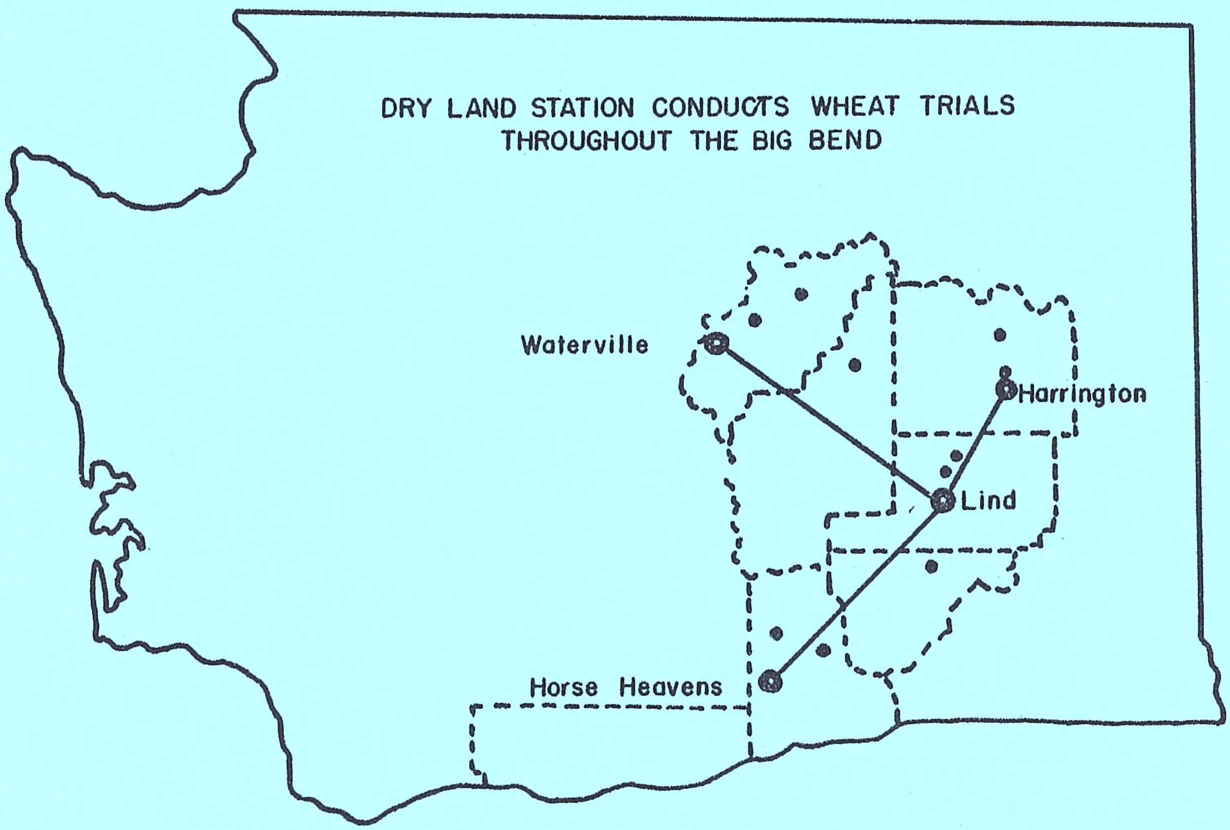
39th ANNUAL

FIELD DAY

DRY LAND EXPERIMENT STATION



LIND, WASHINGTON
JUNE 30, 1955

Washington Agricultural Experiment Stations, Institute of Agricultural Sciences, State College of Washington

INTRODUCTION

The Dry Land Experiment Station, formerly the Adams Branch Experiment Station, was established in 1910 near Ritzville, when a 10-acre plot of land was leased and experiments with cereals, forage crops, and certain phases of soils work commenced. Largely through the efforts of Spokane businessmen, the Milwaukee Railroad, and Adams County, a site was purchased approximately three miles northeast of Lind. Buildings were erected, and the Station moved to its present location in 1915.

Originally, the Station was operated with county, USDA, and state funds. At present it is state-supported, aside from a small labor fund contributed by federal agencies. The land is leased from Adams County. The farm consists of 320 acres of land, of which approximately 260 acres are devoted to crop production experiments. The remainder consists of grass and rough land.

Early in 1949, Adams County deeded approximately four acres to the Board of Regents of the State College of Washington. There the new state-financed office and greenhouse buildings were constructed. Under the leadership of the Washington Agricultural Experiment Stations, the Dry Land Experiment Stations, the Dry Land Experiment Station has carried out a continous program of research since its establishment.

Experiments are planned and conducted cooperatively with the different departments of the Main Experiment Station at Pullman; Soil Conservation Service and Bureau of Plant Industry, USDA; and with the U.S. Weather Bureau, Department of Commerce.

The field day is an annual affair held in June to acquaint farmers, ranchers, and townspeople of central Washington with the nature of the work being conducted and to furnish information collected from the many experiments in progress. The public is especially invited to attend these field days, although visitors are welcome at all times.

Walter L. Nelson, Superintendent

CLIMATIC INFORMATION

Approximately 55 per cent of the rainfall occurs during the winter months, 30 per cent in summer, and 15 per cent in the fall.

Climatic measurements are made daily. They consist of readings made with such standard U.S. Weather Bureau instruments as maximum and minimum thermometers, a manual precipitation gauge, sling psychrometer, and evaporation instruments. In addition, a continuous record of soil and air temperatures, relative humidity, and precipitation is kept by means of automatic recording instruments.

Table 1. Annual Rainfall near Lind, Washington, 1897-1955.

Data Obtained by Dan Krehbiel		Data Obtained by O. W. Goodenough		Data Obtained by the Dry Land Experiment Station			
1897-98	6.34	1909-10	8.74	1916-17	7.60	1935-36	8.09
1898-99	8.76	1910-11	8.10	1917-18	6.64	1936-37	8.93
1899-00	12.00	1911-12	10.33	1918-19	8.10	1937-38	11.89
1900-01	15.34	1912-13	8.24	1919-20	6.56	1938-39	5.32
1901-02	12.33	1913-14	10.50	1920-21	7.01	1939-40	13.01
1902-03	13.67	1914-15	10.54	1921-22	6.97	1940-41	18.00
1903-04	15.03	1915-16	13.59	1922-23	10.90	1941-42	12.29
1904-05	11.34			1923-24	6.62	1942-43	11.65
1905-06	12.01			1924-25	8.32	1943-44	8.60
				1925-26	6.65	1944-45	10.05
				1926-27	12.65	1945-46	11.82
				1927-28	10.83	1946-47	8.02
				1928-29	5.77	1947-48	22.71
				1929-30	4.80	1948-49	7.00
				1930-31	6.91	1949-50	9.89
				1931-32	9.78	1950-51	9.85
				1932-33	8.39	1951-52	8.11
				1933-34	9.79	1952-53	7.71
				1934-35	7.48	1953-54	7.98
Average	11.87		10.01				9.27

Average for 54 years: 9.80.
Rainfall September 1, 1954, to June 1, 1955: 6.43.

RESEARCH ON CEREAL CROPS

In 1950 the Dry Land Experiment Station enlarged the cereal breeding and testing program. The object of this program is to produce new varieties of cereals adapted to the Big Ben area where annual rainfall is from 9 to 13 inches. This program includes the testing of new varieties and selections developed at other experiment stations throughout the Midwest and Pacific Northwest, and the breeding of new varieties.

Three new testing sites were set up in 1950 to adequately check cereal varietal response throughout the Big Bend. These sites are: Nelson Brothers farm, Waterville; Leonard Schultz farm, Harrington; and Horrigan Farms, Prosser. All experimental work at the outlying locations is conducted by the same methods as the work at the Station.

In addition to the locations mentioned above, small variety trials were established in 1953 and 1954 on the following farms: R. P. Nicoson and Ed Tyacke in Benton County; Phil Wainscott and Ted Cornehl in Douglas County;

Oscar McCoy in Grant County; F. Hudlow in Franklin County; Walt Jantz in Adams County; and L. H. Bowman, Davenport. About 10 varieties each of winter and spring wheat and five varieties of barley are grown at most of these locations in 1955. Varieties included in these small trials are standard varieties and new selections being considered for possible release. Farmers in these areas are urged to visit the plots on county tours or at any other time. The results of these small trials and larger testing areas and the trials at the Station will determine the value of any new selection for the Big Bend area.

WINTER WHEAT

Table 2 tabulates the yields of standard varieties of white winter and hard red winter grown at Lind. The white winter-wheat varieties are consistently higher yielding than either Rio or Turkey. Although Elmar and Elgin are higher yielding, these varieties have not been recommended because of poor quality. When grown under dry conditions of the Big Bend, these tend to produce high-protein wheat. At protein above 9 per cent the flour does not make good pastry and is unsuitable for bread flour. The production of good-quality wheat has become increasingly important as surpluses become larger. With the exception of Hymar, all of the white winter-wheat varieties are less winter hardy than Rio.

Table 2. Yield, Test Weight and Plant Height of Winter-Wheat Varieties Grown at the Dry Land Experiment Station.

Variety	No. Yrs. Grown	Yield 1954	Av. Bu/A	Test Wt. Average	Plant Ht. Average	Rank
Elmar	5	39.6	32.4	58.4	24	1
Elgin	9	31.7	28.6	58.6	24	2
Hymar	9	30.1	28.4	58.7	30	3
Brevor	5	34.4	28.3	60.1	24	4
Triplet	9	29.9	25.7	60.3	28	5
Kharkof	9	22.0	24.4	60.6	28	6
Rio	9	18.0	23.7	60.8	28	7
Golden	9	30.1	22.6	57.6	28	8
Rex	9	23.6	21.5	59.6	27	9

Table 3 compares the yield of three new bread-type winter-wheat selections with standard white and red winter-wheat varieties. The selections Rio-Rex x Nebred and Blackhull-Rex x Rio-Rex are hard red types developed at Sherman Branch Experiment Station, Moro, Oregon. These two selections are bearded, red chaffed, stiff strawed, smut resistant, winter hardy, 3-4 days earlier than Rio, and have been consistantly higher yielding than Rio at all locations. Quality tests by the Western Wheat Quality Laboratory at Pullman have shown these varieties to be equal or slightly superior to Rio. Rio-Rex x Nebred is somewhat superior agronomically to Blackhull-Rex x Rio-Rex and is the first choice for release in 1955. Both selections are under breeders seed increase at the Dry Land Experiment Station.

The selection 27-15 x Rex-Rio (Sel 41) is a hard white bread-type winter wheat. This variety is bearded, white chaffed, stiff strawed, 2 to 3 inches taller than Elmar at Lind, smut resistant, and very high yielding. Selection 41 has only fair winter hardiness. It is more susceptible to shattering than Rio, but shatters less than Triplet or Golden. Breeders' seed is under increase at Pullman.

Lots of wheat from all three of these selections will be commercially milled this summer. The results of these trials and yield trials this year will determine which selections will be released for 1955 fall planting.

Table 3. Yield of Winter-Wheat Varieties Grown at Lind and Waterville in 1952 and 1954, and Harrington 1952-54. Dry Land Experiment Station, Lind, Washington.

Variety	C.I.	Waterville 1952 & 1954	Harrington 1952-1954	Lind 1952 & 1954	Av. Yield	% Rio
27-15 x Rex-Rio Sel. 41	12696	34.5	57.1	33.0	43.8	128
Elmar	12392	33.3	51.3	32.5	40.8	119
Elgin	11755	32.9	52.5	29.2	40.2	117
Brevor	12385	32.8	48.1	29.4	38.4	112
Rio-Rex x Nebred	12928	34.6	49.4	23.0	37.6	110
Blackhull-Rex x Rio-Rex	12932	34.3	47.0	23.3	36.6	107
Hymar	11605	33.1	43.5	27.2	35.9	105
Rio	10061	32.6	44.8	20.4	34.3	100
Kharkof	1442	31.2	43.4	22.6	34.0	99
Wasatch	11925	27.4	41.1	25.0	32.6	95
Comanche	11673	31.1	41.6	19.6	32.3	94

The winter-wheat breeding program at the Station is pointed towards increasing the yield, maintaining and improving smut resistance, and improving the winter hardiness and quality of hard red winter-wheat varieties. Winter hardiness will be tested at Pendleton, Oregon, in the cold-chamber facilities available there. Smut and disease testing is in cooperation with USDA at Pullman under the direction of Dr. C. S. Holton. Quality testing is conducted at the USDA Western Wheat Quality Laboratory under the direction of Dr. M. A. Barmore at Pullman. These cooperating agencies make it possible for better and more rapid evaluation of the selections in a breeding program.

Variety recommendations for eastern Washington for wheat, oats, and barley are given in Extension Miscellaneous Publication 14 available from your County Agent. In areas of less than 12 inches of rainfall, Rio and Wasatch are the recommended winter-wheat varieties. Wasatch is recommended only for dwarf-bunt areas of Douglas County.

SPRING WHEAT

The spring-wheat program at the Dry Land Experiment Station has three main objectives: (a) testing and introduction of available spring-wheat varieties and breeding material from other areas, (b) improvement of superior spring-wheat varieties by a breeding program that includes backcrossing, and (c) incorporation of resistance to leaf and stem rust--including 15B stem rust --in the breeding of new spring-wheat varieties adapted to the Big Bend.

The improvement of Awned Onas has received first priority in the spring-wheat breeding program. Awned Onas is an excellent-yielding variety with many desirable agronomic features. It is a poor milling variety and so has not been released. To improve the milling quality of this variety, a backcross program using the best milling spring wheat available was initiated in 1950. This year thousands of plant selections from this program will be tested on a 5-gram mill developed at Pullman to select out the good milling plants. These selections will be tested for yield and milling quality later and the good lines increased. With this method, a good-milling, high-yielding Awned Onas type spring wheat may be available in about five or six years.

In 1953, a new hard red spring-wheat variety, Henry, was released by the Dry Land Experiment Station for reseeding into hard red winter wheat. Experiment Stations Circular 211, available from your County Agent, describes this variety and where it should be used. Henry is a high-yielding hard red spring, with same maturity date as Baart. Henry is stiff strawed, moderately resistant to shattering, and easily threshed. It is the highest yielding hard red spring tested in the Big Bend.

In Table 4 are shown the yields, test weights, and heights of ten spring-wheat varieties grown at the Dry Land Experiment Station. Of those varieties tested for seven years or more, Baart is one of the highest yielding. Only Awned Onas and Lemhi are superior, and these varieties are not recommended because of poor quality. At the Station in certain years, Marfed and Idaed have been superior to Baart, but over the long-time average they have not proved to be any higher yielding than Baart. For spring-wheat recommendations for your area, contact your County Agent.

In Table 5 are shown the yields of 10 spring-wheat varieties grown at Waterville, Harrington, Horse Heaven, and Lind for two or more years. The average yield at all locations shows Marfed, Lemhi, Onas 52, and Awned Onas are the highest-yielding varieties for these years. These four varieties have poor milling quality and have not been recommended for the Big Bend area.

The Dry Land Experiment Station, in cooperation with the Agronomy Department at Pullman, is testing and breeding for resistance to 15B stem rust in spring wheat. To date, this disease is not a problem in the Big Bend. This resistance is being incorporated in new hybrids as protection in case 15B rust becomes serious. The first of these resistant selections are in the yield-testing stage in 1955. The hybrids are tested for 15B rust in a cooperative program with the University of Manitoba, Winnepeg, Canada, and in rust nurseries in Mexico.

Table 4. Yield, Test Weight, and Height of Spring-Wheat Varieties Grown at the Dry Land Experiment Station.

Variety	No. Yrs. Grown	Yield 1954	Av. Bu/A.	Av. Test Wt.	Av. Plant Ht.	Rank
Awned Onas	9	27.1	26.7	58.2	25	1
Lemhi	9	25.9	26.3	57.0	26	2
Marfed	8	30.1	25 1	58.3	25	3
Baart	9	22.9	24.9	60.1	28	4
Federation	9	23.4	24.6	57.6	24	5
Idaed	9	22.4	24.5	59.0	25	6
Henry	3	23.1	20.9	58.5	27	7
Thatcher	5	22.3	20.5	58.0	26	8

Table 5. Yield of Spring-Wheat Varieties Grown at Harrington, Horse Heaven, Waterville, and Lind on Years Indicated, Dry Land Experiment Station, Lind.

Variety	C.I.	Waterville 1951 & 53-54	Harrington 1951-54	Horse Heaven 1951 & 1953-54	Lind 1951-52 & 54	Av. Yield	** Baart
Marfed	11919	31.3	38.2	28.1	25.7	30.8	110
Lemhi	11415	33.4	37.0	25.7	24.6	30.2	108
Onas 52*	12946	31.4	41.8	26.6	24.9	32.4	108
Awned Onas	12235	31.6	38.1	24.3	24.4	29.6	106
Federation	4734	30.1	36.0	24.2	22.5	28.2	101
Idaed	11706	29.1	37.0	25.2	20.8	28.0	100
Baart	1697	29.6	34.3	24.4	23.2	27.9	100
Henry	12265	27.9	36.1	23.9	20.9	27.2	97
Thatcher	10003	23.5	32.9	21.7	19.5	24.4	87

* Onas 52 not grown in 1951. **Baart figured for years grown.

FERTILIZER TRIALS

In cooperation with the Agronomy Department, Pullman, the Dry Land Experiment Station has conducted experiments with nitrogen fertilizer for five years. Previously reported work (Stations Circular 179) has shown that the type of nitrogen fertilizer was less important than the method of application. The data showed that placing the fertilizer was more effective than broadcasting. The wheat utilizes the added nitrogen more efficiently when it is placed below the straw layer. For recommendations on nitrogen fertilizer, farmers are referred to their County Agents, who are kept up to date on recommendations for his rainfall area.

In Table 6, five years of data are given on different rates of anhydrous ammonia fertilizer applications to summer fallow and seeded to Rio winter wheat. The highest yield was obtained from 40 pounds of nitrogen per acre. The best return for the fertilizer investment was on the 20-pound rate. At the 20-pound rate, 4.3 pounds of nitrogen increased the yield one bushel. At the 40-pound rate it took 5.8 pounds of nitrogen for each bushel increase. This rate also returned the greatest net return per acre but at almost twice the investment of the 20-pound rate. Although the 80-pound rate has increased the yield by 4.6 bushels per acre average for three years of data, the cost of the nitrogen exceeded the value of the yield increase by $2.80 per acre. Recommendations for the 9- to 11-inch rainfall area based on these five-year data are 25 to 40 pounds of nitrogen per acre. All types of nitrogen fertilizers have been equal in yield response when placed. Anhydrous ammonia, aqua ammonia, and ammonium nitrate have given best yields when placed at a depth of 6 inches.

Table 6. Summary of 5 Years' Data of Different Rates of NH_3 Fertilizer on Winter Wheat, Variety Rio, Dry Land Experiment Station, Lind, Washington.

Treatment lbs N/A	Yield Bu/A 1950	Yield Bu/A 1951	Yield Bu/A 1952	Yield Bu/A 1953	Yield Bu/A 1954	5-Yr. Av. Yield	Lbs N per bu. inc.	Av. bu. per acre inc.	Net per acre profit** cost-ret. from Fertilizer
0	20.5	20.5	20.5	14.4	27.5	20.7	0.0	0.0	0.0
20	25.2	28.2	23.1	19.9	30.3	25.3	4.3	4.6	$6.20
40	29.9	27.9	24.4	21.3	34.3	27.6	5.8	6.9	$7.80
80	--	26.9	23.1	--	32.2	27.4*	17.4	4.6	-2.80

* Three-year average.
** Cost of N. at 15¢ a pound applied. Wheat value at $2.00 per bushel.

Farmers are urged to check the response to fertilizer applications. A soil test to determine available nitrogen in the soil is advisable. However, it is not complete without a yield check on the response to the recommended rate of nitrogen application. Reliable field checks on response to fertilizer can be made by leaving a check strip unfertilized over a representative portion of the field. By a double application along the side of this unfertilized strip, the farmer can check if his fertilizer rate was high enough. Harvesting these strips and weighing separately will require more time in harvest, but will return many times over the cost and time involved if the farmer finds his rate of application was too high or too low. Each 3 or 4 pounds of nitrogen should increase the yield by one bushel per acre. This ratio can be used as a guide to determine if the correct rate of nitrogen has been applied.

To date, experiments with sulfur and phosphate have not given any significant yield increase. The Station will continue testing with these elements to determine when they might be profitably used in wheat production.

ANNUAL CROPPING

Research on annual cropping was revised in 1952. The Dry Land Experiment Station and Agronomy Department, Pullman, set up four locations for annual cropping experiments. These are on farms scattered throughout eastern Washington at locations with a range in rainfall from 9.5 to 15 inches annually. Cooperating farms are: C. W. Eckhart, Packard; Leonard Schultz, Harrington; and Ed Steckle, LaCrosse. The fourth location is on the Dry Land Station. The location at LaCrosse is conducted in cooperation with the Soil Erosion Farm at Pullman and includes the study of crop rotation, green manure crops, and nitrogen fertilizers in annual cropping. The Dry Land Experiment Station does not obtain the data at the LaCrosse location.

At all locations conventional equipment is used for tillage and harvesting. Three rates of fertilizer are used on both summer-fallow and annual-cropping plots. The soil is sampled in the fall to determine the amount of available nitrogen and sampled again in the spring for moisture. In 1955 the summer-fallow plots at Lind are sampled for moisture weekly through the growing season to determine the rate the soil moisture is used by the wheat at three levels of fertility. The data from these experiments are too incomplete to give any recommendations. At Harrington Marfed spring wheat with 60# of nitrogen average 34.7 bushels per acre for 1953 and 1954. Summer-fallow yields for the two years with 30# of nitrogen averaged 51.5 bushels per acre. Both years were very favorable years for recropping. At Lind, two-year averages show annual cropping yields of 11.5 bushels per acre with 40 pounds of nitrogen and 18 bushels per acre under summer fallow with 20# of nitrogen per acre. Yields at Packard were decreased in 1954 by a severe cheat-grass problem. Only the Harrington location appears to have possibility of annual cropping.

FORAGE INVESTIGATIONS

Forage Adaptation Tests

Grasses and legumes for soil and moisture conservation are being tested at the Dry Land Experiment Station in cooperation with the Soil Conservation Service, Nursery Division. The initial testing is done at Pullman; Lind is one of a system of outlying nurseries under different soil and climatic conditions to carry on secondary testing.

The following data supplement material presented at previous field days:

<u>Fall 1943, Dry-Land Grass Plots</u>

Eighteen grasses were selected on the basis of past performance at Lind and seeded in the fall of 1943. The purpose of this planting was to compare conservation uses and hay yields for the 10- to 14-inch rainfall area. In dry-land rotations, grass roots add organic matter to the soil. This aids in maintaining fertility and improves the physical condition. The soil is more resistant to wind and water erosion when it is well supplied with fibrous grass roots and active organic matter. Hay yields, along with root production, longevity, drought resistance, ground cover, and availability of seed, should be considered in selecting grasses for conservation seeding. The following grasses have been outstanding under dry-land condition at Lind:

Dry-land bunch grasses:	Crested Wheatgrass Whitmar beardless wheatgrass
Sod-forming grasses:	Pubescent wheatgrass
Dry-land bluegrasses:	Sherman big bluegrass
Fine-leaved fescues:	Sheep fescue P-274

From results obtained at this Station and in other dry-land areas, the following grasses can be recommended in the wheat-fallow area from 8 to 14 inches annual rainfall:

Range and pasture

1. Crested wheatgrass, 6 pounds; and Bulbous bluegrass, 2 pounds.

2. Whitmar beardless wheatgrass, 8 pounds; and Bulbous bluegrass, 2 pounds.

Hay

1. Sherman big bluegrass, 4 pounds; and Ladak alfalfa, 2 pounds, seeded in alternate rows.

2. Sherman big bluegrass, 4 pounds.

METHODS OF PLANTING GRASSES

Among the several methods of planting grasses, the most satisfactory stands have been obtained by using a drill in a clean summer fallow. The drill can be adjusted to seed any desired rate and depth. If the stubble land is clean, grass can be successfully established by seeding the stubble in early fall. Since the grass grows very slowly during the seedling stage, the seed bed should be free of weeds.

The rate of seeding grass most suitable for pasture purposes is 5 to 8 pounds per acre. This will establish a stand uniform enough to prevent invasion of weeds. The depth should not be over 1 inch. Preferably it should be from $\frac{1}{4}$- to $\frac{1}{2}$-inch deep. Proper depth can be secured by using depth regulators on the furrow openers or having the hose fastened outside of the furrow openers. A drag chain may be used with the latter to cover the seed with about $\frac{1}{4}$ inch of soil.

The best time to seed grass is in the fall. If moisture conditions are suitable, grass can be sown from as early as September 1 to as last as January 1, but the ideal time is in October. Spring seeding is not recommended, except in years of high spring moisture.

Depending on the use to which the grass is to be put, row spacing may vary from 7 inches to 3 feet. The wider the row spacing, the additional care that is required to control the weeds that may invade the stand between the rows. The 14-inch row spacing seems to be the most satisfactory. Much wider spacings than this make the grass coarse and less desirable for pasture purposes, and--if the grass is cultivated for seed--seem to promote erosion.

Uniform stands of grass can be established by seeding a cereal nurse crop in alternate rows with grass. The grain yield of the nurse crops is approximately 80 per cent of normal, while at the same time satisfactory grass stands are established. The nurse crop can be cut for hay or left to mature for grain. The nurse crop utilizes the soil moisture that would otherwise be used up by the weeds, thereby providing a satisfactory weed-control measure. The ordinary double-run grain drill can be adjusted to seed the two crops in alternate rows by having removable partititions placed in the grain box. The rate of seeding for both the crops can be made at the same setting but for any desired variation. Reducers made of heavy wire can be used very effectively. Recommended rate of grass and nurse crop seeding is 8 pounds and 30 pounds, respectively. If rye is used as a nurse crop, the rate should be cut to 20 pounds per acre. Spring tensions should be lessened on the furrow openers of the drill sowing grass so that the seed will not be buried too deeply in the soil.

TREES AND SHRUBS FOR DRY LAND PLANTING

Several species of trees and shrubs are included in the Station forestry project for farm-home landscaping and windbreak purposes. Some trees on the Station are 28 years old, others are 20 years old. Trees are a valuable asset to any farm, both in improving rural living conditions and in increasing the value of the property.

Initial observational tests of woody species are carried on at the Soil Conservation Nursery at Pullman. Secondary tests are carried on cooperatively at experiment stations at Prosser and Lind, Washington, and Moro, Oregon. The present testing program at Lind was started in 1928 by the Dry Land Experiment Station and the Department of Forestry and Range Management, State College of Washington.

A standard dry-land windbreak planting consists of a minimum of five rows which, when properly established, give excellent protection from the winds.

Results to date indicate that bladdersenna and southernwood are equal to caragana in the erect shrub group, except that neither is quite so winter hardy. Since Russian olive contains an unidentified disease, tamarix appears to be the most promising intermediate shrub. American plum, Bitter Cherry, and Bush Cherry may replace the tamarix, but further testing is needed on these shrubs. Black locust is still the most promising deciduous tree. Other deciduous trees being tested include Green ash and Chinese elm. Austrian pine and Scotch pine are superior to Ponderosa pine in the evergreen group, and Douglas fir, Norway spruce, and Blue spruce appear to be adapted.

Table 7. Standard Species, Arrangement, and Spacing of Trees and Shrubs for Windbreak Plantings in the 8-10 Inch Rainfall Area.

Row No.	Species	Growth Habit	Spacing in Row	Minimum Distance From Next Row *
1	Caragana Southernwood	Erect shrub	3 ft.	18 ft.
2	Tamarix	Intermediate shrub	6 ft.	18 ft.
3 & 4	Black locust	Deciduous tree	12 ft.	18 ft.
5	Austrian pine Scotch pine Ponderosa pine Norway spruce	Evergreen	12 ft.	27 ft.

* Rows may be spaced wider apart if cultivation equipment requires it.

Farmers contemplating a shelterbelt planting should realize that considerable work is involved. To survive under dry-land conditions, trees require continuous clean cultivation. Row spacing between trees should be arranged so available machinery can be used. Trees and shrubs should be transplanted as soon as you get them. Pine and juniper require special care when transplanting. These trees should be unwrapped in water. The roots must not be exposed to sun and air for more than 30 seconds during transplanting. Instructions included with the shipment should be followed. If these suggestions are followed, good survival should be obtained, and the work required to maintain a shelterbelt will be at a minimum.