BULLETIN 175 JULY 1918

The University of Minnesota

AGRICULTURAL EXPERIMENT STATION

FOURTH ANNUAL SEED LABORATORY REPORT 1916-1917

BY

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DIVISION OF PLANT PATHOLOGY AND BOTANY

UNIVERSITY FARM, ST. PAUL

LETTER OF TRANSMITTAL

Minneapolis, Minn., March 30, 1918

To His Excellency, J. A. A. Burnquist,
Governor of Minnesota.

Sir:

I have the honor to transmit to you herewith the third annual report of the Seed Laboratory of the Minnesota Agricultural Experiment Station, for the year ending July 31, 1917. The report is prepared in accordance with the requirements of Chapter 141, H. F. 95, General Laws of Minnesota for 1913, entitled, "An Act to Regulate the Selling, Offering or Exposing for Sale, of Agricultural Seeds in this State and Providing Penalties for Violating the Same." The report will be published as a bulletin of the Agricultural Experiment Station.

Respectfully,
MARION LEROY BURTON,
President of the University of Minnesota.

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FOURTH ANNUAL SEED LABORATORY REPORT

By R. C. Dahlberg and W. L. Oswald

INTRODUCTION

During the year 1916-1917, 10,967 samples of seed were voluntarily sent in to the seed laboratory for testing as to purity or germination, or both. This represents an increase of approximately fifteen per cent over the number sent in during the preceding year. Figure 1 graphically depicts the number of samples received each year since the establishment of the seed-testing laboratory in 1909. These samples were received from both farmers and seedsmen. Most of them were sent in by farmers. The activities of the laboratory have been almost wholly confined to the analysis of these samples. The large number has made it impossible to carry on any organized seed inspection work. The educational feature of the work and the value of using only tested seed for planting has been emphasized whenever possible.

SOURCES OF SAMPLES

Table I shows the number of samples of seed sent in for testing by the various counties. Fully 60 per cent of these were received from farmers. The impetus given to seed-testing work by county agents is very apparent.

TABLE I

Samples Received, by Counties

Name	1913–14	1916–17	Name	1913–14	1916–17
Aitkin	63	123	Dodge	11	17
Anoka	31	27	Douglas	39	46
Becker	48	64	Faribault	38	67
Beltrami	6	17	Fillmore	32	72
Benton	2	12	Freeborn	85	268
Big Stone	15	338	Goodhue	96	248
Blue Earth	55	152	Grant	248	278
Brown	109	66	Hennepin	622	1439
Carlton	14	6	Houston	23	42
Carver	86	30	Hubbard	10	9
Cass	11	33	Isanti	23	42
Chippewa	24	144	Itaska	5	96
Chisago	41	101	Jackson	10	58
Clay	33	90	Kanebec	8	108
Clearwater	23	24	Kandiyohi	11	70
Cook	19	0	Kittson	10	88
Cottonwood	16	14	Koochiching	0	10
Crow Wing	43	89	Lac qui Parle	6	99
Dakota	55	83	Lake	0	0

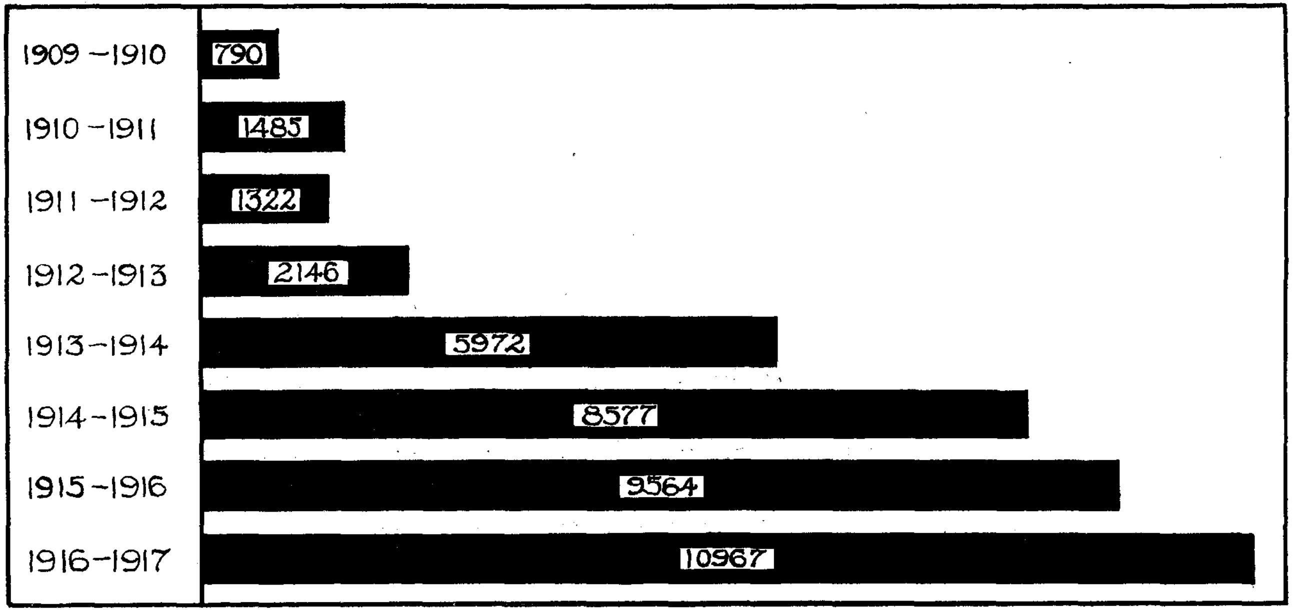

Fig. 1. Increase in Number of Samples Sent to Seed Laboratory
The seed law went into effect in 1913.

TABLE I—*Continued*

SAMPLES RECEIVED, BY COUNTIES

Name	1913–14	1916–17	Name	1913–14	1916–17
Le Sueur	26	45	Redwood	24	56
Lincoln	13	19	Renville	81	592
Lyon	33	77	Rice	267	497
McLeod	62	141	Rock	20	39
Mahnomen	0	10	Roseau	8	28
Marshall	45	139	St. Louis	54	94
Martin	26	33	Scott	22	25
Meeker	15	86	Sherburne	126	118
Mille Lacs	21	32	Sibley	18	37
Morrison	18	36	Stearns	54	105
Mower	26	17	Steele	175	217
Murray	14	24	Stevens	30	41
Nicollet	6	32	Swift	76	307
Nobles	12	41	Todd	22	65
Norman	22	97	Traverse	8	388
Olmsted	57	48	Wabasha	65	66
Otter Tail	136	197	Wadena	40	13
Pennington	35	70	Waseca	19	47
Pipestone	14	17	Washington	106	274
Pine	57	81	Watonwan	8	15
Polk	92	115	Wilkin	15	83
Pope	77	53	Winona	19	46
Ramsey	590	717	Wright	172	235
Red Lake	9	60	Yellow Medicine	42	124

In a few counties, notably Washington, Goodhue, Freeborn, Renville, Swift, Pipestone, and Traverse, well-organized testing campaigns were started by the county agents. In many of these cases the samples were obtained as a result of a campaign in which the school children coöperated. That such work creates a lasting impression is illustrated in the case of Grant County. During the year 1914-1915, because of the activity of the county agent, 962 samples of seed were received from this county for testing. The following two years were not characterized by any extraordinary activity on the part of the agent in regard to seed testing, nevertheless the number of samples sent in by Grant County in 1916-1917 was surpassed only by those counties in which seed companies were located, or in which special seed campaigns were instituted by the county agent.

INSPECTION WORK

Very little inspection work was carried on during the year 1916-1917, owing to the large number of samples voluntarily sent in for testing. Two complaints of improperly labeled seeds were investigated. A lot of red clover seed not properly labeled was sold at Roseau to go to the southeastern part of the state. Upon analysis it was found that it was not only not properly labeled, but that it contained seeds of both Canada thistle and perennial sow thistle, two very noxious and extremely serious weed pests. Prosecution was started and the seller was found guilty and penalized according to the provisions of the seed law. The southern part of the state is practically free from perennial sow thistle and the quantity of Canada thistle is also small in most localities. Every effort should be made to keep this part of the state as nearly free as possible from such noxious weeds.

The second complaint came from Hanley Falls. It concerned a mixture of alsike and timothy seed of very low quality which had been sold unlabeled by a seed company of Iowa doing a large mail order business in Minnesota on the basis of extensive advertisements in the farm papers. The seed was advertised at a very low price and was represented as high-class. Since such mail order sales were technically made in Iowa, it was impossible to enter legal proceedings against the company, the state law having jurisdiction only over sales made within the state. As an illustration of what a farmer may expect from such "cheap" seed the results of the analysis of this much advertised seed are given in detail. The farmer may judge for himself whether it pays to buy such seed.

ANALYSIS OF TIMOTHY AND ALSIKE

(Advertised at $4 per bushel)

Purity, 81.58 per cent—Alsike, 10.12 per cent; Timothy, 71.46 per cent.
Germination of Alsike clover, 44 per cent.
Germination of timothy, 84 per cent.

Weed Seeds Present in Sample

OX-EYED DAISY
CANADA THISTLE
PERENNIAL SOW THISTLE
Wormseed mustard
Wormwood sp.
Five-stamened cinquefoil
Eragrostis grass
Smartweed
Prickly lettuce
Aster sp.
Small crabgrass
Motherwort
Yellow trefoil
Virginia plantain
White vervain
Knotweed
Beaked panicum
Black mustard
Wild barley
Heal-all
Barnyard grass
Catnip
Cyperus sp.
Avens sp.
Creeping spike rush
Bladder campion
Spotted spurge
Tumbling mustard
Cinquefoil
Evening primrose
Black-seeded plantain
Common plantain
Peppergrass
Wild peppergrass
Sheep sorrel
Mouse-ear chickweed
Brown-eyed Susan
Water hoarhound
Panic grass sp.
Mayweed
Buckthorn plantain
Low hop clover
Night-flowering catchfly
Smooth hawksbeard
Hare figwort
Spreading figwort
Rough pigweed
Tickle grass
Lamb's quarters
Shepherd's purse
Horsemint
Green foxtail
Lady's thumb
Bracted plantain

Legume sp.	Tall five-finger
Yellow wood sorrel	Wood sage
Northern bedstraw	Curled dock
Loosestrife	Sleepy catchfly
Round-leaved buttercup	Wintercress
Grass sp.	Pink sp.
Spiny sow thistle	Blue vervain
Reed meadow grass	Reed meadow grass
Pinweed	Canada milk vetch
Small-seeded false flax	Sandwort
Grooved yellow flax	Milkwort
Speedwell sp.	Wild mustard
Dandelion	Saint-John's-wort
Pennyroyal	Common speedwell
Blue vervain	Slender rush
Large crabgrass	Yarrow
Fireweed sp.	Mullein
Mexican tea	Forget-me-not
Wild bergamot	Blue lettuce
Hedge mustard	Cress

While the seed laboratory had no legal jurisdiction over this particularly flagrant case, vigorous action was taken with distinctly positive results. The seed laboratory, with the coöperation of the farm papers, made public through these papers the facts in the case as based upon the analysis. When this information was published, the advertising associations immediately took up the matter and suspended the guilty company from their advertising privileges for some time. The mail-order company, through its representative, after vainly trying to get the seed laboratory to retract the statements previously published, finally promised to send seed into the state only after complying with the labeling and sale regulations of the seed law. While no legal proceedings were possible, the net result was perhaps even more beneficial than the ordinary fine. The hearty coöperation of the farm papers in insisting on clean and honest advertising was especially helpful.

TESTS FOR PURITY

Table II gives the average percentage of purity of crop seeds for the year 1916-1917. The average purity for the preceding three years is also given for comparison. In the column headed "Samples too small for purity test," is noted the number of samples of each kind of seed which were so small that it was deemed inadvisable to make a purity test. The number of such samples was particularly large in the case of the cereals. It is impossible to obtain accurate, reliable, and representative results from a sample that is too small. Attention is called to the "Rules for Seed Testing" adopted by the Association of Official Seed Analysts of North America. A paragraph dealing with the size of sample reads as follows:

"The minimum weight of seed forwarded for test should be approximately:

"(a) One ounce of grass seed of any kind or of white and alsike clover.

"(b) Two ounces of red and crimson clover, alfalfa, millet, flax, or seed of like size.

"(c) One half pound of cereals or seed of like size."

In common terms, the quantity should range from a heaping single handful of the smallest seed to a heaping double handful of the cereals. It is a waste of time and energy to send in a sample that is too small for proper test.

TABLE II

SUMMARY OF PURITY TESTS FOR 1913-1914, TO 1916-1917

Kind of seed	Samples		Average purity	
	Number received 1916–17	No. too small for purity test 1916–17	1913–14 1914–15 1915–16	1916–17
			Per cent	Per cent
Alfalfa	294	29	96.7	96.38
Barley	406	115	96.1	94.9
Bluegrass, Kentucky	36	1	84.9	85.8
Brome grass	29	4	86.8	88.08
Buckwheat	49	10	97.8	98.58
Cane	23	16	97.4	97.5
Clover, alsike	150	4	91.0	92.0
Clover, red	1,461	58	92.96	95.35
Clover, crimson	1	0	98.5	98.72
Clover, sweet	54	1	94.56	96.47
Clover, white	31	1	91.13	90.34
Creeping bent grass	2	0	.....	74.65
Crested dog's tail	1	0	97.5	94.88
Emmer	17	6	95.19	89.03
Flax	127	17	95.9	94.13
Fescue	12	1	95.1	96.27
Johnson grass	1	0	.....	95.13
Lawngrass	16	0	87.9	89.9
Millet	220	5	95.73	95.15
Oats	562	254	97.63	95.63
Orchard grass	4	0	88.1	83.48
Ryegrass, Italian	2	0	95.3	93.98
Ryegrass, perennial	9	1	97.5	98.1
Rape	21	1	99.6	99.84
Redtop	46	0	84.8	84.18
Rye	37	16	97.0	97.14
Slender wheat grass	11	3	89.77	93.34
Sudan grass	9	2	98.67	96.02
Timothy	819	18	96.0	95.0
Vetch	9	3	98.03	97.9
Wheat	824	373	95.83	96.14

GERMINATION TESTS

Approximately ten thousand six hundred samples of seed were tested for germination during the year. The results are given in Tables III to VI, inclusive. The average germination for 1916-1917 is given in the second column and may be compared with the average germination for the preceding three years, given in the first column. In the case of the clovers, Table III, the percentage of germination was somewhat lower for 1916-1917 than the average for the preceding years.

The cereals of the crop of 1916-1917, Table IV, all proved to be lower in germination than those of the three years previous, especially the wheat. This was due entirely to the rust and drought at the close of the growing season.

The vegetable seed, Table VI, it will be noted are all rather low in germination. Fresh vegetable seed are not ordinarily so low in percentage of germination as indicated. Many samples of old seed are, however, received for testing each year and this tends to bring down the average.

TABLE III

GERMINATION TESTS OF ALFALFA AND CLOVERS FOR 1913-1914 TO 1916-1917

Kind of seed	Samples received 1916–17	Average germination		Hard seeds	
		1913–14 1914–15 1915–16	1916–17	1913–14 1914–15 1915–16	1916–17
		Per cent	Per cent	Per cent	Per cent
Alfalfa	327	76	70	17	21
Clover, alsike	246	81	74	13	15
Clover, red	1,545	80	77	13	15
Clover, crimson	1	78	83	2	0
Clover, sweet	62	50	63	35	24
Clover, white	38	76	73	18	20

TABLE IV

GERMINATION TESTS OF GRAIN AND FORAGE CROP SEEDS FOR 1913-1914 TO 1916-1917

Kind of seed	Samples received 1916-17	Average germination 1913-14 1914-15 1915-16	Average germination 1916-17
		Per cent	Per cent
Barley	586	91	88
Bluegrass, Kentucky	51	57	68
Brome grass	28	73	72
Buckwheat	60	89	92
Corn (field)	1,220	91	86
Creeping bent grass	2	68	62
Crested dog's-tail	1	63	55
Emmer	23	89	80
Fescue	15	69	69
Flax	147	87	85
Mangel	51	63	67
Millet	245	77	78
Oats	875	89	88
Orchard grass	4	49	64
Peas, field	9	56	89
Rape	32	89	92
Redtop	47	79	85
Rye	109	83	75
Rye grass, Italian	...	59	..
Rye grass, perennial	24	76	73
Slender wheat grass	3	81	73
Sorghum and amber cane	44	70	71
Soy bean	1	82	23
Sudan grass	11	86	76
Timothy	966	87	86
Vetch	12	69	71
Wheat	1,337	88	79
Wood meadow grass	...	75	..

TABLE V

GERMINATION TESTS OF HERBS FOR 1913-1914 TO 1916-1917

Kind of seed	Samples received 1916-17	Average germination 1913-14 1914-15 1915-16	Average germination 1916-17
		Per cent	Per cent
Caraway	1	49	9
Cress	4	31	33
Dill	11	34	26
Lavender	3	14	15
Sage	8	49	28
Savory	6	28	20
Thyme	4	36	30
Miscellaneous	24	37	49

TABLE VI

GERMINATION OF VEGETABLE SEEDS FOR 1913-1914 TO 1916-1917

Kind of seed	Samples received 1916–17	Average germination 1913–14 1914–15 1915–16	Average germination 1916–17
		Per cent	Per cent
Asparagus	11	68	56
Bean	108	89	81
Beet	123	65	70
Brussels sprouts	6	42	70
Broccoli	4	48	77
Cabbage	128	67	54
Carrot	91	57	51
Cauliflower	20	73	59
Celeriac	7	..	62
Celery	47	58	51
Citron	7	74	74
Collard	...	65	..
Cucumber	72	80	75
Egg plant	14	52	41
Endive	15	73	47
Gourd	11	69	74
Ground cherry	2	23	63
Kale	11	25	67
Kohl-rabi	12	60	47
Leek	6	47	33
Lettuce	128	77	74
Muskmelon	114	76	73
Okra	8	54	51
Onion	167	68	52
Parsley	29	47	41
Parsnip	27	34	36
Pea	150	56	76
Pepper	39	47	53
Potato	1	51	0
Popcorn	5	84	85
Pumpkin	45	66	73
Radish	136	73	72
Rhubarb	7	45	70
Rutabaga	28	77	63
Salsify	9	63	68
Spinach	71	54	60
Squash	45	72	73
Sweet corn	109	81	79
Swiss chard	2	75	66
Tomato	106	72	77
Turnip	57	80	61
Watermelon	69	70	71

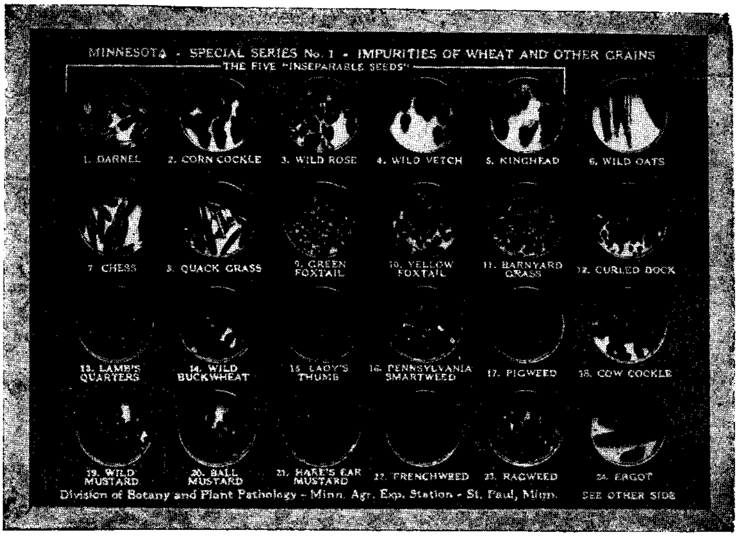

Fig. 2. Minnesota Weed Seed Case, Special Series No. 1.

PUBLICATIONS OF THE SEED LABORATORY

The following publications have been issued by the seed laboratory and will be mailed on request to the Office of Publications, University Farm, St. Paul:

Farmers' Library Bulletin No. 24—Seed Testing.
Farmers' Library Bulletin No. 39—Minnesota Seed Law.
Bulletin No. 129—Minnesota Weeds, Series I.
Bulletin No. 139—Minnesota Weeds, Series II.
Bulletin No. 147—First Annual Seed Laboratory Report, 1913-14.
Bulletin No. 159—Second Annual Seed Laboratory Report, 1914-15.
Bulletin No. 165—Third Annual Seed Laboratory Report, 1915-16.

Farmers' Library bulletin No. 39, dealing with the Minnesota seed law, should be in the hands of every person who sells agricultural seed for seeding purposes. It contains much pertinent and necessary information relating to the sale of agricultural seed.

The seed laboratory has also issued a new weed seed case, Minnesota Weed Seeds, Special Series No. 1 (Figure 2). This case contains the "inseparable weed seeds" mentioned in the former federal grades for wheat, besides other seeds very commonly found in wheat and other cereals. This seed case should be of interest to all dealers in grain. It can be obtained at cost by addressing the Seed Laboratory, University Farm, St. Paul, Minnesota.