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W. W. LYMES

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## RYE GROWING IN MINNESOTA

UNIVERSITY FARM, SAINT PAUL, MINNESOTA.

# UNIVERSITY OF MINNESOTA

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# RYE GROWING IN MINNESOTA

ANDREW BOSS

## INTRODUCTION.

**Acreage**—The acreage of land in Minnesota devoted to rye growing is relatively small, and the crop has been treated as a minor one, owing to the popularity of other cereal crops and to the lack of information regarding the value of the rye crop, its adaptability to our soil and climate, and the profit to be derived from its growth. According to the Year Book of the U. S. Department of Agriculture, the farm value per acre of the rye crop in Minnesota equals or exceeds that of the wheat crop, being \$8.25 for the ten year period, 1896-1905. The farm value of wheat in Minnesota was \$8.78 per acre. The farm value of rye for the ten years, 1900-1909, inclusive, is somewhat higher, being \$10.00 per acre. The farm value of wheat in Minnesota for this period was \$9.85 per acre. These figures represent the price of grain only. Rye straw finds a much readier sale on the market, and is sold at a higher figure, so that were the value of straw added to the value of the grain crop the farm value of rye would exceed by \$2.00 to \$3.00 per acre the value of the wheat crop. The cost of growing rye is no greater than the cost of growing wheat, and consideration should be given the fact that the growth of a reasonable acreage of rye spreads the labor of the farm over a longer season, and makes possible the more economical use of teams and machinery.

Table No. I gives the acreage, total production, and average yield per acre, for the years 1907, 1908 and 1909, in the five states growing the largest acreage of rye; also the average yield per acre for the ten-year period 1896-1905. It will be observed that, while the state stands fifth in acreage grown and in total production, the yield per acre is persistently the highest. In only one instance—Wisconsin in 1908—has any one of the five states secured a higher yield per acre than has Minnesota. The average yield for the ten-year period, 1896-1905, is also 2.6 bushels per acre higher than that of Pennsylvania or Wisconsin, the next highest states in yield for the same period.

TABLE No. I.

	Acreage			Total Production—Bu.		
	1907	1908	1909	1907	1908	1909
Pennsylvania	346,000	343,000	360,000	5,783,000	5,660,000	5,508,000
Michigan	376,060	368,000	350,000	5,452,000	5,704,000	5,425,000
Wisconsin	264,000	275,000	290,000	4,765,000	5,225,000	4,727,000
New York	128,000	145,000	160,000	2,119,000	2,392,000	2,720,000
Minnesota	88,400	88,000	120,000	1,635,000	1,628,000	2,280,000
					10 Yr. Av.	
					Yield Per Acre—Bu.	Yield—Bu.
	1907	1908	1909	1907	1908	1896-1905
Pennsylvania	16.7	16.5	15.3	16.1	16.1	16.1
Michigan	14.5	15.5	15.5	14.5	14.5	14.5
Wisconsin	18.0	19.0	16.3	16.1	16.1	16.1
New York	16.5	16.5	17.0	16.0	16.0	16.0
Minnesota	18.5	18.5	19.0	18.7	18.7	18.7

(From Year Books—U. S. Dept. of Agriculture.)

TABLE No. II.

Table showing average yield per acre of rye by ten-year periods, 1866-1905, inclusive.

	1866-1875	1876-1885	1886-1895	1896-1905
Pennsylvania	13.6	12.0	12.6	16.1
Michigan	15.6	13.0	13.4	14.5
Wisconsin	15.9	14.6	14.0	16.1
New York	14.2	13.0	13.6	16.0
Minnesota	18.7	16.6	16.1	18.7

(From Year Book—U. S. Dept. of Agriculture, 1909.)

Table No. II gives the average yield per acre for the ten-year periods, 1866-1905, inclusive. Attention is called to the fact that Minnesota has secured larger yields than the other states, in bushels per

acre, for the entire period. Thus, while Minnesota ranks fifth in acreage of rye grown, the state is entitled to rank first in yield per acre.

**Rye Growing Districts**—Rye growing has been, in the past, largely confined to the counties bordering the Mississippi river, and extending north as far as Brainerd. Some rye is grown in other sections of the state, but the region above referred to has been most persistent in the production of rye. Dakota, Goodhue, Washington, Scott, Carver, Sherburne, Stearns, Anoka, Isanti and Wright are probably the leading counties in rye production; although it can be successfully grown in any county in the state.

**Uses of Rye**—The grain of rye is made into flour, and used quite extensively in bread making. Rye bread is said to be especially nutritious and adapted to the needs of those doing heavy manual labor.

The grain is also used in the production of alcohol and alcoholic beverages, and as food for live stock. While there is more or less prejudice against the use of rye as food for stock, the Germans very successfully feed to their horses two to four pounds daily, per animal, in combination with oats, or with oats and barley. It probably would not be satisfactory as food for milk cows; it being claimed that its use gives a bitter flavor to the butter. As food for swine, it is equivalent to barley, but should be fed with shorts, barley, or other grain food. Rye should never be fed in large quantities, nor alone, but in proper combination with other grains it may be used with profit.

As fall and early spring pasture, rye is especially valuable. Sown August 20th to September 15th it affords a considerable amount of pasturage until late in the fall, and is practically certain to live over winter, renewing its growth in the spring, providing the earliest of spring pasture. While all kinds of stock relish rye as spring pasture, and do well on it, milk from cows allowed full feed on luxuriant rye pasture will be likely to be ill flavored. The green crop may be used for soiling purposes, or as a green manure crop.

The ripe straw from which the grain has been thrashed is also a valuable article of commerce, its value per acre equalling in many instances the value of the grain. It is used extensively for stuffing horse collars, for manufacturing into paper, for packing fruit trees and other nursery products, and as bedding for live stock, horse trainers and exhibitors especially favoring it for this latter purpose. The straw for horse collars must receive special care and treatment to bring a high price, but a market of considerable extent could undoubtedly be developed if the industry were properly managed.

### RYE CULTURE.

**Classes of Rye**—Two classes of rye are recognized, namely, "Spring" and "Winter." The Spring rye is but little grown in Minnesota, owing to the fact that it does not yield well, and also because other spring grains are more popular. Winter rye is grown quite extensively, and the discussion here offered relates to that crop.

**Soil**—Rye is sometimes called the "grain of poverty," because better adapted to poor soils and unfavorable climates than the other cereals. While rye will thrive on poor soil, and yields well on light, sandy land, it should not be assumed that it does best on that kind of soil. Rye will respond as readily in yield to good tillage and good soil as any of the grain crops. A black loam, clay loam or sandy loam is especially favorable to the crop. Good drainage is necessary to successful rye growing.

**Preparation of Seed Bed**—The seed bed should be prepared by plowing the land as early in the summer as the previous crop can be removed. August 1st is none too early. After plowing, the land should be immediately gone over with a harrow, disk or other suitable implement. It is important that the furrow slice be made compact and reduced to fine tilth before it has had time to dry out. The surface soil

should be stirred frequently enough before sowing to prevent the growth of weeds.

**Sowing the Seed**—The seed should be sown with a disc or shoe drill, rather than with a broadcast seeder. If sown 2 to 2½ inches in depth, there will be less danger of winter-killing. For a grain crop, 1¼ bushels per acre is regarded as sufficient seed; although if the variety used is a large-kerneled one, 1½ bushels is advisable. Where the crop is desired for fall pasture, 1½ to 2 bushels per acre should be sown.

**Time to Sow**—Rye may be sown at any time, from August 20th to October 1st, depending on the location and the purpose for which it is to be used. For fall pasture it should be sown between August 20th and September 10th, the earlier seeding being preferable. For grain only, September 1st to 15th is regarded as a more favorable time. Seldom should the crop be sown later than September 20th, for any purpose.

**Winter and Spring Care**—After sowing, the rye crop will need but little care until harvest time. If the crop has been sown early, for pasturage during the fall and is to be left for a grain crop, it should not be allowed to make fall growth enough to form heads. Close pasturage will prevent such a tendency.

On land that is likely to be dry, it is good practice to go over the land in the spring with a light slant-tooth harrow, breaking the crust of the soil and forming a light dust mulch. No other crop serves better as a nurse crop than rye and grass seed sown in the spring and covered with a harrow, as suggested, and protected against evaporation by the dust mulch it is almost sure to make a stand the following season.

**Harvesting**—Rye ripens in Minnesota between July 10th and 25th, slightly earlier than winter wheat or barley. It is handled with a self-binder, in the same fashion as other grains, and shocked in good-sized round shocks. To secure the best quality of grain and straw, the shocks should be capped, although this practice is not always followed.

The rye straw sold for collar stuffing purposes in Minnesota is prepared by flailing out the grain. Where special markets for straight rye straw are being catered to, special threshing machines have been devised, which keep the straw straight during threshing without breaking it badly.

Where the straw is used for bedding, the crop is thrashed in the same way as other cereal crops.

**Place in Rotation**—Ordinarily, rye takes the place of wheat, oats or barley in the rotation. It is a grain crop, and calls for about the same class of elements as other grain crops, and with practically the same effect on the soil. It is one of the best crops with which to seed down land to grass or clover, on account of being removed from the land so early in the season. It is especially useful in rotations designed to restrict or eradicate noxious weeds. Rye is removed from the land by July 20th to August 1st, thus giving the months of August, September and October for the bare fallow and cultivation found so effective in killing quack grass, Canadian and sow thistles. Followed by a corn crop, it is especially effective where thorough methods of cultivation are practiced.

The following rotation will be found quite satisfactory in many cases where quack grass or thistles are bad.

- 1st year—Rye, land plowed medium deep, using jointer to turn under weeds. Disced frequently until October 15th; replowed deeply before freezing.
- 2d year—Barley, seeded to clover.
- 3d year—Clover, plow under second crop August 1st, cultivate frequently.
- 4th year—Corn, thoroughly cultivated, hand hoed if necessary.
- 5th year—Barley or other grain.

TABLE No. III.

Yields of six varieties of Rye at University Farm for the years 1900-1910, and average height and date ripe for five years.

Minn. No.	Name	Source	Av. hgt. 03, 05, 06, 08, 10 (5 years)	Av. date ripe, 05, 06, 08, 09, 10 (5 yrs)	Yield										Av. 1900- 1910
					1900	1901	1902	1903	1904	1905	1906	1908	1909	1910	
1	Dean	W. M. Liggett, Benson, Minn.	49.6	July 16	42.8	31.7	41.2	55.9	41.8	30.7	51.7	32.1	34.3	17.9	37.92
2	Swedish	Nursery Selection	53.4	July 16	41.4	30.8	43.2	54.3	38.2	32.5	54.2	35.1	35.2	19.9	38.48
3	Kansas	F. Barltelds Co., Lawrence, Kan.	55.0	July 16	39.3	20.2	41.9	44.4	38.2	26.8	47.6	30.7	32.5	18.6	34.04
32	St. John's	J. A. Salzer Seed Co., La Crosse, Wis.	53.6	July 16	39.3	20.2	55.3	41.6	39.6	33.5	49.6	31.4	35.4	21.1	36.73
35	Posko	U. S. Dept. of Agr.	56.0	July 16	45.7	20.6	34.6	43.5	36.4	27.5	42.8	27.1	32.9	19.6	33.08
36	Unnamed	Farmers' Seed Co., Faribault, Minn.	55.6	July 17	40.0	15.2	50.4	47.3	39.6	36.7	50.0	27.8	35.2	21.4	36.36

1907 yields not included on account of becoming mixed in cutting.

TABLE NO. IV.

Yield of eight varieties of Rye at University Farm for the years 1903-1910, and average height and date ripe for five years.

Minn. No.	Name	Source	Av. hgt. 03, 05, 06, 08, 10 (5 years)	Av. date ripe, 05, 06, 08, 09, 10 (5 yrs)	Yield							Av. yield 1903- 1910
					1903	1904	1905	1906	1908	1909	1910	
1	Dean	W. M. Liggett, Benson, Minn.	49.6	July 16	55.9	41.8	30.7	51.7	32.1	34.3	17.9	37.78
2	Swedish	Nursery Selection	53.4	July 16	54.3	38.2	32.5	54.2	35.1	35.2	19.9	38.49
3	Kansas	F. Barltelds Co., Lawrence, Kan.	55.0	July 16	44.4	38.2	26.8	47.6	30.7	32.5	18.6	34.11
32	St. John's	J. A. Salzer Seed Co., La Crosse, Wis.	53.6	July 16	41.6	39.6	33.5	49.6	31.4	35.4	21.1	36.03
35	Posko	U. S. Dept. of Agr.	56.0	July 16	43.5	35.4	27.5	42.8	27.1	32.9	19.6	32.83
36	Unnamed	Farmers' Seed Co., Faribault, Minn.	55.6	July 17	47.3	39.6	36.7	50.0	27.8	35.2	21.4	36.86
42	Schlaustedt	Wis. Exp. Sta., Madison, Wis.	55.4	July 16	43.5	41.8	36.4	50.7	26.8	37.5	21.1	36.83
43	Petkus	Wis. Exp. Sta., Madison, Wis.	54.4	July 16	48.3	37.5	37.8	53.2	27.1	33.8	21.8	37.07

1907 yields not included on account of becoming mixed in cutting.

VARIETIES OF RYE.

Rye cross-pollinates so readily that but very few varieties have become well established. Named varieties frequently appear, but they do not remain as fixed market varieties for any length of time. But little effort has been made by seedsmen to introduce or promote good varieties of rye; and experiment stations have been slow to develop new varieties from the stocks at hand. The Minnesota Experiment Station has had numerous varieties under trial since 1900, and has given considerable attention to breeding and selecting superior strains. One nursery bred variety—more fully described on page 8—has been introduced widely in the state, and has met with considerable favor.

Tables Nos. III and IV give the comparative yields of the varieties which have been grown at University Farm, long enough to give a reliable basis of comparison. Twelve other varieties, originating in nursery selection from some of the best varieties, or secured from commercial sources, have been included in the tests for 1909-1910. While some of the nursery selected stocks have yielded better than Minnesota No. 2 for these years, it is thought that longer trial and more complete knowledge of their behavior should be secured before comparison is made.



Nursery centgeners of rye harvested and protected from the birds until threshing time, by wrapping in cloth. The best plants have been taken out for the propagation of centgeners. These bundles are threshed with specially constructed machinery and the average yield per plant secured of each stock.

The following table gives the yield of Minnesota No. 2 rye for each year since 1900, in comparison with the state average for other varieties:

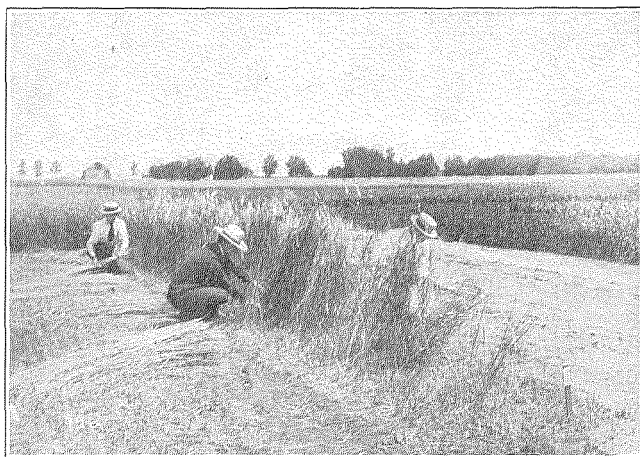
TABLE No. VI.

Yield of Minnesota No. 2 Rye at University Farm Compared with the Average Yield of Rye in the State.

Year	Minnesota No. 2	State Av. Ordinary Rye
1900	41.4	19.5
1901	30.8	19.3
1902	43.2	22.3
1903	54.3	18.4
1904	38.2	17.7
1905	32.5	18.2
1906	54.2	19.3
1907	28.9	18.5
1908	35.1	19.2
1909	35.2	19.0
Average for 10 years	39.38	19.14

As may be noted by reference to the tables, the Minnesota No. 2 Rye has outyielded the other varieties for both the 7- and 10-year periods. The quality of the No. 2 Rye has been satisfactory, and the introduction of this variety in 1908, as a new commercial sort, has been followed by very satisfactory results. It has been sold to farmers in nearly every section of the state, and to a few farmers in the states of Wisconsin, Illinois and North Dakota. The reports as a whole indicate that it is a better yielding variety than those commonly grown. The reports from the first year's distribution show that the No. 2 rye yielded, on the entire acreage sown, an average of 27.2 bushels per acre; while other rye, sown under similar conditions, averaged only 17.7 bushels per acre.

Many of the farmers who secured this rye from the Station, in 1907-1908, are handling it carefully and selling it as seed stock to their neighbors. A list of names of those growing Minnesota No. 2 Rye for seed is kept by the Minnesota Experiment Station, and will be supplied to those wishing to purchase seed, upon application. It is believed to be good policy for prospective purchasers to buy seed from the nearest one offering satisfactory seed.



Eliminating the Inferior Plants from the Foundation Bed in Developing a Heavy Yielding Variety of Rye.

#### HISTORY OF No. 2 RYE.

On January 1st, 1895, a small quantity of Swedish rye was secured by the Minnesota Experiment Station from Mr. John Brogard, Henning, Minnesota. On September 18, 1896, this rye was planted in the rye nursery with other varieties. It winter killed badly, and, the following spring, 1897, the surviving plants were transplanted to a small bed and preserved. In 1897, 120 seeds were planted in the nursery from which 16 plants were harvested in 1898.

It is from this foundation that the Minnesota No. 2 Rye has been developed by a system of selection and seed propagation.

By selecting the hardy plants living through the first two winters, and by carefully eliminating the poor yielding ones, the hardness and yielding ability of the present stock were greatly increased. All of the small grains respond quickly to the selection of good seeds, from plants adapted to the locality; and it is believed that the yield of all of our Minnesota farm crops can be increased, by seed selection and breeding, as easily and as readily as proved to be the case in developing the No. 2 rye.