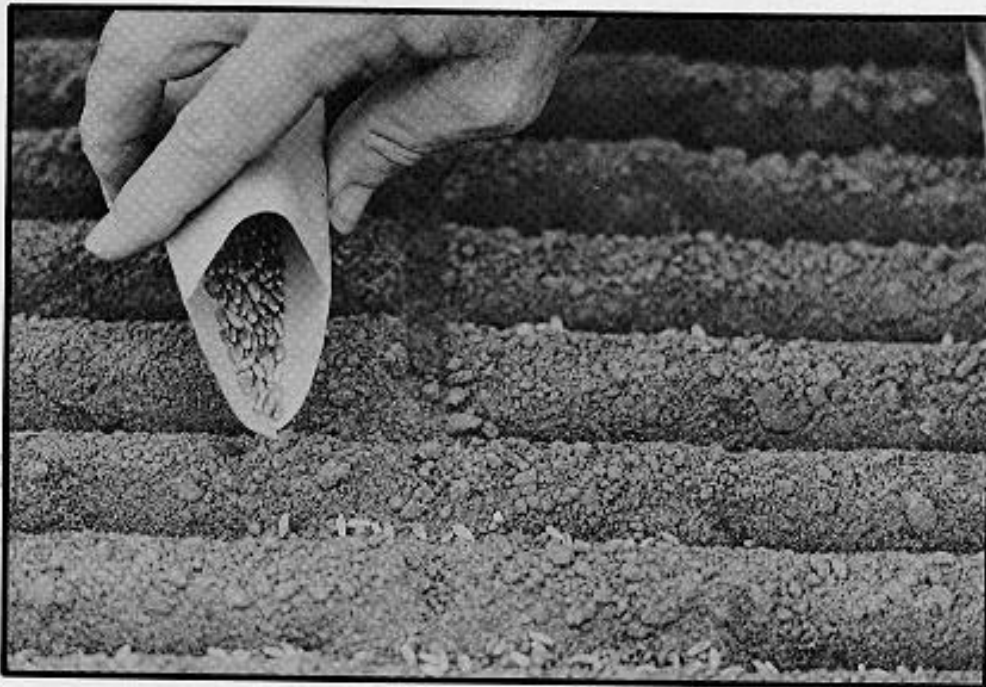


# QUALITY OF WHEAT SEED IN KANSAS



1984 versus 1973

# QUALITY OF WHEAT SEED IN KANSAS 1984 VERSUS 1973<sup>a</sup>

J. R. Stanelle, L. A. Burchett, R. L. Vanderlip,  
and J. P. Shroyer<sup>b</sup>

## ABSTRACT

A survey of 662 wheat farmers in Kansas was conducted in 1984. Questionnaires gathered information on quality of wheat seed and management practices. Each farmer also submitted a sample of seed for testing.

The results indicated that, compared to 1973, more farmers were planting certified, cleaned seed. Certified seed of newly released varieties had the best varietal purity. Most of the seed had a germination rate of 90 to 100 percent. More samples had mechanical purity of over 98 percent. However, more of the samples contained weed seeds than in 1973. Newton was the most popular variety, but more farmers were planting several varieties of wheat.

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Cover photograph by Bern Ketchum

In the fall of 1984, Kansas farmers planted 12.7 million acres of wheat. When this crop was harvested, it accounted for 17 percent of the nation's wheat production. Therefore, any small change in the quality or yield of Kansas wheat could have a considerable impact on the economy of the state and the nation.

One of the factors affecting the quality and yield of wheat is the seed that is planted. Attempts to look at the quality of seed were made in localized areas as early as the late 1950s. These early surveys showed that the majority of farmers planted seed that was of very low quality. In 1973, the first statewide drill-box survey was conducted.<sup>c</sup> Results indicated an increasing awareness by farmers of the need to plant quality seed. However, some quality characteristics, including germination and purity (both mechanical and varietal), still showed deficiencies.

The latest drill-box survey was designed to look at the wheat seed planted in 1984 and to assess the changes that have occurred in the 11 years since the last statewide survey.



A random sample of 1,755 wheat farmers was drawn by the Kansas Crop and Livestock Reporting Service. Growers were selected on a county-by-county basis with regard to number of growers and number of acres of wheat raised within that county. Approximately 18 to 20 farmers were selected from each county in the western and central crop reporting districts (CRDs) and 12 to 16 farmers per county in the three eastern crop reporting districts. A questionnaire (Figure 1) was developed to gather information about the quality of wheat seed being planted, management practices of farmers who plant the seed, and future directions that farmers will choose regarding seed use and management. These questionnaires, along with the list of the selected farmers' names and instructions, were sent to county agricultural extension agents. Agents were asked to contact each farmer on their list, explain the purpose of the survey, and collect a five pound sample of seed from one wheat variety that was to be planted in the fall of 1984. Also, county agents assisted the farmers in completing the questionnaires. A total of 662 samples and questionnaires was collected. Part of the seed from each sample was sent to the State Seed Testing Laboratory in Topeka for analysis of germination, mechanical purity, presence of inert material, name and number of noxious weed seeds present, and the name of other common weed or crop seed contaminants. Also included on each report was a notification if the seed sample as submitted was in compliance with the Kansas State Seed Law.

Bushel test weight was determined as well as three screening fractions: seed that remained on top of a 6/64" by 3/4" slot screen, seed that fell through that screen but remained on top of a 5/64" by 3/4" slot screen, and seed that passed through both screens. A small subsample was ground and used for determination of seed protein.

Four-row plots of 607 of the samples were planted in the fall of 1984 at Manhattan to determine varietal purity. Samples were sorted by variety and planted in a group along with a sample of foundation seed of that variety. Varietal purity estimates were made before harvest, by rating the plots as either pure, mixed (1-30 percent contaminants), or incorrect variety (greater than 30 percent contaminants). Identification was made on physical and morphological features such as height, straw color, spike characteristics, or leaf characteristics.

<sup>c</sup>Jacques, R. M., L. A. Burchett, and R. L. Vanderlip. 1973. Quality of Wheat in Kansas Drill-Boxes. Kansas Agric. Exper. Sta. Bull. 599.

KANSAS STATE UNIVERSITY  
1984 Kansas Wheat Drill Box Survey  
Survey Form

RESULTS

Wheat Varieties

SECTION ONE: Answer questions for sample variety.

1. Identification number \_\_\_\_\_  
District \_\_\_\_\_ County \_\_\_\_\_ ID Number \_\_\_\_\_
2. Variety (Hybrid) sampled \_\_\_\_\_
3. Acres to be planted with this seed lot \_\_\_\_\_
4. Enter acres, seeding rate and expected planting for each cropping system used to plant this seed lot.  
Summer Fallow: Acres \_\_\_\_\_ Rate \_\_\_\_\_ lbs/Ac Date \_\_\_\_\_  
Continuous Cropped: Acres \_\_\_\_\_ Rate \_\_\_\_\_ lbs/Ac Date \_\_\_\_\_  
Irrigated: Acres \_\_\_\_\_ Rate \_\_\_\_\_ lbs/Ac Date \_\_\_\_\_  
Double Cropped: Acres \_\_\_\_\_ Rate \_\_\_\_\_ lbs/Ac Date \_\_\_\_\_
5. Source of this seed lot: Homegrown \_\_\_\_\_ Farmer dealer \_\_\_\_\_  
Other farmer \_\_\_\_\_ Other dealer \_\_\_\_\_
6. Seed treatment:  
Insecticide: Yes \_\_\_\_\_ No \_\_\_\_\_ Don't know \_\_\_\_\_  
Fungicide: Yes \_\_\_\_\_ No \_\_\_\_\_ Don't know \_\_\_\_\_  
If yes, name seed treatment(s) \_\_\_\_\_
7. Was seed cleaned? Yes \_\_\_\_\_ No \_\_\_\_\_ Don't know \_\_\_\_\_  
If cleaned: At home \_\_\_\_\_ Another farmer \_\_\_\_\_  
Commercial \_\_\_\_\_ Don't know \_\_\_\_\_  
If not at home, how many miles to cleaner? \_\_\_\_\_  
Type of cleaner: Air-screen \_\_\_\_\_ Length grader \_\_\_\_\_  
Gravity table \_\_\_\_\_ Other (name) \_\_\_\_\_ Don't know \_\_\_\_\_
8. Was seed laboratory tested? Yes \_\_\_\_\_ No \_\_\_\_\_  
Reported germination \_\_\_\_\_ % Purity \_\_\_\_\_ % Inert \_\_\_\_\_ %
9. Is this seed Certified \_\_\_\_\_ Registered \_\_\_\_\_  
Foundation \_\_\_\_\_ Hybrid \_\_\_\_\_  
Other \_\_\_\_\_ How many years from certified \_\_\_\_\_

SECTION TWO: Answer these questions for all other seed lots.

10. Additional acreage planted with other lots of the sample variety: Acres \_\_\_\_\_ Source \_\_\_\_\_
11. Other varieties to be planted in 1984:  
Variety \_\_\_\_\_ Acres \_\_\_\_\_ Source \_\_\_\_\_  
Variety \_\_\_\_\_ Acres \_\_\_\_\_ Source \_\_\_\_\_  
Variety \_\_\_\_\_ Acres \_\_\_\_\_ Source \_\_\_\_\_

SECTION THREE: Future trends.

13. What percentage of wheat seed planted five years from now (1989) do you expect to purchase? \_\_\_\_\_ %
14. Expected source of purchased seed in five (5) years:  
[Rank in order of estimated importance]  
\_\_\_\_\_ Major company dealer  
\_\_\_\_\_ Local certified seed grower/dealer  
\_\_\_\_\_ Local farmer/uncertified grower  
\_\_\_\_\_ Other [name] \_\_\_\_\_

SECTION FOUR: Cultural practices.

15. What is the row spacing of your drill? \_\_\_\_\_ inches
16. Do you soil test on a regular basis? Yes \_\_\_\_\_ No \_\_\_\_\_  
If yes, who normally runs the tests?  
Commercial lab \_\_\_\_\_ University extension \_\_\_\_\_
17. Estimated 1984 average farm wheat yield \_\_\_\_\_ bu/ac  
(Send seed analysis tag if possible)  
Check here if grower requests a copy of final survey report \_\_\_\_\_

The 662 samples received in the survey included 50 varieties, two hybrids, and two other samples reported to be mixtures of two varieties. Newton (Table 1) was the most frequently reported variety, Hawk was second, and TAM 105 was third. Larned, Arkan, Vona, Eagle, Wings, Mustang, and Scout completed the list of the 10 most used varieties, which accounted for 87 percent of all samples received. The percentage of samples of each variety closely followed the actual planted acreage of those varieties. In the 1973 survey, Scout and Eagle accounted for over 50 percent of all samples received.

Newton and TAM 105 (Figure 2) were popular varieties in all nine of the CRDs. Larned and Eagle were most popular in the western CRDs, whereas Arkan was used primarily in the eastern and central districts. Hawk was used mainly in the central and western parts of the state.

Kansas farmers are planting more varieties of wheat per farm than they did in 1973. In 1984, 41 percent planted one variety, 32 percent planted two varieties, and almost 27 percent planted three or more varieties (Figure 3). This is in contrast to the 1973 data (Figure 4), which showed that 52 percent planted just one variety. The main reason for the trend to more varieties is an increase in the number of available varieties. More diversity in variety characteristics gives the farmer the opportunity to spread his risk with different wheat types.

Table 1. Wheat varieties planted in Kansas in 1984.

Variety	% of Survey Samples	Actual % of Acreage
Newton	26.4	25.7
Hawk	17.2	12.3
TAM 105	14.5	13.4
Arkan	6.8	6.3
Larned	6.8	8.6
Vona	3.9	4.4
Eagle	3.6	4.0
Wings	2.1	1.6
Scout	2.0	3.6
Mustang	1.7	1.4
Sage	1.5	1.4
Centurk	0.9	1.1
Sandy	0.7	0.6

Figure 1. Questionnaire used to collect information on wheat seed and farming practices.

Variety	% of Samples	Variety	% of Samples	Variety	% of Samples
Newton	25	Newton	30	Newton	30
Larned	14	TAM 105	21	Hawk	15
Eagle	9	Hawk	17	TAM 105	13
Hawk	7	Arkan	9	Mustang	8
TAM 105	7	Vona	9	Wings	8
Others	38	Others	14	Others	20
Hawk	18	Newton	38	Arkan	24
TAM 105	18	Hawk	22	Newton	22
Larned	15	Arkan	12	TAM 105	14
Newton	11	TAM 105	10	Hawk	11
Eagle	10	Larned	7	Wings	11
Others	28	Others	11	Others	18
TAM 105	22	Hawk	28	Newton	32
Hawk	15	Newton	26	TAM 105	21
Larned	14	TAM 105	10	Arkan	16
Newton	12	Larned	5	Mustang	5
Eagle	10	Arkan	5	Wings	3
Others	27	Others	26	Others	23

Figure 2. Wheat varieties planted in Kansas in 1984. Note: areas outlined on maps are Crop Reporting Districts.

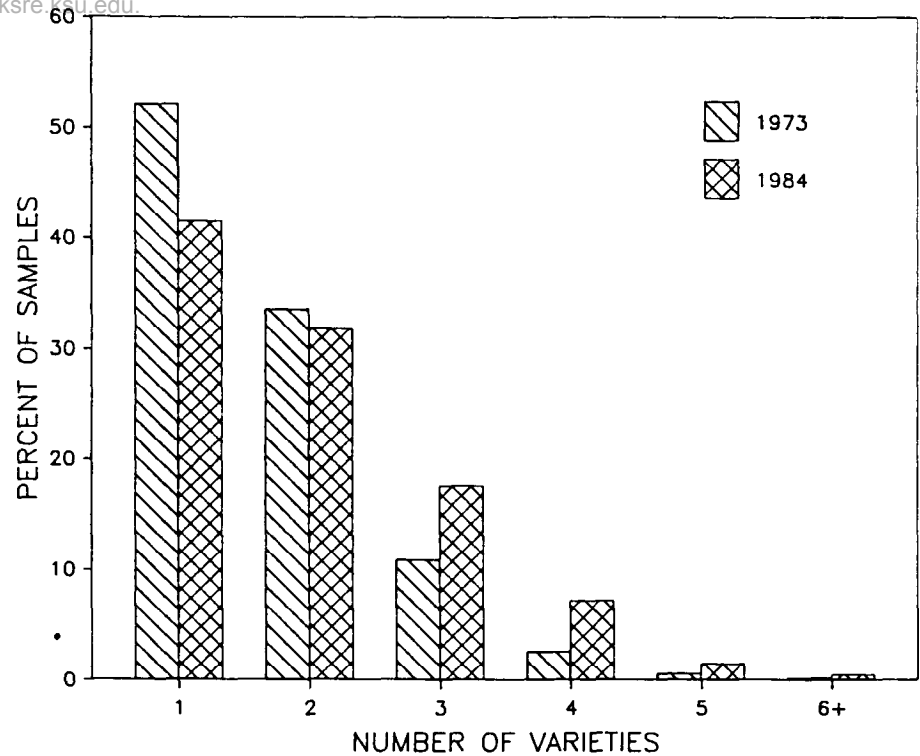


Figure 4. Number of varieties planted per farm 1984 vs. 1973.

No. Varieties Planted	% of Farms	No. Varieties Planted	% of Farms	No. Varieties Planted	% of Farms
1	42	1	31	1	54
2	42	2	39	2	31
3	12	3	16	3	13
4+	4	4+	14	4+	2
1	35	1	31	1	60
2	34	2	27	2	30
3	24	3	24	3	8
4+	7	4+	18	4+	2
1	52	1	39	1	61
2	30	2	28	2	26
3	13	3	28	3	5
4+	5	4+	8	4+	8

Figure 3. Number of varieties planted per farm in 1984.

## Type of Seed

Kansas farmers are planting more seed that is certified or closer to certified status than in 1973. Seventeen percent (Figure 5) of the 1984 samples was in one of the certified classes or a hybrid, whereas in 1973 (Figure 6) only 4 percent was in one of those classes. The eastern three crop reporting districts showed the highest use of certified seed.

Throughout the state, homegrown seed (Figure 7) was still most popular, accounting for almost 68 percent of all plantings. In contrast, 13.5 percent was purchased from farmer dealers, 12.5 percent from another farmer, and only 6.1 percent from commercial dealers. The use of homegrown seed was highest in the west where acreages are largest, and seed purchased from a farmer dealer was highest in the east where acreages and field sizes are smallest.

Homegrown seed also had the highest percentage in 1973 (Figure 8), but in 1984 about 9 percent fewer farmers were planting homegrown seed. Combining that 9 percent drop with a 6 percent decrease in seed from another farmer gives an approximate 15 percent increase in purchases of the normally higher quality farmer dealer and commercial dealer seed in 1984 compared with 1973.

Years from Certification	% of Samples	Years from Certification	% of Samples	Years from Certification	% of Samples
Cert	9	Cert	12	Cert	43
1 year	42	1 year	37	1 year	27
2 years	13	2 years	34	2 years	11
3-5 years	31	3-5 years	14	3-5 years	14
6+ years	5	6+ years	3	6+ years	3
Cert	5	Cert	20	Cert	31
1 year	35	1 year	41	1 year	37
2 years	25	2 years	19	2 years	23
3-5 years	30	3-5 years	16	3-5 years	9
6+ years	5	6+ years	4	6+ years	0
Cert	13	Cert	10	Cert	32
1 year	28	1 year	44	1 year	34
2 years	20	2 years	27	2 years	20
3-5 years	25	3-5 years	18	3-5 years	14
6+ years	14	6+ years	1	6+ years	0

Figure 5. Class of wheat planted in Kansas in 1984.

Source	% of Samples	Source	% of Samples	Source	% of Samples
Homegrown	75	Homegrown	74	Homegrown	50
Another farmer	11	Another farmer	9	Another farmer	13
Farmer/dealer	12	Farmer/dealer	11	Farmer/dealer	24
Commercial/dealer	2	Commercial/dealer	6	Commercial/dealer	13
Homegrown	77	Homegrown	69	Homegrown	58
Another farmer	14	Another farmer	10	Another farmer	14
Farmer/dealer	4	Farmer/dealer	16	Farmer/dealer	17
Commercial/dealer	5	Commercial/dealer	5	Commercial/dealer	11
Homegrown	62	Homegrown	65	Homegrown	68
Another farmer	15	Another farmer	19	Another farmer	3
Farmer/dealer	19	Farmer/dealer	12	Farmer/dealer	11
Commercial/dealer	4	Commercial/dealer	4	Commercial/dealer	18

Figure 7. Source of wheat seed, 1984.

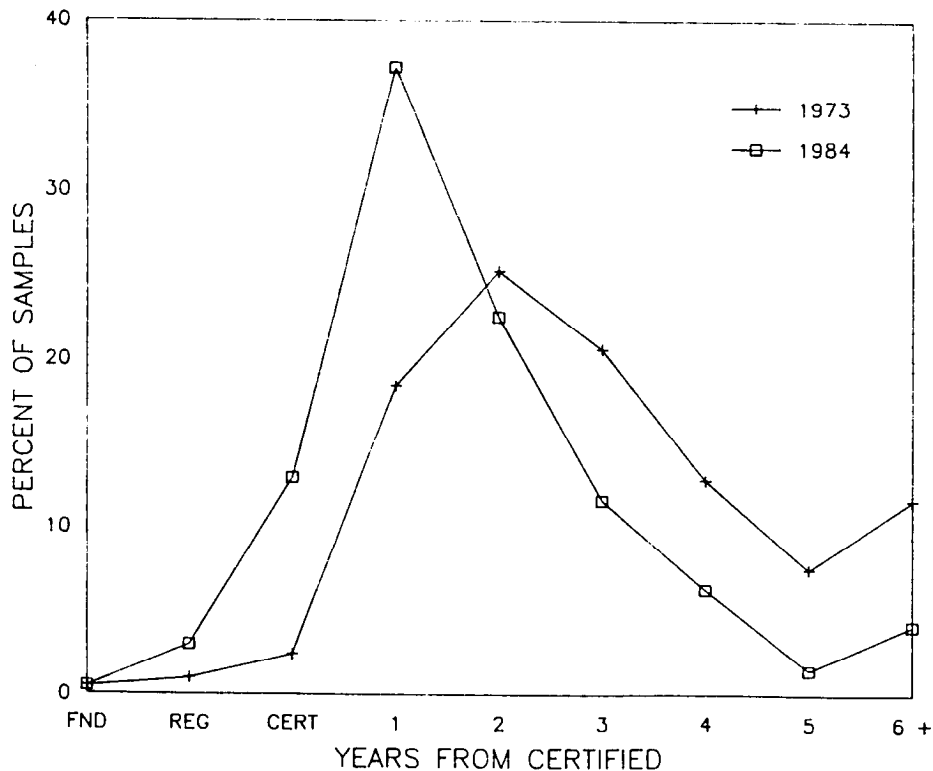


Figure 6. Certification status of seed samples 1984 vs. 1973.

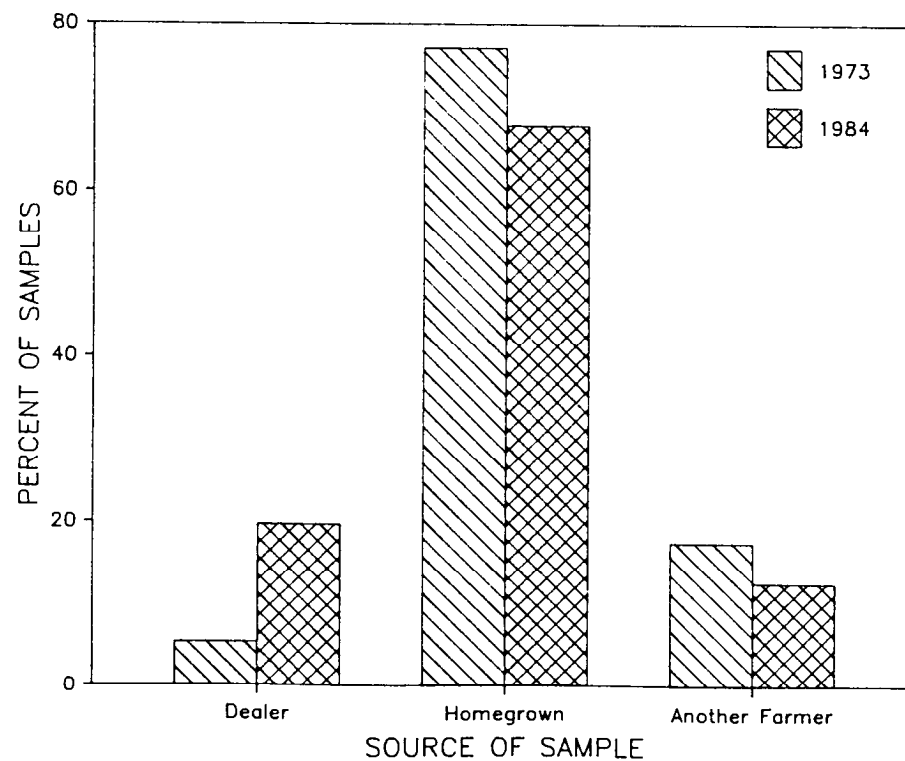


Figure 8. Source of seed 1984 vs. 1973.

## Treatment of Seed

The central part of the state, especially the north central and central districts, showed the highest percent of seed cleaned (Figure 9). There was no difference in percent of samples cleaned between the eastern one-third and the western one-third of the state. Eighty-three percent of samples received in this survey was cleaned before planting. This is an increase of 4.3 percent from 1973 (Figure 10), when 78.2 percent was cleaned prior to planting.

Fungicide was used as a seed treatment on 36 percent of the samples, almost identical to 1973. The western part of the state showed lowest fungicide use (Figure 9). The rest of the state showed nearly a 50 percent use of fungicide. Central Kansas fungicide use paralleled that of 1973, but use in the east almost doubled in the span of 11 years.

Insecticide use (Figure 9) dropped from 20 percent of samples in 1973 to 13 percent in the current survey. The central part of the state showed less insecticide use than did the east or the west. There is some doubt about the accuracy of these figures, because farmers were not always sure if the seed treatment used was insecticide or fungicide.

## Seed Testing

Testing of the seed before planting gives an indication of its quality. Only 18 percent of samples received (Figure 9) had been laboratory tested for germination and/or mechanical purity before planting. Laboratory testing before planting was lowest in the western and highest in the eastern parts of the state. Although a laboratory test was not performed, many farmers indicated that their seed was tested at home.

Management Practice	% of Farmers	Management Practice	% of Farmers	Management Practice	% of Farmers
Cleaned	80	Cleaned	91	Cleaned	81
Fungicide	28	Fungicide	51	Fungicide	36
Insecticide	25	Insecticide	10	Insecticide	11
Seed test	7	Seed test	18	Seed test	38
Cleaned	80	Cleaned	91	Cleaned	74
Fungicide	28	Fungicide	55	Fungicide	58
Insecticide	8	Insecticide	13	Insecticide	26
Seed test	4	Seed test	18	Seed test	43
Cleaned	75	Cleaned	82	Cleaned	78
Fungicide	12	Fungicide	26	Fungicide	52
Insecticide	8	Insecticide	10	Insecticide	29
Seed test	16	Seed test	14	Seed test	29

Figure 9. Seed management practices of sampled farmers, 1984.

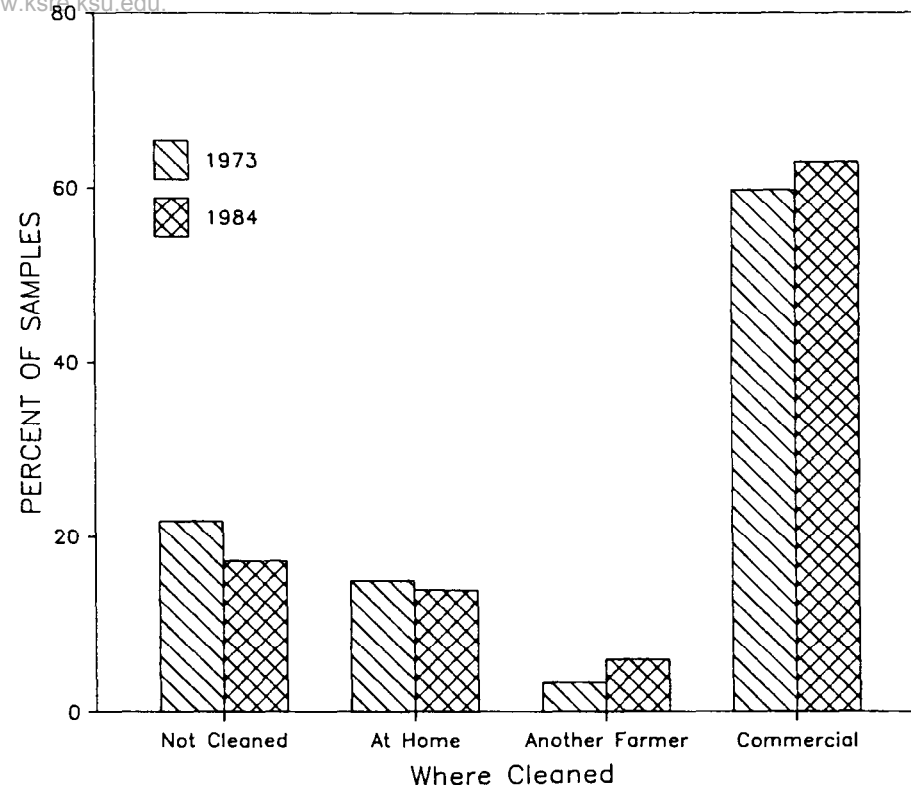


Figure 10. Seed cleaning 1984 vs. 1973.

## Germination

The western part of the state had samples with highest germination rate. Statewide, 64 percent showed a germination rate between 95 and 100 percent, and another 27 percent was between 90 and 95 percent (Figure 11). Only six of the samples received were found to have a germination rate of less than 80 percent. This is in contrast to the 1973 survey (Figure 12), in which 35 percent of the seed showed a germination rate of 90 percent or less.

## Mechanical Purity

Mechanical purity of the seed ranged from near 100 percent to less than 75 percent. Over 44 percent of samples (Figure 13) was between 99 and 100 percent pure, whereas 48 samples, or 7.1 percent, were less than 95 percent pure, and 7 samples (1.0 percent) were below 90 percent. When comparing mechanical purity of samples, 58 percent of the 1984 samples and only 38 percent of 1973 samples had purity of 98.5 percent or greater (Figure 14). The highest purity seed came from eastern Kansas, but in 1973 only 65 percent of the seed from that part of the state was 98.5 percent pure or greater, compared with 81 percent in 1984.

Germination %	% of Samples	Germination %	% of Samples	Germination %	% of Samples
95-100	80	95-100	52	95-100	59
90-94.9	10	90-94.9	37	90-94.9	28
80-89.9	8	80-89.9	11	80-89.9	3
<80	2	<80	0	<80	3
95-100	65	95-100	54	95-100	59
90-94.9	25	90-94.9	33	90-94.9	30
80-89.9	8	80-89.9	13	80-89.9	8
<80	2	<80	0	<80	3
95-100	71	95-100	75	95-100	58
90-94.9	26	90-94.9	20	90-94.9	23
80-89.9	2	80-89.9	5	80-89.9	8
<80	1	<80	0	<80	2

Figure 11. Laboratory germination rate of seed samples, 1984.

% Mechanical Purity	% of Samples	% Mechanical Purity	% of Samples	% Mechanical Purity	% of Samples
99-100	33	99-100	34	99-100	79
97-98.9	51	97-98.9	40	97-98.9	18
95-96.9	8	95-96.9	16	95-96.9	3
<95	8	<95	10	<95	0
99-100	22	99-100	59	99-100	73
97-98.9	48	97-98.9	24	97-98.9	16
95-96.9	23	95-96.9	12	95-96.9	8
<95	7	<95	5	<95	3
99-100	38	99-100	45	99-100	55
97-98.9	38	97-98.9	38	97-98.9	32
95-96.9	15	95-96.9	7	95-96.9	5
<95	9	<95	10	<95	8

Figure 13. Mechanical purity of seed samples, 1984.

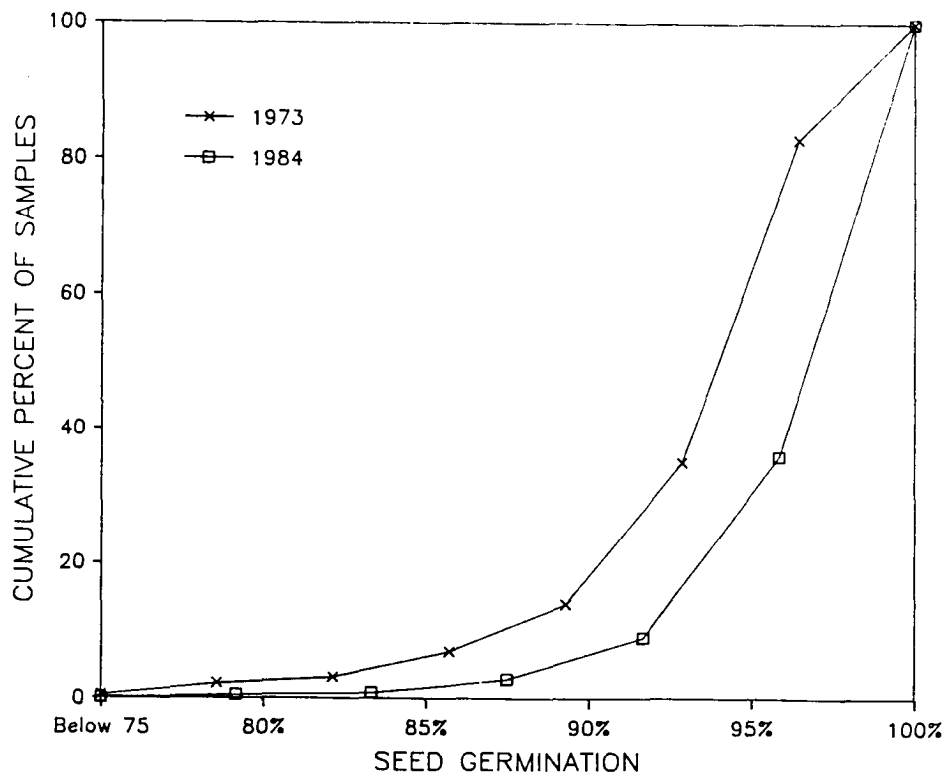


Figure 12. Germination percentage of seed samples 1984 vs. 1973.

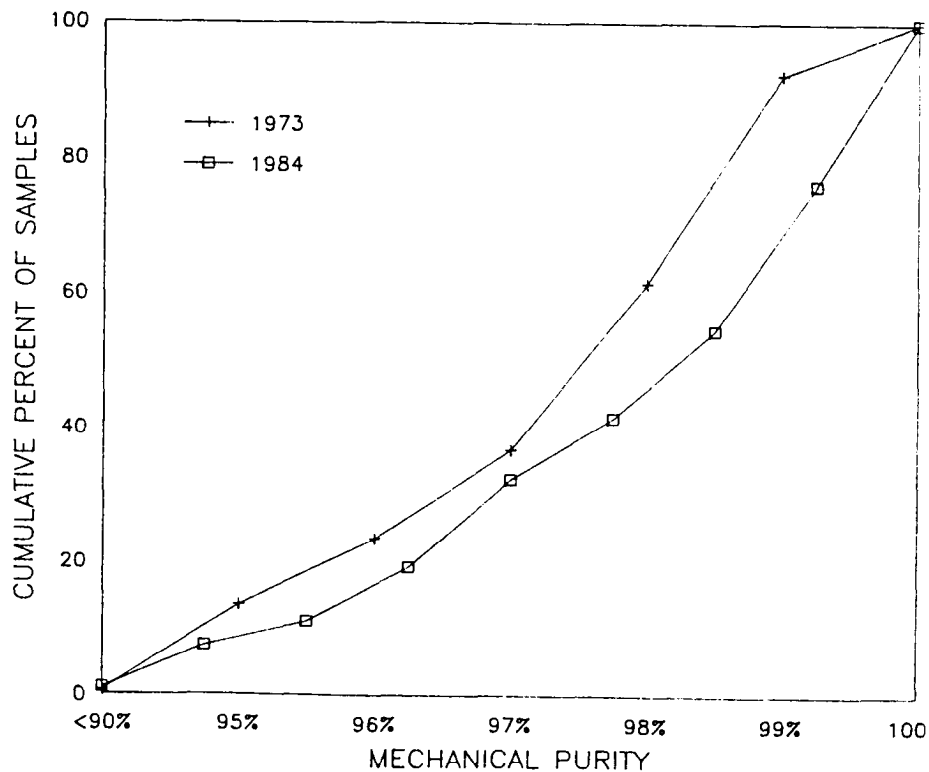


Figure 14. Mechanical purity of seed samples 1984 vs. 1973.



## Inert Material

Absence of inert material makes for higher mechanical purity, and the 1984 survey showed a trend toward cleaner seed with less inert material than in 1973. Sixty-two percent of the 1984 samples contained less than 1.5 percent inert material, whereas in 1973, only 40 percent contained that amount. The eastern one-third of the state had less inert material, corresponding to the high purity of seed. The northeast district had the lowest amount, with 64 percent of its samples having 0.5 percent or less inert material.

## Weed Seeds

Weed seed is a second component of mechanical purity. Weed seeds appeared in 14 percent more samples in 1984 than in 1973. In 1973, 15 percent of the samples contained weed seeds. In 1984, 17 percent of the samples in the western, 39 percent in the central, and 34 percent in the eastern part of the state contained weed seeds (Figure 15). All three areas showed increases over the 1973 survey. Chess was the most commonly found weed seed, in 15.8 percent of all samples, compared with 10 percent of all samples in the 1973 survey. Chess (Figure 16) was the most common weed seed in all CRDs except the northwest, where downy brome was most common. Cheat was found in 7.7 percent of samples, but only from the eastern two-thirds of the state. The third most common weed, pennycress, was also found mainly in eastern districts. Twelve samples contained seed of the prohibited noxious weed, field bindweed, but none was found in the eastern one-third of the state. Table 2 lists the weed seeds found in 1984 wheat samples.

Thirty samples (4.5 percent) received in the 1984 survey (Figure 15) were found to have weed seeds beyond the level dictated by the state seed law. Twelve samples (1.8 percent) contained prohibited noxious weed seeds, 17 contained excessive amounts of restricted noxious weed seeds, and one sample contained more than 2 percent of total weed seeds. Of those 30 samples, 20 were from the central one-third of the state and only two were from the west.

## Seeds of Other Crops

The third component of mechanical purity is the presence of seed of other crops. Almost 10 percent of the samples (Figure 15) contained other crop seeds, with sorghum being the most predominant. Rye, which can be a problem in wheat seed, was found in only two samples, both from the north central district.

Impurity Present	% of Samples	Impurity Present	% of Samples	Impurity Present	% of Samples
Weed seeds	22	Weed seeds	43	Weed seeds	21
Other crops	3	Other crops	13	Other crops	21
Unsaleable	0	Unsaleable	10	Unsaleable	5
Weed seeds	15	Weed seeds	32	Weed seeds	38
Other crops	3	Other crops	13	Other crops	3
Unsaleable	1	Unsaleable	8	Unsaleable	14
Weed seeds	15	Weed seeds	34	Weed seeds	45
Other crops	3	Other crops	9	Other crops	23
Unsaleable	1	Unsaleable	1	Unsaleable	3

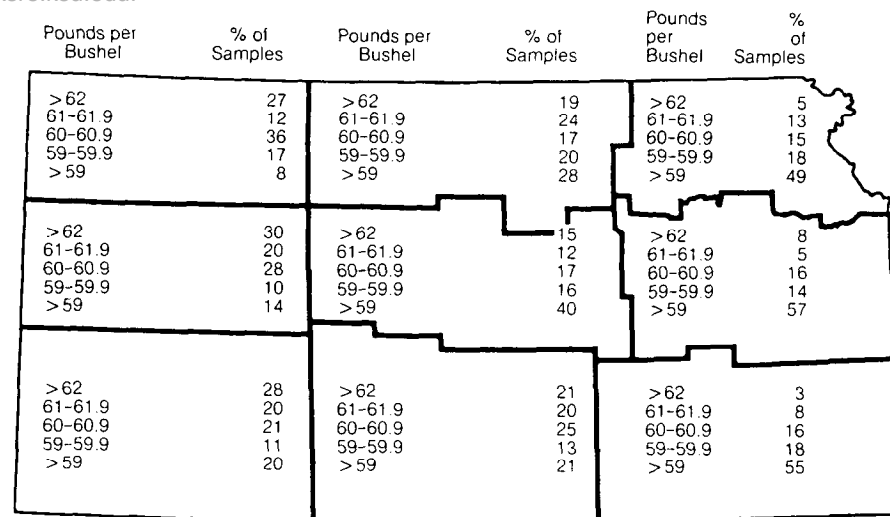
Figure 15. Impurities in seed samples, 1984.

Weed	% of Samples	Weed	% of Samples	Weed	% of Samples
Downy brome	19	Chess	26	Chess	18
Chess	12	Pennycress	18	Pennycress	15
		Cheat	12	Cheat	8
		Wild buckwheat	11	Wild buckwheat	5
		Downy brome	7		
Chess	8	Cheat	13	Chess	22
		Chess	13	Pennycress	22
		Pennycress	9	Wild buckwheat	5
		Wild buckwheat	6		
Chess	5	Chess	21	Chess	26
		Cheat	11	Cheat	21
				Dock	16
				Wild buckwheat	11
				Pennycress	5
				Jointed goatgrass	5

Figure 16. Common weed species in seed samples, 1984.

**Table 2. Weeds species whose seeds were present in Kansas wheat samples, 1984.**

Category	Common Name	Scientific Name
Prohibited Noxious Weeds	Field Bindweed	<i>Convolvulus arvensis</i> L.
	Musk Thistle	<i>Carduus nutans</i> L.
Restricted Noxious Weeds	Cheat	<i>Bromus secalinus</i> L.
	Chess	<i>Bromus commutatus</i> Schrad.
	Curled Dock	<i>Rumex crispus</i> L.
	Dodder	<i>Cuscuta</i> spp.
	Downy Brome	<i>Bromus tectorum</i> L.
	Giant Foxtail	<i>Setaria faberi</i> Herrm.
	Hedge Bindweed	<i>Convolvulus sepium</i> L.
	Jointed Goatgrass	<i>Aegilops cylindrica</i> Host
	Pennycress	<i>Thlaspi arvense</i> L.
	Wild Buckwheat	<i>Polygonum convolvulus</i> L.
	Common Weeds	Barnyardgrass
Cleaver		<i>Galium aparine</i> L.
Cranesbill		<i>Geranium carolinianum</i> L.
Lambsquarters		<i>Chenopodium album</i> L.
Little Barley		<i>Hordeum pusillum</i> Nutt.
Peppergrass		<i>Lepidium</i> spp.
Pigweed		<i>Amaranthus retroflexus</i> L.
Vetch		<i>Vicia</i> spp.



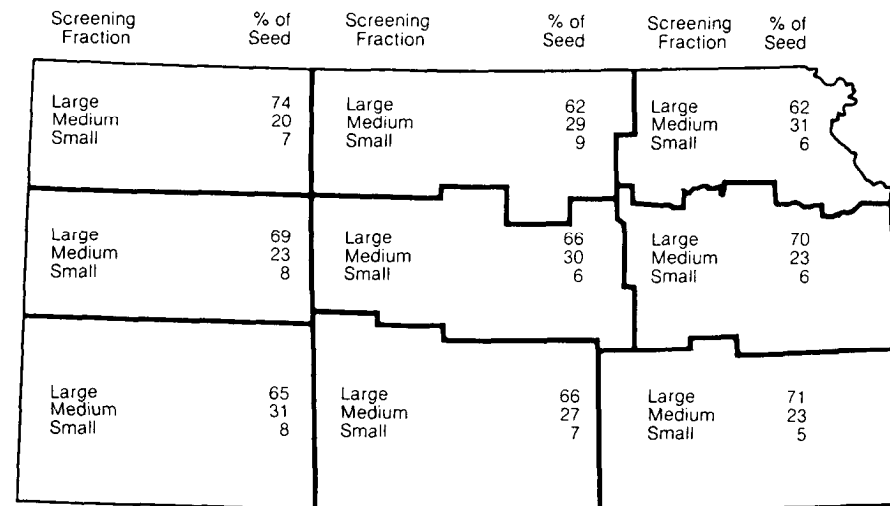
**Figure 17. Bushel test weight of seed samples, 1984.**

## Test Weight

Over 20 percent of the samples received had a bushel test weight between 60 and 61 pounds per bushel, and 56 percent of all samples was at or above 60 pounds/bushel. The test weights (Figure 17) were heaviest in the west and lightest in the east.

## Seed Size

One method of determining seed size is to look at three screening fractions. Seed falling into the large (>6/64) category ranged from 62 percent in northeast Kansas to 74 percent in the northwest (Figure 18). The middle fraction comprised between 20 and 31 percent and the small (<5/64) between 5 and 9 percent, with no major differences among districts.



**Figure 18. Average percent of seed in large (retained on a 6/64" by 3/4" slot screen), medium (through a 6/64" by 3/4" but retained on a 5/64" by 3/4" slot screen), and small (through a 5/64" by 3/4" slot screen) screening fractions, 1984.**

## Protein Content

Analysis of the samples for protein showed levels that centered around 11-12 percent, ranging from 8.3 to 16.5 percent protein (Figure 19).

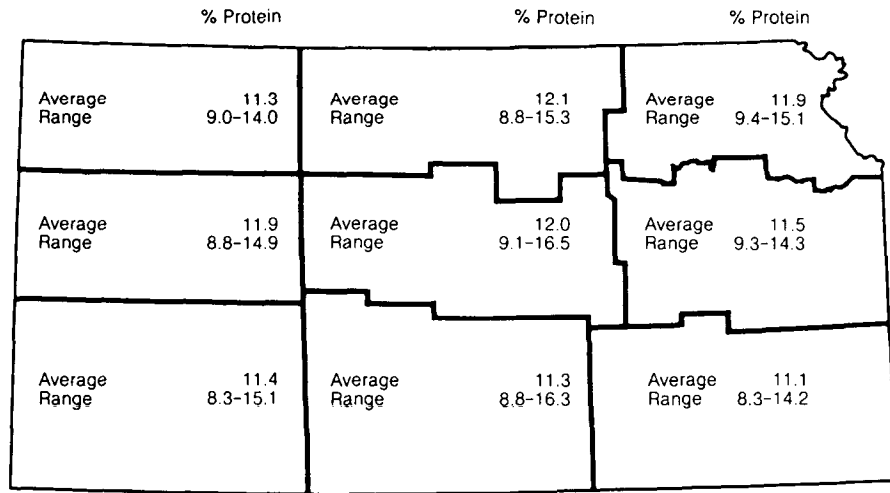


Figure 19. Average and range of protein percentage of seed samples, 1984.

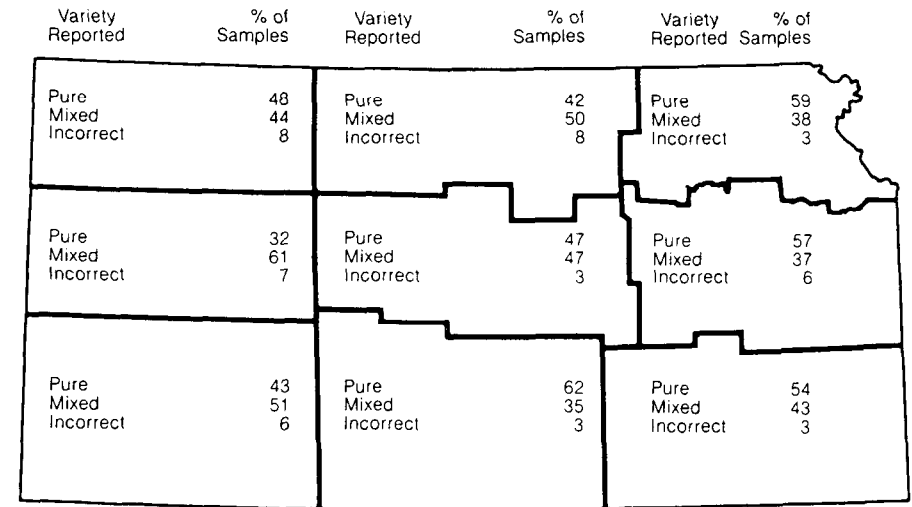


Figure 20. Varietal purity of seed samples, 1984.

## Varietal Purity

Approximately one-half of the samples contained some type of varietal impurity and 6 percent of the samples was reported as the wrong variety. The south central district showed the highest percentage of pure seed, whereas the north central and northwest districts had the highest amount of incorrect samples (Figure 20).

Seed certification was developed as a method of ensuring varietal purity. The percentage of varietal-pure lots (Table 3) was highest in the certified class and purity dropped off as seed was further from certified. The percentage of incorrect lots increased each year that the seed was further from certified. This shows the importance of the seed certification system to ensure the varietal purity of seed being planted. In the 1973 survey, 57.9 percent of the noncertified samples was pure as compared with 46.6 percent in this survey; approximately 6 percent of noncertified samples in each survey was incorrect.

Age of the variety can also have an effect on varietal purity. Seed released for production in 1983 and 1984 showed no incorrect labeling (Table 4), whereas seed that has been on the market for three or more years showed percentages of incorrect samples varying from 3 to 18.

Table 3. Varietal purity of seed samples as affected by certified status.

Variety Reported	Certified	Years from Certification				
		1	2	3-4	5-10	10+
—% of samples—						
Pure	59.6	54.6	40.2	39.0	42.3	42.9
Mixture	39.3	42.0	53.3	53.7	42.3	28.6
Incorrect	1.1	3.4	6.6	7.4	15.4	28.6

Table 4. Varietal purity of seed samples as affected by age of variety.

Variety	Years Variety Has Been on the Market					
	1-2	3-4	5-6	7-10	11-15	16+
—% of samples—						
Pure	56.7	52.8	28.3	53.4	52.2	43.8
Mixture	43.3	40.9	64.6	43.4	34.8	37.5
Incorrect	0.0	6.3	9.1	3.2	13.1	18.8

## Other Factors

Other information gathered indicated that most wheat is raised in a summer-fallow planting system and continuous cropping is the second most popular system. Most custom cleaning is done within 10 miles of the farmer's home. Most farmers are planning to purchase a larger percentage of seed in five years, and that seed is more likely to be a certified variety or hybrid. Drill row spacing tends to be wider in the west and narrower in the east.

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State Seed Testing Laboratory  
South Central Kansas Experiment Field

## SUMMARY

1. Newton was the most popular variety and the top 10 varieties accounted for 87 percent of all samples.
2. Fifty-nine percent of farmers planted more than one variety in 1984, whereas in 1973, 48 percent planted more than one variety.
3. Seventeen percent of seed planted in 1984 was certified, in contrast to 4 percent in 1973.
4. Homegrown seed was still most popular (68 percent of samples), but dealer seed use had increased 15 percent since 1973.
5. Eighty-three percent of samples was cleaned, or almost 5 percent more than in 1973.
6. Thirty-six percent of seed samples was treated with fungicide, a figure almost identical to 1973; insecticide use dropped from 20 percent to 13 percent of samples in that same period.
7. Only 18 percent of samples had been laboratory tested for germination before planting.
8. Ninety-one percent of samples had a germination rate of 90–100 percent, whereas in 1973, only 68 percent showed a germination rate greater than 90 percent.
9. Forty-one percent of the samples had a mechanical purity of 99 percent or greater and only 7.1 percent was less than 95 percent pure.
10. Twenty-nine percent of samples contained weed seeds, whereas in 1973, only 15 percent contained weeds.
11. Thirty samples (4.5 percent) had weed contamination that was above the tolerances of the state seed law.
12. Fifty-six percent of samples had a bushel test weight of 60 pounds/bushel or greater, with a range of weights from 55 to 65 pounds/bushels.
13. Protein percentage centered about 11-12 percent, with a range of 8.3 to 16.5 percent.
14. Half of the samples contained some degree of varietal impurity.
15. Certified seed of newly released varieties had the best varietal purity.



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