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EXTENT AND COST OF WEED CONTROL WITH HERBICIDES AND AN EVALUATION OF IMPORTANT WEEDS, 1965

AGRICULTURAL RESEARCH SERVICE
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USE PESTICIDES SAFELY

Pesticides used improperly can be injurious to man and animals. Use them only when needed and handle them with care. Follow the directions and heed all precautions on the labels.

This report supersedes ARS-34-21, "A Survey of Extent and Cost of Weed Control and Specific Weed Problems," issued in 1965.

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EXTENT AND COST OF WEED CONTROL WITH HERBICIDES AND AN EVALUATION OF IMPORTANT WEEDS, 1965 [1]

INTRODUCTION

For ages the figure of a man with a hoe has symbolized the farmer. A better symbol would be difficult to find. To the farmer, probably no effort in crop production is more universal or more characteristic than his constant battle with weeds. The hoe symbolizes this effort.

Until a generation ago, the farmer's solution to his weed problems was a relatively straightforward attack with physical force. His weapons were tillage implements and, in many situations, even his hands or hand tools. Herbicides have greatly increased the farmer's ability to control weeds. At the same time, herbicides complemented other adjustments in crop production technology and are needed to replace the diminishing supply of farm labor. Weed control with herbicides continues to fit into the scheme of increased mechanization of agriculture. However, with the advances in weed control systems have come changes in the weed problems--the enemy has also changed tactics!

The dramatically effective and selective herbicide 2,4-D was the first organic herbicide widely adopted by farmers for killing weedy broadleaf vegetation in grain crops, pastures, and other areas. However, 2,4-D was no panacea. Tolerant broadleaf weeds and resistant grasses survive treatment and increase in numbers. It is evident that no single herbicide is sufficient and that our weed problems constantly change.

The U.S. Department of Agriculture recognizes that all measures for controlling weeds must be employed to reduce losses in crop production. Integrated weed control programs must include time-tested control measures, such as cultivation, mowing, burning, use of weedfree seed, crop rotation, and fertilizer practices, as well as herbicide control measures. [2] Biological controls must also be developed and integrated into the programs. In the foreseeable future, however, herbicides hold the greatest promise for checking and reducing the losses caused by weeds. The current survey was designed to provide basic information on the economics, costs, and effectiveness of herbicides.

Today we have a growing force of chemically-armed farmers, advised by a dedicated group of trained weed specialists. Their efforts against weeds are aided by an efficient staff of industrial organizations, weed scientists, and teachers who provide needed materials, new and improved methods, and trained personnel for replacement and expansion. However, achievement of desired goals--effective allocation of weed control efforts, maximum utilization of energies, and economy of operation--depends upon constant reappraisal of progress on old problems and definition of new problems. This report provides a basis for assessing these needs.

This report presents results of a third survey on the extent and cost of weed control with herbicides and provides an updated evaluation of some of our more important weed problems. Previous surveys were made in 1959 and 1962; the present survey was conducted during 1965. The data are especially

[1] Information was compiled by L. L. Danielson, W. B. Ennis, Jr., J. T. Holstun, Jr., L. L. Jansen, D. L. Klingman, and F. L. Timmons, Crops Research Division, Agricultural Research Service; J. R. Paulling, Federal Extension Service; and A. S. Fox, Farm Production Economics Division, Economic Research Service, U.S. Department of Agriculture. Information was supplied by specialists in the Cooperative State Extension Services and in the State Agricultural Experiment Stations.

[2] U.S. Agricultural Research Service. Suggested guide for weed control, 1967. Agr. Handb. 332. 1967.

important in establishing trends in usage, costs, effectiveness, areas of application, and intensification of problems. Analysis of trends and new evaluations of specific problems can help us focus attention on problems of greatest importance. What are the costs? What costs are becoming critical? In what crops and geographical areas are the needs for better control of weeds most pressing? In which crops should we develop better alternative treatments? Where do residue hazards exist? Are we directing our efforts against the most important weeds? How important are certain weeds nationally, regionally, statewise, cropwise? These are only a few of the questions for which some answers may be forthcoming to help map future strategy. But other questions remain unanswered. Despite the gaps in the information collected, this third survey provides our best overall appraisal of the extent and costs of weed control and gives valuable new insights into the status of important weed problems.

This study was made possible by the close cooperation of State research and extension workers and three agencies of the U.S. Department of Agriculture--the Economic Research Service, Agricultural Research Service, and Federal Extension Service. All shared in planning the study and writing the report.

GENERAL LIMITATIONS

Tabular data and associated discussions in this report are based on information provided in returned questionnaires.

Some crops are grown in only a few States. Some States did not report on a specific crop, although the crop was grown in the State. In several instances reports were received on specific weed problems but not on associated costs and extent of weed control. Consequently, the number of States reporting on different aspects of problems in a commodity area varies. Weighted averages, totals, and percentages in the summary tables were calculated from the individual reports.

Persistence problems discussed in this report are limited to soil persistence, except for persistence in water of treated aquatic areas. Figures tabulated on persistence problems reflect the number of "yes" or "no" replies to the question "Are herbicidal residues in the soil becoming a problem?" Positive replies are interpreted as indicating that herbicidally active residues persist in the soil (or water) for a sufficient period of time to injure either the crop to which applied or succeeding crops, or to otherwise interfere with traditional programs of cropping, land management, or water usage. Herbicides which persist in the soil do not necessarily cause other environmental contamination.

For several questions, data are not available for providing quantitative answers. In these instances, reporting specialists used their best judgment in making estimates.

These general limitations should be considered in interpreting the report. Other specific limitations are referred to at appropriate places in the discussion.

PURPOSE OF THE SURVEY AND PROCEDURE

The primary objectives of this survey are to update previous information on chemical control of weeds and to identify more exactly the extent and status of the major weed problems contributing to the losses and costs of agriculture. Secondarily, the data are evaluated and presented in a form suited to the varied requirements of both public and private agencies for program reviews and analyses. The report provides a source of information useful for establishing priorities in short term and long range research planning, for implementing research, development, and educational programs, and for guiding effectively the leadership efforts of extension personnel.

Current national and international emphasis on world food problems highlights the importance of weed control in crop production.[3] As

[3] Ennis, W. B., Jr., L. L. Jansen, I. T. Ellis, and L. D. Newsom. Inputs for pesticides. In The World Food Problem, a Report of the President's Science Advisory Committee. Vol. III, pp. 130-175. The White House. 1967.

agricultural technology advances to provide higher levels of production, any factor which limits or reduces yields becomes increasingly important. Information on weed control--one of the major and most costly inputs in time, energy, and materials in crop production--must be updated continually to keep abreast of other developments.

The questionnaire used in the current survey (conducted in 1965) followed the general format of questionnaires used in similar surveys in 1959 and 1962.[4,5] Questions covered items that provide consolidated information on:

(1) The costs of herbicidal control measures, the extent of their use in different crops or commodity areas, their effectiveness, usage trends and residue problems; and

(2) The relative importance of specific weeds as major problems with respect to their geographical distributions and the extent and trends of their infestations in individual crop or commodity areas.

The Federal Extension Service supervised the distribution of the questionnaires to extension specialists charged with educational leadership in weed control in the 50 States. Each specialist was asked to assume responsibility for the reports from his State but was requested to solicit support from all staff members who could contribute to a sound appraisal of the weed problems. Separate reports were requested for each of the 28 crop or commodity areas or types of land usage covered in the tables. Reports were received from all 50 States. Survey results are more complete than were either of the previous surveys.

The Economic Research Service tabulated the information. Regional and national cost averages were weighted for acreages involved. Weed specialists in the Agricultural Research Service interpreted and evaluated the summarized information for each of the crop or commodity areas surveyed. In most instances, State specialists followed suggested guidelines in reporting the weeds by the common names approved by the Weed Science Society of America. Where this was not done, in the best judgment of the botanist and ARS weed specialists, colloquial names were changed to approved common names or to common names used in standard reference volumes. Most of the common names listed in this report are identified in the Appendix by the best-judged scientific nomenclature.

This survey contains some deficiencies that were recognized during the survey planning but which could not then be avoided conveniently. Other deficiencies were detected during summarization and evaluation. Probably some of these can be corrected in future surveys. Nevertheless, the report as it stands satisfies, at least in part, most of the objectives it was designed to meet.

CHEMICAL WEED CONTROL BY FARMERS

(See General Limitations)

The use of herbicides continues to increase in the United States. In 1965, nearly 120 million acres were treated with herbicides as compared with 70 million acres in 1962 and 53 million in 1959 (table 1). These estimates indicate that the use of herbicides is increasing exponentially. For example, the increase during the 3-year period, 1962-65, was 70 percent as compared with about 34 percent during the preceding 3-year period, 1959-62. The largest increases were on corn, small grain, cotton, soybeans, and sorghum.

Although much of the increase is a result of using larger quantities of such older organic herbicides as 2,4-D,[6] a considerable part of the increase is due to the use of some more recently developed herbicides, such as atrazine, trifluralin, and CDAA.[7] Many of the

[4] U.S. Agricultural Research Service and Federal Extension Service. A survey of extent and cost of weed control and specific weed problems. ARS 34-23. 1962.

[5] U.S. Agricultural Research Service and Federal Extension Service. A survey of extent and cost of weed control and specific weed problems. ARS 34-23-1. 1965.

[6] 2,4-dichlorophenoxyacetic acid.

[7] 2-chloro-4-ethylamino-6-isopropylamino-s-triazine (atrazine) α,α,α-trifluoro-2,6-dinitro-N,N-dipropyl-p-toluidine(trifluralin) 2-chloro-N,N-diallylacetamide (CDAA).

Table 1.--Estimated extent and cost of chemical weed control in the United States, 1959, 1962, and 1965

Crop or area	States reporting			Acres treated						Cost of herbicides including cost of application and materials for all treatments						Acreage treated by--					
				Total Number[1]			Percent of total acres[2]			Total			Average per acre			Farmers			Custom		
	1959	1962	1965	1959	1962	1965	1959	1962	1965	1959	1962	1965	1959	1962	1965	1959	1962	1965	1959	1962	1965
	Number	Number	Number	1,000 acres	1,000 acres	1,000 acres	Percent	Percent	Percent	$1,000	$1,000	$1,000	Dollars	Dollars	Dollars	Percent	Percent	Percent	Percent	Percent	Percent
Corn	40	46	48	20,051	25,302	45,012	25	39	68	37,980	57,600	144,267	1.89	2.28	3.21	82	83	80	18	17	20
Cotton	13	15	17	1,554	5,433	12,479	10	35	92	4,709	16,805	59,678	3.03	3.09	4.78	92	91	90	8	9	10
Soybeans	15	28	29	556	2,827	7,832	2	10	23	2,315	10,835	35,249	4.16	3.83	4.50	98	90	93	2	10	7
Small grains	38	45	44	20,723	18,931	28,735	22	24	36	37,095	29,579	53,375	1.79	1.56	1.86	75	65	58	25	35	42
Rice	4	6	5	502	940	1,390	32	53	78	889	6,250	12,638	1.77	6.65	9.09	13	10	8	87	90	92
Peanuts	5	8	9	35	310	797	2	22	55	116	2,565	6,337	3.31	8.27	7.95	100	97	88	--	3	12
Sugarbeets	11	15	15	125	362	495	14	33	40	625	2,237	4,179	5.00	6.18	8.44	94	90	92	6	10	8
Sorghum	14	25	24	2,093	2,665	5,391	14	23	32	6,512	5,258	22,121	3.11	1.97	4.10	40	66	74	60	34	26
Forage seeds	14	20	15	282	439	221	8	16	9	1,868	2,416	1,527	6.62	5.50	6.91	80	62	78	20	38	22
Sweet corn	--	1	21	--	30	308	--	5	56	--	187	1,750	--	6.23	5.68	--	95	81	--	5	19
Other vegetables[3]	20	36	36	276	1,164	779	10	18	13	1,418	10,415	7,969	5.14	8.95	10.23	84	79	72	16	21	28
Fruits and nuts	12	21	21	10	267	540	5	10	19	98	2,397	7,029	9.80	8.98	13.02	99	86	86	1	14	14
Ornamentals	6	15	15	2	51	84	1	25	40	45	969	1,743	22.50	19.00	20.75	70	34	42	30	66	58
Lawns	17	23	29	60	672	1,134	1	5	14	1,489	15,368	26,750	24.82	22.87	23.59	82	83	58	18	17	42
Hay	20	33	35	272	412	1,269	(4)	(4)	2	1,692	1,794	5,224	6.22	4.35	4.12	81	78	79	19	22	21
Pastures[5]	34	45	40	2,400	4,714	6,671	(4)	2	2	5,789	13,340	16,551	2.41	2.83	2.48	74	64	84	26	36	16
Rangeland[6]	13	20	17	2,011	2,262	3,156	(4)	(4)	(4)	6,174	6,265	15,748	3.07	2.77	4.99	37	37	13	63	63	87
Forest plantings	--	18	17	--	274	117	--	--	--	--	2,752	1,492	--	10.04	12.75	--	34	57	--	66	43
Noncropland	27	31	27	1,971	3,612	3,306	--	--	--	19,738	83,714	68,470	10.01	23.18	20.71	30	26	39	70	74	61
Aquatics	--	--	13	--	--	84	--	--	--	--	--	1,922	--	--	22.88	--	--	44	--	--	56
Total or average	41	50	50	52,923	70,667	119,800	--	--	--	128,552	270,746	494,019	2.43	3.83	4.12	--	--	--	--	--	--

[1] Includes acres treated preemergence plus acres treated postemergence; those acres treated both pre- and postemergence are counted twice. This double counting lowers the average cost per acre.
[2] Harvested acreage where crops were harvested (see table 2).
[3] Root crops, cucurbits, vegetable legumes, and solanaceous crops in 1965 and all vegetables except sweet corn in 1959 and 1962. See tables. 27, 29, 31, and 33.
[4] Less than 1.
[5] Annual, improved perennial, and unimproved perennial. See individual tables for more detailed information.
[6] Mountain, prairie, arid, and rainbelt. See individual tables for more detailed information.

newer herbicides possess various properties that make them useful for controlling a broad range of weeds or for controlling specific weeds in many crops and under different soil and climatic conditions.

Herbicidal control of weeds is an essential part of improved crop production technology that also includes the use of fertilizers, and of larger and newer types of machinery and equipment. Many of the recent developments have reduced labor requirements and at the same time have increased the attractiveness of using more herbicides. The use of herbicides helps to reduce the risk of weeds that cannot be controlled because of unfavorable weather conditions. For example, the use of herbicides as preemergence[8] treatments allows the grower several opportunities to control weeds. If the preemergence application is not effective, he still has the alternatives of using herbicides as postemergence treatments or cultivation, or both.

The use of herbicides alone or combined with other methods of weed control offers unusual promise for increasing crop yields. Effective weed control also improves crop quality and reduces costs of harvesting and processing the crop.

Herbicide use affects overall crop production patterns in the choice of crops grown and the variety of crops planted. It influences seedbed preparation, methods of seeding, seeding rates, row spacing, plant spacing in the row, and plant populations per acre. It facilitates the modification of associated fertilizer practices, which include the type of fertilizer used, the time of application, and the placement of fertilizer. More directly, the use of herbicides affects the cultivation practices, such as the number and type of cultivations. The use of herbicides also facilitates irrigation practices, harvesting procedures, seed cleaning operations, erosion control, and fallow practices for weed control. In addition, the extensive use of herbicides helps to improve disease and insect control practices and land and equipment utilization.

[8] Preemergence--prior to emergence of specified weed or crop; postemergence--after emergence of specified weed or crop.

Weed specialists estimate that farmers treated 69 percent more acres in 1965 than in 1962 and that the directly related costs of materials and the cost of application for all herbicide treatments increased about 82 percent. Thus, average costs per acre increased only slightly, from $3.83 to $4.12 per acre. In 1965 costs ranged from less than $2.00 per acre for treatments on small grains to more than $20.00 per acre for treatments on lawns, ornamentals, and noncropland. The higher costs for herbicides are offset by reduced labor needs, improved crop quality and yields, and improvements in other farming operations. Benefits resulting from the use of herbicides continue to attract interest in herbicides that will further reduce yield losses and increase the efficiency of crop production.

Farmers generally treat most of the acreages themselves. This is especially true for the more important row crops--corn, cotton, soybeans, and sorghum--as well as fruits and nuts and most vegetables. Large acreages of small grains and rangeland are often treated by aircraft that generally are owned and furnished by custom operators. Some specialty crops, e.g., rice (which requires flooding and irrigation), are conventionally treated by aircraft.

Herbicides used preemergence continue to grow in importance. Acreage treated preemergence constituted only 7 percent of the total treated acreage of all crops in 1959, but increased to 22 percent in 1962 and to 30 percent in 1965 (table 2). The increase is especially noticeable on such crops as corn and soybeans. From 1962 to 1965, the acres of corn treated preemergence increased from 25 percent to 35 percent of the total acres treated.

Herbicides are still used extensively postemergence. This usage accounts for nearly all of the treated acreage of small grains, most of the treated acreages of sorghum, pasture and rangeland, and about two-thirds of the corn acreage treated.

The average cost of application and materials for herbicides used preemergence is more than twice as much as for those used postemergence (table 3). Most of this difference results from higher costs, or higher

Table 2.--Estimated extent of chemical weed control in the United States, 1959, 1962, and 1965

Crop or area	Total acreage[1]			Acres treated						Preemergence acreage as percent of total			Postemergence acreage as percent of total		
				Preemergence			Postemergence								
	1959	1962	1965	1959	1962	1965	1959	1962	1965	1959	1962	1965	1959	1962	1965
	1,000 acres	1,000 acres	1,000 acres	1,000 acres	1,000 acres	1,000 acres	1,000 acres	1,000 acres	1,000 acres	Percent	Percent	Percent	Percent	Percent	Percent
Corn	81,902	65,204	66,160	2,235	6,382	15,914	17,816	18,920	29,098	2.7	9.8	24.1	21.8	29.0	44.0
Cotton	15,117	15,569	13,617	1,001	3,365	6,613	553	2,068	5,866	6.6	21.6	48.6	3.7	13.3	43.1
Soybeans	22,631	27,604	34,551	546	2,402	6,814	10	425	1,018	2.4	8.7	19.7	(2)	1.5	2.9
Small grains	95,949	80,633	79,363	---	19	1,217	20,723	18,912	27,518	---	(2)	1.5	21.6	23.5	34.7
Rice	1,586	1,773	1,793	---	---	405	502	940	985	---	---	22.6	31.7	53.0	54.9
Peanuts	1,453	1,412	1,443	32	129	377	3	181	420	2.2	9.1	26.1	.2	12.8	29.1
Sugarbeets	905	1,103	1,248	82	331	426	43	31	69	9.1	30.0	34.1	4.8	2.8	5.5
Sorghum	19,035	14,741	16,798	8	241	1,473	2,085	2,424	3,918	(2)	1.6	8.8	11.0	16.4	23.3
Forage seeds	3,627	2,739	2,516	---	62	45	282	377	176	---	2.3	1.8	7.8	13.8	7.0
Sweet corn	634	652	580	---	15	224	---	15	84	---	2.3	38.6	---	2.3	14.5
Other vegetables[3]	6,158	6,194	6,173	72	659	505	204	505	274	1.2	10.6	8.2	3.3	8.2	4.4
Fruits and nuts	2,831	2,893	2,884	2	107	259	8	160	281	.1	3.7	9.0	.3	5.5	9.7
Ornamentals	---	---	---	---	7	15	2	44	69	---	---	---	---	---	---
Lawns	[4] 8,000	[4] 14,000	[4] 15,000	3	104	257	57	568	877	(2)	[5] 0.7	[5] 1.7	.7	[5] 4.1	[5] 5.8
Hay	66,274	67,646	68,076	---	25	112	272	387	1,157	---	(2)	.2	.4	.6	1.7
Pastures[6]	[4] 310,000	[4] 310,000	[4] 310,000	30	32	69	2,370	4,682	6,602	(2)	(2)	(2)	.8	[5] 1.5	[5] 2.1
Rangeland[7]	[4] 630,000	[4] 630,000	[4] 630,000	---	---	---	2,011	2,262	3,156	---	---	---	.3	[5] .4	[5] .5
Forest plantings	---	---	---	---	30	20	---	244	97	---	---	---	---	---	---
Noncropland	---	---	---	27	1,492	1,131	1,944	2,120	2,175	---	---	---	---	---	---
Aquatics	---	---	---	---	---	3	---	---	81	---	---	---	---	---	---
Total or average	1,266,102	1,242,163	1,250,202	4,038	15,402	35,879	48,885	55,265	83,921	[8] 0.3	[8] 1.1	[8] 2.8	[8] 3.7	[8] 4.3	[8] 6.5

[1] Harvested acreage where crops were harvested.
[2] Less than .05.
[3] Root crops, cucurbits, vegetable legumes, and solanaceous crops in 1965 and all vegetables except sweet corn in 1959 and 1962. See tables 27, 29, 31, and 33.
[4] Estimates.
[5] Calculations based on estimated total acres.
[6] Annual, improved perennial and unimproved perennial.
[7] Mountain, foothills, arid, and rainbelt.
[8] Excludes forest plantings, noncropland, and aquatics.

Table 3.--Estimated cost of chemical weed control in the United States, 1959, 1962, and 1965

[Costs are for herbicides and application]

Crop or area	Total cost[1]						Average cost per acre[2]					
	Preemergence			Postemergence			Preemergence			Postemergence		
	1959	1962	1965	1959	1962	1965	1959	1962	1965	1959	1962	1965
	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars
Corn	8,226	28,274	87,526	29,754	29,326	56,741	3.68	4.43	5.50	1.67	1.55	1.95
Cotton	3,222	10,228	33,398	1,487	6,577	26,280	3.22	3.04	5.05	2.69	3.18	4.48
Soybeans	2,297	9,993	32,980	18	842	2,269	4.21	4.16	4.84	1.80	1.98	2.23
Small grains	--	76	5,769	37,095	29,503	47,606	--	4.00	4.74	1.79	1.56	1.73
Rice	--	--	4,078	889	6,250	8,560	--	--	10.07	1.77	6.65	8.69
Peanuts	107	1,188	3,065	9	1,377	3,272	3.34	9.21	8.13	3.00	7.61	7.79
Sugarbeets	428	2,091	3,821	197	146	358	5.22	6.32	8.97	4.58	4.71	5.22
Sorghum	48	700	11,385	6,464	4,558	10,736	6.00	2.91	7.73	3.10	1.88	2.74
Forage seeds	--	668	545	1,868	1,748	982	--	10.77	12.17	6.62	4.64	5.58
Sweet corn	--	112	1,268	--	75	482	--	7.47	5.65	--	5.00	5.75
Other vegetables[3]	582	6,720	6,392	836	3,695	1,577	8.08	10.20	12.66	4.10	7.32	5.76
Fruits and nuts	35	923	3,080	63	1,474	3,949	17.50	8.63	11.87	7.87	9.21	14.06
Ornamentals	2	97	353	43	872	1,390	--	13.86	24.19	21.50	19.82	20.24
Lawns	680	5,163	8,323	809	10,205	18,427	226.67	49.64	32.36	14.19	17.97	20.77
Hay	--	199	1,072	1,692	1,595	4,152	--	7.96	9.54	6.22	4.12	3.59
Pastures[4]	30	135	377	5,759	13,205	16,174	4.00	4.22	5.46	2.43	2.82	2.45
Rangeland[5]	--	--	--	6,174	6,265	15,748	--	--	--	3.07	2.77	4.99
Forest plantings	--	336	126	--	2,416	1,366	--	11.20	6.23	--	9.90	14.08
Noncropland	2,596	33,915	36,631	17,142	49,799	31,839	96.15	22.73	32.40	8.82	23.49	14.64
Aquatics	--	--	113	--	--	1,809	--	--	43.65	--	--	22.33
Total or average	18,253	100,818	240,302	110,299	169,928	253,717	4.54	6.55	6.70	2.26	3.07	3.02

[1] Calculated from the average costs (incurred by farmers and other landowners in the States reporting) times the acres treated as shown on individual tables.
[2] Total costs divided by acreage treated (see table 2) do not always equal average costs, because acreages and costs are rounded in summary tables.
[3] Root crops, cucurbits, vegetable legumes, and solanaceous crops in 1965 and all vegetables except sweet corn in 1959 and 1962.
[4] Annual, improved perennial, and unimproved perennial.
[5] Mountain, foothills, arid, and rainbelt.

rates (or both) of materials for preemergence weed control, particularly on corn, soybeans, small grains, sorghum, and most of the vegetables. On cotton, rice, and peanuts, differences between the costs of using herbicides preemergence and postemergence are not so great. However, preemergence use of herbicides is still slightly more expensive.

Weed specialists reported that the available herbicides were generally effective in controlling weeds in most crops (table 4). However, reports from many states indicate an urgent need for better herbicides on certain crops, particularly soybeans, sugarbeets, hay, and pasture (table 5). Herbicides applied to corn, sorghum, vegetables, fruits and nuts, hay, and pastures are still resulting in some soil residues that are injurious to either treated crops or succeeding crops. Specialists indicated persistence problems in about half the States reporting on corn, cotton, sugarbeets, sorghum, sweet corn, other vegetables, and ornamentals. There appeared to be little difficulty with persistence of herbicides used in small grains, rice, peanuts, and forage seed crops.

Overall trends of herbicide usage still continue upward. However, specialists in some States report that the use of herbicides in 1965 was lower than in 1962. Lower usage was most often reported for small grain, sweet corn, other vegetables, hay, and pasture.

Table 4.--Effectiveness of herbicides and residue problems, by number of States reporting, 1959, 1962, and 1965

Crop or Area	Effectiveness of herbicides																			Problems of herbicide persistence in 1962 and 1965[1]			
	Preemergence									Postemergence										Yes		No	
	Good			Fair			Poor			Good			Fair			Poor						
	1959	1962	1965	1959	1962	1965	1959	1962	1965	1959	1962	1965	1959	1962	1965	1959	1962	1965	1962	1965	1962	1965
	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number
Corn	15	34	32	15	7	15	2	1	1	24	31	31	13	13	17	0	0	0	28	27	17	21
Cotton	4	6	13	7	5	4	0	2	-	5	6	9	3	6	6	0	0	-	9	8	5	9
Soybeans	1	5	7	12	19	17	2	3	5	-	2	4	-	7	7	-	6	5	2	3	25	26
Small grains	-	2	3	-	2	3	-	0	0	24	40	25	11	13	18	0	0	1	3	3	41	41
Rice	-	-	2	-	-	-	-	-	-	4	5	4	0	1	-	0	0	-	1	0	5	5
Peanuts	0	3	5	2	4	4	1	0	-	0	3	2	1	1	4	0	0	1	0	1	6	8
Sugarbeets	3	2	4	4	12	10	3	1	1	1	3	2	4	6	8	0	2	2	4	7	11	8
Sorghum	1	3	11	1	6	9	1	2	1	8	14	11	4	9	11	1	1	1	4	12	19	12
Forage seed	0	3	2	1	4	2	0	1	0	3	7	5	6	9	8	3	2	1	3	4	17	11
Sweet corn	-	1	14	-	0	3	-	0	1	-	1	8	-	0	7	-	0	0	0	15	1	6
Other vegetables[2]	5	15	[3] 25	9	13	[3] 28	1	3	[3] 9	5	16	[3] 16	1	8	[3] 12	0	1	[3] 2	16	[3] 18	19	[3] 32
Fruits and nuts	0	3	7	5	5	5	0	0	-	2	10	10	8	10	9	0	0	-	12	8	8	13
Ornamentals	1	5	7	2	4	6	0	1	1	0	3	4	4	6	6	1	3	2	7	9	8	6
Lawns	2	7	17	2	6	4	1	0	-	8	13	23	7	9	6	2	1	-	7	6	16	23
Hay	1	2	5	0	2	8	0	0	0	10	9	10	6	17	22	2	6	2	6	10	27	25
Pastures[4]	2	1	[3] 2	0	3	[3] 5	0	0	0	19	17	[3] 21	15	33	[3] 24	1	2	[3] 1	7	[3] 15	35	[3] 30
Rangeland[5]	-	-	-	-	-	-	-	-	-	6	11	[3] 12	6	7	[3] 9	1	0	-	2	[3] 4	16	[3] 15
Forest plantings	-	4	4	-	2	3	-	0	0	-	3	8	-	12	6	-	0	2	3	4	14	13
Noncropland	1	5	4	1	4	4	0	0	-	8	12	14	17	15	11	0	2	-	7	5	24	22
Aquatics	-	-	-	-	-	4	-	-	-	-	-	3	-	-	10	-	-	-	-	7	-	6

*Zeros (0) mean that, of the states reporting the use of herbicides or a residue problem, none reported in this category. Dashes (-) mean that no states reported the use of either preemergence, postemergence, or residue problems.

[1] Identifies problem areas needing additional research.

[2] Root crops, curcubits, vegetable legumes, and solanaceous crops in 1965 and all vegetables except sweet corn in 1959 and 1962.

[3] Totals of 4 groupings for vegetables, 3 groupings for pasture, and 4 groupings for rangeland. Each state counted only once in each column; however, within each grouping individual states could report in more than one column under each major heading. See individual tables for more detailed information.

[4] Annual, improved perennial, and unimproved perennial.

[5] Mountain, foothills, arid, and rainbelt.

Table 5.--Herbicide usage trend and need for better herbicides, by number of States reporting, 1959, 1962, and 1965

Crop or Area	Herbicide-usage trend									Need for better herbicides[1]							
	Up			Stationary			Down			Urgent			Some		Little		
	1959	1962	1965	1959	1962	1965	1959	1962	1965	1959	1962	1965	1959	1965	1959	1962	1965
	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number
Corn----------	37	42	43	1	3	5	0	0	--	7	11	8	27	33	4	32	7
Cotton----------	11	14	16	2	0	1	0	0	--	2	5	2	11	13	0	8	2
Soybeans--------	14	27	29	1	0	--	0	0	--	11	24	16	4	12	0	3	1
Small grains----	26	29	26	9	15	18	0	1	--	3	12	6	22	30	11	31	8
Rice----------	2	6	5	2	0	--	0	0	--	1	2	--	3	4	0	4	1
Peanuts---------	2	7	8	0	0	1	0	0	--	2	4	1	1	6	0	2	2
Sugarbeets------	9	14	14	2	1	1	0	0	--	5	12	10	6	5	0	2	--
Sorghum---------	10	13	20	4	11	4	0	0	--	6	14	6	6	14	2	8	4
Forage seeds----	8	15	12	2	6	3	0	0	--	8	15	5	4	8	0	6	2
Sweet corn------	--	0	11	--	1	10	--	0	--	--	0	3	--	14	--	1	4
Other vegetables[2]	16	29	[3] 29	4	7	[3] 20	0	0	--	8	25	[3] 24	12	[3] 31	0	10	[3] 10
Fruit and nuts--	10	20	19	2	1	2	0	0	--	6	15	8	6	13	0	4	--
Ornamentals-----	5	14	14	1	1	1	0	0	--	2	10	4	4	10	0	4	1
Lawns-----------	18	22	27	1	1	2	0	0	--	7	10	7	10	15	3	12	7
Hay----------	14	24	23	4	8	12	0	0	--	8	19	17	9	14	1	14	4
Pastures[4]-------	31	34	[3] 28	3	10	[3] 17	0	0	--	5	16	[3] 13	24	[3] 23	5	24	[3] 9
Rangeland[5]------	10	18	[3] 14	2	1	[3] 5	0	0	1	3	9	[3] 7	8	[3] 11	2	9	[3] 4
Forest planting-	--	10	14	--	0	2	--	0	1	--	11	4	--	9	--	6	4
Noncropland-----	22	27	22	2	4	5	0	0	--	7	12	2	15	20	2	17	5
Aquatics--------	--	--	9	--	--	4	--	--	--	--	--	5	--	8	--	--	--

*Zeros (0) mean that of the states reporting the use of herbicides or a residue problem, none reported in this category. Dashes (-) mean that no states reported the use of either preemergence, postemergence, or residue problems.

[1] Identifies problem areas needing additional research.

[2] Root crops, cucurbits, vegetable legumes, and solanaceous crops in 1965 and all vegetables except sweet corn in 1959 and 1962.

[3] Total for 4 groupings of vegetables, 3 groupings for pasture, and 4 groupings for rangeland. Each state counted only once in each column; however, within each grouping individual states could report in more than one column under each major heading. See individual tables for more detailed information.

[4] Annual, improved perennial, and unimproved perennial.

[5] Mountain, foothills, arid, and rainbelt.

NATIONAL AND REGIONAL IMPORTANCE OF SPECIFIC WEEDS

(See General Limitations)

By design, this survey was limited to only the most serious weeds in the 28 crop, commodity, or land usage areas surveyed. Only the five most important weeds were listed by State specialists for each crop or area. State specialists listed 392 separate weeds, either distinct species or complexes (see even-numbered tables 8 through 62 and Appendix).

From a national standpoint, 34 weeds stand out as important problems because of their occurrence in four of the five groups of crops, commodities, or types of land usage (table 6). In order of their total frequency of listing, the top ten weeds were pigweed, crabgrass, lambsquarters, quackgrass, nutsedge, johnsongrass, foxtail, Canada thistle, ragweed, and barnyardgrass. These weeds were listed as major problems in about two thirds of the individual commodity areas. The fact that they were not listed in the other third does not necessarily imply that any one weed is not a problem or that it does not occur in certain crops, but only that five other weeds are more important in these crops. The same is true for different States and different parts of the same State reporting on a given crop; a weed that is a primary problem in one geographical area may be only of secondary importance in another.

In general, the relative rank of the principal weeds of agronomic and horticultural crops (crops of tilled areas) follows the national order for all groups (table 6). However, within the other commodity area groups a number of weeds were listed more frequently than many of those included in the top ten nationally. Also, the relative importance of a given weed differs greatly from region to region. By frequency rank, the eight principal weeds of the different regions are as follows:

- Northeastern States--quackgrass, crabgrass, lambsquarters, pigweed, nutsedge, ragweed, foxtail, and wild mustard;
- North Central States--quackgrass, Canada thistle, foxtail, pigweed, lambsquarters, giant foxtail, ragweed, and crabgrass;
- Southern States--crabgrass, pigweed, johnsongrass, morningglory, nutsedge, ragweed, bermudagrass, and dock;
- Western States--lambsquarters, pigweed, barnyardgrass, Canada thistle, quackgrass, nutsedge, wild oats, and foxtail.

Frequencies of reporting provide only a partial analysis of the seriousness of specific weed problems. Information on the intensity of the infestation (percent of acreage infested) and on the infestation trend (up, down, or stationary) was also provided for each weed reported. These data are considered in delineating the relative importance of major weeds in each of the crop or commodity areas discussed in the rest of this report. Detailed analyses of all of the weed data are beyond the scope of the current survey.

Table 6.--National and regional importance of 34 weed species or complexes reported as problems in four out of five groups of crops, commodities, or types of land usage

Weed	Number of reports in all crop and commodity areas					Number of areas and number of reports by crop groups[1]								
	Total reports for U.S.	Region				Agronomic Crops[2]		Horticultural Crops[3]		Lawns, Hay, & Pastures[4]		Rangelands, Forest Plantings, & Noncropland[5]		Total areas in all groups
		North-eastern	North-Central	Southern	Western	Areas	Reports	Areas	Reports	Areas	Reports	Areas	Reports	
1. Pigweed	207	40	46	68	53	8	92	7	108	3	17	2	8	20
2. Crabgrass	185	52	24	101	8	7	60	7	88	4	34	2	3	20
3. Lambsquarters	161	51	41	14	55	7	55	7	88	3	15	2	3	19
4. Quackgrass	142	57	49	7	29	6	35	7	53	5	39	2	15	20
5. Nutsedge	109	30	8	46	25	6	39	7	59	2	9	2	2	17
6. Johnsongrass	106	5	21	61	19	7	63	7	21	3	11	1	11	18
7. Foxtail	102	22	47	12	21	6	38	7	43	5	18	2	3	20
8. Thistle, Canada	92	12	49	--	31	6	22	7	21	3	30	4	19	20
9. Ragweed	91	27	27	35	2	6	19	7	32	4	30	3	10	20
10. Barnyardgrass	83	15	12	7	49	7	35	7	40	3	7	1	1	18
11. Morningglory	76	6	7	52	11	7	51	7	21	2	2	1	2	17
12. Mustard, wild	65	18	19	12	16	6	37	5	13	5	13	2	2	18
13. Bermudagrass	40	1	--	27	12	5	8	7	22	4	7	1	3	17
14. Foxtail, giant	39	5	32	2	--	6	19	7	12	3	5	2	3	18
15. Garlic, wild	35	7	6	20	2	2	19	2	3	5	12	1	1	10
16. Sandbur	34	--	4	19	11	6	13	4	6	4	13	1	2	15
17. Smartweed	33	8	17	7	1	5	8	6	15	2	9	1	1	14
18. Dock	32	1	3	24	4	2	7	3	3	5	20	1	2	11
19. Oats, wild	30	--	6	--	24	4	19	3	8	2	2	1	1	10
20. Dock, curly	29	5	6	10	8	3	8	2	4	3	16	1	1	9
21. Horsenettle	27	10	4	13	--	4	5	3	6	4	15	1	1	12
22. Bromegrasses, weed-	27	1	11	1	14	1	2	2	2	3	8	4	15	10
23. Bindweed, field	25	--	9	4	12	3	13	2	6	1	1	2	5	8
24. Kochia	24	--	8	--	16	5	13	3	3	2	3	2	5	12
25. Foxtail, green	23	--	16	--	7	6	11	5	8	2	2	2	2	15
26. Grasses, annual	19	11	4	2	2	1	1	4	13	3	3	1	2	9
27. Sunflower	18	--	8	1	9	4	10	2	2	3	5	1	1	10
28. Thistle, Russian	14	--	1	2	11	4	6	1	1	1	1	3	6	9
29. Milkweed	10	5	4	--	1	1	1	1	2	2	6	1	1	5
30. Buttonweed	8	--	6	--	2	2	2	3	3	1	1	2	2	8
31. Puncturevine	8	--	--	1	7	2	2	2	2	2	2	1	2	7
32. Cheat	6	2	--	4	--	2	2	1	1	2	2	1	1	6
33. Sedges[6]	6	--	--	1	5	1	1	--	--	2	2	1	2	5
34. Cinquefoil	5	4	1	--	--	1	1	1	1	1	2	1	1	4

[1] Aquatic Areas, a fifth group of crops, commodities, or types of land usage, is not shown here. Of the 34 weeds, only one (sedges) was reported in Aquatic Areas.
[2] Includes 9 crop or commodity areas: corn, cotton, soybeans, small grains, rice, peanuts, sugarbeets, sorghum, and forage seed crops.
[3] Includes 7 crop or commodity areas: sweet corn, root crops, cucurbits, vegetable legumes, solanaceous crops, fruits and nuts, and ornamentals.
[4] Includes 5 crop or land use areas: lawns, hay, annual pastures, perennial improved pastures, and perennial unimproved pastures.
[5] Includes 6 land use areas: mountain rangeland, foothills (prairie), arid rangeland, rainbelt rangeland, forest plantings, and noncropland.
[6] Figures for Total reports for U.S., Southern Region, and Total areas in all groups include 1 report of sedges as a problem in a single land use area, Aquatics (see footnote 1).

(See General Limitations)

The 1965 survey included nine agronomic crops--corn, cotton, soybeans, small grains, rice, peanuts, sugarbeets, sorghum, and forage seed crops. The survey did not include sugarcane or tobacco.

In 1965, producers of agronomic crops treated more than 33 million acres with herbicides before the crop emerged. The 1965 acreage treated preemergence is 257 percent of that treated in 1962. The acreage treated with herbicides after the crop emerged also increased from 1962 to 1965, but the rate of increase was less than that for preemergence treatments. In 1965, slightly more than 69 million acres were treated with herbicides after the crop emerged. This is 156 percent of the acreage treated postemergence in 1962.

The total cost of herbicides and their application also rose from 1962 to 1965. This increase in cost exceeded that accounted for by the increase in the number of acres treated. Costs of herbicides and their application for preemergence treatments rose 343 percent from approximately $53 million in 1962 to more than $182 million in 1965. Expenditures for postemergence herbicides and their application rose 195 percent, from approximately $80 million in 1962 to almost $157 million in 1965.

In 1962, the ratio of acres treated postemergence for each acre treated preemergence was 3.42. In 1965, this ratio had dropped to 2.07. In 1962, $1.51 was spent for postemergence treatments for each dollar spent for preemergence treatments. In 1965, only $0.86 was spent for postemergence treatments for each dollar spent for preemergence treatments, despite the fact that twice as many acres were treated postemergence as preemergence.

One part of the discussion that follows, points out important weeds for which infestations appear to be decreasing in a significant portion of the affected crop acreage. Although reports of such decreases indicate that progress is being made toward the solution of problems caused by these weeds, the infestations of these same weeds may be increasing in other States. Also, other weeds may be increasing or may be stationary at high levels of infestation in all regions. Another factor in interpreting these trends is that herbicides that are highly effective in crops grown in one geographical area may be ineffective or unsuitable for similar use in another.

In some instances, reports indicate that a particular weed infests 100 percent of a crop production area and that the trend of infestation is either up or down. This indicates that the intensity of the infestation is either increasing or decreasing and that the entire acreage of the particular crop is infested. In situations involving less than 100 percent infestations, a downward trend could mean that the intensity on infested acres is decreasing, that the actual percentage of fields infested is decreasing, or that both types of decreases are occurring simultaneously.

Tables 1 to 5 present national aspects of the extent, cost, effectiveness, usage trends, and persistence problems associated with herbicides used in individual crops. Odd-numbered tables 7 to 23 present similar data on a State and regional basis. Even-numbered tables 8 through 24 provide information by States and regions on the five most important weeds within each of the nine agronomic crops. Each crop is discussed separately.

Corn

In 1965, corn producers treated 24 percent of the harvested corn acreage with herbicides before the crop emerged, and 44 percent after emergence. They treated almost 16 million acres preemergence at an average cost of $5.50 per acre, and treated slightly more than 29 million acres postemergence at an average cost of $1.95 per acre. Farmers treated 80 percent of the treated acres with their own equipment, and custom operators treated the remaining 20 percent. (Tables 1 to 5, 7, and 8.)

Table 7.--Corn: Estimated extent, cost, and effectiveness of chemical weed control, usage trend, need for better herbicides, and residue problems, by States and geographic divisions, 1965

State and region	Acres treated		Average cost per acre[1]		Acreage treated by--		Effectiveness of herbicides		Herbicides usage trend[2]	Need for better herbicides	Persistence problem
	Pre-emergence	Post-emergence	Pre-emergence	Post-emergence	Farmers	Custom operators	Pre-emergence	Post-emergence			
	1,000 acres	1,000 acres	Dollars	Dollars	Percent	Percent					
Connecticut	25	8	7.00	6.00	50	50	Good	Good	Up	Urgent	No
Delaware	50	50	5.00	2.50	50	50	Good	Good	Up	Some	Yes
Maine	12	1	9.50	2.50	70	30	Good	Good	Up	Some	No
Maryland	250	300	3.00	2.00	85	15	Good	Good	Up	Some	No
Massachusetts	15	10	7.00	5.50	25	75	Good	Good	Up	Some	Yes
New Hampshire	3	7	8.00	8.00	35	65	Fair	Fair	Up	Urgent	Yes
New Jersey	20	16	4.50	2.00	85	15	Good	Good	Up	Little	No
New York	400	100	13.00	7.00	70	30	Good	Fair	Up	Some	No
Pennsylvania	400	550	5.50	6.50	80	20	Fair	Good	Up	Some	No
Rhode Island	4	1	8.00	6.00	90	10	Fair	Fair	Up	Some	No
Vermont	8	12	7.50	7.50	75	25	Good	Fair	Up	Some	No
West Virginia	15	5	6.00	3.00	95	5	Good	Good	Up	Some	Yes
Northeastern	1,202	1,060	7.50	5.00	77	23	9-Good 3-Fair	8-Good 4-Fair	12-Up	2-Urgent 9-Some 1-Little	4-Yes 8-No
Illinois	3,400	3,900	4.00	1.25	95	5	Fair	Good	Up	Some	Yes
Indiana	960	2,400	4.00	.60	100	--	Fair	Fair	Up	Some	Yes
Iowa	3,000	6,000	3.00	1.00	90	10	Fair	Fair	Up	Some	No
Kansas	100	500	7.50	1.85	70	30	Fair	Fair	Up	Some	Yes
Michigan	250	1,000	7.00	2.50	80	20	Good	Good	Sta.	Little	Yes
Minnesota	1,100	3,500	4.50	2.00	75	25	Good	Good	Up	Little	Yes
Missouri	1,000	600	5.00	1.50	63	37	Fair	Good	Up	Some	Yes
Nebraska	1,500	3,500	15.00	4.00	65	35	Good	Good	Up	Some	Yes
North Dakota	22	54	4.50	1.50	99	1	Fair	Good	Up	Some	Yes
Ohio	820	1,115	3.80	1.55	80	20	Good	Good	Up	Some	No
South Dakota	700	2,500	4.00	1.50	40	60	Good	Good	Up	Some	Yes
Wisconsin	525	785	7.20	3.60	70	30	Good	Fair	Up	Some	Yes
North Central	13,377	25,854	5.32	1.78	80	20	6-Good 6-Fair	8-Good 4-Fair	11-Up 1-Sta.	10-Some 2-Little	10-Yes 2-No
Alabama	81	58	4.00	2.00	90	10	Good	Fair	Up	Urgent	No
Arkansas	15	18	4.00	2.75	99	1	Good	Good	Up	Some	Yes
Florida	20	40	4.50	1.50	50	50	Poor	Fair	Up	Urgent	No
Georgia	82	84	9.00	3.00	90	10	Good	Good	Up	Some	No
Kentucky	110	170	4.70	2.00	92	8	Good	Good	Up	Some	Yes
Louisiana	36	72	3.25	1.00	90	10	Fair	Fair	Up	Some	No
Mississippi	100	325	3.00	4.00	85	15	Good	Good	Up	Some	No
North Carolina	315	636	6.00	2.00	90	10	Good	Good	Sta.	Little	No
Oklahoma	10	1	2.50	1.50	100	--	Fair	Good	Sta.	Some	No
South Carolina	75	125	7.50	3.00	75	25	Good	Good	Up	Little	No
Tennessee	170	80	5.50	1.50	60	40	Good	Good	Up	Some	Yes
Texas	35	15	5.00	2.00	60	40	Fair	Good	Up	Urgent	Yes
Virginia	218	163	5.25	3.20	70	30	Fair	Good	Up	Some	No
Southern	1,267	1,787	5.43	2.52	82	18	8-Good 4-Fair 1-Poor	10-Good 3-Fair	11-Up 2-Sta.	3-Urgent 8-Some 2-Little	4-Yes 9-No
Arizona	1	1	5.00	3.00	75	25	Good	Good	Sta.	Little	Yes
California	10	75	7.00	3.50	60	40	Fair	Good	Sta.	Urgent	Yes
Colorado	20	175	3.00	1.50	90	10	Good	Fair	Up	Some	No
Idaho	5	50	6.30	3.00	60	40	Good	Good	Up	Some	Yes
Montana	2	11	3.00	1.25	95	5	Good	Good	Up	Some	Yes
New Mexico	2	9	5.00	1.75	100	--	Good	Fair	Up	Urgent	Yes
Oregon	5	20	7.00	3.00	90	10	Good	Good	Up	Little	Yes
Utah	.5	16	8.00	2.50	80	20	Fair	Fair	Up	Urgent	Yes
Washington	20	5	5.00	2.00	90	10	Good	Fair	Up	Some	Yes
Wyoming	2	35	7.00	2.50	50	50	Good	Fair	Up	Some	Yes
Hawaii	.3	.1	20.00	25.00	100	--	Good	Good	Up	Some	No
Western	67.8	397.1	5.04	2.28	78	22	9-Good 2-Fair	6-Good 5-Fair	9-Up 2-Sta.	3-Urgent 6-Some 2-Little	9-Yes 2-No
United States	15,913.8	29,098.1	5.50	1.95	80	20	32-Good 15-Fair 1-Poor	32-Good 16-Fair	43-Up 5-Sta.	8-Urgent 33-Some 7-Little	27-Yes 21-No

[1] Includes herbicide equipment and labor for treatment made by farmers. Represents cost of herbicide custom applications and/or cost of farmer-applied herbicides. Regional and United States averages are for acreages on which costs were reported.

[2] Sta., stationary.

Table 8.--Corn: Five most important weeds listed alphabetically within States, acreage infested, and infestation trend, 1965

Region and State	Weed	Infestation		Weed	Infestation		Weed	Infestation		Weed	Infestation		Weed	Infestation	
		Acres	Trend (1)		Acres	Trend (1)		Acres	Trend (1)		Acres	Trend (1)		Acres	Trend (1)
		Pct.			Pct.			Pct.			Pct.			Pct.	
Northeastern:															
Connecticut----	Barnyardgrass----	15	Up	Crabgrass--------	30	Up	Nutsedge---------	10	Up	Panicum----------	15	Up	Quackgrass-------	30	Sta.
Delaware-------	Crabgrass--------	70	Up	Foxtail----------	50	Sta.	Johnsongrass-----	5	Up	Pigweed----------	50	Down	Yellow nutsedge--	10	Up
Maine----------	Barnyardgrass----	60	----	Crabgrass--------	1	Up	Lambsquarters----	30	Down	Quackgrass-------	60	Sta.	Wild mustard-----	30	Down
Maryland-------	Canada thistle---	25	Sta.	Curly dock-------	40	Up	Johnsongrass-----	35	Up	Panicum----------	40	Up	Quackgrass-------	25	Up
Massachusetts--	Crabgrass--------	65	Up	Lambsquarters----	80	Sta.	Nutsedge---------	20	Up	Quackgrass-------	25	Sta.	Redroot pigweed--	80	Sta.
New Hampshire--	Crabgrass--------	60	Sta.	Lambsquarters----	60	Sta.	Nutsedge---------	15	Up	Pigweed----------	60	Sta.	Quackgrass-------	60	Up
New Jersey-----	Crabgrass--------	--	Up	Giant foxtail----	--	Up	Lambsquarters----	--	Sta.	Pigweed----------	--	Sta.	Velvetleaf-------	--	Up
New York-------	Crabgrass--------	50	Up	Horsenettle------	30	Up	Lambsquarters----	70	Sta.	Nutsedge---------	40	Up	Quackgrass-------	90	Down
Pennsylvania---	Common milkweed--	4	Up	Giant foxtail----	20	Up	Horsenettle------	5	Up	Nutsedge---------	25	Up	Quackgrass-------	60	Down
Rhode Island---	Crabgrass--------	60	Up	Foxtail----------	60	Up	Nutsedge---------	20	Up	Quackgrass-------	60	Sta.	Wild radish------	80	Up
Vermont--------	Crabgrass--------	25	Up	Lambsquarters----	25	Down	Nutsedge---------	20	Up	Pigweed----------	30	Down	Quackgrass-------	50	Sta.
West Virginia--	Foxtail----------	10	Up	Johnsongrass-----	5	Up	Nutsedge---------	10	Up	Quackgrass-------	10	Up	Smartweed--------	10	Up
North Central:															
Illinois-------	Canada thistle---	15	Down	Giant foxtail----	70	Up	Johnsongrass-----	20	Sta.	Velvetleaf-------	30	Down	Wirestem muhly---	10	Sta.
Indiana--------	Canada thistle---	1	Down	Johnsongrass-----	4	Up	Quackgrass-------	2	Sta.	Wild cane--------	1	Sta.	Wild cucumber----	1	Sta.
Iowa-----------	Buttonweed-------	70	Sta.	Fall panicum-----	5	Up	Giant foxtail----	50	Up	Swamp smartweed--	5	Sta.	Yellow nutsedge--	10	Sta.
Kansas---------	Crabgrass--------	60	Sta.	Giant foxtail----	50	Up	Johnsongrass-----	20	Up	Pigweed----------	75	Sta.	Wild cane--------	20	Up
Michigan-------	Barnyardgrass----	60	Up	Fall panicum-----	60	----	Foxtail----------	95	Sta.	Nutsedge---------	15	Up	Quackgrass-------	75	Down
Minnesota------	Canada thistle---	60	----	Foxtail----------	100	Up	Lambsquarters----	95	Sta.	Pigweed----------	95	Sta.	Quackgrass-------	50	Sta.
Missouri-------	Cocklebur--------	65	Sta.	Crabgrass--------	65	Up	Giant foxtail----	50	Up	Johnsongrass-----	15	Up	Morningglory-----	50	Sta.
Nebraska-------	Crabgrass--------	65	Up	Foxtail----------	95	Up	Pigweed----------	95	Sta.	Velvetleaf-------	35	Sta.	Wild cane--------	30	Up
North Dakota---	Green foxtail----	100	Sta.	Kochia-----------	40	Up	Redroot pigweed--	40	Sta.	Wild mustard-----	90	Sta.	Yellow foxtail---	100	Sta.
Ohio-----------	Canada thistle---	15	Sta.	Foxtail----------	40	Up	Johnsongrass-----	5	Up	Nutsedge---------	10	Up	Velvetleaf-------	5	Sta.
South Dakota---	Canada thistle---	2	Up	Cocklebur--------	50	Sta.	Foxtail----------	100	Sta.	Quackgrass-------	5	Sta.	Sunflower--------	35	Sta.
Wisconsin------	Foxtail----------	100	Up	Lambsquarters----	100	Sta.	Pigweed----------	100	Sta.	Quackgrass-------	60	Down	Velvetleaf-------	70	Up
Southern:															
Alabama--------	Cocklebur--------	50	Up	Crabgrass--------	100	Sta.	Johnsongrass-----	40	Up	Morningglory-----	75	Sta.	Sicklepod--------	90	Sta.
Arkansas-------	Cocklebur--------	10	Sta.	Crabgrass--------	70	Up	Johnsongrass-----	25	Sta.	Morningglory-----	20	Up	Pigweed----------	15	Sta.
Florida--------	Crabgrass--------	100	Sta.	Crotolaria-------	10	Down	Florida purslane-	100	Sta.	Sicklepod--------	20	Sta.	Texas panicum----	20	Up
Georgia--------	Cocklebur--------	50	Up	Johnsongrass-----	40	Up	Nutsedge---------	50	Up	Sandbur----------	20	Up	Sicklepod--------	15	Up
Kentucky-------	Barnyardgrass----	15	Up	Crabgrass--------	60	Sta.	Giant foxtail----	40	Sta.	Johnsongrass-----	30	Up	Pigweed----------	60	Sta.
Louisiana------	Cocklebur--------	30	Down	Crabgrass--------	80	Sta.	Johnsongrass-----	60	Up	Morningglory-----	50	Sta.	Pigweed----------	60	Up
Mississippi----	Cocklebur--------	70	Up	Crabgrass--------	40	Sta.	Hemp sesbania----	30	Up	Morningglory-----	60	Sta.	Tie vine---------	65	Sta.
North Carolina-	Cocklebur--------	40	Sta.	Crabgrass--------	95	Down	Lambsquarters----	90	Down	Nutsedge---------	50	Up	Pigweed----------	90	Down
Oklahoma-------	Crabgrass--------	100	Up	Johnsongrass-----	90	Up	Lambsquarters----	50	Up	Pigweed----------	100	Up	Sandbur----------	50	Up
South Carolina-	Bermudagrass-----	20	Up	Cocklebur--------	60	Up	Johnsongrass-----	20	Sta.	Nutsedge---------	15	Up	Pigweed----------	40	Up
Tennessee------	Cocklebur--------	15	Up	Crabgrass--------	95	Down	Johnsongrass-----	20	Up	Morningglory-----	25	Sta.	Pigweed----------	40	Up
Texas----------	Browntop panicum-	40	Sta.	Crabgrass--------	80	Up	Johnsongrass-----	80	Up	Pigweed----------	80	Up	Texas panicum----	60	Up
Virginia-------	Crabgrass--------	65	Sta.	Fall panicum-----	5	Up	Johnsongrass-----	5	Up	Morningglory-----	15	Sta.	Nutsedge---------	10	Up
Western:															
Arizona--------	Pigweed----------	50	Sta.	Watergrass complex	30	Sta.	Wild cane--------	30	Sta.	-----------------	--	----	-----------------	--	----
California-----	Barnyardgrass----	70	Sta.	Crabgrass--------	50	Sta.	Jimsonweed-------	25	Sta.	Pigweed----------	70	Sta.	Red sorrel-------	30	Sta.
Colorado-------	Field bindweed---	40	Up	Foxtail----------	85	Sta.	Kochia-----------	75	Sta.	Redroot pigweed--	70	Up	Wild oats--------	50	Sta.
Idaho----------	Barnyardgrass----	30	Sta.	Puncturevine-----	30	Up	Sandbur----------	50	Up	-----------------	--	----	-----------------	--	----
Montana--------	Canada thistle---	25	Up	Kochia-----------	50	Sta.	Lambsquarters----	50	Sta.	Pigweed----------	50	Sta.	Quackgrass-------	10	Sta.
Nevada---------	Barnyardgrass----	75	Sta.	Hairy whitetop---	10	Down	Pigweed----------	75	Sta.	Russian knapweed-	10	Up	-----------------	--	----
New Mexico-----	Bindweed---------	10	Sta.	Johnsongrass-----	15	Down	Lambsquarters----	80	Down	Pigweed----------	50	Down	Sunflower--------	60	Down
Oregon---------	Barnyardgrass----	75	Down	Lambsquarters----	15	Down	Pigweed----------	75	Down	Quackgrass-------	15	Down	Sandbur----------	1	Down
Utah-----------	Barnyardgrass----	50	Up	Green foxtail----	50	Up	Morningglory-----	25	Down	Quackgrass-------	20	Up	Redroot pigweed--	100	Sta.
Washington-----	Barnyardgrass----	50	Up	Lambsquarters----	75	Up	Pigweed----------	75	Up	Quackgrass-------	40	Sta.	-----------------	--	----
Wyoming--------	Green foxtail----	90	Sta.	Redroot pigweed--	90	Sta.	Sunflower--------	50	Sta.	Switchgrass------	70	Up	Wild oats--------	30	Sta.
Hawaii---------	Bermudagrass-----	15	Up	Bristly foxtail--	25	Up	Feather fingergrass	15	Up	Spiny amaranth---	15	Up	Swollen fingergrass	15	Up

[1]Sta., stationary

Reports on the effectiveness of herbicides indicate that treatments in 1965 were approximately equal to those used in 1962. Eight States reported an urgent need for better herbicides, 33 reported some need and seven reported little need for better herbicides. Problems of herbicides persisting in the soil in 1965 appear to be about the same as in 1962. In 1965, 27 States reported problems of herbicide persistence, whereas 21 States reported no major problems with persistence. The herbicide-usage trend was up in 43 States, stationary in five, and down in none.

Weeds listed as being one of the five most important in at least four States were barnyardgrass, wild cane, cocklebur, crabgrass, foxtails, johnsongrass, lambsquarters, morningglory, nutsedges, pigweeds, sandbur, Canada thistle, and velvetleaf. Of these nationally or regionally important weeds, those for which the infestation was reported to be decreasing in at least two States were lambsquarters, pigweeds, quackgrass, and Canada thistle.

Cotton

In 1965, cotton producers treated approximately 49 percent of the harvested cotton acreage with herbicides before the crop emerged, and 43 percent after emergence. Although the use of preemergence treatments more than doubled from 1962 to 1965, the percentage of cotton treated postemergence increased even more. Cotton producers treated more than 6.6 million acres preemergence at an average cost of $5.05 per acre, and treated about 5.9 million acres postemergence at an average cost of $4.48 per acre. Farmers applied the herbicides on 90 percent of the treated acres with their own equipment, and custom operators treated 10 percent. (Tables 1 to 5, 9, and 10.)

Reports on the effectiveness of herbicides indicate that treatments in 1965 were more effective than those used in 1962. Two States reported an urgent need for better herbicides, 13 reported some need, and only two reported little need. Problems of herbicides persisting in the soil appear to be about the same as in 1962. Eight States reported problems with herbicides persisting in the soil while nine reported no significant problems with persistence. The usage trend was up in 16 States, stationary in one, and down in none.

Weeds listed as being one of the five most important in at least four States were barnyardgrass, cocklebur, crabgrass, johnsongrass, morningglory, nutsedges, and pigweeds. Of these nationally or regionally important weeds, those for which the infestation was reported to be declining in at least two States were crabgrass, johnsongrass, morningglory, and pigweeds.

Soybeans

In 1965, soybean producers treated almost 20 percent of the harvested acreage with herbicides before the crop emerged, but treated less than 3 percent after emergence. They treated slightly more than 6.8 million acres preemergence at an average cost of $4.84 per acre, and treated slightly over 1.0 million acres postemergence at an average cost of $2.23 per acre. Farmers applied the treatments on 93 percent of the treated acreage with their own equipment, and custom operators treated only 7 percent. (Tables 1 to 5, 11, and 12.)

Reports on the effectiveness of herbicides indicate that treatments in 1965 were only slightly more effective than those used in 1962. Sixteen States reported an urgent need for better herbicides, 12 reported some need, and only one State reported little need. Problems of herbicides persisting in the soil appear to be about the same as in 1962. Three States reported problems with herbicide persistence, and 26 reported no significant problems with persistence. The usage trend for herbicides was up in 29 States and stationary or down in none.

Weeds listed as being one of the five most important in at least four States were cocklebur, crabgrass, foxtails, johnsongrass, lambsquarters, morningglory, nutsedges, pigweeds, velvetleaf, jimsonweed, ragweed, and red sorrel. There were no reports that infestations of any of these nationally or regionally important weeds were declining. This may be related to the small number of acres treated postemergence. The large number of important weeds infesting soybeans is undoubtedly related to the fact that soybeans are grown in States from the extreme southern border to the northern border of the United States.

Table 9.--Cotton: Estimated extent, cost, and effectiveness of chemical weed control, usage trend, need for better herbicides, and residue problems, by States and geographic divisions, 1965

State and region	Acres treated		Average cost per acre[1]		Acreage treated by--		Effectiveness of herbicides		Herbicides usage trend[2]	Need for better herbicides	Persistence problem
	Preemergence	Postemergence	Preemergence	Postemergence	Farmers	Custom operators	Preemergence	Postemergence			
	1,000 acres	1,000 acres	Dollars	Dollars	Percent	Percent					
Missouri	150	100	5.00	2.00	80	20	Good	Good	Up	Some	No
North Central	150	100	5.00	2.00	80	20	1-Good	1-Good	1-Up	1-Some	1-No
Alabama	525	200	6.00	3.50	95	5	Good	Fair	Up	Some	No
Arkansas	1,050	1,000	3.50	10.00	99	1	Good	Good	Up	Some	Yes
Florida	1	--	6.00	--	50	50	Good	----	Up	Some	No
Georgia	403	100	8.00	3.00	70	30	Good	Good	Up	Some	No
Kentucky	.5	2	5.00	2.10	98	2	Good	Fair	Up	Some	No
Louisiana	420	446	3.50	1.50	88	12	Good	Good	Up	Little	No
Mississippi	1,250	1,000	4.00	5.00	90	10	Good	Good	Up	Some	Yes
North Carolina	240	25	6.50	1.75	95	5	Fair	Fair	Up	Some	No
Oklahoma	100	20	7.00	1.50	75	25	Good	Fair	Up	Little	Yes
South Carolina	425	250	6.50	4.50	90	10	Fair	Fair	Up	Some	No
Tennessee	400	143	3.50	4.00	90	10	Good	Fair	Up	Some	Yes
Texas	1,250	2,250	5.00	2.50	95	5	Fair	Good	Up	Urgent	Yes
Virginia	4	--	6.00	--	100	--	Fair	----	Up	Some	No
Southern	6,068.5	5,436	4.82	4.43	92	8	9-Good 4-Fair	5-Good 6-Fair	13-Up	1-Urgent 10-Some 2-Little	5-Yes 8-No
Arizona	75	200	6.00	6.00	80	20	Good	Good	Up	Some	Yes
California	300	100	9.50	7.50	60	40	Good	Good	Up	Some	Yes
New Mexico	20	30	6.00	2.50	80	20	Good	Good	Sta.	Urgent	Yes
Western	395	330	8.66	6.14	69	31	3-Good	3-Good	2-Up 1-Sta.	1-Urgent 2-Some	3-Yes
United States	6,613.5	5,866	5.05	4.48	90	10	13-Good 4-Fair	9-Good 6-Fair	16-Up 1-Sta.	2-Urgent 13-Some 2-Little	8-Yes 9-No

[1] Includes herbicide equipment and labor for treatment made by farmers. Represents cost of herbicide custom applications and/or cost of farmer-applied herbicides. Regional and United States averages are for acreages on which costs were reported.
[2] Sta., stationary.

Table 10.--Cotton: Five most important weeds listed alphabetically within States, acreage infested, and infestation trend, 1965

Region and State	Weed	Infestation		Weed	Infestation		Weed	Infestation		Weed	Infestation		Weed	Infestation	
		Acres	Trend (1)		Acres	Trend (1)		Acres	Trend (1)		Acres	Trend (1)		Acres	Trend (1)
		Pct.			Pct.			Pct.			Pct.			Pct.	
North Central:															
Missouri	Barnyardgrass	85	Sta.	Cocklebur	70	Sta.	Johnsongrass	40	Up	Pigweed	70	Sta.	Morningglory	70	Sta.
Southern:															
Alabama	Cocklebur	40	Up	Johnsongrass	80	Sta.	Morningglory	40	Up	Nutsedge	30	Sta.	Sicklepod	65	Up
Arkansas	Cocklebur	40	Up	Johnsongrass	20	Down	Morningglory	90	Up	Perennial vines	15	Up	Prickly sida	30	Up
Florida	Barnyardgrass	30	Up	Bermudagrass	20	Sta.	Crabgrass	100	Sta.	Florida purslane	100	Sta.	Nutsedge	5	Up
Georgia	Cocklebur	60	Up	Johnsongrass	15	Sta.	Nutsedge	50	Up	Sandbur	20	Up	Sicklepod	5	Sta.
Kentucky	Crabgrass	35	Sta.	Foxtail	25	Up	Johnsongrass	45	Up	Pigweed	10	Sta.	----	--	----
Louisiana	Cocklebur	30	Up	Crabgrass	90	Sta.	Johnsongrass	40	Down	Morningglory	75	Up	Nutsedge	25	Up
Mississippi	Cocklebur	60	Sta.	Crabgrass	75	Down	Johnsongrass	50	Down	Morningglory	50	Sta.	Nutsedge	30	Up
North Carolina	Cocklebur	75	Sta.	Johnsongrass	20	Sta.	Morningglory	80	Sta.	Nutsedge	30	Up	Pigweed	90	Down
Oklahoma	Cocklebur	20	Up	Crabgrass	100	Up	Johnsongrass	80	Up	Pigweed	90	Up	Texas panicum	40	Up
South Carolina	Cocklebur	60	Up	Morningglory	20	Sta.	Nutsedge	20	Up	Pigweed	40	Up	Ragweed	40	Up
Tennessee	Crabgrass	90	Down	Johnsongrass	20	Sta.	Morningglory	25	Sta.	Pigweed	50	Down	Trumpetcreeper	25	Sta.
Texas	Johnsongrass	60	Up	Pigweed	60	Up	Texas panicum	20	Sta.	Trumpetcreeper	10	Sta.	----	--	----
Virginia	Bermudagrass	20	Up	Crabgrass	60	Sta.	Johnsongrass	10	Up	----	--	----	----	--	----
Western:															
Arizona	Barnyardgrass	50	Up	Groundcherry	45	Down	Johnsongrass	15	Down	Morningglory	25	Down	Pigweed	50	Down
California	Barnyardgrass	80	Down	Crabgrass	50	Sta.	Johnsongrass	15	Up	Morningglory	15	Up	Nutsedge	25	Up
Nevada	Barnyardgrass	100	Sta.	Johnsongrass	10	Up	Lambsquarters	50	Sta.	Pigweed	75	Sta.	----	--	----
New Mexico	Johnsongrass	25	Down	Morningglory	45	Down	Nutsedge	45	Sta.	Pigweed	60	Down	Texas blueweed	15	Sta.

[1] Sta., stationary.

Table 11.--Soybeans: Estimated extent, cost and effectiveness of chemical weed control, usage trend, need for better herbicides, and residue problems, by States and geographic divisions, 1965

State and region	Acres treated		Average cost per acre[1]		Acreage treated by--		Effectiveness of herbicides		Herbicides usage trend[2]	Need for better herbicides	Persistence problem
	Preemergence	Postemergence	Preemergence	Postemergence	Farmers	Custom operators	Preemergence	Postemergence			
	1,000 acres	1,000 acres	Dollars	Dollars	Percent	Percent					
Delaware	40	--	4.00	--	85	15	Fair	----	Up	Urgent	No
Maryland	80	--	3.50	--	90	10	Fair	----	Up	Some	No
New Jersey	28	--	3.00	--	95	5	Fair	----	Up	Some	No
New York	2	1	12.00	10.00	70	30	Good	Fair	Up	Some	Yes
Pennsylvania	3	--	4.50	--	100	--	Fair	----	Up	Urgent	No
Northeastern	153	1	3.67	10.00	89	11	1-Good 4-Fair	1-Fair	5-Up	2-Urgent 3-Some	1-Yes 4-No
Illinois	1,800	30	4.50	2.00	95	5	Fair	Fair	Up	Some	No
Indiana	540	--	5.00	--	100	--	Poor	----	Up	Urgent	No
Iowa	1,000	80	3.00	1.50	90	10	Good	Good	Up	Some	No
Kansas	70	--	9.00	--	80	20	Fair	----	Up	Some	Yes
Michigan	100	--	4.00	--	85	15	Good	----	Up	Some	No
Minnesota	360	6	6.00	2.00	95	5	Good	Poor	Up	Little	No
Missouri	350	10	7.00	1.00	83	17	Good	Poor	Up	Some	No
Nebraska	280	--	9.00	--	90	10	Fair	----	Up	Urgent	Yes
North Dakota	20	5	5.00	2.50	100	--	Fair	Fair	Up	Some	No
Ohio	350	12	5.20	4.50	85	15	Fair	Poor	Up	Urgent	No
South Dakota	30	.5	6.00	4.00	40	60	Good	Fair	Up	Urgent	No
Wisconsin	19	--	5.40	--	70	30	Fair	----	Up	Urgent	No
North Central	4,919	143.5	4.91	1.88	92	8	5-Good 6-Fair 1-Poor	1-Good 3-Fair 3-Poor	12-Up	5-Urgent 6-Some 1-Little	2-Yes 10-No
Arkansas	515	315	3.50	2.00	99	1	Fair	Good	Up	Urgent	No
Florida	6	--	6.00	--	100	--	Fair	----	Up	Some	No
Georgia	17	--	9.00	--	100	--	Fair	----	Up	Some	No
Kentucky	40	20	5.00	1.90	95	5	Fair	Poor	Up	Urgent	No
Louisiana	46	150	5.00	2.25	96	4	Fair	Fair	Up	Urgent	No
Mississippi	800	250	5.50	3.00	95	5	Fair	Fair	Up	Urgent	No
North Carolina	55	48	5.00	2.00	95	5	Fair	Good	Up	Urgent	No
Oklahoma	10	--	5.25	--	95	5	Good	----	Up	Some	No
South Carolina	100	50	4.25	1.50	85	15	Poor	Fair	Up	Urgent	No
Tennessee	86	32	4.00	1.00	90	10	Poor	Poor	Up	Urgent	No
Texas	12	--	4.50	--	90	10	Poor	----	Up	Urgent	No
Virginia	55	8	4.80	4.00	70	30	Poor	Good	Up	Urgent	No
Southern	1,742	873	4.73	2.28	95	5	1-Good 7-Fair 4-Poor	3-Good 3-Fair 2-Poor	12-Up	9-Urgent 3-Some	12-No
United States	6,814	1,017.5	4.84	2.23	93	7	7-Good 17-Fair 5-Poor	4-Good 7-Fair 5-Poor	29-Up	16-Urgent 12-Some 1-Little	3-Yes 26-No

[1] Includes herbicide equipment and labor for treatment made by farmers. Represents cost of herbicide custom applications and/or cost of farmer-applied herbicides. Regional and United States averages are for acreages on which costs were reported.

[2] Sta., stationary.

Table 12.--Soybeans: Five most important weeds listed alphabetically within States, acreage infested, and infestation trend, 1965

Region and State	Weed	Infestation		Weed	Infestation		Weed	Infestation		Weed	Infestation		Weed	Infestation	
		Acres	Trend (1)		Acres	Trend (1)		Acres	Trend (1)		Acres	Trend (1)		Acres	Trend (1)
		Pct.			Pct.			Pct.			Pct.			Pct.	
Northeastern:															
Delaware	Crabgrass	50	Up	Foxtail	30	Up	Jimsonweed	20	Up	Morningglory	30	Up	Pigweed	50	Down
Maryland	Horsenettle	15	Up	Jimsonweed	35	Sta.	Johnsongrass	20	Up	Morningglory	40	Up	Ragweed	40	Up
New Jersey	Lambsquarters	--	Sta.	Nutsedge	--	Sta.	Pigweed	--	Sta.	Ragweed	--	Up	Velvetleaf	--	Up
New York	Lambsquarters	70	Sta.	Nutsedge	40	Sta.	Pigweed	60	Sta.	Quackgrass	80	Sta.	Ragweed	70	Sta.
Pennsylvania	Giant foxtail	35	Up	Lambsquarters	80	Sta.	Morningglory	6	Up	Pigweed	80	Sta.	Ragweed	30	Sta.
North Central:															
Illinois	Cocklebur	15	Sta.	Giant foxtail	70	Up	Jimsonweed	15	Sta.	Morningglory	20	Sta.	Red sorrel	25	Up
Indiana	Canada thistle	1	Down	Jimsonweed	10	Up	Johnsongrass	1	Sta.	Morningglory	2	Sta.	Quackgrass	1	Down
Iowa	Buttonweed	50	Sta.	Cocklebur	20	Sta.	Giant foxtail	75	Up	Pigweed	25	Sta.	Ragweed	25	Sta.
Kansas	Foxtail	75	Sta.	Giant foxtail	50	Up	Johnsongrass	20	Up	Pigweed	20	Sta.	Wild cane	20	Up
Michigan	Jimsonweed	30	Up	Nutsedge	30	Up	Quackgrass	60	Sta.	Velvetleaf	50	Up	----------	--	----
Minnesota	Canada thistle	60	Sta.	Cocklebur	40	Up	Foxtail	100	Up	Red sorrel	50	Sta.	Velvetleaf	25	Up
Missouri	Cocklebur	65	Sta.	Giant foxtail	65	Up	Johnsongrass	20	Up	Morningglory	50	Sta.	Pigweed	65	Sta.
Nebraska	Crabgrass	80	Up	Foxtail	90	Up	Pigweed	80	Sta.	Red sorrel	55	Sta.	Velvetleaf	40	Up
North Dakota	Green foxtail	95	Sta.	Lambsquarters	60	Sta.	Redroot pigweed	75	Sta.	Wild mustard	75	Down	Yellow foxtail	95	Sta.
Ohio	Canada thistle	15	Sta.	Foxtail	60	Sta.	Jimsonweed	20	Up	Red sorrel	65	Sta.	Velvetleaf	20	Up
South Dakota	Cocklebur	15	Sta.	Foxtail	18	Sta.	Lambsquarters	10	Sta.	Sunflower	20	Sta.	Velvetleaf	3	Sta.
Wisconsin	Barnyardgrass	80	Up	Foxtail	100	Sta.	Lambsquarters	100	Sta.	Pigweed	100	Sta.	Velvetleaf	70	Up
Southern:															
Arkansas	Barnyardgrass	10	Up	Cocklebur	30	Up	Johnsongrass	55	Sta.	Morningglory	85	Up	Pigweed	40	Up
Florida	Cocklebur	20	Sta.	Crabgrass	100	Sta.	Florida purslane	100	Sta.	Morningglory	10	Up	Sicklepod	20	Sta.
Georgia	Cocklebur	60	Up	Johnsongrass	20	Up	Pigweed	60	Up	Sandbur	20	Sta.	Sicklepod	30	Up
Kentucky	Cocklebur	10	Down	Foxtail	60	Up	Johnsongrass	20	Up	Pigweed	60	Up	Smartweed	20	Up
Louisiana	Crabgrass	50	Down	Hemp sesbania	30	Sta.	Johnsongrass	30	Sta.	Morningglory	70	Up	Pigweed	40	Up
Mississippi	Cocklebur	60	Sta.	Hemp sesbania	35	Up	Johnsongrass	70	Up	Morningglory	75	Sta.	Pigweed	50	Up
North Carolina	Cocklebur	90	Up	Morningglory	85	Up	Nutsedge	15	Up	Pigweed	95	Down	Sicklepod	30	Sta.
Oklahoma	Cocklebur	30	Up	Crabgrass	95	Up	Johnsongrass	80	Up	Morningglory	25	Up	Pigweed	90	Up
South Carolina	Cocklebur	60	Up	Florida purslane	30	Up	Nutsedge	20	Up	Pigweed	40	Up	Ragweed	30	Up
Tennessee	Cocklebur	45	Up	Crabgrass	95	Sta.	Johnsongrass	40	Up	Morningglory	20	Sta.	Pigweed	40	Up
Texas	Crabgrass	45	Sta.	Morningglory	10	Sta.	Nutsedge	25	Sta.	Pigweed	50	Sta.	Ragweed	30	Sta.
Virginia	Cocklebur	20	Up	Jimsonweed	20	Up	Morningglory	45	Up	Ragweed	25	Sta.	Redroot pigweed	40	Sta.
Western:															
New Mexico	Barnyardgrass	15	Down	Johnsongrass	15	Sta.	Pigweed	50	Down	----------	--	----	----------	--	----

[1] Sta., stationary.

Small Grains

In 1965, producers of small grains treated only 1.5 percent of the harvested acreage with herbicides before emergence of the crop, but treated almost 35 percent after emergence. They treated 1.2 million acres preemergence at an average cost of $4.74 per acre and treated 27.5 million acres postemergence at an average cost of $1.73 per acre. Farmers treated 58 percent of the treated acreage with their own equipment, and custom operators treated 42 percent. (Tables 1 to 5, 13, and 14.)

Reports on the effectiveness of herbicides indicate that treatments in 1965 were less effective than those used in 1962. This may indicate that weeds resistant to postemergence applications of 2,4-D are increasing. Only six States reported an urgent need for better herbicides, 30 reported some need, and eight reported little need. Problems of herbicides persisting in the soil appear to be remaining constant at the same low level reported in 1962. Only three States reported problems involving persistence while 41 States reported no problems. The usage trend was up in 26 States, stationary in 18, and down in none.

Weeds listed as one of the five most important in at least four States were foxtails, lambsquarters, quackgrass, ragweed, red sorrel, field bindweed, downy brome, wild buckwheat, chickweed, docks, wild garlic, henbit, knawel, mustards, and wild oats. Of these nationally or regionally important weeds, those for which the infestation was reported to be declining in at least two States were lambsquarters, wild garlic, mustards, and wild oats. More problem weeds infest small grains than any other agronomic crop. Undoubtedly, this is related to the fact that small grains are grown in all geographic regions of the United States and are subject to infestation by both cold-season and warm-season weeds during a single growing season.

Rice

In 1965, rice producers treated almost 23 percent of the harvested rice acreage with herbicides before the crop emerged, and almost 55 percent after emergence. The percentage treated postemergence increased very little as compared with the amount treated in 1962, but there was practically no preemergence treatment of rice in 1962. Rice producers treated 405,000 acres preemergence at an average cost of $10.07 per acre and they treated 985,000 acres postemergence at an average cost of $8.69 per acre. The continual rise in cost per acre for postemergence treatments that has occurred since 1959 is related to the development of newer herbicides that are more effective as postemergence treatments for control of grasses. Farmers treated only 8 percent of their treated acres with their own equipment, and custom operators treated 92 percent. Of all agronomic crops, rice has the highest percentage of the herbicide applications made by custom operators. This, of course, is because most of the applications are made with aerial equipment. (Tables 1 to 5, 15, and 16.)

Reports on the effectiveness of herbicides indicate that treatments in 1965 were more effective than those used in 1962. This is primarily because of the development of chemicals satisfactory for use before the crop emerges. No State reported an urgent need for better herbicides, four States reported some need, and only one reported little need. Problems of herbicides persisting in the soil appear to be about the same as in 1962. No State reported problems with persistence in 1965 and only one State reported problems in 1962. Five States reported that herbicide-usage trends were up and no State reported that usage trends were stationary or down.

Weeds listed as being one of the five most important in at least two States were barnyardgrass, ducksalad, northern jointvetch, red rice, and hemp sesbania. Of these nationally or regionally important weeds, only barnyardgrass was reported to be declining in at least two States.

Peanuts

In 1965, peanut producers treated approximately 26 percent of the harvested acreage with herbicides before the crop emerged, and approximately 29 percent after emergence. They treated 377,000 acres preemergence at an average cost of $8.13 per acre, and treated

Table 13.--Small grains: Estimated extent, cost and effectiveness of chemical weed control, usage trend, need for better herbicides, and residue problems, by States and geographic divisions, 1965[1]

State and region	Acres treated		Average cost per acre[2]		Acreage treated by--		Effectiveness of herbicides		Herbicides usage trend[3]	Need for better herbicides	Persistence problem
	Preemergence	Postemergence	Preemergence	Postemergence	Farmers	Custom operators	Preemergence	Postemergence			
	1,000 acres	1,000 acres	Dollars	Dollars	Percent	Percent					
Delaware	--	20	--	2.00	100	--	----	Fair	Up	Some	No
Maryland	--	25	--	1.75	70	30	----	Fair	Up	Urgent	No
Massachusetts	--	1	--	3.00	45	55	----	Fair	Up	Some	No
New Jersey	--	16	--	1.75	95	5	----	Good	Up	Some	No
New York	--	400	--	6.50	70	30	----	Good	Up	Some	Yes
Pennsylvania	--	375	--	3.75	90	10	----	Good	Up	Little	No
Rhode Island	--	.2	--	5.00	90	10	----	Good	Up	Some	No
Vermont	--	2	--	3.50	75	25	----	Good	Sta.	Some	No
West Virginia	--	2	--	2.00	100	--	----	Fair	Up	Some	No
Northeastern	--	841.2	--	4.91	80	20	----	5-Good 4-Fair	8-Up 1-Sta.	1-Urgent 7-Some 1-Little	1-Yes 8-No
Illinois	--	26	--	1.25	95	5	----	Fair	Sta.	Some	No
Iowa	--	760	--	.75	95	5	----	Good	Sta.	Little	No
Kansas	--	1,000	--	1.85	10	90	----	Fair	Sta.	Urgent	Yes
Michigan	--	1,000	--	2.50	90	10	----	Good	Sta.	Some	No
Minnesota	10	2,800	4.00	2.00	75	25	Good	Good	Up	Little	No
Missouri	--	30	--	1.00	50	50	----	Poor	Sta.	Little	No
Nebraska	--	2	--	3.00	50	50	----	Good	Up	Some	No
North Dakota	90	8,185	4.00	1.50	60	40	Fair	Good	Sta.	Some	No
Ohio	--	210	--	1.40	80	20	----	Fair	Up	Some	No
South Dakota	5	4,000	4.00	1.35	35	65	Fair	Good	Sta.	Urgent	No
Wisconsin	--	550	--	1.30	80	20	----	Good	Sta.	Little	No
North Central	105	18,563	4.00	1.58	58	42	1-Good 2-Fair	7-Good 3-Fair 1-Poor	3-Up 8-Sta.	2-Urgent 5-Some 4-Little	1-Yes 10-No
Alabama	--	10	--	1.50	95	5	----	Fair	Sta.	Some	No
Arkansas	--	5	--	1.50	25	75	----	Good	Up	Some	No
Florida	--	10	--	1.50	75	25	----	Fair	Up	Some	No
Georgia	--	4	--	3.00	60	40	----	Good	Up	Some	No
Kentucky	--	3	--	2.50	80	20	----	Fair	Up	Some	No
Louisiana	--	11	--	1.25	60	40	----	Good	Sta.	Little	No
North Carolina	--	85	--	2.00	90	10	----	Fair	Sta.	Some	No
Oklahoma	--	40	--	1.50	95	5	----	Good	Up	Urgent	No
South Carolina	--	10	--	1.00	75	25	----	Fair	Up	Some	No
Tennessee	--	10	--	1.50	95	5	----	Fair	Up	Some	No
Texas	--	500	--	1.60	25	75	----	Fair	Up	Some	No
Virginia	--	51	--	2.00	90	10	----	Fair	Up	Some	No
Southern	--	739	--	1.66	45	55	----	4-Good 8-Fair	9-Up 3-Sta.	1-Urgent 10-Some 1-Little	12-No
Arizona	--	5	--	2.00	80	20	----	Good	Sta.	Some	No
California	--	700	--	3.00	25	75	----	Good	Sta.	Little	No
Colorado	--	200	--	1.75	40	60	----	Good	Sta.	Some	No
Idaho	1,000	5	5.00	3.00	50	50	Fair	Good	Up	Some	No
Montana	12	3,400	4.00	1.25	60	40	Good	Good	Up	Some	No
Nevada	--	15	--	3.00	20	80	----	Good	Up	Some	No
New Mexico	--	3	--	2.00	100	--	----	Good	Up	Some	No
Oregon	--	800	--	2.00	50	50	----	Good	Sta.	Urgent	Yes
Utah	--	95	--	2.00	40	60	----	Good	Sta.	Little	No
Washington	100	2,000	6.00	2.00	70	30	Good	Fair	Sta.	Some	No
Wyoming	--	150	--	2.00	50	50	----	Fair	Up	Some	No
Alaska	--	2	--	6.00	100	--	----	Fair	Up	Urgent	No
Western	1,112	7,375	5.08	1.75	57	43	2-Good 1-Fair	9-Good 3-Fair	6-Up 6-Sta.	2-Urgent 8-Some 2-Little	1-Yes 11-No
United States	1,217	27,518.2	4.74	1.73	58	42	3-Good 3-Fair	25-Good 18-Fair 1-Poor	26-Up 18-Sta.	6-Urgent 30-Some 8-Little	3-Yes 41-No

[1] Small grains such as wheat, barley, oats and rye.

[2] Includes herbicide equipment and labor for treatment made by farmers. Represents cost of herbicide custom applications and/or cost of farmer-applied herbicides. Regional and United States averages are for acreages on which costs were reported.

[3] Sta., stationary.

Table 14.--Small Grains: Five most important weeds listed alphabetically within States, acreage infested, and infestation trend, 1965.

Region and State	Weed	Infestation		Weed	Infestation		Weed	Infestation		Weed	Infestation		Weed	Infestation	
		Acres	Trend [1]		Acres	Trend [1]		Acres	Trend [1]		Acres	Trend [1]		Acres	Trend [1]
		Pct.			Pct.			Pct.			Pct.			Pct.	
Northeastern:															
Delaware	Chickweed	30	Sta.	Dogfennel	25	Up	Knawel	10	Up	Wild garlic	40	Sta.	Wild mustard	50	Up
Maine	Annual grasses	40	Up	Lambsquarters	30	Sta.	Redroot pigweed	20	Sta.	Wild mustard	20	Sta.	Wild radish	20	Sta.
Maryland	Cheat	20	Sta.	Corn chamomile	70	Up	Corn cockle	35	Sta.	Knawel	30	Up	Quackgrass	15	Up
Massachusetts	Crabgrass	70	Up	Foxtail	45	Up	Lambsquarters	90	Sta.	Redroot pigweed	85	Down	Smartweed	30	Sta.
New Jersey	Corn chamomile	--	Up	Knawel	--	Up	Wild garlic	--	Sta.	----------	--	----	----------	--	----
New York	Lambsquarters	70	Down	Quackgrass	60	Sta.	Ragweed	70	Sta.	Wild mustard	90	Down	Yellow rocket	60	Sta.
Pennsylvania	Canada thistle	10	Down	Nutsedge	18	Up	Ragweed	70	Up	Wild garlic	15	Down	Yellow foxtail	20	Down
Rhode Island	Shepherdspurse	60	Sta.	White cockle	60	Sta.	Wild mustard	80	Sta.	Wild radish	90	Sta.	Yellow rocket	60	Sta.
Vermont	Crabgrass	20	Sta.	Foxtail	20	Sta.	Nutsedge	20	Up	Ragweed	30	Down	Wild mustard	50	Down
West Virginia	Canada thistle	15	Up	Foxtail	25	Up	Quackgrass	10	Up	Wild garlic	25	Up	Wild mustard	30	Up
North Central:															
Illinois	Canada thistle	15	Down	Milkweed	20	Down	Wild garlic	15	Down	Wild mustard	25	Down	Wintercress	20	Down
Indiana	Canada thistle	--	Sta.	Field pepperweed	--	Down	Smartweed	--	Down	Wild garlic	--	Down	Wintercress	--	Down
Iowa	Giant foxtail	50	Sta.	Green foxtail	50	Sta.	Ragweed	25	Sta.	Swamp smartweed	10	Sta.	Yellow foxtail	50	Sta.
Kansas	Bindweed	15	----	Lambsquarters	20	----	Pigweed	20	----	Sunflower	20	----	Wild buckwheat	20	----
Michigan	Quackgrass	35	Sta.	Red sorrel	40	Sta.	Wild garlic	15	Up	----------	--	----	----------	--	----
Minnesota	Foxtail	50	Up	Red sorrel	25	Up	Wild buckwheat	25	Up	Wild mustard	75	Sta.	Wild oats	20	Sta.
Missouri	Cocklebur	35	Sta.	Foxtail	100	Up	Johnsongrass	10	Up	Morningglory	35	Sta.	Pigweed	100	Sta.
Nebraska	Buckhorn plantain	--	Up	Downy brome	--	Up	Foxtail	--	Sta.	Pennycress	--	Sta.	Shepherdspurse	--	Sta.
North Dakota	Field bindweed	30	Sta.	Kochia	30	Up	Wild buckwheat	75	Sta.	Wild mustard	85	Down	Wild oats	85	Sta.
Ohio	Canada thistle	20	Up	Red sorrel	50	Sta.	Wild garlic	10	Sta.	Wild mustard	15	Sta.	Yellow rocket	15	Sta.
South Dakota	Canada thistle	10	Up	Downy brome	40	Sta.	Wild buckwheat	100	Up	Wild mustard	100	Up	Wild oats	90	Sta.
Wisconsin	Lambsquarters	100	Sta.	Quackgrass	50	Sta.	Red sorrel	30	Sta.	Wild mustard	40	Sta.	Wild radish	20	Sta.
Southern:															
Alabama	Chickweed	75	Up	Curly dock	90	Up	Henbit	75	Up	Wild garlic	90	Up	Wild mustard	50	Up
Arkansas	Corn cockle	5	Sta.	Dock	10	Sta.	Wild garlic	15	Sta.	Wild mustard	30	Sta.	Wild onion	10	Sta.
Florida	Carolina geranium	50	Sta.	Eveningprimrose	50	Sta.	Henbit	40	Sta.	Pepperweed	40	Sta.	Wild mustard	10	Up
Georgia	Blessed thistle	20	Up	Dock	--	Up	Pepperweed	--	Up	Wild garlic	70	Sta.	Wild mustard	20	Up
Kentucky	Bindweed	15	Sta.	Chickweed	35	Up	Curly dock	25	Sta.	Henbit	35	Up	Wild garlic	80	Up
Louisiana	Common chickweed	10	Sta.	Curly dock	80	Sta.	Henbit	20	Down	Knawel	15	Down	Wild mustard	50	Sta.
North Carolina	Dock	40	Sta.	Meadow campion	70	Sta.	Thistles	60	Sta.	Wild garlic	80	Sta.	Wild mustard	85	Sta.
Oklahoma	Bindweed	50	Up	Lambsquarters	40	Up	Pigweed	50	Up	Vetch	30	Sta.	Wild mustard	20	Sta.
South Carolina	Blessed thistle	15	Sta.	Common chickweed	15	Up	Little barley	20	Up	Wild garlic	25	Sta.	Wild mustard	35	Sta.
Tennessee	Curly dock	20	Sta.	Henbit	90	Sta.	Knawel	30	Sta.	Wild garlic	75	Up	Wild mustard	20	Sta.
Texas	Bindweed	25	Sta.	Pepperweed	45	Sta.	Ragweed	50	Sta.	Texas blueweed	25	Sta.	Wild mustard	50	Sta.
Virginia	Chickweed	25	Up	Dock	10	Sta.	Henbit	20	Sta.	Knawel	20	Up	Wild garlic	35	Sta.
Western:															
Arizona	Johnsongrass	10	Sta.	Lambsquarters	25	Sta.	London rocket	60	Sta.	Sowthistle	10	Sta.	Wild oats	40	Sta.
California	Bindweed	25	Sta.	Douglas fiddleneck	30	Sta.	London rocket	30	Sta.	Tansymustard	20	Sta.	Wild oats	25	Sta.
Colorado	Downy brome	60	Up	Lambsquarters	60	Sta.	Russian thistle	90	Sta.	Wild mustard	90	Sta.	Wild oats	75	Up
Idaho	Blue mustard	10	Up	Canada thistle	80	Down	Field bindweed	20	Sta.	Pennycress	30	Sta.	Wild oats	60	Down
Montana	Cow cockle	30	Up	Downy brome	50	Up	Kochia	25	Up	Wild buckwheat	50	Up	Wild oats	40	Down
Nevada	Flixweed	60	Down	Hairy whitetop	30	Down	Lambsquarters	60	Down	Russian knapweed	10	Up	Wild mustard	60	Sta.
New Mexico	Bindweed	5	Sta.	Curly dock	5	Down	Lambsquarters	10	Down	Sunflower	10	Down	Wild oats	5	Sta.
Oregon	Bindweed	8	Sta.	Blue mustard	1	Sta.	Downy brome	50	Up	Fiddleneck	50	Sta.	Ryegrasses	15	Down
Utah	Morningglory	15	Up	Prickly lettuce	50	Sta.	Sunflower	50	Sta.	Wild mustard	100	Down	Wild oats	20	Down
Washington	Canada thistle	10	Up	Downy brome	25	Sta.	Fiddleneck	50	Sta.	Field bindweed	10	Sta.	Russian thistle	25	Sta.
Wyoming	Downy brome	40	Up	Redroot pigweed	80	Sta.	Sunflower	70	Sta.	Wild buckwheat	30	Up	Wild mustard	40	Up
Alaska	Chickweed	100	Sta.	Hempnettle	20	Up	Lambsquarters	100	Sta.	Wild buckwheat	50	Up	Wild mustard	80	Up

[1] Sta., stationary

Table 15.--Rice: Estimated extent, cost, and effectiveness of chemical weed control, usage trend, need for better herbicides, and residue problems, by States and geographic divisions, 1965

State and region	Acres treated		Average cost per acre[1]		Acreage treated by--		Effectiveness of herbicides		Herbicides usage trend[2]	Need for better herbicides	Persistence problem
	Preemergence	Postemergence	Preemergence	Postemergence	Farmers	Custom operators	Preemergence	Postemergence			
	1,000 acres	1,000 acres	Dollars	Dollars	Percent	Percent					
Arkansas	--	540	--	9.00	1	99	----	Good	Up	Little	No
Louisiana	--	250	--	10.00	1	99	----	Good	Up	Some	No
Mississippi	--	45	--	10.00	20	80	----	Good	Up	Some	No
Texas	400	--	10.00	--	25	75	Good	----	Up	Some	No
Southern	400	835	10.00	9.35	9	91	1-Good	3-Good	4-Up	3-Some 1-Little	4-No
California	5	150	16.00	5.00	3	97	Good	Good	Up	Some	No
Western	5	150	16.00	5.00	3	97	1-Good	1-Good	1-Up	1-Some	1-No
United States	405	985	10.07	8.69	8	92	2-Good	4-Good	5-Up	4-Some 1-Little	5-No

[1] Includes herbicide equipment and labor for treatment made by farmers. Represents cost of herbicide custom applications and/or cost of farmer-applied herbicides. Regional and United States averages are for acreages on which costs were reported.
[2] Sta., stationary.

Table 16.--Rice: Five most important weeds listed alphabetically within States, acreage infested, and infestation trend, 1965

Region and State	Weed	Infestation		Weed	Infestation		Weed	Infestation		Weed	Infestation		Weed	Infestation	
		Acres	Trend (1)		Acres	Trend (1)		Acres	Trend (1)		Acres	Trend (1)		Acres	Trend (1)
		Pct.			Pct.			Pct.			Pct.			Pct.	
Southern:															
Arkansas	Barnyardgrass	90	Up	Ducksalad	80	Up	Hemp sesbania	90	Sta.	Morningglory	10	Up	Northern jointvetch	90	Sta.
Louisiana	Barnyardgrass	100	Sta.	Ducksalad	25	Up	Goosegrass	25	Up	Red rice	100	Sta.	Sedges	25	Up
Texas	Barnyardgrass	50	Down	Baronetgrass	50	Down	Hemp sesbania	25	Down	Northern jointvetch	25	Down	Red rice	30	Down
Western:															
California	Algae	20	Sta.	Barnyardgrass	60	Down	Bulrushes	20	Up	Cattail	20	Up	Sprangletop	15	Up

[1] Sta., stationary.

420,000 acres postemergence at an average cost of $7.79 per acre. Farmers treated 88 percent of the treated acreage with their own equipment, and custom operators treated 12 percent. (Tables 1 to 5, 17, and 18.)

Reports on the effectiveness of herbicides indicate that treatments in 1965 were slightly more effective than those used in 1962. Only one State reported an urgent need for better herbicides, six reported some need, and only two reported little need. Problems of herbicides persisting in the soil were about the same as in 1962, except that one State indicated some problems in 1965 whereas no problems were reported in 1962. Eight States reported no problems with persistence. The herbicide-usage trend was up in eight states, stationary in one, and down in none.

Weeds listed as being one of the five most important in at least three States were crabgrass, morningglory, nutsedges, pigweeds, sandbur, Texas panicum, and sicklepod. None of these nationally or regionally important weeds were reported to be declining in more than one State.

Sugarbeets

In 1965, sugarbeet producers treated about 34 percent of the harvested acreage with herbicides before the crop emerged, and treated 5.5 percent after emergence. They treated 426,000 acres preemergence at an average cost of $8.97 per acre, and treated 69,000 acres postemergence at an average cost of $5.22 per acre. Farmers treated 92 percent of the treated acreage with their own equipment, and custom operators treated 8 percent. (Tables 1 to 5, 19, and 20.)

Reports on the effectiveness of herbicides indicate that treatments in 1965 were slightly more effective than those used in 1962. Ten States reported an urgent need for better herbicides, five reported some need, and no State reported little need for better herbicides. Problems of herbicides persisting in the soil appear to be increasing as compared with the situation in 1962. Seven states now report problems of herbicide persistence whereas in 1962 only four States reported problems. Fourteen States reported that the use of herbicides was up in 1965, one State reported that the use was stationary, and no State reported a decrease in the use of herbicides.

Weeds listed as being one of the five most important in at least four States were barnyardgrass, foxtails, lambsquarters, pigweeds, mustards, wild oats, and kochia. Of these nationally or regionally important weeds, those for which the infestation was reported to be declining in at least two States were barnyardgrass, lambsquarters, pigweeds, mustards, and wild oats. One difficulty in developing improved methods for controlling weeds in sugarbeets is the wide difference in species of weeds that infest the crop in different areas of the country. These differences hinder a concerted, nationwide effort against a particular species of weed. Currently, it appears that different systems of control will need to be developed for each of the different geographical areas.

Sorghum

In 1965, sorghum producers treated slightly less than 9 percent of the harvested acreage with herbicides before the crop emerged, and slightly more than 23 percent after emergence. They treated almost 1.5 million acres preemergence at an average cost of $7.73 per acre, and treated more than 3.9 million acres postemergence at an average cost of $2.74 per acre. Farmers treated 74 percent of the treated acreage with their own equipment, and custom operators treated 26 percent. (Tables 1 to 5, 21, and 22.)

Reports on the effectiveness of herbicides indicate that treatments in 1965 were generally more effective than those used in 1962, although there was a slight decline in reports expressing a high degree of satisfaction with postemergence treatments. Six States reported an urgent need for better herbicides, 14 reported some need, and four reported little need. Problems of herbicides persisting in the soil appear to have increased sharply as compared with the situation in 1962. Twelve States reported problems of herbicide persistence in 1965 as compared with only four in 1962. Twenty States reported that the use of herbicides was increasing, four reported that the use was stationary, while no State reported a decrease in the use of herbicides.

Table 17.--Peanuts: Estimated extent, cost and effectiveness of chemical weed control, usage trend, need for better herbicides, and residue problems by States and geographic divisions, 1965.

State and region	Acres treated		Average cost per acre[1]		Acreage treated by--		Effectiveness of herbicides		Herbicides usage trend[2]	Need for better herbicides	Persistence problem
	Pre-emergence	Post-emergence	Pre-emergence	Post-emergence	Farmers	Custom operators	Pre-emergence	Post-emergence			
	1,000 acres	1,000 acres	Dollars	Dollars	Percent	Percent					
Alabama	33	68	7.00	7.00	95	5	Good	Good	Up	Some	No
Florida	40	20	8.00	8.00	60	40	Fair	Fair	Up	Some	No
Georgia	67	290	8.00	8.00	95	5	Good	Good	Up	Some	No
North Carolina	115	5	9.00	3.00	98	2	Fair	Fair	Up	Some	No
Oklahoma	33	2	5.25	3.00	80	20	Good	Poor	Up	Some	No
South Carolina	7	---	5.00	---	100	--	Good	----	Up	Little	No
Texas	40	1	5.50	6.40	40	60	Fair	Fair	Up	Urgent	Yes
Virginia	37	34	9.90	8.50	85	15	Fair	Fair	Up	Some	No
Southern	372	420	7.84	7.79	88	12	4-Good 4-Fair	2-Good 4-Fair 1-Poor	8-Up	1-Urgent 6-Some 1-Little	1-Yes 7-No
Hawaii	5	---	30.00	--	100	--	Good	----	Sta.	Little	No
Western	5	---	30.00	--	100	--	1-Good	----	1-Sta.	1-Little	1-No
United States	377	420	8.13	7.79	88	12	5-Good 4-Fair	2-Good 4-Fair 1-Poor	8-Up 1-Sta.	1-Urgent 6-Some 2-Little	1-Yes 8-No

[1] Includes herbicide equipment and labor for treatment made by farmers. Represents cost of herbicide custom applications and/or cost of farmer-applied herbicides. Regional and United States averages are for acreage on which costs were reported.
[2] Sta., stationary.

Table 18.--Peanuts: Five most important weeds listed alphabetically within States, acreage infested, and infestation trend, 1965

Region and States	Weed	Infestation		Weed	Infestation		Weed	Infestation		Weed	Infestation		Weed	Infestation	
		Acres	Trend (1)		Acres	Trend (1)		Acres	Trend (1)		Acres	Trend (1)		Acres	Trend (1)
		Pct.			Pct.			Pct.			Pct.			Pct.	
Southern:															
Florida	Crabgrass	100	Sta.	Florida purslane	100	Sta.	Morningglory	20	Up	Nutsedge	5	Up	Sicklepod	20	Sta.
Georgia	Nutsedge	50	Up	Sandbur	20	Up	Sicklepod	15	Up	Texas panicum	25	Up	----------	---	---
North Carolina	Cocklebur	40	Sta.	Crabgrass	90	Down	Morningglory	45	Sta.	Nutsedge	20	Up	Smartweed	80	Down
Oklahoma	Crabgrass	95	Up	Johnsongrass	95	Up	Morningglory	25	Up	Pigweed	80	Up	Texas panicum	50	Up
South Carolina	Crabgrass	60	Sta.	Florida purslane	40	Sta.	Nutsedge	25	Up	Sandbur	20	Sta.	Sicklepod	20	Sta.
Texas	Bermudagrass	50	Up	Crabgrass	100	Up	Pigweed	50	Up	Signalgrass	20	Up	Texas panicum	90	Up
Virginia	Crabgrass	75	Sta.	Horsenettle	25	Sta.	Morningglory	60	Sta.	Nutsedge	40	Up	Smartweed	15	Sta.
Western:															
Arizona	Barnyardgrass	30	Sta.	Puncturevine	30	Sta.	Sandbur	70	Sta.	----------	---	---	----------	--	---
New Mexico	Junglerice	15	Down	Pigweed	60	Down	Sandbur	10	Sta	----------	---	---	----------	--	---
Hawaii	Goosegrass	30	Sta.	Little mallow	20	Up	Nutsedge	30	Up	Smallflower galinsoga	20	Up	Red tasselflower	25	Up

Table 19.--Sugarbeets: Estimated extent, cost, and effectiveness of chemical week control, usage trend, need for better herbicides, and residue problems, by States and geographic divisions, 1965

State and region	Acres treated		Average cost per acre[1]		Acreage treated by--		Effectiveness of herbicides		Herbicides usage trend[2]	Need for better herbicides	Persistence problem
	Preemergence	Postemergence	Preemergence	Postemergence	Farmers	Custom operators	Preemergence	Postemergence			
	1,000 acres	1,000 acres	Dollars	Dollars	Percent	Percent					
New York	18	--	12.00	--	70	30	Fair	----	Up	Urgent	Yes
Northeastern	18	--	12.00	--	70	30	1-Fair	----	1-Up	1-Urgent	1-Yes
Iowa	4	1	3.00	1.00	90	10	Fair	Fair	Up	Some	Yes
Michigan	65	--	9.00	--	95	5	Good	----	Up	Some	No
Minnesota	84	30	5.00	4.00	90	10	Good	Good	Up	Urgent	No
Nebraska	30	7	15.00	4.00	100	--	Fair	Fair	Up	Urgent	Yes
North Dakota	50	7	4.00	3.00	97	3	Good	Good	Up	Urgent	No
North Central	233	45	7.15	3.78	94	6	3-Good 2-Fair	2-Good 2-Fair	5-Up	3-Urgent 2-Some	2-Yes 3-No
California	50	1	12.00	7.50	90	10	Fair	Poor	Up	Urgent	No
Colorado	15	5	10.00	5.00	95	5	Fair	Fair	Up	Urgent	No
Idaho	30	10	20.00	10.00	80	20	Good	Fair	Up	Some	No
Montana	27	2	5.00	4.00	100	--	Fair	Fair	Up	Some	Yes
New Mexico	1	--	8.00	--	80	20	Fair	----	Up	Urgent	Yes
Oregon	8	1	8.00	3.00	90	10	Fair	Fair	Up	Urgent	Yes
Utah	2	.5	15.00	10.00	75	25	Fair	Fair	Up	Some	No
Washington	2	1	16.00	15.00	90	10	Poor	Poor	Up	Urgent	Yes
Wyoming	40	3	8.00	8.00	90	10	Fair	Fair	Sta.	Urgent	No
Western	175	23.5	11.08	7.98	90	10	1-Good 7-Fair 1-Poor	6-Fair 2-Poor	8-Up 1-Sta.	6-Urgent 3-Some	4-Yes 5-No
United States	426	68.5	8.97	5.22	92	8	4-Good 10-Fair 1-Poor	2-Good 8-Fair 2-Poor	14-Up 1-Sta.	10-Urgent 5-Some	7-Yes 8-No

[1] Includes herbicide equipment and labor for treatment made by farmers. Represents cost of herbicide custom applications and/or cost of farmer-applied herbicides. Regional and United States averages are for acreages on which costs were reported.
[2] Sta., stationary.

Table 20.--Sugarbeets: Five most important weeds listed alphabetically within States, acreage infested, and infestation trend, 1965

Region and States	Weed	Infestation		Weed	Infestation		Weed	Infestation		Weed	Infestation		Weed	Infestation	
		Acres	Trend (1)		Acres	Trend (1)		Acres	Trend (1)		Acres	Trend (1)		Acres	Trend (1)
		Pct.			Pct.			Pct.			Pct.			Pct.	
Northeastern:															
New York	Foxtail	80	Sta.	Lambsquarters	80	Sta.	Quackgrass	50	Sta.	Ragweed	80	Sta.	Wild mustard	80	Sta.
North Central:															
Iowa	Giant foxtail	90	Up	Green foxtail	75	Up	Lambsquarters	90	Sta.	Pigweed	75	Sta.	Yellow foxtail	75	Up
Michigan	Bindweed	15	Up	Canada thistle	30	Up	Nightshade	10	Up	Quackgrass	55	Sta.	Sowthistle	30	Up
Minnesota	Foxtail	100	Sta.	Lambsquarters	65	Sta.	Pigweed	75	Up	Wild mustard	60	Sta.	Wild oats	45	Sta.
Nebraska	Foxtail	95	Sta.	Kochia	90	Up	Lambsquarters	90	Sta.	Pigweed	95	Sta.	Sandbur	15	Sta.
North Dakota	Green foxtail	100	Sta.	Wild buckwheat	90	Sta.	Wild mustard	50	Down	Wild oats	85	Sta.	Yellow foxtail	100	Sta.
Ohio	Foxtail	50	Sta.	Lambsquarters	40	Sta.	Pigweed	60	Sta.	Ragweed	40	Sta.	Red sorrel	80	Sta.
Western:															
California	Barnyardgrass	45	Sta.	Junglerice	10	Sta.	Lambsquarters	60	Sta.	Nettleleaf goosefoot.	50	Sta.	Silversheath knotweed.	25	Sta.
Colorado	Foxtail	90	Sta.	Kochia	90	Sta.	Redroot pigwood	80	Up	Russian thistle	60	Sta.	Wild oats	90	Up
Idaho	Barnyardgrass	50	Up	Foxtail	90	Sta.	Lambsquarters	100	Down	Pigweed	100	Down	Wild oats	10	Sta.
Montana	Kochia	30	Up	Nightshade	5	Up	Pigeongrass	20	Sta.	Pigweed	50	Sta.	Wild oats	25	Down
Nevada	Barnyardgrass	100	Sta.	Pigweed	100	Sta.	Russian knapweed	10	Up	Whitetop	10	Down	----	--	----
New Mexico	Barnyardgrass	60	Down	Foxtail	85	Down	Kochia	70	Down	Lambsquarters	60	Down	Pigweed	90	Down
Oregon	Barnyardgrass	90	Down	Groundcherry	5	Down	Lambsquarters	90	Down	Pigweed	90	Down	Wild mustard	90	Down
Utah	Barnyardgrass	20	Up	Lambsquarters	60	Sta.	Redroot pigweed	100	Sta.	Wild mustard	100	Sta.	Wild oats	50	Down
Washington	Barnyardgrass	75	Sta.	Lambsquarters	75	Sta.	Pigweed	75	Sta.	----	--	----	----	--	----
Wyoming	Green foxtail	100	Sta.	Kochia	30	Up	Lambsquarters	90	Sta.	Nightshade	30	Up	Redroot pigweed	100	Sta.

[1] Sta., stationary.

Table 21.--Sorghum: Estimated extent, cost, and effectiveness of chemical weed control, usage trend, need for better herbicides, and residue problems, by States and geographic divisions, 1965

State and region	Acres treated		Average cost per acre[1]		Acreage treated by--		Effectiveness of herbicides		Herbicides usage trend[2]	Need for better herbicides	Persistence problem
	Preemergence	Postemergence	Preemergence	Postemergence	Farmers	Custom operators	Preemergence	Postemergence			
	1,000 acres	1,000 acres	Dollars	Dollars	Percent	Percent					
Massachusetts	--	1	--	3.00	70	30	----	----	Up	Some	Yes
New York	20	10	13.00	7.00	70	30	Good	Fair	Up	Some	Yes
Northeastern	20	11	13.00	6.64	70	30	1-Good	1-Fair	2-Up	2-Some	2-Yes
Illinois	3	4	4.00	1.25	95	5	Fair	Good	Sta.	Some	No
Iowa	6	28	3.00	1.00	90	10	Fair	Good	Up	Some	No
Kansas	200	2,000	7.50	1.85	85	15	Fair	Fair	Up	Urgent	Yes
Minnesota	.5	1	4.50	2.00	100	--	Good	Good	Up	Little	Yes
Missouri	50	50	7.00	1.00	75	25	Good	Fair	Up	Little	No
Nebraska	500	1,500	12.00	4.00	70	30	Good	Good	Up	Some	Yes
South Dakota	80	125	4.00	1.50	50	50	Good	Good	Up	Some	Yes
North Central	839.5	3,708	9.77	2.69	77	23	4-Good 3-Fair	5-Good 2-Fair	6-Up 1-Sta.	1-Urgent 4-Some 2-Little	4-Yes 3-No
Alabama	--	1	--	2.00	98	2	----	Fair	Sta.	Urgent	No
Arkansas	4	15	4.00	1.50	99	1	Good	Good	Up	Urgent	Yes
Florida	1	--	6.00	--	50	50	Fair	----	Up	Some	No
Kentucky	.8	1	3.00	2.00	95	5	Good	Poor	Sta.	Little	No
Mississippi	5	8	2.50	3.00	90	10	Good	Fair	Up	Some	No
North Carolina	25	20	7.00	2.00	99	1	Fair	Good	Sta.	Some	No
Oklahoma	55	15	2.50	1.50	90	10	Fair	Good	Up	Urgent	Yes
Tennessee	10	5	3.00	1.50	95	5	Fair	Fair	Up	Some	No
Texas	500	1	5.00	3.00	50	50	Good	Fair	Up	Urgent	Yes
Virginia	.2	1	2.75	2.00	95	5	Poor	Fair	Up	Some	No
Southern	601	67	4.79	1.87	61	39	4-Good 4-Fair 1-Poor	3-Good 5-Fair 1-Poor	7-Up 3-Sta.	4-Urgent 5-Some 1-Little	3-Yes 7-No
Arizona	5	20	4.00	5.00	50	50	Fair	Good	Up	Little	Yes
California	--	75	--	5.00	40	60	----	Good	Up	Some	Yes
Colorado	5	20	3.00	2.00	40	60	Fair	Fair	Up	Some	No
New Mexico	2	17	3.50	2.00	100	--	Good	Fair	Up	Urgent	Yes
Hawaii	.3	.1	20.00	25.00	100	--	Good	Good	Up	Some	No
Western	12.3	132.1	3.90	4.17	50	50	2-Good 2-Fair	3-Good 2-Fair	5-Up	1-Urgent 3-Some 1-Little	3-Yes 2-No
United States	1,472.8	3,918.1	7.73	2.74	74	26	11-Good 9-Fair 1-Poor	11-Good 10-Fair 1-Poor	20-Up 4-Sta.	6-Urgent 14-Some 4-Little	12-Yes 12-No

[1] Includes herbicide equipment and labor for treatment made by farmers. Represents cost of herbicide custom applications and/or cost of farmer-applied herbicides. Regional and United States averages are for acreages on which costs were reported.
[2] Sta., stationary.

Table 22.--Sorghum: Five most important weeds listed alphabetically within States, acreage infested, and infestation trend, 1965

Region and State	Weed	Infestation		Weed	Infestation		Weed	Infestation		Weed	Infestation		Weed	Infestation	
		Acres	Trend (1)		Acres	Trend (1)		Acres	Trend (1)		Acres	Trend (1)		Acres	Trend (1)
		Pct.			Pct.			Pct.			Pct.			Pct.	
Northeastern:															
New Jersey	Crabgrass	--	Up	Giant foxtail	--	Up	Lambsquarters	--	Sta.	Pigweed	--	Sta.	Velvetleaf	--	Up
New York	Crabgrass	50	Up	Horsenettle	30	Up	Lambsquarters	60	Sta.	Nutsedge	40	Up	Quackgrass	80	Down
North Central:															
Illinois	Giant foxtail	50	Sta.	Jimsonweed	15	Sta.	Lambsquarters	15	Sta.	Smartweed	25	Sta.	Velvetleaf	15	Sta.
Iowa	Barnyardgrass	25	Sta.	Giant foxtail	50	Sta.	Green foxtail	25	Sta.	----------	--	----	----------	--	----
Kansas	Foxtail	75	Sta.	Giant foxtail	20	Up	Johnsongrass	20	Up	Pigweed	75	Sta.	Wild cane	20	Up
Minnesota	Canada thistle	60	Sta.	Foxtail	100	Up	Lambsquarters	95	Sta.	Pigweed	95	Sta.	Smartweed	50	Sta.
Missouri	Cocklebur	60	Sta.	Foxtail	60	Sta.	Johnsongrass	15	Up	Morningglory	60	Sta.	Pigweed	60	Sta.
Nebraska	Crabgrass	60	Up	Foxtail	95	Up	Pigweed	95	Down	Wild cane	20	Up	----------	--	----
North Dakota	Green foxtail	100	Sta.	Kochia	40	Up	Redroot pigweed	40	Sta.	Wild mustard	40	Sta.	Yellow foxtail	100	Sta.
South Dakota	Barnyardgrass	10	Sta.	Field bindweed	5	Sta.	Foxtail	50	Sta.	Pigweed	10	Sta.	Sunflower	10	Sta.
Southern:															
Arkansas	Cocklebur	70	Up	Crabgrass	85	Up	Johnsongrass	15	Sta.	Morningglory	75	Sta.	Pigweed	30	Sta.
Florida	Bermudagrass	30	Up	Crabgrass	100	Sta.	Crotalaria	10	Down	Florida purslane	100	Sta.	Sicklepod	20	Sta.
Georgia	Cocklebur	20	Up	Johnsongrass	10	Sta.	Pigweed	5	Sta.	Sandbur	5	Sta.	Sicklepod	20	Up
Kentucky	Crabgrass	60	Sta.	Pigweed	20	Sta.	----------	--	----	----------	--	----	----------	--	----
Mississippi	Cocklebur	60	Sta.	Crabgrass	80	Sta.	Morningglory	35	Sta.	Pigweed	40	Sta.	Signalgrass	40	Sta.
North Carolina	Crabgrass	90	Down	Johnsongrass	20	Sta.	Lambsquarters	85	Down	Morningglory	90	Sta.	Pigweed	90	Down
Oklahoma	Cocklebur	50	Up	Crabgrass	90	Up	Johnsongrass	90	Up	Morningglory	25	Up	Pigweed	85	Up
South Carolina	Cocklebur	50	Sta.	Crabgrass	80	Sta.	Morningglory	25	Up	Pigweed	40	Sta.	Ragweed	40	Sta.
Tennessee	Cocklebur	25	Up	Crabgrass	95	Sta.	Johnsongrass	40	Up	Morningglory	20	Sta.	Pigweed	20	Up
Texas	Browntop panicum	40	Sta.	Johnsongrass	60	Sta.	Morningglory	10	Sta.	Pigweed	50	Sta.	Russian thistle	35	Down
Virginia	Crabgrass	20	Sta.	Foxtail	10	Sta.	Morningglory	10	Sta.	Nutsedge	5	Sta.	----------	--	----
Western:															
Arizona	Barnyardgrass	75	Sta.	Cocklebur	15	Sta.	Johnsongrass	15	Sta.	Morningglory	15	Sta.	Pigweed	75	Sta.
California	Barnyardgrass	70	Sta.	Bindweed	15	Sta.	Pigweed	25	Sta.	----------	--	----	----------	--	----
Colorado	Field bindweed	50	Up	Kochia	70	Up	Lambsquarters	50	Up	Redroot pigweed	90	Up	Sandbur	70	Sta.
Nevada	Barnyardgrass	100	Sta.	Johnsongrass	25	Up	Lambsquarters	50	Sta.	Pigweed	75	Sta.	----------	--	----
New Mexico	Bindweed	10	Sta.	Johnsongrass	25	Sta.	Lambsquarters	80	Down	Pigweed	50	Down	Sunflower	60	Down
Hawaii	Bermudagrass	15	Up	Bristly foxtail	25	Up	Feather fingergrass.	15	Up	Spiny amaranth	15	Up	Swollen fingergrass.	15	Up

[1] Sta., stationary.

Weeds listed as being one of the five most important in at least four States were barnyardgrass, cocklebur, crabgrass, foxtails, johnsongrass, lambsquarters, morningglory, and pigweeds. Of these nationally or regionally important weeds, only pigweed was reported to be decreasing in two or more States. The reports indicate that progress in control of major weeds in sorghum is less than the progress being made in control of weeds in corn. This may be related to the fact that a far greater proportion of the harvested corn acreage than sorghum acreage is treated with herbicides. Concurrently, this greater use of herbicides in corn probably indicates that the herbicides developed for use in corn are more satisfactory than the same or different herbicides used in sorghum.

Forage Seed Crops

In considering the extent of herbicides used in forage crops grown for seed, it should be pointed out that reports for these crops in Oregon and Missouri are missing from the 1965 report. Collectively, these two States accounted for about half of the acreage treated in 1962. Of the States which reported on the number of acres treated in 1965, producers of forage crops for seed treated slightly less than 2 percent of the harvested acreage with herbicides before the crop emerged, and slightly less than 7 percent after emergence. They treated 45,000 acres preemergence at an average cost of $12.17, and treated 176,000 acres postemergence at an average cost of $5.58 per acre. Farmers treated 78 percent of the acreage with their own equipment, and custom operators treated 22 percent. (Tables 1 to 5, 23, and 24.)

Reports on the effectiveness of herbicides indicate the treatments used in 1965 were slightly less effective than those used in 1962. Five States reported an urgent need for better herbicides in 1965, eight reported some need for better herbicides, and two reported little need for better herbicides. Four of 15 States reported problems of herbicide persistence in 1965, whereas only three of 20 States reported problems in 1962. Of the 15 States reporting, the usage trend for herbicides was up in 12 States, stationary in three, and down in none.

Weeds listed as being one of the five most important in at least three States were lambsquarters, pigweeds, field bindweed, docks, wild garlic, dodder, plantain, and wild radish. None of these nationally or regionally important weeds was reported as declining in more than one State.

Table 23.--Forage seeds: Estimated extent, cost, and effectiveness of chemical weed control, usage trend, need for better herbicides, and residue problems, by States and geographic divisions, 1965

State and region	Acres treated		Average cost per acre[1]		Acreage treated by--		Effectiveness of herbicides		Herbicides usage trend[2]	Need for better herbicides	Persistence problem
	Preemergence	Postemergence	Preemergence	Postemergence	Farmers	Custom operators	Preemergence	Postemergence			
	1,000 acres	1,000 acres	Dollars	Dollars	Percent	Percent					
Pennsylvania	--	2	--	5.50	100	--	----	Fair	Sta.	Some	No
Vermont	.5	1	6.00	4.00	25	75	Good	Good	Up	Little	Yes
Northeastern	.5	3	6.00	5.00	68	32	1-Good	1-Good 1-Fair	1-Up 1-Sta.	1-Some 1-Little	1-Yes 1-No
Illinois	--	1	--	2.00	95	5	----	Fair	Up	Some	No
Minnesota	--	25	--	2.50	85	15	----	Fair	Up	Urgent	No
North Dakota	--	.5	--	1.50	100	--	----	Good	Sta.	Little	No
South Dakota	--	5	--	2.00	30	70	----	Good	Up	Some	No
North Central	--	31.5	--	2.39	77	23	----	2-Good 2-Fair	3-Up 1-Sta.	1-Urgent 2-Some 1-Little	4-No
Florida	--	2	--	1.50	50	50	----	Fair	Up	Some	No
Kentucky	--	30	--	2.00	95	5	----	Fair	Sta.	Some	No
Texas	--	6	--	2.00	50	50	----	Good	Up	Some	No
Virginia	--	2	--	6.40	75	25	----	Poor	Up	Urgent	No
Southern	--	40	--	2.20	85	15	----	1-Good 2-Fair 1-Poor	3-Up 1-Sta.	1-Urgent 3-Some	4-No
California	40	80	12.00	9.00	75	25	Fair	Fair	Up	Urgent	Yes
Montana	.3	.9	7.00	1.75	100	--	Good	Fair	Up	Some	No
Nevada	--	.5	--	30.00	60	40	----	Fair	Up	Urgent	Yes
Utah	4	--	15.00	--	20	80	Fair	----	Up	Urgent	Yes
Washington	--	20	--	4.00	90	10	----	Good	Up	Some	No
Western	44.3	101.4	12.24	7.92	76	24	1-Good 2-Fair	1-Good 3-Fair	5-Up	3-Urgent 2-Some	3-Yes 2-No
United States	44.8	175.9	12.17	5.58	78	22	2-Good 2-Fair	5-Good 8-Fair 1-Poor	12-Up 3-Sta.	5-Urgent 8-Some 2-Little	4-Yes 11-No

[1] Includes herbicide equipment and labor for treatment made by farmers. Represents cost of herbicide custom applications and/or cost of farmer-applied herbicides. Regional and United States averages are for acreages on which costs were reported.

[2] Sta., stationary.

Table 24.--Forage seeds: Five important weeds listed alphabetically within States, acreage infested, and infestation trend, 1965

Region and State	Weed	Infestation		Weed	Infestation		Weed	Infestation		Weed	Infestation		Weed	Infestation	
		Acres	Trend [1]		Acres	Trend [1]		Acres	Trend [1]		Acres	Trend [1]		Acres	Trend [1]
		Pct.			Pct.			Pct.			Pct.			Pct.	
Northeastern:															
Pennsylvania---	Buckhorn plantain.	20	Up	Lambsquarters---	22	Sta.	Plaintain------	8	Sta.	White cockle---	2	Sta.	Wild carrot----	30	Sta.
Vermont--------	Chickweed-------	50	Sta.	Chicory---------	75	Down	Cinquefoil-----	75	Sta.	Dandelion------	75	Up	Quackgrass-----	95	Sta.
North Central:															
Illinois-------	Buckhorn plantain.	15	----	Canada thistle--	15	----	Curly dock-----	10	----	Giant foxtail--	10	----	Quackgrass-----	15	----
Michigan-------	Quackgrass------	--	----	----------	--	----	----------	--	----	----------	--	----	----------	--	----
Minnesota------	Canada thistle--	75	Up	Catchfly--------	75	Up	Perennial Sowthistle.	60	Up	Quackgrass-----	75	Sta.	White cockle---	75	Up
Missouri-------	Crabgrass-------	100	Up	Dock------------	10	Sta.	Dodder---------	2	Sta.	Pennycress-----	20	Up	Wild mustard---	8	Up
Southern:															
Arkansas-------	Bitter sneezeweed.	25	Up	Dodder----------	30	Up	Gumweed--------	40	Up	Ragweed--------	30	Up	Sumpweed-------	30	Up
Tennessee------	Cheat-----------	5	Sta.	Dodder----------	20	Sta.	Plantain-------	30	Sta.	Ragweed--------	25	Sta.	Wild garlic----	10	Sta.
Texas----------	Bermudagrass----	10	----	Bindweed--------	10	----	Dock-----------	10	----	Dodder---------	10	----	Johnsongrass---	15	----
Virginia-------	Chicory---------	10	Sta.	Dock------------	5	Up	Dodder---------	5	Sta.	Quackgrass-----	5	Up	Wild garlic----	30	Sta.
Western:															
California-----	Buckhorn plantain.	35	Sta.	Curly dock------	30	Sta.	Dodder---------	25	Up	Volunteer alfalfa.	50	Sta.	Weed bromegrasses.	25	Sta.
Idaho----------	Dodder----------	50	Sta.	Prickly lettuce-	80	Up	Tansymustard---	80	Up	----------	--	----	----------	--	----
Montana--------	Dodder----------	1	Up	Green foxtail---	30	Sta.	Lambsquarters--	30	Sta.	Pigweed--------	30	Sta.	Weed bromegrasses.	10	Up
Nevada---------	Bindweed--------	10	Up	Dodder----------	20	Up	Flixweed-------	100	Sta.	Pigweed--------	100	Sta.	Russian thistle	100	Sta.
New Mexico-----	Bindweed--------	5	Sta.	Dodder----------	5	Down	Johnsongrass---	15	Down	Pigweed--------	10	Down	Texas blueweed-	5	Sta.
Oregon---------	Annual bluegrass	65	Down	Chickweed-------	35	Down	Red sorrel-----	15	Down	Ryegrasses-----	65	Down	Wild garlic----	5	Sta.
Utah-----------	Dodder----------	75	Up	Knotweed--------	15	Up	Kochia---------	50	Sta.	Povertyweed----	30	Sta.	Russian thistle	15	Sta.
Washington-----	Dodder----------	10	Sta.	Lambsquarters---	30	Sta.	Pigweed--------	30	Sta.	Plantain-------	20	Sta.	Wild oats------	25	Sta.

[1] Sta., stationary.

HORTICULTURAL CROPS

(See General Limitations)

Weeds are especially difficult to control in plantings of horticultural crops. The problem is due in part to the multitude of crop plant species and varieties involved and their differing responses to any single herbicide treatment, mechanical method, or cultural practice used to control weeds. In addition, the specialized production methods, climatic requirements, fertilization practices, and soil conditions further complicate the problem. Despite the complexity of the problems, diligent effort by weed scientists has given the farmer many useful chemical, mechanical, cultural, biological, and combination methods for controlling numerous weeds in plantings of a number of horticultural crops.

Rapid strides have been made in the mechanization of many phases of horticultural crop production. These include land preparation, fertilization, seeding, transplanting, cultivation, harvesting, hauling, drying, and processing. Weed research has been spurred on by the need for new and improved chemical and combination weed control methods that will facilitate the maximum utilization of these mechanical advances in other phases of production. Remarkable advances in weed control methods have been made and quickly accepted by the growers.

Sweet Corn

Approximately 580,000 acres of sweet corn were grown in 21 States in 1965. Market value of the crop was $94 million. Acreage treated with herbicides was 308,000 or about 56 percent of the total acreage harvested. Farmers treated 81 percent of the acreage and custom operators treated the remainder. Three-fourths of the treated acreage was treated before emergence of the crops and weeds. Total cost of herbicides including cost of application for all treatments was approximately 1.75 million. This amounts to an average of $5.68 per acre for all treated acreage. Costs of preemergence and postemergence treatments were approximately $5.65 per acre and $5.75 per acre, respectively. Reports of effectiveness of preemergence treatments show that, in general, results were good. Results of postemergence treatments were fair to good. Problems in herbicide persistence were reported by 15 of the 21 States. Herbicide-usage trend in sweet corn is up in 11 States and stationary in 10 States. Three States report an urgent need for better herbicides; 14 States indicate some need; and 4 States indicate little need. (Tables 1 to 5, 25, and 26.)

Acreage treated preemergence ranked by regions was: North Central States 54 percent; Northeastern States 35 percent; Western States 6 percent; and Southern States 5 percent of total treated acreage. Acreage treated postemergence ranked by regions was: North Central States 54 percent; Northeastern States 20 percent; Western States 19 percent; and Southern States 7 percent of total treated acreage.

Average cost per acre for preemergence treatments ranked by regions was: Southern States $7.70; Northeastern States $6.59; Western States $5.77; and North Central States $4.83.

Average cost per acre for postemergence treatments ranked by regions was: Southern States $8.87; Northeastern States $8.24; Western States $5.19; and North Central States $4.61. Average percent of acreage treated by farmers ranked by regions was: Northeastern States 91 percent; North Central States 80 percent; Southern States 77 percent; and Western States 62 percent of total treated acreage.

Annual weeds mentioned two or more times in reports from the various regions are: Northeastern States--crabgrass, foxtail, pigweed, and lambsquarters; North Central States--pigweed, lambsquarters, velvetleaf, barnyardgrass, giant foxtail, and foxtail; Southern States--crabgrass, lambsquarters, pigweed, cocklebur, morningglory, and foxtail; and Western States--barnyardgrass, lambsquarters, and pigweed.

Important perennial weeds mentioned in reports from the various regions are: Northeastern States--horsenettle, nutsedge, johnsongrass, orchardgrass, quackgrass, and bindweed; North Central States--Canada thistle,

Table 25.--Sweet corn: Estimated extent, cost, and effectiveness of chemical weed control, usage trend, need for better herbicides, and residue problems, by States and geographic divisions, 1965

State and region	Acres treated		Average cost per acre[1]		Acreage treated by--		Effectiveness of herbicides		Herbicides usage trend[2]	Need for better herbicides	Persistence problem
	Preemergence	Postemergence	Preemergence	Postemergence	Farmers	Custom operators	Preemergence	Postemergence			
	1,000 acres	1,000 acres	Dollars	Dollars	Percent	Percent					
Connecticut	3	--	15.00	--	75	25	Good	----	Up	Some	Yes
Delaware	2	1	7.00	3.00	90	10	Good	Good	Sta.	Little	Yes
Maryland	27	--	5.00	--	100	--	Good	----	Sta.	Some	No
New Hampshire	2	1	20.00	20.00	60	40	Good	Good	Up	Some	Yes
New Jersey	3	--	4.50	--	90	10	Good	----	Sta.	Some	Yes
New York	30	--	7.50	--	90	10	Good	----	Sta.	Some	Yes
Pennsylvania	12	15	4.00	7.80	90	10	Good	Good	Up	Some	Yes
Northeastern	79	17	6.59	8.24	91	9	7-Good	3-Good	3-Up 4-Sta.	6-Some 1-Little	6-Yes 1-No
Indiana	1	--	10.00	--	100	--	----	Fair	Up	Urgent	No
Iowa	5	5	3.00	1.00	95	5	Fair	Fair	Sta.	Some	No
Michigan	10	2	10.00	2.00	90	10	Good	Good	Up	Some	Yes
Minnesota	75	2	3.50	2.00	100	--	Good	Good	Up	Some	Yes
Wisconsin	27	36	6.75	5.40	50	50	Good	Fair	Up	Some	Yes
North Central	118	45	4.83	4.61	80	20	1-Fair 3-Good	2-Good 3-Fair	4-Up 1-Sta.	1-Urgent 4-Some	3-Yes 2-No
Florida	12	5	8.00	10.00	75	25	Good	Good	Up	Some	Yes
Oklahoma	--	.5	--	1.50	100	--	----	Good	Up	Some	Yes
Tennessee	.3	--	7.00	--	90	10	Good	----	Up	Little	Yes
Virginia	1	.3	4.25	2.25	90	10	Fair	Fair	Sta.	Some	Yes
Southern	13.3	5.8	7.70	8.87	77	23	2-Good 1-Fair	2-Good 1-Fair	3-Up 1-Sta.	3-Some 1-Little	4-Yes
California	--	2	--	3.50	100	--	Poor	Fair	Sta.	Urgent	No
Idaho	6	5	6.00	3.00	50	50	Good	----	Up	Some	Yes
Oregon	8	4	5.00	10.00	60	40	Fair	Fair	Sta.	Little	No
Utah	--	5	--	5.00	75	25	----	Fair	Sta.	Urgent	Yes
Hawaii	.2	([3])	30.00	35.00	100	--	Good	Good	Sta.	Little	No
Western	14.2	16	5.77	5.19	62	38	2-Good 1-Fair 1-Poor	1-Good 3-Fair	1-Up 4-Sta.	2-Urgent 1-Some 2-Little	2-Yes 3-No
United States	224.5	83.8	5.65	5.75	81	19	14-Good 3-Fair 1-Poor	8-Good 7-Fair	11-Up 10-Sta.	3-Urgent 14-Some 4-Little	15-Yes 6-No

[1] Includes herbicide equipment and labor for treatment made by farmers. Represents cost of herbicide custom applications and/or cost of farmer-applied herbicides. Regional and United States averages are for acreages on which costs were reported.
[2] Sta., stationary.
[3] Less than 100 acres.

Table 26.--Sweet corn: Five most important weeds listed alphabetically within States, acreage infested, and infestation trend, 1965

Region and State	Weed	Infestation		Weed	Infestation		Weed	Infestation		Weed	Infestation		Weed	Infestation	
		Acres	Trend (1)		Acres	Trend (1)		Acres	Trend (1)		Acres	Trend (1)		Acres	Trend (1)
		Pct.			Pct.			Pct.			Pct.			Pct.	
Northeastern:															
Delaware	Crabgrass	60	Up	Foxtail	30	Up	Lambsquarters	50	Sta.	Nutsedge	20	Up	Pigweed	50	Sta.
Maryland	Foxtail	--	Sta.	Horsenettle	--	Up	Jimsonweed	--	Up	Johnsongrass	--	Up	----------	--	----
New Hampshire	Barnyardgrass	10	Down	Crabgrass	60	Sta.	Hairy galinsoga	10	Down	Orchardgrass	10	Down	Quackgrass	30	Down
New Jersey	Crabgrass	--	Up	Giant foxtail	--	Up	Lambsquarters	--	Sta.	Pigweed	--	Sta.	Velvetleaf	--	Up
New York	Bindweed	5	Up	Crabgrass	5	Sta.	Horsenettle	10	Up	----------	--	----	----------	--	----
Pennsylvania	Foxtail	80	Down	Nutsedge	15	Up	Pigweed	25	Down	Quackgrass	50	Up	Ragweed	80	Down
Rhode Island	Crabgrass	60	Sta.	Foxtail	60	Sta.	Nutsedge	20	Sta.	Purslane	60	Sta.	Quackgrass	60	Sta.
Vermont	Crabgrass	15	Up	Lambsquarters	25	Down	Nutsedge	15	Up	Pigweed	25	Down	Quackgrass	50	Sta.
North Central:															
Illinois	Giant foxtail	25	Down	Jimsonweed	25	Down	Pigweed	25	Down	Smartweed	25	Down	Velvetleaf	25	Down
Indiana	Canada thistle	1	Down	Johnsongrass	4	Up	Quackgrass	2	Sta.	Wild cane	1	Sta.	Wild cucumber	1	Sta.
Iowa	Barnyardgrass	75	Sta.	Buttonweed	50	Sta.	Giant foxtail	50	Sta.	Green foxtail	75	Sta.	Yellow foxtail	75	Sta.
Michigan	Crabgrass	--	Sta.	Lambsquarters	--	Sta.	Nutsedge	--	Up	Quackgrass	--	Sta.	Ragweed	--	Up
Ohio	Barnyardgrass	40	Up	Fall panicum	30	Up	Foxtail	60	Up	Lambsquarters	30	Sta.	Pigweed	50	Sta.
Wisconsin	Foxtail	100	Up	Lambsquarters	100	Sta.	Pigweed	100	Sta.	Quackgrass	60	Down	Velvetleaf	70	Up
Southern:															
Arkansas	Bermudagrass	--	Sta.	Crabgrass	--	Sta.	Johnsongrass	--	Sta.	Nutsedge	--	Sta.	Pigweed	--	Sta.
Florida	Bermudagrass	60	Up	Crabgrass	100	Sta.	Goosegrass	100	Sta.	Nutsedge	50	Up	Spiny amaranth	60	Up
Kentucky	Crabgrass	40	Sta.	Foxtail	25	Sta.	Lambsquarters	30	Sta.	Pigweed	40	Sta.	Purslane	20	Sta.
North Carolina	Cocklebur	70	Sta.	Crabgrass	90	Down	Morningglory	80	Sta.	Nutsedge	15	Up	Pigweed	85	Down
Oklahoma	Foxtail	30	Up	Johnsongrass	80	Up	Lambsquarters	60	Up	Pigweed	80	Up	Sunflower	30	Up
Tennessee	Bindweed	20	Sta.	Cocklebur	25	Sta.	Crabgrass	30	Sta.	Johnsongrass	5	Sta.	Morningglory	40	Sta.
Virginia	Crabgrass	30	Sta.	Fall panicum	10	Up	Johnsongrass	5	Up	Nutsedge	10	Sta.	----------	--	----
Western:															
California	Barnyardgrass	65	Sta.	Crabgrass	50	Sta.	Nutsedge	25	Up	Pigweed	75	Sta.	Velvetleaf	5	Up
Montana	Canada thistle	25	Up	Kochia	50	Sta.	Lambsquarters	50	Sta.	Pigweed	50	Sta.	Quackgrass	10	Sta.
Oregon	Barnyardgrass	50	Sta.	Lambsquarters	50	Sta.	Pigweed	50	Sta.	Quackgrass	15	Down	Ryegrasses	50	Sta.
Utah	Barnyardgrass	75	Down	Green foxtail	75	Sta.	Morningglory	25	Down	Quackgrass	20	Down	Redroot pigweed	100	Down
Washington	Barnyardgrass	60	Sta.	Lambsquarters	60	Sta.	Pigweed	60	Sta.	Quackgrass	5	Sta.	Smartweed	20	Sta.
Hawaii	Bermudagrass	15	Up	Bristly foxtail	25	Up	Feather fingergrass.	15	Up	Nutsedge	25	Up	Swollen fingergrass.	15	Up

[1] Sta., stationary.

johnsongrass, nutsedge, bindweed, and quackgrass; Southern States--bermudagrass, bindweed, johnsongrass, and nutsedge; and Western States--Canada thistle, nutsedge, and quackgrass.

Other Vegetables

Approximately 6.2 million acres of vegetable crops other than sweet corn were grown in 36 States in 1965. Acreage treated with herbicides was 779,000 or about 12.5 percent. Farmers treated 72 percent of the acreage and custom operators treated the remainder. Sixty-five percent of the treated acreage was treated before emergence of crops and weeds. Total cost of herbicides including all treatments was $7,969,000. This amounts to an average of $10.23 per acre for all treated acreage. Average costs of preemergence and postemergence treatments were $12.66 and $5.76 per acre, respectively. Effectiveness of both preemergence and postemergence treatments was fair to good. Problems in herbicide persistence were reported by 18 States. Herbicide-usage trend for vegetable crops as a whole is up in 29 States. An urgent need for better herbicides is reported by 24 States. (Tables 1 to 5.)

Root Crops

Preemergence and postemergence herbicide treatments of root crop plantings totaled 121,300 acres in 1965. Sixty percent of this acreage was treated before emergence of crops and weeds. Of the acreage treated preemergence, distribution by regions was: Northeastern States 41 percent; Southern States 28 percent; North Central States 24 percent; and Western States 7 percent. Average cost per acre of preemergence and postemergence treatments for all States was $15.21 and $12.60, respectively. Average cost per acre for preemergence treatments ranked by regions was: North Central States $17.90; Northeastern States $17.05; Western States $12.39; and Southern States $10.90. Average cost per acre for postemergence treatments ranked by regions was: Northeastern States $17.20; Western States $11.78; Southern States $11.67; and North Central States $11.33. Percent of acreage treated by farmers ranked by regions was: Southern States 87 percent; Northeastern States 83 percent; North Central States 81 percent; and Western States 31 percent. The remainder was treated by custom operators. Effectiveness of herbicide treatments was, in general, fair to good in all regions for both preemergence and postemergence treatments. Herbicide-usage trend on these crops was ascending for all regions except the Western States where six States reported usage as stationary. All regions report some need for better herbicides. Five States have an urgent need for better herbicides. All regions except the North Central States have some persistence problems. (Tables 27 and 28.)

Annual weeds mentioned two or more times in reports from the various regions are: Northeastern States--annual grasses, crabgrass, barnyardgrass, hairy galinsoga, foxtail, lambsquarters, ragweed, pigweed, and redroot pigweed; North Central States--crabgrass, giant foxtail, lambsquarters, foxtail, purslane, pigweed, and smartweed; Southern States--crabgrass, morningglory, and pigweed; and Western States--knotweed, barnyardgrass, lambsquarters, mallow, foxtail, pigweed, purslane, nightshade, and wild mustard.

Important perennial weeds mentioned in reports from the various regions are: Northeastern States--nutsedge and quackgrass; North Central States--nutsedge and quackgrass; Southern States--bermudagrass, nutsedge, johnsongrass, and quackgrass; and Western States--Canada thistle and nutsedge.

Cucurbits

Preemergence and postemergence herbicide treatments of cucurbit plantings totaled 64,300 acres in 1965. Of the total acreage treated, 89 percent was treated preemergence. Of the acreage treated preemergence, distribution by regions was: Northeastern States 41.8 percent; North Central States 29.5 percent; Western States 15.2 percent; and Southern States 13.5 percent. States using postemergence treatments were Washington, Oregon, and Kentucky. Average cost per acre of preemergence and postemergence treatments for all States was $10.09 and $13.59, respectively. Average cost per acre for preemergence treatments ranked by regions was: Western States $13.68; Northeastern States $11.43; Southern States $8.34; and North Central States $7.15. Average cost per acre for postemergence treatments ranked by regions was: Southern States $15.00 and

Table 27.--Root crops: Estimated extent, cost, and effectiveness of chemical weed control, usage trend, need for better herbicides, and residue problems, by States and geographic divisions, 1965

State and region	Acres treated		Acreage cost per acre[1]		Acreage treated by--		Effectiveness of herbicides		Herbicides usage trend[2]	Need for better herbicides	Persistence problem
	Preemergence	Postemergence	Preemergence	Postemergence	Farmers	Custom operators	Preemergence	Postemergence			
	1,000 acres	1,000 acres	Dollars	Dollars	Percent	Percent					
Connecticut	--	.7	--	35.00	100	--	----	Good	Up	Some	Yes
Delaware	2	6	5.00	15.00	50	50	Good	Good	Up	Some	No
New Hampshire	1	.5	20.00	25.00	80	20	Fair	Fair	Up	Some	Yes
New Jersey	12	--	12.00	--	90	10	Good	----	Up	Some	No
New York	15	--	22.50	--	95	5	Fair	----	Sta.	Some	No
Pennsylvania	--	1	--	14.00	90	10	----	Good	Up	Some	No
Northeastern	30	8.2	17.05	17.20	83	17	2-Good 2-Fair	3-Good 1-Fair	5-Up 1-Sta.	6-Some	2-Yes 4-No
Indiana	.7	.9	16.00	22.50	100	--	Fair	Fair	Up	Some	No
Iowa	1	--	3.00	--	95	5	Fair	----	Sta.	Urgent	No
Michigan	10	5	25.00	10.00	70	30	Good	Fair	Up	Some	No
Minnesota	.2	.5	9.50	9.50	100	--	Good	Good	Up	Some	No
Ohio	.3	.2	6.00	12.00	100	--	Good	Good	Up	Some	No
Wisconsin	5	2	8.00	10.00	95	5	Fair	Good	Sta.	Some	No
North Central	17.2	8.6	17.90	11.33	81	19	3-Good 3-Fair	3-Good 2-Fair	4-Up 2-Sta.	1-Urgent 5-Some	6-No
Arkansas	.3	--	12.00	--	95	5	Fair	----	Up	Some	No
Florida	5	4	8.00	10.00	80	20	Good	Good	Up	Some	Yes
Georgia	.5	--	10.00	--	90	10	Fair	----	Up	Urgent	No
Kentucky	.2	--	10.00	--	100	--	Good	----	Up	Some	Yes
Oklahoma	.5	--	4.50	--	100	--	Good	----	Up	Some	Yes
South Carolina	1	--	10.00	--	100	--	Fair	----	Up	Some	Yes
Tennessee	.8	--	18.00	--	90	10	Good	----	Sta.	Little	Yes
Virginia	12	2	12.00	15.00	90	10	Fair	Fair	Up	Urgent	No
Southern	20.3	6	10.90	11.67	87	13	4-Good 4-Fair	1-Good 1-Fair	7-Up 1-Sta.	2-Urgent 5-Some 1-Little	5-Yes 3-No
Arizona	--	2	--	12.00	20	80	----	Good	Sta.	Little	No
California	2	20	12.00	12.00	20	80	----	Good	Sta.	Urgent	No
New Mexico	.8	--	4.00	--	100	--	Good	----	Up	Some	No
Oregon	--	2	--	6.00	90	10	----	Good	Sta.	Little	No
Utah	--	.1	--	15.00	100	--	----	Good	Sta.	Little	No
Washington	2	2	15.00	15.00	50	50	Good	Good	Sta.	Some	Yes
Alaska	--	([3])	--	80.00	100	--	Poor	----	Sta.	Urgent	No
Hawaii	.1	--	35.00	--	100	--	Fair	----	Up	Some	Yes
Western	4.9	26.1	12.39	11.78	31	69	2-Good 1-Fair 1-Poor	5-Good	2-Up 6-Sta.	2-Urgent 3-Some 3-Little	2-Yes 6-No
United States	72.4	48.9	15.21	12.60	70	30	11-Good 10-Fair 1-Poor	12-Good 4-Fair	18-Up 10-Sta.	5-Urgent 19-Some 4-Little	9-Yes 19-No

[1] Includes herbicide equipment and labor for treatment made by farmers. Represents cost of herbicide custom applications and/or cost of farmer-applied herbicides. Regional and United States averages are for acreages on which costs were reported.
[2] Sta., stationary.
[3] Less than 50 acres.

Table 28.--Root crops: Five most important weeds listed alphabetically within States, acreage infested, and infestation trend, 1965.

Region and State	Weed	Infestation		Weed	Infestation		Weed	Infestation		Weed	Infestation		Weed	Infestation	
		Acres	Trend (1)		Acres	Trend (1)		Acres	Trend (1)		Acres	Trend (1)		Acres	Trend (1)
		Pct.			Pct.			Pct.			Pct.			Pct.	
Northeastern:															
Connecticut---	Annual grasses--	25	Sta.	Chickweed------	25	Sta.	Pepperweed---------	10	Sta.	Ragweed--------	75	Up	Shepherdspurse-----	50	Sta.
Delaware------	Crabgrass-------	90	Up	Lambsquarters--	90	Sta.	Nutsedge----------	60	Up	Pigweed--------	80	Sta.	Wild radish--------	50	Sta.
Maine---------	Annual grasses--	20	Sta.	Lambsquarters--	80	Sta.	Quackgrass---------	30	Sta.	Redroot pigweed	80	Up	Wild mustard-------	10	Down
New Hampshire-	Crabgrass-------	40	Sta.	Hairy Galinsoga	10	Up	Lambsquarters------	15	Down	Pigweed--------	15	Down	Quackgrass---------	5	Sta.
New Jersey----	Barnyardgrass---	--	Sta.	Fall Panicum---	--	Sta.	Nutsedge----------	--	Sta.	Ragweed--------	--	Sta.	-------------------	--	----
New York------	Hairy galinsoga-	50	Sta.	Henbit---------	10	Sta.	Lambsquarters------	95	Sta.	Ragweed--------	50	Sta.	Redroot pigweed----	95	Sta.
Pennsylvania--	Foxtail---------	5	Down	Lambsquarters--	12	Up	Nutsedge----------	45	Down	Pigweed--------	60	Sta.	Ragweed------------	40	Down
Vermont-------	Barnyardgrass---	25	Sta.	Crabgrass------	25	Sta.	Foxtail------------	25	Sta.	Lambsquarters--	25	Sta.	Pigweed------------	25	Sta.
North Central:															
Illinois------	Crabgrass-------	20	Down	Giant foxtail--	20	Down	Lambsquarters------	20	Down	Pigweed--------	20	Down	Smartweed----------	20	Down
Indiana-------	Annual grasses--	100	Sta.	Hairy galinsoga	20	Up	-------------------	--	----	---------------	--	----	-------------------	--	----
Iowa----------	Giant foxtail---	75	Sta.	Lambsquarters--	50	Sta.	Pigweed------------	50	Sta.	Purslane-------	50	Sta.	-------------------	--	----
Michigan------	Common chickweed	--	Up	Crabgrass------	--	Up	Nutsedge----------	--	Sta.	Purslane-------	--	Up	Smartweed----------	--	Sta.
Minnesota-----	Lambsquarters---	50	Sta.	Purslane-------	100	Sta.	Smartweed----------	100	Sta.	---------------	--	----	-------------------	--	----
North Dakota--	Foxtail---------	75	Sta.	Lambsquarters--	60	Sta.	Quackgrass---------	4	Sta.	Redroot pigweed	60	Sta.	Wild oats----------	30	Sta.
Ohio----------	Barnyardgrass---	40	----	Foxtail--------	60	----	Pigweed------------	60	----	Purslane-------	60	----	Ragweed------------	50	Up
Wisconsin-----	Foxtail---------	100	Sta.	Lambsquarters--	100	Sta.	Pigweed------------	100	Sta.	Purslane-------	100	Sta.	Sandbur------------	100	Sta.
Southern:															
Arkansas------	Bermudagrass----	--	Sta.	Crabgrass------	--	Up	Johnsongrass-------	--	Up	Nutsedge-------	--	Sta.	Redroot pigweed----	--	Sta.
Florida-------	Bermudagrass----	60	Up	Crabgrass------	100	Sta.	Goosegrass---------	100	Sta.	Nutsedge-------	50	Up	Spiny amaranth-----	50	Up
Georgia-------	Dock--------------	10	Sta.	Grasses--------	50	Up	-------------------	--	----	---------------	--	----	-------------------	--	----
Kentucky------	Chickweed-------	30	Sta.	Grabgrass------	75	Sta.	Foxtail------------	50	Sta.	Pigweed--------	75	Sta.	Purslane-----------	50	Sta.
North Carolina	Cocklebur-------	70	Sta.	Crabgrass------	95	Down	Morningglory-------	80	Sta.	Nutsedge-------	20	Up	Pigweed------------	90	Down
Oklahoma------	Crabgrass-------	90	Up	Lambsquarters--	60	Up	Morningglory-------	35	Up	Pigweed--------	80	Up	Wild mustard-------	30	Sta.
South Carolina	Crabgrass-------	90	Sta.	Morningglory---	30	Up	Nutsedge----------	20	Up	Pigweed--------	40	Sta.	Ragweed------------	30	Sta.
Tennessee-----	Bindweed--------	30	Sta.	Morningglory---	30	Sta.	Nutsedge----------	5	Up	Quackgrass-----	5	Up	Wild barley--------	15	Up
Virginia------	Crabgrass-------	30	Sta.	Nutsedge-------	5	Up	-------------------	--	----	---------------	--	----	-------------------	--	----
Western:															
Arizona-------	Knotweed--------	20	----	Mallow---------	20	----	Nettleleaf goosefoot	50	----	Sowthistle-----	50	----	Wild mustard-------	80	----
California----	Knotweed--------	80	Up	Lambsquarters--	80	Sta.	Nettle-------------	50	Sta.	Nutsedge-------	20	Up	Purslane-----------	80	Up
Colorado------	Canada thistle--	10	Up	Foxtail--------	50	Sta.	Lambsquarters------	50	Down	Nightshade-----	10	Sta.	Wild oats----------	20	Sta.
New Mexico----	Barnyardgrass---	50	Down	Foxtail--------	80	Down	Lambsquarters------	70	Down	Nutsedge-------	60	Sta.	Pigweed------------	60	Down
Oregon--------	Lambsquarters---	7	Down	Pigweed--------	3	Sta.	Purslane-----------	3	Sta.	Ryegrasses-----	7	Sta.	-------------------	--	----
Utah----------	Barnyardgrass---	90	Sta.	Lambsquarters--	100	Sta.	Mallow-------------	75	Sta.	Ragweed--------	50	Sta.	Redroot pigweed----	100	Sta.
Washington----	Barnyardgrass---	75	Sta.	Canada thistle-	10	Up	Lambsquarters------	75	Sta.	Nightshade-----	75	Sta.	Pigweed------------	75	Sta.
Alaska--------	Annual bluegrass	25	Up	Chickweed------	100	Sta.	Field peperweed----	100	Sta.	Lambsquarters--	100	Sta.	Wild mustard-------	100	Sta.
Hawaii--------	Lambsquarters---	30	Up	Little mallow--	30	Up	Nutsedge----------	40	Up	Red tassel-flower.	25	Up	Smallflower galinsoga.	30	Up

[1] Sta., stationary.

Western States $13.57. Percent of acreage treated by farmers with their own equipment ranked by regions was: North Central States 82 percent; Northeastern States 70 percent; Southern States 65 percent; and Western States 54 percent. The remainder was treated by custom operators. The effectiveness of preemergence herbicide treatments was fair to poor in the Northeastern, North Central, and Western States, and fair to good in the Southern States. Effectiveness of postemergence treatments was good in the Southern States and fair to good in the Western States. Herbicide-usage trend in cucurbits was ascending in more than half of the States reporting. There is an urgent need for better herbicides in cucurbits in the majority of States. About one-third of the States reported persistence problems. (Tables 29 and 30.)

Annual weeds mentioned two or more times in reports from the various regions are: Northeastern States--annual grasses, crabgrass, barnyardgrass, lambsquarters, goosegrass, foxtail, pigweed, purslane, redroot pigweed, and ragweed; North Central States--crabgrass, foxtail, giant foxtail, lambsquarters, purslane, and pigweed; Southern States--cocklebur, crabgrass, lambsquarters, morningglory, pigweed, and ragweed; and Western States--barnyardgrass, pigweed, lambsquarters, and purslane.

Important perennial weeds mentioned in reports from the various regions are: Northeastern States--quackgrass; North Central States--bindweed, quackgrass; Southern States--bermudagrass, bindweed, johnsongrass, nutsedge, and horsenettle; and Western States--nutsedge, Canada thistle, horsetail, and rough bentgrass.

Vegetable Legumes

Acreage treated preemergence and postemergence with herbicides in 1965 was 168,100 acres and 182,600 acres, respectively, or a total of 350,700 acres. Acreage treated preemergence amounted to about 47.9 percent of the total acreage treated. Of the acreage treated preemergence, distribution by regions was: Western States 48.9 percent; Northeastern States 27.5 percent; North Central States 18.7 percent; and Southern States 4.9 percent. Of the acreage treated postemergence, distribution by regions was: Western States 60.9 percent; North Central States 29.8 percent; Southern States 5.4 percent; and Northeastern States 3.9 percent. Average cost per acre of preemergence and postemergence treatments for all States was $9.92 and $3.30, respectively. Average cost per acre for preemergence treatments ranked by regions was: Western States $11.48; Southern States $11.12; North Central States $8.84; and Northeastern States $7.69. Average cost per acre for postemergence treatments ranked by regions was: Northeastern States $7.08; Southern States $4.00; Western States $3.10; and North Central States $3.07. Percent of acreage treated by farmers ranked by regions was: North Central States 93 percent; Northeastern States 80 percent; Southern States 74 percent; and Western States 66 percent. The remainder was treated by custom operators. Effectiveness of preemergence herbicide treatments was good in the Northeastern States, and fair to good in the other regions. Effectiveness of postemergence treatments was fair in the Southern States, and fair to good in the other regions. Herbicide-usage trend in vegetable legumes was ascending in more than 70 percent of the States reporting. There is an urgent need for better herbicides in five States; some need for better herbicides in 17 States; and six States report little need for better herbicides. About 20 percent of the States reported persistence problems. (Tables 31 and 32.)

Annual weeds mentioned two or more times in reports from the various regions are: Northeastern States--barnyardgrass, crabgrass, lambsquarters, and pigweed; North Central States--ragweed, foxtail, lambsquarters, pigweed, velvetleaf, smartweed, and wild mustard; Southern States--cocklebur, chickweed, crabgrass, pigweed, and ragweed; and Western States--barnyardgrass, foxtail, lambsquarters, nightshade, pigweed, redroot pigweed, and wild oats.

Important perennial weeds mentioned in reports from the various regions are: Northeastern States--Canada thistle, quackgrass, nutsedge, and red sorrel; North Central States--Canada thistle, field bindweed, nutsedge, quackgrass, and johnsongrass; Southern States--bermudagrass, johnsongrass, and nutsedge; and Western States--field bindweed, Canada thistle, fiddleneck, and nutsedge.

Table 29.--Cucurbits: Estimated extent, cost, and effectiveness of chemical weed control, usuage trend, need for better herbicides, and residue problems, by States and geographic divisions, 1965

State and region	Acres treated		Average cost per acre[1]		Acreage treated by--		Effectiveness of herbicides		Herbicides usage trend[2]	Need for better herbicides	Persistence problem
	Pre-emergence	Post-emergence	Pre-emergence	Post-emergence	Farmers	Custom operators	Pre-emergence	Post-emergence			
	1,000 acres	1,000 acres	Dollars	Dollars	Percent	Percent					
Connecticut	.2	---	10.00	---	100	---	Fair	---	Up	Urgent	Yes
Delaware	.1	---	5.00	---	100	---	Poor	---	Sta.	Urgent	No
Maryland	.9	---	2.50	---	100	---	Fair	---	Sta.	Urgent	No
New Hampshire	.5	---	20.00	---	100	---	Fair	---	Sta.	Urgent	Yes
New Jersey	.2	---	2.50	---	100	---	Fair	---	Up	Urgent	No
New York	10	---	15.00	---	40	60	Poor	---	Sta.	Some	No
Pennsylvania	12	---	9.00	---	90	10	Fair	---	Up	Urgent	No
Northeastern	23.9	---	11.43	---	70	30	5-Fair 2-Poor	---	3-Up 4-Sta.	6-Urgent 1-Some	2-Yes 5-No
Indiana	.1	---	5.00	---	100	---	Poor	---	Sta.	Urgent	No
Iowa	10	---	3.00	---	95	5	Fair	---	Sta.	Urgent	No
Michigan	5	---	15.00	---	50	50	Poor	---	Up	Urgent	Yes
Minnesota	1	---	8.00	---	100	---	Good	---	Up	Little	No
Ohio	.5	---	10.00	---	100	---	Fair	---	Up	Urgent	No
Wisconsin	.3	---	8.00	---	95	5	Poor	---	Sta.	Urgent	No
North Central	16.9	---	7.15	---	82	18	1-Good 2-Fair 3-Poor	---	3-Up 3-Sta.	5-Urgent 1-Little	1-Yes 5-No
Arkansas	.1	---	7.00	---	100	---	Poor	---	Sta.	Urgent	No
Florida	2	---	12.00	---	80	20	Good	---	Up	Urgent	Yes
Georgia	.5	---	10.00	---	90	10	Fair	---	Up	Urgent	No
Kentucky	2	.1	7.00	15.00	10	90	Good	Good	Up	Some	Yes
Oklahoma	2	---	4.80	---	85	15	Fair	---	Up	Urgent	Yes
Tennessee	.1	---	14.00	---	95	5	Fair	---	Sta.	Urgent	No
Virginia	1	---	9.50	---	95	5	Fair	---	Up	Urgent	No
Southern	7.7	.1	8.34	15.00	65	35	2-Good 4-Fair 1-Poor	1-Good	5-Up 2-Sta.	6-Urgent 1-Some	3-Yes 4-No
Arizona	1	---	5.00	---	20	80	Fair	---	Sta.	Some	No
California	1	---	12.00	---	100	---	Poor	---	Sta.	Urgent	No
Oregon	---	1	---	5.00	50	50	---	Good	Sta.	Little	No
Utah	.5	---	10.00	---	100	---	Fair	---	Up	Urgent	No
Washington	6	6	15.00	15.00	50	50	Fair	Fair	Up	Urgent	Yes
Hawaii	.2	---	35.00	---	100	---	Fair	---	Up	Some	Yes
Western	8.7	7	13.68	13.57	54	46	4-Fair 1-Poor	1-Good 1-Fair	3-Up 3-Sta.	3-Urgent 2-Some 1-Little	2-Yes 4-No
United States	57.2	7.1	10.09	13.59	69	31	3-Good 15-Fair 7-Poor	2-Good 1-Fair	14-Up 12-Sta.	20-Urgent 4-Some 2-Little	8-Yes 18-No

[1] Includes herbicide equipment and labor for treatment made by farmers. Represents cost of herbicide custom application and/or cost of farmer-applied herbicides. Regional and United States averages are for acreages on which cost were reported.
[2] Sta., stationary.

Table 30.--Cucurbits: Five most important weeds listed alphabetically within States, acreage infested, and infestation trend, 1965

Region and State	Weed	Infestation		Weed	Infestation		Weed	Infestation		Weed	Infestation		Weed	Infestation	
		Acres	Trend [1]		Acres	Trend [1]		Acres	Trend [1]		Acres	Trend [1]		Acres	Trend [1]
		Pct.			Pct.			Pct.			Pct.			Pct.	
Northeastern:															
Connecticut	Annual grasses	25	Up	Lambsquarters	50	Sta.	Pigweed	50	Sta.	----------	--	----	----------	--	----
Delaware	Crabgrass	90	Up	Goosegrass	60	Up	Lambsquarters	75	Up	Pigweed	75	Up	Smartweed	50	Sta.
Maine	Annual grasses	20	Sta.	Lambsquarters	80	Sta.	Quackgrass	30	Sta.	Redroot pigweed-	80	Up	Wild mustard	10	Down
Maryland	Barnyardgrass	--	Up	Crabgrass	--	Sta.	Goosegrass	--	Sta.	----------	--	--	----------	--	----
New Hampshire	Chickweed	20	Down	Crabgrass	40	Sta.	Lambsquarters	50	Down	Pigweed	30	Down	Purslane	20	Down
New Jersey	Barnyardgrass	--	Sta.	Foxtail	--	Sta.	Lambsquarters	--	Sta.	Ragweed	--	Sta.	----------	--	----
New York	Annual grasses	75	Sta.	Lambsquarters	95	Sta.	Purslane	75	Sta.	Ragweed	85	Sta.	Redroot pigweed-	95	Sta.
Pennsylvania	Crabgrass	5	Up	Foxtail	45	Up	Lambsquarters	52	Sta.	Pigweed	60	Down	Ragweed	55	Sta.
North Central:															
Illinois	Crabgrass	20	Down	Giant foxtail	20	Down	Lambsquarters	20	Down	Pigweed	20	Down	Smartweed	20	Down
Indiana	Crabgrass	100	Sta.	Goosegrass	5	Up	----------	--	----	----------	--	----	----------	--	----
Iowa	Buttonweed	75	Sta.	Giant foxtail	75	Sta.	Lambsquarters	75	Sta.	Pigweed	75	Sta.	Sandbur	25	Sta.
Michigan	Crabgrass	--	Up	Lambsquarters	--	Up	Purslane	--	Up	Quackgrass	--	Sta.	Redroot pigweed	--	Up
Minnesota	Foxtail	100	Sta.	Lambsquarters	30	Sta.	Purslane	100	Sta.	----------	--	----	----------	--	----
Ohio	Bindweed	25	Up	Foxtail	60	Up	Lambsquarters	50	Up	Pigweed	50	Sta.	Purslane	40	Sta.
Wisconsin	Barnyardgrass	100	Sta.	Foxtail	100	Sta.	Lambsquarters	100	Sta.	Pigweed	100	Sta.	Purslane	100	Sta.
Southern:															
Arkansas	Bermudagrass	--	Sta.	Crabgrass	--	Up	Johnsongrass	--	Sta.	Nutsedge	--	Sta.	Pigweed	--	Sta.
Florida	Bermudagrass	60	Sta.	Crabgrass	100	Up	Goosegrass	100	Up	Nutsedge	60	Sta.	Spiny amaranth	50	Up
Georgia	Cocklebur	20	Up	Grasses	50	Sta.	Sicklepod	40	Up	----------	--	----	----------	--	----
Kentucky	Chickweed	--	----	Crabgrass	--	----	Foxtail	--	----	Pigweed	--	----	Purslane	--	----
Louisiana	Bermudagrass	50	Sta.	Crabgrass	90	Up	Johnsongrass	30	Sta.	Morningglory	50	Sta.	Nutsedge	60	Up
North Carolina	Cocklebur	--	----	Crabgrass	--	----	Horsenettle	--	----	Morningglory	--	----	Nutsedge	--	----
Oklahoma	Bindweed	20	Up	Crabgrass	90	Up	Lambsquarters	80	Up	Morningglory	25	Up	Pigweed	90	Up
South Carolina	Crabgrass	90	Sta.	Florida purslane	50	Up	Nutsedge	50	Up	Pigweed	50	Sta.	Ragweed	30	Up
Tennessee	Cocklebur	35	Sta.	Crabgrass	75	Sta.	Morningglory	35	Sta.	Ragweed	60	Sta.	Wild barley	40	Up
Virginia	Crabgrass	50	Up	Lambsquarters	40	Sta.	Redroot pigweed	30	Sta.	----------	--	----	----------	--	----
Western:															
Arizona	Barnyardgrass	85	----	Goosefoot	--	----	Punctturevine	40	----	Wild mustard	--	----	----------	--	----
California	Barnyardgrass	80	Sta.	Nutsedge	10	Up	Pigweed	80	Sta.	Purslane	80	Up	Rough bentgrass	25	Sta.
Nevada	Lambsquarters	100	Sta.	Pigweed	100	Sta.	Sandbur	--	Up	----------	--	----	----------	--	----
New Mexico	Barnyardgrass	50	Down	Foxtail	80	Down	Lambsquarters	70	Down	Nutsedge	60	Sta.	Pigweed	60	Down
Oregon	Barnyardgrass	65	Sta.	Lambsquarters	65	Sta.	Pigweed	65	Sta.	Purslane	65	Sta.	----------	--	----
Utah	Barnyardgrass	90	Sta.	Lambsquarters	100	Sta.	Mallow	100	Sta.	Prickly lettuce	90	Sta.	Redroot pigweed	100	Sta.
Washington	Barnyardgrass	70	Sta.	Canada thistle	10	Up	Horsetail	5	Up	Lambsquarters	50	Sta.	Nightshade	50	Sta.
Hawaii	Florida purslane	30	Up	Little mallow	20	Up	Nutsedge	40	Up	Red tasselflower	30	Up	Smallflower galinsoga.	25	Up

[1] Sta., stationary.

Table 31.--Vegetable legumes: Estimated extent, cost, and effectiveness of chemical weed control, usage trend, need for better herbicides, and residue problems, by States and geographic divisions, 1965

State and region	Acres treated		Average cost per acre[1]		Acreage treated by--				Herbicides usage trend[2]	Need for better herbicides	Persistence problem
	Preemergence	Postemergence	Preemergence	Postemergence	Farmers	Custom operators	Preemergence	Postemergence			
	1,000 acres	1,000 acres	Dollars	Dollars	Percent	Percent					
Connecticut	.3	--	10.00	--	100	--	Good	----	Up	Little	No
Delaware	15	3	6.00	5.00	80	20	Good	Good	Up	Some	No
Maryland	5	--	10.00	--	80	20	Good	----	Sta.	Some	No
New Hampshire	1	.2	20.00	20.00	100	--	Good	Good	Up	Some	Yes
New Jersey	3	--	7.00	--	85	15	Good	----	Up	Some	No
New York	20	--	7.50	--	75	25	Good	----	Up	Little	No
Pennsylvania	2	4	11.00	8.00	90	10	Good	Fair	Up	Urgent	No
Northeastern	46.3	7.2	7.69	7.08	80	20	7-Good	2-Good 1-Fair	6-Up 1-Sta.	1-Urgent 4-Some 2-Little	1-Yes 6-No
Indiana	.1	--	6.00	--	100	--	Fair	----	Up	Some	Yes
Iowa	.4	.4	2.00	1.00	95	5	Fair	Fair	Sta.	Urgent	No
Michigan	5	--	15.00	--	70	30	Fair	Poor	Up	Some	No
Minnesota	8	20	9.50	2.60	90	10	Good	Good	Up	Some	No
Missouri	--	10	--	2.00	100	--	----	Fair	Sta.	Some	No
Wisconsin	18	24	7.00	3.95	95	5	Good	Fair	Up	Some	No
North Central	31.5	54.4	8.84	3.07	93	7	2-Good 3-Fair	1-Good 3-Fair 1-Poor	4-Up 2-Sta.	1-Urgent 5-Some	1-Yes 5-No
Arkansas	.2	--	6.00	--	90	10	Fair	----	Up	Little	No
Georgia	1	--	8.00	--	90	10	Good	----	Up	Some	No
North Carolina	--	5	--	6.00	100	--	----	Fair	Sta.	Some	No
South Carolina	1	--	10.00	--	100	--	Good	----	Up	Some	No
Tennessee	5	--	12.00	--	60	40	Good	----	Up	Little	No
Texas	--	5	--	2.00	50	50	----	Fair	Up	Urgent	No
Virginia	1	--	12.00	--	95	5	Poor	----	Up	Urgent	No
Southern	8.2	10	11.12	4.00	74	26	3-Good 1-Fair 1-Poor	2-Fair	6-Up 1-Sta.	2-Urgent 3-Some 2-Little	7-No
California	5	5	12.00	5.00	90	10	Fair	Fair	Up	Some	Yes
Idaho	50	--	15.00	--	50	50	Good	----	Up	Some	Yes
Montana	4	1	4.00	4.00	95	5	Good	Good	Up	Little	No
Oregon	10	30	6.00	5.00	70	30	Fair	Good	Up	Urgent	No
Utah	1	5	12.00	5.00	25	75	Fair	Good	Up	Some	No
Washington	2	70	6.00	2.00	70	30	Fair	Fair	Up	Some	No
Wyoming	10	--	3.00	--	80	20	Good	----	Up	Some	No
Hawaii	.1	--	30.00	--	100	--	Good	----	Sta.	Little	No
Western	82.1	111	11.48	3.10	66	34	4-Good 4-Fair	3-Good 2-Fair	7-Up 1-Sta.	1-Urgent 5-Some 2-Little	2-Yes 6-No
United States	168.1	182.6	9.92	3.30	75	25	16-Good 8-Fair 1-Poor	6-Good 8-Fair 1-Poor	23-Up 5-Sta.	5-Urgent 17-Some 6-Little	4-Yes 24-No

[1] Includes herbicide equipment and labor for treatment made by farmers. Represents cost of herbicide custom applications and/or cost of farmer-applied herbicides. Regional and United States averages are for acreages on which costs were reported.

[2] Sta., stationary.

Table 32.--Vegetable legumes: Five most important weeds listed alphabetically within States, acreage infested, and infestation trend, 1965

Region and State	Weed	Infestation		Weed	Infestation		Weed	Infestation		Weed	Infestation		Weed	Infestation	
		Acres	Trend (1)		Acres	Trend (1)		Acres	Trend (1)		Acres	Trend (1)		Acres	Trend (1)
		Pct.			Pct.			Pct.			Pct.			Pct.	
Northeastern:															
Connecticut	Barnyardgrass	40	Up	Crabgrass	20	Up	Nutsedge	20	Up	Pigweed	10	Sta.	Quackgrass	10	Sta.
Delaware	Barnyardgrass	25	Up	Crabgrass	50	Up	Lambsquarters	60	Sta.	Pigweed	60	Sta.	Wild radish	30	Sta.
Maine	Dandelion	30	Up	Quackgrass	10	Up	----------	--	----	----------	--	----	----------	--	----
Maryland	Canada thistle	--	Up	Lambsquarters	--	Sta.	Smartweed	--	Sta.	----------	--	----	----------	--	----
Massachusetts	Crabgrass	80	Up	Foxtail	50	Up	Lambsquarters	90	Down	Pigweed	90	Down	White cockle	30	Up
New Hampshire	Crabgrass	30	Sta.	Lambsquarters	50	Down	Pigweed	40	Down	Quackgrass	10	Sta.	Red sorrel	20	Sta.
New Jersey	Barnyardgrass	--	Up	Crabgrass	--	Up	Ragweed	--	Up	----------	--	----	----------	--	----
Pennsylvania	Chickweed	10	Sta.	Field pepperweed	8	Down	Lambsquarters	40	Sta.	Pigweed	32	Sta.	Wintercress	40	Up
North Central:															
Illinois	Canada thistle	20	Down	Field bindweed	20	Down	Pigweed	20	Down	Smartweed	20	Down	Wild mustard	20	Down
Indiana	Jimsonweed	10	Sta.	Ragweed	40	Sta.	Velvetleaf	50	Sta.	----------	--	----	----------	--	----
Iowa	Giant foxtail	75	Sta.	Green foxtail	50	Sta.	Ragweed	25	Sta.	Yellow foxtail	50	Sta.	----------	--	----
Michigan	Common ragweed	--	Sta.	Lambsquarters	--	Sta.	Nutsedge	--	Up	Quackgrass	--	Sta.	Redroot pigweed	--	Sta.
Minnesota	Canada thistle	10	Sta.	Foxtail	100	Sta.	Smartweed	50	Sta.	----------	--	----	----------	--	----
Missouri	Chickweed	20	Sta.	Crabgrass	40	Up	Foxtail	45	Sta.	Johnsongrass	10	Up	Weed bromegrasses	60	Sta.
Nebraska	Cocklebur	10	Up	Foxtail	30	Up	Velvetleaf	10	Up	Wild mustard	25	Up	----------	--	----
Wisconsin	Canada thistle	25	Sta.	Foxtail	100	Sta.	Lambsquarters	100	Sta.	Pigweed	100	Sta.	Smartweed	50	Sta.
Southern:															
Arkansas	Bermudagrass	--	Sta.	Crabgrass	--	Up	Johnsongrass	--	Sta.	Nutsedge	--	Sta.	Pigweed	--	Up
Georgia	Cocklebur	10	Up	Crabgrass	70	Sta.	Pigweed	20	Up	----------	--	----	----------	--	----
Kentucky	Chickweed	--	----	Crabgrass	--	----	Foxtail	--	----	Pigweed	--	----	Purslane	--	----
North Carolina	Chickweed	--	Up	Dock	--	Sta.	Henbit	--	Up	Ragweed	--	Down	Shepherdspurse	--	Sta.
Oklahoma	Crabgrass	90	Up	Johnsongrass	90	Up	Lambsquarters	50	Up	Pigweed	90	Up	Wild mustard	30	Sta.
South Carolina	Cocklebur	40	Up	Crabgrass	90	Sta.	Nutsedge	20	Up	Pigweed	20	Sta.	Ragweed	20	Sta.
Tennessee	Cocklebur	10	Sta.	Crabgrass	10	Down	Nutsedge	10	Up	Ragweed	30	Sta.	Smartweed	10	Sta.
Virginia	Pigweed	40	Sta.	----------	--	----	----------	--	----	----------	--	----	----------	--	----
Western:															
California	Barnyardgrass	50	Sta.	Nightshade	20	Sta.	Pigweed	75	Sta.	Wild barley	30	Sta.	Wild oats	30	Sta.
Idaho	Foxtail	100	Down	Nightshade	80	Up	Pigweed	100	Down	----------	--	----	----------	--	----
Montana	Canada thistle	10	Up	Lambsquarters	50	Sta.	Nightshade	5	Up	Pigweed	40	Sta.	Wild oats	10	Down
New Mexico	Barnyardgrass	40	Down	Foxtail	30	Down	Lambsquarters	50	Down	Pigweed	70	Down	Sunflower	60	Down
Oregon	Lambsquarters	100	Sta.	Nightshade	50	Sta.	Ryegrasses	100	Sta.	Wild mustard	100	Sta.	Wild oats	100	Sta.
Utah	Canada thistle	20	Down	Lambsquarters	100	Down	Morningglory	25	Sta.	Nightshade	50	Down	Redroot pigweed	100	Down
Washington	Fiddleneck	60	Sta.	Field bindweed	10	Sta.	Lambsquarters	75	Sta.	Nightshade	60	Sta.	Wild oats	25	Up
Wyoming	Barnyardgrass	50	Sta.	Green foxtail	70	Sta.	Nightshade	30	Up	Redroot pigweed	70	Sta.	Switchgrass	60	Up
Hawaii	Nutsedge	30	Up	----------	--	----	----------	--	----	----------	--	----	----------	--	----

[1] Sta., stationary.

Solanaceous Crops

Acreage treated preemergence and postemergence with herbicides in 1965 was 207,200 acres and 35,100 acres, respectively, or a total of 242,300 acres. Acreage treated preemergence amounted to about 85.5 percent of the total acreage treated. Of the acreage treated preemergence, distribution by regions was: Western States 48.2 percent; North Central States 24.3 percent; Northeastern States 15.2 percent; and Southern States 12.3 percent. Of the acreage treated postemergence, distribution by regions was: North Central States 57.5 percent; Southern States 31.3 percent; Western States 5.8 percent; and Northeastern States 5.4 percent. Average cost per acre of preemergence and postemergence treatments for all States was $14.71 and $7.45, respectively. Average cost per acre for preemergence treatments ranked by regions was: Western States $18.60; North Central States $11.96; Northeastern States $10.39; and Southern States $10.24. Average cost per acre for postemergence treatments ranked by regions was: Northeastern States $15.47; Southern States $11.73; North Central States $4.76; and Western States $3.50. Percent of acreage treated by farmers ranked by regions was: North Central States 97 percent; Southern States 82 percent; Northeastern States 75 percent; and Western States 43 percent. The remainder was treated by custom operators. Effectiveness of preemergence herbicide treatments was good in the Northeastern States, and fair to good in the other regions. Effectiveness of postemergence treatments was poor in the Western States, fair to good in the North Central and Northeastern States, and good in the Southern States. Herbicide-usage trend in solanaceous crops was ascending in about 75 percent of the States reporting. There was some need for better herbicides in all of the regions. About one-half of the States, including some in each region, reported persistence problems. (Tables 33 and 34.)

Annual weeds mentioned two or more times in reports of the various regions are: Northeastern States--annual grasses, crabgrass, barnyardgrass, lambsquarters, pigweed, and ragweed; North Central States--giant foxtail, lambsquarters, foxtail, pigweed, ragweed, and smartweed; Southern States--cocklebur, crabgrass, goosegrass, lambsquarters, morningglory, pigweed, and ragweed; and Western States--barnyardgrass, foxtail, lambsquarters, mallow, pigweed, nightshade, and wild oats.

Important perennial weeds mentioned in reports from the various regions are: Northeastern States--nutsedge and quackgrass; North Central States--quackgrass and nutsedge; Southern States--bermudagrass, nutsedge, and johnsongrass; and Western States--Canada thistle, nutsedge, and quackgrass.

Fruits and Nuts

Approximately 2.9 million acres of fruit and nut crops were grown in 21 States in 1965. Acreage treated preemergence and postemergence[9] with herbicides in 1965 was 259,500 acres and 280,900 acres, respectively, or a total of 540,400 acres. Thus, about 19 percent of the total harvested acreage was treated. Acreage treated preemergence amounted to about 48 percent of the total acreage treated. Of the acreage treated preemergence, distribution by regions was: Western States 96.8 percent; Southern States 2.3 percent; North Central States 0.8 percent; and Northeastern States 0.1 percent. Of the acreage treated postemergence, distribution by regions was: Western States 43.8 percent; North Central States 34.1 percent; Southern States 18.4 percent; and Northeastern States 3.7 percent. Average per acre cost of preemergence and postemergence treatments for all States was $11.87 and $14.06, respectively. Average cost per acre for preemergence treatments ranked by regions was: Northeastern States $25.00; Western States $11.98; Southern States $9.62; and North Central States $4.05. Average cost per acre for postemergence treatments ranked by regions was: Southern States $28.61; North Central States $26.31; Northeastern States $11.79; and Western States $6.38. Percent of acreage treated by farmers' own equipment ranked by regions was: North Central States 95 percent; Northeastern States 92 percent; Western States 90 percent; and Southern States 43 percent. The remainder was treated by custom operators. Effectiveness of both preemergence and postemergence herbicide

[9] Preemergence and postemergence refer to emergence of weeds in perennial plantings.

Table 33.--Solanaceous crops: Estimated extent, cost, and effectiveness of chemical weed control, usage trend, need for better herbicides, and residue problems, by States and geographic divisions, 1965

State and region	Acres treated		Average cost per acre[1]		Acreage treated by--		Effectiveness of herbicides		Herbicides usage[2] trend	Need for better herbicides	Persistence problem
	Pre-emergence	Post-emergence	Pre-emergence	Post-emergence	Farmers	Custom operators	Pre-emergence	Post emergence			
	1,000 acres	1,000 acres	Dollars	Dollars	Percent	Percent					
Connecticut	--	.1	--	20.00	100	--	----	Fair	Up	Urgent	Yes
Delaware	.5	.3	8.00	8.00	80	20	Good	Good	Up	Some	No
Maryland	5	--	12.00	--	100	--	Good	----	Up	Some	No
New Hampshire	.9	.5	14.00	20.00	100	--	Good	Good	Up	Some	Yes
New Jersey	8	--	7.00	--	90	10	Good	----	Up	Some	No
New York	5	--	7.50	--	30	70	Good	----	Up	Some	No
Pennsylvania	8	--	12.00	--	50	50	Good	----	Up	Some	Yes
Rhode Island	4	1	15.00	15.00	100	--	Fair	Fair	Sta.	Urgent	Yes
Northeastern	31.4	1.9	10.39	15.47	75	25	6-Good 1-Fair	2-Good 2-Fair	7-Up 1-Sta.	2-Urgent 6-Some	4-Yes 4-No
Indiana	([3])	--	10.00	--	100	--	Fair	----	Sta.	Some	No
Iowa	.2	.2	2.00	1.00	95	5	Fair	Fair	Sta.	Some	No
Michigan	10	--	20.00	--	80	20	Good	----	Up	Some	No
Ohio	.2	2	12.00	12.00	80	20	Fair	Good	Up	Some	Yes
Wisconsin	40	18	10.00	4.00	100	--	Good	Good	Up	Some	Yes
North Central	50.4	20.2	11.96	4.76	97	3	2-Good 3-Fair	2-Good 1-Fair	3-Up 2-Sta.	5-Some	2-Yes 3-No
Arkansas	2	--	14.00	--	85	15	Fair	----	Up	Little	Yes
Florida	20	10	10.00	12.00	80	20	Good	Good	Up	Some	Yes
Georgia	.5	--	10.00	--	100	--	Fair	----	Up	Urgent	No
South Carolina	2	--	10.00	--	100	--	Good	----	Up	Some	Yes
Tennessee	1	--	8.00	--	90	10	Good	----	Up	Little	Yes
Virginia	--	1	--	9.00	100	--	----	Good	Up	Some	No
Southern	25.5	11	10.24	11.73	82	18	3-Good 2-Fair	2-Good	6-Up	1-Urgent 3-Some 2-Little	4-Yes 2-No
Arizona	2	--	5.00	--	75	25	Fair	----	Sta.	Some	No
California	80	2	20.00	3.50	40	60	Fair	Poor	Up	Urgent	Yes
Idaho	10	--	15.00	--	40	60	Fair	----	Up	Some	No
Montana	2	--	3.00	--	95	5	Fair	----	Sta.	Some	Yes
Utah	1	--	15.00	--	75	25	Good	----	Up	Little	No
Washington	4	--	15.00	--	50	50	Fair	----	Up	Some	Yes
Alaska	.7	--	15.00	--	100	--	Good	----	Sta.	Some	No
Hawaii	.2	--	35.00	--	100	--	Fair	----	Up	Some	Yes
Western	99.9	2	18.60	3.50	43	57	2-Good 6-Fair	1-Poor	5-Up 3-Sta.	1-Urgent 6-Some 1-Little	4-Yes 4-No
United States	207.2	35.1	14.71	7.45	69	31	13-Good 12-Fair	6-Good 3-Fair 1-Poor	21-Up 6-Sta.	4-Urgent 20-Some 3-Little	14-Yes 13-No

[1] Includes herbicide equipment and labor for treatment made by farmers. Represents cost of herbicide custom applications and/or cost of farmer-applied herbicides. Regional and United States averages are for acreages on which costs were reported.
[2] Sta., stationary.
[3] Less than 50 acres.

Table 34.--Solanaceous crops: Five most important weeds listed alphabetically within States, acreage infested, and infestation trend, 1965.

Region and State	Weed	Infestation		Weed	Infestation		Weed	Infestation		Weed	Infestation		Weed	Infestation	
		Acres	Trend (1)		Acres	Trend (1)		Acres	Trend (1)		Acres	Trend (1)		Acres	Trend (1)
		Pct.			Pct.			Pct.			Pct.			Pct.	
Northeastern:															
Connecticut----	Annual grasses---	25	Sta.	Barnyardgrass-----	10	Up	Crabgrass---------	50	Up	Hairy galinsoga--	40	Sta.	Lambsquarters----	25	Down
Delaware-------	Crabgrass--------	80	Up	Goosegrass--------	40	Up	Lambsquarters-----	50	Sta.	Pigweed----------	60	Sta.	Ragweed----------	60	Sta.
Maine----------	Annual grasses---	20	Sta.	Lambsquarters-----	80	Sta.	Quackgrass--------	30	Sta.	Redroot pigweed--	80	Up	Wild mustard-----	10	Down
Maryland-------	Crabgrass--------	--	Sta.	Lambsquarters-----	--	Sta.	Morningglory------	--	Sta.	Pigweed----------	--	Sta.	-----------------	--	--
New Hampshire--	Barnyardgrass----	15	Sta.	Chickweed---------	10	Down	Crabgrass---------	40	Sta.	Nutsedge---------	5	Down	Quackgrass-------	10	Sta.
New Jersey-----	Crabgrass--------	--	Sta.	Fall panicum------	--	Up	Lambsquarters-----	--	Sta.	-----------------	--	--	-----------------	--	--
Pennsylvania---	Lambsquarters----	30	Down	Nutsedge----------	25	Up	Pigweed-----------	70	Down	Quackgrass-------	40	Down	Ragweed----------	25	Down
Rhode Island---	Crabgrass--------	80	Sta.	Ladysthumb--------	80	Sta.	Nutsedge----------	25	Up	Ragweed----------	80	Sta.	Wild radish------	80	Sta.
North Central:															
Illinois-------	Giant foxtail----	20	Down	Lambsquarters-----	20	Down	Pigweed-----------	20	Down	Ragweed----------	20	Down	Smartweed--------	20	Down
Indiana--------	Annual grasses---	100	Sta.	Jimsonweed--------	30	Sta.	Nutsedge----------	15	Up	Ragweed----------	30	Sta.	Velvetleaf-------	50	Sta.
Iowa-----------	Buttonweed-------	25	Sta.	Giant foxtail-----	50	Sta.	Green foxtail-----	25	Sta.	Lambsquarters----	25	Sta.	Yellow foxtail---	25	Sta.
Michigan-------	Lambsquarters----	--	Sta.	Purslane----------	--	Up	Quackgrass--------	--	Sta.	Redroot pigweed--	--	Up	-----------------	--	--
Minnesota------	Quackgrass-------	10	Sta.	Sowthistle--------	20	Sta.	Wild oats---------	10	Sta.	-----------------	--	--	-----------------	--	--
Ohio-----------	Foxtail----------	60	Sta.	Lambsquarters-----	40	Up	Pigweed-----------	60	Up	Smartweed--------	40	Up	-----------------	--	--
Wisconsin------	Barnyardgrass----	100	Sta.	Foxtail-----------	100	Sta.	Lambsquarters-----	100	Sta.	Pigweed----------	100	Sta.	Quackgrass-------	50	Sta.
Southern:															
Arkansas-------	Bermudagrass-----	--	Sta.	Crabgrass---------	--	Sta.	Henbit------------	--	Up	Johnsongrass-----	--	Sta.	Morningglory-----	--	Sta.
Florida--------	Bermudagrass-----	40	Up	Crabgrass---------	100	Sta.	Goosegrass--------	100	Sta.	Nightshade-------	75	Up	Nutsedge---------	40	Up
Georgia--------	Cocklebur--------	20	Up	Sicklepod---------	10	Up	-----------------	--	----	-----------------	--	----	-----------------	--	----
Kentucky-------	Chickweed--------	--	----	Crabgrass---------	--	----	Foxtail-----------	--	----	Pigweed----------	--	----	Purslane---------	--	----
Oklahoma-------	Cocklebur--------	25	Up	Crabgrass---------	90	Up	Johnsongrass------	85	Up	Lambsquarters----	45	Up	Pigweed----------	80	Up
South Carolina-	Cocklebur--------	30	Sta.	Crabgrass---------	90	Sta.	Morningglory------	20	Up	Pigweed----------	40	Sta.	Ragweed----------	30	Sta.
Tennessee------	Crabgrass--------	40	Down	Goosegrass--------	30	Sta.	Nutsedge----------	10	Up	Pigweed----------	30	Sta.	Ragweed----------	30	Sta.
Virginia-------	Crabgrass--------	25	Sta.	Lambsquarters-----	30	Sta.	Morningglory------	25	Sta.	Ragweed----------	30	Sta.	-----------------	--	----
Western:															
California-----	Barnyardgrass-----	60	Sta.	Mallow------------	60	Sta.	Nightshade--------	35	Up	Nutsedge---------	25	Up	Pigweed----------	75	Sta.
Colorado-------	Canada thistle----	10	Up	Foxtail-----------	50	Sta.	Lambsquarters-----	50	Down	Nightshade-------	10	Sta.	Wild oats--------	20	Sta.
Idaho----------	Foxtail-----------	100	Down	Pigweed-----------	100	Down	Russian thistle---	50	Up	-----------------	--	----	-----------------	--	----
Montana--------	Lambsquarters-----	50	Sta.	Mustard-----------	45	Sta.	Pigweed-----------	50	Sta.	Quackgrass-------	10	Down	Wild oats--------	15	Down
Oregon---------	Kochia------------	15	Sta.	Lambsquarters-----	100	Sta.	Nightshade--------	100	Sta.	Pigweed----------	100	Sta.	Quackgrass-------	25	Down
Utah-----------	Barnyardgrass-----	90	Down	Lambsquarters-----	100	Down	Mallow------------	50	Sta.	Nightshade-------	50	Down	Redroot pigweed--	100	Down
Washington-----	Barnyardgrass-----	75	Up	Canada thistle----	2	Up	Lambsquarters-----	75	Sta.	Nightshade-------	75	Sta.	Pigweed----------	75	Sta.
Alaska---------	Chickweed---------	100	Sta.	Field pepperweed--	100	Sta.	Lambsquarters-----	100	Sta.	Quackgrass-------	25	Sta.	Wild mustard-----	100	Sta.
Hawaii---------	Apple-of-Peru-----	20	Up	Black nightshade--	30	Up	Little mallow-----	15	Up	Nutsedge---------	30	Up	Red tasselflower-	30	Up

[1] Sta., stationary.

treatments was fair to good in all regions. Herbicide-usage trend in fruit and nut crops was ascending in more than 80 percent of the States reporting. Some States in all regions reported an urgent need for better herbicides, amounting to about 40 percent of the States reporting. The remainder of the States from various regions indicated some need for improved herbicides. The North Central and Southern States reported, in general, no persistence problems. Two of the four Northeastern States reporting indicated persistence problems and the five Western States reporting indicated persistence problems. (Tables 1 to 5, 35 and 36.)

Annual weeds mentioned two or more times in reports of the various regions are: Northeastern States--crabgrass, foxtail, curly dock, lambsquarters, dandelion, and pigweed; North Central States--none; Southern States--crabgrass, chickweed, and pigweed; and Western States--barnyardgrass.

Important perennial weeds mentioned in reports from the various regions are: Northeastern States--poison ivy, orchardgrass, and quackgrass; North Central States--Canada thistle, bindweed, poison ivy, horsenettle, and quackgrass; Southern States--bermudagrass, johnsongrass, paragrass, quackgrass, honeysuckle, horsenettle, poison ivy, trumpetcreeper, Virginia creeper, and torpedograss; and Western States--bermudagrass, bindweed, Canada thistle, johnsongrass, quackgrass, nutsedge, paspalum, and wild garlic.

Ornamentals

Accurate estimates of the total acreage of ornamentals are not available at the present time. Acreage treated preemergence and postemergence [10] with herbicides in 1965 was 14,600 acres and 68,700 acres, respectively, or a total of 83,300 acres. Acreage treated preemergence amounted to about 17.5 percent of the total acreage treated. Of the acreage treated preemergence, distribution by regions was: Western States 35 percent; Southern States 27.3 percent; Northeastern States 19.2 percent; and North Central States 18.5 percent. Of the acreage treated postemergence, distribution by regions was: Western States 59.6 percent; Southern States 22.3 percent; Northeastern States 17.9 percent; and North Central States 0.2 percent. Average per acre cost of preemergence and postemergence treatments for all States was $24.19 and $20.24, respectively. Average cost per acre for preemergence treatments ranked by regions was: Southern States $40.88; Northeastern States $22.71; North Central States $18.81; and Western States $14.75. Average cost per acre for postemergence treatments ranked by regions was: Southern States $26.70; Northeastern States $20.62; Western States $17.76; and North Central States $1.00. Percent of acreage treated by farmers ranked by regions was: Northeastern States 84 percent; Southern States 82 percent; North Central States 78 percent; and Western States 10 percent. The remainder was treated by custom operators. Effectiveness of preemergence herbicide treatments was fair to good in the Northeastern, North Central, and Southern States, and poor to good in the Western States. Effectiveness of postemergence treatments was fair to good in the Northeastern and Southern States, fair in the North Central States, and poor to good in the Western States. Herbicide-usage trend in ornamentals was ascending in 14 of the 15 States reporting. There was some need for better herbicides in all of the regions, with 4 States reporting an urgent need. There were persistence problems in some of the States in each of the regions. (Tables 1 to 5, 37, and 38.)

Annual weeds mentioned two or more times in reports of the various regions are: Northeastern States--annual grasses, chickweed, crabgrass, and pigweed; North Central States--crabgrass, and other annual grasses; Southern States--betony, chickweed, crabgrass, pigweed, and ragweed; and Western States--crabgrass and purslane.

Important perennial weeds mentioned in reports from the various regions are: Northeastern States--bindweed, Canada thistle, mugwort, nutsedge, and quackgrass; North Central States--field bindweed, bluegrass, Canada thistle, quackgrass, nutsedge, and red sorrel; Southern States--bermudagrass, alligatorweed, field bindweed, mugwort, purple nutsedge, johnsongrass, quackgrass, yellow nutsedge, and wild garlic; and Western States--bermudagrass, bentgrass, bluegrass, quackgrass, nutsedge, and red sorrel.

[10] Preemergence and postemergence refer to emergence of weeds in perennial ornamentals and to crop emergence in annual ornamentals.

Table 35.--Fruits and nuts: Estimated extent, cost, and effectiveness of chemical weed control, usage trend, need for better herbicides, and residue problems, by States and geographic divisions, 1965

State and region	Acres treated		Average cost per acre[1]		Acreage treated by--		Effectiveness of herbicides		Herbicides usage trend[2]	Need for better herbicides	Persistence problem
	Pre-emergence	Post-emergence	Pre-emergence	Post-emergence	Farmers	Custom operators	Pre-emergence	Post-emergence			
	1,000 acres	1,000 acres	Dollars	Dollars	Percent	Percent					
Connecticut	.2	1	25.00	10.00	95	5	Good	Good	Up	Some	No
Delaware	--	.3	--	13.00	75	25	----	Good	Up	Urgent	Yes
New Hampshire	--	2	--	10.00	100	--	----	Good	Up	Some	Yes
Pennsylvania	--	7	--	12.50	90	10	----	Good	Up	Some	No
Northeastern	.2	10.3	25.00	11.79	92	8	1-Good	4-Good	4-Up	1-Urgent 3-Some	2-Yes 2-No
Indiana	1	--	4.00	--	100	--	Good	----	Up	Urgent	No
Iowa	1	1	2.00	1.00	95	5	Fair	Fair	Sta.	Some	No
Michigan	--	50	--	10.00	90	10	----	Good	Up	Urgent	No
Minnesota	.1	([3])	25.00	5.00	100	--	Fair	Fair	Up	Urgent	No
Wisconsin	--	45	--	45.00	100	--	----	Fair	Up	Some	No
North Central	2.1	96	4.05	26.31	95	5	1-Good 2-Fair	1-Good 3-Fair	4-Up 1-Sta.	3-Urgent 2-Some	5-No
Arkansas	2	3	5.00	10.00	20	80	Fair	Fair	Up	Some	No
Florida	--	40	--	35.00	30	70	----	Fair	Up	Urgent	No
Georgia	([3])	([3])	15.00	5.00	100	--	Good	Good	Up	Some	No
Kentucky	2	.8	15.00	5.00	90	10	Good	Fair	Up	Some	No
Oklahoma	1	1	2.75	1.50	100	--	Fair	Good	Up	Urgent	Yes
Tennessee	1	.8	15.00	2.50	95	5	Good	Good	Up	Some	No
Virginia	--	6	--	6.50	90	10	----	Good	Up	Some	No
Southern	6	51.6	9.62	28.61	43	57	3-Good 2-Fair	4-Good 3-Fair	7-Up	2-Urgent 5-Some	1-Yes 6-No
Arizona	--	7	--	10.00	80	20	----	Good	Sta.	Some	Yes
California	250	100	12.00	5.00	90	10	Good	Fair	Up	Some	Yes
Utah	1	--	5.00	--	100	--	Good	----	Up	Some	Yes
Washington	--	15	--	12.00	99	1	----	Fair	Up	Urgent	Yes
Hawaii	.2	1	25.00	35.00	100	--	Fair	Fair	Up	Urgent	Yes
Western	251.2	123	11.98	6.38	90	10	2-Good 1-Fair	1-Good 3-Fair	4-Up 1-Sta.	2-Urgent 3-Some	5-Yes
United States	259.5	280.9	11.87	14.06	86	14	7-Good 5-Fair	10-Good 9-Fair	19-Up 2-Sta.	8-Urgent 13-Some	8-Yes 13-No

[1] Includes herbicide equipment and labor for treatment made by farmers. Represents cost of herbicide custom applications and/or cost of farmer-applied herbicides. Regional and United States averages are for acreages on which costs were reported.

[2] Sta., stationary.

[3] Less than 50 acres.

Table 36.--Fruits and nuts: Five most important weeds listed alphabetically within States, acreage infested, and infestation trend, 1965

Region and State	Weed	Infestation		Weed	Infestation		Weed	Infestation		Weed	Infestation		Weed	Infestation	
		Acres	Trend (1)		Acres	Trend (1)		Acres	Trend (1)		Acres	Trend (1)		Acres	Trend (1)
		Pct.			Pct.			Pct.			Pct.			Pct.	
Northeastern:															
Connecticut	Bedstraw	5	Up	Chickweed	10	Sta.	Dandelion	40	Sta.	Poison ivy	10	Sta.	Quackgrass	75	Sta.
Delaware	Crabgrass	10	Sta.	Curly dock	2	Up	Pigweed	10	Sta.	Poison ivy	2	Down	----------	--	----
New Hampshire	Goldenrod	20	Down	Milkweed	8	Down	Morningglory	10	Down	Poison ivy	50	Down	Quackgrass	85	Down
New Jersey	Crabgrass	--	Sta.	Curly dock	--	Up	Dandelion	--	Up	Orchardgrass	--	Sta.	----------	--	----
Pennsylvania	Foxtail	30	Sta.	Lambsquarters	50	Down	Pigweed	40	Down	Poison ivy	10	Down	Quackgrass	35	Up
Vermont	Crabgrass	20	Sta.	Foxtail	30	Sta.	Lambsquarters	20	Sta.	Pigweed	20	Sta.	Quackgrass	75	Up
North Central:															
Illinois	Bindweed	10	Down	Crabgrass	10	Down	Poison ivy	10	Down	Quackgrass	10	Down	Weed bromegrasses	10	Down
Indiana	Bindweed	--	Up	Canada thistle	--	Up	Fescue	--	Sta.	Horsenettle	--	Up	Poison ivy	--	Sta.
Iowa	Barnyardgrass	50	Sta.	Giant foxtail	25	Sta.	Green foxtail	50	Sta.	Ragweed	25	Sta.	Sandbur	25	Sta.
Michigan	Bindweed	--	Up	Cinquefoil	--	Up	Horsenettle	--	Up	Milkweed	--	Up	Quackgrass	--	Down
Minnesota	Canada thistle	5	Up	Foxtail	100	Sta.	Purslane	100	Sta.	Quackgrass	20	Sta.	Shepherdspurse	50	Sta.
Wisconsin	Black nightshade	75	Sta.	Canada thistle	40	Sta.	Dandelion	100	Sta.	Poison ivy	30	Down	Quackgrass	100	Sta.
Southern:															
Arkansas	Barnyardgrass	--	Sta.	Crabgrass	--	Up	Dock	--	Up	Johnsongrass	--	Up	Morningglory	--	Sta.
Florida	Bermudagrass	80	Sta.	Milkweed	70	Up	Paragrass	20	Sta.	Torpedograss	20	Up	Virginia creeper	5	Sta.
Kentucky	Cheat	30	Sta.	Chickweed	40	Sta.	Crabgrass	45	Sta.	Foxtail	30	Sta.	Pigweed	45	Sta.
North Carolina	Bermudagrass	30	Sta.	Horsenettle	40	Up	Johnsongrass	20	Sta.	Trumpetcreeper	35	Up	Virginia creeper	20	Up
Oklahoma	Bermudagrass	60	Up	Crabgrass	85	Up	Johnsongrass	80	Up	Lambsquarters	40	Up	Pigweed	50	Up
Tennessee	Bermudagrass	10	Sta.	Chickweed	95	Sta.	Crabgrass	95	Sta.	Henbit	95	Sta.	Smartweed	60	Up
Virginia	Honeysuckle	6	Sta.	Poison ivy	8	Sta.	Quackgrass	2	Sta.	----------	--	----	----------	--	----
Western:															
Arizona	Barnyardgrass	40	----	Bermudagrass	15	----	Johnsongrass	10	----	Sandbur	20	----	Wild mustard	70	----
California	Bermudagrass	30	Sta.	Bindweed	40	Sta.	Curly dock	50	Sta.	Johnsongrass	30	Up	Nutsedge	20	Up
New Mexico	Barnyardgrass	10	Sta.	Foxtail	35	Sta.	Kochia	40	Sta.	Nutsedge	10	Sta.	Pigweed	45	Sta.
Oregon	Annual bluegrass	50	Sta.	Chickweed	50	Sta.	Henbit	50	Sta.	Ryegrasses	20	Sta.	Wild garlic	10	Sta.
Utah	Canada thistle	30	Up	Green foxtail	40	Up	Morningglory	25	Up	Puncturevine	15	Sta.	Quackgrass	40	Up.
Washington	Bindweed	20	Sta.	Canada thistle	50	Up	Dandelion	40	Up	Quackgrass	80	Sta.	Ragweed	50	Sta.
Hawaii	Bristly foxtail	25	Up	Buttonweed	15	Up	Junglerice	20	Up	Nutsedge	50	Up	Paspalum	15	Sta.

[1] Sta., stationary

Table 37.--Ornamentals: Estimated extent, cost, and effectiveness of chemical weed control, usage trend, need for better herbicides, and residue problems, by States and geographic divisions, 1965

State and region	Acres treated		Average cost per acre[1]		Acreage treated by--		Effectiveness of herbicides		Herbicides usage trend[2]	Need for better herbicides	Persistence problem
	Preemergence	Postemergence	Preemergence	Postemergence	Farmers	Custom operators	Preemergence	Postemergence			
	1,000 acres	1,000 acres	Dollars	Dollars	Percent	Percent					
Connecticut	2	3	25.00	40.00	90	10	Good	Good	Up	Some	No
Delaware	(3)	.3	30.00	18.00	100	--	Good	Good	Up	Some	Yes
Pennsylvania	.8	9	17.00	14.25	80	20	Fair	Fair	Up	Some	No
Northeastern	2.8	12.3	22.71	20.62	84	16	2-Good 1-Fair	2-Good 1-Fair	3-Up	3-Some	1-Yes 2-No
Indiana	.3	--	25.00	--	100	--	Good	----	Up	Some	Yes
Iowa	.1	.1	3.00	1.00	95	5	Fair	Fair	Sta.	Some	No
Michigan	2	--	20.00	--	70	30	Fair	----	Up	Some	No
Minnesota	.3	--	10.00	--	100	--	Fair	----	Up	Urgent	Yes
North Central	2.7	.1	18.81	1.00	78	22	1-Good 3-Fair	1-Fair	3-Up 1-Sta	1-Urgent 3-Some	2-Yes 2-No
Florida	2	12	20.00	30.00	80	20	Fair	Fair	Up	Urgent	No
Georgia	(3)	(3)	15.00	5.00	100	--	Good	Good	Up	Some	No
Kentucky	.5	.1	15.00	15.00	100	--	Fair	Fair	Up	Some	Yes
Tennessee	1	.2	16.00	10.00	95	5	Good	Fair	Up	Some	Yes
Virginia	.5	3	200.00	15.00	80	20	Good	Fair	Up	Some	Yes
Southern	4.0	15.3	40.88	26.70	82	18	3-Good 2-Fair	1-Good 4-Fair	5-Up	1-Urgent 4-Some	3-Yes 2-No
California	5	40	15.00	18.00	10	90	Poor	Poor	Up	Urgent	Yes
Oregon	.1	1	2.00	8.00	20	80	Good	Good	Up	Little	Yes
Utah	--	(3)	--	25.00	100	--	----	Poor	Up	Urgent	Yes
Western	5.1	41	14.75	17.76	10	90	1-Good 1-Poor	1-Good 2-Poor	3-Up	2-Urgent 1-Little	3-Yes
United States	14.6	68.7	24.19	20.24	42	58	7-Good 6-Fair 1-Poor	4-Good 6-Fair 2-Poor	14-Up 1-Sta.	4-Urgent 10-Some 1-Little	9-Yes 6-No

[1] Includes herbicide equipment and labor for treatment made by farmers. Represents cost of herbicide custom application and/or cost of farmer-applied herbicides. Regional and United States averages are for acreages on which costs were reported.
[2] Sta., stationary.
[3] Less than 50 acres.

Table 38.--Ornamentals: Five most important weeds listed alphabetically within States, acreage infested, and infestation trend, 1965

Region and State	Weed	Infestation		Weed	Infestation		Weed	Infestation		Weed	Infestation		Weed	Infestation	
		Acres	Trend (1)		Acres	Trend (1)		Acres	Trend (1)		Acres	Trend (1)		Acres	Trend (1)
		Pct.			Pct.			Pct.			Pct.			Pct.	
Northeastern:															
Connecticut	Annual grasses	100	Sta.	Bindweed	10	Sta.	Chickweed	20	Sta.	Mugwort	15	Sta.	Quackgrass	40	Sta.
Delaware	Chickweed	90	Sta.	Crabgrass	90	Up	Mugwort	15	Up	Nutsedge	25	Up	Pigweed	60	Sta.
Maine	Annual grasses	50	Sta.	Chickweed	80	Up	Pigweed	80	Sta.	Quackgrass	25	Up	----------	--	----
New Jersey	Canada thistle	--	Up	Fall panicum	--	Up	Morningglory	--	Up	Mugwort	--	Down	----------	--	----
Pennsylvania	Mugwort	12	Up	Nutsedge	18	Up	Pigweed	50	Down	Quackgrass	80	Up	Yellow foxtail	35	Down
Vermont	Barnyardgrass	25	Sta.	Crabgrass	50	Up	Quackgrass	50	Sta.	----------	--	----	----------	--	----
North Central:															
Illinios	Crabgrass	10	Down	Field bindweed	10	Down	Giant foxtail	10	Down	Goosegrass	10	Down	Panicum	10	Down
Indiana	Annual grasses	30	Sta.	Canada thistle	3	Sta.	Field bindweed	5	Up	Nutsedge	1	Up	Quackgrass	15	Sta.
Iowa	Green foxtail	50	Sta.	Lambsquarters	25	Sta.	Pigweed	25	Sta.	Yellow foxtail	50	Sta.	----------	--	----
Michigan	Annual grasses	--	Up	Canada thistle	--	Up	Crabgrass	--	Sta.	Field bindweed	--	Up	Quackgrass	--	Sta.
Minnesota	Bluegrass	40	Up	Chickweed	30	Up	Quackgrass	30	Up	Woodsorrel	20	Up	----------	--	----
Southern:															
Arkansas	Bermudagrass	--	Sta.	Crabgrass	--	Up	Curly dock	--	Sta.	Nutsedge	--	Up	Wild garlic	--	Up
Florida	Betony	40	Sta.	Crabgrass	100	Sta.	Purple nutsedge	75	Sta.	Spurges	95	Sta.	Yellow nutsedge	50	Sta.
Georgia	Alligatorweed	5	Sta.	Betony	40	Up	Dichondra	20	Up	Pennywort	20	Up	Soliva	50	Up
Kentucky	Bermudagrass	10	Up	Chickweed	60	Sta.	Crabgrass	60	Sta.	Field bindweed	20	Sta.	Pigweed	40	Sta.
North Carolina	Artichoke betony	50	Up	Chickweed	80	Up	Henbit	80	Sta.	Mugwort	60	Up	Nutsedge	20	Up
Oklahoma	Bermudagrass	60	Up	Crabgrass	85	Up	Johnsongrass	75	Up	Pigweed	90	Up	Sandbur	30	Up
South Carolina	Chickweed	40	Sta.	Crabgrass	98	Sta.	Johnsongrass	10	Sta.	Nutsedge	25	Sta.	Ragweed	40	Sta.
Tennessee	Crabgrass	40	Down	Mugwort	15	Up	Quackgrass	25	Sta.	Ragweed	40	Sta.	Wild garlic	15	Sta.
Virginia	Crabgrass	75	Sta.	Foxtail	5	Up	Morningglory	15	Sta.	Mugwort	3	Up	Quackgrass	2	Up
Western:															
Arizona	Bermudagrass	100	----	Nutsedge	30	----	----------	--	----	----------	--	----	----------	--	----
California	Bermudagrass	60	Up	Crabgrass	80	Sta.	Nutsedge	30	Up	Prostrate spurge	30	Up	Purslane	25	Up
New Mexico	Barnyardgrass	40	Sta.	Foxtail	10	Down	Lambsquarters	10	Down	Nutsedge	10	Sta.	----------	--	----
Oregon	Bentgrass	100	Sta.	Bluegrass	100	Sta.	Chickweed	100	Sta.	Quackgrass	100	Sta.	Red sorrel	100	Sta.
Utah	Bluegrass	100	Up	Purslane	40	Up	Quackgrass	50	Up	Redroot pigweed	90	Sta.	Shepherspurse	60	Up
Alaska	Quackgrass	50	Up	----------	--	----	----------	--	----	----------	--	----	----------	--	----
Hawaii	Crabgrass	15	Sta.	Florida purslane	25	Up	Nutsedge	40	Up	Red tasselflower	30	Up	Smallflower galinsoga.	25	Up

[1] Sta., stationary.

LAWNS

Over 5 million acres of turfgrass are found in home lawns and 10 million acres of turf are devoted to school installations, industrial grounds, military reservations, cemeteries, parks, and golf courses.

Weeds rank as one of the major problems in turf as judged by consumer interest and demand for tools and chemicals for weed control (tables 1 to 5).

Twenty-nine States estimated that over a million acres of turf were treated with herbicides in 1965 at a total cost of almost $27 million (tables 1 and 39). Of this acreage, almost one-fourth was treated preemergence (table 2). Forty-two percent was treated by custom operators. Seventeen of 21 States reported good effectiveness for preemergence herbicides and 23 of the 29 States reported good effectiveness of postemergence treatments (tables 4 and 39). Twenty-seven of the 29 States reported upward trend for use of herbicides (tables 5 and 39).

The most important lawn weeds, as indicated by their frequency of listing (table 40), include: dandelion (26 States), chickweed (22 States), crabgrass (21 States), plantains (15 States), annual bluegrass (13 States), knotweed (10 States), and nutsedge (9 States). Many of the species above, with the exception of annual bluegrass and nutsedge, are controlled by herbicides available. In addition, there were 10 species of perennial grasses that were listed 34 times among the five most important weeds of the various States. These included such species as quackgrass, nimblewill, tall fescue, bermudagrass, bentgrass, and velvetgrass. These latter cannot generally be controlled selectively in lawns. Worse, most are difficult to eradicate conveniently by any means.

It is notable that many of the species listed infest a high percentage of the lawns. This indicates a sizable acreage where control methods are needed. Also, even though there may now be a useful control method for many species, this does not preclude wide acceptance of a more effective method should it become available. More effective and efficient herbicides are needed to cope with lawn weed problems.

Table 39.--Lawns: Estimated extent, cost, and effectiveness of chemical weed control, usage trend, need for better herbicides, and residue problems, by States and geographic divisions, 1965

State and region	Acres treated		Average cost per acre[1]		Acreage treated by--		Effectiveness of herbicides		Herbicides usage trend[2]	Need for better herbicides	Persistence problem
	Pre-emergence	Post-emergence	Pre-emergence	Post-emergence	Farmers	Custom operators	Pre-emergence	Post-emergence			
	1,000 acres	1,000 acres	Dollars	Dollars	Percent	Percent					
Connecticut	10	12	50.00	70.00	75	25	Good	Good	Up	Some	Yes
Delaware	(3)	5	50.00	15.00	99	1	Good	Good	Up	Some	No
Maine	--	(3)	--	4.50	100	--	----	Good	Up	Little	No
Massachusetts	.1	3	8.00	8.00	50	50	Good	Good	Up	Little	Yes
New Hampshire	5	45	5.00	5.00	95	5	Fair	Good	Up	Some	No
New Jersey	8	15	50.00	16.00	90	10	Good	Good	Up	Some	No
Vermont	--	1	--	10.00	75	25	----	Good	Up	Some	No
Northeastern	23.1	81	40.08	17.46	88	12	4-Good 1-Fair	7-Good	7-Up	5-Some 2-Little	2-Yes 5-No
Indiana	4	20	50.00	10.00	95	5	Good	Good	Up	Some	No
Iowa	1	2	50.00	1.70	95	5	Fair	Good	Sta.	Little	No
Minnesota	15	100	2.50	3.00	50	50	Good	Fair	Up	Urgent	Yes
Ohio	--	5	--	20.00	60	40	----	Good	Up	Some	No
North Central	20	127	14.38	4.75	59	41	2-Good 1-Fair	3-Good 1-Fair	3-Up 1-Sta.	1-Urgent 2-Some 1-Little	1-Yes 3-No
Arkansas	--	.9	--	20.00	90	10	----	Good	Up	Some	No
Florida	70	130	30.00	20.00	30	70	Good	Good	Up	Urgent	No
Georgia	50	50	15.00	5.00	70	30	Good	Good	Up	Some	No
Kentucky	5	10	50.00	10.00	70	30	Good	Good	Up	Little	No
Oklahoma	10	15	24.50	9.00	85	15	Good	Fair	Up	Little	No
Tennessee	5	15	20.00	14.00	75	25	Good	Fair	Up	Some	Yes
Texas	10	50	60.00	30.00	70	30	Fair	Fair	Up	Some	No
Virginia	--	300	--	30.00	70	30	----	Good	Up	Some	No
Southern	150	570.9	26.97	24.20	51	49	5-Good 1-Fair	5-Good 3-Fair	8-Up	1-Urgent 5-Some 2-Little	1-Yes 7-No
Arizona	.5	.1	50.00	10.00	90	10	Good	Good	Up	Little	No
California	60	70	50.00	30.00	70	30	Good	Fair	Up	Urgent	Yes
Idaho	--	1	--	20.00	50	50	----	Good	Up	Little	No
Montana	.1	1	10.00	3.00	85	15	Good	Good	Up	Some	No
Nevada	--	.7	--	5.00	80	20	----	Good	Up	Urgent	No
Oregon	1	1	5.00	30.00	50	50	Good	Good	Sta.	Urgent	No
Utah	.5	2	45.00	10.00	50	50	Fair	Fair	Up	Urgent	Yes
Washington	--	20	--	12.00	90	10	----	Good	Up	Some	No
Wyoming	2	2	5.00	5.00	20	80	Good	Good	Up	Some	No
Hawaii	(3)	.5	20.00	20.00	50	50	Good	Good	Up	Urgent	No
Western	64.1	98.3	47.79	25.04	71	29	6-Good 1-Fair	8-Good 2-Fair	9-Up 1-Sta.	5-Urgent 3-Some 2-Little	2-Yes 8-No
United States	257.2	877.2	32.36	20.77	58	42	17-Good 4-Fair	23-Good 6-Fair	27-Up 2-Sta.	7-Urgent 15-Some 7-Little	6-Yes 23-No

[1] Includes herbicide equipment and labor for treatment made by farmers. Represents cost of herbicide custom applications and/or cost of farmer-applied herbicides. Regional and United States averages are for acreages on which costs were reported.

[2] Sta., stationary.

[3] Less than 50 acres.

Table 40.--Lawns: Five most important weeds listed alphabetically within States, acreage infested, and infestation trend, 1965

Region and State	Weed	Infestation		Weed	Infestation		Weed	Infestation		Weed	Infestation		Weed	Infestation	
		Acres	Trend (1)		Acres	Trend (1)		Acres	Trend (1)		Acres	Trend (1)		Acres	Trend (1)
		Pct.			Pct.			Pct.			Pct.			Pct.	
Northeastern:															
Connecticut----	Chickweed---------	40	Sta.	Crabgrass---------	80	Down	Dandelion---------	50	Down	Hay grasses-------	50	Down	Plantain----------	40	Down
Delaware-------	Chickweed---------	15	Sta.	Crabgrass---------	40	Down	Dandelion---------	30	Down	Nutsedge----------	20	Up	Wild garlic-------	20	Sta.
Maine----------	Chickweed---------	40	Sta.	Dandelion---------	90	Sta.	Fall hawkbit------	70	Sta.	Plantain----------	70	Sta.	Wild mustard------	90	Sta.
Maryland-------	Annual bluegrass--	--	Sta.	Bermudagrass------	--	Up	Knotweed----------	--	Sta.	Paspalum----------	--	Up	Velvetgrass-------	--	Sta.
Massachusetts--	Chickweed---------	70	Sta.	Crabgrass---------	90	Sta.	Dandelion---------	90	Sta.	Plantain----------	90	Sta.	White clover------	40	Sta.
New Hampshire--	Chickweed---------	--	Sta.	Crabgrass---------	--	Sta.	Dandelion---------	--	Down	Knotweed----------	--	Up	Plantain----------	--	Down
New Jersey-----	Annual bluegrass--	--	Up	Fescue------------	--	Up	Nutsedge----------	--	Sta.	Spotted spurge----	--	Sta.	Velvetgrass-------	--	Up
Rhode Island---	Little starwort---	20	Sta.	Spotted spurge----	15	Sta.	Velvetgrass-------	25	Sta.	Woodsorrel--------	20	Sta.	------------------	--	----
Vermont--------	Crabgrass---------	25	Sta.	Dandelion---------	75	Down	Ground ivy--------	25	Sta.	Knotweed----------	25	Sta.	Plantain----------	50	Down
West Virginia--	Chickweed---------	--	Up	Crabgrass---------	--	Up	Dandelion---------	--	Sta	Ground ivy--------	--	Sta.	Plantain----------	--	Sta.
North Central:															
Illinois-------	Chickweed---------	20	Down	Dandelion---------	20	Down	Fescue------------	20	Sta.	Nimblewill--------	20	Sta.	Plantain----------	20	Down
Indiana--------	Annual bluegrass--	20	Up	Bentgrass---------	1	Up	Fescue------------	1	Sta.	Nimblewill--------	2	Up	------------------	--	----
Iowa-----------	Chickweed---------	10	Sta.	Fescue------------	5	Sta.	Ground ivy--------	10	Sta.	Red sorrel--------	10	Sta.	Smooth brome------	5	Sta.
Kansas---------	Common chickweed--	--	----	Crabgrass---------	--	----	Dandelion---------	--	----	Foxtail-----------	--	----	Henbit------------	--	----
Michigan-------	Annual bluegrass--	--	Up	Bentgrass---------	--	Sta.	Black medic-------	--	Up	Crabgrass---------	--	Down	Knotweed----------	--	Up
Minnesota------	Annual bluegrass--	90	Sta.	Bentgrass---------	70	Up	Chickweed---------	60	Up	Dandelion---------	90	Sta.	Quackgrass--------	50	Up
Missouri-------	Chickweed---------	--	----	Crabgrass---------	--	----	Dandelion---------	--	----	Henbit------------	--	----	Plantain----------	--	--
Nebraska-------	Chickweed---------	30	Sta.	Crabgrass---------	80	Down	Dandelion---------	85	Down	Foxtail-----------	15	Up	Nimblewill--------	40	Up
North Dakota---	Common chickweed--	80	Sta.	Dandelion---------	95	Sta.	Ground ivy--------	15	Sta.	Prostrate knotweed	50	Sta.	Quackgrass--------	80	Sta.
Ohio-----------	Fescue------------	40	Up	Knotweed----------	60	Sta.	Nimblewill--------	30	Up	Red sorrel--------	10	Sta.	Velvetgrass-------	15	Sta.
Wisconsin------	Broadleaf plantain	100	Sta.	Chickweed---------	100	Sta.	Crabgrass---------	80	Sta.	Dandelion---------	100	Sta.	Quackgrass--------	100	Sta.
Southern:															
Arkansas-------	Crabgrass---------	--	Up	Dallisgrass-------	--	Up	Dandelion---------	--	Sta.	Nutsedge----------	--	Up	Wild garlic-------	--	Up
Florida--------	Crowfootgrass-----	30	Sta.	Purple nutsedge---	75	Sta.	Sandbur-----------	40	Sta.	Spurge------------	95	Sta.	Torpedograss------	40	Sta.
Georgia--------	Alligatorweed-----	10	Sta.	Dichondra---------	30	Up	Florida betony----	30	Sta.	Pennywort---------	30	Up	Sage--------------	60	Up
Kentucky-------	Bermudagrass------	25	Up	Chickweed---------	75	Sta.	Crabgrass---------	75	Sta.	Henbit------------	65	Sta.	Red sorrel--------	30	Up
North Carolina-	Chickweed---------	60	Sta.	Crabgrass---------	80	Down	Ground ivy--------	40	Up	Henbit------------	60	Sta.	Wild garlic-------	75	Up
Oklahoma-------	Annual grasses----	85	Up	Chickweed---------	50	Up	Crabgrass---------	85	Up	Dandelion---------	90	Up	Henbit------------	50	Up
South Carolina-	Annual bluegrass--	50	Up	Common chickweed--	50	Up	Crabgrass---------	98	Sta.	Henbit------------	50	Sta.	Wild garlic-------	50	Sta.
Tennessee------	Crabgrass---------	50	Up	Dandelion---------	40	Sta.	Paspalum----------	30	Sta.	Plantain----------	40	Sta.	Wild garlic-------	75	Up
Texas----------	Annual bluegrass--	5	Sta.	Crabgrass---------	5	Sta.	Dallisgrass-------	8	Sta.	Nutsedge----------	10	Sta.	Sandbur-----------	5	Sta.
Virginia-------	Annual bluegrass--	10	Sta.	Bermudagrass------	10	Up	Ground ivy--------	20	Up	Nimblewill--------	5	Up	Quackgrass--------	5	Up
Western:															
Arizona--------	Crabgrass---------	50	----	Nutsedge----------	20	----	Spurge------------	70	----	Wild mustard------	50	----	------------------	--	----
California-----	Annual bluegrass--	30	Sta.	Dallisgrass-------	15	Up	Nutsedge----------	10	Up	Prostrate spurge--	20	Up	Woodsorrel--------	20	Sta.
Colorado-------	Chickweed---------	50	Up	Crabgrass---------	50	Down	Dandelion---------	90	Sta.	Quackgrass--------	30	Up	Spurge------------	50	Up
Idaho----------	Annual bluegrass--	--	Up	Chickweed---------	--	Down	Mallow------------	--	Up	------------------	--	----	------------------	--	----
Montana--------	Broadleaf plantain	70	Sta.	Chickweed---------	30	Up	Creeping bellflower.	10	Up	Dandelion---------	90	Sta.	Quackgrass--------	10	Up
Nevada---------	Chickweed---------	--	Up	Dandelion---------	--	Up	Knotweed----------	--	Up	Nimblewill--------	--	Up	Plantain----------	--	Up
New Mexico-----	Dandelion---------	20	Sta.	Knotweed----------	5	Sta.	Nutsedge----------	10	Sta.	Punctureveine------	15	Down	Rescuegrass-------	15	Down
Oregon---------	Annual bluegrass--	--	Down	Buckhorn plantain-	--	Down	Dandelion---------	--	Down	Dock--------------	--	Down	Velvetgrass-------	--	Sta.
Utah-----------	Chickweed---------	20	Up	Crabgrass---------	50	Down	Dandelion---------	90	Sta.	Plantain----------	50	Sta.	Trefoil-----------	75	Up
Washington-----	Annual bluegrass--	25	Up	Black medic-------	40	Sta.	Dandelion---------	80	Sta.	Plantain----------	75	Sta.	Speedwell---------	20	Up
Wyoming--------	Chickweed---------	40	Up	Creeping bell-flower.	10	Up	Dandelion---------	90	Sta.	Knotweed----------	50	Up	Quackgrass--------	20	Up
Alaska---------	Annual bluegrass--	50	Up	Chickweed---------	100	Sta.	Dandelion---------	90	Sta.	Knotweed----------	30	Up	Pingue------------	50	Sta.
Hawaii---------	Buttonweed--------	10	Up	Kyllinga----------	10	Up	Nutsedge----------	15	Up	Stargrass---------	20	Up	Swollen finger-grass.	10	Up

[1] Sta., stationary.

Thirty-five States reported that 1,269,000 acres were sprayed for weed control in 1965 (tables 1 to 5 and 41). This is about three times the acreage reported for 1962. Of this total, 79 percent was sprayed by farmers and 21 percent by custom applicators. Twenty-four States reported effectiveness of postemergence herbicides to be fair or poor. Only 10 reported good effectiveness. Thirty-four States indicated need for better herbicides in hay crops.

A wide range of weeds are important in hay crops and they tend to be somewhat regional in distribution although some are found widely (table 42). Some of the species having wide distribution are quackgrass (15 States), foxtails (12 States), chickweed (12 States), dock (10 States), weed bromegrasses (10 States), ragweed (9 States), and dandelion (8 States). Some of these weeds infest 100 percent of the hay acreage in several States.

There is need for much more research on control of weeds in hay crops than is currently underway. Methods for control of many of the weeds listed are inadequate.

Table 41.--Hay: Estimated extent, cost, and effectiveness of chemical weed control, usage trend, need for better herbicides, and residue problems, by States and geographic divisions, 1965

State and region	Acres treated		Average cost per acre[1]		Acreage treated by--		Effectiveness of herbicides		Herbicides usage trend[2]	Need for better herbicides	Persistence problem
	Pre-emergence	Post-emergency	Pre-emergence	Post-emergence	Farmers	Custom operators	Pre-emergence	Post emergence			
	1,000 acres	1,000 acres	Dollars	Dollars	Percent	Percent					
Delaware	.5	2	8.00	3.00	95	5	Fair	Fair	Up	Urgent	No
Maine	--	2	--	2.50	100	--	----	Good	Up	Little	No
Maryland	3	35	11.00	5.00	80	20	Good	Good	Up	Some	No
Massachusetts	2	4	10.00	3.00	40	60	Fair	Fair	Up	Some	No
New Jersey	--	19	--	2.25	90	10	----	Fair	Up	Urgent	No
New York	50	280	10.00	4.00	70	30	Fair	Fair	Up	Urgent	Yes
Pennsylvania	--	35	--	4.50	75	25	----	Fair	Up	Urgent	No
Rhode Island	.2	.4	15.00	10.00	100	--	Fair	Fair	Sta.	Urgent	Yes
Vermont	--	1	--	3.00	75	25	----	Fair	Sta.	Urgent	No
West Virginia	--	1	--	4.00	100	--	----	Poor	Sta.	Urgent	No
Northeastern	55.7	379.4	10.05	4.03	72	28	1-Good 4-Fair	2-Good 7-Fair 1-Poor	7-Up 3-Sta.	7-Urgent 2-Some 1-Little	2-Yes 8-No
Illinois	--	2	--	2.00	95	5	----	Fair	Sta.	Some	No
Iowa	--	350	--	1.50	95	5	----	Fair	Sta.	Little	No
Minnesota	5	10	10.00	7.50	90	10	Fair	Good	Up	Urgent	Yes
Ohio	--	7	--	6.50	90	10	----	Fair	Sta.	Urgent	No
South Dakota	--	85	--	1.50	50	50	----	Good	Sta.	Some	No
Wisconsin	--	4	--	1.45	80	20	----	Poor	Sta.	Urgent	No
North Central	5	458	10.00	1.71	86	14	1-Fair	2-Good 3-Fair 1-Poor	1-Up 5-Sta.	3-Urgent 2-Some 1-Little	1-Yes 5-No
Kentucky	20	55	10.00	4.00	90	10	Good	Fair	Up	Some	No
North Carolina	--	5	--	2.00	100	--	----	Fair	Sta.	Some	No
Oklahoma	--	10	--	7.50	95	5	----	Good	Up	Urgent	Yes
South Carolina	--	5	--	1.00	75	25	----	Good	Up	Some	No
Tennessee	--	2	--	3.00	50	50	----	Fair	Sta.	Some	Yes
Texas	--	30	--	2.00	50	50	----	Good	Up	Some	No
Virginia	.4	43	10.00	4.30	75	25	Fair	Fair	Up	Some	No
Southern	20.4	150.0	10.00	3.74	79	21	1-Good 1-Fair	3-Good 4-Fair	5-Up 2-Sta.	1-Urgent 6-Some	2-Yes 5-No
Arizona	.2	.2	4.00	4.00	100	--	Good	Good	Sta.	Little	No
California	25	40	8.50	6.50	70	30	Fair	Fair	Up	Urgent	No
Idaho	--	([3])	--	6.00	50	50	----	Fair	Up	Some	Yes
Montana	--	.5	--	3.00	90	10	----	Fair	Up	Little	No
Nevada	--	5	--	3.00	50	50	----	Fair	Up	Urgent	Yes
New Mexico	5	8	7.00	7.00	80	20	Good	Good	Up	Urgent	No
Oregon	1	30	8.00	20.00	80	20	Fair	Good	Up	Urgent	Yes
Utah	--	.5	--	6.00	100	--	----	Fair	Up	Urgent	No
Washington	--	80	--	4.00	90	10	----	Fair	Up	Some	Yes
Wyoming	--	1	--	3.00	100	--	----	Fair	Sta.	Some	No
Alaska	--	4	--	6.00	100	--	----	Fair	Up	Urgent	No
Hawaii	.1	--	25.00	--	100	--	Good	----	Up	Some	Yes
Western	31.3	169.2	8.27	7.58	81	19	3-Good 2-Fair	3-Good 8-Fair	10-Up 2-Sta.	6-Urgent 4-Some 2-Little	5-Yes 7-No
United States	112.4	1,156.6	9.54	3.59	79	21	5-Good 8-Fair	10-Good 22-Fair 2-Poor	23-Up 12-Sta.	17-Urgent 14-Some 4-Little	10-Yes 25-No

[1] Includes herbicide equipment and labor for treatment made by farmers. Represents cost of herbicide custom applications and/or cost of farmer-applied herbicides. Regional and United States averages are for acreages on which costs were reported.
[2] Sta., stationary.
[3] Less than 50 acres.

Table 42.--Hay: Five most important weeds listed alphabetically within States, acreage infested, and infestation trend, 1965

Region and State	Weed	Infestation		Weed	Infestation		Weed	Infestation		Weed	Infestation		Weed	Infestation	
		Acres	Trend [1]		Acres	Trend [1]		Acres	Trend [1]		Acres	Trend [1]		Acres	Trend [1]
		Pct.			Pct.			Pct.			Pct.			Pct.	
Northeastern:															
Connecticut	Chickweed	50	Sta.	Pepperweed	50	Sta.	Quackgrass	75	Sta.	Shepherdspurse	50	Sta.	Wintercress	50	Sta.
Delaware	Chickweed	25	Up	Pigweed	50	Up	Ragweed	50	Up	Wild garlic	10	Down	Wild mustard	25	Sta.
Maine	Dandelion	50	Sta.	Quackgrass	10	Up	----------	--	----	----------	--	----	----------	--	----
Massachusetts	Chickweed	--	Sta.	Dandelion	--	Sta.	Plantain	--	Sta.	White cockle	--	Up	Wild mustard	--	Sta.
New Hampshire	Dock	15	Sta.	Quackgrass	35	Sta.	White cockle	15	Up	Yellow rocket	30	Sta.	----------	--	----
New Jersey	Barnyardgrass	--	--	Corn chamomile	--	----	Mustard	--	----	Shepherdspurse	--	----	Yellow rocket	--	----
New York	Bedstraw	40	Sta.	Dandelion	100	Sta.	Quackgrass	100	Sta.	Wild carrot	50	Up	Yellow rocket	90	----
Pennsylvania	Chickweed	12	Down	Dandelion	15	Up	Pigweed	8	Sta.	Plantain	5	Up	Wintercress	21	Up
Rhode Island	Chickweed	20	Sta.	Daisy	10	Sta.	Horsenettle	10	Sta.	Quackgrass	40	Sta.	Wild mustard	60	Sta.
Vermont	Canada thistle	30	Sta.	Chicory	40	Sta.	Quackgrass	90	Sta.	----------	--	----	----------	--	----
West Virginia	Chickweed	25	Sta.	Foxtail	30	Up	Quackgrass	20	Up	Ragweed	50	Up	Thistles	20	Up
North Central:															
Illinois	Canada thistle	10	--	Curly dock	10	----	Giant foxtail	20	----	Wild carrot	10	----	Wild mustard	10	----
Indiana	Canada thistle	--	Sta.	Dock	--	Sta.	Downy brome	--	Down	Giant foxtail	--	Sta.	Quackgrass	--	Sta.
Iowa	Giant foxtail	50	--	Green foxtail	50	----	Ragweed	25	----	Smartweed	10	----	Yellow foxtail	50	----
Michigan	Downy brome	15	Up	Quackgrass	90	Sta.	Shepherdspurse	60	Up	White cockle	30	Up	----------	--	----
Minnesota	Canada thistle	50	Up	Foxtail	80	Up	Quackgrass	75	Sta.	White cockle	25	Up	Wild mustard	50	Sta.
Missouri	Broomsedge	25	Sta.	Johnsongrass	3	Up	Red sorrel	2	----	Thistles	5	Up	Weed bromegrasses	--	Sta.
North Dakota	Dandelion	25	Sta.	Kochia	45	Up	Lambsquarters	35	Sta.	Pigweed	35	Sta.	Redroot pigweed	35	Sta.
Ohio	Canada thistle	25	Up	Crabgrass	40	Sta.	Quackgrass	20	Sta.	Ragweed	60	Sta.	Smartweed	20	Sta.
South Dakota	Canada thistle	1	----	Downy brome	10	----	Field bindweed	2	----	Japanese brome	--	----	Milkweed	1	----
Wisconsin	Hoary alyssum	75	Up	Pennycress	20	Sta.	Quackgrass	100	Sta.	White cockle	90	Up	Yellow rocket	50	Up
Southern:															
Arkansas	Bitter sneezeweed	25	Up	Chickweed	60	Up	Croton	10	Up	Dock	5	Up	Henbit	60	Up
Florida	Bull thistle	5	Up	Crotalaria	2	Down	Dogfennel	5	Sta.	Ragweed	10	Sta.	Smartweed	2	Down
Georgia	Annual grasses	50	Up	Blackberry	20	Up	Johnsongrass	30	Up	Smartweed	30	Up	Smutgrass	30	Up
Kentucky	Chickweed	50	Up	Crabgrass	45	Up	Dock	25	Sta.	Henbit	50	Up	Ragweed	40	Up
Louisiana	Crabgrass	65	Sta.	Curly dock	50	Up	Foxtail	25	Sta.	Horsenettle	15	Up	Sandbur	10	Sta.
Mississippi	Bitter sneezeweed	70	Sta.	Cheat	65	Sta.	Darnel	65	Sta.	Dock	80	Sta.	Yankeeweed	50	Sta.
North Carolina	Chickweed	40	Sta.	Dock	15	Sta.	Henbit	30	Sta.	Horsenettle	25	Up	Ragweed	20	Down
Oklahoma	Crabgrass	80	Up	Curly dock	50	Up	Henbit	50	Up	Johnsongrass	90	Up	Sandbur	40	Up
South Carolina	Dodder	30	Sta.	Fleabane	30	Sta.	Plantain	30	Sta.	Poorjoe	20	Sta.	Ragweed	30	Sta.
Tennessee	Dodder	30	Sta.	Fleabane	30	Sta.	Plantain	30	Sta.	Poorjoe	20	Sta.	Ragweed	20	Sta.
Texas	Crabgrass	10	----	Henbit	3	----	Johnsongrass	10	----	Sandbur	8	----	Texas panicum	10	----
Virginia	Chickweed	25	Up	Chicory	10	Sta.	Dock	10	Sta.	Henbit	30	Up	----------	--	----
Western:															
Arizona	Barnyardgrass	60	----	Johnsongrass	15	----	London rocket	50	----	Pigweed	30	----	Wild oats	30	----
California	Chickweed	30	Sta.	Douglas fiddleneck	30	Sta.	Russian thistle	20	Sta.	Tansymustard	20	Sta.	Weed bromegrasses	60	Sta.
Idaho	Downy brome	100	Sta.	Shepherdspurse	80	Up	----------	--	----	----------	--	----	----------	--	----
Montana	Canada thistle	5	Sta.	Caraway	10	Sta.	Common milkweed	2	Sta.	Downy brome	5	Sta.	Foxtail	5	Sta.
Nevada	Dodder	10	Sta.	Foxtail barley	25	Sta.	Hairy whitetop	10	Down	Russian knapweed	20	Up	Sandbur	10	Sta.
New Mexico	Barnyardgrass	45	Sta	Foxtail	45	Sta.	Johnsongrass	20	Sta.	Pigweed	10	Sta.	Sandbur	10	Sta.
Oregon	Bentgrass	10	Sta.	Dodder	2	Sta.	Foxtail barley	10	Sta.	Rattail fescue	4	Sta.	Red sorrel	5	Down
Utah	Dandelion	30	Sta.	Downy brome	15	Sta.	Foxtail	10	Down	Mustard	20	Up	Quackgrass	20	Up
Washington	Dandelion	50	Up	Downy brome	20	Up	Shepherdspurse	30	Sta.	Tansymustard	30	Sta.	Wild barley	40	Up
Wyoming	Arrowgrass	20	Sta.	Dandelion	60	Sta.	Foxtail	20	Sta.	Plantain	20	Sta.	Quackgrass	10	Sta.
Alaska	Chickweed	100	Sta.	Corn spurry	20	Up	Hempnettle	10	Up	Lambsquarters	100	Sta.	Quackgrass	50	Up
Hawaii	Bermudagrass	5	Up	Feather fingergrass	40	Up	Kikuyugrass	5	Sta.	Sandbur	30	Up	Spiny amaranth	5	Sta.

[1] Sta., stationary.

Approximately 940 million acres of land are grazed in the United States--about 310 million acres of pasture and 630 million acres of rangeland. Weeds and brush are found in almost all this area but are a problem on only about one-half to three-fourths of it.

Almost 10 million acres of grazing land was sprayed by herbicides in 1965 at a cost of about $32 million (tables 1 to 5 and odd-numbered tables 43 to 55). Farmers or ranchers sprayed only 13 percent of the treated acreage of rangelands with their own equipment but sprayed 84 percent of the treated pasture acreage. Custom applicators treated the balance of each. The cost for spraying rangeland is higher than that for pastures, largely because relatively more brush species on rangeland were sprayed with 2,4,5-T. Less expensive 2,4-D is more commonly used on pastures. Also, the rate of spraying required for control of brush is usually higher than for control of herbaceous weeds.

To provide more meaningful information on weed and brush species the grazing land area is classified as follows: Annual pastures (table 44), perennial improved pastures (table 46), perennial unimproved pastures (table 48), mountain rangeland (table 50), foothill or prairie rangeland (table 52), arid rangeland (table 54), and rainbelt rangeland (table 56).

Annual Pastures

In annual pastures annual weed species were listed most often among the five most important weeds. Those listed most frequently were lambsquarters (12 States), pigweeds (14 States), and ragweed (6 States) (table 44). Only a few perennial and biennial species were listed for annual pastures.

Perennial Improved Pastures

Perennial improved pastures are characterized as having a high proportion of perennial weed species listed as most important problems (table 46). Those species mentioned most frequently are docks (18 States), Canada thistle (16 States), other thistles, mostly biennial (13 States), quackgrass (11 States), and horsenettle, dandelion and ragweed (9 States each).

Perennial Unimproved Pastures

Perennial unimproved pastures are also characterized by having a preponderance of perennial weeds listed as most important (table 48). A number of annual weeds are notably important also. Species listed most often include Canada thistle (7 States), other thistles (11 States), ragweed (6 States), dock and ironweed (5 States each), and broomsedge, quackgrass and bitter sneezeweed (4 States each). The high percentages of pasture acreage infested by many of the species listed in table 48 indicates a high potential acreage for use of any improved method of control that may be developed.

Mountain Rangeland

On mountain rangeland more serious weed problems mentioned by the most States included larkspurs, sagebrush species, and Canada thistle (table 50). Many other weed and brush species are listed as serious on extensive acreages.

Foothills [Prairie]

On the foothill and prairie ranges species of weed bromegrasses are most often mentioned among the five most important weeds within the States reporting (table 52). The next most frequently mentioned are the sagebrush species. Other species listed in several States include junipers, loco, goldenrods, leafy spurge, sagewort wormwood, and medusahead. Because of the extensive acreages involved and the high percentage of infestation, many of the difficult-to-kill species warrant increased attention in research. On the other hand, species such as the sagebrushes which are found on extensive acreages probably should command low priority in research because efficient and effective methods for their control have been developed.

Table 43.--Annual pastures: Estimated extent, cost, and effectiveness of chemical weed control, usage trend, need for better herbicides, and residue problems, by States and geographic divisions, 1965

State and region	Acres treated		Average cost per acre[1]		Average treated by--		Effectiveness of herbicides		Herbicides usage trend[2]	Need for better herbicides	Persistence problem
	Pre-emergence	Post-emergence	Pre-emergence	Post-emergence	Farmers	Custom operators	Pre-emergence	Post-emergence			
	1,000 acres	1,000 acres	Dollars	Dollars	Percent	Percent					
Connecticut	--	.1	--	7.50	100	--	----	Good	Sta.	Some	Yes
New Hampshire	.1	.1	4.00	4.00	50	50	Good	Good	Sta.	Little	No
New York	20	30	8.00	6.00	60	40	----	Good	Up	Some	Yes
Rhode Island	--	.4	--	8.00	100	--	----	Good	Up	Little	Yes
Northeastern	20.1	30.6	7.98	6.02	60	40	1-Good	4-Good	2-Up 2-Sta.	2-Some 2-Little	3-Yes 1-No
Illinois	1	1	4.00	1.25	95	5	Fair	Fair	Up	Some	No
Iowa	--	100	--	1.50	95	5	----	Good	Up	Little	No
Minnesota	--	5	--	2.00	100	--	----	Good	Up	Little	No
South Dakota	--	10	--	1.35	50	50	----	Good	Up	Urgent	No
North Central	1	116	4.00	1.51	91	9	1-Fair	3-Good 1-Fair	4-Up	1-Urgent 1-Some 2-Little	4-No
Florida	--	8	--	1.50	50	50	----	Fair	Up	Some	No
North Carolina	--	10	--	2.00	100	--	----	Good	Sta.	Some	No
South Carolina	--	1	---	1.00	75	25	----	Fair	Up	Urgent	No
Tennessee	--	2	--	1.50	95	5	----	Fair	Up	Some	Yes
Texas	--	10	--	2.00	40	60	----	Fair	Up	Some	No
Virginia	--	1	--	3.50	90	10	----	Fair	Sta.	Some	No
Southern	--	32	--	1.86	67	33	----	1-Good 5-Fair	4-Up 2-Sta.	1-Urgent 5-Some	1-Yes 5-No
California	--	10	--	3.50	70	30	----	Fair	Sta.	Some	No
Western	--	10	--	3.50	70	30	----	1-Fair	1-Sta.	1-Some	1-No
United States	21.1	188.6	7.79	2.41	79	21	1-Good 1-Fair	8-Good 7-Fair	10-Up 5-Sta.	2-Urgent 9-Some 4-Little	4-Yes 11-No

[1] Includes herbicide equipment and labor for treatment made by farmers. Represents cost of herbicide custom applications and/or cost of farmer-applied herbicides. Regional and United States averages are for acreages on which costs were reported.

[2] Sta., stationary.

Table 44.--Annual pastures: Five most important weeds listed alphabetically within States, acreage infested, and infestation trend, 1965

Region and State	Weed	Infestation		Weed	Infestation		Weed	Infestation		Weed	Infestation		Weed	Infestation	
		Acres	Trend [1]		Acres	Trend [1]		Acres	Trend [1]		Acres	Trend [1]		Acres	Trend [1]
		Pct.			Pct.			Pct.			Pct.			Pct.	
Northeastern:															
Connecticut	Barnyardgrass	40	Sta.	Lambsquarters	50	Sta.	Ragweed	40	Sta.	Redroot pigweed	80	Sta.	Smartweed	25	Sta.
Massachusetts	Crabgrass	--	Sta.	Foxtail	--	Sta.	Lambsquarters	--	Sta.	Redroot pigweed	--	Sta.	Smartweed	--	Sta.
New Hampshire	Lambsquarters	40	Sta.	Redroot pigweed	40	Sta.	Smartweed	20	Sta.	----------	--	----	----------	--	----
New York	Lambsquarters	50	Sta.	Nutsedge	40	Up	Pigweed	50	Sta.	Quackgrass	60	Sta.	Wild mustard	80	Sta.
Rhode Island	Lambsquarters	40	Sta.	Pigweed	60	Sta.	Ragweed	60	Sta.	Smartweed	75	Sta.	----------	--	----
North Central:															
Illinois	Johnsongrass	10	Sta.	Lambsquarters	10	Down	Pigweed	10	Down	Smartweed	10	Down	Wild garlic	10	Sta.
Iowa	Giant foxtail	25	Sta.	Green foxtail	25	Sta.	Ragweed	25	Sta.	Yellow foxtail	25	Sta.	----------	--	----
Minnesota	Barnyardgrass	75	Sta.	Lambsquarters	95	Sta.	Pigweed	95	Sta.	Quackgrass	60	Up	Ragweed	70	Sta.
Nebraska	Crabgrass	25	Sta.	Foxtail	50	Sta.	Lambsquarters	60	Sta.	Pigweed	80	Sta.	Sunflower	25	Sta.
South Dakota	Cocklebur	---	----	Horseweed	--	----	Lambsquarters	--	----	Pigweed	--	----	Sunflower	--	----
Southern:															
Arkansas	Pigweed	30	Up	Ragweed	30	Up	----------	--	----	----------	--	----	----------	--	----
Florida	Crabgrass	100	Sta.	Crotalaria	5	Down	Florida purslane	100	Sta.	Ragweed	30	Sta.	Sicklepod	20	Sta.
North Carolina	Chickweed	40	Sta.	Dock	25	Sta.	Henbit	45	Sta.	Horsenettle	40	Sta.	Knawel	20	Up
Tennessee	Cocklebur	15	Up	Crabgrass	95	Sta.	Lambsquarters	15	Up	Morninglory	20	Sta.	Pigweed	50	Up
Texas	Crabgrass	10	Sta.	Dock	1	Sta.	Johnsongrass	15	Sta.	Pigweed	10	Sta.	Texas panicum	12	Sta.
Western:															
Idaho	Musk thistle	1	Up	Scotch thistle	1	Down	Wild barley	20	Sta.	----------	--	----	----------	--	----
New Mexico	Barnyardgrass	5	Sta.	Johnsongrass	15	Sta.	Lambsquarters	10	Down	Pigweed	15	Down	Sunflower	10	Sta.
Oregon	Lambsquarters	--	----	Pigweed	--	----	Wild oats	--	----	----------	--	----	----------	--	----

[1] Sta., stationary.

Table 45.--Improved perennial pastures: Estimated extent, cost, and effectiveness of chemical weed control, usage trend, need for better herbicide, and residue problems, by States and geographic divisions, 1965

State and region	Acres treated		Average cost per acre[1]		Acreage treated by--		Effectiveness of herbicides		Herbicides usage trend[2]	Need for better herbicides	Persistence problem
	Pre-emergence	Post-emergence	Pre-emergence	Post-emergence	Farmers	Custom operators	Pre-emergence	Post-emergence			
	1,000 acres	1,000 acres	Dollars	Dollars	Percent	Percent					
Connecticut	--	1	--	7.00	75	25	----	Fair	Up	Some	Yes
Delaware	--	2	--	2.00	100	--	----	Fair	Sta.	Some	No
Maine	--	2	--	2.50	100	--	----	Good	Up	Some	No
Maryland	--	20	--	1.50	80	20	----	Poor	Up	Urgent	No
New Hampshire	10	90	12.00	9.00	75	25	Fair	Fair	Sta.	Urgent	Yes
New Jersey	--	14	--	1.75	95	5	---	Good	Sta.	Some	No
New York	--	200	--	5.00	60	40	---	Good	Up	Some	Yes
Pennsylvania	--	15	--	3.50	95	5	---	Good	Sta.	Some	No
Rhode Island	--	1	--	8.00	100	--	---	Fair	Up	Urgent	Yes
West Virginia	--	2	--	2.00	100	--	---	Fair	Up	Some	No
Northeastern	10	347	12.00	7.61	69	31	1-Fair	4-Good 5-Fair 1-Poor	6-Up 4-Sta.	3-Urgent 7-Some	4-Yes 5-No
Illinois	--	10	--	1.50	95	5	----	Fair	Sta.	Some	No
Iowa	--	250	--	1.50	95	5	----	Good	Up	Little	No
Kansas	--	1,000	--	1.85	95	5	----	Fair	Sta.	Some	Yes
Minnesota	--	100	--	2.50	95	5	----	Fair	Up	Little	No
Ohio	--	40	--	2.00	90	10	----	Fair	Sta.	Some	No
South Dakota	--	20	--	1.50	50	50	----	Good	Sta.	Some	No
North Central	--	1,420	--	1.42	94	6	----	2-Good 4-Fair	2-Up 4-Sta.	4-Some 2-Little	1-Yes 5-No
Alabama	--	119	--	2.00	95	5	----	Fair	Up	Urgent	Yes
Arkansas	10	60	1.50	2.00	90	10	Fair	Good	Up	Some	Yes
Florida	--	10	--	1.50	50	50	----	Fair	Up	Some	No
Georgia	--	400	--	2.00	80	20	----	Good	Up	Some	No
Kentucky	--	150	--	2.00	95	5	----	Fair	Up	Urgent	No
Louisiana	5	120	6.00	1.25	70	30	Good	Good	Up	Little	No
Mississippi	--	300	--	1.00	95	5	----	Fair	Up	Some	No
North Carolina	--	100	--	2.00	100	--	----	Good	Sta.	Some	No
Oklahoma	--	30	--	1.75	20	80	----	Good	Up	Urgent	Yes
South Carolina	--	10	--	1.00	75	25	----	Fair	Up	Urgent	No
Tennessee	--	5	--	3.00	95	5	----	Good	Up	Some	Yes
Texas	3	50	6.00	2.00	50	50	Fair	Good	Up	Some	No
Virginia	--	75	--	3.50	70	30	----	Fair	Up	Some	No
Southern	18	1,429	3.50	1.79	84	16	1-Good 2-Fair	7-Good 6-Fair	12-Up 1-Sta.	4-Urgent 8-Some 1-Little	4-Yes 9-No
Arizona	--	1	--	2.00	80	20	----	Good	Sta.	Little	No
California	--	50	--	3.50	70	30	----	Fair	Up	Urgent	No
Montana	--	1	--	1.75	100	--	----	Good	Sta.	Little	No
Nevada	--	3	--	4.50	50	50	----	Fair	Up	Urgent	Yes
Oregon	--	10	--	4.00	90	10	----	Fair	Sta.	Urgent	Yes
Utah	--	1	--	3.00	70	30	----	Fair	Up	Urgent	Yes
Washington	--	20	--	5.00	90	10	----	Good	Up	Some	No
Wyoming	--	2	--	2.00	50	50	----	Fair	Up	Some	No
Hawaii	--	5	--	10.00	50	50	----	Fair	Up	Urgent	Yes
Western	--	93	--	4.19	75	25	----	3-Good 6-Fair	6-Up 3-Sta.	5-Urgent 2-Some 2-Little	4-Yes 5-No
United States	28	3,289	6.54	2.31	86	14	1-Good 3-Fair	16-Good 21-Fair 1-Poor	26-Up 12-Sta.	12-Urgent 21-Some 5-Little	13-Yes 25-No

[1] Includes herbicide equipment and labor for treatment made by farmers. Represents cost of herbicide custom applications and/or cost of farmer-applied herbicides. Regional and United States averages are for acreages on which costs were reported.

[2] Sta., stationary.

Table 46.--Improved perennial pastures: Five most important weeds listed alphabetically, within States, acreage infested, and infestation trend, 1965

Region and State	Weed	Infestation		Weed	Infestation		Weed	Infestation		Weed	Infestation		Weed	Infestation	
		Acres	Trend (1)		Acres	Trend (1)		Acres	Trend (1)		Acres	Trend (1)		Acres	Trend (1)
		Pct.			Pct.			Pct.			Pct.			Pct.	
Northeastern:															
Connecticut	Dandelion	50	Up	Quackgrass	25	Sta.	White cockle	30	Up	Wild carrot	25	Sta.	Wintercress	30	Up
Delaware	Canada thistle	5	Down	Chickweed	25	Up	Horsenettle	5	Up	Wild garlic	25	Sta.	Wild mustard	15	Sta.
Maine	Dandelion	10	Sta.	Milkweed	5	Up	Thistles	--	Sta.	----------	--	----	----------	--	----
Maryland	Canada thistle	45	Up	Horsenettle	40	Up	Milkweed	10	Up	Purpletop	15	Up	Star-of-Bethlehem-	5	Up
Massachusetts	Chickweed	--	Sta.	Dandelion	--	Sta.	Plantain	--	Sta.	Shepherdspurse	--	Sta.	White cockle	--	Sta.
New Hampshire	Quackgrass	75	Sta.	Thistles	15	Sta.	White cockle	10	Up	Wild mustard	20	Sta.	Yellow rocket	30	Sta.
New Jersey	Canada thistle	--	Up	Horsenettle	--	Sta.	Milkweed	--	Up	Quackgrass	--	Sta.	----------	--	----
New York	Bedstraw	20	Sta.	Dandelion	90	Up	Quackgrass	60	Sta.	Wild carrot	50	Up	Yellow rocket	90	Up
Pennsylvania	Bull thistle	40	Down	Buttercup	15	Sta.	Canada thistle	30	Up	Dandelion	60	Up	Wintercress	20	Down
Rhode Island	Cheat	40	Sta.	Chickweed	40	Sta.	Dandelion	80	Sta.	Quackgrass	40	Sta.	Yellow rocket	30	Sta.
Vermont	Buttercup	25	Sta.	Canada thistle	25	Sta.	Chicory	10	Sta.	Milkweed	10	Sta.	Yellow hawkweed	10	Sta.
West Virginia	Curly dock	15	Sta.	Ironweed	10	Sta.	Multiflora rose	5	Up	Thistles	15	Up	----------	--	----
North Central:															
Illinois	Bull thistle	10	Down	Canada thistle	10	Down	Curly dock	5	Down	Elm brush	5	Down	Johnsongrass	15	Sta.
Indiana	Bull thistle	--	Sta.	Canada thistle	--	Sta.	Dogfennel	--	Sta.	Horsenettle	--	Sta.	Ironweed	--	Sta.
Iowa	Bull thistle	--	----	Canada thistle	5	Sta.	Horsenettle	--	----	----------	--	----	----------	--	----
Kansas	Musk thistle	65	Up	Ragweed	80	Sta.	Weed bromegrasses-	50	Sta.	----------	--	----	----------	--	----
Minnesota	Canada thistle	15	Sta.	Quackgrass	70	Sta.	Ragweed	70	Sta.	Vervain	50	Sta.	Weed bromegrasses-	75	Sta.
Missouri	Dock	--	Sta.	Ironweed	--	Up	Ragweed	--	Up	Thistles	--	Up	Woody plants	--	Sta.
Nebraska	Foxtail	70	Sta.	Kochia	40	Sta.	Ragweed	85	Sta.	Weed bromegrasses-	70	Sta.	Wild mustard	40	Sta.
Ohio	Canada thistle	25	Sta.	Crabgrass	40	Sta.	Foxtail	60	Sta.	Quackgrass	15	Sta.	Ragweed	80	Sta.
South Dakota	Canada thistle	1	Sta.	Cocklebur	8	Sta.	Goldenrod	100	Sta.	Leafy spurge	1	Up	Sunflower	10	Sta.
Wisconsin	Hoary alyssum	75	Up	Pennycress	20	Sta.	Quackgrass	100	Sta.	White cockle	90	Up	Yellow rocket	50	Up
Southern:															
Alabama	Bitter sneezeweed-	75	Sta.	Dogfennel	40	Up	Dropseed	25	Up	Little barley	75	Sta.	Wolftail	30	Up
Arkansas	Croton	20	Up	Dock	10	Up	Ragweed	--	--	Sandbur	5	Up	Sumpweed	5	Up
Florida	Bull thistle	5	Up	Carolina geranium-	10	Up	Curly dock	5	Sta.	Matweed	10	Sta.	Smutgrass	20	Up
Georgia	Bitter sneezeweed-	70	Down	Dock	50	Sta.	Pigweed	30	Sta.	Sandbur	30	Up	Smutgrass	20	Up
Kentucky	Crabgrass	60	Up	Curly dock	10	Sta.	Giant foxtail	30	Up	Johnsongrass	20	Sta.	Ragweed	40	Up
Louisiana	Bitter sneezeweed-	40	Down	Curly dock	70	Sta.	Horsenettle	30	Up	Little barley	35	Up	Yankeeweed	25	Up
Mississippi	Bitter sneezeweed-	100	Sta.	Croton	75	Sta.	Dock	90	Sta.	Thistles	90	Sta.	Yankeeweed	85	Sta.
North Carolina	Bitter sneezeweed-	40	Sta.	Chickweed	45	Sta.	Dock	20	Sta.	Henbit	45	Sta.	Wild garlic	30	Sta.
Oklahoma	Broomsedge	75	Sta.	Crabgrass	60	Up	Ragweed	90	Up	Sandbur	60	Up	Threeawn	50	Sta.
South Carolina	Bitter sneezeweed-	40	Up	Dogfennel	15	Up	Horsenettle	30	Sta.	Little barley	25	Up	Wild garlic	40	Sta.
Tennessee	Bitter sneezeweed-	25	Up	Broomsedge	20	Up	Buttercup	35	Up	Horsenettle	30	Up	Ragweed	50	Up
Texas	Bullnettle	10	Down	Croton	15	Down	Dock	3	Sta.	Horsenettle	5	Down	Sandbur	15	Down
Virginia	Buttercup	20	Sta.	----------	--	----	----------	--	----	----------	--	----	----------	--	----
Western:															
California	Bermudagrass	20	Up	Buttercup	20	Up	Curly dock	60	Sta.	Foxtail	15	Up	Sedges	20	Up
Colorado	Canada thistle	30	Up	Curly dock	20	Sta.	Foxtail	35	Sta.	Milkweed	10	Sta.	Quackgrass	20	Up
Idaho	Curly dock	90	Down	Leafy spurge	1	Up	Quackgrass	20	Sta.	Wormwood	5	Up	----------	--	----
Montana	Bull thistle	1	Down	Canada thistle	2	Up	Leafy spurge	1	Up	Wild barley	1	Sta.	Yarrow	1	Down
Nevada	Bull thistle	10	----	Curly dock	30	Sta.	Foxtail barley	15	Sta.	Hairy whitetop	10	Sta.	Povertyweed	5	----
New Mexico	Barnyardgrass	30	Sta.	Cocklebur	5	Sta.	Dock	5	Sta.	Lambsquarters	20	Sta.	Wild mustard	20	Sta.
Oregon	Bentgrass	--	----	Buttercup	--	----	Canada thistle	--	----	Dock	--	----	Velvetleaf	--	----
Utah	Curly dock	--	----	Dandelion	--	----	Mallow	--	----	Morningglory	--	----	Plantain	--	----
Washington	Buttercup	5	Sta.	Canada thistle	15	Up	Dandelion	25	Sta.	Quackgrass	20	Up	----------	--	----
Wyoming	Canada thistle	50	Up	Dandelion	70	Sta.	Kochia	80	Sta.	Mustard	20	Up	Plantain	30	Up
Hawaii	Boneset	25	Up	Cocklebur	5	Sta.	Mallow	10	Up	Sensitiveplant	15	Up	Sourgrass	10	Sta.

[1] Sta., stationary.

Table 47.--Unimproved perennial pastures: Estimated extent, cost, and effectiveness of chemical weed control, usage trend, need for better herbicides, and residue problems by States and geographic divisions, 1965

State and region	Acres treated		Average cost per acre[1]		Acreage treated by--		Effectiveness of herbicides		Herbicides usage trend[2]	Need for better herbicides	Persistence problem
	Pre-emergence	Post-emergence	Post-emergence	Post-emergence	Farmers	Custom operators	Pre-emergence	Post-emergence			
	1,000 acres	1,000 acres	Dollars	Dollars	Percent	Percent					
Connecticut	--	.1	--	25.00	100	--	----	Good	Sta.	Little	No
New York	--	300	--	5.00	60	40	----	Good	Up	Some	Yes
Northeastern	--	300.1	--	5.01	60	40	----	2-Good	1-Up 1-Sta.	1-Some 1-Little	1-Yes 1-No
Illinois	--	40	--	1.50	95	5	----	Fair	Sta.	Some	No
Iowa	--	500	--	1.50	95	5	----	Good	Up	Little	No
Kansas	--	1,000	--	1.85	95	5	----	Fair	Sta.	Some	Yes
Minnesota	--	75	--	2.50	95	5	----	Fair	Up	Little	No
Missouri	--	70	--	2.00	30	70	----	Fair	Sta.	Little	No
Ohio	--	220	--	1.50	90	10	----	Fair	Sta.	Some	No
South Dakota	--	50	--	2.50	40	60	----	Good	Sta.	Some	No
Wisconsin	--	50	--	1.90	90	10	----	Good	Sta.	Some	No
North Central	--	2,005	--	1.76	91	9	----	3-Good 5-Fair	2-Up 6-Sta.	5-Some 3-Little	1-Yes 7-No
Arkansas	20	100	1.50	2.00	90	10	Fair	Good	Up	Some	No
North Carolina	--	50	--	2.00	100	--	----	Good	Sta.	Some	No
South Carolina	--	2	--	1.00	75	25	----	Fair	Up	Urgent	No
Texas	--	100	--	2.00	50	50	----	Good	Up	Some	No
Virginia	--	525	--	4.50	70	30	----	Fair	Up	Some	No
Southern	20	777	1.50	3.69	72	28	1-Fair	3-Good 2-Fair	4-Up 1-Sta.	1-Urgent 4-Some	5-No
California	--	30	--	3.50	70	30	----	Fair	Sta.	Some	No
Montana	--	2	--	1.75	100	--	----	Good	Sta.	Little	No
Hawaii	--	10	--	10.00	50	50	----	Fair	Up	Urgent	Yes
Western	--	42	--	4.96	67	33	----	1-Good 2-Fair	1-Up 2-Sta.	1-Urgent 1-Some 1-Little	1-Yes 2-No
United States	20	3,124.1	1.50	2.60	83	17	1-Fair	9-Good 9-Fair	8-Up 10-Sta.	2-Urgent 11-Some 5-Little	3-Yes 15-No

[1] Includes herbicide equipment and labor for treatment made by farmers. Represents cost of herbicide custom applications and/or cost of farmer-applied herbicides. Regional and United States averages are for acreages on which costs were reported.

[2] Sta., stationary.

Table 48.--Perennial unimproved pastures: Five most important weeds listed alphabetically within States, acreage infested, and infestation trend, 1965

Region and State	Weed	Infestation		Weed	Infestation		Weed	Infestation		Weed	Infestation		Weed	Infestation	
		Acres	Trend [1]		Acres	Trend [1]		Acres	Trend [1]		Acres	Trend [1]		Acres	Trend [1]
		Pct.			Pct.			Pct.			Pct.			Pct.	
Northeastern:															
Connecticut	Cinquefoil	75	Sta.	Hawkweed	75	Sta.	Wild carrot	75	Sta.	Woodsorrel	75	Sta.	Yarrow	75	Sta.
Massachusetts	Curly dock	--	Sta.	Dandelion	--	Sta.	Goldenrod	--	Sta.	Plantain	--	Sta.	Wild carrot	--	Sta.
New York	Annual grasses	95	Sta.	Brush	90	Up	Perennial grasses	95	Up	Quackgrass	90	Sta.	----------	--	----
Rhode Island	Chicory	10	Sta.	Dandelion	80	Sta.	Plantain	20	Sta.	Quackgrass	40	Sta.	Thistles	10	Sta.
West Virginia	Cinquefoil	20	Sta.	Greenbrier	20	Sta.	Sassafras	20	Sta.	Yarrow	20	Sta.	----------	--	----
North Central:															
Illinois	Broomsedge	15	Sta.	Bull thistle	10	Down	Canada thistle	10	Down	Vervain	5	Sta.	White snakeroot	5	Down
Iowa	Buckbrush	50	Sta.	Hazel brush	50	Sta.	Red alder	5	Sta.	Tree seedlings	5	Sta.	----------	--	----
Kansas	Ironweed	50	Sta.	Musk thistle	65	Up	Ragweed	80	Sta.	Vervain	50	Sta.	Weed bromegrasses	40	Sta.
Minnesota	Canada thistle	85	Sta.	Curly dock	65	Sta.	Ironweed	65	Sta.	Quackgrass	90	Sta.	Ragweed	85	Sta.
Missouri	Fleabane	--	Sta.	Foxtail	--	Up	Ragweed	--	Sta.	Thistles	--	Up	Weed bromegrasses	--	Up
Nebraska	Dandelion	90	Sta.	Ironweed	85	Up	Ragweed	60	Up	Threeawn	50	Up	Wild mustard	50	Sta.
Ohio	Canada thistle	30	Sta.	Ironweed	15	Up	Quackgrass	15	Sta.	Ragweed	80	Sta.	Wild carrot	15	Sta.
South Dakota	Canada thistle	1	Sta.	Goldenrod	50	Sta.	Ironweed	1	Sta.	Sagewort wormwood	85	Sta.	Wormwood	2	Up
Wisconsin	Canada thistle	50	Sta.	Curly dock	40	Sta.	Hoary alyssum	80	Up	Oxeye daisy	30	Sta.	Yarrow	30	Sta.
Southern:															
Arkansas	Bitter sneezeweed	50	Up	Gumweed	20	Up	Pricklypear	5	Up	Starthistle	5	Up	Yankeeweed	5	Up
Georgia	Bitter sneezeweed	70	Sta.	Brush	20	Up	Dock	60	Up	----------	--	----	----------	--	----
North Carolina	Chickweed	40	Up	Hawkweed	10	Up	Henbit	45	Up	Horsenettle	30	Up	Wild garlic	40	Up
Oklahoma	Bull thistle	40	Up	Cocklebur	40	Up	Dock	50	Up	Puncturevine	40	Up	Sunflower	30	Up
South Carolina	Bitter sneezeweed	60	Up	Broomsedge	40	Sta.	Common chickweed	20	Sta.	Poorjoe	30	Sta.	Wild garlic	40	Up
Tennessee	Bitter sneezeweed	30	Up	Broomsedge	85	Up	Buttercup	35	Up	Ragweed	50	Up	Thistles	35	Up
Texas	Bullnettle	15	Sta.	Croton	23	Sta.	Horsenettle	15	Sta.	Sandbur	25	Sta.	Yankeeweed	5	Sta.
Virginia	Bermudagrass	15	Up	Buttercup	40	Sta.	Musk thistle	15	Up	Spotted knapweed	10	Up	Welted thistle	35	Up
Western:															
California	Bermudagrass	40	Up	Bull thistle	75	Sta.	Foxtail	30	Up	Weed bromegrasses	40	Up	Yellow starthistle	20	Up
Colorado	Certain elms and ashes.	30	Sta.	Pricklypear	25	Up	Rabbitbrush	25	Up	Sagebrush	40	Up	Snakeweed	25	Up
Montana	Burdock	5	Up	Canada thistle	5	Up	Hairy whitetop	2	Down	Musk thistle	1	Sta.	Spotted knapweed	2	Up
Nevada	Arrowgrass	20	Sta.	Foxtail barley	25	Sta.	Iris	30	Sta.	Povertyweed	10	Sta.	Sedges	15	Sta.
Utah	Bull thistle	--	----	Canada thistle	--	----	Common milkweed	--	----	Gumweed	--	----	----------	--	Sta.
Hawaii	Barbwiregrass	2	Up	Boneset	40	Up	Broomsedge	30	Up	Flatsedge	10	Up	Foxtail	10	Up

[1] Sta., stationary

Table 49.--Mountain rangeland: Estimated extent, cost, and effectiveness of chemical weed control, usage trend, need for better herbicides and residue problems, by States and geographic divisions, 1965

State and region	Acres treated		Average cost per acre[1]		Acreage treated by--		Effectiveness of herbicides		Herbicides usage trend[2]	Need for better herbicides	Persistence problem
	Pre-emergence	Post-emergence	Pre-emergence	Post-emergence	Farmers	Custom operators	Pre-emergence	Post-emergence			
	1,000 acres	1,000 acres	Dollars	Dollars	Percent	Percent					
South Dakota	--	20	--	20.00	25	75	----	Good	Up	Urgent	Yes
North Central	--	20	--	20.00	25	75	----	1-Good	1-Up	1-Urgent	1-Yes
Texas	--	500	--	5.00	10	90	----	Good	Up	Some	No
Southern	--	500	--	5.00	10	90	----	1-Good	1-Up	1-Some	1-No
Arizona	--	2	--	5.00	100	--	----	Fair	Sta.	Little	No
California	--	80	--	6.50	10	90	----	Good	Up	Some	No
Idaho	--	5	--	3.00	20	80	----	Good	Up	Some	No
Montana	--	4	--	3.00	10	90	----	Good	Up	Little	No
New Mexico	--	2	--	2.50	50	50	----	Good	Up	Some	No
Oregon	--	1	--	10.00	90	10	----	Fair	Up	Urgent	Yes
Utah	--	45	--	4.00	5	95	----	Good	Up	Some	No
Washington	--	1	--	2.00	10	90	----	Good	Up	Some	No
Hawaii	--	10	--	5.00	50	50	----	Good	Up	Urgent	Yes
Western	--	150	--	5.36	14	86	----	7-Good 2-Fair	8-Up 1-Sta.	2-Urgent 5-Some 2-Little	2-Yes 7-No
United States	--	670	--	5.53	11	89	----	9-Good 2-Fair	10-Up 1-Sta.	3-Urgent 6-Some 2-Little	3-Yes 8-No

[1] Includes herbicide equipment and labor for treatment made by farmers. Represents cost of herbicide custom applications and/or cost of farmer-applied herbicides. Regional and United States averages are for acreages on which costs were reported.
[2] Sta., stationary.

Table 50.--Mountain rangland: Five most important weeds listed alphabetically within States, acreage infested, and infestation trend, 1965

Region and State	Weed	Infestation		Weed	Infestation		Weed	Infestation		Weed	Infestation		Weed	Infestation	
		Acres	Trend (1)		Acres	Trend (1)		Acres	Trend (1)		Acres	Trend (1)		Acres	Trend (1)
		Pct.			Pct.			Pct.			Pct.			Pct.	
North Central:															
South Dakota	Burdock	8	Sta.	Canada thistle	12	Up	Leafy spurge	2	Sta.	Mullein	12	Up	Sagebrush	20	Sta.
Southern:															
Texas	Cresotebush	4	Up	Juniper	40	Up	Mesquite	30	Up	Pricklypear	65	Up	Saltcedar	1	Up
Western:															
Arizona	Juniper	15	----	Manzanita	10	----	Oakbrush	20	----	----	--	----	----	--	----
California	Chamise	60	Sta.	Elm	60	Sta.	False hellebore	10	Sta.	Sagebrush	20	Sta.	Tall larkspur	10	Up
Idaho	Canada thistle	50	Up	Diffuse knapweed	--	Up	Rush skeletonweed	--	Up	Spotted knapweed	1	Up	Yellow toadflax	1	Up
Montana	Canada thistle	1	Up	Downy brome	5	Up	Leafy spurge	1	Up	Sagebrush	5	Sta.	Tall larkspur	1	Up
Nevada	Manzanita	10	Up	Tall larkspur	5	Sta.	Willow	5	Sta.	----	--	----	----	--	----
New Mexico	Bracken	5	Sta.	Larkspur	5	Sta.	Pingue	5	Sta.	Sagebrush	10	Down	Sedge	5	Sta.
Oregon	Canada thistle	--	----	Mediterranean sage	--	----	Mulesears	--	----	Sedges	--	----	Tall larkspur	--	----
Utah	Big sagebrush	18	Up	Downy brome	28	Sta.	Mulesears	6	Up	Tall larkspur	3	Sta.	Tarweed	5	Sta.
Washington	Brush	20	Up	Canada thistle	1	Up	False hellebore	1	Up	Oxeye daisy	1	Up	Tall larkspur	1	Sta.
Wyoming	Mulesears	10	Up	Sagebrush	80	Sta.	Tall larkspur	10	Up	----	--	----	----	--	----
Hawaii	A'alii	10	Sta.	Boneset	20	Up	Firebush	10	Up	Gorse	5	Up	Pukiawe	15	Up

[1] Sta., stationary.

Table 51.--Prairie or foothills rangeland: Estimated extent, cost, and effectiveness of chemical weed control, usage trend, need for better herbicides, and residue problems, by States and geographic divisions, 1965

State and region	Acres treated		Average cost per acre[1]		Acreage treated by--		Effectiveness of herbicides		Herbicides usage trend[2]	Need for better herbicides	Persistence problem
	Pre-emergence	Post-emergence	Pre-emergence	Post-emergence	Farmers	Custom operators	Pre-emergence	Post-emergence			
	1,000 acres	1,000 acres	Dollars	Dollars	Percent	Percent					
Kansas	--	250	--	1.85	10	90	--	Fair	Sta.	Some	No
North Dakota	--	65	--	2.00	50	50	--	Good	Up	Little	No
South Dakota	--	75	--	3.00	20	80	--	Good	Up	Some	No
North Central	--	390	--	2.10	19	81	--	2-Good 1-Fair	2-Up 1-Sta.	2-Some 1-Little	3-No
Oklahoma	--	200	--	7.50	10	90	--	Fair	Up	Urgent	Yes
Texas	--	1,000	--	5.00	10	90	--	Good	Up	Some	No
Southern	--	1,200	--	5.42	10	90	--	1-Fair 1-Good	2-Up	1-Urgent 1-Some	1-Yes 1-No
California	--	30	--	6.50	10	90	--	Good	Up	Some	No
Colorado	--	10	--	1.50	--	100	--	Fair	Sta.	Some	No
Idaho	--	5	--	3.00	20	80	--	Good	Up	Some	No
Montana	--	4	--	3.00	15	85	--	Good	Up	Little	No
Nevada	--	15	--	2.50	5	95	--	Good	Up	Urgent	No
New Mexico	--	3	--	2.50	75	25	--	Good	Up	Some	No
Oregon	--	10	--	5.00	90	10	--	Fair	Sta.	Urgent	No
Utah	--	85	--	5.00	5	95	--	Good	Up	Some	No
Washington	--	5	--	2.00	10	90	--	Good	Up	Some	No
Hawaii	--	15	--	10.00	50	50	--	Fair	Up	Some	Yes
Western	--	182	--	5.04	16	84	--	7-Good 3-Fair	8-Up 2-Sta.	2-Urgent 7-Some 1-Little	1-Yes 9-No
United States	--	1,772	--	4.65	13	87	--	10-Good 5-Fair	12-Up 3-Sta.	3-Urgent 10-Some 2-Little	2-Yes 13-No

[1] Includes herbicide equipment and labor for treatment made by farmers. Represents cost of herbicide custom applications and/or cost of farmer-applied herbicides. Regional and United States averages are for acreages on which costs were reported.
[2] Sta., stationary.

Table 52.--Foothills [prairie]: Five most important weeds listed alphabetically within States, acreage infested, and infestation trend, 1965

Region and State	Weed	Infestation		Weed	Infestation		Weed	Infestation		Weed	Infestation		Weed	Infestation	
		Acres	Trend (1)		Acres	Trend (1)		Acres	Trend (1)		Acres	Trend (1)		Acres	Trend (1)
		Pct.			Pct.			Pct.			Pct.			Pct.	
North Central:															
Kansas	Ironweed	10	Sta.	Musk thistle	15	Up	Ragweed	10	Sta.	Snow-on-the-mountain.	10	Sta.	Weed bromegrasses-	10	Sta.
Nebraska	Leafy spurge	20	Up	Sagewort	15	Sta.	Thistles	70	Up	----------	--	----	----------	--	----
North Dakota	Fringed sagebrush	85	----	Goldenrod	30	----	Gumweed	60	----	Leafy spurge	50	----	Western snowberry-	50	----
South Dakota	Big sagebrush	8	Sta.	Goldenrod	1	Sta.	Japanese brome	100	Sta.	Sagewort	100	Sta.	Weed bromegrasses-	100	Sta.
Southern:															
Oklahoma	Goldenrod	80	Up	Ragweed	95	Up	Sagebrush	40	Up	Weed bromegrasses-	90	Up	Western yarrow	80	Up
Texas	Live oak	30	Up	Mesquite	50	Up	Pricklypear	70	Up	Sagebrush	25	Sta.	Whitebrush	12	Up
Western:															
California	Loco	15	Sta.	Medusahead	20	Up	Oak brush	40	Up	Weed bromegrasses-	50	Sta.	Yellow starthistle	30	Sta.
Idaho	Diffuse knapweed-	--	Up	Spotted knapweed	--	Up	Yellow starthistle	--	Up	----------	--	----	----------	--	----
Montana	Leafy spurge	1	Up	Sagebrush	10	Sta.	Sagewort wormwood-	1	Up	Spotted knapweed-	1	Up	Weed bromegrasses-	5	Up
Nevada	Big sagebrush	80	Sta.	Juniper	10	Sta.	Low sagebrush	20	Sta.	Rabbitbrush	40	Up	Weed bromegrasses-	80	Up
New Mexico	Juniper	10	Down	Loco	20	Sta.	Mesquite	20	Up	Rabbitbrush	10	Sta.	Weed bromegrasses-	15	Sta.
Oregon	Blackberry	--	----	Buckhorn plantain-	--	----	Crested dogtail	--	----	Medusahead	--	----	Wild carrot	--	----
Utah	Big sagebrush	45	Up	Downy brome	20	Sta.	Halogeton	2	Up	Juniper	20	Up	Loco	5	Up
Washington	Balsam fir	2	Up	Brush	7	Up	Canada thistle	1	Sta.	Knapweed	1	Up	Medusahead	2	Up
Hawaii	A'alii	15	Sta.	Brazil peppertree-	15	Up	Broomsedge	15	Up	Guava	15	Sta.	Indian rhododendron.	15	Up

[1] Sta., stationary.

Table 53.--Arid rangeland: Estimated extent, cost, and effectiveness of chemical weed control, usage trend, need for better herbicides, and residue problems, by States and geographic divisions, 1965

State and region	Acres treated		Average cost per acre[1]		Acreage treated by--		Effectiveness of herbicides		Herbicides usage trend[2]	Need for better herbicides	Persistence problem
	Pre-emergence	Post-emergence	Pre-emergence	Post-emergence	Farmers	Custom operators	Pre-emergence	Post-emergence			
	1,000 acres	1,000 acres	Dollars	Dollars	Percent	Percent					
Texas	--	250	--	4.00	10	90	----	Good	Up	Urgent	No
Southern	--	250	--	4.00	10	90	----	1-Good	1-Up	1-Urgent	1-No
Arizona	--	20	--	3.00	100	--	----	Fair	Up	Little	No
California	--	5	--	5.00	25	75	----	Fair	Sta.	Urgent	No
Idaho	--	5	--	3.00	20	80	----	Fair	Down	Some	No
Montana	--	2	--	3.00	15	85	----	Good	Up	Little	No
New Mexico	--	12	--	3.00	100	--	----	Good	Up	Some	No
Oregon	--	100	--	2.00	10	90	----	Good	Up	Little	No
Utah	--	10	--	4.50	5	95	----	Fair	Up	Some	No
Washington	--	10	--	2.00	10	90	----	Good	Up	Some	No
Wyoming	--	10	--	3.00	--	100	----	Good	Sta.	Some	No
Hawaii	--	15	--	7.50	75	25	----	Fair	Up	Some	Yes
Western	--	189	--	2.91	30	70	----	5-Good 5-Fair	7-Up 2-Sta. 1-Down	1-Urgent 6-Some 3-Little	1-Yes 9-No
United States	--	439	--	3.53	19	81	----	6-Good 5-Fair	8-Up 2-Sta. 1-Down	2-Urgent 6-Some 3-Little	1-Yes 10-No

[1] Includes herbicide equipment and labor for treatment made by farmers. Represents cost of herbicide custom applications and/or cost of farmer-applied herbicides. Regional and United States averages are for acreages on which costs were reported.
[2] Sta., stationary.

Table 54.--Arid rangeland: Five important weeds listed alphabetically within States, acreage infested, and infestation trend, 1965

Region and State	Weed	Infestation		Weed	Infestation		Weed	Infestation		Weed	Infestation		Weed	Infestation	
		Acres	Trend (1)		Acres	Trend (1)		Acres	Trend (1)		Acres	Trend (1)		Acres	Trend (1)
		Pct.			Pct.			Pct.			Pct.			Pct.	
North Central:															
South Dakota	Prickly pear	--	Sta.	----------	--	----	----------	--	----	----------	--	----	----------	--	----
Southern:															
Texas	Blackbush	40	Up	Creosotebush	70	Up	Mesquite	75	Up	Saltcedar	2	Up	Tarbush	60	Sta.
Western:															
Arizona	Mesquite	31	----	Pricklypear	40	----	----------	--	----	----------	--	----	----------	--	----
California	Saltgrass	20	Sta.	Tarweed	50	Sta.	Tree tobacco	10	Sta.	Weed bromegrasses-	80	Sta.	Yellow starthistle	65	Up
Idaho	Halogeton	--	Up	Medusahead	--	Up	----------	--	----	----------	--	----	----------	--	----
Montana	Leafy spurge	1	Up	Pricklypear	1	Up	Sagebrush	15	Sta.	Spotted knapweed--	1	Up	Weed bromegrasses-	5	Up
Nevada	Greasewood	10	Sta.	Halogeton	15	Up	----------	--	----	----------	--	----	----------	--	----
New Mexico	Cacti	15	Sta.	Mesquite	60	Up	Oak	15	Up	Russian thistle---	15	Sta.	Yucca	15	Up
Oregon	Low larkspur	--	----	Medusahead	--	----	Rabbitbrush	--	----	Sagebrush	--	----	----------	--	----
Utah	Big sagebrush	30	Sta.	Downy brome	10	Sta.	Halogeton	10	Up	Juniper	5	Sta.	Loco	12	Up
Washington	Big sagebrush	25	Up	Greene rabbitbrush	10	Up	Horsebrush	1	Up	Weed bromegrasses-	75	Sta.	----------	--	----
Wyoming	Greasewood	10	Sta.	Halogeton	10	Sta.	Pricklypear	20	Sta.	Russian thistle---	30	Up	Sagebrush	50	Sta.
Hawaii	Apple-of-Sodom nightshade.	5	Up	Brazil peppertree-	20	Up	Fountaingrass	5	Up	Lantana	25	Down	Partridgepea	5	Up

[1] Sta., stationary.

Table 55.--Rainbelt rangeland: Estimated extent, cost, and effectiveness of chemical weed control, usage trend, need for better herbicides, and residue problems, by States and geographic divisions, 1965

State and region	Acres treated		Average cost per acre[1]		Acreage treated by--		Effectiveness of herbicides		Herbicides usage trend[2]	Need for better herbicides	Persistence problem
	Pre-emergence	Post-emergence	Pre-emergence	Post-emergence	Farmers	Custom operators	Pre-emergence	Post-emergence			
	1,000 acres	1,000 acres	Dollars	Dollars	Percent	Percent					
Texas	--	250	--	8.00	10	90	--	Good	Up	Urgent	No
Southern	--	250	--	8.00	10	90	--	1-Good	1-Up	1-Urgent	1-No
California	--	10	--	6.50	25	75	--	Fair	Up	Urgent	No
Hawaii	--	15	--	12.50	50	50	--	Fair	Up	Urgent	Yes
Western	--	25	--	10.10	40	60	--	2-Fair	2-Up	2-Urgent	1-Yes 1-No
United States	--	275	--	8.19	13	87	--	1-Good 2-Fair	3-Up	3-Urgent	1-Yes 2-No

[1] Includes herbicide equipment and labor for treatment made by farmers. Represents cost of herbicide custom application and/or cost of farmer-applied herbicides. Regional and United States averages are for acreages on which costs were reported.
[2] Sta., stationary.

Table 56.--Rainbelt rangeland: Five most important weeds listed alphabetically within States, acreage infested, and infestation trend, 1965

Region and State	Weed	Infestation		Weed	Infestation		Weed	Infestation		Weed	Infestation		Weed	Infestation	
		Acres	Trend (1)		Acres	Trend (1)		Acres	Trend (1)		Acres	Trend (1)		Acres	Trend (1)
		Pct.			Pct.			Pct.			Pct.			Pct.	
Southern:															
Florida	Dogfennel	10	Sta.	Gallberry	20	Sta.	Palmetto	75	Sta.	Smutgrass	10	Up	Waxmyrtle	10	Sta.
Georgia	Palmetto	--	Sta.	Persimmon	--	Up	Sassafras	--	Sta.	----------	--	----	----------	--	----
Texas	Elm	10	Up	Huisache	10	Up	Macartney rose	2	Up	Post oak	50	Up	Yaupon	10	Up
Western:															
California	Blackberry	40	Sta.	Gorse	5	Up	Italian thistle	30	Up	Pennycress	20	Up	Rush	15	Sta.
Oregon	Buttercup	--	----	Iris	--	----	Tansy ragwort	--	----	Wild berries	--	----	----------	--	----
Hawaii	Boneset	45	Up	Fern	30	Up	Guava	40	Sta.	Hairy fleabane	20	Up	Indian rhododendron.	30	Up

[1] Sta., stationary.

Arid Rangelands

Vast acreages are included in the arid rangelands class (table 54). The vegetation on these rangelands consists mostly of species of low grazing value whose replacement by more useful forage would improve carrying capacity. In addition to sagebrush, which is mentioned most often, other species frequently listed as most important in the 13 States reporting include weed bromegrasses, halogeton, prickly-pear, mesquite, and other brush species.

Rainbelt Rangeland

Three Southern and three Western States reported the most important weed and brush problems in rainbelt rangeland (table 56). Sixteen of the species listed were woody plants, 11 were herbaceous. Many of the species are not efficiently controlled by herbicides now registered for use on grazing lands.

FOREST PLANTINGS

Control of competing vegetation increases chances of success in forest plantings and assures more rapid development of forest species. Acreage reported as receiving herbicidal control is relatively small--117,000 acres. Cost was about $1.5 million (tables 1 to 5 and 57).

Most important weeds in forest plantings were woody plants (table 58). Next in importance were perennial herbaceous weeds, followed by annual weeds. Species mentioned by the most States include quackgrass, Canada thistle, bracken, bluegrass, blackberry and pigweed. Research, so far, has shown a high potential for improvement of weed control in forest plantings. More research in this area is badly needed.

Table 57.--Forest Plantings: Estimated extent, cost, and effectiveness of chemical weed control, usage trend, need for better herbicides, and residue problems, by States and geographic divisions, 1965

State and region	Acres treated		Average cost per acre[1]		Acreage treated by--		Effectiveness of herbicides		Herbicides usage trend[2]	Need for better herbicides	Persistence problem
	Pre-emergence	Post-emergence	Pre-emergence	Post-emergence	Farmers	Custom operators	Pre-emergence	Post-emergence			
	1,000 acres	1,000 acres	Dollars	Dollars	Percent	Percent					
Connecticut	--	([3])	--	15.00	100	--	----	Fair	Up	Some	No
New Jersey	--	29	--	15.00	95	5	----	Good	Up	Some	No
Vermont	.1	--	5.00	--	100	--	Good	----	Up	Little	No
Northeastern	.1	29	5.00	15.00	95	5	1-Good	1-Good 1-Fair	3-Up	2-Some 1-Little	3-No
Illinois	.6	.1	5.50	6.50	100	--	Good	Good	Up	Some	No
Iowa	.5	.5	4.00	4.00	95	5	Fair	Fair	Sta.	Little	No
North Dakota	8	.3	5.00	1.50	90	10	Good	Good	Up	Urgent	Yes
North Central	9.1	.9	4.98	3.44	91	9	2-Good 1-Fair	2-Good 1-Fair	2-Up 1-Sta.	1-Urgent 1-Some 1-Little	1-Yes 2-No
Alabama	--	12	--	13.00	15	85	----	Good	Up	Urgent	No
Arkansas	10	10	--	11.00	100	--	----	Fair	Down	Some	No
Florida	10	.5	5.00	4.00	30	70	Fair	Fair	Up	Some	No
North Carolina	--	1	--	10.00	100	--	----	Poor	Up	Some	No
Tennessee	1	25	30.00	20.00	10	90	Fair	Poor	Up	Some	Yes
Virginia	--	2	--	10.00	25	75	----	Fair	Up	Urgent	No
Southern	11	50.5	7.27	15.80	31	69	2-Fair	1-Good 3-Fair 2-Poor	5-Up 1-Down	2-Urgent 4-Some	1-Yes 5-No
California	--	5	--	7.50	5	95	----	Fair	Up	Urgent	No
Montana	--	.5	--	6.50	100	--	----	Good	Up	Little	Yes
Oregon	--	10	--	8.00	90	10	----	Good	Sta.	Little	No
Washington	--	1	--	8.00	90	10	----	Good	Up	Some	Yes
Hawaii	([3])	.1	10.00	7.50	100	--	Good	Good	Up	Some	No
Western	([3])	16.6	10.00	7.80	65	35	1-Good	4-Good 1-Fair	4-Up 1-Sta.	1-Urgent 2-Some 2-Little	2-Yes 3-No
United States	20.2	97.0	6.23	14.08	57	43	4-Good 3-Fair	8-Good 6-Fair 2-Poor	14-Up 2-Sta. 1-Down	4-Urgent 9-Some 4-Little	4-Yes 13-No

[1] Includes herbicide equipment and labor for treatment made by farmers. Represents cost of herbicide custom applications and/or cost of farmer-applied herbicides. Regional and United States averages are for acreages on which costs were reported.

[2] Sta., stationary.

[3] Less than 50 acres.

Table 58.--Forest planting: Five most important weeds listed alphabetically within States, acreage infested, and infestation trend, 1965

Region and State	Weed	Infestation		Weed	Infestation		Weed	Infestation		Weed	Infestation		Weed	Infestation	
		Acres	Trend (1)		Acres	Trend (1)		Acres	Trend (1)		Acres	Trend (1)		Acres	Trend (1)
		Pct.			Pct.			Pct.			Pct.			Pct.	
Northeastern:															
Connecticut----	Annual grasses---	100	Sta.	Bentgrass--------	100	Sta.	Bluegrass--------	100	Sta.	Quackgrass-------	100	Sta.	Woody plants------	50	Sta.
Pennsylvania---	Bracken----------	15	Sta.	Brush------------	70	Down	Goldenrod--------	24	Sta.	Lambsquarters----	12	Down	Pigweed-----------	10	Down
Vermont--------	Cinquefoil-------	50	Sta.	Horsetail--------	25	Sta.	Nutsedge---------	25	Sta.	Quackgrass-------	100	Sta.	Weed bromegrasses-	25	Sta.
West Virginia--	Bluegrass--------	--	----	Crabgrass--------	--	----	Foxtail----------	--	----	Quackgrass-------	--	----	Ragweed-----------	--	----
North Central:															
Illinois-------	Canada thistle---	5	----	Field bindweed---	5	----	Giant foxtail----	10	----	Poison ivy-------	5	----	Quackgrass--------	15	----
Iowa-----------	Buttonweed-------	50	----	Green foxtail----	40	----	Pigweed----------	50	----	Smooth brome-----	25	----	Timothy-----------	10	----
North Dakota---	Common ragweed---	65	Sta.	Kochia-----------	60	Sta.	Leafy spurge-----	40	Up	Russian thistle--	25	Sta.	Wildmustard-------	60	Sta.
Ohio-----------	Canada thistle---	25	Up	Curly dock-------	10	Sta.	Foxtail----------	20	Sta.	Poison ivy-------	10	Sta.	Quackgrass--------	30	Up
Southern:															
Alabama--------	Hickory----------	20	Up	Oak brush--------	20	Up	Red oak----------	20	Up	Sweetgum---------	20	Up	Turkey oak--------	20	Up
Arkansas-------	Beech------------	10	Sta.	Blackjack oak----	20	Sta.	Post oak---------	20	Sta.	-----------------	--	----	-----------------	--	----
Florida--------	Gallberry--------	30	Sta.	Palmetto---------	75	Sta.	Scrub oak--------	25	Sta.	Titi-------------	5	Sta.	Waxmyrtle---------	20	Sta.
North Carolina-	Blackberry-------	50	Up	Bluegrass--------	60	Down	Crabgrass--------	75	Down	Horsenettle------	60	Up	Quackgrass--------	80	Up
Tennessee------	Broomsedge-------	40	Sta.	Fescue-----------	65	Up	Ironweed---------	30	Sta.	Ragweed----------	30	Sta.	Sumac-------------	20	Up
Virginia-------	Perennial grasses	100	----	-----------------	--	--	-----------------	--	----	-----------------	--	----	-----------------	--	----
Western:															
California-----	Bearmat----------	50	Sta.	Bracken----------	15	Sta.	Grass sod--------	50	Sta.	Manzanita--------	25	Sta.	Tanoak------------	25	Sta.
Montana--------	Bull thistle-----	10	Up	Canada thistle---	5	Up	Lambsquarters----	50	Sta.	Pigweed----------	50	Sta.	Weed bromegrasses-	30	Up
Oregon---------	Alder------------	--	Up	Bentgrass--------	--	Up	-----------------	--	----	-----------------	--	----	-----------------	--	----
Washington-----	Annual grasses---	50	Up	Blackberry-------	5	Up	Bracken----------	25	Up	Horsetail--------	25	Up	Quackgrass--------	25	Up
Hawaii---------	Blackberry-------	20	Up	Boneset----------	50	Up	Firebush---------	20	Up	Indian rhododendron.	30	Up	Redfruit passionflower.	5	Up

[1] Sta., stationary.

NONCROPLAND

Noncropland includes ditchbanks; fencerows; feedlots; rights-of-way for highways, railroads, and utility lines; areas around building, and industrial and defense installations. Weed growth in fencerows and in rights-of-way for highways and railroads is a serious problem for agriculture. These areas constitute narrow bands of land through largely agricultural areas where seeds from uncontrolled weeds on the fencerows and rights-of-way provide an extremely troublesome source of weed infestations on adjoining farmlands.

The questionnaires returned from 27 States reported chemical treatment in 1965 on 3,306,000 acres of noncropland at a total cost of $68,470,000 (tables 1 and 59). This use was about 9 percent less than that reported in 1962 by 31 States but was 68 percent more than the use reported in 1959 by 27 States. Thirty-nine percent of the herbicide applications were made by farmers and other landowners and 61 percent by custom operators (table 1). This was a considerable decrease in percent of applications made by custom operators as compared to 1962 and 1959. Of the total acreage treated, preemergence soil sterilant herbicides were used on 34 percent in 1965, 41 percent in 1962, and only 1.4 percent in 1959. Costs of treatment per acre in 1965 averaged $32.40 for preemergence treatments and $14.64 for postemergence treatments (table 3). This was a considerable increase for preemergence treatments and a considerable decrease for postemergence treatments as compared to 1962 when the average costs of the two types of treatment were about the same.

About half of the States reported good results and about half reported fair results from both preemergence and postemergence treatments in 1962 and 1965. In 1959 only one-third of the States reported good results from postemergence treatments. Two-thirds of the States reported no problems of herbicide persistence on noncropland as an average of 1962 and 1965.

Most of the States reported an upward trend in usage of herbicides on noncropland. This trend was slightly less pronounced in 1965 than in 1962 or 1959. The need for better herbicides for weed control on noncropland was considerably less urgent in 1965 than was reported in 1959 or 1962.

Geographically, the greatest usage of herbicides on noncropland in 1965 was reported from the North Central States and California. California and Iowa each reported four or more times as many acres treated as in any other State. In California 95 percent of the area was treated by custom operators whereas in Iowa 95 percent was treated by farmers or other landowners or managers. The trend of herbicide usage was up in California and in 21 other States but stationary in Iowa and four other States.

Thirty-one States listed 75 weeds, constituting 60 different species or weed types, as being important on noncropland (table 60). The 15 species or types reported most frequently and on the greatest percentages of noncropland in the State in approximate order were as follows: (1) Herbaceous perennial weeds--Canada thistle, bindweed, quackgrass, johnsongrass, and knapweed; (2) annual weeds--ragweed, pigweed, weedy bromegrasses, foxtails, kochia, and Russian thistle; (3) woody plants--poison ivy and oak, blackberry and other briers, honeysuckle, oaks, and other woody plants. Canada thistle and quackgrass were most common in North Central and Western States. Field bindweed, also called bindweed and morningglory, was reported in six Western States and in Nebraska and Oklahoma. It is of special interest that Kansas, Minnesota, and South Dakota, States formerly the most heavily infested with bindweed, did not report it among their five most important weeds. Johnsongrass was reported in all regions except the Northeast while knapweed was important only in Western States.

Ragweed was an important annual weed in all regions except the West. Pigweed was reported most frequently in North Central and Southern States. Weedy bromegrasses were the most important in Western States as were kochia and Russian thistle. Poison ivy and poison oak were reported as important in one State of each region, and one or more other woody species were considered important in one or more States in each region.

Table 59.--Noncropland: Estimated extent, cost, and effectiveness of chemical weed control, usage trend, need for better herbicides, and residue problems, by States and geographic divisions, 1965

State and region	Acres treated		Average cost per acre[1]		Acreage treated by--		Effectiveness of herbicides		Herbicides usage trend[2]	Need for better herbicides	Persistence problem
	Pre-emergence	Post-emergence	Pre-emergence	Post emergence	Farmers	Custom operators	Pre-emergence	Post-emergence			
	1,000 acres	1,000 acres	Dollars	Dollars	Percent	Percent					
Connecticut	--	1	--	10.00	100	--	----	Fair	Up	Some	No
Delaware	--	20	--	30.00	10	90	----	Good	Up	Some	No
New Jersey	--	28	--	15.00	70	30	----	Good	Up	Some	No
Pennsylvania	--	45	--	32.00	10	90	----	Good	Up	Some	No
Northeastern	--	94	--	26.28	29	71	----	3-Good 1-Fair	4-Up	4-Some	4-No
Illinois	--	100	--	10.00	80	20	----	Fair	Up	Some	No
Iowa	500	500	50.00	5.00	95	5	Fair	Fair	Sta.	Some	No
Kansas	--	250	--	5.00	5	95	----	Fair	Sta.	Urgent	Yes
Minnesota	--	250	--	15.00	25	75	----	Fair	Up	Little	No
Missouri	--	20	--	60.00	100	--	----	Good	Up	Little	No
North Dakota	--	20	--	2.50	10	90	----	Good	Up	Some	No
Ohio	--	20	--	3.50	60	40	----	Good	Up	Some	No
South Dakota	5	100	50.00	2.00	10	90	Good	Good	Up	Some	No
North Central	505	1,260	50.00	7.95	65	35	1-Good 1-Fair	4-Good 4-Fair	6-Up 2-Sta.	1-Urgent 5-Some 2-Little	1-Yes 7-No
Georgia	--	10	--	20.00	100	--	----	Good	Up	Some	No
Kentucky	--	([3])	--	60.00	60	40	----	Fair	Up	Some	No
Tennessee	--	25	--	30.00	5	95	----	Good	Up	Some	Yes
Texas	12	--	8.00	--	83	17	Fair	----	Up	Some	No
Virginia	--	3	--	10.00	70	30	----	Fair	Up	Some	No
Southern	12	38	8.00	25.79	47	53	1-Fair	2-Good 2-Fair	5-Up	5-Some	1-Yes 4-No
Arizona	10	20	25.00	25.00	50	50	Good	Good	Up	Little	No
California	600	700	18.00	25.00	5	95	Good	Fair	Up	Some	Yes
Idaho	--	.3	--	10.00	80	20	----	Fair	Sta.	Some	No
Montana	1	2	10.00	4.50	90	10	Fair	Fair	Up	Some	No
Nevada	--	5	--	3.00	25	75	----	Good	Up	Urgent	No
Oregon	--	1	--	4.00	90	10	----	Good	Sta.	Little	No
Utah	.6	4	50.00	10.00	70	30	Fair	Fair	Up	Some	No
Washington	--	50	--	6.00	10	90	----	Good	Up	Some	Yes
Wyoming	2	--	100.00	--	50	50	Good	----	Sta.	Some	Yes
Hawaii	--	.5	--	10.00	100	--	----	Good	Up	Little	No
Western	613.6	782.8	18.40	23.47	7	93	3-Good 2-Fair	5-Good 4-Fair	7-Up 3-Sta.	1-Urgent 6-Some 3-Little	3-Yes 7-No
United States	1,130.6	2,174.8	32.40	12.90	39	61	4-Good 4-Fair	14-Good 11-Fair	22-Up 5-Sta.	2-Urgent 20-Some 5-Little	5-Yes 22-No

[1] Includes herbicide equipment and labor for treatment made by farmers. Represents cost of herbicide custom applications and/or cost of farmer-applied herbicides. Regional and United States averages are for acreages on which costs were reported.

[2] Sta., stationary.

[3] Less than 50 acres.

Table 60.--Noncropland: Five most important weeds listed alphabetically within States, acreage infested, and infestation trend, 1965

Region and State	Weed	Infestation		Weed	Infestation		Weed	Infestation		Weed	Infestation		Weed	Infestation	
		Acres	Trend (1)		Acres	Trend (1)		Acres	Trend (1)		Acres	Trend (1)		Acres	Trend (1)
		Pct.			Pct.			Pct.			Pct.			Pct.	
Northeastern:															
Connecticut----	Canada thistle----	5	Sta.	Goldenrod---------	75	Sta.	Japanese knotweed-	5	Up	Poison ivy--------	40	Sta.	Woody plants------	80	Up
Delaware-------	Common reed-------	20	Up	Crabgrass---------	90	Up	Honeysuckle-------	50	Up	Ragweed-----------	75	Up	Sod species-------	100	Sta.
New Jersey-----	Common reed-------	--	----	Mixed brush-------	--	----	Perennial grasses-	--	----	------------------	--	----	------------------	--	----
Vermont--------	Japanese knotweed-	10	Down	Poison ivy--------	20	Down	Quackgrass--------	50	Sta.	Ragweed-----------	50	Down	------------------	--	----
West Virginia--	Blackberry--------	--	Up	Greenbrier--------	--	Up	Sassafras---------	--	Up	Scrub oak---------	--	Up	Wild cherry-------	--	Up
North Central:															
Illinois-------	Broomsedge--------	25	----	Giant foxtail-----	70	----	Johnsongrass------	20	----	Quackgrass--------	15	----	Wild garlic-------	25	----
Indiana--------	Canada thistle----	--	Sta.	Horseweed---------	--	Sta.	Johnsongrass------	6	Sta.	Poison ivy--------	--	Sta.	Quackgrass--------	6	Sta.
Iowa-----------	Buttonweed--------	50	----	Giant foxtail-----	50	----	Green foxtail-----	100	----	Lambsquarters-----	100	----	Pigweed-----------	100	----
Kansas---------	Giant ragweed-----	40	Sta.	Johnsongrass------	30	Up	Musk thistle------	20	Up	Smartweed---------	25	Sta.	Woollyleaf bursage	15	Sta.
Minnesota------	Canada thistle----	80	Up	Leafy spurge------	5	Down	Quackgrass--------	80	Up	Ragweed-----------	50	Sta.	Sowthistle--------	20	Sta.
Nebraska-------	Bindweed----------	95	Sta.	Foxtail-----------	20	Sta.	Pigweed-----------	60	Up	Ragweed-----------	80	Up	Thistles----------	95	Up
North Dakota---	Canada thistle----	15	Up	Flodman thistle---	20	Sta.	Goldenrod---------	20	Sta.	Leafy spurge------	30	Up	Maximilian sunflower.	25	Sta.
Ohio-----------	Canada thistle----	30	Up	Goldenrod---------	35	Sta.	Johnsongrass------	15	Up	Quackgrass--------	35	Up	Wild carrot-------	40	Sta.
South Dakota---	Canada thistle----	--	----	Japanese brome----	--	----	Kochia------------	--	----	Milkweed----------	--	----	Weed bromegrasses-	--	----
Southern:															
Arkansas-------	Croton------------	--	Up	Dock--------------	--	Up	Johnsongrass------	--	----	Pigweed-----------	--	Up	Ragweed-----------	--	Up
Kentucky-------	Cheat-------------	40	Sta.	Honeysuckle-------	20	Sta.	Johnsongrass------	20	Up	Musk thistle------	30	Up	Poison ivy--------	40	Sta.
North Carolina-	Bermudagrass------	--	Sta.	Johnsongrass------	--	Sta.	Nutsedge----------	--	Up	Ragweed-----------	--	Down	Woody plants------	--	Sta.
Oklahoma-------	Johnsongrass------	90	Up	Morningglory------	40	Up	Pigweed-----------	85	Up	Russian thistle---	50	Up	Sandbur-----------	40	Up
Tennessee------	Blackberry--------	95	Sta.	Broomsedge--------	95	Sta.	Persimmon---------	95	Sta.	Sassafras---------	95	Sta.	Sumac-------------	95	Sta.
Texas----------	Ash---------------	1	Sta.	Elm---------------	1	Sta.	Hickory-----------	5	Up	Oak---------------	2	Up	------------------	--	----
Western:															
Arizona--------	Bermudagrass------	20	----	Johnsongrass------	10	----	Pigweed-----------	50	----	Wild mustard------	70	----	Wild oats---------	50	----
California-----	Alkaligrass-------	5	Sta.	Bermudagrass------	10	Up	Dallisgrass-------	5	Up	Field bindweed----	20	Sta.	Johnsongrass------	10	Up
Colorado-------	Canada thistle----	25	Up	Field bindweed----	70	Up	Kochia------------	75	Up	Quackgrass--------	10	Sta.	Russian knapweed--	10	Up
Idaho----------	Field bindweed----	--	Sta.	Quackgrass--------	--	Sta.	Russian knapweed--	--	Up	------------------	--	----	------------------	--	----
Montana--------	Canada thistle----	2	Up	Dalmatian toadflax	--	Up	Leafy spurge------	1	Up	Spotted knapweed--	1	Up	Weed bromegrasses-	5	Up
Nevada---------	Hairy whitetop----	5	Sta.	Halogeton---------	10	Sta.	Puncturevine------	10	Up	Russian knapweed--	5	Up	Russian thistle---	50	Sta.
New Mexico-----	Barnyardgrass-----	--	Sta.	Bindweed----------	--	Up	Dock--------------	--	Sta.	Johnsongrass------	--	Up	Sunflower---------	--	Sta.
Oregon---------	Bentgrass---------	2	Up	Blackberry--------	2	Up	Poison oak--------	1	Up	Roses-------------	1	Up	Tansy ragwort-----	2	Up
Utah-----------	Canada thistle----	--	Sta.	Hairy whitetop----	--	Down	Kochia------------	--	Up	Morningglory------	--	Sta.	Quackgrass--------	--	Up
Washington-----	Horseweed---------	20	Up	Prickly lettuce---	20	----	Puncturevine------	20	Up	Sandbur-----------	20	Up	Weed bromegrasses-	20	Sta.
Wyoming--------	Canada thistle----	5	Up	Field bindweed----	5	Up	Kochia------------	20	Sta.	Russian knapweed--	5	Up	Russian thistle---	20	Up

[1] Sta., stationary

The trend of weed infestations was strongly up for Canada thistle, johnsongrass, Russian knapweed, and bindweed in all States that reported them as important problems. The trends for quackgrass and most of the important annual weeds except pigweeds were stationary or downward in most States that reported them as important. The trend for blackberry and other briers was up in nearly all States, but the trends for poison ivy and oak and most other woody plants except oaks were downward.

AQUATIC AREAS

Aquatic areas include farm ponds, lakes, reservoirs, earth tanks, and irrigation and drainage canals. Most of these areas are subject to serious weed infestations.

Weeds in aquatic areas were reported separately from other noncrop areas for the first time in 1965. Thirteen States reported treatment of 84,000 acres of aquatic weeds with herbicides (tables 1 and 61). Fifty-six percent of the areas were treated by custom operators and 44 percent by farmers. Most of the applications were made postemergence at an average cost of $22.33 per acre (tables 2 and 3). The cost of preemergence treatments on a relatively small total area was $43.65 per acre. Most of the States reported only fair results from either preemergence or postemergence treatments (table 4). Problems of herbicide persistance existed in seven of the 13 States reporting. Nevertheless, the trend of herbicide usage in aquatic areas was up in nine States (table 5). All of the States reported an urgent or moderate need for better herbicides to control aquatic weeds.

Seventy-eight percent of the reported area of aquatic weeds treated with herbicides was in Florida, Georgia, and California (table 61). No report was received from Louisiana where use of herbicides for aquatic weed control is more extensive than in any other State.

Twenty-three States listed 36 weeds, constituting 27 different species or weed types, as important in aquatic areas (table 62). The 12 species or types reported most frequently and on the greatest percentages of aquatic sites in approximate order were algae, pondweeds, cattail, elodea, duckweed, coontail, waterhyacinth, alligatorweed, watermilfoil, parrotfeather, waterlily and bulrush. Algae, pondweeds, cattail, and elodea were reported from all parts of the country. Alligatorweed and waterhyacinth were reported from Southern States and waterhyacinth also from Hawaii.

Table 61.--Aquatics: Estimated extent, cost, and effectiveness of chemical weed control, usage trend, need for better herbicides, and residue problems, by States and geographic divisions, 1965

State and region	Acres treated		Average cost per acre[1]		Acreage treated by--		Effectiveness of herbicides		Herbicides usage trend[2]	Need for better herbicides	Persistence problem
	Pre-emergence	Post-emergence	Pre-emergence	Post-emergence	Farmers	Custom operators	Pre-emergence	Post-emergence			
	1,000 acres	1,000 acres	Dollars	Dollars	Percent	Percent					
Connecticut	--	.4	--	35.00	25	75	----	Fair	Up	Some	Yes
Pennsylvania	1	4	25.00	25.00	90	10	----	Fair	Sta.	Some	No
Northeastern	1	4.4	25.00	25.91	85	15	----	2-Fair	1-Up 1-Sta.	2-Some	1-Yes 1-No
Iowa	.1	.1	10.00	2.00	95	5	Fair	Fair	Up	Urgent	Yes
North Central	.1	.1	10.00	2.00	95	5	1-Fair	1-Fair	1-Up	1-Urgent	1-Yes
Arkansas	--	2	--	20.00	100	--	----	Fair	Sta.	Urgent	No
Florida	--	20	--	15.00	10	90	----	Fair	Up	Some	Yes
Georgia	--	20	--	10.00	100	--	----	Good	Up	Some	No
Virginia	--	3	--	50.00	50	50	----	Fair	Up	Some	No
Southern	--	45.0	--	15.33	57	43	----	1-Good 3-Fair	3-Up 1-Sta.	1-Urgent 3-Some	1-Yes 3-No
Arizona	--	.5	--	25.00	90	10	Fair	Fair	Sta.	Urgent	No
California	.5	25	75.00	35.00	10	90	Fair	Fair	Up	Urgent	Yes
Montana	--	.5	--	10.00	80	20	----	Good	Up	Some	No
Utah	--	.5	--	25.00	50	50	----	Good	Up	Some	Yes
Wyoming	1	3	50.00	20.00	10	90	Fair	Fair	Sta.	Some	Yes
Hawaii	--	2	--	20.00	100	--	----	Fair	Up	Urgent	Yes
Western	1.5	31.5	58.33	31.90	18	82	3-Fair	2-Good 4-Fair	4-Up 2-Sta.	3-Urgent 3-Some	4-Yes 2-No
United States	2.6	81.0	43.65	22.33	44	56	4-Fair	3-Good 10-Fair	9-Up 4-Sta.	5-Urgent 8-Some	7-Yes 6-No

[1] Includes herbicide equipment and labor for treatment made by farmers. Represents cost of herbicide custom applications and/or cost of farmer-applied herbicides. Regional and United States averages are for acreages on which costs were reported.
[2] Sta., stationary.

Table 62.--Aquatics: Five most important weeds listed alphabetically within States, acreage infested, and infestation trend, 1965

Region and State	Weed	Infestation		Weed	Infestation		Weed	Infestation		Weed	Infestation		Weed	Infestation	
		Acres	Trend [1]		Acres	Trend [1]		Acres	Trend [1]		Acres	Trend [1]		Acres	Trend [1]
		Pct.			Pct.			Pct.			Pct.			Pct.	
Northeastern:															
Connecticut	Algae	60	Up	Elodea	40	Up	Pondweed	40	Up	Southern naiad	40	Up	Watermilfoil	40	Up
New Jersey	Cabomba	--	Sta.	Common reed	--	Up	Spatterdock	50	Up	Vallisneria	--	Sta.	Water burreed	--	Sta.
Pennsylvania	Algae	35	Up	Cattail	20	Down	Duckweed	18	Up	Elodea	30	Down	Waterlily	9	Down
Vermont	Algae	50	Up	Filamentous algae	40	Up	Pondweed	40	Sta.	Vallisneria	30	Sta.	Watermilfoil	30	Sta.
North Central:															
Illinois	Cabomba	--	Sta.	Chara	--	Up	Duckweed	--	Up	Elodea	--	Sta.	Southern naiad	--	Up
Indiana	Algae	--	Sta.	Coontail	75	Sta.	Duckweed	--	Sta.	Pondweed	--	Sta.	Watermilfoil	--	Sta.
Iowa	Arrowhead	50	Sta.	Coontail	75	Sta.	Duckweed	50	Sta.	Pondweed	75	Sta.	Waterlily	10	Sta.
Ohio	Algae	60	Sta.	Cattail	10	Sta.	Chara	20	Up	Pondweed	15	Up	Watermilfoil	15	Up
Southern:															
Arkansas	Algae	--	Up	Cattail	--	Sta.	Coontail	--	Up	Duckweed	--	Up	Waterlily	--	Sta.
Florida	Alligatorweed	10	Up	Coontail	80	Up	Naiad	40	Up	Waterhyacinth	80	Up	Waterlettuce	5	Up
Georgia	Algae	15	Up	Cattail	5	Up	Elodea	5	Up	Parrotfeather	10	Up	Waterlily	5	Up
Louisiana	Alligatorweed	35	Up	Elodea	15	Sta.	Lotus	10	Sta.	Pondweed	15	Sta.	Waterhyacinth	35	Up
North Carolina	Algae	40	Sta.	Alligatorweed	20	Up	Bladderwort	15	Sta.	Duckweed	15	Sta.	Parrotfeather	20	Sta.
South Carolina	Alligatorweed	35	Up	Cattail	25	Up	Duckweed	20	Up	Elodea	20	Up	Waterhyacinth	5	Up
Western:															
Arizona	Cattail	10	----	Chara	15	----	Filamentous algae	95	----	Sago pondweed	75	----	Waterstargrass	20	----
California	American pondweed	15	Up	Cattail	20	Sta.	Hardstem bulrush	20	Sta.	Sago pondweed	15	Up	Waterprimrose	5	Sta.
Idaho	Parrotfeather	--	Up	----------	--	----	----------	--	----	----------	--	----	----------	--	----
Montana	Algae	--	Up	Bulrushes	--	Down	Cattail	--	Sta.	Leafy pondweed	--	Sta.	Sago pondweed	--	Sta.
Nevada	Cattail	--	----	Rush	--	----	Sedges	--	----	----------	--	----	----------	--	----
Oregon	American pondweed	--	Up	Cattail	--	Up	Pondweed	--	Up	Reed canarygrass	--	Up	----------	--	----
Utah	Algae	50	Up	Bulrushes	35	Sta.	Cattail	35	Sta.	Pondweed	20	Up	Waterbuttercup	20	Sta.
Washington	Algae	--	Up	Cattail	--	Up	Pondweed	--	Up	----------	--	----	----------	--	----
Hawaii	Elodea	25	Up	Filamentous algae	25	Up	Paragrass	25	Up	Parrotfeather	10	Up	Waterhyacinth	20	Up

[1] Sta., stationary.

APPENDIX

Weeds Listed Among the Five Most Important Weeds in the Various Crop or Commodity Areas Surveyed

Standardized common names approved by the Terminology Committee, Weed Science Society of America, were assigned where possible to all weeds listed in the survey. Listings are arranged alphabetically by common or colloquial names. In the best judgment of the botanist, the correct scientific name was also assigned.

COMMON NAME	SCIENTIFIC NAME
A'alii	Dodonaea viscosa (L.) Jacq.
Alfalfa, volunteer	Medicago sativa L.
Algae	a complex
Algae, filamentous	a complex
Alder	Alnus spp.
Alder, red	Alnus rubra Bong.
Alkaligrass	Puccinellia spp.
Alligatorweed	Alternanthera philoxeroides (Mart.) Griseb.
Alyssum, hoary	Berteroa incana (L.) DC.
Amaranth, spiny	Amaranthus spinosus L.
Apple-of-Peru	Nicandra physalodes (L.) Gaertn.
Arrowgrass	Triglochin spp.
Arrowhead	Sagittaria spp.
Ash	Fraxinus spp.
Barbwiregrass	Cymbopogon refractus (R.Br.) A. Camus
Barley, foxtail	Hordeum jubatum L.
Barley, little	Hordeum pusillum Nutt.
Barley, wild	Hordeum leporinum Link
Barnyardgrass	Echinochloa crusgalli (L.) Beauv.
Baronetgrass	Echinochloa sp.
Bearmat	Chamaebatia foliolosa Benth.
Bedstraw	Galium spp.
Beech	Fagus spp.
Bellflower, creeping	Campanula rapunculoides L.
Bentgrass	Agrostis sp.
Bentgrass, rough	Agrostis scabra Willd.
Bermudagrass	Cynodon dactylon (L.) Pers.
Berries, wild	a complex
Betony	Stachys sp.
Betony, artichoke	Stachys sieboldii Miq.
Betony, Florida	Stachys floridana Shuttlw.
Bindweed	Convolvulus spp.
Bindweed, field	Convolvulus arvensis L.
Blackberry	Rubus spp.
Blackbush	Coleogyne ramosissima Torr.
Bladderwort	Utricularia spp.
Bluegrass	Poa spp.
Bluegrass, annual	Poa annua L.
Blueweed, Texas	Helianthus ciliaris DC.

COMMON NAME	SCIENTIFIC NAME
Boneset	Eupatorium perfoliatum L.
Bracken	Pteridium spp.
Brome, downy	Bromus tectorum L.
Brome, Japanese	Bromus japonicus Thunb.
Brome, smooth	Bromus inermis Leyss.
Bromegrasses, weed	Bromus spp.
Broomsedge	Andropogon virginicus L.
Brush	a complex
Brush, elm	Ulmus spp.
Brush, hazel	Corylus spp.
Brush, mixed	a complex
Brush, oak	Quercus spp.
Buckbrush	Symphoricarpos orbiculatus Moench
Buckwheat, wild	Polygonum convolvulus L.
Bullnettle	Cnidoscolus stimulosus (Michx.) Gray
Bulrush, hardstem	Scirpus acutus Muhl.
Bulrushes	Scirpus spp.
Burdock	Arctium spp.
Burreed, water	Sparganium fluctuans (Morong) Robinson
Bursage, woollyleaf	Franseria tomentosa Gray
Buttercup	Ranunculus spp.
Buttonweed	Diodia virginiana L.
Cabomba	Cabomba caroliniana Gray
Cacti	a complex
Campion, meadow	Lychnis floscuculi L.
Canarygrass, reed	Phalaris arundinacea L.
Cane, wild	Sorghum bicolor (L.) Moench
Caraway	Carum carvi L.
Carrot, wild	Daucus carota L.
Catchfly	Silene spp.
Cattail	Typha spp.
Chamise	Adenostoma fasciculatum Hook. & Arn.
Chamomile, corn	Anthemis arvensis L.
Chara	Chara spp.
Cheat	Bromus secalinus L.
Cherry, wild	Prunus spp.
Chickweed	a complex
Chickweed, common	Stellaria media (L.) Cyrillo
Chicory	Cichorium intybus L.
Cinquefoil	Potentilla spp.
Clover, white	Trifolium repens L.
Cockle, corn	Agrostemma githago L.
Cockle, cow	Saponaria vaccaria L.
Cockle, white	Lychnis alba Mill.
Cocklebur	Xanthium spp.
Coontail	Ceratophyllum spp.
Crabgrass	Digitaria spp.
Creeper, Virginia	Parthenocissus quinquefolia (L.) Planch.
Creosotebush	Larrea tridentata (DC.) Coville
Crotalaria	Crotalaria spp.

COMMON NAME	SCIENTIFIC NAME
Croton	Croton spp.
Crowfootgrass	Dactyloctenium aegyptium (L.) Beauv.
Cucumber, wild	Echinocystis lobata (Michx.) Torr. & Gray
Daisy	Chrysanthemum spp.
Daisy, oxeye	Chrysanthemum leucanthemum L.
Dallisgrass	Paspalum dilatatum Poir.
Dandelion	Taraxacum spp.
Darnel	Lolium temulentum L.
Dichondra	Dichondra repens Forst. var. carolinensis (Michx.) Choisy
Dock	Rumex spp.
Dock, curly	Rumex crispus L.
Dodder	Cuscuta spp.
Dogfennel	Eupatorium capillifolium (Lam.) Small
Dogtail, crested	Cynosurus cristatus L.
Dropseed	Sporobolus spp.
Ducksalad	Heteranthera limosa (Sw.) Willd.
Duckweed	Lemna spp.
Elm	Ulmus spp.
Elms and ashes, certain	a complex
Elodea	Elodea spp.
Eveningprimrose	Oenothera spp.
Fern	a complex
Fescue	Festuca spp.
Fescue, rattail	Vulpia myuros (L.) K. C. Gmel.
Fiddleneck	Amsinckia spp.
Fiddleneck, Douglas	Amsinckia douglasiana A. DC.
Fingergrass, feather	Chloris virgata Swartz
Fingergrass, swollen	Chloris inflata Link
Fir, balsam	Abies balsamea (L.) Mill.
Firebush	Myrica faya Ait.
Flatsedge	Cyperus spp.
Fleabane	Erigeron spp.
Fleabane, hairy	Conyza bonariensis (L.) Cronq.
Flixweed	Descurania sophia (L.) Prantl
Fountaingrass	Pennisetum ruppellii Steud.
Foxtail	Setaria spp.
Foxtail, bristly	Setaria verticillata (L.) Beauv.
Foxtail, giant	Setaria faberii Herrm.
Foxtail, green	Setaria viridis (L.) Beauv.
Foxtail, yellow	Setaria glauca (L.) Beauv.
Galinsoga, hairy	Galinsoga ciliata (Raf.) Blake
Galinsoga, smallflower	Galinsoga parviflora Cav.
Gallberry	Ilex glabra (L.) Gray
Garlic, wild	Allium vineale L.
Geranium, Carolina	Geranium carolinianum L.
Goldenrod	Solidago spp.
Goosefoot	Chenopodium spp.
Goosefoot, nettleleaf	Chenopodium murale L.
Goosegrass	Eleusine indica (L.) Gaertn.

COMMON NAME	SCIENTIFIC NAME
Gorse	Ulex europaeus L.
Grasses	a complex
Grasses, annual	a complex
Grasses, hay	a complex
Grasses, perennial	a complex
Greasewood	Sarcobatus vermiculatus (Hook.) Torr.
Greenbrier	Smilax spp.
Groundcherry	Physalis spp.
Guava	Psidium guajava L.
Gumweed	Grindelia squarrosa (Pursh) Dunal
Halogeton	Halogeton glomeratus (Bieb.) C.A. Mey.
Hawkbit, fall	Leontodon autumnalis L.
Hawkweed	Hieracium spp.
Hawkweed, yellow	Hieracium pratense Tausch
Hellebore, false	Veratrum californicum Durand
Hempnettle	Galeopsis tetrahit L.
Henbit	Lamium amplexicaule L.
Hickory	Carya spp.
Honeysuckle	Lonicera spp.
Horsebrush	Tetradymia spp.
Horsenettle	Solanum carolinense L.
Horsetail	Equisetum spp.
Horseweed	Erigeron canadensis L.
Huisache	Acacia farnesiana (L.) Willd.
Iris	Iris spp.
Ironweed	Vernonia spp.
Ivy, ground	Glechoma hederacea L.
Ivy, poison	Rhus radicans L.
Jimsonweed	Datura stramonium L.
Johnsongrass	Sorghum halepense (L.) Pers.
Jointvetch, northern	Aeschynomene virginica (L.) BSP.
Junglerice	Echinochloa colonum (L.) Link
Juniper	Juniperus spp.
Kikuyugrass	Pennisetum clandestinum Hochst. ex Chiov.
Knapweed	Centaurea spp.
Knapweed, diffuse	Centaurea diffusa Lam.
Knapweed, Russian	Centaurea repens L.
Knapweed, spotted	Centaurea maculosa Lam.
Knawel	Scleranthus annuus L.
Knotweed	Polygonum spp.
Knotweed, Japanese	Polygonum cuspidatum Sieb. & Zucc.
Knotweed, prostrate	Polygonum aviculare L.
Knotweed, silversheath	Polygonum argyrocoleon Steud.
Kochia	Kochia scoparia (L.) Schrad.
Kyllinga	Kyllinga brevifolia Rottb.
Ladysthumb	Polygonum persicaria L.
Lambsquarters	Chenopodium album L.
Lantana	Lantana camara L.
Larkspur	Delphinium spp.
Larkspur, low	Delphinium nelsonii Greene

COMMON NAME	SCIENTIFIC NAME
Larkspur, tall	Delphinium barbeyi (Huth) Huth
Lettuce, prickly	Lactuca serriola L.
Loco	Astragalus spp.
Lotus	Nelumbo lutea (Willd.) Pers.
Mallow	Malva spp.
Mallow, little	Malva parviflora L.
Manzanita	Arctostaphylos spp.
Matweed	Brayulinea densa (Willd.) Small
Medic, black	Medicago lupulina L.
Medusahead	Taeniatherum asperum (Sim.) Nevski
Mesquite	Prosopis spp.
Milkvine	Gonolobus sp.
Milkweed	Asclepias spp.
Milkweed, common	Asclepias syriaca L.
Morningglory	Ipomoea spp.
Mugwort	Artemisia vulgaris L.
Muhly, wirestem	Muhlenbergia frondosa (Poir.) Fern.
Mulesears	Wyethia amplexicaulis Nutt.
Mullein	Verbascum spp.
Mustard	a complex
Mustard, blue	Chorispora tenella (Willd.) DC.
Mustard, wild	Brassica kaber (DC.) L.C. Wheeler var. pinnatifida (Stokes) L.C. Wheeler
Naiad	Najas spp.
Naiad, southern	Najas guadalupensis (Spreng.) Magnus
Nettle	Urtica spp.
Nightshade	Solanum spp.
Nightshade, apple-of-Sodom	Solanum sodomeum L.
Nightshade, black	Solanum nigrum L.
Nimblewill	Muhlenbergia schreberi J. F. Gmel.
Nutsedge	Cyperus spp.
Nutsedge, purple	Cyperus rotundus L.
Nutsedge, yellow	Cyperus esculentus L.
Oak	Quercus spp.
Oak, blackjack	Quercus marilandica Muenchh.
Oak, live	Quercus virginiana Mill.
Oak, poison	Rhus toxicodendron L.
Oak, post	Quercus stellata Wangh.
Oak, red	Quercus rubra L.
Oak, scrub	Quercus spp.
Oak, turkey	Quercus laevis Walt.
Oats, wild	Avena fatua L.
Onion, wild	Allium canadense L.
Orchardgrass	Dactylis glomerata L.
Palmetto	Sabal spp.
Panicum	Panicum spp.
Panicum, browntop	Panicum fasciculatum Swartz var. reticulatum (Torr.) Beal
Panicum, fall	Panicum dichotomiflorum Michx.
Panicum, Texas	Panicum texanum Buckl.

COMMON NAME	SCIENTIFIC NAME
Paragrass	Panicum purpurascens Raddi
Parrotfeather	Myriophyllum brasiliense Camb.
Partridgepea	Cassia fasciculata Michx.
Paspalum	Paspalum spp.
Passionflower, redfruit	Passiflora foetida L.
Pennycress	Thlaspi arvense L.
Pennywort	Hydrocotyle spp.
Peppertree, Brazil	Schinus terebinthifolius Raddi
Pepperweed	Lepidium spp.
Pepperweed, field	Lepidium campestre (L.) R. Br.
Persimmon	Diospyros spp.
Pigeongrass	Setaria spp.
Pigweed	Amaranthus spp.
Pigweed, redroot	Amaranthus retroflexus L.
Pingue	Hymenoxys richardsonii (Hook.) Cock. var. floribunda (Gray) Parker
Plantain	Plantago spp.
Plantain, broadleaf	Plantago major L.
Plantain, buckhorn	Plantago lanceolata L.
Plants, woody	a complex
Pondweed	Potamogeton spp.
Pondweed, American	Potamogeton nodosus Poir.
Pondweed, leafy	Potamogeton foliosus Raf.
Pondweed, sago	Potamogeton pectinatus L.
Poorjoe	Diodia teres Walt.
Povertyweed	Iva axillaris Pursh
Pricklypear	Opuntia spp.
Pukiawe	Styphelia tameiameiae (Cham.) F. Muell.
Punctureveine	Tribulus terrestris L.
Purpletop	Triodia flava (L.) Smyth
Purslane	Portulaca oleracea L.
Purslane, Florida	Richardia scabra L.
Quackgrass	Agropyron repens (L.) Beauv.
Rabbitbrush	Chrysothamnus spp.
Rabbitbrush, Greene	Chrysothamnus greenei (A. Gray) Greene
Radish, wild	Raphanus raphanistrum L.
Ragweed	Ambrosia spp.
Ragweed, common	Ambrosia artemisiifolia L.
Ragweed, giant	Ambrosia trifida L.
Ragwort, tansy	Senecio jacobaea L.
Reed, common	Phragmites communis Trin.
Rescuegrass	Bromus willdenowii Kunth
Rhododendron, Indian (possibly Rosemyrtle, downy)	(Rhodomyrtus tomentosa (Ait.) Hassk.)
Rice, red	Oryza sativa L.
Rocket, London	Sisymbrium irio L.
Rocket, yellow	Barbarea vulgaris R. Br.
Rose, Macartney	Rosa bracteata Wendl.
Rose, multiflora	Rosa multiflora Thunb.
Roses	Rosa spp.

COMMON NAME	SCIENTIFIC NAME
Rush	Juncus spp.
Ryegrasses	Lolium spp.
Sage	Salvia spp.
Sage, Mediterranean	Salvia aethiopis L.
Sagebrush	Artemisia spp.
Sagebrush, big	Artemisia tridentata Nutt.
Sagebrush, fringed	Artemisia frigida Willd.
Sagebrush, low	Artemisia arbuscula Pursh
Saltcedar	Tamarix pentandra Pall.
Saltgrass	Distichlis stricta (Torr.) Rydb.
Sandbur	Cenchrus spp.
Sassafras	Sassafras albidum (Nutt.) Nees
Sedges	Carex spp.
Seedlings, tree	a complex
Sensitiveplant	Mimosa pudica L.
Sesbania, hemp	Sesbania exaltata (Raf.) Cory
Shepherdspurse	Capsella bursa-pastoris (L.) Medic.
Sicklepod	Cassia tora L.
Sida, prickly	Sida spinosa L.
Signalgrass	Brachiaria spp.
Skeletonweed, rush	Chondrilla juncea L.
Smartweed	Polygonum spp.
Smartweed, swamp	Polygonum coccineum Muhl.
Smutgrass	Sporobolus poiretii (Roem. & Schult.) Hitchc.
Snakeroot, white	Eupatorium rugosum Houtt.
Snakeweed	Gutierrezia spp.
Sneezeweed, bitter	Helenium amarum (Rafin.) H. Rock
Snow-on-the-mountain	Euphorbia marginata Pursh
Snowberry, western	Symphoricarpos occidentalis Hook.
Sod, grass	a complex
Sod species	a complex
Soliva	Soliva sessilis R. & P.
Sorrel, red	Rumex acetosella L.
Sourgrass	Trichachne insularis (L.) Nees
Sowthistle	Sonchus spp.
Sowthistle, perennial	Sonchus arvensis L.
Spatterdock	Nuphar luteum Sibth. & Sm.
Speedwell	Veronica spp.
Sprangletop	Leptochloa spp.
Spurge	Euphorbia spp.
Spurge, leafy	Euphorbia esula L.
Spurge, prostrate	Euphorbia supina Raf. ex Boiss.
Spurge, spotted	Euphorbia maculata L.
Spurry, corn	Spergula arvensis L.
Star-of-Bethlehem	Ornithogalum umbellatum L.
Stargrass	Chloris divaricata R. Br.
Starthistle	Centaurea spp.
Starthistle, yellow	Centaurea solstitialis L.
Starwort, little	Stellaria graminea L.
Sumac	Rhus spp.

COMMON NAME	SCIENTIFIC NAME
Sumpweed	Iva ciliata Willd.
Sunflower	Helianthus spp.
Sunflower, Maximilian	Helianthus maximiliani Schrad.
Sweetgum	Liquidambar styraciflua L.
Switchgrass	Panicum virgatum L.
Tanoak	Lithocarpus densiflora (Hook. & Arn.) Rehd.
Tansymustard	Descurainia pinnata (Walt.) Britt.
Tarbush	Flourensia cernua DC.
Tarweed	Madia spp.
Tasselflower, red	Emilia sonchifolia (L.) DC.
Thistle, blessed	Cnicus benedictus L.
Thistle, bull	Cirsium vulgare (Savi) Tenore
Thistle, Canada	Cirsium arvense (L.) Scop.
Thistle, Flodman	Cirsium flodmani (Rydb.) Arthur
Thistle, Italian	Carduus pycnocephalus L.
Thistle, musk	Carduus nutans L.
Thistle, Russian	Salsola kali L. var. tenuifolia Tausch
Thistle, Scotch	Onopordum acanthium L.
Thistle, welted	Carduus crispus L.
Thistles	a complex
Threeawn	Aristida spp.
Timothy	Phleum pratense L.
Titi	Cliftonia monophylla (Lam.) Britt. ex Sarg.
Toadflax, Dalmatian	Linaria dalmatica (L.) Mill.
Toadflax, yellow	Linaria vulgaris Hill
Tobacco, tree	Nicotiana glauca Graham
Torpedograss	Panicum repens L.
Trefoil	Lotus spp.
Trumpetcreeper	Campsis radicans (L.) Seem.
Vallisneria	Vallisneria americana Michx.
Velvetgrass	Holcus lanatus L.
Velvetleaf	Abutilon theophrasti Medic.
Vervain	Verbena spp.
Vetch	Vicia spp.
Vine, tie	a complex
Vines, perennial	a complex
Waterbuttercup	Ranunculus spp.
Watergrass complex	a complex
Waterhyacinth	Eichhornia crassipes (Mart.) Solms
Waterlettuce	Pistia stratiotes L.
Waterlily	Nymphaea spp.
Watermilfoil	Myriophyllum spp.
Waterprimrose	Jussiaea spp.
Waterstargrass	Heteranthera dubia (Jacq.) MacM.
Waxmyrtle	Myrica spp.
Whitebrush	Aloysia lycioides Cham.
Whitetop, hairy	Cardaria pubescens (C.A. Mey.) Rollins var. elongata Rollins
Willow	Salix spp.
Wintercress	Barbarea verna (Mill.) Aschers

COMMON NAME	SCIENTIFIC NAME
Wolftail	Lycurus phleoides HBK
Woodsorrel	Oxalis spp.
Wormwood	Artemisia spp.
Wormwood, sagewort	Artemisia campestris L.
Yankeeweed	Eupatorium compositifolium Walt.
Yarrow	Achillea spp.
Yarrow, western	Achillea millefolium L. (A. lanulosa Nutt.)
Yaupon	Ilex vomitoria Ait.
Yucca	Yucca spp.

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