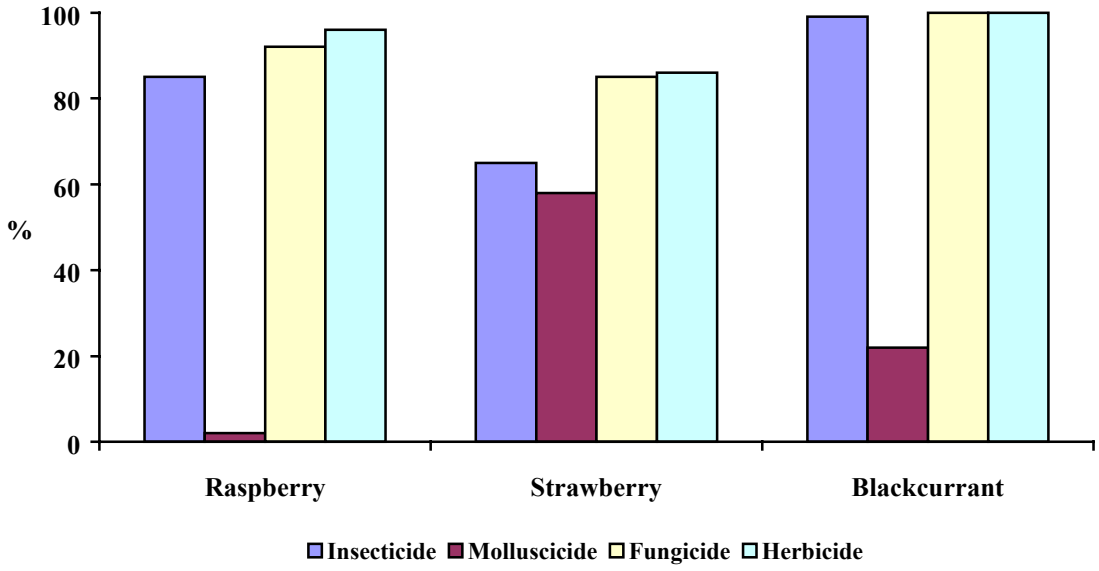

TABLE 1 Regional distribution of soft fruit crops in 1998 (hectares)

	North	East Central	West Central	South	Scotland 1998	Scotland 1994	% change
Raspberry	52	1,197	42	21	**1,311**	1,399	-6
Strawberry	62	443	42	26	**573**	503	14
Blackcurrant	4	254	1	1	**261**	330	-21
Other soft fruit	13	27	19	11	**70**	62	12
All soft fruits	130	1,921	104	60	**2,215**	2,293	-3

TABLE 2 Number of holdings surveyed in each region and size group*

Size group (ha)	North	East Central	West Central	South	Scotland
0.1-4.9	2	6		1	9
5.0-9.9	2	8	1	1	12
10.0-19.9		21	1		22
20+		13			13
All groups	4	48	2	2	56

'*' size group refers to area of soft fruit grown on holding

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TABLE 3 Proportion (%) of each soft fruit crop treated with pesticides

	Raspberry	*Strawberry*	*Blackcurrant*	*Other soft fruit*	*All soft fruit crops*
Insecticide/acaricide	85	65	99	46	80
Molluscicide	2	58	22		19
Fungicide	92	85	100	80	91
Soil sterilant	1	+			+
Herbicide	96	86	100	82	93
Any pesticide	98	92	100	82	96

'+' = <0.5%

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TABLE 4 Raspberry

Usage of insecticides and molluscicides, the reasons for their use (spray hectares of formulations) and the percentage of crop treated

Insecticides	***Raspberry beetle***	***Raspberry cane midge***	***Aphids***	***Aphids & raspberry cane midge***	***Raspberry moth***	***Clay coloured weevil***	***Earwigs***	***General pests***	***Slugs***	***Total spray area***	***% of crop treated***
Chlorpyrifos	114	388	18	32		30		106		**687**	37
Deltamethrin	9		4				28			**41**	3
Demeton-S-methyl			24							**24**	2
Dimethoate			25							**25**	2
Fenitrothion	619	283	126			31		342		**1,400**	70
Gamma-HCH		46								**46**	2
Malathion	88									**88**	7
Pirimicarb			358							**358**	18
Tar oils					104					**104**	8
All insecticides	**830**	**717**	**554**	**32**	**104**	**61**	**28**	**448**		**2,773**	**85**
Molluscicides											
Metaldehyde									22	**22**	2
All molluscicides									**22**	**22**	**2**
Area planted (ha)											1,311

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TABLE 5 Raspberry

Usage of fungicides and soil sterilants, the reasons for their use (spray hectares of formulations) and the percentage of crop treated

Fungicides	***Botrytis***	***Cane disease***	***Botrytis & cane disease***	***Phytoph-thora root rot***	***Mildew***	***Rust***	***Mildew & rust***	***No reason given***	***General diseases & nematodes***	***Total spray area***	***% of crop treated***
Bupirimate					8					**8**	1
Carbendazim	23	409	54							**486**	28
Chlorothalonil	491				54			96		**641**	25
Dichlofluanid	3,733	52	30					235		**4,050**	88
Fenarimol					306					**306**	14
Fenhexamid	6									**6**	+
Fenpropimorph					32	5				**37**	3
Iprodione	391							348		**739**	29
Mancozeb/oxadixyl				848						**848**	43
Myclobutanil					2	46				**49**	4
Thiram	70									**70**	2
Triadimefon					433	49	121	93		**696**	38
Unspecified fungicide	11									**11**	1
All fungicides	**4,723**	**462**	**84**	**848**	**835**	**101**	**121**	**773**		**7,946**	**92**
Soil sterilants											
Dazomet									8	**8**	1
All soil sterilants									**8**	**8**	**1**
Area planted (ha)											1,311

'+' = <0.5%

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TABLE 6 Raspberry

Usage of herbicides, the reasons for their use (spray hectares of formulations) and the percentage of crop treated

Herbicides	***Annual bl weeds***	***Groundsel***	***Annual bl & grass weeds***	***Annual grass weeds***	***Couch***	***Perennial bl weeds***	***Sucker control***	***Crop destruction***	***General weed control***	***Total spray area***	***% of crop treated***
2,4-D								7		**7**	1
Atrazine									77	**77**	6
Bromacil	50			27	176				37	**290**	22
Clopyralid						100				**100**	5
Dichlobenil						2				**2**	+
Diquat/paraquat	260	84	54	75					703	**1,177**	54
Glufosinate-ammonium		12								**12**	1
Glyphosate						6		2	+	**8**	1
Isoxaben	47	39							52	**139**	11
Napropamide	199	75							186	**460**	35
Oxadiazon	30									**30**	2
Paraquat	259	97	10		4	16			367	**752**	40
Pendimethalin	12	20							48	**80**	6
Propyzamide				27	23				87	**137**	10
Simazine	244	26	108						197	**575**	42
Sodium monochloroacetate							491		8	**499**	31
Triclopyr								7		**7**	1
Unspecified herbicide									11	**11**	1
All herbicides	**1,102**	**352**	**171**	**129**	**202**	**123**	**491**	**15**	**1,774**	**4,360**	**96**
Area planted (ha)											1,311

'+' = <0.5ha or <0.5%

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TABLE 7 Strawberry

Usage of insecticides, acaricides and molluscicides, the reasons for their use (spray hectares of formulations) and the percentage of crop treated

Insecticides/acaricides	***Red spider mite***	***Tarsonemid mite***	***Red spider mite & tarsonemid mite***	***Aphids & red spider mite***	***Aphids***	***Caterpillars***	***Vine weevil***	***No reason given***	***Slugs***	***Total spray area***	***% of crop treated***
Bifenthrin	217			34	4		48	50		**352**	38
Carbofuran							3			**3**	1
Chlorpyrifos	22			1	58	37	10	22		**150**	26
Clofentezine	45							7		**52**	9
Cypermethrin					20	25		63		**109**	19
Demeton-S-methyl	46				45					**91**	13
Dicofol								4		**4**	1
Dicofol/tetradifon		47	46							**93**	16
Endosulfan	3	94			11			5		**112**	18
Fenpropathrin				46						**46**	8
Heptenophos					7					**7**	1
Malathion					11					**11**	2
Pirimicarb					93					**93**	16
Tetradifon	63							4		**67**	12
All insecticides/acaricides	**396**	**140**	**46**	**80**	**251**	**62**	**61**	**154**		**1,190**	**65**
Molluscicides											
Metaldehyde									234	**234**	26
Methiocarb									253	**253**	34
All molluscicides									**486**	**486**	**58**
Area planted (ha)											573

TABLE 8 Strawberry

Usage of fungicides and soil sterilants, the reasons for their use (spray hectares of formulations) and the percentage of crop treated

Fungicides	***Botrytis***	***Mildew***	***Botrytis & mildew***	***Foliar feed & mildew***	***Red core***	***Disease precaution***	***No reason given***	***Verticillium wilt***	***Total spray area***	***% of crop treated***
Bupirimate		779				1	32		**812**	55
Chlorothalonil	228	47							**275**	34
Copper oxychloride/metalaxyl					156				**156**	11
Dichlofluanid	1,593						7		**1,599**	72
Fenarimol		228							**228**	18
Fenhexamid	7								**7**	+
Fenpropimorph		403	19						**423**	45
Fosetyl-aluminium					398				**398**	58
Iprodione	957						13		**970**	65
Myclobutanil		1,101			31		71		**1,203**	68
Pyrifenox	6	607					52		**666**	42
Pyrimethanil	492						49		**541**	57
Sulphur				136			8		**144**	8
Thiram	141								**141**	9
All fungicides	**3,424**	**3,166**	**19**	**136**	**585**	**1**	**231**		**7,562**	**85**
Soil sterilants										
Methyl bromide								2	**2**	+
All soil sterilants								**2**	**2**	+
Area planted (ha)										573

'+' = <0.5%

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TABLE 9 Strawberry

Usage of herbicides, the reasons for their use (spray hectares of formulations) and the percentage of crop treated

Herbicides	***Annual bl weeds***	***Groundsel***	***Annual bl & grass weeds***	***Grass weeds***	***Couch***	***Perennial bl weeds***	***Runner control***	***Plant destruction***	***General weed control***	***Total spray area***	***% of crop treated***
Asulam						+				+	+
Chlorthal-dimethyl	25								5	**30**	5
Clopyralid	2	4				15			8	**29**	5
Cycloxydim				10	4					**13**	2
Diquat/paraquat	18		53	5			60		111	**246**	33
Ethofumesate				5					13	**17**	3
Fluazifop-P-butyl				4	15					**19**	3
Fluroxypyr	+									+	+
Glyphosate					+			42	9	**50**	9
Isoxaben	69	11							6	**86**	12
Lenacil	42		50						11	**103**	14
Napropamide	45	3	42						39	**128**	19
Oxadiazon	15									**15**	3
Paraquat			13				127		47	**187**	33
Pendimethalin	29		32	4					43	**108**	19
Phenmedipham	124								18	**142**	14
Propachlor	53	14	52						11	**130**	20
Propaquizafop					18					**18**	3
Propyzamide			37	26	30				43	**136**	24
Simazine	27		101						205	**332**	49
Trifluralin									10	**10**	2
All herbicides	**447**	**31**	**379**	**53**	**67**	**16**	**187**	**42**	**579**	**1,801**	**86**
Area planted (ha)											573

'+' = <0.5ha or < 0.5%

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TABLE 10 Blackcurrant

Usage of insecticides, acaricides and molluscicides, the reasons for their use (spray hectares of formulations) and the percentage of crop treated

Insecticides/acaricides	***Big bud mite***	***Big bud mite & leaf curling midge***	***Big bud mite & red spider mite***	***Aphids***	***Aphids & leaf curling midge***	***Aphids, caterpillars & leaf curling midge***	***Leaf curling midge***	***No reason given***	***Slugs***	***Total spray area***	***% of crop treated***
Bifenthrin								1		**1**	+
Chlorpyrifos								1		**1**	1
Dimethoate					36					**36**	14
Endosulfan	231									**231**	56
Fenitrothion				53	53	13	20			**139**	33
Fenpropathrin	426	30	21							**477**	87
Pirimicarb				19						**19**	7
All insecticides/acaricides	**657**	**30**	**21**	**72**	**89**	**13**	**20**	**2**		**904**	**99**
Molluscicides											
Metaldehyde									57	**57**	22
All molluscicides									**57**	**57**	**22**
Area planted (ha)											261

'+' = <0.5%

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TABLE 11 Blackcurrant

Usage of fungicides, the reasons for their use (spray hectares of formulations) and the percentage of crop treated

Fungicides	***Botrytis***	***Botrytis & mildew***	***Mildew***	***Leaf spot & mildew***	***Leaf spot***	***Big bud mite & leaf spot***	***Big bud mite***	***No reason given***	***Total spray area***	***% of crop treated***
Bupirimate			98						**98**	37
Chlorothalonil	72	170			219			19	**480**	82
Copper oxychloride					10				**10**	4
Copper sulphate				36					**36**	14
Dichlofluanid	748								**748**	82
Fenarimol			9	29					**38**	14
Fenpropimorph			42						**42**	8
Iprodione	2								**2**	+
Mancozeb					10			1	**11**	4
Myclobutanil			149	354	36				**539**	89
Penconazole			460						**460**	63
Pyrifenox			1						**1**	+
Pyrimethanil	198							57	**255**	64
Sulphur						69	439		**508**	99
All fungicides	**1,020**	**170**	**759**	**419**	**275**	**69**	**439**	**76**	**3,227**	**100**
Area planted (ha)										261

'+' = <0.5%

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TABLE 12 Blackcurrant

Usage of herbicides, the reasons for their use (spray hectares of formulations) and the percentage of crop treated

Herbicides	***Annual bl weeds***	***Annual bl & grass weeds***	***Annual & perennial bl weeds***	***Annual bl weeds, nettles & thistles***	***Docks, thistles & willowherb***	***Willowherb***	***Couch, docks & thistles***	***Couch***	***General weed control***	***Total spray area***	***% of crop treated***
Dichlobenil			36		77				27	**140**	54
Diquat/paraquat					20				3	**23**	8
Diuron	36					34				**70**	27
Glufosinate-ammonium				7						**7**	3
Glyphosate					17		7	6	1	**31**	12
Isoxaben	1								58	**59**	22
Napropamide									1	**1**	+
Paraquat	42								2	**44**	17
Pendimethalin									1	**1**	+
Propyzamide								1		**1**	+
Simazine	43	67				20			77	**206**	79
All herbicides	**121**	**67**	**36**	**7**	**115**	**54**	**7**	**7**	**169**	**581**	**100**
Area planted (ha)											261

'+' = <0.5%

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TABLE 13 Other soft fruit

Usage of insecticides and acaricides, the reasons for their use (spray hectares of formulations) and the percentage of crop treated

Insecticides/acaricides	***Aphids***	***Spider mite***	***No reason given***	***Total spray area***	***% of crop treated***
Chlorpyrifos			19	**19**	27
Fenitrothion			2	**2**	2
Lambda-cyhalothrin		1		**1**	1
Pirimicarb	15			**15**	16
All insecticides/acaricides	**15**	**1**	**21**	**37**	**46**
Area planted (ha)					70

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TABLE 14 Other soft fruit

Usage of fungicides, the reasons for their use (spray hectares of formulations) and the percentage of crop treated

Fungicides	***Botrytis***	***Mildew***	***Foliar feed & mildew***	***Leaf spot & mildew***	***Leaf spot***	***No reason given***	***Total spray area***	***% of crop treated***
Bupirimate		51					**51**	58
Chlorothalonil					24		**24**	11
Dichlofluanid	101						**101**	53
Fenarimol		10					**10**	7
Fenpropimorph		10					**10**	7
Iprodione	7						**7**	7
Mancozeb						1	**1**	1
Myclobutanil		17		7			**23**	26
Penconazole		5					**5**	2
Pyrifenox		6					**6**	4
Sulphur			11				**11**	3
Triadimefon		1					**1**	1
All fungicides	**108**	**99**	**11**	**7**	**24**	**1**	**249**	**80**
Area planted (ha)								70

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TABLE 15 Other soft fruit

Usage of herbicides, the reasons for their use (spray hectares of formulations) and the percentage of crop treated

Herbicides	***Annual bl weeds***	***Groundsel***	***Groundsel & willowherb***	***Annual bl & grass weeds***	***Annual bl & perennial bl weeds***	***Couch***	***General weed control***	***Total spray area***	***% of crop treated***
Dichlobenil					7			**7**	10
Diquat/paraquat	10			2			17	**29**	31
Diuron							5	**5**	8
Fluroxypyr	+							**+**	+
Glyphosate							11	**11**	16
Isoxaben	21	3					1	**25**	36
Napropamide		8	1				1	**10**	14
Oxadiazon			3					**3**	5
Paraquat					7		13	**20**	26
Pendimethalin							1	**1**	1
Propyzamide						2		**2**	3
Simazine	10			12			20	**42**	57
All herbicides	**41**	**11**	**5**	**14**	**14**	**2**	**69**	**155**	**82**
Area planted (ha)									70

'+' = <0.5ha or <0.5%

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TABLE 16 All soft fruit crops

Usage of insecticides, acaricides and molluscicides (spray hectares of formulations)

Insecticides/acaricides	*Raspberry*	*Strawberry*	*Blackcurrant*	*Other soft fruit*	*Total spray area 1998*	*Spray area 1994*
Bifenthrin		352	1		**353**	28
Carbofuran		3			**3**	5
Chlorpyrifos	687	150	1	19	**858**	618
Clofentezine		52			**52**	16
Cypermethrin		109			**109**	11
Deltamethrin	41				**41**	174
Demeton-S-methyl	24	91			**115**	
Dicofol		4			**4**	
Dicofol/tetradifon		93			**93**	14
Dimethoate	25		36		**61**	64
Endosulfan		112	231		**344**	430
Fenitrothion	1,400		139	2	**1,542**	1,978
Fenpropathrin		46	477		**522**	400
Gamma-HCH	46				**46**	3
Heptenophos		7			**7**	
Lambda-cyhalothrin				1	**1**	
Malathion	88	11			**99**	9
Pirimicarb	358	93	19	15	**486**	100
Tar oils	104				**104**	51
Tetradifon		67			**67**	
All insecticides/acaricides	**2,773**	**1,190**	**904**	**37**	**4,904**	

Cont….

TABLE 16 All soft fruit crops (continued)

Usage of insecticides, acaricides and molluscicides (spray hectares of formulations)

	Raspberry	*Strawberry*	*Blackcurrant*	*Other soft fruit*	*Total spray area 1998*	*Spray area 1994*
Molluscicides						
Metaldehyde	22	234	57		**312**	178
Methiocarb		253			**253**	134
All molluscicides	**22**	**486**	**57**		**565**	

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TABLE 17 All soft fruit crops

Usage of fungicides and soil sterilants (spray hectares of formulations)

Fungicides	***Raspberry***	***Strawberry***	***Blackcurrant***	***Other soft fruit***	***Total spray area 1998***	***Spray area 1994***
Bupirimate	8	812	98	51	**969**	1,807
Carbendazim	486				**486**	278
Chlorothalonil	641	275	480	24	**1,419**	2,605
Copper oxychloride			10		**10**	94
Copper oxychloride/metalaxyl		156			**156**	6
Copper sulphate			36		**36**	
Dichlofluanid	4,050	1,599	748	101	**6,498**	5,556
Fenarimol	306	228	38	10	**582**	570
Fenhexamid	6	7			**12**	
Fenpropimorph	37	423	42	10	**512**	39
Fosetyl-aluminium		398			**398**	176
Iprodione	739	970	2	7	**1,718**	1,996
Mancozeb			11	1	**11**	282
Mancozeb/oxadixyl	848				**848**	864
Myclobutanil	49	1,203	539	23	**1,814**	
Penconazole			460	5	**465**	339
Pyrifenox		666	1	6	**673**	
Pyrimethanil		541	255		**796**	
Sulphur		144	508	11	**663**	215
Thiram	70	141			**211**	57
Triadimefon	696			1	**697**	841
Unspecified fungicide	11				**11**	
All fungicides	**7,946**	**7,562**	**3,227**	**249**	**18,984**	

Cont….

TABLE 17 All soft fruit crops (continued)

Usage of fungicides and soil sterilants (spray hectares of formulations)

	Raspberry	*Strawberry*	*Blackcurrant*	*Other soft fruit*	*Total spray area 1998*	*Spray area 1994*
Soil sterilants						
Dazomet	8				**8**	11
Methyl bromide		2			**2**	4
All soil sterilants	**8**	**2**			**10**	

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TABLE 18 All soft fruit crops

Usage of herbicides (spray hectares of formulations)

Herbicides	*Raspberry*	*Strawberry*	*Blackcurrant*	*Other soft fruit*	*Total spray area 1998*	*Spray area 1994*
2,4-D	7				**7**	
Asulam		+			+	
Atrazine	77				**77**	82
Bromacil	290				**290**	523
Chlorthal-dimethyl		30			**30**	21
Clopyralid	100	29			**129**	38
Cycloxydim		13			**13**	
Dichlobenil	2		140	7	**149**	66
Diquat/paraquat	1,177	246	23	29	**1,475**	722
Diuron			70	5	**75**	95
Ethofumesate		17			**17**	
Fluazifop-P-butyl		19			**19**	62
Fluroxypyr		+		+	+	
Glufosinate-ammonium	12		7		**18**	
Glyphosate	8	50	31	11	**101**	26
Isoxaben	139	86	59	25	**308**	614
Lenacil		103			**103**	144
Napropamide	460	128	1	10	**599**	326
Oxadiazon	30	15		3	**48**	

Cont….

TABLE 18 All soft fruit crops (continued)

Usage of herbicides (spray hectares of formulations)

Herbicides	***Raspberry***	***Strawberry***	***Blackcurrant***	***Other soft fruit***	***Total spray area 1998***	***Spray area 1994***
Paraquat	752	187	44	20	**1,003**	743
Pendimethalin	80	108	1	1	**189**	46
Phenmedipham		142			**142**	209
Propachlor		130			**130**	78
Propaquizafop		18			**18**	
Propyzamide	137	136	1	2	**275**	114
Simazine	575	332	206	42	**1,156**	1,573
Sodium monochloroacetate	499				**499**	72
Triclopyr	7				**7**	
Trifluralin		10			**10**	13
Unspecified herbicide	11				**11**	
All herbicides	**4,360**	**1,801**	**581**	**155**	**6,897**	

'+' = <0.5ha

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TABLE 19 All soft fruit crops

Usage of insecticides, acaricides and molluscicides (spray hectares of active ingredients)

Insecticides/acaricides	***Raspberry***	***Strawberry***	***Blackcurrant***	***Other soft fruit***	***Total spray area 1998***	***Spray area 1994***
Pyrethroids						
Bifenthrin		352	1		**353**	28
Cypermethrin		109			**109**	11
Deltamethrin	41				**41**	174
Fenpropathrin		46	477		**522**	400
Lambda-cyhalothrin				1	**1**	
Carbamates						
Carbofuran		3			**3**	5
Pirimicarb	358	93	19	15	**486**	100
Organophosphates						
Chlorpyrifos	687	150	1	19	**858**	618
Demeton-S-methyl	24	91			**115**	
Dimethoate	25		36		**61**	64
Fenitrothion	1,400		139	2	**1,542**	1,978
Heptenophos		7			**7**	
Malathion	88	11			**99**	9
Organochlorines						
Dicofol		96			**96**	14
Endosulfan		112	231		**344**	430
Gamma-HCH	46				**46**	3

Cont….

TABLE 19 All soft fruit crops (continued)

Usage of insecticides, acaricides and molluscicides (spray hectares of active ingredients)

Insecticides/acaricides	***Raspberry***	***Strawberry***	***Blackcurrant***	***Other soft fruit***	***Total spray area 1998***	***Spray area 1994***
Others						
Clofentezine		52			**52**	16
Tar oils	104				**104**	51
Tetradifon		160			**160**	14
All insecticides/acaricides	**2,773**	**1,283**	**904**	**37**	**4,997**	
Molluscicides						
Metaldehyde	22	234	57		**312**	178
Methiocarb		253			**253**	134
All molluscicides	**22**	**486**	**57**		**565**	

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TABLE 20 All soft fruit crops

Usage of fungicides and soil sterilants (spray hectares of active ingredients)

Fungicides	***Raspberry***	***Strawberry***	***Blackcurrant***	***Other soft fruit***	***Total spray area 1998***	***Spra area 1994***
Bupirimate	8	812	98	51	**969**	1,807
Carbendazim	486				**486**	278
Chlorothalonil	641	275	480	24	**1,419**	2,605
Copper oxychloride		156	10		**165**	100
Copper sulphate			36		**36**	
Dichlofluanid	4,050	1,599	748	101	**6,498**	5,556
Fenarimol	306	228	38	10	**582**	570
Fenhexamid	6	7			**12**	
Fenpropimorph	37	423	42	10	**512**	39
Fosetyl-aluminium		398			**398**	176
Iprodione	739	970	2	7	**1,718**	1,996
Mancozeb	848		11	1	**859**	1,146
Metalaxyl		156			**156**	6
Myclobutanil	49	1,203	539	23	**1,814**	
Oxadixyl	848				**848**	864
Penconazole			460	5	**465**	339
Pyrifenox		666	1	6	**673**	
Pyrimethanil		541	255		**796**	
Sulphur		144	508	11	**663**	215
Thiram	70	141			**211**	57
Triadimefon	696			1	**697**	841
Unspecified fungicide	11				**11**	
All fungicides	**8,794**	**7,718**	**3,227**	**249**	**19,988**	

Cont…

TABLE 20 All soft fruit crops (continued)

Usage of fungicides and soil sterilants (spray hectares of active ingredients)

	Raspberry	*Strawberry*	*Blackcurrant*	*Other soft fruit*	*Total spray area 1998*	*Spray area 1994*
Soil sterilants						
Dazomet	8				**8**	11
Methyl bromide		2			**2**	4
All soil sterilants	**8**	**2**			**10**	

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TABLE 21 All soft fruit crops

Usage of herbicides (spray hectares of active ingredients)

Herbicides	*Raspberry*	*Strawberry*	*Blackcurrant*	*Other soft fruit*	*Total spray area 1998*	*Spray area 1994*
2,4-D	7				**7**	5
Asulam		+			**+**	
Atrazine	77				**77**	82
Bromacil	290				**290**	523
Chlorthal-dimethyl		30			**30**	21
Clopyralid	100	29			**129**	38
Cycloxydim		13			**13**	
Dichlobenil	2		140	7	**149**	66
Diquat	1,177	246	23	29	**1,475**	730
Diuron			70	5	**75**	95
Ethofumesate		17			**17**	
Fluazifop-P-butyl		19			**19**	62
Fluroxypyr		+		+	**+**	
Glufosinate-ammonium	12		7		**18**	
Glyphosate	8	50	31	11	**101**	26
Isoxaben	139	86	59	25	**308**	614
Lenacil		103			**103**	144
Napropamide	460	128	1	10	**599**	326
Oxadiazon	30	15		3	**48**	

Cont….

TABLE 21 All soft fruit crops (continued)

Usage of herbicides (spray hectares of active ingredients)

Herbicides	***Raspberry***	***Strawberry***	***Blackcurrant***	***Other soft fruit***	***Total spray area 1998***	***Spray area 1994***
Paraquat	1,929	433	66	49	**2,477**	1,465
Pendimethalin	80	108	1	1	**189**	46
Phenmedipham		142			**142**	209
Propachlor		130			**130**	78
Propaquizafop		18			**18**	
Propyzamide	137	136	1	2	**275**	114
Simazine	575	332	206	42	**1,156**	1,573
Sodium monochloroacetate	499				**499**	72
Triclopyr	7				**7**	5
Trifluralin		10			**10**	13
Unspecified herbicide	11				**11**	
All herbicides	**5,537**	**2,047**	**604**	**184**	**8,372**	

'+' = <0.5ha

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TABLE 22 All soft fruit crops

Quantities (kg) of insecticides, acaricides and molluscicides used

Insecticides/acaricides	***Raspberry***	***Strawberry***	***Blackcurrant***	***Other soft fruit***	***Total kg 1998***	***Total kg 1994***
Pyrethroids						
Bifenthrin		12	+		**12**	1
Cypermethrin		3			**3**	+
Deltamethrin	+				**+**	2
Fenpropathrin		5	31		**35**	35
Lambda-cyhalothrin				+	**+**	
Carbamates						
Carbofuran		5			**5**	8
Pirimicarb	50	23	3	3	**78**	28
Organophosphates						
Chlorpyrifos	352	146	1	14	**512**	529
Demeton-S-methyl	5	29			**34**	
Dimethoate	8		6		**14**	18
Fenitrothion	698		76	1	**775**	1,034
Heptenophos		3			**3**	
Malathion	74	13			**86**	11
Organochlorines						
Dicofol		75			**75**	11
Endosulfan		58	143		**201**	191
Gamma-HCH	5				**5**	+

Cont….

TABLE 22 All soft fruit crops (continued)

Quantities (kg) of insecticides, acaricides and molluscicides used

Insecticides/acaricides	***Raspberry***	***Strawberry***	***Blackcurrant***	***Other soft fruit***	***Total kg 1998***	***Total kg 1994***
Others						
Clofentezine		5			**5**	3
Tar oils	3,159				**3,159**	2,022
Tetradifon		45			**45**	4
All insecticides/acaricides	**4,352**	**420**	**259**	**18**	**5,049**	
Molluscicides						
Metaldehyde	10	113	25		**148**	78
Methiocarb		49			**49**	47
All molluscicides	**10**	**161**	**25**		**196**	

'+' = <0.5kg

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TABLE 23 All soft fruit crops

Quantities (kg) of fungicides and soil sterilants used

Fungicides	***Raspberry***	***Strawberry***	***Blackcurrant***	***Other soft fruit***	***Total kg 1998***	***Total kg 1994***
Bupirimate	3	283	38	13	**337**	473
Carbendazim	244				**244**	121
Chlorothalonil	1,105	459	671	38	**2,274**	3,417
Copper oxychloride		149	21		**170**	129
Copper sulphate			6		**6**	
Dichlofluanid	5,267	2,042	544	134	**7,987**	7,825
Fenarimol	11	9	1	+	**21**	20
Fenhexamid	4	4			**9**	
Fenpropimorph	25	315	10	8	**357**	29
Fosetyl-aluminium		1,102			**1,102**	527
Iprodione	430	658	1	4	**1,093**	1,006
Mancozeb	2,729		14	+	**2,743**	4,466
Metalaxyl		64			**64**	4
Myclobutanil	3	71	39	2	**114**	
Oxadixyl	487				**487**	642
Penconazole			14	+	**14**	17
Pyrifenox		53	+	+	**53**	
Pyrimethanil		291	149		**439**	
Sulphur		138	2,720	17	**2,876**	86
Thiram	112	276			**388**	69
Triadimefon	31			+	**31**	39
All fungicides	**10,452**	**5,912**	**4,228**	**217**	**20,809**	

Cont….

TABLE 23 All soft fruit crops (continued)

Quantities (kg) of fungicides and soil sterilants used

	Raspberry	*Strawberry*	*Blackcurrant*	*Other soft fruit*	*Total kg 1998*	*Total kg 1994*
Soil sterilants						
Dazomet	2,903				**2,903**	3,300
Methyl bromide		869			**869**	1,328
All soil sterilants	**2,903**	**869**			**3,772**	

'+' = <0.5kg

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TABLE 24 All soft fruit crops

Quantities (kg) of herbicides used

Herbicides	*Raspberry*	*Strawberry*	*Blackcurrant*	*Other soft fruit*	*Total kg 1998*	*Total kg 1994*
2,4-D	13				**13**	3
Asulam		+			+	
Atrazine	107				**107**	144
Bromacil	182				**182**	638
Chlorthal-dimethyl		103			**103**	90
Clopyralid	20	4			**24**	6
Cycloxydim		6			**6**	
Dichlobenil	2		209	17	**228**	171
Diquat	187	75	1	5	**268**	128
Diuron			34	3	**38**	29
Ethofumesate		20			**20**	
Fluazifop-P-butyl		6			**6**	19
Fluroxypyr		+			+	
Glufosinate-ammonium	4		4		**8**	
Glyphosate	13	75	24	8	**120**	28
Isoxaben	23	14	7	6	**51**	68
Lenacil		132			**132**	181
Napropamide	934	185	2	16	**1,136**	655
Oxadiazon	16	15		1	**32**	

Cont….

TABLE 24 All soft fruit crops (continued)

Quantities (kg) of herbicides used

Herbicides	***Raspberry***	***Strawberry***	***Blackcurrant***	***Other soft fruit***	***Total kg 1998***	***Total kg 1994***
Paraquat	578	169	18	18	**783**	500
Pendimethalin	110	150	1	1	**263**	63
Phenmedipham		68			**68**	63
Propachlor		328			**328**	304
Propaquizafop		1			**1**	
Propyzamide	165	62	+	1	**228**	43
Simazine	531	248	252	44	**1,075**	2,124
Sodium monochloroacetate	2898				**2,898**	781
Triclopyr	3				**3**	1
Trifluralin		11			**11**	14
All herbicides	**5,786**	**1,672**	**553**	**122**	**8,132**	

'+' = <0.5kg

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TABLE 25 Principal active ingredients

Area (spray hectares) treated with the 20 most used active ingredients on all soft fruit crops

		1998	1994
1	Dichlofluanid	**6,498**	5,556
2	Paraquat	**2,477**	1,465
3	Myclobutanil	**1,814**	
4	Iprodione	**1,718**	1,996
5	Fenitrothion	**1,542**	1,978
6	Diquat	**1,475**	730
7	Chlorothalonil	**1,419**	2,605
8	Simazine	**1,156**	1,573
9	Bupirimate	**969**	1,807
10	Mancozeb	**859**	1,146
11	Chlorpyrifos	**858**	618
12	Oxadixyl	**848**	864
13	Pyrimethanil	**796**	
14	Triadimefon	**697**	841
15	Pyrifenox	**673**	
16	Sulphur	**663**	215
17	Napropamide	**599**	326
18	Fenarimol	**582**	570
19	Fenpropathrin	**522**	400
20	Fenpropimorph	**512**	39

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TABLE 26 Principal active ingredients

Quantity (kg) of the 20 most used active ingredients on all soft fruit crops

		1998	1994
1	Dichlofluanid	**7,987**	7,825
2	Tar oils	**3,159**	2,022
3	Dazomet	**2,903**	3,300
4	Sodium monochloroacetate	**2,898**	781
5	Sulphur	**2,876**	86
6	Mancozeb	**2,743**	4,466
7	Chlorothalonil	**2,274**	3,417
8	Napropamide	**1,136**	655
9	Fosetyl-aluminium	**1,102**	527
10	Iprodione	**1,093**	1,006
11	Simazine	**1,075**	2,124
12	Methyl bromide	**869**	1,328
13	Paraquat	**783**	500
14	Fenitrothion	**775**	1,034
15	Chlorpyrifos	**512**	529
16	Oxadixyl	**487**	642
17	Pyrimethanil	**439**	
18	Thiram	**388**	69
19	Fenpropimorph	**357**	29
20	Bupirimate	**337**	473

TABLE 27 All soft fruit crops

Comparisons of pesticide usage on soft fruit crops in 1990, 1994 & 1998, spray hectares of formulations and quantities (kg of active ingredients) used

	1990		*1994*		*1998*	
	sp ha of formulations	***kg***	***sp ha of formulations***	***kg***	***sp ha of formulations***	***kg***
Insecticides/acaricides						
Pyrethroids	53	3	614	39	1,026	50
Organophosphates	3,174	1,717	2,686	1,599	2,682	1,424
Organochlorines	770	626	432	202	394	281
Carbamates	144	260	123	55	489	83
Others	138	2,707	88	3,547	316	3,209
All insecticides/acaricides	**4,279**	**5,313**	**3,943**	**5,442**	**4,904**	**5,049**
Molluscicides	**190**	**41**	**312**	**125**	**565**	**196**
Fungicides	**12,197**	**18,932**	**16,316**	**19,173**	**18,984**	**20,809**
Herbicides	**7,657**	**5,846**	**5,619**	**6,093**	**6,897**	**8,132**
Soil sterilants	**4**	**1,650**	**15**	**4,628**	**10**	**3,772**
Biological controls			**14**	+		
All pesticides	**24,327**	**31,782**	**26,219**	**35,461**	**31,360**	**37,958**
Area of all soft fruit crops (ha)	**3,281**		**2,293**		**2,215**	

'+' = <0.5 kg

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TABLE 28 Sampled areas

Areas (ha) of soft fruit crops grown in sample

Size group (ha)	North	East Central	West Central	South	Scotland
0.1-4.9	1	13		1	15
5.0-9.9	16	65	10	6	97
10.0-19.9		275	11		286
20+		455			455
All sizes	**17**	**808**	**21**	**7**	**853**

TABLE 29 Census areas

Areas (ha) of soft fruit crops grown in Scotland

Size group (ha)	North	East Central	West Central	South	Scotland
0.1-4.9	80	172	42	30	323
5.0-9.9	39	287	39	15	381
10.0-19.9	11	635	22	15	683
20+		827			827
All sizes	**130**	**1,921**	**104**	**60**	**2,215**

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TABLE 30 Raising factors

Size group (ha)	North	East Central	West Central	South
0.1-4.9	147.78	13.12		26.82
5.0-9.9	2.45	4.43	3.97	2.50
10.0-19.9		2.31	2.09	
20+		1.82		

TABLE 31 First adjustment factors

Crop	North	East Central	West Central	South
Raspberry	1.57	1.09	1.45	1.73
Strawberry	0.75	0.96	1.53	0.84
Blackcurrant		0.75	0.40	1.87
Other soft fruit	4.26	1.57	7.88	15.09

TABLE 32 Second adjustment factors

Crop	
Raspberry	1.00
Strawberry	1.00
Blackcurrant	1.02
Other soft fruit	1.00

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