8-1990

Pesticide Use on Crops in Nebraska - 1987

Maurice Baker

Nancy Peterson

Shripat T. Kamble
University of Nebraska-Lincoln

Pesticide Use on Crops in Nebraska-1987

Research Bulletin
311

August 1990

by
Maurice Baker
Nancy Peterson
Shripat T. Kamble

ACKNOWLEDGMENTS

This research project was conducted as part of Nebraska's participation in the National Agricultural Pesticide Impact Assessment Program of the United States Department of Agriculture.

The authors appreciate the assistance of Alex Martin, Agronomy; Fred Baxendale, Entomology; Larry Schulze, Environmental Programs; Ron Johnson and Scott Hygnstrom, Forestry, Fisheries and Wildlife; and David Wysong, Plant Pathology for their suggestions and assistance in survey instrument design and pesticide and active ingredients identification.

Table of Contents

	Page
Introduction	1
Methods	2
Survey Instrument	2
Sampling	2
Data Collection and Analysis	2
Results and Discussion	3
Total Acres Treated With Pesticides	3
Herbicide Use on Major Field Crops	5
Insecticide Use on Major Field Crops	11
Pesticide Use on Major Specialty Crops	13
Herbicides	13
Insecticides	15
Fungicides and Nematicides	16
Grain Storage Fumigants, Protectants and Bin Treatment	16
Rodenticides and Avicides	18
Herbicide Use by Crop Reporting District	20
Conclusions	27
Appendix	28
Literature Cited	34

Reference to commercial products or trade names is for ease of communication. The University of Nebraska neither discriminates against nor endorses any of the products.

Pesticide Use on Crops in Nebraska-1987

Maurice Baker, Nancy Peterson and Shripat T. Kamble[1]

INTRODUCTION

Pesticides are crop management tools widely used to reduce the effects of crop pests. The use of pesticides has become of concern because of their potential adverse effects on human and animal health. Trace amounts of pesticides have been found in ground water. This is of special concern because many municipalities and individuals rely on this source of water. These pesticide issues lead to review of pesticides requiring a benefit/risk analysis. In order to complete such analyses, it is necessary to know the amount and purpose of current pesticide use. Pesticide use patterns are important to full assessment of impacts from changes in their use. These impacts can be assessed by comparing use between time periods.

This is the third and most comprehensive study of pesticide use on crops in Nebraska. The first was completed in 1978 (Johnson and Byers) and the second one in 1982 (Johnson and Kamble). The first study indicated that approximately 25 million pounds (11.34 million kg) of active ingredients were used on the major crops in Nebraska. This increased to approximately 30.2 million pounds (13.7 million kg) in 1982. The results of the earlier studies have provided a data base to assess the benefits and associated impacts for the "Special Review of Pesticides" (SRP) studies conducted by the U.S. Department of Agriculture (USDA) and the U.S. Environmental Protection Agency (EPA). These reviews involve the registration/reregistration, restriction, suspension and cancellation of pesticide use. The USDA through its National Agricultural Pesticide Impact Assessment Program (NAPIAP), has been charged with responsibilities for providing use and benefit from each state.

The USDA requires accurate information to meet their responsibilities. Thus, this survey was undertaken to determine: 1) the use of pesticides on crops, pasture and rangeland and 2) to identify pest management practices.

---

[1]Professor and former Research Associate, Department of Agricultural Economics and Extension Specialist-Pesticide Impact Assessment, Environmental Programs, respectively.

METHODS

Advice for developing the survey instrument and identifying the active ingredients of the materials was provided by representatives from the following departments in the Institute of Agriculture and Natural Resources: Agronomy, Entomology, Environmental Programs, Plant Pathology, and Forestry, Fisheries and Wildlife. Sampling assistance was provided by the Nebraska Agricultural Statistics Service. The survey and analysis were completed by the first two authors of this report who are in the Department of Agricultural Economics.

SURVEY INSTRUMENT

A mail-survey instrument (Appendix 1) was used to collect information about the use of herbicides, insecticides, fungicides, nematicides, avicides, rodenticides and fumigants. The major field crops included were: corn, grain sorghum, wheat, oats, barley, alfalfa, and rye. Respondents reported use on minor field crops, and range and pasture, also. Unlike earlier surveys, this one included specialty crops of potatoes, sugar beets and dry edible beans. The acreage of these crops is found largely in the western part of the state. Because these crops were included, the total amount of pesticide usage is not comparable between this and the earlier studies. Information is detailed so comparisons with earlier studies are possible; however.

Extensive pretests of the instrument was not considered necessary since it was very similar to the one successfully used in the 1982 survey. A limited pretest was conducted because of minor changes in the format from the earlier instrument. The response indicated accurate data was being obtained.

SAMPLING

The Nebraska Agricultural Statistics Service drew a stratified random sample of over 5400 producers. The strata for the major field crops and the pasture and range were from the Service's general directory. The specialty crop strata were from directories including producers of these crops. The size of the respective strata are shown in Table 1. The proportion of population included in the sample reflected the statistician's knowledge of the amount of variation in the responses and the characteristics of the directories with which he was working.

DATA COLLECTION AND ANALYSIS

A mail survey with two mailings to increase the response rate was used. The first mailing was in April 1988 and the second followed approximately six weeks later. Over 1000 usable surveys were returned for a 19 percent response

Table 1. Strata, population size and sample size for pesticide survey, Nebraska, 1987.

Stratum	Population Size	Sample Size
Dry Beans & Sugar Beets	500	250
Dry Beans	653	65
Sugar Beets	75	7
Potatoes	94	94
999+ acres	9,443	1,600
400-998 acres	15,695	1,600
less than 400 acres	17,768	1,800

Source: Nebraska Agricultural Statistics Service

rate. To evaluate the adequacy of this response rate, the sample responses were expanded to state totals and compared with the 1987 Nebraska Agricultural Statistics Service totals. Estimated acres of crops as reported by respondents were within five percent of the actual acres for the state.

Pesticide quantities were estimated by expanding the acres reported treated with pesticides to state totals and multiplying this by the application rate per acre as determined from the survey. Analysis of responses indicated there was little variation in the pesticide used per acre. Most producers used rates close to those recommended on the label.

RESULTS AND DISCUSSION

TOTAL ACRES TREATED WITH PESTICIDES

There were 14.85 million acres (5.99 million hectares) of major field crops planted in 1987 (Table 2). Of these, 10.2 million acres (4.13 million hectares) or 68 percent were treated with herbicides and 4.45 million acres (1.80 million hectares) or 30 percent were treated with insecticides. Only 0.7 percent were treated with fungicides excluding seed treatment.

Approximately 90 percent of the corn, soybean and grain sorghum acreage was treated with herbicides. This was similar to the proportions reported in the 1978 and 1982 surveys. A smaller proportion of corn, soybean and grain sorghum acres were treated with insecticides. Much of the corn is irrigated and a large proportion of that is continuous corn; thus, insecticides were used on 69 percent of the irrigated acres. Insecticides were applied to only 27 and 20 percent of the irrigated grain sorghum and soybean acres, respectively.

Nearly 29 percent of the wheat acres were treated with herbicides in 1987. This was nearly 3 times the proportion treated in 1982. Year-to-year variation in the use of herbicide on wheat is much greater than for other crops; therefore,

Table 2. Acres[a] and percent of major crops treated with herbicides, insecticides, and fungicides and nematicides, Nebraska, 1987.

Item	Total Acres Planted	Acreage Treated With: Herbicides		Insecticides		Fungicides and Nematicides	
	1000 acres	1000 acres	percent	1000 acres	percent	1000 acres	percent
Corn							
Irrigated	4492	4240	94.4	3107	69.2	45.5	1.0
Nonirrigated	2008	1678	83.6	577	28.8	6.0	0.3
Total	6500	5918	91.0	3684	56.7	51.5	0.8
Soybeans							
Irrigated	588	564	95.9	115	19.6	c	c
Nonirrigated	1761	1530	86.9	55.1	3.1	6.1	0.3
Total	2350	2094	89.1	170.1	7.2	6.1	0.3
Grain Sorghum							
Irrigated	132	118	89.2	36.3	27.5	c	c
Nonirrigated	1318	1191	90.4	339.2	25.7	c	c
Total	1450	1309	90.3	375.5	25.9	c	c
Alfalfa							
Irrigated	324	13.1	4.0	24.0	7.4	c	c
Nonirrigated	926	26.0	2.8	86.8	9.4	c	c
Total	1250	39.1	3.1	110.8	8.9	c	c
Wheat	2200	634	28.8	83.9	3.8	21.7	1.0
Other small grains[b]	1100	158	14.4	21.3	1.9	16.0	1.5
Total Major Field Crops	14,850	10,152	68.4	4446	30.0	95.3	0.6
Sugar Beets	61.5	53.2	86.5	9.7	15.7	11.2	18.2
Dry Edible Beans	230	212	92.3	21.2	9.2	14.8	6.4
Potatoes	10.5	10.5	100	9.0	85.3	1.0	9.5
Total Specialty Crops	302.0	275.7	91.3	39.4	13.0	27.0	8.9
Pasture and Rangeland	16,975	393	2.3	47.8	0.3	c	c

[a] 1 acre = 0.4047 hectares
[b] Includes barley, oats and rye
[c] No reported information

Source: *1987 Nebraska Agricultural Statistics*, Nebraska Agricultural Statistics Service, October 1988. *Census of Agriculture*, Bureau of the Census, U.S. Department of Commerce, 1984. Survey of agricultural producers.

this increased use may only reflect a particularly bad year for weeds in wheat. Only 2.3 percent of the pasture and rangeland were treated with herbicides in 1987. This was approximately one-half the proportion treated in 1982. Use of herbicides on alfalfa declined 44 percent between 1982 and 1987. Five and one-half percent of the acres were treated in the earlier time period and only 3.1 percent were treated this time.

Insecticide use on corn in 1987 was slightly less than that reported in earlier surveys. Only 57 percent of the corn acres were treated in 1987 as compared to 62 percent in 1982. However, the use of insecticides on soybeans increased greatly since 1982. Over 7 percent of the soybean acreage was treated in 1987 as compared to only 1.5 percent in 1982. One-quarter of the grain sorghum acreage was treated with insecticides in 1987 while one-fifth was treated in 1982. The proportion of alfalfa acres treated for insect control was 8.9 percent in 1987 as compared to only 1.9 percent in 1982.

Fungicides were applied to almost no corn, soybeans and grain sorghum. This is in contrast with the 1982 survey when 3.4 percent of the corn acres were treated. Only 1 percent of the wheat acres were treated with fungicide in 1987 while 2.5 percent were treated in 1982.

Herbicides are used on a high proportion of the sugar beets, dry edible beans and potatoes, ranging from 86.5 percent of the sugar beet acres to all of the potato acreage. An average of slightly more than 90 percent of the acres of these three crops were treated with herbicides.

Insecticide use on specialty crops varied widely. Over 85 percent of the potato acres but only 9.2 percent of the dry edible bean acres were treated.

Fungicides and nematicides were used on a higher proportion of the specialty crop acres than on the field crops. A total of 8.9 percent of all specialty crop acres were treated with fungicides and nematicides ranging from 18.2 percent of the sugar beet acreage to 2.7 percent of the potato acres.

While there are more pasture and rangeland acres than crop acres in Nebraska, far fewer were treated with pesticides. Only 2.3 percent of the pasture and rangeland acres were treated with herbicides in 1987. This was slightly less than one-half as many as in 1982 and only about one-third that in 1978. Likewise, insecticides are infrequently used for pasture and rangeland. Only 0.3 percent of the acreage was treated in 1987, but none was treated in 1982. No fungicide use was reported for pasture and rangeland in either 1987 or 1982.

HERBICIDE USE ON MAJOR FIELD CROPS

Approximately 28 million pounds (12.7 million kg) of herbicides were applied to slightly more than 10 million acres (4 million hectares) in 1987 (Table 3). (All quantities of pesticides are reported as pounds (kg) of active ingredients.) This is over 4 million more pounds (1.8 million kg.) of herbicides

Table 3. Total pounds of herbicide active ingredients used with major crops and pasture and rangeland, Nebraska, 1987.

Herbicide	Active Ingredients Applied to: Corn	Grain Sorghum	Soybeans	Wheat, Oats Barley & Rye	Alfalfa	Rangeland & Wild Hay	Total
aciflurofen							
Blazer	0	0	394	0	0	0	394
alachlor							
Lasso	2,459,897	0	652,407	0	0	0	3,112,304
Lasso+atrazine	583,326	45,362	0	0	0	0	628,688
Lariat	27,609	0	0	0	0	0	27,609
Subtotal	3,070,832	45,362	652,407				3,768,771
atrazine							
Aatrex, Aatram	11,069,046	936,849	0	38,327	0	18,793	12,063,015
Bicep	1,264,753	347,677	0	0	0	0	1,612,430
Extrazine	473,578	858	0	0	0	0	474,436
Lariat	16,564	0	0	0	0	0	16,564
Lasso+Atrazine	349,995	27,217	0	0	0	0	377,212
Marksman	13,567	0	0	0	0	0	13,567
Ramrod+atrazine	5,031	145,358	0	0	0	0	150,390
Sutan+atrazine	179,554	0	0	0	0	0	179,554
Conquest	28,495	0	0	0	0	0	28,495
Subtotal	13,400,583	1,457,959		38,327		18,793	14,915,663
benefin							
Balan	0	0	0	0	187	0	187
bentazon							
Basagran	97,176	0	7,705	0	0	0	104,881

Table 3. Continued.

Herbicide	Active Ingredients Applied to: Corn	Grain Sorghum	Soybeans	Wheat, Oats Barley & Rye	Alfalfa	Rangeland & Wild Hay	Total
bifenox							
Modown	0	0	2,954	0	0	0	2,954
bromoxynil							
Buctril	495	0	0	0	0	0	495
butylate							
Genate	1,167,864	0	0	0	0	0	1,167,864
Sutan+atrazine	718,218	0	0	0	0	0	718,218
Subtotal	1,886,082						1,886,082
chloramben							
Amiben	0	0	97,556	0	0	0	97,556
chlorimuron ethyl							
Preview	0	0	734	0	0	0	734
chlorsufuron							
Glean	0	0	0	29,348	0	0	29,348
cyanazine							
Bladex	1,747,097	16,305	0	0	0	0	1,763,402
Conquest	85,486	0	0	0	0	0	85,486
Extrazine	157,859	286	0	0	0	0	158,145
Subtotal	1,990,442	16,591					2,007,033
dicamba							
Banvel	108,123	0	0	9,415	0	3,170	120,708

Table 3. Continued.

Herbicide	Active Ingredients Applied to: Corn	Grain Sorghum	Soybeans	Wheat, Oats Barley & Rye	Alfalfa	Rangeland & Wild Hay	Total
Marksman	7,107	0	0	0	0	0	7,107
Subtotal	115,230			9,415		3,170	127,815
2,4-D							
2,4-D	23,516	23,062	0	70,768	0	228,485	345,831
2,4-D Amine	7,727	31,827	0	10,416	0	17,720	67,690
2,4-D Ester	16,325	6,007	0	11,057	0	7,993	41,382
Subtotal	47,568	60,896		92,241		254,198	454,903
EPTC							
Eradicane	784,694	0	0	0	0	0	784,694
ethalfluralin							
Sonalin	0	0	182,654	0	0	0	182,654
FMC 57020							
Command	0	0	71,265	0	0	0	71,265
Commence	0	0	38,917	0	0	0	38,917
Subtotal			110,182				110,182
glyphosate							
Roundup	0	0	0	0	2	0	2
imazaquin							
Scepter	0	0	21,548	0	0	0	21,548
Tri-Scept	0	0	345	0	0	0	345
Subtotal			21,893				21,893
lactofen							
Cobra	0	0	215	0	0	0	215

Table 3. Continued.

Herbicide	Active Ingredients Applied to: Corn	Grain Sorghum	Soybeans	Wheat, Oats Barley & Rye	Alfalfa	Rangeland & Wild Hay	Total
linuron							
Lorox	0	0	12,164	0	0	0	12,164
MCPA							
metasulfuronmethyl	0	0	0	3,460	0	0	3,460
Ally	0	0	0	963	0	0	963
metolachlor							
Dual	96,641	40,683	85,100	0	0	0	245,657
Bicep	1,577,389	433,619	0	0	0	0	2,011,008
Turbo	0	0	9,109	0	0	0	9,109
Subtotal	1,674,030	474,302	94,209				2,265,774
metribuzin							
Sencor, Lexone	0	0	26,219	0	39	0	26,258
Preview	0	0	7,340	0	0	0	7,340
Turbo	0	0	2,017	0	0	0	2,017
Subtotal			35,576	39			35,615
MSMA							
Target	6,184	0	0	0	0	0	6,184
paraquat	552	6,386	0	0	0	1,174	8,112
pendimethalin							
Prowl	0	0	287,320	0	0	0	287,320
picloram							
Tordon	0	0	0	0	0	85,314	85,314

Table 3. Continued.

Herbicide	Active Ingredients Applied to: Corn	Grain Sorghum	Soybeans	Wheat, Oats Barley & Rye	Alfalfa	Rangeland & Wild Hay	Total
propachlor							
Ramrod	2,959	240,603	590	0	0	0	244,152
Ramrod+atrazine	15,094	436,073	0	0	0	0	451,167
Subtotal	18,053	676,676	590				695,319
propham							
Chem-Hoe	0	0	0	15	0	0	15
sethoxydim							
Poast	0	0	3,639	0	0	0	3,639
simazine							
Princep	0	0	0	0	1,002	0	1,002
terbutryn							
Igran	0	21,486	0	0	0	0	21,486
traiallate							
Far-Go	0	0	0	1,366	0	0	1,366
trifluralin							
Treflan	0	624,572	0	1,544	0	0	626,116
Tri-Scept	0	0	2,239	0	0	0	2,239
Commence	0	0	50,890	0	0	0	50,890
Subtotal			678,701		1,544		680,245
TOTAL	23,091,921	2,759,658	2,188,956	175,135	2,881	385,882	28,604,433

SOURCE: Survey of agricultural producers

applied to 1 million (.4 million hectares) fewer acres than in 1982.

Herbicide Use on Corn: Atrazine was the most commonly used herbicide for corn. More than 11 million pounds (5.0 million kg) of atrazine alone and almost 2 million pounds (.9 million kg) in combination with other herbicides i.e. Ramrod/atrazine were applied. This was almost twice as much as was used in 1982. Lasso was the next most frequently used herbicide on corn.

Herbicide Use on Grain Sorghum: Almost 1 million pounds (453,592 kg) of atrazine alone and another 521,000 pounds (236,321 kg) in combination with other herbicides were used on grain sorghum. Similar amounts were used in 1982. Other heavily used herbicides were propachlor (Ramrod) and metolachlor (Dual, Bicep) products.

Herbicide Use on Soybeans: Soybean producers used slightly more than 650,000 pounds (294,834 kg) of Lasso and nearly 625,000 pounds (283,495 kg) of Treflan. Producers used nearly twice as much Lasso and 50 percent more Treflan in 1982 as they did in 1987. The total amount of herbicide used on soybeans was nearly the same both years indicating more of other herbicides were used during the latter one.

Herbicide Use on Small Grains: Only about 175,000 pounds (79,379 kg) of herbicides were used on small grains. This was about 16 percent less than in 1982; however, herbicide use on these crops varies greatly from year to year and comparisons are less meaningful than for other crops. Slightly more than 50 percent of all herbicides used on small grains was 2,4-D which is frequently used during the fallow year in summer fallow production systems.

Herbicides on alfalfa, rangeland and wild hay: Farmers and ranchers used nearly 390,000 pounds (176,900 kg) of herbicides on alfalfa, rangeland and wild hay. Nearly 60 percent of this was 2,4-D used on rangeland and wild hay. The use of herbicides on alfalfa, rangeland and wild hay was only about 80 percent as great in 1987 as in 1982. As with small grains, herbicide use on these areas varies greatly between years.

INSECTICIDE USE ON MAJOR FIELD CROPS

There were 4.8 million pounds (2.2 million kg) of insecticides (Table 4) applied to 4.4 million acres (1.78 million hectares) of cropland. Approximately 0.5 million fewer pounds (0.23 million kg) of insecticides were applied to approximately 0.6 million fewer acres (0.24 million hectares) in 1987 than in 1982.

Insecticide Use on Corn: Counter and Lorsban were the two most popular insecticides for corn growers. Corn producers used nearly 2 million pounds (907,000 kg) and 1 million pounds (453,000 kg) of Counter and Lorsban, respectively. Only about 65 percent as much Counter and approximately 50

percent as much Lorsban was used in 1982 as in 1987. The total amount of insecticides was nearly identical in each year.

Table 4. Total pounds active ingredients of insecticide used on major crops, pasture and rangeland, Nebraska, 1987.

Insecticides	Corn	Grain Sorghum	Soybeans	Wheat,Oats Barley&Rye	Alfalfa	Rangeland & Wild Hay	Total
	pounds						
Bacillus thuringiensis (Dipel)	24,338	0	0	0	0	0	24,338
carbaryl (Sevin)	4,552	0	0	0	178	0	4,730
carbofurnan (Furadan)	489,015	9,801	0	0	4,620	0	503,436
chlorpyrifos (Lorsban)	1,055,187	679	18,584	0	7,172	407	1,082,029
diazinon	141,099	0	0	0	0	0	141,099
dimethoate (Cygon)	497	6,972	0	0	0	0	7,469
disulfoton (Di-Syston)	0	8,260	0	28,615	0	0	36,875
fenvalerate (Pydrin)	18,087	0	0	0	0	0	18,087
fonofos (Dyfonate)	351,354	0	0	0	0	0	351,354
malathion	0	0	1,684	0	3,480	205	5,369
methomyl (Nudrin)	0	0	1,440	0	153	0	1,593
methylparathion (Penncap)	0	0	0	0	320	0	320
parathion	5,157	61,469	0	0	51	0	66,677
permethrin (Ambush, Pounce)	282,790	0	0	0	0	0	282,790
phorate (Thimet)	264,548	1,716	0	0	0	0	266,264
terbufos (Counter)	1,964,438	39,756	0	0	0	0	2,004,194
TOTAL	4,610,062	128,653	21,708	28,615	15,974	612	4,805,624

SOURCE: Survey of agricultural producers.

Insecticide Use on Grain Sorghum: Parathion and Counter were the most heavily used insecticides by grain sorghum producers. They used just over 61,000 pounds (27,700 kg) of parathion and nearly 40,000 pounds (18,143 kg) of Counter. These two insecticides accounted for 77 percent of all insecticide treatment of grain sorghum.

Insecticide Use on Soybeans: Only slightly more than 20,000 pounds (9,071 kg) of insecticides were used on soybeans. Of this, 18,500 pounds (8,391 kg) was Lorsban.

Insecticide Use on Small Grains: Di-Syston was the only insecticide used on small grains. Slightly more than 28,500 pounds (12,927 kg) were used. No insecticide was used on small grains in 1982.

Insecticide Use on Alfalfa, Pasture and Wild Hay: Over 95 percent of the insecticide use on these crops was for alfalfa. However, only 16,500 pounds (7,484 kg) were used in total. Little insecticide was used on these crops in 1982.

Fungicide and Nematicide Use: Approximately 95,000 acres (38,446 hectares) of field crops were treated with fungicides and nematicides, excluding seed treatment, in 1987. The amount of active ingredients could not be fully determined since respondents did not report fully enough to provide reliable estimates. Also, with changes in the products which are currently registered as compared to 1982, producers are using some of the same pesticides for insect and nematode control. Thus, they did not identify the purpose for the treatment and these products were included only in the insecticides statistics. This represents less than one-third the number of acres treated in 1982 and the authors have no explanation for such a change in the five-year period.

PESTICIDE USE ON MAJOR SPECIALTY CROPS

Potatoes, sugar beets and dry edible beans are specialty crops of significant economic importance in Nebraska. Extensive use of pesticides on these crops is a common practice.

These specialty crops were planted on 302,000 acres (122,219 hectares) in 1987. as compared to 286,400 acres (115,906 hectares) in 1982. There is considerable year-to-year variability in the acres planted to these crops.

Herbicides

Over 384,000 pounds (174,179 kg) of herbicides were applied to specialty crops with nearly 85 percent of this on dry edible beans (Table 5). Over 12 percent was used on sugar beets.

Herbicide Use on Dry Edible Beans: Over 162,000 pounds (73,481 kg) of Eptam was applied to 80,600 acres (32,616 hectares) of dry edible beans (Table 5). Nearly 82,500 pounds (37,421 kg) of Lasso was also applied to over 43,000 acres (17,402 hectares).

Table 5. Pounds of active ingredient of herbicides applied to major specialty crops, Nebraska, 1987.

Herbicide	Active Ingredients Applied to: Dry Edible Beans	Sugar Beets	Potatoes	Total
alachlor				
Arena	3,054			3,054
Lasso	79,301			79,301
Subtotal	82,355			82,355
cycloate				
Ro-Neet	13,514	25,645		39,159
diethatyl ethyl				
Antor		910		910
desmedipham				
Betamix		1,880		1,880
EPTC				
Eptam	162,110		6,282	168,392
Genep	4,010			4,010
Subtotal	166,120		6,282	172,402
ethalfluralin				
Sonolan	27,073			27,073
ethofumesate				
Nortron		16,441		16,441
metholachlor				
Dual	8,274		2,034	10,308
metribuzin				
Lexone			3,242	3,242
pendimethalin				
Prowl			838	838
phenmedipham				
Betamix		1,880		1,880
trifluralin				
Treflan	26,919		897	27,816
Total	324,255	46,756	13,293	384,304

Source: Survey of agricultural producers.

Herbicide Use on Sugar Beets: Sugar beet producers applied 25,600 pounds (11,612 kg) of Ro-Neet to nearly 4,000 acres (1,619 hectares). Over 27,000 acres (10,926 hectares) were treated with 16,400 pounds (7,439 kg) of Nortron. Herbicides used by sugar beet producers generally require low per acre application levels; therefore, the total amount of herbicides used is much lower than for other crops with similar acreage planted.

Herbicide Use on Potatoes: Producers applied 3,200 pounds (1,451 kg) of Lexone to 5,100 acres (2,063 hectares) of potatoes. Nearly 6,300 pounds (2,858 kg) of Eptam was used to control weeds on nearly 1,800 acres (728 hectares).

Insecticides

Producers used nearly 40,000 pounds (18,144 kg) of insecticides to control insects on nearly 40,000 acres (16,188 hectares) of specialty crops (Table 6). Nearly one-half of the insecticides were applied to dry edible beans.

Insecticide use on Potatoes: Monitor was the main product for insect control on potatoes with 6,800 acres (2,752 hectares) being treated with it. Relatively small amounts of Dy-Syston, Thimet and Pydrin were also used for potato insect control.

Table 6. Pounds of active ingredients of insecticides applied to major specialty crops, Nebraska, 1987.

	Active Ingredients Applied to:			
Insecticide	Dry Edible Beans	Sugar Beets	Potatoes	Total
chlorpyrifos (Lorsban)		2,708		2,708
disulfoton (Dy-Syston)	7,823		443	8,266
fenvalerate (Pydrin)	2,035		170	2,205
methamidophos (Monitor)			6,821	6,821
phorate (Thimet)	8,183	2,431	364	10,978
Terbufos (Counter)		8,216		8,216
Total	18,041	13,355	7,798	39,194

Source: Survey of agricultural producers.

Insecticide Use on Sugar Beets: Counter was the most frequently reported insecticide used on sugar beets. About 6,000 acres (2,428 hectares) were treated with 8,200 pounds(3,719 kg) of this insecticide. Lorsban and Thimet were applied to approximately the same number of acres but fewer than one-half as many acres were treated with each of these as were treated with Counter.

Insecticide Use on Dry Edible Beans: Di-Syston was used on the most acres of dry edible beans and Thimet was used on the fewest acres. However, because of different active ingredients in each insecticide, more pounds of Thimet than Dy-Syston were applied. Pydrin was the only other insecticide used on this crop. Nearly 8,700 acres (3,521 hectares) were treated with Di-Syston and nearly 8,200 pounds (3,719 kg) of Thimet were applied to dry edible beans.

Fungicides and Nematicides

Approximately 526,000 pounds (238,589 kg) of fungicides and nematicides were applied to about 27,000 acres (1,092 hectares) of the major speciality crops (Table 7). Nearly 90 percent of this was applied to sugar beets where control of nematodes is of vital importance for successful production.

Temik was the most commonly used nematicide for all three crops. This was applied to approximately 21,000 acres (8,500 hectares) of these crops. Over one-half of the Temik-treated acres were in dry edible beans. More pounds of active ingredients were applied as Telone than Temik. Approximately 455,000 pounds (206,384 kg) of Telone were applied with all of it on sugar beets.

Table 7. Pounds of active ingredients of fungicides and nematicides applied to major speciality crops, Nebraska, 1987.

Fungicide & Nematicide	Active Ingredients Applied to:			
	Dry Edible Beans	Sugar Beets	Potatoes	Total
copper sulfate	1,896			1,896
Telone		454,031		454,031
Temik	46,794	22,578	1,500	70,872
Total	48,690	476,609	1,500	526,799

Source: Survey of agricultural producers.

GRAIN STORAGE FUMIGANTS, PROTECTANTS AND BIN TREATMENTS

Farmers control insects in stored grain in order to protect their investment. They use fumigants and protectants in the stored grain and treat the empty bins before filling them.

Since there is no way of expanding the sample to either the total amount of active ingredients used or the bushels treated, only the amounts reported by respondents are included in Table 8.

Table 8. Active ingredients and bushels treated with fumigants and protectants by kind of grain and empty bin treatments as reported by respondents, Nebraska, 1987.

Item	Barley	Corn	Grain Sorghum	Oats	Wheat	Total
			Fumigants			
aluminum phosphide						
Active Ingredients (lb.)	4.1	331.7	44.8	3.5	27.0	411.1
Bushels Treated	10,000	804,200	105,500	8,100	64,800	982,600
chloropicrin						
Active Ingredients (lb.)		202.9			30.82	33.7
Bushels Treated		79,000			12,000	91,000
malathion						
Active Ingredients (lb.)					100.0	100.0
Bushels Treated					8,000	8,000
methylbromide						
Active Ingredients (lb.)		107.9				107.9
BushelsTreated		42,000				42,000
			Protectants			
pirmiphos-methyl (Actellic)						
Active Ingredients (lb.)		8.75				8.75
Bushels Treated		200,000				200,000
Bacillus thuringiensis						
Active Ingredients (lb.)		2,116.4	22.5		15.0	2,153.9
Bushels treated		282,000	3,000		2,000	287,000
malathion						
Active Ingredients (lb.)	6.0	530.9	67.0	3.5	261.9	2,153.9
BushelsTreated	10,00	907,500	114,500	5,000	387,950	1,424,950
chlorpyrifos-methyl (Reldan)						
Active Ingredients (lb.)					29.3	29.3
Bushels Treated					40,700	40,700
			Empty Bin Treatment			
malathion						
Active Ingredients (lb.)						211.75
Bushel Capacity						1,694,000
methoxychlor						
Active Ingredients (lb.)						32.0
Bushel Capacity						64,000

SOURCE: Survey of agricultural producers

Fumigants Used on Stored Grain: Aluminum phosphide was the most widely used fumigant, accounting for 48 percent of all fumigants used for grain protection. The second most heavily used fumigant was chloropicrin or tear gas.

Protectants Used on Stored Grain: More bushels of grain were protected with malathion than any other material. However, more pounds of *Bacillus thuringiensis* was used.

Pesticides Used on Empty Storage Bins: Methoxychlor and malathion were the only pesticides used for empty bin treatment of grain storage facilities. More than twenty-five times as much capacity was treated with malathion as with methoxychlor.

RODENTICIDES AND AVICIDES

Just under 40 percent of the respondents indicated a problem with rodents and 20 percent reported bird problems. The most frequently mentioned rodents were Norway (barn) rats, house mice and pocket gophers. Rodent problems were most frequently reported in the farm buildings, alfalfa fields and rangeland.

Table 9. Amount and kind of rodenticides used by respondents to a survey of agricultural producers, Nebraska, 1987.

Rodenticide	Quantities of Product Used	Number of Respondents
Bluedeath	26.5 pounds	3
d-con	15 bait traps	6
d-con	147 pounds	19
d-conconcentrate	25 pounds	8
d-conmousepruf	14 pounds	8
d-con pellets	56 packets	20
d-con pellets	80 pounds	
d-con ready mixed	84 packets	25
d-con ready mixed	129 pounds	
Ferret	33 pounds	3
Gopher bait	4 pounds	3
Havoc	135 pounds	8
Purina Place Pack	34 pounds	10
Purina Pitch Pack Tag M	321 packets	28
Purina Pitch Pack Tag M	281.5 pounds	
Purina Rat Control Pellets	211.5 pounds	11
Ropax	21 pounds	5
Strychnine on Grain	492 pounds	3
0.35% Strychnine	880 pounds	12
0.5% Strychnine	343 pounds	14
Trax One	1 box	5
Warfarin	215.5 pounds	32
Zinc Phosphide Concentrate	31 pounds	5
Zinc Phosphide on Grain	95 pounds	3

SOURCE: Survey of agricultural producers

Nearly 14 percent and 9 percent of respondents reported problems with sparrows and starlings, respectively. As with rodents, bird problems were most frequently reported in farm buildings. Both chemical and non-chemical methods to control birds and rodents were used. Nearly 17 percent of the respondents used non-chemical controls on rodents and 9 percent used these methods for birds.

Table 10. Amount and kind of fumigants used for rodent control by respondents to a survey of agricultural producers, Nebraska, 1987.

Fumigant	Quantities of Product Used	Number of Respondents
Aluminum phosphide		
Fumitoxin	6 pounds	2
Phostoxin	57.5 pounds	8
Phostoxin	4 pints	
Ammonia	200 pounds	1
Gas Cartridge Fumigants	50 cartridges	2

SOURCE: Survey of agricultural producers

Nearly one-third of the respondents reported using chemicals for rodent and bird problems. Warfarin including the various d-con products was the most frequently used rodenticide. Just over 45 percent of those who used rodenticides used this chemical in one form or another. Active ingredients could not be determined because of an inadequate base for expanding the sample and imprecise reporting by respondents.

Table 11. Amount and kind of avicide and bird repellents reported used by respondents to a survey of agricultural producers, Nebraska, 1987.

Avicide or Repellent	Product Used	Number of Respondents
Avitrol Mixed Grain	2 pounds	2
Rid-A-Bird (Endrin)	2 pints	6
Rid-A-Bird (Fenthion)	10 pints	6
Roost No More	10 quarts	1
Starlicide Complete	30 pounds	2
Zinc Phosphide on Grain	3 pounds	1

SOURCE: Survey of agricultural producers.

Respondents reported using fumigants for rodent control primarily in range and pastures. The lack of an adequate base for expanding the sample and the imprecise quantities reported in some cases makes it impossible to know how much of these fumigants were used statewide.

Fewer than 2 percent of the respondents reported using any kind of avicide. Rid-A-Bird with either endrin or fenthion was the most commonly used avicide.

The most frequently used non-chemical control of both rodents and birds were trapping and shooting. Trapping was used by nearly 9 percent of the producers and shooting was used by 12 percent of them.

HERBICIDE USE BY CROP REPORTING DISTRICT

Most herbicides were applied to the three major crops in Nebraska, namely corn, grain sorghum and soybeans. As can be seen in Table 3 relatively small amounts were used on small grains and hay and pasture; therefore, the analysis of herbicide use by crop reporting district was limited to the major crops.

As would be expected, the amount of active ingredients corresponds to the distribution of the acres of crops grown in each district. The application rates per acre varied little between districts.

Table 12. Total pounds of active ingredients of herbicide used on corn, grain sorghum and soybeans by crop reporting district, Nebraska, 1987.

Herbicide	Crop Reporting District							
	Central	East	North	Northeast	Northwest	South	Southeast	Southwest
	1000 pounds							
CORN								
alachlor								
Lasso	396.54	472.30	674.26	317.33	278.95	278.95	36.65	202.65
Lasso+atrazine	45.38	208.48	3.85	94.56	0	148.98	82.02	0
Lariat	13.33	14.28	0	0	0	0	0	0
atrazine								
Aatrex, Aatram	1632.68	2291.29	1798.72	1099.16	254.59	1825.28	659.72	1506.50
Bicep	81.32	308.22	416.86	120.28	0	155.94	89.80	92.33
Extrazine	137.90	276.66	0	0	0	0	59.06	0
Lariat	8.00	8.57						
Lasso+atrazine	27.23	125.09	2.31	56.73	0	89.39	49.21	0
Marksman	0	0	0	0	0	1.02	8.89	3.65
Ramrod+atrazine	0	.38	0	0	0	1.52	3.13	0
Sutan+atrazine	10.81	0	83.74	69.94	0	0	0	15.05
Conquest	0	20.90	0	7.60	0	0	0	0
bentazon								
Basagran	0	0	0	0	97.18	0	0	0
bromoxynil								
Buctril	0	.36	0	.09	0	0	.04	0
butylate								
Genate	0	676.08	363.67	128.11	0	0	0	0
Sutan+atrazine	43.24	0	334.98	279.82	0	0	0	60.19

Table 12. Continued.

Herbicide	Crop Reporting District							
	Central	East	North	Northeast	Northwest	South	Southeast	Southwest
	1000 pounds							
cyanazine								
Bladex	4.19	609.91	54.51	651.49	216.99	17.30	71.11	85.26
Conquest	0	62.70	0	22.77	0	0	0	0
Extrazine	45.97	92.22	0	0	0	0	19.68	0
dicamba								
Banvel	27.81	0	.81	38.43	29.93	7.83	.59	2.72
Marksman	0	0	0	0	0	.54	4.66	1.91
2,4-D								
2,4-D	2.52	4.24	.61	11.62	3.57	0	.54	.40
2,4-D Amine	1.11	1.58	2.98	2.06	0	0	.11	0
2,4-D Ester	0	11.87	0	4.11	.24	0	0	.10
EPTC								
Eradicane	142.03	88.51	71.56	1.61	.91	169.42	224.50	63.56
metolachlor								
Dual	14.73	32.22	12.03	19.14	9.70	.84	.48	.42
Bicep	101.43	384.41	519.91	150.01	0	194.49	111.99	115.15
MSMA								
Target	0	6.18	0	0	0	0	0	0
paraquat	0	0	0	0	0	0	0	.55
propachlor								
Ramrod	0	0	0	2.96	0	0	0	0
Ramrod+atrazine	0	1.16	0	0	0	4.55	9.39	0

Table 12. Continued.

Herbicide	Crop Reporting District							
	Central	East	North	Northeast	Northwest	South	Southeast	Southwest
	1000 pounds							
GRAIN SORGHUM								
alachlor								
Lasso	39.86	144.98	0	0	0	471.21	0	0
Lasso+atrazine	0	33.64	0	0	0	4.45	7.27	0
atrazine								
Aatrex, Aatram	9.37	279.37	0	15.08	0	130.41	436.20	66.42
Bicep	3.34	168.90	0	7.89	0	39.36	86.54	41.34
Extrazine	0	0	0	0	0	0	.86	0
Lasso+atrazine	0	20.18	0	0	0	2.67	4.36	0
Ramrod+atrazine	9.24	59.71	0	0	0	26.70	49.70	0
cyanazine								
Bladex	0	0	.66	0	0	1.12	10.30	4.22
Extrazine	0	0	0	0	0	0	.29	0
2,4-D								
2,4-D	0	11.15	1.59	1.10	0	0	9.22	0
2,4-D Amine	0	26.52	0	0	0	0	5.30	0
2,4-D Ester	0	.86	0	0	0	0	5.14	0
metolachlor								
Dual	2.77	13.84	0	7.38	0	15.41	1.28	0
Bicep	4.16	210.65	0	9.84	0	49.08	107.93	51.56
paraquat	0	0	0	0	0	0	6.39	0

Table 12. Continued.

Herbicide	Crop Reporting District							
	Central	East	North	Northeast	Northwest	South	Southeast	Southwest
	1000 pounds							
propachlor								
Ramrod	0	20.09	6.50	2.89	0	59.28	151.82	0
Ramrod+atrazine	27.73	179.14	0	0	0	80.11	149.09	0
terbutryn								
Igran	0	0	0	0	0	0	0	21.49
				SOYBEANS				
acifluren								
Blazer	.08	.27	0	0	0	0	.04	0
atrazine								
Aatrex,Aatram	0	0	0	0	0	5.91	0	0
bentazon								
Basagran	.28	5.98	0	.12	0	1.33	0	0
bifenox								
Modown	.55	2.26	0	0	0	.14	0	0
chloramben								
Amiben	8.51	43.81	0	40.97	0	0	4.25	0
chlorimuron ethyl								
Preview	.43	.11	0	0	0	0	.19	0
2,4-D								
Landmaster	0	0	0	0	0	1.53	0	0

Table 12. Continued.

Herbicide	Crop Reporting District							
	Central	East	North	Northeast	Northwest	South	Southeast	Southwest
	1000 pounds							
ethalfluralin								
Sonalin	.75	45.13	115.02	5.19	0	8.55	7.05	.97
FMC 57020								
Command	0	44.81	0	10.52	0	2.55	13.75	0
Commence	0	11.71	0	11.79	0	5.94	10.48	0
glyphosate								
Landmaster	0	0	0	0	0	1.15	0	0
imazaquin								
Sceptor	.08	9.61	0	8.92	0	.45	1.95	0
Tri-Scept	.34	0	0	0	0	0	0	0
lactofen								
Cobra	.14	0	0	0	0	0	0	.07
linuron								
Lorox	.74	5.22	1.34	.91	0	.62	1.62	1.72
metolachlor								
Dual	0	58.25	0	0	0	0	6.20	20.65
Turbo	0	9.11	0	0	0	0	0	0
metribuzin								
Sencor, Lexone	.87	12.50	3.67	4.34	0	.94	3.90	0
Preview	4.32	1.13	0	0	0	0	1.89	0
Turbo	0	9.11	0	0	0	0	0	0

Table 12. Continued.

Herbicide	Crop Reporting District							
	Central	East	North	Northeast	Northwest	South	Southeast	Southwest
	1000 pounds							
pendimethalin								
Prowl	2.58	137.68	0	121.25	0	.23	25.57	0
propachlor								
Ramrod	0	0	0	.59	0	0	0	0
sethoxydim								
Poast	0	1.12	0	1.28	0	0	1.24	0
trifluralin								
Treflan	30.60	409.91	17.18	0	1.81	18.18	148.71	0
Tri-Scept	2.24	0	0	0	0	0	0	0
Commence	0	14.92	0	15.04	0	7.57	13.36	0

SOURCE: Survey of agricultural producers

CONCLUSIONS

1. Pesticide use is an integral component of crop production systems in Nebraska.

2. The majority of the crop acres in Nebraska receive one or more applications of pesticides.

3. The acres and proportion of acres treated with pesticides has increased over the past five years.

4. The number of acres receiving herbicide application is increasing.

5. The acres and proportion of the acres treated with insecticides has decreased over the last five years.

APPENDIX

Table 13. Percent of crop pesticide used with different tillage methods, Nebraska, 1987.

Crop and Pesticide	Conventional	Reduced Tillage	No-till	Total[a]
ALFALFA:				
Balan	9.09			
Cygon			9.09	
Lorsban	18.18			
Mobait			9.09	
Parathion	9.09		9.09	
Penncap-M			9.09	
Princep	9.09			
Li700			9.09	
Sevin	9.09			
	54.54	0.00	45.46	100
BARLEY:				
2,4-D	11.11	55.56		
Banvel		22.22		
Cygon		11.11		
	11.11	88.89	0.00	100
CORN:				
2,4-D	1.62	1.68	0.52	
2,4-D Amine	0.40	0.29	0.06	
2,4-D Ester	0.17	0.98	0.06	
Atrazine	7.46	8.84	2.20	
Banvel	0.92	1.68	0.17	
Basagran		0.06		
Bicep	2.49	3.41	0.46	
Bladex	1.27	2.95	0.92	
Brominal	0.06			
Buctril	0.17	0.52	0.12	
Captan	0.12			
Conquest		0.23		
Counter	5.49	7.29	0.81	
Cyclone			0.06	
Cygon	0.23	0.23		
Diazinon	0.12	0.23		
Dual	0.40	0.92	0.17	
Dyfonate	1.16	1.45	0.23	
EPN		0.17		
Eradicane	1.27	0.92	0.06	
Extrazine	0.40	0.98	0.35	
Furadan	1.68	2.03	0.29	
Genate	0.06	0.23	0.06	
Isotox	0.06		0.06	
Lariat	0.12	0.06		
Lasso	5.43	5.95	0.52	
Lasso/atrazine	1.16	2.43	0.12	

Table 13. Continued.

Crop and Pesticide	Conventional	Reduced Tillage	No-till	Total[a]
Li700/Mobait		0.06		
Lindane	0.06	0.06	0.06	
Lorsban	2.60	3.18	0.75	
Marksman		0.17		
Mocap	0.06	0.17		
paraquat			0.17	
parathion	0.17	0.40		
Penncap-M	0.12	0.06		
Pounce	0.23	0.35	0.06	
Princep	0.06	0.06		
Prowl	0.12	0.12		
Pydrin	0.06	0.23	0.17	
Ramrod	0.06	0.12		
Ramrod/atrazine	0.40	0.06		
Roundup		0.06		
Sevin	0.12	0.06		
Sutan	1.16	1.50		
Sutazine	0.81	0.40		
Tandem	0.06	0.12		
Target	0.06			
Thimet	0.75	1.16	0.06	
Treflan	0.06	0.12		
	39.22	51.99	8.51	100
CRP:				
Atrazine			25.00	
Banvel			25.00	
Landmaster			25.00	
Roundup		25.00		
	0.00	25.00	75.00	100
DRY BEANS:				
Arena	1.43			
Copper sulfate	1.43			
Di-Syston	1.43			
Dual	1.43			
Eptam	30.00	4.29	2.86	
Genep		1.43		
Lasso	7.14	4.29		
Pydrin	1.43			
Ro-Neet	2.86			
Sonalan	12.86	4.29		
Temik	2.86			
Thimet	1.43		1.43	
Treflan	14.28	1.43	1.43	
	78.58	15.73	5.72	100

Table 13. Continued.

Crop and Pesticide	Conventional	Reduced Tillage	No-till	Total[a]
FALLOW:				
Atrazine	14.29	14.29		
Banvel		14.29		
Cyclone		14.29		
Landmaster	14.29	14.29		
Roundup	14.29			
	42.87	57.16	0.00	100
GRAIN SORGHUM:				
2,4-D	2.63	3.62	0.66	
2,4-D Amine	0.33			
2,4-D Ester	1.64		0.33	
Atrazine	14.14	11.18	4.93	
Banvel			0.66	
Bicep	6.25	3.95	1.32	
Bladex	0.66	0.33	1.64	
Buctril		0.66		
Counter		0.33		
Cygon	1.32	0.66		
Di-Syston	0.66			
Dual	0.66	0.99	0.33	
Extrazine			0.33	
Furadan	0.99			
Igran			0.33	
Landmaster		0.33		
Lasso	0.99	0.66	0.33	
Lasso/atrazine	0.66	0.99		
Lindane	0.33			
Lorsban		0.66		
Malathion	0.66			
Modown		0.66		
paraquat			0.66	
Parathion	5.26	3.62	0.99	
Ramrod	4.28	3.95		
Ramrod/atrazine	7.57	5.26		
Roundup		0.33		
Thimet	0.33			
	49.36	38.18	12.51	100
IDLE:				
2,4-D		5.26	10.53	
2,4-D Amine			5.26	
2,4-D Ester		15.79		
Atrazine			5.26	
Banvel		5.26		

Table 13. Continued.

Crop and Pesticide	Conventional	Reduced Tillage	No-till	Total
Bladex			5.26	
Cyclone			10.53	
Landmaster			5.26	
Li700			10.53	
Marksman			5.26	
Roundup		5.26	10.53	
	0.00	31.57	68.42	100
MILLET:				
2,4-D	37.50	6.25		
Atrazine			12.50	
Banvel	31.25	6.25		
Cyclone			6.25	
	68.75	12.50	18.75	100
OATS:				
2,4-D	20.00	20.00		
2,4-D Amine	20.00	10.00		
2,4-D Ester		10.00		
MCPA	10.00	10.00		
	50.00	50.00	0.00	100
POPCORN:				
Atrazine	16.67	16.67		
Banvel		16.67		
Counter		16.67		
Lasso		33.33		
	16.67	83.34	0.00	100
POTATOES:				
Di-Syston		5.88		
Dual	11.76			
Eptam		5.88		
Gramoxane	5.88			
Lexone		11.76		
Lorox	5.88			
Monitor		11.76		
Phorate	5.88			
Prowl		5.88		
Pydrin	5.88	11.76		
Temik	5.88			
Treflan		5.88		
	41.16	58.80	0.00	100
RYE:				
2,4-D	50.00			
Ally	50.00			
	100.00	0.00	0.00	100

Table 13. Continued

Crop and Pesticide	Conventional	Reduced Tillage	No-till	Total[a]
SOYBEANS:				
Amiben	0.52	0.26	0.13	
Arena	0.13			
Basagran	1.17	2.74	0.26	
Blazer	0.26	0.65		
Cobra	0.13	0.13		
Command	3.52	2.61		
Commence	1.69	0.39		
Dual	1.30	1.17	0.13	
Fusilade			0.13	
Lasso	7.30	7.17	0.65	
Lexone	1.96	0.52		
Lorox	1.69	1.17		
Lorsban	0.26			
Malathion		0.13		
Modown	0.13	0.26	0.26	
Parathion		0.13		
Penncap-M	0.13	0.13		
Poast	0.52	0.65	0.13	
Preview	0.65	0.39		
Prowl	2.09	3.78	0.13	
Ramrod	0.13			
Rescue		0.13		
Reward		0.13		
Roundup	1.04	1.04		
Scepter	4.30	4.30	0.13	
Sencor	6.00	6.26	0.26	
Sevin	0.13	0.13		
Sonalan	1.83	1.17		
Squadron		0.13		
Sutan		0.13		
Tackle			0.13	
Treflan	12.78	11.21	0.26	
Tri-Scept		0.13		
Turbo	0.13	0.26		
	49.92	47.30	2.60	100
SUGAR BEETS:				
Antor	3.57			
Betamix	12.50			
Counter	3.57	1.79		
Lorsban	3.57			
Nortron	10.71			
Poast	1.79			
Ro-Neet	35.71	1.79		
Telone	10.71			

Table 13. Continued.

Crop and Pesticide	Conventional	Reduced Tillage	No-till	Total[a]
Temik	12.50			
Thimet	1.79			
	96.42	3.58	0.00	100
WHEAT:				
2,4-D	45.83	8.33	1.67	
2,4-D Amine	0.83			
2,4-D Ester	1.67	1.67	0.83	
Ally	5.83	1.67		
Banvel	10.83	1.67		
Di-Syston	0.83	0.83		
Far-Go	0.83			
Glean	2.50	5.00		
Malathion	0.83			
Maneb	0.83			
MCPA	0.83			
Vitavax	1.67			
	74.14	21.67	4.06	100

[a] May not sum to 100 because of rounding errors.

SOURCE: Survey of agricultural producers.

Literature Cited

Johnson, Bruce and Thomas Byers, *Agricultural Crop Pesticide Usage in Nebraska - 1978*, Report 100, Department of Agricultural Economics, The Agricultural Experiment Station, Institute Of Agriculture and Natural Resources, University of Nebraska-Lincoln, October 1979.

Johnson, Bruce B. and Shripat T. Kamble, *Pesticide Use on Major Crops in Nebraska - 1982*, Department Report No. 10, Environmental Programs, Cooperative Extension Service and Agricultural Research Division, Institute of Agriculture and Natural Resources, University of Nebraska-Lincoln, October 1984.