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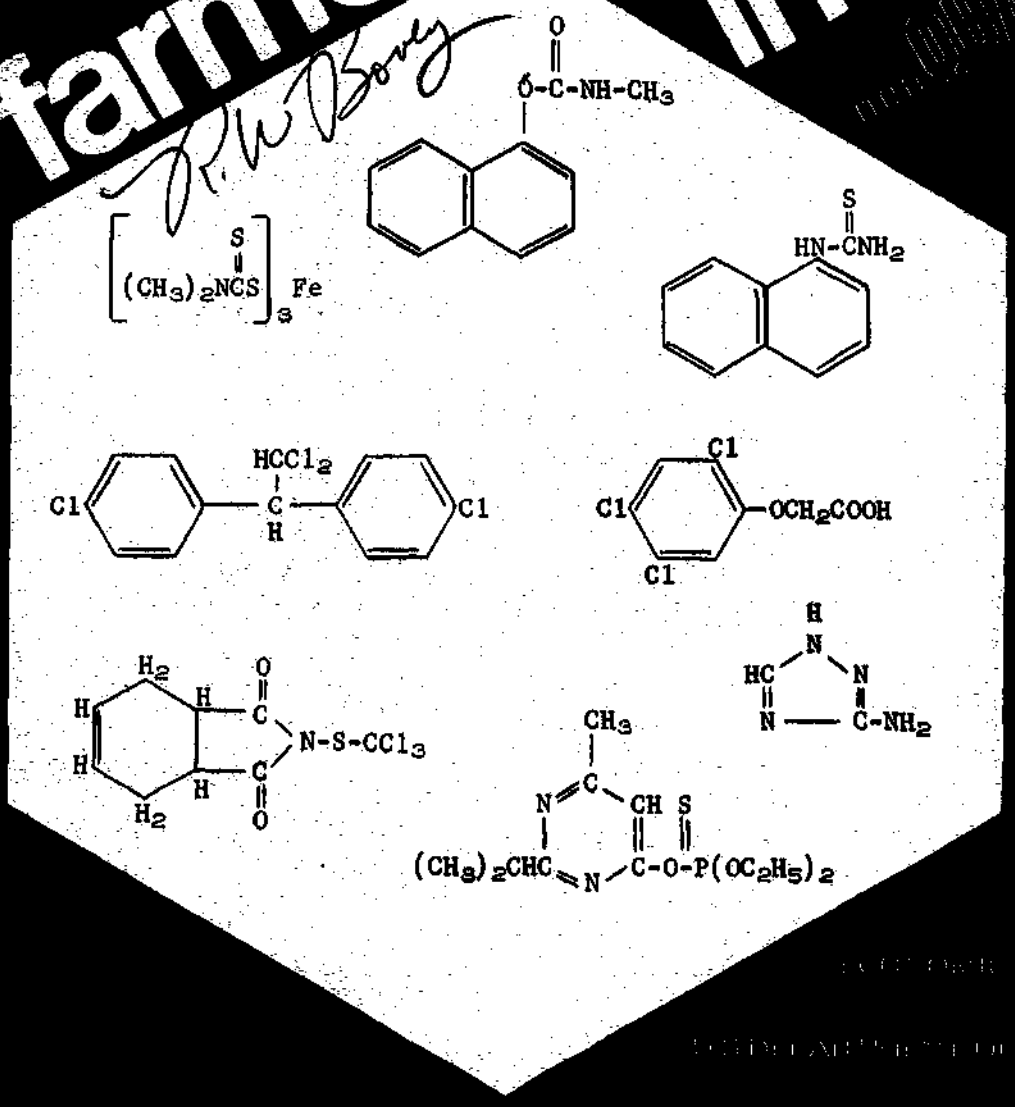
farmers' use of pesticides in 1971



ABSTRACT

Farmers used 494 million pounds of pesticides in 1971 (exclusive of sulfur and petroleum)—a 40-percent increase over 1966. Crops accounted for close to 94 percent of the use of these pesticides. Herbicides, the major farm pesticide products, accounted for 228 million pounds, twice the amount in 1966. Almost all of the herbicides were used on crops, and 45 percent of these on corn. Farmers used about 170 million pounds of insecticides in 1971, up 14 percent over 1966. Cotton was the major recipient of insecticide products, accounting for over 47 percent of those used on crops. Farm use of fungicides amounted to almost 42 million pounds, and miscellaneous pesticides accounted for over 54 million pounds.

Information is presented on leading products such as methyl parathion, toxaphene, and 2,4-D. Approximately 96 pesticides (individual products or groups of products) are included in the study, which is based on a survey of about 8,600 farmers throughout the United States (excluding Alaska). Survey data were expanded to represent regional and U.S. pesticide usage for selected crops, livestock, and other purposes.

Keywords: Pesticides, Insecticides, Herbicides, Fungicides, Farming methods, Crops, Livestock.

PREFACE

In 1964, Congress authorized an expanded research program on the use of pesticides in agriculture. One phase of this program was a periodic farm survey to obtain information on the use of pesticides in different areas and on different crops and classes of livestock. These data were to provide a basis for estimating the costs and benefits of pesticides and to serve as a measure of changes in pesticide use.

To meet this need for information, the Economic Research Service obtained in early 1972 its third measure of the extent of pesticide use by farmers. The information on pesticide use was obtained as a part of the Statistical Reporting Services' 1971 Farm Production Expenditure Survey.

The Standards and Research Division of the Statistical Reporting Service (SRS) designed the nationwide sample from which farmers were selected for interview. The Data Collection Branch of SRS assisted in developing the final format of the pesticide use sections in the Farm Production Expenditure Survey questionnaire. The Data Collection Branch supervised collection of the data through their State offices. This is one of several reports to be published on farm use of pesticides in 1971.

Special acknowledgement is made to my colleagues, Herman Delvo, Theodore Eichers, and Helen Blake, of the Inputs and Finance Program Area, National Economic Analysis Division, who assisted in making a quality check on the data. Special acknowledgement is also made to Larry Otto and Douglas Westenhaver of the ADP Group, Commodity Economics Division, who developed and operated the data processing system that tabulated the data.

We are also indebted to the thousands of farmers who provided the data collected in the 1971 Farm Production Expenditure Survey. Without their interest and cooperation, this publication would not have been possible.

Use of company names in this publication is for identification only and does not imply endorsement by the U.S. Department of Agriculture.

Washington, D.C. 20250 July 1974

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Farmers used 494 million pounds of pesticides in 1971 (exclusive of sulphur and petroleum), accounting for over 59 percent of all pesticides used in the United States in that year. Farm pesticides, including sulphur and petroleum, were valued at over $1 billion in 1971.

Farm pesticide use in 1971 was 40-percent over 1966. Use of herbicides, the major pesticide products, doubled to reach 228 million pounds. Fungicide use was also up, totaling almost 42 million pounds, and insecticide use, at 170 million pounds, was up 14 percent. Use of miscellaneous pesticides, at over 54 million pounds, was up only slightly from 1966.

Crops accounted for close to 94 percent (excluding sulphur and petroleum) of all pesticides used by farmers in 1971. Cotton was the major recipient of insecticide products, accounting for over 47 percent of those used on crops. Herbicides, as used to control weeds in corn fields, accounted for about 44 percent of all herbicides used on crops.

Farmers in the Southeast and Delta States used more than 45 percent of all insecticides applied to growing crops on U.S. farms in 1971. The Corn Belt accounted for a third of all herbicides used by farmers.

In 1971, atrazine, the leading herbicide used by farmers, accounted for a fourth of all herbicides used by farmers. Its use more than doubled since 1966. Other herbicides which increased substantially in use are propachlor, alachlor, amiben, and trifluralin. These herbicides accounted for another 25 percent of herbicide use.

In 1971, atrazine, the leading herbicide used by farmers, accounted for a fourth of all herbicides used by farmers. Its use more than doubled since 1966. Other herbicides which increased substantially in use are propachlor, alachlor, amiben, and trifluralin. These herbicides accounted for another 25 percent of herbicide use. Another important herbicide, 2,4-D, dropped from 35 percent to 15 percent of total herbicide use.

The leading insecticides—toxaphene, methyl parathion, and carbaryl—accounted for 24, 18, and 11 percent, respectively, of all insecticides (excluding sulphur and petroleum) used by farmers in 1971. These three products accounted for almost half the quantity of insecticides. Insecticide ingredients showed some shifts in usage from 1966 to 1971. Use of organochlorines decreased, and use of organophosphorus and carbamate products increased.

Approximately 96 pesticides—insecticides, herbicides, fungicides, miticides, rodenticides, fumigants, growth regulators, defoliants, and desiccants—are included in the study, which is based on a survey of 8,600 farmers throughout the United States (excluding Alaska). Survey data were expanded to represent regional and U.S. pesticide usage for selected crops, livestock, and other purposes.

Farmers' Use of Pesticides in 1971 -- Quantities

By

Paul A. Andrilenas
Agricultural Economist, National Economic Analysis Division

INTRODUCTION

Pesticide use has led to more economic and efficient agricultural production. Insecticides and fungicides have helped to control many pests that damage crops and livestock, while herbicide use, by killing undesirable plants, has freed workers for other jobs. However, questions still arise on the productivity of pesticides, the effects of substituting pesticides for other resources, and the possibility of environmental contamination.

In an attempt to supply policymakers, researchers, farmers, extension workers, and industry with the data necessary to grapple with these questions, this report presents: (1) information on quantities of pesticides used by farmers and the number of acres of crops treated with pesticides in 1971; [1] (2) data comparable to that reported for 1966; [2] and (3) an indication of change from 1966 to 1971 for the most widely used pesticides.

[1] Ingredients are reported as 100-percent active materials. They are quantities used during the entire year, except for those applied through various Federal, State, and local programs at no direct expense to the farmer.

[2] Eichers, Theodore; Andrilenas, Paul; Blake, Helen; Jenkins, Robert; and Fox, Austin. Quantities of Pesticides used by Farmers in 1966, U.S. Dept. Agr., Econ. Res. Serv., Agr. Econ. Rpt. No. 179, April 1970.

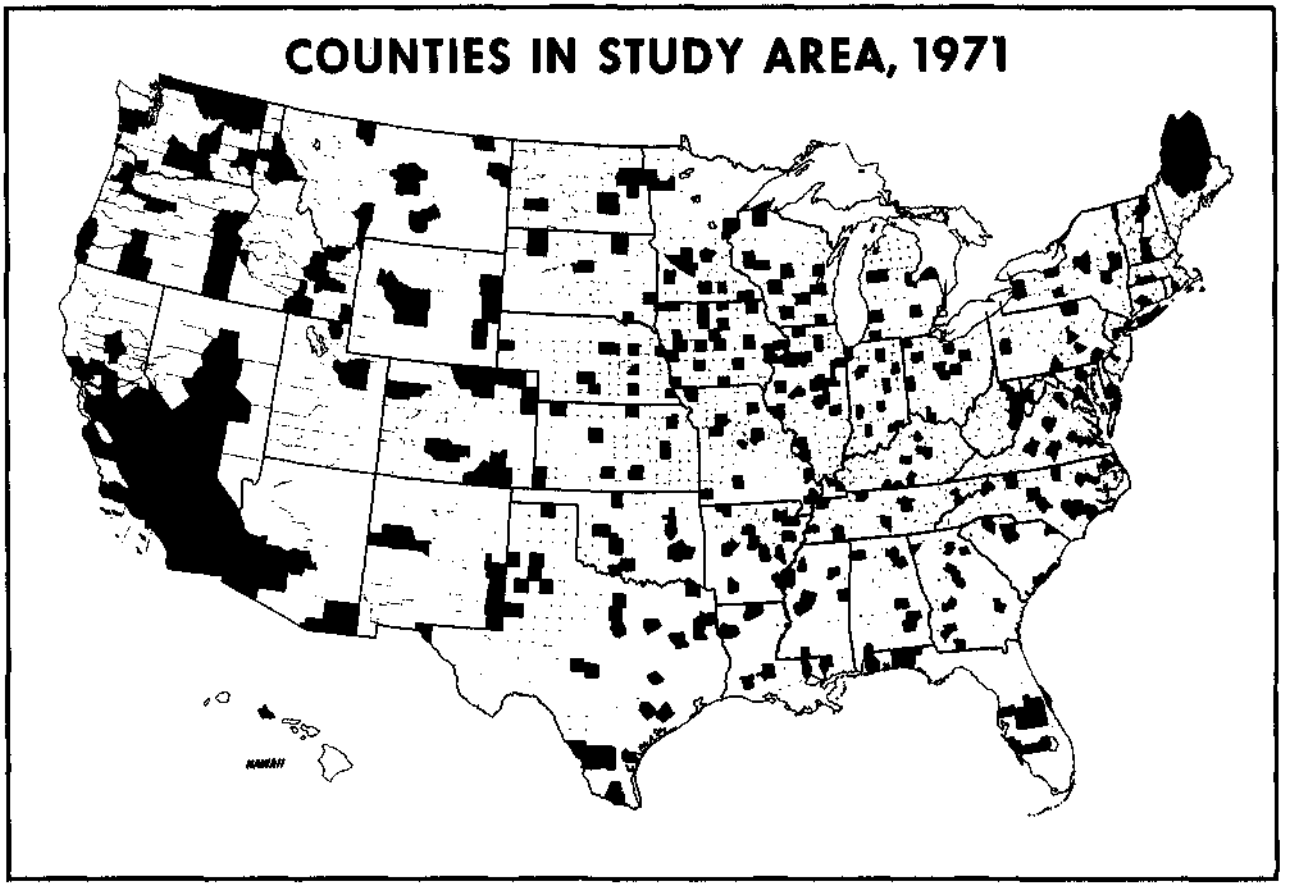

Figure 1

METHODOLOGY

This study was based on personal interviews with 8,600 farmers in 394 counties throughout the 48 contiguous States and Hawaii (fig. 1). The information on pesticide use was gathered as part of a nationwide survey of farmers' production expenditures for 1971. The interviews provided detailed information on costs of certain groups of pesticides and quantities of specific pesticide materials used to treat growing crops, stored crops, seeds, livestock, and storage or livestock buildings.

Selection of farmers for interview was based on a two-stage multiple frame sample designed to represent all United States farms. The first stage of sampling consisted of selecting counties or groups of counties to form the primary sampling units. The second stage of sampling was selecting farms within each primary sampling unit.

All data were expanded by an expansion factor unique to each primary sampling unit. Pesticide use data for crops were then adjusted by an adjustment factor that reflected the ratio of the number of acres of each crop grown in an ERS production region (fig. 2) to the number of expanded sample acres of each crop grown on sample farms. For example, all pesticide data related to the 22 million expanded acres of wheat reported grown by farmers sampled in the Northern Plains were adjusted to represent the 23.9 million acres of wheat grown by all farmers in the Northern Plains in 1971. Each of 22 classes of crops had an adjustment factor for each of 10 ERS production regions.

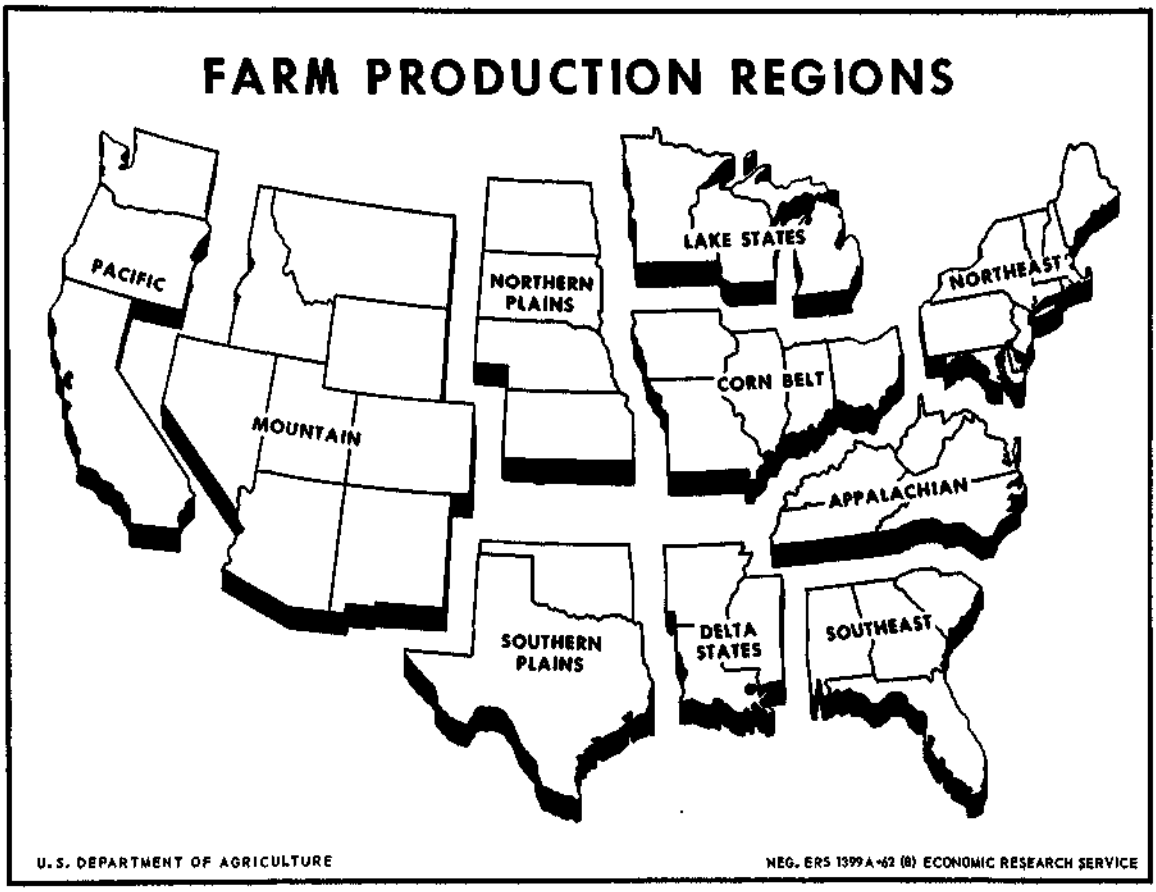

Figure 2

The livestock data were expanded only by the expansion factor related to the primary sampling unit. The nature of the data did not permit the additional adjustment made for pesticides used on crops.

Data for pesticides used for seed, stored crops, and other purposes were expanded by appropriate primary sampling unit expansion factors and adjusted through use of composites of crop ratios in each region.

Regional totals were added to obtain U.S. totals for each of 22 classes of crops, five classes of livestock, and five classes of other farm uses. The individual crops discussed in this report and the crops included in the group categories are shown in appendix 1.

Pesticides discussed in this report do not include disinfectants or any kind of livestock medicine taken internally. (Systemic insecticides are included, however.) Pesticides are grouped into the following categories of chemicals: (1) Fungicides (used to control diseases by killing or inhibiting fungi), (2) herbicides (used to kill plants or inhibit their growth), and (3) insecticides (used to kill or inhibit insects). Additionally, fumigants (used to inhibit or kill organisms in stored crops or soil), defoliants and desiccants (used as harvesting aids), growth regulators (used to influence plant growth), and miticides (used to kill mites) are briefly discussed.

Each pesticide is classified by what is considered its major use. For example, chlorates and borates are classified as defoliants or desiccants, although these ingredients can be used as herbicides. Pentachlorophenol is classified as a fungicide, though it can be used as an insecticide, herbicide, defoliant, or preservative. Fumigants, which can be used as insecticides, nematocides, or soil sterilants, are grouped in a single category.

INTERPRETING THE DATA

Statistical reliability of the data is directly related to the quantity of pesticides used, the number of acres treated, and the importance of the crop in a region. For example, data for corn in the Corn Belt is more reliable than that for apples in the Delta region, due to the respective importance of the crops to the area. (Also, the relative distribution of pesticides among crops and regions is more reliable than absolute quantities for individual crops and regions.

This report presents the relative importance of specific pesticides or groups of pesticides in terms of quantity used. It should be recognized that their importance based on value, frequently shown elsewhere, may be quite different. Prices range from a few cents a pound for a simple inorganic pesticide such as sulfur to several dollars a pound for some of the complex organic pesticides.

Differences between data for 1966 and 1971 do not necessarily indicate trends. Because of variations in weather, pest infestations, and crop acreages, and also the nature of the samples used, appreciable differences could appear between the 2 years without necessarily indicating basic changes in patterns of pesticide use.

Information about acreages treated with pesticides must be interpreted carefully. The following should be considered:

(1) Amount of land area treated with a single ingredient is overstated when different commercial pesticides with the same ingredients are applied on the same acreage in separate treatments. For example, number of acres treated with toxaphene will be overstated if more than one commercial product containing toxaphene has been used on the same acreage during the same season. For crops normally receiving only single treatments of herbicides, the overstatement is slight. However, for cotton, fruits, or vegetables receiving multiple treatments, overstatements of the amount of land area are greater since these crops could be treated during a season with several different commercial pesticides that contain the same ingredient.

(2) The number of acres treated with different ingredients in a group or class of pesticide products should not be added together since two or more of these ingredients may have been used separately or together on the same acre. For example, 1 acre of cotton treated with two organochlorines—toxaphene and DDT—would be counted twice, once for each organochlorine. Primarily because these acreages have been treated with more than one ingredient in a group, they cannot be added to estimate the total land area treated with herbicides, insecticides, and so forth.

(3) Because a pesticide is often applied more than once on the same acreage, number of acres cannot be related to quantities of pesticides to determine the rate per acre for a single application. Such a comparison would represent the total quantity used per acre during the season rather than that for a single application.

TYPES AND USE OF PESTICIDES ON FARMS

In 1971, about 833 million pounds of pesticides (not including sulfur or petroleum) were used in the United States. Farmers used about 494 million pounds of these pesticides to control fungi, weeds, insects, mites, nematodes, and rodents, and to aid in harvesting and regulating growth. The remainder of the pesticides was used by Government, industry, and homeowners. Farmers used about 27 percent of the fungicides, about 63 percent of the herbicides, and over half of the insecticides (table 1).[3]

Farm use of pesticides other than sulfur and

[3] Summary tables appear in the body of the report. Detailed tables on quantities of individual ingredients used and acres treated with specific ingredients by crops and regions are shown in app. 2.

Table 1—Use of selected pesticides (active ingredients) and percentage used by farmers, 1971

Type of pesticide	Total use[1]	Percentage used by farmers
	Million pounds	*Percent*
Fungicides[2]	155	27
Herbicides[3]	359	63
Insecticides:[4]		
Aldrin-toxaphene[5]	86	58
Methyl parathion	31	92
Other organophosphorus	55	79
Other insecticides[6]	147	31
Total insecticides	319	53
Total pesticides	833	59

[1] Based on Pesticide Review 1972, U.S. Dept. Agr., Agr. Stabilization and Conserv. Serv. Estimates calculated by subtracting exports from production and adding imports to production. For pesticide formulations other than DDT, assumed exports average 50 percent of active ingredient.

[2] Does not include sulfur.

[3] Includes plant hormones, defoliants, and desiccants. Does not include petroleum.

[4] Includes fumigants, rodenticides, and miticides. Does not include petroleum.

[5] Includes only aldrin, chlordane, dieldrin, endrin, heptachlor, Strobane, and toxaphene.

[6] Includes inorganic insecticides and other organic insecticides not included in methyl parathion, aldrin-toxaphene group, and other organophosphorus insecticides.

petroleum went up about 40 percent between 1966 and 1971 (table 2). Use of fungicides in 1971 were up 25 percent from 1966, and insecticide use increased 14 percent. Herbicide use doubled during this period to account for almost half of all pesticides used on farms in 1971, compared with only a third in 1966. Use of miscellaneous pesticides– including miticides, fumigants, defoliants and desiccants, rodenticides, growth regulators, and repellents—was about the same as in 1966.

Growing Crops

In 1971, about 94 percent of the farm use of pesticides, exclusive of sulfur and petroleum, was on crops—466 million of the 494 million pounds. Crop use accounted for 95 percent of the fungicides, almost all of the herbicides, 91 percent of the insecticides, and 85 percent of other pesticides used by farmers.

Fungicides

Quantities of fungicides used by farmers (excluding sulfur) increased from about 33 million pounds in 1966 to almost 42 million pounds in 1971. Use of inorganic fungicides and sulfur increased from 1966 (table 3), but use of organic fungicides remained about the same.

Sulfur, still the most widely used fungicide product, accounted for close to three times as many pounds as all other fungicides combined in 1971. It was used on about a third of the acres treated with fungicides. Well over half of the sulfur was used in the production of fruits and nuts. Peanut and cotton production accounted for another 37 percent of total crop use.

Farm use of inorganic fungicides, primarily copper and zinc compounds, increased from about 7.5 million pounds in 1966 to 16 million pounds in 1971. The increased use reflected an increase in acres treated with inorganic fungicides and a different method of measuring percentage of active ingredients in copper and zinc compounds. In 1966, pounds of active ingre-

Table 2—Quantities of selected pesticides (active ingredients) used by farmers, 1966 and 1971[1]

Type of pesticide[2]	1966 total	1971			
		Total	Crops[3]	Livestock[4]	Other[5]
		1,000 pounds			
Fungicides (excluding sulphur):					
Inorganic[6]	7,567	15,987	15,857	98	32
Organic	25,637	25,740	23,698	416	1,626
Total	33,204	41,727	39,555	514	1,658
Herbicides:[7]					
Inorganic	4,907	1,820	1,665	—	155
Organic	110,423	226,086	223,995	—	2,091
Total	115,330	227,906	225,660	—	2,246
Insecticides:[6]					
Inorganic	5,784	3,232	3,042	189	1
Synthetic organic	142,936	166,325	151,145	14,451	729
Other organics	204	213	69	144	—
Total	148,924	169,770	154,256	14,784	730
Miscellaneous pesticides:					
Miticides	2,132	2,021	2,021	—	—
Fumigants	36,750	28,958	20,959	136	7,863
Defoliants and desiccants	6,114	17,718	17,718	—	—
Rodenticides[7]	38	15	10	4	1
Growth regulators	3,291	5,551	5,551	—	—
Repellents	7,458	443	13	429	1
Total	55,783	54,706	46,272	569	7,865
Total pesticides (not including sulfur or petroleum)	353,241	494,109	465,743	15,867	12,499
Sulfur	57,101	112,453	112,093	358	2
Petroleum[8]	92,160	221,528	203,474	13,126	4,928
Total pesticides	502,502	828,090	781,310	29,351	17,429

— = none reported.

[1] Does not include Alaska.

[2] All technical pesticide materials classified by anticipated major use. Each ingredient, except sodium chlorate, included in only one category. Sodium chlorate is included under herbicides and miscellaneous pesticides—defoliants and dessicants.

[3] Includes all crops, pasture,rangeland, and land in summer fallow.

[4] Includes livestock buildings.

[5] Includes pesticides for all other noncrop and nonlivestock uses.

[6] Not including petroleum.

[7] Includes all uses.

[8] Used primarily in insecticidal and herbicidal preparations.

dients in these compounds were measured in terms of metallic equivalents. In 1971, they were measured in terms of quantity of the metallic salts in the compound. Therefore, the percentage and pounds of active ingredients were greater in 1971 than they were for similar copper or zinc compounds used by farmers in 1966.[4]

Mercury compounds have been gradually declining in use as seed treatments. In fact, regis-

[4] It is not possible to convert quantities of copper and zinc compounds reported in 1966 to 1971 equivalents. The proportion contributed to total 1966 use by each copper or zinc compound is unknown. However, the total quantity used in 1966 is probably close to 1971 usage when changes in acres treated are considered.

Table 3—Quantities of selected fungicides (active ingredients) used by farmers on crops and livestock and for other purposes, 1966 and 1971[1]

Type of fungicide[2]	1966 total	1971			
		Total	Crops[3]	Livestock[4]	Other[5]
		1,000 pounds			
Inorganic fungicides (not including sulphur):					
Copper sulfates	1,704	7,717	7,714	1	2
Other coppers	4,546	2,191	2,173	13	5
Mercury compounds	137	42	17	—	25
Other inorganics	1,180	6,037	5,953	84	—
Total	7,567	15,987	15,857	98	32
Organic fungicides:					
Dithiocarbamates:					
Maneb	4,443	3,878	3,747	—	131
Zineb	6,903	1,969	1,967	—	2
Ferbam	2,945	1,398	784	—	614
Others	855	5,797	5,434	3	360
Total	15,146	13,042	11,932	3	1,107
Phthalimides:					
Captan	6,869	6,490	6,013	—	477
Others	605	998	998	—	—
Total	7,474	7,488	7,011	—	477
Dinocap, Dodine, Quinones	1,143	1,191	1,181	—	10
Phenols	329	165	156	8	1
Other organics	1,545	3,854	3,418	405	31
Total organics	25,637	25,740	23,698	416	1,626
Total fungicides (not including sulfur)	33,204	41,727	39,555	514	1,658
Sulfur	57,101	112,453	112,093	358	2
Total fungicides	90,305	154,180	151,648	872	1,660

— = none reported.
[1] Does not include Alaska.
[2] May include quantities used for purposes other than as fungicides.
[3] Includes all crops, pasture, rangeland, and land in summer fallow.
[4] Includes livestock buildings.
[5] Includes pesticides for all other noncrop and nonlivestock uses.

tration of many of these compounds for seed treatment has been suspended or canceled. Mercury use in 1971 was only a third of its use in 1966.

Dithiocarbamates accounted for about half of the organic fungicides used by farmers in 1971. Maneb, zineb, and ferbam accounted for over half of the dithiocarbamates used on crops. Dithiocarbamate use was most extensive on apples, Irish potatoes, and other vegetables. Quantities used on citrus and apples increased, while quantities used on field crops and other fruits and nuts declined between 1966 and 1971.

Captan was the most important organic fungicide used in crop production outside of the dithiocarbamate group. In 1971, it accounted for 6 million pounds, or about a fourth of all organic fungicides. Captan used on apples and other deciduous fruits accounted for about 80 percent of total captan use.

Fungicides continued to be used mostly on fruit and vegetable crops. In 1971, the largest volume (excluding sulfur) was used in citrus production—9.3 million pounds, or 24 percent of the total (table 4). Substantial amounts were used on apples, other deciduous fruits, and vegetables other than potatoes. Crop use patterns for

Table 4—Farm use of fungicides, by crop, 1966 and 1971 [1]

Crop	1966		1971	
	Pounds of active ingredients[2]	Percentage of farm fungicides used	Pounds of active ingredients[2]	Percentage of farm fungicides used
	Million pounds	*Percent*	*Million pounds*	*Percent*
Citrus	4.1	13	9.3	24
Apples	8.5	28	7.2	18
Other vegetables[3]	4.1	13	5.7	14
Peanuts	1.1	4	4.4	11
Irish potatoes	3.5	12	4.1	10
Other deciduous fruit[4]	1.8	6	3.8	10
Other fruits and nuts[5]	2.5	8	3.1	8
Other field crops[6]	4.5	15	1.7	4
Cotton	.4	1	.3	1
All crops	30.5	100	39.6	100

[1] Does not include Alaska.
[2] Does not include sulfur.
[3] Includes other vegetables listed in app. 1.
[4] Includes other deciduous fruits listed in app. 1.
[5] Includes other fruits and nuts listed in app. 1.
[6] Includes corn, sorghum, wheat, rice, soybeans, tobacco, and sugarbeets as well as other grains, other field crops, alfalfa, other hay and pasture, and nursery and greenhouse crops listed in app. 1.

Table 5—Farm use of fungicides on crops, by region, 1966 and 1971[1]

Region	1966		1971	
	Pounds of active ingredients[2]	Percentage of farm fungicides used	Pounds of active ingredients[2]	Percentage of farm fungicides used
	Million pounds	*Percent*	*Million pounds*	*Percent*
Southeast	5.2	17	13.4	34
Northeast	6.8	22	7.1	18
Pacific	2.8	9	6.9	17
Corn Belt	5.4	18	5.3	13
Appalachian	3.3	11	3.8	10
Lake States	3.4	11	1.3	3
Southern Plains	1.8	6	.8	2
Northern Plains	.8	3	.5	1
Mountain	.4	1	.3	1
Delta States	.6	2	.2	1
All regions	30.5	100	39.6	100

[1] Does not include Alaska.
[2] Does not include sulfur.

Table 6—Quantities of selected herbicides (active ingredients) used by farmers on crops and for other purposes, 1966 and 1971[1]

Type of herbicide[2]	1966 total	1971		
		Total	Crops[3]	Other[4]
		1,000 pounds		
Inorganic herbicides	4,907	1,820	1,665	155
Organic herbicides:				
Arsenicals	881	7,981	7,837	144
Phenoxys:				
2,4-D	40,144	34,612	33,252	1,360
2,4,5-T	760	1,530	1,339	191
MCPA	1,669	3,299	3,284	15
Other phenoxy	1,492	605	605	—
Total	44,065	40,046	38,480	1,566
Phenyl urea:				
Diuron	1,624	1,234	1,229	5
Linuron	1,425	1,803	1,803	—
Fluometuron	NA	3,334	3,334	—
Other phenyl urea	647	262	259	3
Total	3,696	6,633	6,625	8
Amides:				
Propachlor	2,269	23,732	23,730	2
Propanil	2,589	6,656	6,656	—
Alanap	999	3,332	3,332	—
Alachlor	—	14,754	14,754	—
Other amides	—	793	793	—
Total	5,857	46,267	49,265	2
Carbamates:				
EPTC	3,138	4,409	4,409	—
Pebulate	150	1,062	1,062	—
Vernolate	—	3,739	3,736	3
Butylate	—	5,915	5,915	—
Other carbamates	6,851	3,214	3,214	—
Total	10,139	18,339	18,336	3
Dinitro group	5,015	7,219	7,191	28
Triazines:				
Atrazine	23,521	57,445	57,219	229
Propazine	580	3,171	3,171	—
Simazine	193	1,738	1,723	15
Other triazines	—	1,450	1,443	7
Total	24,294	63,804	63,553	251
Benzoics:				
Amiben	3,765	9,555	9,555	—
Dicamba	222	430	420	10
Other benzoic	2,985	117	117	—
Total	6,972	10,102	10,092	10
Other organics:				
Trifluralin	5,233	11,427	11,427	(5)
Nitralin	14	2,706	2,706	—
Dalapon	38	1,043	1,032	11
Norea	239	1,323	1,323	—
Fluorodifen	NA	1,330	1,330	—
Others	3,980	4,866	4,798	68
Total	9,504	22,695	22,616	79

See footnotes at end of table.

Continued

Table 6—Quantities of selected herbicides (active ingredients) used by farmers on crops and for other purposes, 1966 and 1971[1] — Continued

Type of herbicide[2]	1966 total	1971		
		Total	Crops[3]	Other[4]
	1,000 pounds			
Total organic herbicides (not including petroleum)	110,423	226,086	223,995	2,091
Total herbicides (not including petroleum)	115,330	227,906	225,660	2,246
Petroleum	80,741	145,578	142,753	2,825
Total herbicides	196,071	373,484	368,413	5,071

— = none reported.
NA = not available.
[1] Does not include Alaska.
[2] May include quantities for purposes other than as herbicides.
[3] Includes all crops, pasture, rangeland, and land in summer fallow.
[4] Includes fence rows, ditch banks, and other noncrop usages.
[5] Less than 500 pounds.

1966 and 1971 indicate that use on most fruits and vegetables was generally higher in 1971, while use on most field crops was lower.

Farm use of fungicides in 1971 was heaviest in the Southeast (table 5). This is a different region pattern from that in 1966, when use was heaviest in the Northeast. The 35-percent increase in dithiocarbamate use by citrus producers contributed to increased fungicide use in the Southeast, as did the use of zinc compounds applied as micronutrients but containing fungicidal properties. Peanut producers also contributed to added fungicide use in the Southeast by using more "other" organic fungicides in 1971 than in 1966.

Herbicides

Herbicides have increased more rapidly in use during the last decade than any other type of pesticide. Herbicides have replaced, to a large extent, more expensive mechanical means for controlling weeds and are now used in the production of almost every major crop.

By far, the herbicide product used most by farmers in 1971 was atrazine, accounting for a fourth of all herbicides used. An important herbicide used in corn production, atrazine more than doubled in use from 1966 to 1971. Quantity used increased from 23.5 million pounds in 1966 to 57.4 million pounds in 1971. Other herbicides, which increased substantially in use from 1966, are propachlor, alachlor, amiben, and trifluralin. These herbicides accounted for 11.2 million pounds, or about 10 percent of the total herbicides used in 1966. From 1966, their use increased almost fivefold to about 59 million pounds in 1971, or about 25 percent of total herbicide use (table 6).

The herbicide, 2,4-D, an important herbicide used by farmers since the early fifties, accounted for a much smaller share of herbicide use in 1971 than in 1966. Use of 2,4-D declined from about 40 million pounds and 34 percent of total herbicide use by farmers in 1966 to about 34 million pounds and 15 percent of total use in 1971.

Inorganic herbicides also declined in use. Use declined from 5.0 million pounds in 1966 to 1.8 million pounds in 1971, or from 4 percent of the total herbicide use to less than 1 percent.

Corn is the major recipient of herbicides. In 1971, about 80 percent of all corn acreage was treated for weed control, and 101 million pounds of herbicides were used— up from 46 million pounds in 1966 (table 7). Corn accounted for 45 percent of total herbicide use in 1971, up 4 percent from 1966.

Table 7—Farm use of herbicides, by crop, 1966 and 1971[1]

Crop	1966		1971	
	Pounds of active ingredients[2]	Percentage of farm herbicides used	Pounds of active ingredients[2]	Percentage of farm herbicides used
	Million pounds	*Percent*	*Million pounds*	*Percent*
Corn	46.0	41	101.1	45
Soybeans	10.4	9	36.5	16
Cotton	6.5	6	19.6	9
Other field crops[3]	10.8	10	15.1	7
Wheat	8.2	7	11.6	5
Sorghum	4.0	4	11.5	5
Pasture and rangeland	10.5	9	8.3	4
Rice	2.8	2	8.0	3
Vegetables[4]	5.7	5	5.6	2
Peanuts	2.9	3	4.4	2
Fruits and nuts[5]	3.6	3	2.4	1
Summer fallow	.9	1	1.4	1
Nursery and greenhouse crops	.1	(6)	.2	(6)
All crops	112.4	100	225.7	100

[1] Does not include Alaska.
[2] Does not include petroleum.
[3] Includes tobacco, sugarbeets, alfalfa, and other hay as well as other grains and other field crops listed in app. 1.
[4] Includes potatoes as well as other vegetables listed in app. 1.
[5] Includes apples and citrus as well as other deciduous fruits and other fruit and nut crops listed in app. 1.
[6] Less than 0.5 percent.

Atrazine was the leading herbicide used on corn, followed by propachlor, 2,4-D, alachlor, and butylate. In 1971, 52 million pounds of atrazine accounted for over half the herbicides used by corn producers. Propachlor accounted for approximately 20 percent of the herbicide use, and 2,4-D, alachlor, and butylate accounted for another 20 percent.

Soybean and cotton producers are important users of herbicides—36.5 and 19.6 million pounds, respectively, were used on these crops in 1971. Herbicide use on soybeans increased from 10.4 million pounds in 1966 to 36.5 million pounds in 1971. Herbicide use on cotton increased from 6.5 million pounds in 1966 to 19.6 million pounds in 1971.

Although a variety of herbicides were used on soybeans in 1971, amiben and alachlor accounted for over 40 percent. The leading herbicide was amiben at 9.3 million pounds, followed by alachlor at 6.3 million pounds. Trifluralin and fluometuron were the herbicides most often used on cotton. About 4.5 million pounds of trifluralin and 3.3 million pounds of fluometuron were used, accounting for over a third of the herbicides used in cotton production.

Other crops receiving substantial amounts of herbicides were: wheat, 11.6 million pounds; sorghum, 11.5 million pounds; pasture and rangeland, 8.3 million pounds; rice, 8 million pounds; and vegetables, 5.6 million pounds. Herbicide use on wheat, sorghum, and rice increased from 1966. Use on vegetables remained about the same, and use on pasture and rangeland declined.

Farmers in the Corn Belt used most of the herbicides used on crops in 1971. They used 76.4 million pounds, or a third of all herbicides used by farmers in 1971 (table 8). This quantity was up from the 35.5 million pounds used in 1966. The Lake States region was second in herbicide usage with 29.7 million pounds, and the Northern Plains was third with 28.2 million pounds.

Table 8—Farm use of herbicides on crops, by region, 1966 and 1971[1]

Region	1966		1971	
	Pounds of active ingredients[2]	Percentage of farm herbicides used	Pounds of active ingredients[2]	Percentage of farm herbicides used
	Million pounds	*Percent*	*Million pounds*	*Percent*
Corn Belt	35.5	32	76.4	34
Lake States	11.6	10	29.7	13
Northern Plains	14.9	13	28.2	12
Delta States	6.1	5	24.3	11
Southern Plains	7.5	7	15.1	7
Pacific	14.1	12	12.7	6
Appalachian	5.3	5	12.5	5
Southeast	4.9	4	11.2	5
Northeast	6.2	6	8.1	4
Mountain	6.3	6	7.5	3
All regions	112.4	100	225.7	100

[1] Does not include Alaska.
[2] Does not include petroleum.

Nearly all the herbicides used by farmers in the Corn Belt in 1971 were used on corn and soybeans. In the Lake States, corn accounted for over 70 percent of the herbicide use. In the Northern Plains, corn again accounted for the largest share or close to 40 percent of the total. Wheat and sorghum shared about equally in another 40 percent of the use.

Insecticides

Farmers used about 170 million pounds of insecticides, other than petroleum, in 1971 (table 9). This amount was up by about 14 percent from 1966, when 149 million pounds were used. An increase in cotton acreage plus increased use on sorghum and livestock were three of the most important factors that influenced increased insecticide use. For other crops and other farm uses, increases and decreases were largely offsetting.

About 91 percent of the insecticides used by farmers in 1971 were applied to crops— 154 million of 170 million pounds. Farmers used 15 million pounds on livestock and livestock premises and less than 1 million pounds for other purposes.

Organophosphorus and organochlorine insecticides together accounted for about the same share of insecticide use in 1971. Each group of insecticides accounted for about 41 percent of total farm use. The organochlorines declined from 60 percent of all insecticides in 1966, while the organophosphorus compounds increased from 27 percent.

The three leading organochlorine products in use in 1971 were toxaphene, DDT, and aldrin. These products accounted for 35 percent of all insecticides used by farmers in 1971—down from 51 percent in 1966. DDT use declined from 27 million pounds in 1966 to about 14 million in 1971. In the same period, aldrin use declined from nearly 15 million pounds to about 8 million pounds. Toxaphene use increased by about 8 percent to 37.5 million pounds.

The development of resistance to DDT and aldrin by specific insects which attack cotton, peanuts, and corn may have contributed to a decline in the use of DDT and aldrin. Cotton pests such as the bollworm and tobacco budworm developed resistance to DDT as did the peanut pests, thrips and leaf hoppers. The corn rootworm also developed resistance to aldrin.

DDT use in cotton production declined from 19.2 million pounds in 1966 to 13.2 million in

Table 9—Quantities of selected insecticides (active ingredients) used by farmers on crops and livestock and for other purposes, 1966 and 1971[1]

Type of insecticide[2]	1966 total	1971			
		Total	Crops[3]	Livestock[4]	Other[5]
		1,000 pounds			
Inorganic insecticides	5,784	3,232	3,042	189	1
Botanicals and biologicals	204	213	69	144	([6])
Synthetic organic insecticides:					
Organochlorines:					
Lindane	704	650	176	416	58
Strobane	2,016	216	216	—	—
TDE (DDD)	2,896	244	244	—	—
DDT	27,004	14,324	14,005	245	74
Methoxychlor	2,578	3,012	933	1,988	91
Endrin	571	1,427	1,418	—	9
Heptachlor	1,536	1,211	1,143	—	68
Dieldrin	724	332	321	4	7
Aldrin	14,761	7,928	7,907	14	7
Chlordane	526	1,890	1,496	366	28
Endosulfan	791	882	880	—	2
Toxaphene	34,605	37,464	32,867	4,575	22
Others	347	293	270	19	4
Total	89,239	69,873	61,876	7,627	370
Organophosphorus:					
Disulfoton	1,952	4,079	4,049	—	30
Bidrin	1,857	807	807	—	—
Methyl parathion	8,002	27,563	27,562	—	1
Parathion	8,452	9,481	9,372	107	2
Malathion	5,218	3,602	2,711	652	239
Dichlorvos	912	2,434	35	2,398	1
Diazinon	5,605	3,167	3,138	9	20
Trichlorfon	1,060	617	556	59	2
Azinphosmethyl	1,474	2,654	2,653	1	—
Phorate	326	4,178	4,178	—	—
Ethion	2,007	2,326	2,326	—	—
Ronnel	391	479	9	470	—
Others	2,710	9,319	7,635	1,673	11
Total	39,966	70,706	65,031	5,369	306
Carbamates:					
Bux	39	3,606	3,606	—	—
Carbaryl	12,392	17,838	16,592	1,194	52
Carbofuran	—	2,854	2,854	—	—
Methomyl	—	1,077	1,077	—	—
Others	502	37	37	—	—
Total	12,933	25,412	24,166	1,194	52

See footnotes at end of table.

Continued

Table 9—Quantities of selected insecticides (active ingredients) used by farmers on crops and livestock and for other purposes, 1966 and 1971[1] — Continued

Type of insecticide[2]	1966 total	1971			
		Total	Crops[3]	Livestock[4]	Other[5]
		1,000 pounds			
Other synthetic organics	798	334	72	261	1
Total synthetic organics	142,936	166,325	151,145	14,451	729
Total insecticides (not including petroleum)	148,924	169,770	154,256	14,784	730
Petroleum	11,419	73,950	60,721	13,126	103
Total insecticides	160,343	243,720	214,977	27,910	833

—— = none reported.

[1] Does not include Alaska.

[2] May include quantities for purposes other than as insecticides.

[3] Includes all crops, pasture, rangeland, and land in summer fallow.

[4] Includes livestock buildings.

[5] Includes pesticides for all other noncrop and nonlivestock uses.

[6] Less than 500 pounds.

1971. DDT use also declined in peanut production, from 2.3 million pounds to less than 100,000 pounds. Use of aldrin in corn production declined from about 14.2 million pounds in 1966 to about 7.8 million in 1971.

Farmers used about 71 million pounds of organophosphorus compound in 1971, up from 40 million pounds in 1966. The leading organophosphorus compound used in 1971, by far, was methyl parathion at 27.6 million pounds. Next in line were parathion at 9.5 million pounds, phorate at 4.2 million, disulfoton at 4.1 million, and malathion at 3.6 million. Methyl parathion use increased almost 20 million pounds between 1966 and 1971, primarily because of its increased use to control cotton insects. Parathion use increased by about 1 million pounds; phorate increased by almost 4 million pounds; and disulfoton, by over 2 million. Use of malathion decreased by 1.6 million pounds.

Carbamate use amounted to over 25 million pounds in 1971, almost double the amount in 1966. Carbamates accounted for about 15 percent of all insecticides used in 1971. Carbaryl, the leading carbamate product, accounted for 70 percent of all carbamates. Bux and carbofuran, two insecticides that became important substitutes for aldrin in the control of corn rootworm, accounted for another 25 percent.

In 1971, farm use of other synthetic organic insecticides, at under 500,000 pounds, was less than half of the quantity used in 1966. Inorganic insecticide use was relatively insignificant in both years and dropped from 5.8 million pounds in 1966 to 3.2 million pounds in 1971, down from 4 percent to less than 2 percent of all insecticides used.

Insecticides used on cotton accounted for 73.3 million pounds, or 47 percent of all insecticides used by farmers on crops in 1971 (table 10). The percentages of the leading insecticides used on cotton—toxaphene, methyl parathion, and DDT—were 85, 83, and 94 percent, respectively, of all the crop use of these insecticides.

Insecticide use on cotton in 1971 was 13 percent above the 65 million pounds used in 1966. The increase in use was primarily due to an increase in acres treated. Acres planted were up by 20 percent in 1971, and a small increase occurred in the percentage of acres treated with insecticides.

Large quantities of insecticides were also used on corn. In 1971, corn growers used 25.5 million pounds, or 17 percent of all crop insecticides. This amount reflected an increase of

Table 10—Farm use of insecticides, by crop, 1966 and 1971[1]

Crop	1966		1971	
	Pounds of active ingredients[2]	Percentage of farm insecticides used	Pounds of active ingredients[2]	Percentage of farm insecticides used
	Million pounds	*Percent*	*Million pounds*	*Percent*
Cotton	64.9	47	73.3	47
Corn	23.6	17	25.5	17
Other field crops[3]	8.7	6	17.5	11
Vegetables[4]	11.1	8	11.1	7
Fruits (not including apples and citrus)	6.6	5	6.3	4
Soybeans	3.2	2	5.6	4
Apples	8.5	6	4.8	3
Tobacco	3.8	3	4.0	3
Citrus	2.9	2	3.1	2
Hay and pasture[5]	4.1	3	2.6	2
Other	0.2	([6])	0.5	([6])
All crops	137.6	100	154.3	100

[1] Does not include Alaska.
[2] Does not include petroleum.
[3] Includes wheat, sorghum, rice, peanuts, and sugarbeets as well as other grains and other field crops listed in app. 1.
[4] Includes potatoes as well as other vegetables listed in app. 1.
[5] Includes alfalfa, other hay and forage, and pasture and rangeland.
[6] Less than 0.5 percent.

about 8 percent from 1966, when 23.6 million pounds were used. Aldrin was the leading insecticide used on corn in 1971, but its use had declined by almost half since 1966 from 14.2 million pounds to 7.8 million. In 1966, aldrin accounted for 60 percent of all insecticides used on corn, but by 1971, it had declined to only 30 percent. Other products used in substantial amounts on corn were bux, carbofuran, and phorate—all substitutes for aldrin in the treatment of corn rootworm. Use of these three insecticides was up appreciably from 1966.

Farmers used substantial amounts of insecticides on fruits and vegetables in 1971. Organophosphorus compounds were generally used much more extensively than the organochlorine compounds or carbamates on fruits. For example, phosphorus compounds accounted for over 85 percent of the organic insecticides used on citrus fruits. On apples, organophosphorus products were used over three times as much as organochlorines, and on other fruits and nuts, their use greatly exceeded that of the organochlorines. In 1971, vegetable producers also used less organochlorines than they did in 1966. They used about the same quantity of organophosphorus compounds and more carbamates. Increased insect resistance to DDT caused its use in vegetable production to drop from over 800,000 pounds in 1966 to less than 400,000 pounds in 1971. To replace DDT, farmers have substituted carbaryl in their insect control programs. The use of carbaryl has increased from 32 percent of all insecticides used on vegetables in 1966 to 39 percent in 1971.

The South accounts for a large share of insecticides used by farmers. In 1971, the Southeast led with 40.4 million pounds, or 26 percent of all insecticides used (table 11). The Delta States region was next with 32.3 million pounds, or 21 percent of the total. The Southern Plains used 18.5 million pounds, or 12 percent of the total. These three regions accounted for almost 60 percent of farmers' insecticide use on crops in 1971. Their share was up slightly from 1966, when they accounted for 54 percent of the

Table 11--Farm use of insecticides on crops, by region, 1966 and 1971[1]

Region	1966		1971	
	Pounds of active ingredients[2]	Percentage of farm insecticides used	Pounds of active ingredients[2]	Percentage of farm insecticides used
	Million pounds	*Percent*	*Million pounds*	*Percent*
Southeast	35.4	26	40.4	26
Delta States	21.8	16	32.3	21
Southern Plains	16.0	12	18.5	12
Corn Belt	21.5	15	18.4	12
Pacific	9.2	7	12.1	8
Appalachian	10.7	8	9.9	6
Northern Plains	4.5	3	7.5	5
Northeast	7.0	5	5.5	4
Mountain	6.9	5	5.4	3
Lake States	4.6	3	4.3	3
All regions	137.6	100	154.3	100

[1] Does not include Alaska.
[2] Does not include petroleum.

total. Use in the Delta States and Northern Plains increased approximately 50 percent between 1966 and 1971.

Miscellaneous Pesticides

Farmers use pesticides for a variety of purposes other than to control fungi, weeds, and insects. The group of miscellaneous pesticides includes some long-established products such as rodenticides and fumigants and some newer products such as plant hormones that are being used mainly for tobacco sucker control and fruit setting and thinning purposes. Miticides, repellents, defoliants, and desiccants are also considered miscellaneous pesticides in this report.

In 1971, farmers used over 54 million pounds of miscellaneous pesticides, about the same as in 1966 (table 12). The leading category was fumigants, which were used to treat soil organisms and control stored product pests. Fumigant use at 29 million pounds was about 20 percent less than in 1966. The leading fumigant in 1971, as in 1966, was D-D mixture. However, in 1971, D-D mixture was followed closely in quantity used by Telone and bromomethane. These three products accounted for 69 percent of the fumigants.

Farmers used substantial amounts of fumigants on vegetables, tobacco, and other field crops in 1971. Vegetable producers used about half of the fumigants, primarily for Irish potatoes. Vegetables, tobacco, and other field crops accounted for 84 percent of all fumigants used on crops.

In 1971, farmers used about 17.7 million pounds of defoliants and desiccants--up from slightly over 6 million pounds in 1966. Almost all of these products were used in cotton production as harvest aids. The increase can be attributed to increased cotton acreage and to a higher percentage of cotton acres being treated with chemical harvest aids.

Plant growth regulators reported used in 1971 amounted to about 5.5 million pounds, up from 1966's 3.3 million pounds. Most of the growth-regulating material used was malaeic hydrazide, which was used for tobacco sucker control.

Farmers used just over 2 million pounds of miticides in 1971—about the same quantity as in 1966. Miticides were used mostly on cotton and fruit crops. The largest increase in use from 1966 was in citrus production, while the largest decline was in apple production.

In 1971, a large share of the miscellaneous pesticides was used on cotton, vegetables, and

Table 12—Quantities of selected miscellaneous pesticides (active ingredients) used by farmers on crops and for other purposes, 1966 and 1971[1]

Type of miscellaneous pesticide	1966 total	1971		
		Total	Crops[2]	Other[3]
	1,000 pounds			
Miticides:				
Dicofol	893	447	447	--
Chlorobenzilate	465	812	812	--
Aramite	97	17	17	--
Omite	[7]	415	415	--
Others	677	330	330	--
Total	2,132	2,021	2,021	--
Fumigants:				
Dibromochloropropane	3,910	3,601	3,599	2
D-D mixture	13,961	7,015	6,760	255
Telone	389	6,949	6,434	515
Bromomethane	5,713	5,923	771	5,152
Others[4]	12,777	5,470	3,395	2,075
Total	36,750	28,958	20,959	7,999
Defoliants and desiccants:[5]				
Arsenic acid	975	6,073	6,073	--
DEF and Folex	4,226	5,050	5,050	--
Others	913	6,595	6,595	--
Total	6,114	17,718	17,718	--
Rodenticides[6]	38	15	10	5
Plant growth regulators:				
Maleic hydrazide	3,288	4,223	4,223	--
Others	3	1,328	1,328	--
Total	3,291	5,551	5,551	--
Repellents	7,458	443	13	430
Total miscellaneous pesticides[7]	55,783	54,706	46,272	8,434

-- = none reported.
[1] Does not include Alaska.
[2] Includes all crops, pasture, rangeland, and land in summer fallow.
[3] Includes pesticides for all noncrop uses.
[4] Some used extensively in sterilizing the soil to kill weeds.
[5] Some products reported as herbicides may also have been used as defoliants and desiccants.
[6] Only those used on field crops in 1966.
[7] Enumeration may have been incomplete for some miscellaneous pesticides.

tobacco—41, 22, and 20, percent, respectively (table 13). Over 70 percent of the miscellaneous pesticides was used in the Pacific, Appalachian, and Southern Plains regions (table 14).

Livestock Insecticides

Farmers use a variety of insecticide products to control livestock pests. However, the proportion of all insecticides used on livestock in 1971 was small—less than 10 percent of the total insecticides used by farmers. In 1971, farmers used about 14.8 million pounds of insecticides on livestock or livestock premises, an increase of almost 38 percent from 1966 (table 15).

More insecticides were used on beef cattle and premises than for any other class of livestock. About 6.8 million pounds, or 46 percent of all livestock insecticides, were used for beef cattle operations. This amount was up slightly from 1966, when farmers used 6.2 million pounds.

Table 13—Farm use of miscellaneous pesticides on crops, 1966 and 1971[1]

Crop	1966		1971	
	Pounds of active ingredients	Percentage of farm miscellaneous pesticides used	Pounds of active ingredients	Percentage of farm miscellaneous pesticides used
	Million pounds	*Percent*	*Million pounds*	*Percent*
Cotton	14.2	30	18.7	41
Vegetables[2]	.9	2	10.4	22
Tobacco	13.4	28	9.4	20
Other field crops[3]	7.6	16	3.3	7
Other fruits and nuts[4]	8.7	18	1.8	4
Citrus	1.1	2	1.3	3
Apples	1.1	2	.6	1
Corn	.6	2	.5	1
Nursery and greenhouse crops	.1	([5])	.3	1
All crops	47.7	100	46.3	100

[1] Does not include Alaska.
[2] Includes potatoes as well as other vegetables listed in app. 1.
[3] Includes sorghum, wheat, rice, soybeans, sugarbeets, peanuts, and alfalfa, as well as other field crops, other grains, and other hay and pasture listed in app. 1.
[4] Includes other deciduous fruits and other fruits and nuts listed in app. 1.
[5] Less than 0.5 percent.

Table 14—Farm use of miscellaneous pesticides on crops, by region, 1966 and 1971[1]

Region	1966		1971	
	Pounds of active ingredients	Percentage of farm miscellaneous pesticides used	Pounds of active ingredients	Percentage of farm miscellaneous pesticides used
	Million pounds	*Percent*	*Million pounds*	*Percent*
Pacific	18.7	39	18.4	40
Appalachian	11.1	23	7.3	16
Southern Plains	2.2	5	7.3	16
Southeast	11.2	24	6.9	15
Delta States	1.6	3	3.3	7
Northern Plains	.1	[2]	1.5	3
Mountain	.8	2	.8	2
Corn Belt	.7	2	.5	1
Northeast	.7	1	.2	([2])
Lake States	.6	1	.1	([2])
All regions	47.7	100	46.3	100

[1] Does not include Alaska.
[2] Less than 0.5 percent.

Table 15—Quantities of selected insecticides (active ingredients) used on livestock, by type of livestock, 1966 and 1971[1]

Type of insecticide	1966 total	1971						
		Total	Dairy cattle	Beef cattle	Hogs	Poultry	Sheep	Other
				1,000 pounds				
Inorganic insecticides	9	189	4	4	9	166	—	6
Botanicals and biologicals	161	144	78	38	6	18	2	2
Synthetic organic insecticides:								
Organochlorines:								
Lindane	293	416	14	226	164	5	4	3
DDT	505	245	55	158	27	(2)	3	2
Methoxychlor	1,509	1,988	872	1,011	58	9	18	20
Toxaphene	3,670	4,575	200	3,483	843	4	39	6
Others	208	403	358	19	19	2	2	3
Total	6,185	7,627	1,499	4,897	1,111	20	66	34
Organophosphorus (including animal systemics):								
Ruelene	129	217	2	215	(2)	—	—	—
Coumaphos	434	168	18	147	2	(2)	1	(2)
Ronnel	391	470	33	384	44	7	1	1
Malathion	735	652	142	357	88	38	3	24
Ciodrin	141	901	693	176	26	3	1	2
Dichlorvos	907	2,398	2,109	153	26	75	2	33
Others	401	563	117	215	22	173	1	35
Total	3,138	5,369	3,114	1,647	208	296	9	95
Carbamates:								
Carbaryl	548	1,194	18	196	52	928	(2)	(2)
Total	548	1,194	18	196	52	928	(2)	(2)
Other synthetic organics:								
Piperonyl butoxide	72	209	181	8	19	—	—	1
Others	668	52	31	16	3	(2)	—	2
Total	740	261	212	24	22	(2)	—	3
Total synthetic organics	10,611	14,451	4,843	6,764	1,393	1,244	75	132
Total insecticides[3]	10,781	14,784	4,925	6,806	1,408	1,428	77	140

— = none reported.

[1] Does not include Alaska. Includes pesticides used on livestock buildings and replacement livestock. Livestock buildings include milkrooms.

[2] Less than 500 pounds.

[3] Does not include petroleum.

About 4.9 million pounds of livestock insecticides were used in dairy cattle operations in 1971, about a 70-percent increase over 1966. Use of such insecticides on hogs and poultry was up appreciably, while use on sheep was about the same.

Leading insecticides for treating livestock were toxaphene, dichlorvos, methoxychlor, and carbaryl. Toxaphene and methoxychlor accounted for almost 45 percent of total insecticide use. Dichlorvos and carbaryl accounted for 16 and 8 percent, respectively. Farmers' use of dichlorvos and carbaryl to control livestock pests increased substantially from 1966.

Seeds, Seedbeds, Buildings, Stored Crops, and Transplants

Farmers used about 10 million pounds of pesticides to treat seeds, buildings, stored crops, seedbeds, and transplants in 1971. Such use included treatments made by farmers or treatments made by custom operators for farmers. It did not include materials used on seeds that had been treated before purchase.

Most products used for these purposes were fungicides, insecticides, or fumigants. About 1.6 million pounds were fungicides, including about 1.1 million pounds of dithiocarbamates. Insecticides accounted for 0.7 million pounds, and 7.7 million pounds were fumigants (table 16). About half of all such pesticides were used on tobacco beds or tobacco transplants.

Table 16—Quantities of selected pesticides (active ingredients) used on stored crops, seeds, seedbeds, and transplants, 1971[1]

Type of pesticide	Corn and sorghum	Wheat	Other small grains	Cotton	Other field crops	Tobacco seedbeds and transplants	Other	Total
	1,000 pounds							
Fungicides:								
Inorganic:								
Mercury	—	16	8	(2)	(2)	—	—	24
Other inorganics	3	1	2	—	—	—	1	7
Total	3	17	10	(2)	(2)	—	1	31
Organic:								
Dithiocarbamates	12	49	43	6	401	582	8	1,101
Phthalimides	108	2	—	4	360	—	2	476
Other organics	2	(2)	2	4	(2)	—	(2)	8
Total	122	51	45	14	761	582	10	1,585
Herbicides:								
Inorganic	—	—	—	—	—	5	—	5
Organic	2	1	(2)	—	1	3	1	8
Total	2	1	(2)	—	1	8	1	13
Insecticides:								
Inorganic:	—	—	—	—	—	1	—	1
Organic:								
Organochlorines	141	66	21	1	88	11	29	357
Organophosphorus	169	28	12	18	3	14	59	303
Other organics	(2)	1	(2)	—	—	32	13	46
Total organics	308	95	33	19	91	57	101	706
Total insecticides	308	95	33	19	91	58	101	707
Fumigants	211	816	239	5	5	4,609	1,867	7,752

[1] Does not include Alaska. Petroleum excluded from active ingredients.
[2] Less than 500 pounds.

APPENDIX I

CROPS INCLUDED IN REPORT

INDIVIDUAL CROPS
- corn
- cotton
- wheat
- sorghum
- rice
- soybeans
- tobacco
- peanuts
- sugarbeets
- alfalfa
- pasture and rangeland
- Irish potatoes
- citrus
- apples

SUMMER FALLOW

OTHER GRAINS
- oats
- mixed grains
- barley
- rye

OTHER HAY
- all hay, other than alfalfa

OTHER VEGETABLES
- cabbage
- carrots
- celery
- lettuce
- onions
- tomatoes
- watermelons
- sweet corn
- snap beans
- spinach
- artichokes
- asparagus
- broccoli
- cauliflower
- cucumbers
- beets
- green peppers
- green peas
- cranberries
- other vegetables

OTHER DECIDUOUS FRUIT
- peaches
- pears
- cherries
- apricots
- plums
- prunes
- nectarines

OTHER FRUITS AND NUTS
- grapes
- avocados
- figs
- blackberries
- blueberries
- boysenberries
- currants
- gooseberries
- loganberries
- raspberries
- strawberries
- almonds
- filberts
- pecans
- walnuts
- olives
- tung nuts

OTHER FIELD CROPS
- grass and hayseed
- buckwheat
- castor beans
- hops
- lentils
- millet

mung beans
peppermint
spearmint
rutabagas
sesame
spelt
sunflowers
velvet beans

dry beans
dry field peas
flax
popcorn
broomcorn
cowpeas
sugarcane
sweetpotatoes

APPENDIX 2. Tables

Appendix table 1—*Quantities of fungicides (active ingredients) used on selected crops, by region, 1971*[1]

Crop	North-east	Lake States	Corn Belt	Northern Plains	Appa-lachian	South-east	Delta States	Southern Plains	Moun-tain	Pacific	Total
						1,000 pounds					
Cotton	—	—	—	—	—	60	19	15	12	114	220
Peanuts	—	—	—	—	1,132	2,985	2	312	—	—	4,431
Irish potatoes	2,463	82	—	189	304	421	—	88	160	417	4,124
Other vegetables[2]	143	5	3,513	—	396	1,102	2	41	27	437	5,666
Citrus	—	—	—	—	—	7,996	—	—	—	1,261	9,257
Apples	2,943	1,026	853	12	1,353	67	—	—	16	937	7,207
Other deciduous fruits[2]	908	111	163	6	379	249	21	—	—	1,985	3,822
Other fruits and nuts[2]	440	74	—	—	103	442	75	256	99	1,607	3,096
All other crops[3]	160	7	768	310	122	52	8	92	31	182	1,732
Total	7,057	1,305	5,297	517	3,789	13,374	127	804	345	6,940	39,555

— = none reported.

[1] Does not include Alaska. Sulfur excluded from active ingredients.

[2] Crops included in this category are listed in app. 1.

[3] Includes corn, sorghum, wheat, rice, tobacco, soybeans, and sugarbeets as well as other grains, other field crops, alfalfa, other hay and pasture, and nursery and greenhouse crops listed in app. 1.

Appendix table 2—Quantities of selected fungicides (active ingredients) used on specified crops, 1971[1]

Type of fungicide[2]	Cotton	Peanuts	Other field crops[3]	Irish potatoes	Other vegetables[4]	Citrus	Apples	Other deciduous fruits[4]	Other fruits and nuts[4]	Total
					1,000 pounds					
Inorganic fungicides:										
Copper sulfates	26	1,906	102	29	1,812	2,506	16	871	446	7,714
Other coppers	—	—	338	—	116	766	111	584	258	2,173
Mercury compounds	—	—	17	—	—	—	—	([5])	—	17
Other inorganics	([5])	11	4	81	11	4,448	541	256	601	5,953
Total (not including sulfur)	26	1,917	461	110	1,939	7,720	668	1,711	1,305	15,857
Organic fungicides:										
Dithiocarbamates:										
Maneb	—	—	195	961	2,348	—	125	52	66	3,747
Zineb	12	38	60	109	48	1,116	510	48	26	1,967
Ferbam	—	3	44	—	5	196	118	234	184	784
Others	34	266	718	2,052	933	21	1,297	42	71	5,434
Total	46	307	1,017	3,122	3,334	1,333	2,050	376	347	11,932
Phthalimides:										
Captan	5	—	141	94	102	163	3,364	1,417	727	6,013
Others	—	2	—	789	12	40	28	9	118	998
Total	5	2	141	883	114	203	3,392	1,426	845	7,011
Dinocap, Dodine, Quinones	15	—	—	—	1	—	921	160	84	1,181
Phenols	74	1	14	—	—	1	—	19	47	156
Other organics	54	2,204	99	9	278	—	176	130	468	3,418
Total organics	194	2,514	1,271	4,014	3,727	1,537	6,539	2,111	1,791	23,698
Total fungicides (not including sulfur)	220	4,431	1,732	4,124	5,666	9,257	7,207	3,822	3,096	39,555
Sulfur	15,078	25,966	803	—	5,261	24,500	1,095	8,169	31,221	112,093
Total fungicides	15,298	30,397	2,535	4,124	10,927	33,757	8,302	11,991	34,317	151,648

— = none reported.

[1] Does not include Alaska. [2] May include use for purposes other than as fungicides. [3] Includes corn, wheat, sorghum, rice, tobacco, soybeans, alfalfa, and sugarbeets, as well as other grains and other grains and other field crops listed in app. 1. [4] Crops included in this category are listed in app. 1. [5] Less than 500 pounds.

Appendix table 3—Quantities of selected fungicides (active ingredients) used on crops, by region, 1971 [1]

Type of fungicide [2]	North-east	Lake States	Corn Belt	Northern Plains	Appa-lachian	South-east	Delta States	Southern Plains	Moun-tain	Pacific	Total
	1,000 pounds										
Inorganic fungicides:											
Copper sulfates	71	29	1,657	6	1,027	3,077	1	7	1	1,838	7,714
Other coppers	67	—	312	—	—	549	—	—	—	1,245	2,173
Mercury compounds	—	—	17	—	—	—	—	—	—	(3)	17
Other inorganics	66	—	2	—	—	4,101	17	205	17	1,545	5,953
Total (not including sulfur)	204	29	1,988	6	1,027	7,727	18	212	18	4,628	15,857
Organic fungicides:											
Dithiocarbamates:											
Maneb	767	62	1,476	3	295	573	1	15	139	416	3,747
Zineb	52	2	252	—	276	1,144	—	38	25	178	1,967
Ferbam	277	86	—	—	110	259	—	—	—	52	784
Others	2,577	24	763	497	531	531	4	277	43	187	5,434
Total	3,673	174	2,491	500	1,212	2,507	5	330	207	833	11,932
Phthalimides:											
Captan	1,852	807	757	—	1,386	283	11	92	101	724	6,013
Others	474	34	—	—	—	41	—	90	—	359	998
Total	2,326	841	757	—	1,386	324	11	182	101	1,083	7,011
Dinocap, Diodine, Quinones	735	173	54	1	9	33	2	63	16	95	1,181
Phenols	10	—	—	—	4	1	3	—	—	138	156
Other organics	109	88	7	10	151	2,782	88	17	3	163	3,418
Total organics	6,853	1,276	3,309	511	2,762	5,647	109	592	327	2,312	23,698
Total fungicides (not including sulfur)	7,057	1,305	5,297	517	3,789	13,374	127	804	345	6,940	39,555
Sulfur	2,559	1,164	—	22	10,270	40,119	1,202	6,946	4,967	44,844	112,093
Total fungicides	9,616	2,469	5,297	539	14,059	53,493	1,329	7,750	5,312	51,784	151,648

[1] Does not include Alaska.

[2] May include use for purposes other than as fungicides.

[3] Less than 500 pounds.

Appendix table 4—Acres of specified crops treated with selected fungicides, 1971[1]

Type of fungicide [2]	Cotton	Peanuts	Other field crops [3]	Irish potatoes	Other vegetables [4]	Citrus	Apples	Other deciduous fruits [4]	Other fruits and nuts [4]	Total
	1,000 acres									
Inorganic fungicides:[5]										
Copper sulfates	52	503	41	34	148	427	(6)	78	55	1,338
Other coppers	—	—	299	—	52	94	16	57	57	575
Mercury compounds	—	—	58	—	—	—	—	2	—	60
Other inorganics	42	112	67	40	9	578	34	61	43	986
Organic fungicides:										
Dithiocarbamates:										
Maneb	—	—	163	211	278	—	82	17	15	766
Zineb	6	125	11	17	50	179	91	7	3	489
Ferbam	—	14	2	—	3	16	54	98	69	256
Others	23	108	374	281	167	7	119	8	14	1,101
Phthalimides:										
Captan	9	—	126	7	33	14	167	98	264	818
Others	—	3	—	220	8	6	21	2	42	302
Dinocap, Dodine, Quinones	27	—	—	—	1	—	377	133	29	567
Phenols	73	2	43	—	—	2	—	4	122	246
Other organics	140	831	63	42	76	—	127	104	222	1,605
Sulfur	667	781	212	—	202	523	106	394	473	3,358

— = none reported.

[1] Does not include Alaska.

[2] May include use for purposes other than as fungicides.

[3] Includes corn, wheat, sorghum, rice, tobacco, soybeans, and sugarbeets, as well as other grains and other field crops listed in app. 1.

[4] Crops included in this category are listed in app. 1.

[5] Does not include sulfur.

[6] Less than 500 acres.

Appendix table 5—Acres of all crops treated with selected fungicides, by region, 1971[1]

Type of fungicide[2]	North-east	Lake States	Corn Belt	Northern Plains	Appa-lachian	South-east	Delta States	Southern Plains	Moun-tain	Pacific	Total
	1,000 acres										
Inorganic fungicides:[3]											
Copper sulfates	13	33	104	2	233	660	2	8	1	282	1,338
Other coppers	23	—	257	—	—	75	—	—	—	220	575
Mercury compounds	—	—	58	—	—	—	—	—	—	2	60
Other inorganics	27	—	57	—	—	548	1	127	14	212	986
Organic fungicides:											
Dithiocarbamates:											
Maneb	111	14	213	12	22	116	5	5	95	173	766
Zineb	11	3	53	—	25	187	—	124	11	75	489
Ferbam	97	51	—	—	13	60	—	—	—	35	256
Others	322	25	169	143	50	133	15	137	29	78	1,101
Phthalimides:											
Captan	209	78	63	—	82	82	46	72	27	159	818
Others	124	89	—	—	—	7	—	29	—	53	302
Dinocap, Dodine, Quinones	236	131	40	3	9	24	5	16	10	93	567
Phenols	28	—	—	—	17	2	59	—	—	140	246
Other organics	52	88	22	42	105	989	119	42	10	136	1,605
Sulfur	152	98	—	2	295	1,000	590	278	64	879	3,358

— = none reported.

[1] Does not include Alaska.

[2] May include use for purposes other than as fungicides.

[3] Does not include sulfur.

Appendix table 6—Quantities of herbicides (active ingredients) used on selected crops, by region, 1971[1]

Crop	North-east	Lake States	Corn Belt	Northern Plains	Appa-lachian	South-east	Delta States	Southern Plains	Moun-tain	Pacific	Total
					1,000 pounds						
Corn	5,250	21,358	54,069	10,700	6,166	2,105	474	127	566	245	101,060
Cotton	—	—	1,176	—	1,039	3,045	9,649	3,952	210	539	19,610
Wheat	1	639	—	5,013	15	18	—	144	2,853	2,939	11,622
Sorghum	14	—	1,176	5,834	310	125	287	3,486	251	55	11,538
Rice	—	—	—	—	—	—	4,450	2,646	—	889	7,985
Other grains[2]	265	1,210	77	1,831	—	7	—	30	1,092	865	5,377
Soybeans	207	2,998	18,875	1,054	3,042	1,233	9,011	99	—	—	36,519
Peanuts	—	—	—	—	1,431	2,669	5	266	3	—	4,374
Sugarbeets	—	340	126	333	—	—	—	—	415	1,763	2,977
Other field crops[3]	126	2,396	152	856	122	1,221	42	—	417	721	6,053
Alfalfa, other hay, and forage	74	14	16	9	27	35	66	42	36	308	627
Pasture and rangeland	6	84	212	2,225	167	161	248	4,223	686	324	8,336
Irish potatoes	1,451	51	—	45	—	64	—	12	318	237	2,178
Other vegetables[2]	296	518	392	—	45	33	33	21	126	1,897	3,361
Citrus	—	—	—	—	—	372	—	—	—	304	676
Apples	128	—	11	—	1	6	—	—	—	51	197
All other fruits and nuts[3]	181	57	37	—	9	149	2	—	—	1,068	1,503
Summer fallow	—	62	32	331	16	15	—	9	501	471	1,437
Nursery and greenhouse crops	79	—	—	—	99	4	—	—	19	29	230
Total	8,078	29,727	76,351	28,231	12,489	11,262	24,267	15,057	7,493	12,705	225,660

— = none reported.

[1] Does not include Alaska. Petroleum excluded from active ingredients.

[2] Crops included in this category are listed in app. 1.

[3] Includes tobacco as well as other field crops listed in app. 1.

Appendix table 7—Quantities of selected herbicides (active ingredients) used on specified crops, 1971[1]

Type of herbicide[2]	Corn	Cotton	Wheat	Sorghum	Rice	Other grains[3]	Soybeans	Peanuts	Sugarbeets	Other field crops[4]
						1,000 pounds				
Inorganic herbicides	18	557	113	50	4	—	451	—	—	120
Organic herbicides:										
Arsenicals	—	7,569	—	185	3	—	49	—	—	—
Phenoxys:										
2, 4-D	9,144	4	8,937	2,039	126	3,516	222	6	—	952
2, 4, 5-T	50	—	112	10	92	39	3	—	—	—
MCPA	159	[5]	1,123	119	316	1,400	—	—	—	82
Other phenoxy	9	61	1	8	33	40	309	16	—	16
Total	9,362	65	10,173	2,176	567	4,995	534	22	—	1,050
Phenyl ureas:										
Diuron	—	568	367	—	—	45	—	—	—	58
Linuron	804	53	—	56	—	—	837	—	—	2
Fluometuron	—	3,334	—	—	—	—	—	—	—	—
Other phenyl urea	13	42	[5]	17	—	—	62	—	—	2
Total	817	3,997	367	73	—	45	899	—	—	62
Amides:										
Propachlor	21,300	—	—	1,433	—	[5]	470	—	24	85
Propanil	—	—	—	—	6,656	—	—	—	—	—
Alanap	—	4	—	2	—	—	2,956	324	—	—
Alachlor	8,360	4	—	20	—	—	6,308	56	—	—
Other amides	479	188	—	11	—	—	4	—	—	4
Total	30,139	196	—	1,466	6,656	[5]	9,738	380	24	89
Carbamates:										
EPTC	292	—	—	36	—	—	1	—	372	2,880
Pebulate	—	—	—	—	—	—	—	—	858	69
Vernolate	—	—	—	—	—	—	1,446	2,283	—	7
Butylate	5,818	—	50	—	—	—	—	—	—	—
Other carbamates	20	3	250	—	715	153	529	—	1,091	190
Total	6,130	3	300	36	715	153	1,976	2,283	2,321	3,146
Dinitro group	15	382	50	2	—	69	3,604	443	—	240
Triazines:										
Atrazine	52,000	—	54	4,175	—	10	17	—	—	495
Propazine	583	—	—	2,585	—	—	—	—	—	3
Simazine	920	—	—	—	—	—	123	—	—	37
Other triazines	83	806	297	144	—	25	16	—	—	29
Total	53,586	806	351	6,904	—	35	156	—	—	564

See footnotes at end of table.

Continued

Appendix table 7—Quantities of selected herbicides (active ingredients) used on specified crops, 1971[1]—Continued

Type of herbicide[2]	Corn	Cotton	Wheat	Sorghum	Rice	Other grains[3]	Soybeans	Peanuts	Sugarbeets	Other field crops[4]
	1,000 pounds									
Benzoics:										
Amiben	44	—	—	—	—	—	9,340	—	—	160
Dicamba	284	—	77	4	—	10	—	—	—	4
Other benzoic	—	—	—	10	—	—	—	—	—	—
Total	328	—	77	14	—	10	9,340	—	—	164
Other organics										
Trifluralin	29	4,544	—	40	—	—	5,962	141	167	150
Nitralin	—	500	—	—	—	—	2,146	(5)	—	10
Dalapon	34	18	—	14	—	—	320	38	53	93
Norea	51	846	—	418	—	—	5	—	—	—
Fluorodifen	—	—	—	—	—	—	1,183	—	—	146
Others	551	127	191	160	40	70	156	1,067	412	219
Total	665	6,035	191	632	40	70	9,772	1,246	632	618
Total organic herbicides (not including petroleum)	101,042	19,053	11,509	11,488	7,981	5,377	36,068	4,374	2,977	5,933
Total herbicides (not including petroleum)	101,060	19,610	11,622	11,538	7,985	5,377	36,519	4,374	2,977	6,053
Petroleum	11,173	41	708	17	—	4	73	—	13	322
Total herbicides (including petroleum)	112,233	19,651	12,330	11,555	7,985	5,381	36,592	4,374	2,990	6,375

See footnotes at end of table.

Continued

Appendix table 7—Quantities of selected herbicides (active ingredients) used on specified crops, 1971[1]—Continued

Type of herbicide[2]	Alfalfa, other hay, and forage	Pasture and rangeland	Irish potatoes	Other vegetables[3]	Citrus	Apples	All other fruits and nuts[3,4]	Summer fallow	Nursery and greenhouse crops	Total
					1,000 pounds					
Inorganic herbicides	6	139	—	2	20	—	95	90	—	1,665
Organic herbicides:										
Arsenicals	—	1	—	—	7	—	22	1	(5)	7,837
Phenoxys:										
2, 4-D	230	6,926	—	47	11	23	38	1,028	3	33,252
2, 4, 5-T	20	999	—	—	(5)	—	1	5	8	1,339
MCPA	9	54	—	2	—	—	—	20	—	3,284
Other phenoxy	17	4	7	10	56	(5)	18	—	—	605
Total	276	7,983	7	59	67	23	57	1,053	11	38,480
Phenyl ureas:										
Diuron	29	1	—	—	50	2	109	—	—	1,229
Linuron	—	—	29	22	—	—	—	—	—	1,803
Fluometuron	—	—	—	—	—	—	—	—	—	3,334
Other phenyl urea	—	6	—	28	38	—	51	—	—	259
Total	29	7	29	50	88	2	160	—	—	6,625
Amides:										
Propachlor	35	88	—	289	—	—	—	6	—	23,730
Propanil	—	—	—	—	—	—	—	—	—	6,656
Alanap	—	—	—	46	—	—	(5)	—	—	3,332
Alachlor	1	—	—	5	—	—	—	—	—	14,754
Other amides	2	9	—	96	—	—	—	—	—	793
Total	38	97	—	436	—	—	(5)	6	—	49,265
Carbamates:										
EPTC	58	—	581	146	3	—	4	35	1	4,409
Pebulate	—	—	—	135	—	—	—	—	—	1,062
Vernolate	—	—	—	—	—	—	—	—	—	3,736
Butylate	—	—	—	47	—	—	—	—	—	5,915
Other carbamates	126	—	—	130	—	—	4	3	—	3,214
Total	184	—	581	458	3	—	8	38	1	18,336
Dinitro group	22	27	1,398	557	9	6	358	9	(5)	7,191

See footnotes at end of table.

Continued

Appendix table 7—Quantities of selected herbicides (active ingredients) used on specified crops, 1971[1]—Continued

Type of herbicide[2]	Alfalfa, other hay, and forage	Pasture and rangeland	Irish potatoes	Other vegetables[3]	Citrus	Apples	All other fruits and nuts[3]	Summer fallow	Nursery and greenhouse crops	Total
	1,000 pounds									
Triazines:										
Atrazine	([5])	1	—	380	—	—	1	42	41	57,216
Propazine	—	—	—	—	—	—	—	—	—	3,171
Simazine	17	—	7	20	140	36	313	8	102	1,723
Other triazines	—	1	—	22	—	—	—	20	—	1,443
Total	17	2	7	422	140	36	314	70	143	63,553
Benzoics:										
Amiben	—	—	—	11	—	—	—	—	—	9,555
Dicamba	5	7	—	4	—	—	—	25	—	420
Other benzoic	—	—	—	—	—	—	—	107	—	117
Total	5	7	—	15	—	—	—	132	—	10,092
Other organics:										
Trifluralin	1	19	110	213	1	1	15	23	11	11,427
Nitralin	—	—	—	43	—	—	7	—	—	2,706
Dalapon	24	—	32	17	171	34	181	—	3	1,032
Norea	—	—	—	3	—	—	—	—	—	1,323
Fluorodifen	—	—	—	1	—	—	—	—	—	1,330
Others	25	54	14	1,085	170	95	286	15	61	4,798
Total	50	73	156	1,362	342	130	489	38	75	22,616
Total organic herbicides (not incl. petroleum)	621	8,197	2,178	3,359	656	197	1,408	1,347	230	223,995
Total herbicides (not incl. petroleum)	627	8,336	2,178	3,361	676	197	1,503	1,437	230	225,660
Petroleum	22	32,659	4,107	6,651	66,360	6	20,289	140	168	142,753
Total herbicides	649	40,995	6,285	10,012	67,036	203	21,792	1,577	398	368,413

— = none reported.

[1] Does not include Alaska.

[2] May include use for purposes other than as herbicides.

[3] Crops included in this category are listed in app. 1.

[4] Includes tobacco as well as other field crops listed in app. 1.

[5] Less than 500 pounds.

Appendix table 8—Quantities of selected herbicides (active ingredients) used on crops, by region, 1971[1]

Type of herbicide[2]	North-east	Lake States	Corn Belt	Northern Plains	Appa-lachian	South-east	Delta States	Southern Plains	Moun-tain	Pacific	Total
					1,000 pounds						
Inorganic herbicides	35	—	580	187	16	31	84	211	91	430	1,665
Organic herbicides:											
Arsenicals	—	—	371	—	174	1,078	5,088	1,052	31	43	7,837
Phenoxys:											
2, 4-D	746	2,313	5,099	9,543	1,107	1,340	412	4,286	5,007	3,399	33,252
2, 4, 5-T	23	11	59	131	27	7	113	745	61	162	1,339
MCPA	17	1,062	111	1,371	—	—	2	26	120	575	3,284
Other phenoxy	28	30	85	—	164	70	146	—	20	62	605
Total	814	3,416	5,354	11,045	1,298	1,417	673	5,057	5,208	4,198	38,480
Phenyl ureas:											
Diuron	51	—	11	—	65	59	429	12	17	585	1,229
Linuron	31	255	1,054	175	41	24	176	14	26	7	1,803
Fluometuron	—	—	149	—	296	598	2,123	146	—	22	3,334
Other phenyl urea:	58	—	10	20	2	15	50	24	9	71	259
Total	140	255	1,224	195	404	696	2,778	196	52	685	6,625
Amides:											
Propachlor	90	5,485	14,234	3,729	6	—	120	42	—	24	23,730
Propanil	—	—	—	—	—	—	4,097	2,559	—	—	6,656
Alanap	—	4	407	11	372	747	1,783	8	—	—	3,332
Alachlor	905	1,765	9,805	585	920	127	588	26	25	8	14,754
Other amides	—	110	480	1	—	—	148	54	—	—	793
Total	995	7,364	24,926	4,326	1,298	874	6,736	2,689	25	32	49,265
Carbamates:											
EPTC	117	2,085	90	810	([5])	64	—	36	366	841	4,409
Pebulate	23	—	—	—	39	31	—	—	—	969	1,062
Vernolate	—	—	247	([5])	1,687	1,555	208	39	—	—	3,736
Butylate	124	168	3,818	170	197	1,253	—	—	79	106	5,915
Other carbamates	—	149	377	472	45	14	276	87	426	1,368	3,214
Total	264	2,402	4,532	1,452	1,968	2,917	484	162	871	3,284	18,336
Dinitro group	1,608	25	693	45	502	420	2,761	19	235	883	7,191

See footnotes at end of table.

Continued

Appendix table 8—Quanities of selected herbicides (active ingredients) used on crops, by region, 1971[1]—Continued

Type of herbicide[2]	North-east	Lake States	Corn Belt	Northern Plains	Appa-lachian	South-east	Delta States	Southern Plains	Moun-tain	Pacific	Total
	1,000 pounds										
Triazines:											
Atrazine	3,723	13,105	24,049	8,959	4,793	719	474	838	371	185	57,216
Propazine	—	—	543	669	43	189	32	1,693	—	2	3,171
Simazine	164	128	779	3	172	76	—	6	(3)	395	1,723
Other triazines	18	3	51	13	18	39	118	791	29	363	1,443
Total	3,905	13,236	25,422	9,644	5,026	1,023	624	3,328	400	945	63,553
Benzoics:											
Amiben	5	1,866	7,197	426	34	—	20	7	—	—	9,555
Dicamba	3	57	184	73	—	—	—	9	59	35	420
Other benzoic	—	—	—	117	—	—	—	—	—	—	117
Total	8	1,923	7,381	616	34	—	20	16	59	35	10,092
Other organics:											
Trifluralin	36	277	4,034	222	877	972	2,519	1,866	291	333	11,427
Nitralin	—	—	18	—	73	138	2,127	127	31	192	2,706
Dalapon	66	20	112	50	19	364	209	—	19	173	1,032
Norea	—	—	80	364	108	505	75	188	—	3	1,323
Fluorodifen	—	392	888	49	—	—	—	—	—	1	1,330
Others	207	417	736	36	692	827	89	146	180	1,468	4,798
Total	309	1,106	5,868	721	1,769	2,806	5,019	2,327	521	2,170	22,616
Total organic herbicides (not including petroleum)	8,043	29,727	75,771	28,044	12,473	11,231	24,183	14,846	7,402	12,275	223,995
Total herbicides (not including petroleum)	8,078	29,727	76,351	28,231	12,489	11,262	24,267	15,057	7,493	12,705	225,660
Petroleum	3,802	6,980	5,265	—	60	2,816	130	32,458	3,011	88,231	142,753
Total herbicides	11,880	36,707	81,616	28,231	12,549	14,078	47,515	47,515	10,504	100,936	368,413

— = none reported.

[1] Does not include Alaska.

[2] May include use for purposes other than as herbicides.

[3] Less than 500 pounds.

Appendix table 9—Acres of specified crops treated with selected herbicides, 1971[1]

Type of herbicide[2]	Corn	Cotton	Wheat	Sorghum	Rice
			1,000 acres		
Inorganic herbicides	24	265	146	26	3
Organic herbicides:					
Arsenicals	—	4,123	—	68	4
Phenoxys:					
2, 4-D	16,626	5	19,268	3,395	162
2, 4, 5-T	123	—	107	63	74
MCPA	339	4	3,189	53	281
Other phenoxy	97	287	3	17	32
Phenyl ureas:					
Diuron	—	776	228	—	—
Linuron	1,427	220	—	147	—
Fluometuron	—	4,206	—	—	—
Other phenyl urea	13	58	6	23	—
Amides:					
Propachlor	13,188	—	—	999	—
Propanil	—	—	—	—	1,758
Alanap	—	17	—	2	—
Alachlor	6,633	2	—	27	—
Other amides	316	108	—	14	—
Carbamates:					
EPTC	292	—	—	20	—
Pebulate	—	—	—	—	—
Vernolate	—	—	—	—	—
Butylate	1,843	—	16	—	—
Other carbamates	18	18	992	—	320
Dinitro group	16	256	46	3	—
Triazines:					
Atrazine	35,993	—	33	3,356	—
Propazine	166	—	—	2,426	—
Simazine	688	—	—	—	—
Other triazines	245	1,118	214	160	—
Benzoics:					
Amiben	60	—	—	—	—
Dicamba	1,652	—	818	20	—
Other benzoic	—	—	—	16	—
Other organics:					
Trifluralin	67	6,804	—	68	—
Nitralin	—	516	—	—	—
Dalapon	73	22	—	18	—
Norea	42	419	—	450	—
Fluorodifen	—	—	—	—	—
Others	467	449	439	154	19
Petroleum	1,528	4	79	3	—

See footnotes at end of table.

Continued

Appendix table 9—Acres of specified crops treated with selected herbicides, 1971[1]—Continued

Type of herbicide[2]	Other grains[3]	Soybeans	Peanuts	Sugar-beets	Other field crops[4]
			1,000 acres		
Inorganic herbicides	—	52	—	—	15
Organic herbicides:					
Arsenicals	—	29	—	—	—
Phenoxys:					
2, 4-D	7,504	336	11	—	438
2, 4, 5-T	75	2	—	—	—
MCPA	3,850	—	—	—	259
Other phenoxy	156	848	48	—	24
Phenyl ureas:					
Diuron	34	—	—	—	34
Linuron	—	2,820	—	—	19
Fluometuron	—	—	—	—	—
Other phenyl urea	—	102	—	—	1
Amides:					
Propachlor	(5)	298	—	6	61
Propanil	—	—	—	—	—
Alanap	—	3,751	349	—	—
Alachlor	—	4,935	33	—	—
Other amides	—	3	—	—	5
Carbamates:					
EPTC	—	(5)	—	122	814
Pebulate	—	—	—	185	16
Vernolate	—	517	670	—	4
Butylate	—	—	—	—	—
Other carbamates	463	1,457	—	677	112
Dinitro group	68	3,809	491	—	159
Triazines:					
Atrazine	6	18	—	—	183
Propazine	—	—	—	—	2
Simazine	—	31	—	—	28
Other triazines	21	31	—	—	88
Benzoics:					
Amiben	—	9,152	—	—	135
Dicamba	109	—	—	—	18
Other benzoic	—	—	—	—	—
Other organics:					
Trifluralin	—	8,211	341	242	283
Nitralin	—	761	1	—	17
Dalapon	—	68	10	37	141
Norea	—	6	—	—	—
Fluorodifen	—	311	—	—	104
Others	226	136	744	270	179
Petroleum	5	8	—	5	23

See footnotes at end of table.

Continued

Appendix table 9—Acres of specified crops treated with selected herbicides, 1971[1]—Continued

Type of herbicide[2]	Alfalfa, other hay and forage	Pasture and rangeland	Irish potatoes	Other vegetables[3]	Citrus
	1,000 acres				
Inorganic herbicides	2	28	—	2	15
Organic herbicides:					
Arsenicals	—	(5)	—	—	8
Phenoxys:					
2,4-D	266	5,988	—	52	19
2, 4, 5-T	37	1,051	—	—	(5)
MCPA	18	42	—	4	—
Other phenoxy	25	14	4	32	25
Phenyl ureas:					
Diuron	22	4	—	—	29
Linuron	—	—	96	37	—
Fluometuron	—	—	—	—	—
Other phenyl urea	—	17	—	17	18
Amides:					
Propachlor	6	160	—	129	—
Propanil	—	—	—	—	—
Alanap	—	—	—	18	—
Alachlor	(5)	—	—	6	—
Other amides	2	15	—	19	—
Carbamates:					
EPTC	19	—	223	76	2
Pebulate	—	—	—	33	—
Vernolate	—	—	—	—	—
Butylate	—	—	—	14	—
Other carbamates	150	—	—	53	—
Dinitro group	9	43	517	169	8
Triazines:					
Atrazine	(5)	(5)	—	218	—
Propazine	—	—	—	—	—
Simazine	22	—	7	12	47
Other triazines	—	4	—	2	—
Benzoics:					
Amiben	—	—	—	13	—
Dicamba	11	30	—	1	—
Other benzoic	—	—	—	—	—
Other organics:	1	47	142	335	6
Trifluralin	—	—	—	46	—
Nitralin	13	—	4	17	103
Dalapon	—	—	—	2	—
Norea	—	—	—	1	—
Fluorodifen	32	89	5	381	117
Others					
Petroleum	2	457	218	68	93

See footnotes at end of table.

Continued

Appendix table 9—Acres of specified crops treated with selected herbicides, 1971[1]—Continued

Type of herbicide[2]	Apples	All other fruits and nuts[3]	Summer fallow	Nursery and greenhouse crops	Total
			1,000 acres		
Inorganic herbicides	--	35	38	--	651
Organic herbicides:					
Arsenicals	--	36	1	NA	4,269
Phenoxys:					
2,4—D	74	69	632	NA	54,845
2,4,5-T	--	6	1	NA	1,539
MCPA	--	--	45	--	8,084
Other phenoxy	1	16	--	--	1,629
Phenyl ureas:					
Diuron	(5)	85	--	--	1,212
Linuron	--	--	--	--	4,766
Fluometuron	--	--	--	--	4,206
Other phenyl urea	--	14	--	--	269
Amides:					
Propachlor	--	--	1	--	14,848
Propanil	--	--	--	--	1,758
Alanap	--	5	--	--	4,137
Alachlor	--	--	--	--	11,636
Other amides	--	--	--	--	482
Carbamates:					
EPTC	--	1	6	NA	1,575
Pebulate	--	--	--	--	234
Vernolate	--	--	--	--	1,191
Butylate	--	--	--	--	1,873
Other carbamates	--	2	14	--	4,276
Dinitro group	15	61	8	NA	5,678
Triazines:					
Atrazine	--	1	34	NA	39,842
Propazine	--	--	--	--	2,594
Simazine	49	307	2	NA	1,193
Other triazines	--	--	35	--	1,918
Benzoics:					
Amiben	--	--	--	--	9,360
Dicamba	--	--	47	--	2,706
Other benzoic	--	--	125	--	141
Other organics:					
Trifluralin	1	17	48	NA	16,613
Nitralin	--	7	--	--	1,348
Dalapon	16	62	--	NA	584
Norea	--	--	--	--	919
Fluorodifen	--	--	--	--	416
Others	116	360	104	NA	4,287
Petroleum	(5)	75	5	NA	2,573

-- = none reported.
NA = not available.
[1] Does not include Alaska.
[2] May include use for purposes other than as herbicides.
[3] Crops included in this category are listed in app. 1.
[4] Includes tobacco as well as other field crops listed in app. 1.
[5] Less than 500 acres.

Appendix table 10—Acres of all crops treated with selected herbicides by region, 1971[1]

Type of herbicide[2]	North-east	Lake States	Corn Belt	Northern Plains	Appa-lachian	South-east	Delta States	Southern Plains	Moun-tain	Pacific	Total
	1,000 acres										
Inorganic herbicides	5	—	114	92	8	25	60	135	23	189	651
Organic herbicides:											
Arsenicals	—	—	199	—	166	657	2,382	774	15	76	4,269
Phenoxys:											
2,4-D	944	4,568	10,346	19,637	1,040	859	836	3,385	9,172	4,058	54,845
2,4,5-T	20	32	90	264	22	8	168	647	51	237	1,539
MCPA	27	2,931	206	3,897	—	—	1	43	201	778	8,084
Other phenoxy	65	136	417	—	446	65	394	—	36	70	1,629
Phenyl urea:											
Diuron	38	—	46	—	38	93	575	37	23	362	1,212
Linuron	99	503	2,583	210	386	108	789	46	26	16	4,766
Fluometuron	—	—	247	—	449	661	2,574	233	—	42	4,206
Other phenyl urea	24	—	11	28	1	42	67	34	10	52	269
Amides:											
Propachlor	104	2,797	8,915	2,707	3	—	165	135	—	22	14,848
Propanil	—	—	—	—	—	—	1,152	606	—	—	1,758
Alanap	—	3	866	18	425	800	2,001	24	—	—	4,137
Alachlor	666	1,438	7,628	727	633	113	383	22	22	4	11,636
Other amides	—	57	295	(3)	—	—	107	23	—	—	482
Carbamates:											
EPTC	36	545	144	311	1	42	—	20	151	325	1,575
Pebulate	4	—	—	—	7	9	—	—	—	214	234
Vernolate	—	—	214	(3)	368	511	86	12	—	—	1,191
Butylate	39	63	1,194	55	63	378	—	—	43	38	1,873
Other carbamates	2	377	869	1,131	233	22	409	29	478	726	4,276
Dinitro group	619	21	231	34	405	800	3,101	43	169	255	5,678

See footnotes at end of table.

Continued

Appendix table 10—Acres of all crops treated with selected herbicides by region, 1971[1]—Continued

Type of herbicide[2]	North-east	Lake States	Corn Belt	Northern Plains	Appa-lachian	South-east	Delta States	Southern Plains	Moun-tain	Pacific	Total
	1,000 acres										
Triazines:											
Atrazine	2,604	7,952	16,696	7,903	2,836	356	307	776	254	158	39,842
Propazine	--	--	138	508	30	61	37	1,817	--	3	2,594
Simazine	125	95	499	2	115	38	--	4	5	310	1,193
Other triazines	26	4	187	11	17	130	96	1,136	28	283	1,918
Benzoics:											
Amiben	3	1,691	7,001	592	27	--	43	3	--	--	9,360
Dicamba	7	432	1,108	632	--	--	--	12	375	140	2,706
Other benzoic	--	--	--	141	--	--	--	--	--	--	141
Other organics:											
Trifluralin	53	436	5,317	293	1,073	1,597	3,776	3,019	384	665	16,613
Nitralin	--	--	30	--	69	174	724	173	31	147	1,348
Dalapon	20	30	54	97	11	207	52	--	21	92	584
Norea	--	--	69	371	65	178	67	167	--	2	919
Fluorodifen	--	167	220	28	--	--	--	--	--	1	416
Others	135	322	413	178	488	701	225	218	275	1,332	4,287
Petroleum	322	760	702	--	5	16	16	449	123	180	2,573

-- = not reported.
[1] Does not include Alaska.
[2] May include use for purposes other than as herbicides.
[3] Less than 500 acres.

Appendix table 11—Quantities of insecticides (active ingredients) used on selected crops, by region, 1971[1]

Crop	North-east	Lake States	Corn Belt	Northern Plains	Appa-lachian	South-east	Delta States	Southern Plains	Moun-tain	Pacific	Total
	1,000 pounds										
Corn	155	2,749	15,314	5,852	375	42	37	54	928	25	25,531
Cotton	—	—	38	—	3,610	27,259	29,323	10,320	1,868	939	73,357
Wheat	1	—	—	41	2	(3)	87	1,355	33	193	1,712
Sorghum	—	—	94	1,301	28	406	339	2,927	398	236	5,729
Rice	—	—	—	—	—	—	91	726	—	129	946
Other grain[2]	14	181	112	(3)	10	3	36	404	2	59	821
Soybeans	27	—	117	—	928	2,655	1,872	22	—	—	5,621
Tobacco	19	—	2	—	2,511	1,467	—	—	—	—	3,999
Peanuts	—	—	—	—	1,071	3,835	3	1,084	—	—	5,993
Sugarbeets	—	4	2	11	—	—	—	—	151	492	660
Other field crops[2]	3	9	39	62	—	407	118	3	479	502	1,619
Alfalfa	245	206	470	8	170	—	24	52	486	615	2,276
Other hay crops and forage	8	4	102	—	—	4	—	36	15	3	172
Pasture and rangeland	—	—	—	1	—	31	34	93	—	2	161
Potatoes	621	182	—	258	268	91	—	518	548	284	2,770
Other vegetables[2]	1,389	366	1,238	—	395	1,364	126	295	156	2,939	8,268
Citrus	—	—	—	—	—	2,139	—	224	27	659	3,049
Apples	2,403	349	831	5	359	32	—	—	44	808	4,831
Other deciduous fruits[2]	393	148	62	2	143	307	33	3	24	1,976	3,091
Other fruits and nuts[2]	58	72	3	2	76	272	122	352	248	1,978	3,183
Nursery and greenhouse crops	150	1	—	—	20	88	—	—	2	206	467
Total	5,486	4,271	18,424	7,543	9,966	40,402	32,245	18,465	5,409	12,045	154,256

— = not reported

[1] Does not include Alaska. Petroleum excluded from active ingredients.

[2] Crops included in this category are listed in app. 1.

[3] Less than 500 pounds.

Appendix table 12—Quantities of selected insecticides (active ingredients) used on specified crops, 1971[1]

Type of insecticide[2]	Corn	Cotton	Wheat	Other grains[3]	Soybeans	Tobacco
	1,000 pounds					
Inorganic insecticides	—	69	—	—	—	96
Botanicals and biologicals	33	—	—	—	—	(7)
Synthetic organic insecticides:						
Organochlorines:						
Lindane	4	—	—	(7)	1	(7)
Strobane	—	216	—	—	—	—
TDE (DDD)	—	—	—	—	(7)	162
DDT	4	13,158	9	91	197	7
Methoxychlor	92	—	11	—	—	—
Endrin	30	1,068	5	25	23	—
Heptachlor	1,104	—	—	—	—	—
Dieldrin	—	65	—	—	—	1
Aldrin	7,759	—	—	67	11	(7)
Chlordane	842	—	—	41	—	2
Endosulfan	—	—	—	4	17	120
Toxaphene	182	28,112	26	462	1,524	206
Others	29	—	—	—	—	5
Total	10,046	42,619	51	690	1,773	503
Organophosphorus:						
Disulfoton	312	225	579	1,319	2	148
Bidrin	—	778	—	(7)	—	—
Methyl parathion	15	22,988	429	1,261	2,209	14
Parathion	1,329	2,560	395	2,114	59	271
Malathion	114	670	1	195	89	126
Diazinon	1,991	—	—	—	—	154
Trichlorfon	—	144	—	—	—	4
Azinphosmethyl	—	288	4	88	—	97
Phorate	2,661	100	122	441	140	—
Ethion	—	6	—	—	—	—
Others	1,093	1,617	17	112	3	997
Total	7,515	29,376	1,547	5,530	2,502	1,811
Carbamates:						
Bux	3,575	—	—	24	—	—
Carbaryl	1,649	1,214	114	1,088	1,346	1,420
Carbofuran	2,681	—	—	164	—	—
Methomyl	—	40	—	—	—	166
Others	—	37	—	—	—	—
Total	7,905	1,291	114	1,276	1,346	1,586
Other synthetic organics	32	2	—	—	(7)	3
Total synthetic organics	25,498	73,288	1,712	7,496	5,621	3,903
Total insecticides (not including petroleum)	25,531	73,357	1,712	7,496	5,621	3,999
Petroleum	1,784	8	—	55	128	144
Total insecticides	27,315	73,365	1,712	7,551	5,749	4,143

See footnotes at end of table.

Continued

Appendix table 12—Quantities of selected insecticides (active ingredients) used on specified crops, 1971[1]—Continued

Type of insecticide[2]	Peanuts	Other field crops[4]	Alfalfa	Other hay and pasture[5]	Irish potatoes	Other vegetables[6]
	1,000 pounds					
Inorganic insecticides	17	2	—	(7)	3	179
Botanicals and biologicals	—	—	(7)	—	1	27
Synthetic organic insecticides:						
Organochlorines:						
Lindane	—	1	(7)	—	1	36
Strobane	—	—	—	—	—	—
TDE (DDD)	—	1	—	—	—	77
DDT	62	47	—	1	77	330
Methoxychlor	85	123	499	25	14	15
Endrin	(7)	226	—	—	5	1
Heptachlor	—	—	3	1	—	34
Dieldrin	—	118	(7)	—	—	64
Aldrin	—	31	1	—	—	—
Chlordane	—	29	—	2	33	16
Endosulfan	—	43	—	—	182	299
Toxaphene	1,356	85	18	32	142	628
Others	—	—	—	5	—	10
Total	1,503	704	521	66	454	1,510
Organophosphorus:						
Disulfoton	26	114	227	1	1,047	28
Bidrin	(7)	17	—	—	—	(7)
Methyl parathion	13	24	137	1	—	265
Parathion	7	183	247	10	167	430
Malathion	—	40	401	116	12	223
Diazinon	114	127	151	3	2	356
Trichlorfon	2	219	142	—	—	42
Azinphosmethyl	—	2	132	2	191	251
Phorate	134	271	22	(7)	254	33
Ethion	—	49	—	—	(7)	52
Others	89	261	136	—	224	958
Total	385	1,307	1,595	133	1,897	2,638
Carbamates:						
Bux	—	7	—	—	—	—
Carbaryl	4,088	219	104	134	357	3,199
Carbofuran	—	4	—	—	—	2
Methomyl	—	36	56	—	58	713
Others	—	—	—	—	—	—
Total	4,088	266	160	134	415	3,914
Other synthetic organics	—	—	—	—	—	—
Total synthetic organics	5,976	2,277	2,276	333	2,766	8,062
Total insecticides (not including petroleum)	5,993	2,279	2,276	333	2,770	8,268
Petroleum	—	6	41	—	119	226
Total insecticides	5,993	2,285	2,317	333	2,889	8,494

See footnotes at end of table.

Continued

Appendix table 12—Quantities of selected insecticides (active ingredients) used on specified crops, 1971[1]—Continued

Type of insecticide[2]	Citrus	Apples	All other fruits and nuts[6]	Nursery and greenhouse crops	Total
	1,000 pounds				
Inorganic insecticides	338	1,853	484	1	3,042
Botanicals and biologicals	7	—	(7)	1	69
Synthetic organic insecticides:					
Organochlorines:					
Lindane	—	—	120	13	176
Strobane	—	—	—	—	216
TDE (DDD)	—	1	3	—	244
DDT	5	—	16	1	14,005
Methoxychlor	—	7	60	2	933
Endrin	—	2	33	—	1,418
Heptachlor	—	1	—	—	1,143
Dieldrin	15	5	47	6	321
Aldrin	35	—	3	—	7,907
Chlordane	18	373	7	133	1,496
Endosulfan	—	136	76	3	880
Toxaphene	9	—	58	27	32,867
Others	1	2	218	—	270
Total	83	527	641	185	61,876
Organophosphorus:					
Disulfoton	—	—	17	4	4,049
Bidrin	—	12	—	—	807
Methyl parathion	49	—	155	2	27,562
Parathion	68	138	1,323	71	9,372
Malathion	56	21	589	58	2,711
Diazinon	—	18	212	10	3,138
Trichlorfon	—	—	—	3	556
Azinphosmethyl	25	969	603	1	2,653
Phorate	—	—	—	—	4,178
Ethion	1,818	69	330	2	2,326
Others	326	641	1,148	57	7,679
Total	2,342	1,868	4,377	208	65,031
Carbamates:					
Bux	—	—	—	—	3,606
Carbaryl	244	583	769	64	16,592
Carbofuran	—	—	3	—	2,854
Methomyl	—	—	—	8	1,077
Others	—	—	—	—	37
Total	244	583	772	72	24,166
Other synthetic organics	35	—	(7)	(7)	72
Total synthetic organics	2,704	2,978	5,790	465	151,145
Total insecticides (not including petroleum)	3,049	4,831	6,274	467	154,256
Petroleum	40,082	5,690	12,244	194	60,721
Total insecticides	43,131	10,521	18,518	661	214,977

— = not reported.

[1] Does not include Alaska. [2] May include use for purposes other than insecticides. [3] Includes sorghum and rice as well as other grains listed in app. 1. [4] Includes sugarbeets and summer fallow as well as other field crops listed in app. 1. [5] Includes rangeland. [6] Crops included in this category are listed in app. 1. [7] Less than 500 pounds.

Appendix table 13—Quantities of selected insecticides (active ingredients) used on crops, by region, 1971[1]

Type of insecticide[2]	North-east	Lake States	Corn Belt	Northern Plains	Appa-lachian	South-east	Delta States	Southern Plains	Moun-tain	Pacific	Total
	1,000 pounds										
Inorganic insecticides	1,121	14	615	—	282	427	—	—	—	583	3,042
Botanicals and biologicals	1	3	30	—	1	22	—	—	4	8	69
Synthetic organic insecticides:											
Organochlorines:											
Lindane	6	1	1	2	(3)	41	108	—	(3)	17	176
Strobane	—	—	—	—	201	—	—	—	15	—	216
TDE (DDD)	—	—	1	—	21	150	—	69	—	3	244
DDT	313	2	9	—	994	6,992	4,774	825	41	55	14,005
Methoxychlor	177	76	264	(3)	102	37	3	(3)	15	259	933
Endrin	5	—	37	4	—	339	990	—	7	36	1,418
Heptachlor	18	10	1,110	—	—	—	1	—	3	1	1,143
Dieldrin	6	—	—	(3)	7	6	158	32	15	97	321
Aldrin	—	93	7,435	247	40	42	36	1	10	3	7,907
Chlordane	479	225	575	—	30	67	—	41	9	70	1,496
Endosulfan	185	2	30	3	110	121	1	—	29	399	880
Toxaphene	—	40	189	87	2,196	15,369	10,754	2,694	1,238	300	32,867
Others	3	—	—	29	4	7	(3)	1	—	226	270
Total	1,192	449	9,651	372	3,705	23,171	16,825	3,663	1,382	1,466	61,876
Organophosphorus:											
Disulfoton	46	30	20	635	119	148	14	2,052	634	351	4,049
Bidrin	—	—	36	—	12	—	259	464	15	21	807
Methyl parathion	8	(3)	35	83	379	6,600	13,398	6,051	439	569	27,562
Parathion	412	92	45	1,563	624	917	44	3,258	1,159	1,258	9,372
Malathion	100	53	276	178	300	526	114	293	32	839	2,711
Diazinon	86	373	1,053	787	302	78	—	(3)	80	379	3,138
Trichlorfon	—	—	—	21	—	6	—	33	162	334	556
Azinphosmethyl	637	140	285	2	194	204	—	336	25	830	2,653
Phorate	2	225	1,940	415	376	19	24	20	510	647	4,178

See footnotes at end of table.

Coninued

Appendix table 13—Quantities of selected insecticides (active ingredients) used on crops, by region, 1971[1]—Continued

Type of insecticide[2]	North-east	Lake States	Corn Belt	Northern Plains	Appa-lachian	South-east	Delta States	Southern Plains	Moun-tain	Pacific	Total
	1,000 pounds										
Ethion	38	—	—	—	5	1,666	19	82	14	502	2,326
Others	496	287	623	282	676	885	949	284	477	2,720	7,679
Total	1,825	1,200	4,313	3,966	2,987	11,049	14,821	12,873	3,547	8,450	65,031
Carbamates:											
Bux	9	817	1,375	1,365	—	—	—	—	40	—	3,606
Carbaryl	1,267	966	1,299	1,205	2,852	5,424	526	1,929	330	794	16,592
Carbofuran	59	791	1,140	635	22	4	62	—	38	103	2,854
Methomyl	12	—	1	—	112	295	—	—	68	589	1,077
Other	—	—	—	—	1	10	9	—	—	17	37
Total	1,347	2,574	3,815	3,205	2,987	5,733	597	1,929	476	1,503	24,166
Other synthetic organics	—	31		—	4	—	2	—	—	35	72
Total synthetic organics	4,364	4,254	17,779	7,543	9,683	39,953	32,245	18,465	5,405	11,454	151,145
Total insecticides (not including petroleum)	5,486	4,271	18,424	7,543	9,966	40,402	32,245	18,465	5,409	12,045	154,256
Petroleum	2,385	481	1,997	4	583	21,433	4	43	17	33,774	60,721
Total insecticides	7,871	4,752	20,421	7,547	10,549	61,835	32,249	18,508	5,426	45,819	214,977

— = none reported.
[1] Does not include Alaska.
[2] May include use for purposes other than as insecticides.
[3] Less than 500 pounds.

Appendix table 14—Acres of specified crops treated with selected insecticides, 1971[1]

Type of insecticide[2]	Corn	Cotton	Wheat	Other grains[3]	Soybeans	Tobacco
	1,000 acres					
Inorganic insecticides	—	23	—	—	—	13
Botanicals and biologicals	22	—	—	—	—	23
Synthetic organic insecticides:						
Organochlorines:						
Lindane	2	—	—	2	9	5
Strobane	—	18	—	—	—	—
TDE (DDD)	—	—	—	—	2	34
DDT	4	2,383	16	262	247	6
Methoxychlor	56	—	22	—	—	—
Endrin	75	262	18	102	58	—
Heptachlor	1,901	—	—	—	—	—
Dieldrin	—	174	—	—	—	7
Aldrin	7,540	—	—	57	9	([7])
Chlordane	533	—	—	78	—	1
Endosulfan	—	—	—	4	18	105
Toxaphene	140	3,275	25	387	951	20
Others	37	—	—	—	—	1
Organophosphorus:						
Disulfoton	517	553	1,221	2,406	3	38
Bidrin	—	1,797	—	2	—	—
Methyl parathion	47	6,384	1,091	2,016	2,150	17
Parathion	1,524	682	1,137	4,409	194	105
Malathion	146	273	11	312	110	101
Diazinon	1,849	—	—	—	—	98
Trichlorfon	—	191	—	—	—	7
Azinphosmethyl	—	119	4	92	—	22
Phorate	3,353	182	142	480	200	—
Ethion	—	30	—	—	—	—
Others	1,428	1,216	34	175	13	203
Carbamates:						
Bux	4,425	—	—	39	—	—
Carbaryl	1,203	244	99	856	913	359
Carbofuran	3,677	—	—	78	—	—
Methomyl	—	84	—	—	—	131
Others	—	66	—	—	—	—
Other synthetic organics	7	24	—	—	6	56
Petroleum	501	11	—	90	169	26

See footnotes at end of table.

Continued

Appendix table 14—Acres of specified crops treated with selected insecticides, 1971[1]—Continued

Type of insecticide[2]	Peanuts	Other field crops[4]	Alfalfa	Other hay and pasture[5]	Irish potatoes	Other vegetables[6]
	1,000 acres					
Inorganic insecticides	3	8	—	348	1	50
Botanicals and biologicals	—	—	11	—	7	47
Synthetic organic insecticides:						
Organochlorines:						
Lindane	—	11	(7)	—	6	30
Strobane	—	—	—	—	—	—
TDE (DDD)	—	6	—	—	—	20
DDT	22	49	—	1	38	68
Methoxychlor	15	35	480	30	2	9
Endrin	1	72	—	—	3	1
Heptachlor	—	—	14	2	—	10
Dieldrin	—	50	2	—	—	123
Aldrin	—	39	1	—	—	—
Chlordane	—	16	—	3	55	7
Endosulfan	—	72	—	—	270	148
Toxaphene	472	61	16	23	47	175
Others	—	—	—	36	—	7
Organophosphorus:						
Disulfoton	35	108	236	1	273	45
Bidrin	1	6	—	—	—	1
Methyl parathion	30	64	230	7	—	80
Parathion	30	204	368	15	141	410
Malathion	—	71	288	63	8	111
Diazinon	64	147	346	11	6	186
Trichlorfon	2	127	114	—	—	34
Azinphosmethyl	—	28	185	6	192	63
Phorate	161	255	22	7	164	69
Ethion	—	66	—	—	8	15
Others	43	332	197	—	266	469
Carbamates:						
Bux	—	7	—	—	—	—
Carbaryl	1,164	169	141	207	171	699
Carbofuran	—	7	—	—	—	8
Methomyl	—	44	47	—	44	275
Others	—	—	—	—	—	—
Other synthetic organics	—	—	—	—	—	—
Petroleum	—	11	78	—	35	98

See footnotes at end of table.

Continued

Appendix table 14—Acres of specified crops treated with selected insecticides, 1971[1]—Continued

Type of insecticide[2]	Citrus	Apples	All other fruits and nuts[6]	Nursery and greenhouse crops	Total
	1,000 acres				
Inorganic insecticides	49	103	87	NA	685
Botanicals and biologicals	37	—	1	NA	148
Synthetic organic insecticides:					
Organochlorines:					
Lindane	—	—	82	NA	147
Strobane	—	—	—	—	18
TDE (DDD)	—	1	1	—	64
DDT	2	—	8	NA	3,106
Methoxychlor	—	6	70	NA	725
Endrin	—	9	47	—	648
Heptachlor	—	(7)	—	—	1,927
Dieldrin	17	4	103	NA	480
Aldrin	11	—	1	—	7,658
Chlordane	10	10	4	NA	717
Endosulfan	—	97	107	NA	821
Toxaphene	2	—	7	NA	5,601
Others	1	9	43	—	134
Organophosphorus:					
Disulfoton	—	—	10	NA	5,446
Bidrin	—	4	—	—	1,811
Methyl parathion	13	—	13	NA	12,142
Parathion	29	119	618	NA	9,985
Malathion	34	16	259	NA	1,803
Diazinon	—	9	124	NA	2,840
Trichlorfon	—	—	—	NA	475
Azinphosmethyl	12	323	475	NA	1,521
Phorate	—	—	—	—	5,035
Ethion	790	94	249	NA	1,252
Others	219	419	643	NA	5,657
Carbamates:					
Bux	—	—	—	—	4,471
Carbaryl	66	231	406	NA	6,928
Carbofuran	—	—	2	—	3,772
Methomyl	—	—	—	NA	625
Others	—	—	—	—	66
Other synthetic organics	7	—	2	NA	102
Petroleum	803	232	384	NA	2,438

— = none reported.
NA = not available.
[1] Does not include Alaska.
[2] May include use for purposes other than as insecticides.
[3] Includes sorghum and rice as well as other grains listed in app. 1.
[4] Includes sugarbeets and summer fallow as well as other field crops listed in app. 1.
[5] Includes rangeland.
[6] Crops included in this category are listed in app. 1.
[7] Less than 500 acres.

Appendix table 15—Acres of all crops treated with selected insecticides, by region, 1971[1]

Type of insecticide[2]	North-east	Lake States	Corn Belt	Northern Plains	Appa-lachian	South-east	Delta States	Southern Plains	Moun-tain	Pacific	Total
	1,000 acres										
Inorganic insecticides	55	2	35	—	30	68	—	—	—	495	685
Botanicals and biologicals	5	7	17	—	20	25	—	—	19	55	148
Synthetic organic insecticides:											
Organochlorines:											
Lindane	[4]	1	3	11	6	34	69	—	[3]	23	147
Strobane	—	—	—	—	14	—	—	—	4	—	18
TDE (DDD)	—	—	6	—	13	41	—	3	—	1	64
DDT	19	6	8	—	152	1,015	1,293	518	44	51	3,106
Methoxychlor	113	67	275	[3]	38	49	25	[3]	20	138	725
Endrin	7	—	127	6	—	156	273	—	26	53	648
Heptachlor	62	32	1,817	—	—	—	2	—	13	1	1,927
Dieldrin	11	—	—	1	5	25	67	170	17	184	480
Aldrin	—	135	6,990	442	35	21	18	1	14	2	7,658
Chlordane	64	159	343	—	30	5	—	78	7	31	717
Endosulfan	207	22	8	10	86	119	5	—	21	343	821
Toxaphene	—	21	159	59	210	2,144	1,590	963	359	96	5,601
Others	[3]	—	—	37	6	37	1	2	—	51	134
Organophosphorus:											
Disulfoton	25	115	91	1,098	124	67	25	2,779	606	516	5,446
Bidrin	—	—	171	—	5	—	890	709	3	33	1,811
Methyl parathion	13	6	75	97	173	2,317	4,634	4,014	493	320	12,142
Parathion	224	139	55	3,551	230	508	197	3,344	820	917	9,985
Malathion	53	43	175	251	181	228	11	267	65	430	1,803
Diazinon	74	235	867	1,015	196	111	—	6	92	244	2,840
Trichlorfon	—	—	—	9	—	4	—	108	71	283	475
Azinphosmethyl	347	205	87	5	109	32	—	159	21	556	1,521
Phorate	1	330	2,355	447	531	30	57	25	576	683	5,035
Ethion	86	—	—	—	6	729	5	29	4	393	1,252
Others	361	278	766	496	224	284	377	475	412	1,984	5,657
Carbamates:											
Bux	11	1,055	1,709	1,639	—	—	—	—	57	—	4,471
Carbaryl	357	631	543	898	1,028	1,567	436	1,074	87	307	6,928
Carbofuran	79	1,302	1,443	779	30	7	36	—	54	42	3,772
Methomyl	7	—	1	—	89	136	—	—	70	322	625
Others	—	—	—	—	1	34	22	—	—	9	66
Other synthetic organics	—	5	—	—	63	—	24	—	—	10	102
Petroleum	151	52	474	27	65	861	2	80	44	682	2,438

— = none reported.
[1] Does not include Alaska.
[2] May include use for purposes other than as insecticides.
[3] Less than 500.
[4] Nursery and greenhouse uses; acres treated not available.

Appendix table 16—Quantities of miscellaneous pesticides (active ingredients) used on selected crops, by region, 1971[1]

Crop	North-east	Lake States	Corn Belt	Northern Plains	Appa-lachian	South-east	Delta States	Southern Plains	Moun-tain	Pacific	Total
	1,000 pounds										
Corn	1	—	(5)	386	—	—	—	—	—	56	443
Cotton	—	—	340	—	178	1,323	3,303	7,230	96	6,226	18,696
Wheat	—	—	—	—	—	—	—	—	245	—	245
Soybeans	—	—	6	—	—	21	25	—	—	—	52
Tobacco	48	—	87	—	6,842	2,443	—	—	—	—	9,420
Peanuts	—	—	—	—	257	68	—	146	—	—	471
Sugarbeets	—	—	3	994	—	—	—	—	123	994	2,114
Other field crops[2]	—	—	—	—	—	—	—	—	35	411	446
Alfalfa	—	(5)	—	—	—	—	—	(5)	—	6	6
Vegetables[3]	43	—	—	55	—	2,222	—	4	5	8,106	10,435
Citrus	—	—	—	—	—	785	—	—	—	495	1,280
Apples	116	29	36	—	27	7	—	—	23	310	548
Other deciduous fruits[4]	8	—	—	—	1	—	—	—	(5)	252	261
Other fruits and nuts[4]	4	—	—	—	—	(5)	—	—	294	1,213	1,511
Nursery and greenhouse crops	18	—	—	—	21	8	—	—	—	297	344
Total	238	29	472	1,435	7,326	6,877	3,328	7,380	821	18,366	46,272

— = none reported.

[1] Does not include Alaska.

[2] Includes other grains, other hay, and forage as well as crops listed in this category in app. 1.

[3] Includes potatoes as well as other vegetables listed in app. 1.

[4] Crops included in this category are listed in app. 2.

[5] Less than 500 pounds.

Appendix table 17—Quantities of selected miscellaneous pesticides (active ingredients) used on specified crops, 1971[1]

Type of miscellaneous pesticide[2]	Corn	Cotton	Tobacco	Other field crops[3]	Vegetables[4]	Citrus	Apples	Other fruits and nuts[5]	Nursery and greenhouse crops	Total
	1,000 pounds									
Miticides:										
Dicofol	56	189	—	32	37	30	6	79	18	447
Chlorobenzilate	—	25	—	—	—	706	—	81	—	812
Aramite	—	—	—	—	—	—	—	15	2	17
Omite	—	6	—	42	—	—	278	89	—	415
Others	1	62	—	14	5	20	83	133	12	330
Total	57	282	—	88	42	756	367	397	32	2,021
Fumigants:										
Dibromochloropropane	—	211	6	1,415	1,149	36	—	782	(6)	3,599
D-D mixture	—	—	2,468	893	2,950	449	—	—	—	6,760
Telone	—	616	1,264	515	4,032	—	—	—	7	6,434
Bromomethane	—	—	2	1	290	17	—	190	271	771
Others	386	337	689	300	1,538	13	—	101	31	3,395
Total	386	1,164	4,429	3,124	9,959	515	—	1,073	309	20,959
Defoliants and desiccants:										
Arsenic acid	—	6,051	—	14	—	8	—	—	—	6,073
DEF and Folex	—	5,004	—	46	—	—	—	—	—	5,050
Others	—	6,195	—	61	339	(6)	—	—	—	6,595
Total	—	17,250	—	121	339	8	—	—	—	17,718
Rodenticides	(6)	—	—	1	—	(6)	7	1	1	10
Plant growth regulators:										
Maleic hydrazide	—	—	4,128	—	95	—	—	—	—	4,223
Others	—	—	850	(6)	(6)	1	174	301	2	1,328
Total	—	—	4,978	(6)	95	1	174	301	2	5,551
Repellents	—	—	13	—	—	—	—	—	—	13
Total miscellaneous pesticides	443	18,696	9,420	3,334	10,435	1,280	548	1,772	344	46,272

— = none reported. [1]Does not include Alaska. [2]May include use for purposes other than those indicated. [3]Includes sorghum, wheat, rice, soybeans, peanuts, sugarbeets, and alfalfa, as well as other grains, other field crops, and other hay and forage listed in app. 1. [4]Includes potatoes, as well as other vegetables listed in app. 1. [5]Includes other deciduous fruits and other fruits and nuts listed in app. 1. [6]Less than 500 pounds.

Appendix table 18—Quantities of selected miscellaneous pesticides (active ingredients) used on crops, by region, 1971[1]

Type of miscellaneous pesticide[2]	North-east	Lake States	Corn Belt	Northern Plains	Appa-lachian	South-east	Delta States	Southern Plains	Moun-tain	Pacific	Total
	1,000 pounds										
Miticides:											
Dicofol	23	—	([3])	—	1	3	—	—	11	409	447
Chlorobenzilate	—	—	—	—	—	695	—	—	—	117	812
Aramite	—	—	—	—	—	—	—	—	—	17	17
Omite	69	10	28	—	9	—	—	—	14	285	415
Others	44	—	—	—	17	23	—	2	18	226	330
Total	136	10	28	—	27	721	—	2	43	1,054	2,021
Fumigants:											
Dibromochloropropane	—	—	5	995	255	119	—	92	—	2,133	3,599
D-D mixture	2	—	—	—	1,559	3,123	—	—	124	1,952	6,760
Telone	—	—	—	—	1,264	—	—	3	—	5,167	6,434
Bromomethane	17	—	—	—	22	17	—	—	—	715	771
Others	11	—	—	386	313	394	38	116	245	1,892	3,395
Total	30	—	5	1,381	3,413	3,653	38	211	369	11,859	20,959
Defoliants and desiccants:											
Arsenic	—	—	—	—	—	46	—	5,975	52	—	6,073
DEF and Folex	—	—	84	—	162	1,306	3,003	308	51	136	5,050
Others	—	—	260	—	16	—	287	884	2	5,145	6,595
Total	—	—	344	—	178	1,352	3,290	7,167	105	5,282	17,718
Rodenticides	8	([3])	([3])	([3])	—	—	—	([3])	([3])	2	10
Plant growth regulators:											
Maleic hydrazide	55	—	87	54	3,224	770	—	—	4	29	4,223
Others	9	19	8	—	471	381	—	—	300	140	1,328
Total	64	19	95	54	3,695	1,151	—	—	304	169	5,551
Repellents	—	—	—	—	13	—	—	—	—	—	13
Total miscellaneous pesticides	238	29	472	1,435	7,326	6,877	3,328	7,380	821	18,366	46,272

— = none reported.
[1] Does not include Alaska.
[2] May include use for purposes other than those indicated.
[3] Less than 500 pounds.

Appendix table 19--Acres of specified crops treated with selected miscellaneous pesticides, 1971[1]

Type of miscellaneous pesticide[2]	Corn	Cotton	Tobacco	Other field crops[3]	Vegetables[4]	Citrus	Apples	Other fruits and nuts[5]	Nursery and greenhouse crops	Total
	1,000 acres									
Miticides:										
Dicofol	89	236	--	41	44	13	16	35	NA	474
Chlorobenzilate	--	51	--	--	--	417	--	24	--	492
Aramite	--	--	--	--	--	--	--	21	NA	21
Omite	--	11	--	35	--	--	270	53	--	369
Others	1	113	--	10	7	13	78	97	NA	319
Fumigants:										
Dibromochloropropane	--	24	1	102	76	2	--	50	NA	255
D-D mixture	--	--	31	6	34	2	--	--	--	73
Telone	--	14	23	5	40	--	--	--	NA	82
Bromomethane	--	--	1	1	1	3	--	1	NA	7
Others	64	231	51	20	72	3	--	5	NA	446
Defoliants and desiccants:										
Arsenic acid	--	922	--	5	--	6	--	--	--	933
DEF and Folex	--	3,638	--	33	--	--	--	--	--	3,671
Others	--	1,035	--	24	11	6	--	--	--	1,076
Rodenticides	1	--	--	209	--	1	105	19	NA	335
Plant growth regulators:										
Maleic hydrazide	--	--	716	--	37	--	--	--	--	753
Others	--	--	131	1	13	5	130	61	NA	341
Repellents	--	--	16	--	--	--	--	--	--	16

-- = none reported.
NA = not available.
[1] Does not include Alaska.
[2] May include use for purposes other than those indicated.
[3] Includes sorghum, wheat, rice, soybeans, peanuts, sugarbeets, and alfalfa, as well as other grains, other field crops, and other hay and pasture listed in app. 1.
[4] Includes potatoes as well as other vegetables listed in app. 1.
[5] Includes other deciduous fruits and other fruits and nuts listed in app. 1.

Appendix table 20—Acres of all crops treated with selected miscellaneous pesticides, by region, 1971[1]

Type of miscellaneous pesticide[2]	North-east	Lake States	Corn Belt	Northern Plains	Appa-lachian	South-east	Delta States	Southern Plains	Moun-tain	Pacific	Total
	1,000 acres										
Miticides:											
Dicofol	23	—	1	—	8	([4])	—	—	14	428	474
Chlorobenzilate	—	—	—	—	—	410	—	—	—	82	492
Aramite	—	—	—	—	—	—	—	—	—	21	21
Omite	58	75	30	—	5	—	—	—	14	187	369
Others	49	—	—	—	10	14	—	11	21	214	319
Fumigants:											
Dibromochloropropane	—	—	6	8	63	18	—	12	—	148	255
D-D mixture	([3])	—	—	—	23	34	—	—	1	15	73
Telone	—	—	—	—	23	—	—	2	—	57	82
Bromomethane	([3])	—	—	—	([3])	4	—	—	—	3	7
Others	2	—	—	64	28	36	50	60	27	179	446
Defoliants and desiccants:											
Arsenic acid	—	—	—	—	—	23	—	879	31	—	933
DEF and Folex	—	—	89	—	174	835	2,057	406	31	79	3,671
Others	—	—	8	—	20	—	229	322	2	495	1,076
Rodenticides	29	94	1	([3])	—	—	—	37	11	163	335
Plant growth regulators:											
Maleic hydrazide	18	—	13	28	563	124	—	—	1	6	753
Others	15	22	4	—	92	43	—	—	36	129	341
Repellents	—	—	—	—	16	—	—	—	—	—	16

— = none reported.

[1] Does not include Alaska.

[2] May include use for purposes other than those indicated.

[3] Less than 500 acres.

[4] Nursery and greenhouse uses for which acres treated are not available.

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This publication reports research involving pesticides. It does not contain recommendations for their use, nor does it imply that the uses discussed here have been registered. All uses of pesticides must be registered by appropriate State and/or Federal agencies before they can be recommended.

CAUTION: Pesticides can be injurious to humans, domestic animals, desirable plants, and fish or other wildlife — if they are not handled or applied properly. Use all pesticides selectively and carefully. Follow recommended practices for the disposal of surplus pesticides and pesticide containers.