

Part 4. Section B

Insecticides, Herbicides, Fungicides, Other Pesticides, and Other Chemicals

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PART 4

SECTION B. INSECTICIDES, HERBICIDES, FUNGICIDES, OTHER PESTICIDES, AND OTHER CHEMICALS

Information is presented in this section of part 4 on the number of acres treated with and the cost of insecticides, herbicides, fungicides, other pesticides, and other chemicals; and the cost for the control of insects on livestock and poultry for class 1-5 farms.

Other Published Data

In addition to the information for the use of insecticides, herbicides, fungicides, other pesticides, and other chemicals published in this section, data for 1969 have been published in volume I and in other chapters of volume II. The location of the data are shown below.

Definitions and Explanations

The 1969 Census of Agriculture report form for class 1-5 farms contained seven inquiries relating to acres and cost of treatment for crops and pasture treated with insecticides, herbicides, fungicides, other pesticides, and other chemicals.

A facsimile of the inquiries (section 33 of form 69-A1) is shown on page 174.

In addition to the instructions on the report form, the leaflet guide which accompanied the report form contained the following instructions. (See facsimile on page 174.)

The farm operator was also instructed to report the cost of the chemical for all applications of the chemical, regardless of who paid for the chemical.

It should be noted that, for many farm operators, the accurate reporting of acres treated and chemical costs presented a difficult problem. The most common problem was the unavailability of accurate data from farm records.

Some farmers do not keep separate cost records for the various groups of crops or uses. In cases of custom applications, many farmers are not able to separate chemical costs from application costs. For others, the use of dual-purpose chemicals presented a problem. Some farm operators growing crops under contract may not have been aware of chemicals used and applied by the

Table 1. Other Published Data for Agricultural Chemicals

<u>Where found</u>	<u>Geographical area for which available</u>	<u>Period</u>	<u>Classification</u>	<u>Subjects covered</u>
Volume I				
<u>State tables:</u>				
<u>All farms</u>				
5.....	State.....	1969.....	Total farms.....	Farms, acres, agricultural chemicals and expenditures.
9.....	State.....	1969.....	Selected class group.....	Farms reporting the use of agricultural chemicals.
14.....	State.....	1969 to 1959.....		
<u>Class 1-5 farms</u>				
14.....	State.....	1969 to 1959.....	Total farms.....	Farms reporting the use of agricultural chemicals.
24.....	State.....	1969.....	Tenure of operator and type of organization...	Farms reporting the use of agricultural chemicals.
25.....	State.....	1969.....	Age of operator.....	Farms reporting the use of agricultural chemicals.
26.....	State.....	1969.....	Farms by size.....	Farms reporting the use of agricultural chemicals.
27.....	State.....	1969.....	Farms by value of sales class.....	Farms reporting the use of agricultural chemicals.
28.....	State.....	1969.....	Farms by type.....	Farms reporting the use of agricultural chemicals.
29.....	State.....	1969.....	Farms by type and value of sales class.....	Farms reporting the use of agricultural chemicals.
30.....	State.....	1969.....	Large-scale farms by type.....	Farms reporting the use of agricultural chemicals.
<u>County tables:</u>				
<u>All farms</u>				
5.....	County and State.....	1969 to 1964.....	Total farms.....	Farms reporting the use of agricultural chemicals.
<u>Class 1-5 farms</u>				
14.....	County and State.....	1969 to 1964.....	Production expenses.....	Farms reporting the use of agricultural chemicals.
19.....	County and State.....	1969.....	Agricultural chemicals used.....	Farms reporting the use of agricultural chemicals.
Volume II				
Chapter 3.....	United States.....	1969.....	Farms by tenure and type of organization.....	Farms reporting acres on which used and expenditures for agricultural chemicals.
Chapter 7.....	United States.....	1969.....	Farms by value of sales class.....	Farms reporting acres on which used and expenditures for agricultural chemicals.
Chapter 8.....	United States.....	1969.....	Farms by type.....	Farms reporting acres on which used and expenditures for agricultural chemicals.

Table 2. Land Treated With Insecticides, Herbicides, Fungicides, and Other Chemicals: 1969 and 1964

	For control of—									
	Weeds and grass in crops			Weeds and brush in pasture				Insects and diseases in crops		
	Farms reporting 1969	Acres		Farms reporting	Acres		Acres		1969	1964
	1969	1964	1969	1964	1969	1964	1969	1964	1969	1964
United States, total	644,984	84,913,547	59,629,354	78,056	64,238	4,967,459	3,166,802	46,149,827	37,633,100	
Economic class of farm										
Class 1.....	119,352	35,882,810	16,776,607	14,428	7,041	2,128,571	934,071	25,881,506	16,305,313	
Class 2.....	177,400	25,101,981	16,120,120	18,942	13,506	1,073,624	695,250	10,688,255	8,591,946	
Class 3.....	169,272	15,581,572	16,224,157	18,460	20,572	858,912	713,177	5,841,549	7,228,421	
Class 4.....	108,933	6,026,957	8,172,522	14,248	14,378	540,032	499,950	2,470,825	3,889,194	
Class 5.....	70,027	2,320,227	2,335,948	11,978	8,741	366,320	324,354	1,267,692	1,618,226	
Type of farm										
Cash-grain.....	206,892	41,130,278	28,095,629	12,088	10,652	508,441	335,354	15,503,069	10,444,073	
Tobacco.....	14,565	433,014	396,200	1,307	764	15,256	11,364	711,156	759,583	
Cotton.....	20,447	4,510,401	3,805,238	705	1,402	57,479	131,100	3,624,426	7,171,551	
Other field crop....	17,111	2,861,013	1,988,640	645	711	44,121	28,951	2,651,785	2,103,389	
Vegetable.....	8,142	1,212,588	570,966	163	138	10,145	5,391	1,962,715	1,558,846	
Fruit and nut.....	12,784	823,223	520,669	358	438	13,036	19,144	3,986,477	2,861,690	
Poultry.....	8,274	580,252	552,174	1,667	1,714	62,111	51,450	229,342	237,892	
Dairy.....	108,158	6,270,806	5,363,344	10,232	11,687	308,346	294,817	2,257,408	2,020,625	
Livestock other than poultry and dairy..	189,655	20,151,549	12,970,680	37,558	24,851	1,910,096	1,054,836	10,149,780	6,053,740	
Livestock ranches...	3,485	332,285	261,273	6,825	4,276	1,726,934	957,818	276,112	312,288	
General.....	50,832	6,409,905	5,031,641	5,819	7,149	282,862	249,443	4,486,805	3,927,144	
Miscellaneous.....	4,649	198,233	72,900	689	456	28,632	27,134	310,752	182,279	

crops indicate that a high percentage of the cotton, Irish potatoes, sugarbeets, and vegetable crops are treated for weed and grass control.

Data by class of farm indicate that the large, more productive farms accounted for more than a proportional share of the acreage treated in 1969 and of the increase since 1964. The increasing use of pre-emergent chemicals and the relatively low cost per acre are important factors.

The acres of pastureland treated for the control of weeds and brush accounted for 44 percent of the acres of cropland pasture and improved pasture in 1969. The acres of pastureland treated increased by 56 percent from 1964 to 1969. Most of the treated acreage in 1964 and 1969 was on livestock farms and livestock ranches which indicates that most of this acreage treated was improved pasture.

The 46.1 million acres treated for the control of insects and diseases accounted for about 18 percent of the cropland harvested in 1969. The acres treated increased by about 22 percent from 1964 to 1969. Cash-grain farms and livestock farms account for about 56 percent of the total acres treated for control of insects and diseases. This is an indication that corn for grain may be the crop most often treated. Crops which would be expected to have the highest percentage of the acres treated are cotton, Irish potatoes, sorghums, peanuts, fruits, nuts, and vegetables.

Land Treated With Chemicals in 1969

Data presented in table 3 provide information about the use of chemicals by economic class of farm and type of farm for 1969. Additional data on acreage treated, by class of farm, can be

Table 3. Land Treated With Insecticides, Herbicides, Other Pesticides, and Other Chemicals: 1969

	For control of—											
	Insects on hay crops			Insects on all other crops			Nematodes in crops			Weeds and grass in crops		
	Farms reporting	Acres	Dollars	Farms reporting	Acres	Dollars	Farms reporting	Acres	Dollars	Farms reporting	Acres	Dollars
United States, total	49,911	2,180,223	8,627,706	403,484	39,881,566	296,971,125	34,059	1,267,101	17,334,850	644,984	84,913,547	345,683,739
By economic class												
Class 1.....	11,851	1,078,934	4,879,465	88,205	22,252,692	197,436,523	6,966	686,194	10,963,047	119,352	35,882,810	179,538,389
Class 2.....	14,562	532,064	1,841,783	96,087	9,449,164	49,365,777	7,494	281,093	2,948,910	177,400	25,101,981	87,205,961
Class 3.....	10,809	314,924	1,034,749	89,405	5,061,171	27,702,515	8,504	174,994	1,885,472	169,272	15,581,572	48,815,736
Class 4.....	7,471	164,344	550,043	72,832	2,091,688	13,892,534	7,074	88,218	1,075,836	108,933	6,026,957	20,761,179
Class 5.....	5,218	89,957	321,666	56,955	1,026,851	8,573,776	4,021	36,602	461,585	70,027	2,320,227	9,362,474
By type of farm												
Cash-grain.....	5,018	159,045	610,591	90,309	14,581,323	48,504,346	2,539	247,706	1,471,301	206,892	41,130,278	139,909,249
Tobacco.....	1,007	10,799	56,238	51,062	682,905	9,476,480	15,095	159,591	2,616,797	14,565	433,014	2,591,556
Cotton.....	578	39,544	223,177	20,136	3,478,983	38,720,954	977	91,444	845,838	20,447	4,510,401	27,980,710
Field-crop.....	797	42,424	218,516	15,896	2,149,586	23,656,292	2,387	162,949	3,250,973	17,111	2,861,013	22,211,842
Vegetable.....	339	27,843	208,250	11,198	1,562,087	35,325,557	1,526	120,353	2,467,471	8,142	1,212,588	11,031,321
Fruit and nut.....	408	12,591	100,147	29,841	2,391,593	59,078,707	2,207	56,321	1,818,918	12,784	823,223	8,036,943
Poultry.....	685	14,269	49,181	4,539	197,488	1,603,161	526	8,376	110,736	8,274	580,252	2,651,706
Dairy.....	17,140	602,249	2,147,543	34,578	1,569,020	6,840,666	806	36,084	259,441	108,158	6,270,806	25,398,232
Livestock other than poultry and dairy..	15,176	583,407	1,900,405	100,313	9,238,754	32,420,205	3,260	175,682	1,321,626	189,655	20,151,549	73,610,484
Livestock ranches...	1,609	121,979	304,288	1,257	131,654	789,289	57	2,837	23,767	3,485	332,285	853,191
General.....	6,885	556,653	2,756,732	37,389	3,674,517	35,740,047	3,709	186,008	2,231,378	50,832	6,409,905	29,251,632
Miscellaneous.....	269	9,420	52,638	6,966	223,656	4,815,421	970	19,750	916,604	4,649	198,233	2,186,873

Class 1-5 Farms Table N. Land Treated With Insecticides, Herbicides, Other Pesticides, and Other Chemicals: 1969—Continued

	For control of—											
	Weeds and brush in pasture			Diseases in crops and orchards			Defoliation, growth of crops, or thinning of fruit			Insects on livestock and poultry		
	Farms reporting	Acres	Dollars	Farms reporting	Acres	Dollars	Farms reporting	Acres	Dollars	Farms reporting	Dollars	
United States, total	78,056	4,967,459	9,678,717	45,669	4,088,038	54,803,096	68,788	5,780,991	23,095,545	352,047	26,428,158	
By economic class of farm												
Class 1.....	14,428	2,128,571	4,229,081	11,465	2,549,880	37,958,365	14,502	3,172,873 ¹	13,549,332	70,968	13,472,174	
Class 2.....	18,942	1,073,624	2,050,240	9,128	707,027	7,211,843	14,046	1,124,023	4,097,184	92,099	6,006,470	
Class 3.....	18,460	858,912	1,617,823	9,434	465,454	4,662,287	15,255	804,887	2,854,472	82,931	3,645,153	
Class 4.....	14,248	540,032	1,000,244	8,227	214,793	2,785,988	13,787	432,292	1,648,339	59,118	1,991,002	
Class 5.....	11,978	366,320	781,329	7,415	150,884	2,184,613	11,198	246,916	946,218	46,831	1,313,359	
By type of farm												
Cash-grain.....	12,088	508,441	1,059,911	4,460	762,701	2,287,077	11,062	1,226,863	3,891,023	36,965	1,622,195	
Tobacco.....	1,307	15,256	59,057	1,222	17,452	188,984	10,839	112,307	1,513,483	9,834	337,274	
Cotton.....	705	57,479	161,870	627	105,699	482,468	12,687	2,124,391	6,862,634	2,684	149,496	
Other field-crop	645	44,121	293,708	3,486	459,775	4,217,823	3,706	389,378	1,789,290	2,766	169,943	
Vegetable.....	163	10,145	51,690	3,482	372,785	7,642,824	647	62,937	441,455	816	52,326	
Fruit and nut.....	358	13,036	36,262	18,721	1,582,293	33,193,169	3,981	174,008	1,808,007	1,233	79,788	
Poultry.....	1,667	62,111	126,627	640	17,585	244,875	720	28,860	125,034	13,126	2,723,776	
Dairy.....	10,232	308,346	693,389	2,240	86,139	608,432	3,810	117,860	536,684	88,057	5,345,332	
Livestock other than poultry and dairy...	37,558	1,910,096	3,609,174	4,653	327,619	1,602,533	9,911	453,708	1,745,587	147,173	11,596,284	
Livestock ranchers...	6,825	1,726,934	2,928,978	328	22,479	230,129	326	20,764	78,150	20,475	2,825,200	
General.....	5,819	282,862	576,587	3,547	255,635	2,294,324	10,522	1,059,612	4,175,745	25,841	1,345,825	
Miscellaneous.....	689	28,632	81,464	2,263	77,676	1,810,458	577	10,303	128,453	3,077	180,719	

found in chapter 7, and by type of farm in chapter 8 of this volume.

Insects on Hay Crops

The 2.2 million acres of hay crops treated for the control of insects represented 5 percent of the hay crops harvested in 1969. Over 50 percent of the acres treated were on dairy and livestock farms. The cost of the chemicals used to treat the hay crops was about \$4 per acre. Alfalfa is the most commonly treated of the hay crops.

Insects on All Other Crops

The 39.9 million acres treated for the control of insects on all other crops except hay crops was about 15 percent of the other cropland harvested in 1969. The cost of the chemicals used to treat these acres was about \$7.5 per acre. By type of farm, over 50 percent of the acres treated were included on cash-grain farms and livestock farms. Corn is probably the most significant crop treated on cash-grain farms. The data indicate that tobacco, cotton, Irish potatoes, and vegetables may be treated to a large extent.

Nematodes in Crops

The 1.3 million acres treated for the control of nematodes in crops represented less than 0.5 percent of the cropland harvested. However, the cost of the chemicals to control nematodes, at about \$14 per acre, was the highest of any chemical treatment. Data by type of farm indicate that tobacco, Irish potatoes, sugar beets, and vegetables were some of the crops most commonly treated for nematode control.

Diseases in Crops and Orchards

About 1.6 percent of the cropland harvested or about 4.1 million acres was treated for the control of diseases in crops and orchards. The cost of the chemicals to treat these crops at about \$13.5 per acre, was the second highest of any of the chemical treatments. When these data are shown by type of farm, there is some indication that a large proportion of the disease-control chemicals are applied to fruit and nut trees and to a lesser extent to Irish potatoes and sugar beets.

Defoliation, Growth Control of Crops, or Thinning of Fruit

The 5.8 million acres treated with chemicals for defoliation, or growth control of crops, or thinning of crops was about 2.2 percent of the harvested cropland. The cost of the chemicals to treat the crops was about \$4 per acre in 1969. Data by type of farm indicate that most of the acres treated were cotton and to some extent corn and other grain crops.

Expenditures for Insecticides, Herbicides, Other Pesticides, and Other Chemicals

The \$345.7 million of expenditures for the control of weeds and grass in crops was about 44 percent of the total expenditures for agricultural chemicals other than fertilizer and lime used in class 1-5 farms. The \$297.0 million of expenditures for the control of insects on all other crops except hay crops represented 38 percent of the total expenditures for such chemicals.

Table 4 gives the amount expended per acre for each of the seven groups of crops and pasture by type of farm for the United States.

Table 4. Average Cost of Insecticides, Herbicides, Other Pesticides, and Other Chemicals Per Acre of Land Treated: 1969

	Average costs per acre (dollars) for control of—						
	Insects on hay crops	Insects on all other crops	Nematodes in crops	Diseases in crops and orchards	Weeds and grass in crops	Weeds and brush in pasture	Defoliation growth of crops, or thinning of fruit
Total.....	3.98	7.45	13.68	13.41	4.07	1.95	4.00
Cash-grain.....	3.84	3.33	5.94	3.00	3.40	2.08	3.17
Tobacco.....	5.21	13.88	16.40	10.83	5.98	3.87	13.48
Cotton.....	5.64	11.13	9.25	4.56	6.20	2.82	3.23
Field crop.....	5.15	11.01	19.95	9.17	7.76	6.66	4.60
Vegetable.....	7.48	22.61	20.50	20.50	9.10	5.10	7.01
Fruit and nut.....	7.95	24.70	32.30	20.98	9.76	2.78	10.39
Poultry.....	3.45	8.12	13.22	13.93	4.52	2.04	4.33
Dairy.....	3.57	4.36	7.19	7.06	4.05	2.25	4.55
Livestock other than poultry and dairy.....	3.26	3.51	7.52	4.89	3.65	1.89	3.85
Livestock ranches.....	2.50	6.00	8.38	10.24	2.57	1.70	3.76
General.....	4.95	9.73	12.00	8.97	4.56	2.04	3.94
Miscellaneous.....	5.59	21.53	46.41	23.31	11.03	2.85	12.47

The average costs of treatment vary significantly from one type of farm to another and among the various kinds of treatments. These figures are intended to represent only the annual average cost of the chemicals per acre. They do not represent the per-acre cost of an application of a particular chemical. For many crops, one application may have been all that was

necessary; for others, a large number of applications were necessary. The number of applications during the year and the cost of the particular chemical used are the two most important factors in establishing the annual average cost per acre since the cost of application was supposed to have been excluded and reported in machine hire and customwork or in "all other production expenses."

Chemicals for the Control of Insects on Livestock and Poultry

The 352 thousand farms reporting the use of these chemicals equaled 36 percent of the farms reporting the value of livestock and poultry sold. These farms reported a total of \$26.4 million in expenditures for the control of insects on livestock and poultry, or about \$75 per farm in 1969. The \$26.4 million in expenditures for the control of insects on livestock and poultry is less than 1 percent of the value of livestock and poultry sold. The data by type of farm show that about three-fourths of the expenditures were on dairy farms, livestock farms, and livestock ranches. These data indicate that most of the cost of livestock and poultry treated for insect control was for dairy and beef cattle.