

2129

U. S. DEPARTMENT OF AGRICULTURE.

DIVISION OF BOTANY.

INVENTORY NO. 4.

CEREALS AND FORAGE PLANTS

COLLECTED IN RUSSIA BY MR. M. A. CARLETON FOR THE
SECTION OF SEED AND PLANT INTRODUCTION.

INVENTORY OF CEREALS AND FORAGE PLANTS COLLECTED IN RUSSIA.

The cereals and forage plants included in the following list were obtained by Mr. M. A. Carleton, of the Division of Vegetable Physiology and Pathology, who visited Russia in 1898 under detail as Agricultural Explorer of the Section of Seed and Plant Introduction. The primary purpose of this investigation was to secure superior varieties of cereals, especially such as might be adapted to the grain-producing Northwestern States. From the notes prepared by Mr. Carleton it appears that he has succeeded in securing several varieties of much promise, since they are adapted to cold climates, have a short growing season, and are resistant to fungous diseases. This is particularly the case with the wheats, in the special study of which Mr. Carleton has long been engaged. The other items, while of subsidiary importance, may also prove valuable. In addition to those enumerated in the present list, Mr. Carleton brought back a considerable number of samples of miscellaneous seeds of garden vegetables and other annuals. These will be catalogued in a later inventory.

Experimental quantities of these cereals and forage plants have been sent out to the Western agricultural stations and to a few private experimenters. In but few cases is the amount of seed sufficient to permit wider distribution at present, but in the event of conspicuous success with any of these importations larger quantities will be made available in future seasons.

O. F. COOK,

Special Agent in Charge of Seed and Plant Introduction.

WASHINGTON, D. C., April 15, 1899.

INVENTORY.

2788. AVENA SATIVA.

Oat.

From Russia. Received March, 1899, through Mr. M. A. Carleton.

Swedish Select oat. From the government of St. Petersburg. Mean annual rainfall, 18½ inches; for the growing season (May to September, inclusive), 10½ inches. Mean annual temperature, 38.6°. Soil, a dark humus clay with considerable sand intermixed. Sown April 27. Period of growth, 106 to 108 days. A very large-grained white oat, much improved from the original seed, which was introduced from Sweden into Finland and the St. Petersburg government. Well suited for trial in western New York, Michigan, Wisconsin, Minnesota, Iowa, eastern North and South Dakota, and perhaps southern Alaska. Amount obtained, 20 bushels.

2789. TRITICUM DICOCBUM.**Emmer.**

From Russia. Received March, 1899, through Mr. M. A. Carleton.

Yaroslaf Spring emmer. From the government of Yaroslaf. Mean annual rainfall, a little over 20 inches; for the growing season (May to September, inclusive), a little more than 12 inches. Soil, sandy, with considerable clay, but very little humus. Sown in Yaroslaf about May 1, but in this country should be sown earlier, depending, however, upon the latitude where tried. Period of growth, 108 to 112 days. Seed should always be drilled in, at the rate of $2\frac{1}{2}$ to $2\frac{1}{2}$ bushels per acre. A hardy cereal, little known in this country, but considered a very valuable one in parts of Russia. The hull remains on the seed similarly as in oats and barley. The seed is used both for stock feed and for human food; in the latter case in the form of gruel. It is a variety of *Triticum dicoccum*, called correctly "emmer," but known also as Russian spelt. The Russian name is "polba." Adapted for trial in all States from New York to the Dakotas and Kansas and in Washington and Oregon. Amount obtained, 18 bushels.

2790. SECALE CEREALE.**Rye.**

From Russia. Received March, 1899, through Mr. M. A. Carleton.

Teshitin Winter rye. From the government of Tver. Annual rainfall, 18 to 21 inches; for the growing season (May to September, inclusive), 11 or 12 inches. Soil, a sandy clay and very poor. Harvested July 12 to 15. An excellent variety of rye, well adapted to all the States from New York to the Dakotas and southward to Kentucky and Kansas, and possibly to southern Alaska. Amount obtained, 18 bushels.

2791. TRITICUM VULGARE.**Wheat.**

From Russia. Received March, 1889, through Mr. M. A. Carleton.

Yaroslaf Winter wheat. From the government of Yaroslaf. Mean annual rainfall near 21 inches; for the growing season (May to September, inclusive), $11\frac{1}{2}$ to 12 inches. Soil, a strong clay, well manured and well drained. Sown September 9; harvested July 24. Yield, about 18 bushels per acre. A semihard red wheat, which ought to be rather resistant to severe winters. Should be tried in Iowa, eastern South Dakota, northern Nebraska, Michigan, southern Wisconsin and Minnesota, and northern New York, to replace spring wheat, if possible. Amount obtained, 9 bushels.

2792. TRITICUM VULGARE.**Wheat.**

From Russia. Received March, 1899, through Mr. M. A. Carleton.

Yaroslaf Winter wheat. From the government of St. Petersburg. Mean annual rainfall, $18\frac{1}{2}$ inches; for the growing season (May to September, inclusive), $10\frac{1}{2}$ inches. Mean annual temperature, 38.6° . Soil, a clay loam, rich in humus. Sown in well-prepared ground September 4, and harvested July 24. Yield, 20 bushels per acre. A semihard red wheat, which should be very resistant to winter cold. Should be tried in northern New York, Wisconsin, Minnesota, Iowa, western North and South Dakota, and southern Alaska, to replace spring wheat, if possible. Amount obtained, 9 bushels.

2793. HORDEUM VULGARE.**Barley.**

From Russia. Received March, 1899, through Mr. M. A. Carleton.

Kostroma Spring barley. From the government of Kostroma. Mean annual rainfall, about 20 inches; for the growing season (May to September, inclusive), 12 inches. Soil, sandy clay loam, well manured. Sown during the first week of May, about $1\frac{1}{2}$ bushels per acre. Ripens in 88 days. Yields about 26 bushels per acre. In Russia this sort is especially used for beer brewing. It is well suited to a rather cold climate, not very wet. Might well be tried in any of the Northwestern States from Michigan to the Dakotas. Amount obtained, $1\frac{1}{2}$ bushels.

2794. PANICUM MILIACEUM.**Millet.**

From Russia. Received March, 1899, through Mr. M. A. Carleton.

Tambov Broom-corn millet. From the vicinity of Morzhansk, in northern Tambov government. Mean annual rainfall, about 20 inches; for the growing season (May to September, inclusive), about 10 inches. Soil, sandy black loam, rather rich

in humus. Sown at Morzhansk during the last week of May, but should probably be sown earlier in this country—near May 15, perhaps. Period of growth about 112 days. It is best drilled in, at the rate of 12 to 15 pounds of seed per acre. Yields anywhere from 18 to 50 bushels per acre, depending upon treatment and the nature of the season. A yellow-seeded, panicle millet (*Panicum miliaceum*), much different from the ordinary forage millets. This particular sort is a new variety, not well known yet even in Russia, but said to give excellent results. Grown chiefly for the seed, which, besides furnishing excellent stock feed, is extensively used in Russia for human food in the form of grits or gruel and with soups. Should be tried in the Dakotas, Nebraska, east Colorado, Minnesota, and Iowa, and perhaps in Wyoming, Montana, and Washington. Amount obtained, 9 bushels.

2795. PANICUM MILIACEUM.

Millet.

From Russia. Received March, 1899, through Mr. M. A. Carleton.

Black Voronezh Broom-corn millet. From the government of Voronezh. Mean annual rainfall, 20 to 21 inches; for the growing season (May to September, inclusive), 10 to 11 inches. Soil, sandy black loam, rather rich in humus. Sown in Voronezh during the last week of May, but should probably be sown a little earlier in this country—soon after May 15, or earlier. Period of growth about 112 days. It is best drilled in at the rate of 12 to 15 pounds per acre. Yields anywhere from 18 to 50 bushels per acre, depending upon the treatment and the kind of season. A black-seeded, panicle millet (*Panicum miliaceum nigrum*), quite different from the ordinary forage millets of the prairie States. Grown chiefly for the seed, which, besides being excellent stock feed, is also extensively used in Russia for human food in the form of grits or gruel and with soups. Well adapted for trial in almost all the prairie States, especially in the drier, colder districts. Amount obtained, 9 bushels.

2796. PANICUM MILIACEUM.

Millet.

From Russia. Received March, 1899, through Mr. M. A. Carleton.

Red Voronezh Broom-corn millet. From the government of Voronezh. Mean annual rainfall, 20 to 21 inches; for the growing season (May to September, inclusive), 10 to 11 inches. Mean annual temperature, 41.1°. Soil, sandy black loam, rather rich in humus. Sown in Voronezh during the last week of May, but probably should be sown a little earlier in this country—soon after May 15. Period of growth about 115 days. It is best drilled in at the rate of 12 to 15 pounds per acre. Yields anywhere from 18 to 50 bushels per acre, depending upon treatment and the season. A red-seeded, panicle millet (*Panicum miliaceum*), but having the compacted form of panicle. Grown chiefly for the seed, which, besides being good stock feed, is extensively used in Russia for human food in the form of grits or gruel and with soups. Well adapted for trial in almost all the prairie States, but especially the drier, colder districts. Amount obtained, 3 bushels.

2797. PANICUM MILIACEUM.

Millet.

From Russia. Received March, 1899, through Mr. M. A. Carleton.

Red Russian Broom-corn millet. From the government of Voronezh. Mean annual rainfall, 20 to 21 inches; for the growing season (May to September, inclusive), 10 to 11 inches. Mean annual temperature, 41.1°. Soil, sandy black loam, rather rich in humus. Sown in Voronezh during the last week of May, but probably should be sown a little earlier in this country—about May 15, or before. Period of growth about 115 days. It is best drilled in at the rate of 12 to 15 pounds of seed per acre. Yields anywhere from 18 to 50 bushels per acre, depending upon treatment and the season. A red-seeded, panicle millet (*Panicum miliaceum*), but varying greatly as to the form of panicle. Grown chiefly for the seed, which, besides being good stock feed, is extensively used in Russia for human food in the form of grits or gruel and with soups. Well adapted for trial in almost all the prairie States, but especially in the drier, colder districts. Amount obtained, 3 bushels.

2798. CHAETOCHELOA ITALICA.

Millet.

From Russia. Received March, 1899, through Mr. M. A. Carleton.

Kursk millet. From the government of Kursk. Mean annual rainfall, about 21 inches; for the growing season (May to September, inclusive), about 11 inches. Soil, a sandy, black, clay loam, rather rich in humus. Sown at the usual time for sowing forage millets. Best drilled in at the rate of 25 to 30 pounds per acre. A very good sort of the ordinary German millet, until recently known as *Panicum germanicum* or

Setaria germanica, now regarded as one of the numerous varieties of *Chatochloa italica*. In Kursk, grown only for the forage it produces. Suitable for trial in the north Central States from Ohio to Kansas. Amount obtained, $1\frac{1}{2}$ bushels.

2799. ZEA MAYS.

Sugar Corn.

From Russia. Received March, 1899, through Mr. M. A. Carleton.

Malakhof Sugar corn. From the government of Tula. Mean annual rainfall, near 21 inches; for the growing season (May to September, inclusive), about 11 inches. Considered in that region excellent sugar corn, and especially one that ripens very early. Suitable for trial in Iowa, Nebraska, Kansas, and perhaps South Dakota, Michigan, and Illinois. Amount obtained, $\frac{3}{8}$ bushel.

2800. AVENA SATIVA.

Oat.

From Russia. Received March, 1899, through Mr. M. A. Carleton.

Tobolsk oats. From Tobolsk government. Mean annual rainfall, about 18 inches; for the growing season (May to September, inclusive), 12 inches. Mean annual temperature, 31.7° ; for the growing season, 56.5° . Seems an excellent sort of white oats for a cold climate. Should be tried in northern New York, Wisconsin, Minnesota, North Dakota, and southern Alaska. Amount obtained, 12 bushels.

2801. FAGOPYRUM FAGOPYRUM.

Buckwheat.

From Russia. Received March, 1899, through Mr. M. A. Carleton.

Orenburg buckwheat. From the government of Orenburg. Mean annual rainfall, 15.5 inches; for the growing season (May to September, inclusive), 8 inches. Mean annual temperature, 37.9° ; for January, 4.5° ; for July, 68.8° . Soil, black, sandy loam. Sown as soon as there are no longer night frosts of any importance, at the rate of $1\frac{1}{2}$ bushels per acre. Period of growth about 90 days. A very large-seeded buckwheat, of a deep brown color, wingless. Grown much in east Russia and west Siberia. A sort of gruel is often made of the hulled seed, or it is compacted into cake form and served with soups. Should be tried in the Great Plains from Oklahoma or Kansas northward, and in portions of the mountain States and perhaps in Iowa and Minnesota. Amount obtained, 15 bushels.

2802. LATHYRUS SYLVESTRIS WAGNERI.

Flat Pea.

From Russia. Received March, 1899, through Mr. M. A. Carleton.

Tambov Flat pea. From the government of Tambov. Mean annual rainfall, 20 inches; for the growing season (May to September, inclusive), 10 inches. Considered an excellent forage plant in the drier regions, though it is slow in obtaining a start. Suitable for the Plains States north of Oklahoma. Amount obtained, $\frac{3}{8}$ bushel.

2804. POLYGONUM WEYRICHII.

From Russia. Received March, 1899, through Mr. M. A. Carleton.

Originally from the island of Sachalin, and recently grown in the government of Kief. This perennial plant was discovered by a Russian physician, Dr. Weyrich, and first introduced from Sachalin by Prof. A. T. Batalin, and grown at the Imperial Botanical Gardens at St. Petersburg. It seems to have all the good qualities of sachalin (*Polygonum sachalinense*), and at the same time the leaves are tender and the branches not woody, as in the case of the other plant, which was its chief objection. Should be tried wherever the plant sachalin has been most successful. Amount obtained, 2 pounds.

2953. TRITICUM DURUM.

Wheat.

From Russia. Received March, 1899, through Mr. M. A. Carleton.

Kubanka Spring wheat. From the Turgai territory in the Kirghiz Steppes, 40 miles southeast of Orenburg. Grown by Mr. Gnyezdilof. Average rainfall for the year, about 15 inches or a little less; for the growing season (May to September, inclusive), about 8 inches. The last season was an unusually dry one. Summer short but very hot. Soil much grayer than the usual black earth, with a greater mixture of clay, and also considerable sand. The common custom is to plow the ground the preceding autumn, and then stir the surface again before sowing in the spring. Period of growth in this region about 100 days. Mean time of harvest,

August 10 to 12. The wheat is a *durum*, extremely hard, and of excellent quality. The best bread wheat in the Volga-Ural region, but may be received complainingly by our millers; 10 to 25 per cent of a softer red wheat, however, is mixed with it in grinding. It is very drought resistant, and considerably resistant to orange-leaf rust. Suitable for trial in this country in extreme western Nebraska, Kansas, the Dakotas, east Colorado, Texas Panhandle, and perhaps the Columbia plains and New Mexico. This variety might be transformed into a winter sort in warm latitudes. Amount obtained, 6 bushels.

2954. TRITICUM DURUM.

Wheat.

From Russia. Received March, 1899, through Mr. M. A. Carleton.

Pererodka Spring wheat. From Orsk district, Orenburg government. Average annual rainfall of the region, about 15 inches; for the growing season (May to September, inclusive), about 8 inches. The last season was an unusually dry one. Mean annual temperature, 37.9°. Soil, the usual "black earth" of east Russia, though perhaps not so dark as in the Samara government; similar to west Nebraska or east Colorado soil. Should be sown early. Period of growth about 100 days. Harvest time, August 10 to 12. Sown in soil plowed the previous autumn. It is a wheat allied to the Kubanka, and said to be originally identical, but it is a little darker and perhaps softer, and has become changed by transference to darker, richer soils. A hard wheat, making good bread, but hardly so good as Kubanka. It is a very drought-resisting variety. In this country it may well be tried in the Dakotas, Minnesota, Nebraska, Kansas, and perhaps Oklahoma, east Colorado, Texas, and Columbia plains. Amount obtained, 6 bushels.

2955. TRITICUM VULGARE.

Wheat.

From Russia. Received March, 1899, through Mr. M. A. Carleton.

Russian Spring wheat. From the Kirghiz Steppes, in the vicinity of Orenburg. Mean annual rainfall of the region, about 15 inches; for the growing season (May to September, inclusive), about 8 inches. Summers short but very hot. Soil, the rich "black earth" of the Russian plains, but probably not so dark as in Samara government; much like west Dakota soils. Wheat should be sown early. Period of growth about 100 days. Mean harvest time, August 10 to 12. Sown in soil that was plowed the previous autumn. Rather a small-grained, hard, or semihard red wheat. Makes a very good bread flour itself, but is also used to mix with Kubanka by millers of the Volga region. Suitable for trial in this country in the Dakotas and Minnesota particularly, but might also be transformed into a good winter wheat in districts farther south. Amount obtained, 6 bushels.

2956. TRITICUM VULGARE.

Wheat.

From Russia. Received March, 1899, through Mr. M. A. Carleton.

Banatka Winter wheat. From Kublich, in eastern Podolia, but introduced there originally from the Banat district in Hungary. Mean annual rainfall of the region, about 18 inches; for the growing season (May to September, inclusive), about 10 inches. Mean annual temperature, near 44.6°. The locality is near the edge of the "black earth" belt, and therefore partakes also somewhat of the nature of the soils of the "gray forest lands." The wheat is probably adapted to almost any medium soil of our prairie region, or even of New York. Should be sown early (September 10 to 15). Mean harvest time, July 27. An excellent semihard red wheat, of medium-sized grains. Very popular in Hungary, but made perhaps all the better by acclimation in Russia. Suitable for trial in Michigan, Ohio, New York, Indiana, Illinois, Kansas, and perhaps Nebraska and Iowa. Amount obtained, 9 bushels.

2957. TRITICUM POLONICUM.

Wheat.

From Russia. Received March, 1899, through Mr. M. A. Carleton.

Polish wheat. From Glinyayaya, in northern part of Kherson government. Mean annual rainfall of the region, about 20 inches. Mean annual temperature, about 44.6°. Sown in this region about April 15, but the seed time varies exceedingly depending on the condition of the weather. Period of growth about 115 days. Mean harvest time about August 1. This variety belongs to the species *Triticum polonicum*, and must not be confused with the sort that is most commonly called Polish wheat in Russia, which latter is a variety of *Triticum vulgare* and entirely different. It is the largest-grained wheat known, is extremely hard, and contains a very large per cent of gluten comparatively. It is especially valuable for macaroni

production and for certain pastries. It is at first bearded, but loses its beards at harvest time. It seems adapted to a soil not too rich in humus, with considerable clay and some sand, and a rather warm, dry climate. Should be tried in this country in the western portions of Texas, Oklahoma, Kansas, and Nebraska, in east Colorado, Arizona, and California, and perhaps in some of the Southern States. It is considerably resistant to orange-leaf rust. Amount obtained, 6 bushels.

2958. TRITICUM VULGARE.

Wheat.

From Russia. Received March, 1899, through Mr. M. A. Carleton.

Sandomir Winter wheat. From the government of Radom, in Poland. Mean annual rainfall, 27 inches; for the growing season (May to September, inclusive), 15.5 inches. Mean annual temperature, about 44.6°. Mean harvest time August 6. A rather soft, plump, white wheat, quite susceptible to changes of soil and climate. Best grades of the variety to be obtained only in Poland, near the town of Sandomir. Has already been tried in the United States with some success. Might be of especial value for cracker making and for certain breakfast foods. Should be tried on the Columbia plains, in northern California, and in New York. Amount obtained, 3 bushels.

2959. TRITICUM DICOCCUM.

Emmer.

From Russia. Received March, 1899, through Mr. M. A. Carleton.

Ufa Spring emmer. From the government of Ufa, about 8 miles from the city of the same name. Mean annual rainfall, 16.6 inches; for the growing season (May to September, inclusive), 10.9 inches. Mean annual temperature, 37.5°. For January, 9.5°; for July, 69.4°. Soil a very rich, deep, black loam, the famous "black earth" of Russia. Should be sown quite early in the spring, drilled in at the rate of 2 to 2½ bushels per acre. Period of growth about the same as for oats. This very hardy cereal is little known in this country, but is much valued in Russia and Germany. It is used both for stock feed, similarly to oats, and also as human food, in the form of gruel. Is very resistant to cold and often to drought also, but may suffer some from rust in warm wet seasons. It is a variety of *Triticum dicoccum*, correctly called emmer, but also known as Russian spelt. The Russian name is "polba." Is worthy of thorough trial. Admirably adapted for trial in all the extreme northern States from Minnesota to Washington, and in Alaska; also in arid districts. Amount obtained, 6 bushels.

2960. PANICUM MILIACEUM.

Millet.

From Russia. Received March, 1899, through Mr. M. A. Carleton.

Red Orenburg Broom-corn millet. From the Turgai territory of the Kirghiz Steppes, about 40 miles southwest of Orenburg. Mean annual rainfall, about 15 inches or less; for the growing season (May to September, inclusive), about 8 inches. Mean annual temperature, about 37.9°. Summers short but very hot. Soil differs from the usual "black earth" in being a rather stronger clay with a considerable mixture of sand, making it also grayer in color—the same sort of soil to which durum wheats are so well adapted. Should be sown probably about May 15 or soon after, though in Russia it is sown about the 25th or later. Period of growth 110 to 115 days. A red-seeded, paniced millet (*Panicum miliaceum sanguineum*), quite different from the ordinary forage millets of our prairie States. Grown chiefly for the seed, which is not only excellent for stock feeding, but in Russia is most widely used for human food in the form of grits or gruel and with soups. Well adapted for trial in the Dakotas, Nebraska, east Colorado, Kansas, and similar cold and arid districts. Amount obtained, 3 bushels.

2961. SECALE CEREALE.

Rye.

From Russia. Received March, 1899, through Mr. M. A. Carleton.

Sisolsk Winter rye. From Ust-Sisolsk, in Vologda government, about 61½ north latitude. Mean annual temperature, 31.7°; for the growing season (May to September, inclusive), 56.5°. Normal rainfall not known, but during one year it was 18 inches. Seed obtained from Mr. A. E. Sukhanof, free of charge. Rotation of crops where seed was grown as follows: (1) Fallow without manure; (2) winter rye; (3) spring barley and oats with manure. Variety grown in that region for many years and therefore thoroughly adapted to extreme cold, and rather drought-resistant. Should be tried in Alaska, and perhaps also in the very coldest districts of the United States proper. Amount obtained, ⅔ bushel.

2962. HORDEUM VULGARE.**Barley.**

From Russia. Received March, 1899, through Mr. M. A. Carleton.

Sisolsk Spring barley. From Ust-Sisolsk, in Vologda government, about $61\frac{1}{2}^{\circ}$ north latitude. Mean annual temperature, 31.7° ; for the growing season (May to September, inclusive), 56.5° . Normal rainfall unknown, but during a single year it was 18 inches. Seed obtained from Mr. M. I. Tur, free of charge. Rotation of crops where seed was grown as follows: (1) Fallow without manure; (2) winter rye; (3) spring barley and oats with manure. Should be tried principally in Alaska or other extremely cold districts. Amount obtained, $\frac{3}{8}$ bushel.

2963. AVENA SATIVA.**Oat.**

From Russia. Received March, 1899, through Mr. M. A. Carleton.

Zhelannii oat. From Ust-Sisolsk, in Vologda government, about $61\frac{1}{2}^{\circ}$ north latitude. Mean annual temperature, 31.7° ; for the growing season (May to September, inclusive), 56.5° . Normal rainfall not known, but during a single year it was 18 inches. Variety grown in the region 12 years; originally obtained from Moscow. Thoroughly acclimated. The grower strongly recommends a two-days' soaking of the seed before sowing in order to hasten germination. Seed obtained from Mr. M. I. Tur, free of charge. Rotation of crops where seed was grown as follows: (1) Fallow without manure; (2) winter rye; (3) spring barley and oats with manure. Harvested season of 1898. Should be tried in Alaska and the very coldest regions of the United States. Amount obtained, $\frac{3}{8}$ bushel.