



KANSAS
AGRICULTURAL
STATISTICS

Fact Finders

For Agriculture

KANSAS ON-FARM POSTHARVEST CHEMICAL USAGE

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Public concern about chemical usage on food has increased greatly in recent years. The Food Quality Protection Act, signed into law by President Clinton in 1996, directs the Environmental Protection Agency (EPA) to develop standards for pesticide use on agricultural products for human consumption. The EPA considers the public's overall exposure to pesticides, from all sources, when making decisions to set these standards. The Kansas Department of Agriculture requested Kansas Agricultural Statistics to survey farmers and determine the present level of chemical usage on farm-stored grain.

During October and November of 1999, 650 farm operators were asked about grain storage and chemical applications to their grain for the 1998 crop year. For wheat, the chemical application period was June 1, 1998 to May 31, 1999. The reference period for the other grains surveyed, (corn, soybeans and sorghum) was September 1, 1998 to August 31, 1999. Sampling procedures were used to ensure that a representative sample of Kansas farmers were surveyed. Of the 650 operations in the survey, 418 reported grain stored on the farm during the reference period. Grain was not stored on 148 of the farms that responded to the survey. The remaining samples were not usable because they refused, were inaccessible or screened out.

An estimated total of 275 million bushels of grain were stored Statewide between June 1, 1998 and August 31, 1999. Overall, 23 percent of the wheat, corn, soybeans and sorghum stored on-farm received some sort of chemical treatment during the reference period, (see table 1). Wheat, by far, was the most commonly treated grain with 71 percent treated, while soybeans were the least commonly treated. All chemical treatments were insecticides. Table 2 shows that overall 22.6 percent of the grains stored were treated with insecticides at a rate of .32 pound of active ingredient per 1,000 bushels for a total of 19,900 pounds of insecticides applied. Wheat received the majority of the chemical treatments, with 16,000 pounds applied. The most common chemicals, ranked in order of largest amount used, were malathion, aluminum phosphide and chlorpyrifos-methyl (see tables 3-7). Malathion ranked number one in amount used for each of the four commodities treated. The chlorpyrifos-methyl ranked number two in amount used for corn, soybeans, and sorghum (see table 3-7).

Fifty-two percent of the chemical treatments were performed during the binning process (see Table 8). A significant amount of treatments occurred while stored, 39 percent and 9 percent of the treatment were made while in bound to the farm storage. The most common method of chemical application is mixing tablets or pellets at 38 percent (see table 9). The method of treatment is somewhat dictated by the type of product used. Aluminum phosphide is widely used and commonly applied in tablet or pellet form. Direct spray was the next most common treatment method at 35 percent, followed by direct powder, 17 percent, and top dress, 10 percent. Approximately 11 percent of the total 275 million bushels of on-farm stored grain were fumigated (see table 1 and 10). Forty percent of the stored wheat was fumigated, while less than 1 percent of soybeans were fumigated. Where fumigants were used, the ratio of bin volume to grain fumigated for all grains surveyed was 117 percent.

Table 1--GRAIN STORED AND GRAIN CHEMICALLY TREATED

Crop	Grain Stored	Grain Chemically Treated	% of Grain Chemically Treated	On-Farm Grain Storage Capacity ^{1/}
	(1,000 bushels)	(1,000 bushels)	(percent)	(1,000 bushels)
Wheat	70,000	50,000	71	
Corn	126,000	6,000	5	
Soybeans	24,000	500	2	
Sorghum	55,000	7,000	13	
Total	275,000	64,000	23	

^{1/} December 1998 estimate.

Table 2--POST-HARVEST INSECTICIDE APPLICATIONS

Crop	Grain Stored	Percent Treated, Application Rate, and Total Applied		
		Grain Treated	Application Rate per Marketing Year	Total Applied
	(1,000 bushels)	(percent)	(lbs. per 1,000 bushels)	(lbs.)
Wheat	70,000	69.7	.33	16,000
Corn	126,000	4.7	.24	1,400
Soybeans	24,000	1.8	.23	100
Sorghum	55,000	12.7	.34	2,400
Total	275,000	22.6	.32	19,900

Table 3--WHEAT: POST-HARVEST CHEMICAL APPLICATIONS

Agricultural Chemical	Grain Treated	Application Rate per Marketing Year	Total Applied
	(percent)	(lbs. per 1,000 bushels)	(lbs.)
Insecticides: ^{1/}			
Aluminum Phosphide	36.9	.23	6,000
Malathion	21.9	.41	6,300
Chlorpyrifos-methyl	18.8	.27	3,600

^{1/} Insufficient reports to publish usage data for other chemicals such as silicon dioxide.

Table 4--CORN: POST-HARVEST CHEMICAL APPLICATIONS

Agricultural Chemical	Grain Treated	Application Rate per Marketing Year	Total Applied
	(percent)	(lbs. per 1,000 bushels)	(lbs.)
Insecticides: ^{1/}			
Aluminum Phosphide	1.2	.10	150
Malathion	1.9	.29	700
Chlorpyrifos-methyl	1.5	.27	510

^{1/} Insufficient reports to publish usage data for other chemicals such as silicon dioxide.

Table 5--SOYBEAN: POST-HARVEST CHEMICAL APPLICATIONS

Agricultural Chemical	Grain Treated	Application Rate per Marketing Year	Total Applied
	(percent)	(lbs. per 1,000 bushels)	(lbs.)
Insecticides:			
Aluminum Phosphide	.8	.10	20
Malathion	.6	.28	40
Chlorpyrifos-methyl	.5	.25	30

1/ Insufficient reports to publish usage data for other chemicals such as silicon dioxide.

Table 6--SORGHUM: POST-HARVEST CHEMICAL APPLICATIONS

Agricultural Chemical	Grain Treated	Application Rate per Marketing Year	Total Applied
	(percent)	(lbs. per 1,000 bushels)	(lbs.)
Insecticides:			
Aluminum Phosphide	2.7	.16	240
Malathion	4.5	.48	1,200
Chlorpyrifos-methyl	5.5	.31	950

1/ Insufficient reports to publish usage data for other chemicals such as silicon dioxide.

Table 7--WHEAT, CORN, SOYBEANS, & SORGHUM COMBINED: POST-HARVEST CHEMICAL APPLICATIONS

Agricultural Chemical	Grain Treated	Application Rate per Marketing Year	Total Applied
	(percent)	(lbs. per 1,000 bushels)	(lbs.)
Insecticides: 1/			
Aluminum Phosphide	10.6	.22	6,410
Malathion	7.4	.41	8,240
Chlorpyrifos-methyl	6.6	.28	5,090

1/ Insufficient reports to publish usage data for other chemicals such as silicon dioxide.

Table 8--TIMING OF CHEMICAL APPLICATIONS

Crop	In Bound	During Binning	While Stored	Out Bound
	----- Percent of Treatments -----			
Wheat	7	49	44	0
Corn	2	73	25	0
Soybeans	0	91	9	0
Sorghum	26	49	25	0
Total	9	52	39	0

Table 9--**CHEMICAL TREATMENTS BY METHOD OF APPLICATION**

Crop	Direct Spray	Top Dress	Mixing Tablet/Pellet	Direct Powder	Re-circulation	Other
	----- Percent of Treatments -----					
Wheat	40	7	39	14	0	0
Corn	9	5	44	42	0	0
Soybeans	11	60	9	20	0	0
Sorghum	25	22	32	21	0	0
Total	35	10	38	17	0	0

Table 10--**BIN SPACE FUMIGATED**

Crop	Bushels Fumigated (1,000 bushels)	Ratio of Bin Volume to Bushels
Wheat	28,000	1.16
Corn	1,700	1.08
Soybeans	150	2.47
Sorghum	1,400	1.27
Total	31,250	1.17

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