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Proso or Hog Millet

J. J. Curtis, J. F. Brandon, D. W. Robertson

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Proso or Hog Millet

J. J. CURTIS, J. F. BRANDON, D. W. ROBERTSON[1]

Contents

THIS BULLETIN gives the results of experiments with proso at the United States Dry-land Field Station near Akron, Colo.[2] from 1930 to 1936. Results of these experiments are believed to be of value in further stabilizing the production of this crop in Colorado.

Proso, locally called "Hershey," is one of the more important of the feed grain crops on the non-irrigated lands of eastern Colorado. It yields well on the hard lands in comparison with corn and barley, the other common feed grain crops of the region. It may be fed to the same classes of livestock with equally good results. When fed to livestock, preferably it should be mixed with about equal portions of either corn or barley. It is palatable to all classes of livestock, particularly to fattening hogs. When fed to hogs it may be the only grain in the ration. It produces no undesirable after-effects with hogs, such as soft, poorly colored, or disagreeably flavored meat. It is being used by some of the prominent cattle feeders of the state as a part of their fattening grain ration whenever the price is below that of other grains. It has been fed as a part of the grain ration to horses at the Akron Station, with no undesirable

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[2]The United States Dry-land Field Station, located in northeastern Colorado, at an altitude of about 4,600 feet, is operated by the Division of Dry-land Agriculture of the U. S. Department of Agriculture, in full cooperation with the Colorado Experiment Station. The cereal experiments at this station are under the care of a representative of the Division of Cereal Crops and Diseases of the U. S. Department of Agriculture, also in cooperation with the Colorado Experiment Station. Proso experiments were carried on at this station by the representative of the Division of Cereal Crops and Diseases from 1908 to 1924, by J. F. Brandon and D. W. Robertson from 1924 to 1930, and by J. J. Curtis from 1930 to the present time.

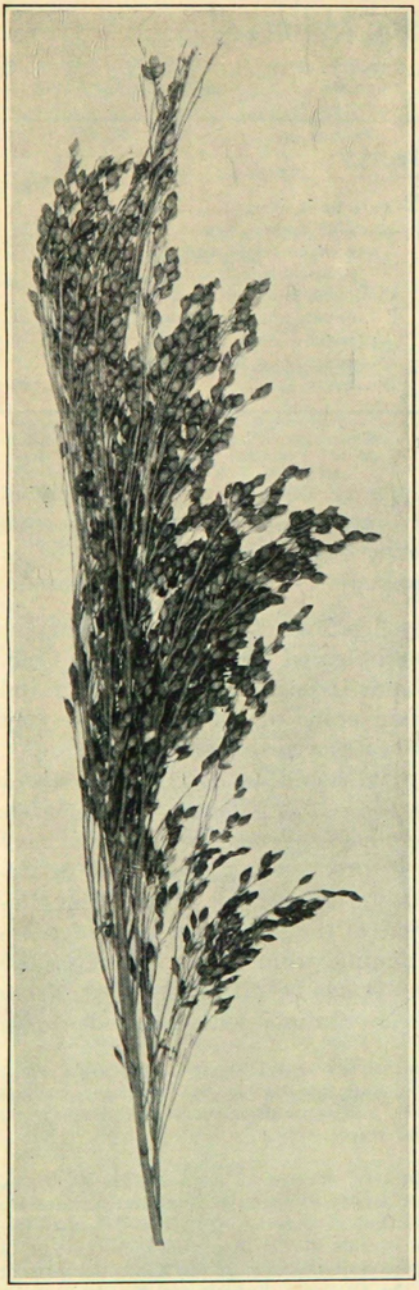

Fig. 1.—Head of proso or hog millet.

dietary disturbances. To get good results from feeding this grain, however, it must be very finely ground and then fed with the proper kind and quantity of protein and mineral supplements. It is not a complete feed in itself. It is just another of the carbonaceous grain feeds high in palatability. For further feeding results with the crop, the reader is referred to Colorado Experiment Station Bulletins 395 and 396.

Description

Proso has been grown in the United States since the Colonial period, but only to a slight extent. After certain better-adapted varieties were introduced by Russian immigrants into Minnesota and the Dakotas about 50 years ago, the acreage increased gradually. It has been grown in the Old World since historic times as an important grain crop for human food.[3]

In addition to the name proso, this crop is often called hog millet, Hershey, broomcorn millet, and proso millet. The name "Hershey" is frequently used in northeastern Colorado. The name "proso" will be used throughout this bulletin.

Proso is distinguished from the foxtail or hay millets by having an open-panicled head, similar to that of oats. The seed of proso is larger and not so tightly held in the hull as in the foxtail millets. When threshed

[3]Martin, J. H. Proso or Hog Millet. U. S. D. A. Farmers' Bul. 1162.

most of the seed remains enclosed in the hull. The hulls of different varieties of proso are of various shades and colors: white, cream, yellow, red, brown, gray, or black. The bran or seedcoat of all varieties is creamy white.

Proso has coarse, hollow, hairy, stems. At Akron the crop averages from 22 to 24 inches in height. It varies, however, in different varieties. White Ural, a short-growing variety, has been as short as 11 inches in a very unfavorable year, while White French, a tall variety, has grown to 52 inches in a favorable year.

The proso flowers may be either cross-fertilized or self- fertilized. A large percentage of the flowers are self-fertilized so that two varieties may be grown side by side without much cross-pollination. Pure seed supplies, however, should be grown at least 20 rods away from any other variety.

Adaptation in Colorado

Proso is sometimes referred to as being very drought-resistant. Seeded in season, it matures very quickly, often requiring only 60 to 65 days from seeding to maturity. It may make a fair crop with only from one to two consequential rains, i. e., 0.50 inch or more after seeding, if the seedbed has been prepared early and there is considerable stored moisture in the soil. Thus, the crop is more truly drought-evasive than drought-resistant, even though it does have the lowest water requirement of any of the crops tested at Akron.[4] Seeded in season, it may yield no better than other cereal crops. It is sometimes a complete failure in seasons when barley has produced good yields. Conversely, it sometimes produces good yields during seasons having delayed summer rains when barley fails or when both barley and corn produce poorly.

Proso is a relatively shallow-rooted crop, hence is better adapted to the hard than to the soft, or sandy, soils. Corn is so much better adapted to these sandy soils that it will outyield proso. This shallow-rooting habit may explain why the crop apparently lacks drought-resistance when moisture is scarce.

It is one of the quickest maturing of the cereal grain crops, hence it is adapted as a catch crop to many regions of Colorado. It is well adapted for seeding on "hailed-out" wheat land up to about July 10 at an altitude of about 4,600 feet.

Proso is not adapted as a major crop for the irrigated sections of Colorado except possibly where there is insufficient irrigation water at the proper time to produce a crop of barley or corn. It lacks the yielding capacity of both of these crops. It has a top limit in yield of about 60 bushels per acre in Colorado, and would probably lodge in attempting to carry any higher production. It might, how-

[4]See footnote 3.

ever, be used as a late-seeded catch crop under irrigation, but water should be used sparingly.

Proso is so well adapted as a major crop on the hard lands of the non-irrigated sections that it might well occupy a greater area than it does at present. For adaptation to other sections of the United States, see United States Deparment of Agriculture Farmers' Bulletin 1162.

Preparing the Seedbed

Fallowing is good preparation for proso, as the comparative yields reveal. However, unless half of the entire tilled area of a farm is fallowed each year, and additional diversification seems desirable, winter wheat, which also responds well to fallow, should be sown on the fallowed land because of a greater acre return.

Small-grain stubble land intended for proso should be worked early in the spring and then kept free from weeds up to seeding time. Generally, fall working of stubble is not beneficial to succeeding spring-sown crops in northeastern Colorado. In certain portions of southeastern Colorado, where the small-grain crop is harvested earlier, proso may benefit from early fall listing of the stubble land.

In preparing a seedbed for proso, the shovel-type implements, such as the spring-tooth harrow and the duckfoot cultivator, should be used where possible. An initial disking is sometimes necessary, especially if the stubble is weedy. The shovel implements leave the soil surface open and flocculent and in good condition to absorb spring rainfall and resist blowing.

Damming and basin listers are implements new on the market but well designed to conserve rainfall during the preparation of the seedbed. They form dams of earth automatically and at regular intervals that block the furrows made by the shovels and thus prevent the flow of water off the land. Precautions must be taken to keep weeds from growing on the land being prepared with these implements. They leave the surface very rough for seeding with a drill, but the extra work of packing and leveling may be compensated for when the normal number of hard, dashing rains occur during the spring.

Bean land and all row-crop land from which the crop residues have been harvested should be fall listed in order to better trap drifting winter snow and to resist almost certain winter and early spring soil blowing. These listed furrows may start to blow, but this conditon usually can be corrected by a cultivation with the row-crop cultivator.

Farming on the contour should be practiced where possible. This will further aid in trapping dashing rains until the water can percolate into the soil.

Proso needs a firm seedbed, making it necessary to level the furrows 3 or 4 weeks before seeding time, and then any further work should be with the shallow surface cultivating tools.

Place of Proso in Rotations

Proso being a late-seeded, short-season summer crop is well adapted to follow any other crop that may be grown in the rotation. For this reason, it may follow the most severe conditions of crop sequence such as after a crop of sorgo (cane).

Proso leaves a closely spaced stubble that is ideal for holding the soil in place over the dangerous winter soil-blowing period. It usually leaves a stubble largely free from weeds because the crop is harvested too late for weed growth after harvest. The surface of proso stubble land is nearly always loose and friable after the crop has been harvested, and winter wheat usually can be drilled in without any previous tillage. The stubble cover is then disturbed very little. This has proved to be very good preparation for winter wheat in the 6-year period from 1931 to 1936 at the Akron Station. The average yield of winter wheat on proso stubble for this period was 10.1 bushels per acre, compared with an average yield from corn land of 7.1 bushels per acre. Rotation studies indicate that proso leaves by far the best stubble for succeeding crops of any of the cereal small grains adapted to the dry lands of Colorado.

Methods of Planting

Proso is sown almost universally with a grain drill. Efforts to grow it in cultivated rows 42 inches apart at the Akron Station resulted in decidedly lower yields than from the drilled seedings. The plants in wide rows spread and lodged in the space between the rows to an extent that made harvesting with a binder extremely difficult and unsatisfactory.

The 8-inch disk drill has been used in the experiments at Akron, but satisfactory stands may be observed any year in fields that have been seeded with 12-inch or 14-inch furrow drills. While the closer spaced drills might enable the crop to contend with weeds better, the weed problem is determined largely by the way the seedbed has been prepared and by the time of seeding. The closer-spaced drills are to be preferred, but there is no reason why a grower cannot continue to use his furrow drill satisfactorily.

Proso is a poor competitor of weeds regardless of seeding method; hence, every reasonable effort should be made to create a weed-free seedbed by early working and then cultivating to destroy succeeding crops of weeds. If these precautions are followed, a comparatively weed-free seedbed should be ready about June 15.

Proso has very small grains. It germinates best when seeded in a moist, firm seedbed covered by about 1 inch of loose soil. Every

precaution should be taken to get proso started ahead of the weed crop. Successful stands have been obtained on land free from weeds and well supplied with subsoil moisture by delaying seeding after the best seeding date until a rain of three-fourths inch or more has wet the dry surface soil. The stirring of the soil in the seeding operation delays the germination of any remaining weed seed, and the crop with ample moisture at that season of the year will emerge within 3 to 5 days and start vigorous growth. Of course, in this section of the Great Plains one is not at all certain of getting an ample rain within the best seeding period. Such ideal conditions are well worth waiting for until the end of the safe seeding period, after which seeding can be done under less favorable circumstances, if necessary.

Methods of Harvesting

Proso heads ripen from the top downward. Harvesting too early results in immature seed on the lower portion of the head. Harvesting too late results in heavy loss from shattering.

Heading the crop with ordinary small-grain machinery when the heads are about two-thirds ripe is one of the very best ways of harvesting it. If headed, it may be allowed to get considerably riper than when it is cut with a binder. The action of the packers and the tying mechanism of the binder are particularly conducive to shattering, whereas the cutting and elevating causes relatively little shattering. Some growers arrange to run two headers and elevate the double swath into one windrow. Others have improvised or have secured boxes to catch the grain from the header and then dump it into sizeable piles. The choice seems to depend on the ultimate method planned for threshing. If a pick-up attachment for the combine harvester is available, the crop may be threshed readily from the windrow. If a thresher only is available, then the piles are loaded and hauled to the machine after they have field cured. Just as the header and combine harvester have largely displaced the old binder method of harvesting other cereal grains, they have improved the method of harvesting proso.

The crop is not adapted to direct combine harvesting because it shatters and lodges very soon after ripening and because the seed and straw contain too much moisture at harvest time. The harvested crop should be allowed to dry in piles or windrows before being picked up by the combine harvester and threshed.

If the binder is used, the crop must be cut just as soon as the top seeds show evidence of shattering. The stem and the leaves of the plant will still be green at that stage, but the bundles can be placed in small, narrow shocks where they will cure satisfactorily. In case of wet weather, precaution must be taken to air out the shocks to prevent damage to the grain.

Experimental Methods and Results

Rate-and-date-of-seeding and varietal experiments with proso have been conducted at the Akron Field Station for several years. In all these experiments the proso was sown with a common grain drill with 8-inch spacing between rows. An effort was made to place the seed about 1 inch deep. Alleys 16 inches wide were left between plots. All outside plots were protected by guard plots to eliminate border effect as much as possible.

Rate of Seeding

Experiments to determine the best rate of seeding proso have been carried on at the Akron Field Station since 1930. These have been seeded during the latter part of June on land cropped to beans the preceding year. Yellow Manitoba was seeded each year at the following rates per acre: 20, 28, 35, 48, and 58 pounds. All rates were sown in triplicate plots 0.04 acre in size. The highest average yield was obtained from sowing 58 pounds of seed per acre (table 1). However, the increase in yield over the 35-pound rate was only 0.8 bushel per acre. Under Akron conditions when sown with a drill, 35 pounds should be ample to secure a good stand. The light seeding rates were noticeably weedier than the heavier rates in all years, except 1936, when all plots were free from weeds.

Date of Seeding

Date-of-seeding experiments with proso have been conducted from 1930 to 1936. The land used for these tests was cropped to corn each preceding year and was worked early in the spring and then kept free from weeds until seeding. Both Turghai and Yellow Manitoba were seeded in triplicate plots on each seeding date. These dates were the first and middle of each month, beginning May 15 and ending August 1.

TABLE 1.—*Yields of Yellow Manitoba proso in a rate-of-seeding experiment at the Akron Field Station in the 7-year period, 1930 to 1936.*

Seeding rate	Grain yields in bushels per acre							
	1930	1931	1932	1933	1934	1935	1936	Average
Pounds								
20	30.3	18.2	20.4	9.8	2.7	6.9	16.1	14.9
28	33.3	19.6	20.5	12.2	4.1	8.8	16.1	16.4
35	34.2	19.5	23.9	16.3	3.4	8.6	14.7	17.2
48	33.7	19.3	22.7	17.4	3.6	9.4	14.2	17.2
58	36.9	18.9	24.0	17.9	3.4	9.9	14.7	18.0

Table 2 gives the results of the date-of-seeding tests. The highest yields for both varieties were obtained when they were seeded on July 1. The yields of proso seeded on June 15 were slightly lower

than when sown on July 1. A failure occurred, however, in 1 year of the 7 when seeded on the former date. Three failures out of seven occurred in the July 15 seedings, and accordingly this date of seeding cannot be recommended. The data presented show that good yields can be obtained by seeding proso between June 15 and July 1. Earlier or later seedings failed in at least 2 years of the 7 in which the experiments were conducted. The May 15 and June 1 seedings were very weedy in 6 of the 7 years. Later seedings were comparatively free from weeds.

Varietal Tests

The varietal tests with proso at Akron were begun in 1909. Field plots were grown that year and from 1912 to 1923, inclusive. The results obtained in the earlier experiments are reported in Colorado Experiment Station Bulletin 383. The results obtained from experiments beginning in 1930 are discussed here. The date of seeding of the varietal test ranged from June 16 to July 11 during this period. The average date was June 26. The date of seeding was determined by the condition of the seedbed, a rain generally being considered necessary to furnish moisture for germination. Seeding was done as soon as the ground was dry enough after a rain.

The seeding rate was 20 pounds per acre in 1930 and 1931 and 35 pounds per acre thereafter.

TABLE 2.—*Annual and average yields of proso seeded on different dates at the Akron Field Station in the 7-year period, 1930 to 1936.*

Date sown	Grain yields in bushels per acre							
	1930	1931	1932	1933	1934	1935	1936	Average
				Yellow Manitoba				
May 15	3.4	4.2	6.9	0	0	7.1	7.3	4.1
June 1	13.4	5.4	8.9	0	0	7.7	4.5	5.7
June 15	5.5	2.1	10.0	11.3	0	7.0	9.8	6.5
July 1	10.8	0.5	10.9	12.8	2.3	4.8	9.6	7.4
July 15	10.3	0	6.4	23.8	0	0	3.4	6.3
Aug. 1	14.5	0	.....	10.5	.....	0	0	5.0
				Turghai				
May 15	3.3	3.0	5.2	0	0	6.6	12.0	4.3
June 1	3.9	4.9	8.0	0	0	6.9	5.5	4.2
June 15	3.4	1.9	13.1	6.4	0	7.3	10.9	6.1
July 1	9.4	1.7	15.6	11.9	2.4	6.9	8.7	8.1
July 15	15.6	0	9.7	23.8	0	0	3.8	7.6
Aug. 1	.....	0	7.1	10.9	.....	0	0	4.5

The experiments were seeded on both fallowed and cropped land in all 7 years. Two plots of each variety were sown on fallowed land and two on land cropped to Sudan grass that had been sown with a grain drill. The plots were 1/60 acre in size.

Fig. 2.—Millet cut with combine and windrow attachment.

Yield of Varieties Under Akron Conditions

Table 3 gives the average yield in bushels per acre for the various varieties grown on fallow and Sudan-grass stubble. The highest yield of grain was obtained from Turghai. Red Russian, Tambov, and Yellow Manitoba yielded from 1 bushel to 1.5 bushels less. Early Fortune, however, did not produce as well. It yielded, on the average, 4.5 bushels less than Turghai.

The yield of straw is given in table 4. It will be seen that Yellow Manitoba gave the highest yield of straw, averaging 1,865 pounds per acre. White French, a variety not grown commercially in this section, yielded slightly less, and Turghai ranked third in straw yield. Turghai yielded 217 pounds per acre less straw than Yellow Manitoba.

The data again indicate, as has been shown previously in Colorado Experiment Station Bulletin 383, that Turghai is the highest yielding variety for grain in northeastern Colorado. Yellow Manitoba, a common commercial variety in this section, also is recommended, and in seasons when the straw is short the greater height of Yellow Manitoba is of advantage in harvesting.

TABLE 3.—*Annual and average yield of proso on fallow and Sudan-grass stubble at the Akron Field Station during 3 or 7 years, 1930 to 1936, inclusive.*

Variety	Grain yields in bushels per acre							Average for years grown	Average Turghai, same period
	1930	1931	1932	1933	1934	1935	1936		
White Ural	27.4	3.0	4.8	9.1	0.6	8.4	9.5	9.0	15.9
Tambov	42.6	8.2	11.2	11.9	2.1	10.7	16.9	14.8	15.9
Early Fortune	37.1	4.8	7.9	8.8	1.7	6.8	12.5	11.4	15.9
Red Russian	43.5	7.9	10.3	13.9	1.8	10.0	16.4	14.8	15.9
Hansen White Siberian	37.2	7.6	8.6	14.4	2.0	10.0	11.5	13.0	15.9
Turghai	48.9	12.3	10.0	14.8	2.2	9.9	13.1	15.9	15.9
Yellow Manitoba	38.8	12.1	9.3	15.3	2.8	9.6	13.0	14.4	15.9
White French	14.4	4.3	2.6	8.3	1.1	2.4	2.6	5.1	15.9
Black Voronezh	37.2	8.7	7.8	9.4	2.6	8.7	15.2	12.8	15.9
Vladimir (C. I.[1] 217)	.....	.....	.....	.....	1.3	4.7	10.7	5.6	8.4
Deerbrook (C. I. 298)	.....	.....	.....	.....	1.4	2.8	11.1	5.1	8.4

[1]C. I. refers to accession number of the Division of Cereal Crops and Diseases, formerly Office of Cereal Investigations.

TABLE 4.—*Annual and average straw yield of proso grown on fallow and Sudan-grass stubble at the Akron Field Station for 3 or 7 years, 1930 to 1936, inclusive.*

Variety	Straw yield pounds per acre							Average for years grown	Average Turghai, same period
	1930	1931	1932	1933	1934	1935	1936		
White Ural	2744	285	551	500	189	630	1194	870	1648
Tambov	4818	518	975	911	368	746	2012	1478	1648
Early Fortune	3848	255	661	714	267	417	1309	1067	1648
Red Russian	5273	536	836	1140	657	783	2052	1611	1648
Hansen White Siberian	3693	488	1107	1257	413	762	2301	1432	1648
Turghai	4614	720	1139	1571	390	867	2232	1648	1648
Yellow Manitoba	6153	720	1253	1506	497	837	2087	1865	1648
White French	4518	818	1388	1772	465	1308	1797	1724	1648
Black Voronezh	3621	747	836	632	341	870	2225	1325	1648
Vladimir (C. I.[1] 217)	.....	.....	.....	.....	335	378	1197	637	1163
Deerbrook (C. I. 298)	.....	.....	.....	.....	317	213	1337	622	1163

[1]C. I. refers to accession number of the Division of Cereal Crops and Diseases, formerly Office of Cereal Investigations.

Comparison of Fallowed Land and Sudan-grass Stubble for Proso

The grain yields after fallow and after Sudan-grass stubble are given in table 5. On the Sudan-grass stubble, failures in 2 years are recorded for several of the varieties. The lowest average yield for any year on summer-fallowed land is 3.6 bushels in 1934. A complete failure of all varieties tested occurred on the Sudan-grass stubble that year. The average yield for all varieties following summer fallow is 15.1 bushels for the 7-year period and 8.4 bushels on the Sudan-grass stubble. Considering the yield after summer fallow as

Fig. 3.—Field of Yellow Manitoba near Akron Field Station, August 23, 1930.

100 percent, the yield on Sudan-grass stubble is 55.8 percent, or slightly more than half.

The yield of straw after fallow and after Sudan-grass stubble is given in table 6. The average production of straw on Sudan-grass stubble was about 58.8 percent of that of all varieties on summer-fallowed land.

The above data show that the yield of grain on summer-fallowed land is nearly double that obtained on Sudan-grass stubble and that the frequency of failure is reduced by sowing proso on fallowed land.

Fig. 4.—Proso variety test plats at Akron Field Station, August 20, 1930.

Agronomic Data

The number of days from seeding to maturity (table 7) ranged from 62 for White Ural to 80 for Black Voronezh. Turghai and Yellow Manitoba averaged about 70 days. This shows the possibility of growing proso as a catch crop on land where an earlier seeded crop has failed or where early moisture conditions did not justify the seeding of another crop.

TABLE 5.—*Annual and average yields of proso grown on fallow and Sudan-grass stubble at the Akron Field Station for 3 or 7 years, 1930 to 1936, inclusive.*

Variety	C. I.[1] no.	Yield of grain in bushels per acre							Average for years grown	Average Turghai, same period
		1930[2]	1931	1932	1933	1934	1935	1936		
					Fallow					
White Ural	4	27.1	5.9	7.8	10.4	1.1	9.6	14.8	11.0	20.6
Tambov	13	40.6	16.3	20.3	14.1	4.2	12.2	25.0	19.0	20.6
Early Fortune	23	37.6	9.6	14.0	10.2	3.4	8.3	19.8	14.7	20.6
Red Russian	11	44.0	15.7	15.6	16.6	3.5	10.9	23.1	18.5	20.6
Hansen White Siberian	183	35.3	15.0	14.3	14.7	3.9	12.9	16.4	16.1	20.6
Turghai	31	49.4	22.5	17.3	18.2	4.5	12.0	20.6	20.6	20.6
Yellow Manitoba	101	36.9	23.5	16.1	20.2	5.6	12.3	19.3	19.1	20.6
White French	239	14.0	7.4	4.5	10.2	2.2	2.4	3.5	6.3	20.6
Black Voronezh	16	36.2	17.2	13.9	10.8	5.3	11.2	22.3	16.7	20.6
Vladimir	217	.....	.....	.....	.....	2.6	7.3	15.3	8.4	12.4
Deerbrook	298	.....	.....	.....	.....	2.9	5.5	15.8	8.1	12.4
					Sudan-grass stubble					
White Ural	4	27.7	0	1.9	7.8	0	7.3	4.3	7.0	11.2
Tambov	13	44.5	0	2.2	9.7	0	9.1	8.8	10.6	11.2
Early Fortune	23	36.7	0	1.8	7.4	0	5.4	5.1	8.1	11.2
Red Russian	11	43.7	0	5.0	11.2	0	9.0	9.7	11.2	11.2
Hansen White Siberian	183	39.1	0.2	2.9	14.1	0	7.2	6.7	10.0	11.2
Turghai	31	48.4	2.1	2.6	11.5	0	7.8	5.7	11.2	11.2
Yellow Manitoba	101	40.7	0.8	2.5	10.5	0	7.0	6.7	9.7	11.2
White French	239	14.9	1.1	0.6	6.4	0	2.3	1.6	3.8	11.2
Black Voronezh	16	38.1	0.3	1.8	8.1	0	6.2	8.1	8.9	11.2
Vladimir	217	.....	.....	.....	.....	0	2.1	6.2	2.8	4.5
Deerbrook	298	.....	.....	.....	.....	0	0	6.4	2.1	4.5

[1] C. I. refers to accession number of the Division of Cereal Crops and Diseases, formerly Office of Cereal Investigations.

[2] Small-grain stubble.

TABLE 6.—*Annual and average yields of proso straw grown on fallow and Sudan-grass stubble at the Akron Field Station for 3 or 7 years, 1930 to 1936, inclusive.*

Variety	C. I.[1] no.	Yield in pounds per acre							Average for years grown	Average Turghai, same period
		1930[2]	1931	1932	1933	1934	1935	1936		
Fallow										
White Ural	4	2835	570	741	555	377	750	1719	1078	2100
Tambov	13	4926	1035	1380	1116	735	966	2745	1843	2100
Early Fortune	23	3600	510	927	783	534	570	2274	1314	2100
Red Russian	11	4590	1071	1080	1344	1314	1020	2739	1880	2100
Hansen White Siberian	183	4326	960	1494	1260	825	1074	3069	1858	2100
Turghai	31	5187	1290	1596	1830	780	1050	2970	2100	2100
Yellow Manitoba	101	6186	1386	1770	1737	993	1089	2829	2284	2100
White French	239	4620	1536	1935	2007	930	1680	2535	2178	2100
Black Voronezh	16	4125	1440	1200	720	681	1101	2994	1752	2100
Vladimir	217	.....	.....	.....	.....	669	585	1644	966	1600
Deerbrook	298	.....	.....	.....	.....	633	426	1845	968	1600
Sudan-grass stubble										
White Ural	4	2652	0	360	444	0	510	669	662	1194
Tambov	13	4710	0	570	705	0	525	1278	1113	1194
Early Fortune	23	4095	0	396	645	0	264	744	878	1194
Red Russian	11	5955	0	591	936	0	546	1365	1342	1194
Hansen White Siberian	183	3060	15	720	1254	0	450	1533	1005	1194
Turghai	31	4041	150	681	1311	0	684	1494	1194	1194
Yellow Manitoba	101	6120	54	735	1275	0	585	1344	1445	1194
White French	239	4416	99	840	1536	0	936	1059	1269	1194
Black Voronezh	16	3117	54	471	543	0	639	1455	897	1194
Vladimir	217	.....	.....	.....	.....	0	171	750	307	726
Deerbrook	298	.....	.....	.....	.....	0	0	864	288	726

[1]C. I. refers to accession number of the Division of Cereal Crops and Diseases, formerly Office of Cereal Investigations.

[2]Small-grain stubble.

TABLE 7.—*Average agronomic data on proso varieties grown at the Akron Field Station. (Average for 7 years, 1930 to 1936, inclusive.)*

Variety	Dates		First headed	Fully ripe	Plant height	Average days from seeding until ripe
	Seeded	Emerged				
					Inches	
White Ural	June 25	July 2	July 25	Aug. 26	17	62
Tambov	June 25	July 2	July 27	Aug. 30	20	66
Early Fortune	June 25	July 2	July 26	Aug. 28	18	64
Red Russian	June 25	July 2	July 28	Aug. 29	21	65
Hansen White Siberian	June 25	July 2	July 29	Aug. 31	23	67
Turghai	June 25	July 2	July 29	Sept. 3	22	70
Yellow Manitoba	June 25	July 2	July 30	Sept. 3	23	70
White French	June 25	July 2	July 26	Sept. 1	22	68
Black Voronezh	June 25	July 2	Aug. 8	Sept. 13	30	80

Turghai required from 67 to 74 days from seeding until ripe and averaged 70 days.

Characteristics of Proso Varieties

Turghai has spreading panicles and yellowish-brown seed. Tambov and Red Russian have spreading panicles and reddish-brown seed. Early Fortune has a compact-type head and large, reddish-brown seed.

Yellow Manitoba, the variety commonly grown in this section, has a loose, one-sided head and yellowish seed. Black Voronezh has a similar-type head and brownish-black seed.

Both White French and White Ural have white seed. White French grows much taller than other proso, has a coarse stalk, and is extremely late in maturity. White Ural has a spreading panicle and is very short as compared with other varieties. It is the earliest variety grown. White French and White Ural are not adapted to this section. The two gray-seeded varieties, Vladimir and Deerbrook, were not promising in the 3 years they were grown in these experiments.

SUMMARY

Proso, locally called "Hershey," is one of the more important feed grain crops on the non-irrigated lands of eastern Colorado. It is well adapted to the hard lands but less productive than corn on sandy lands. Proso is palatable to all classes of livestock and may be fed to hogs as the only grain in the ration. Proso is grown largely as a short-season, late-sown catch crop and as such may follow or precede any other annual crop satisfactorily.

Experiments indicate that proso should be sown with a grain drill immediately after a rain, about June 15 to July 1, at a rate of about 35 pounds of seed per acre. Seeding before or after these dates has given reduced yields. Seeding as much as 58 pounds per acre has produced about the same yield as was obtained from 35 pounds of seed.

Turghai, an open-panicled variety with yellowish-brown seed, has given the highest average yield, 15.9 bushels, in a 7-year period. Yellow Manitoba, a yellow-seeded variety commonly grown in this section, yielded slightly less, 14.4 bushels, in the same period. These varieties reached maturity in about 70 days after seeding.

The average yield of all varieties tested was 15.1 bushels on summer-fallowed land and 8.4 bushels on Sudan-grass stubble. No failures occurred on summer-fallowed land, whereas two failures occurred on Sudan-grass stubble. The average yields of Turghai and Yellow Manitoba on summer-fallowed land were 20.6 bushels and 19.1 bushels, respectively.