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EXPERIMENTAL CROP NOTES FOR 1894.

BY C. F. CURTISS.

WINTER WHEAT.

PRESS DRILL VS. COMMON GRAIN DRILL.

Since interest in winter wheat growing has revived in some sections of Iowa considerable merit has been claimed for the press drill over other grain drills and other methods of seeding. The Hoosier Press Drill Co., of Richmond, Ind., furnished the Iowa Experiment Station a drill free of charge, and we deemed it of interest to test its value for sowing winter wheat. Accordingly, on October 2, 1893, a small piece of ground, that had grown a crop of oats and vetches, was plowed to a depth of five inches and disced and harrowed thoroughly, and one-half of the piece sown with Turkish Red winter wheat with the Hoosier press drill, and the remainder with the same variety of wheat, at the same rate per acre, with a common grain drill. The principal point of difference in these machines is that the press drill has runners like a corn planter, that may be forced down to a depth of four or five inches, and each runner is followed by a narrow wheel that firms the earth over the grain and leaves the soil between the rows standing up in ridges, by reason of which snow falling upon the field during winter lodges first in these tracks and protects the plants. The common drill also leaves the ground ridged, but does not press the soil over the seed, and the ridges are less marked. The soil of both plats was uniform, and all conditions were the same except the method of seeding. The depth of seeding was about four inches on each plat. The crop came on well, both plats coming up about the same time and going through the winter in similar condition. But little if any difference was noticed in the early stages of growth. Some difference was noticeable through May and June, but it was not until the wheat was in shock that any marked contrast was apparent. Then it was clear that the press drill plat had the heavier crop, though the stand was

good on each. Both pieces ripened at the same time, and were harvested July 19th and handled alike. When threshed the press drill plat, containing 85 square rods, gave 25 bushels and 30 pounds of wheat that tested $61\frac{1}{2}$ pounds to the bushel; and the common drill plat of the same area gave 16 bushels that made the same test. The first was at the rate of 48 bushels per acre and the second 30 bushels, a difference of 18 bushels per acre in favor of the press drill. In hauling the grain a mile and a half to the threshing machine one load from the press drill plat fell off, and in the extra handling some grain shattered out, but not enough to make any material difference, though whatever it was came from the heavier yield. The test in its details and execution was satisfactorily conducted, and the comparison a fair one so far as could be determined by a single trial, and the result is given as such for what immediate service it may be to those interested; though a comparison of this kind needs to be repeated several times, and under varying conditions, in order to safely establish conclusions.

Since 1891 we have grown a small area of winter wheat each year, with the exception of 1893, when the soil was so dry during the autumn months of 1892 that the seed would not germinate. In our experience with about twenty varieties the only one that has proven satisfactory is the Turkish Red. The lowest yield made by this variety was twenty-five bushels per acre in 1892, and the highest was the forty-eight reported in this experiment. We usually sow in September if there is moisture enough in the soil for germination, and cover the seed in a finely and thoroughly prepared seed-bed from two to five inches below the surface, depending on the condition of the soil. The Turkish Red is a small-berried, strong-tillering wheat, and should be sown at the rate of $1\frac{1}{4}$ to $1\frac{1}{2}$ bushels per acre.

ROOT CROPS FOR STOCK.

The rapid advancement of the dairy branch of farming in this state increases the necessity for more succulent feed during the winter months. The main source of this kind of feed lies in the silage and root crops. A good crop of roots can, by right methods, be grown cheaply, and with

as much certainty in this locality, as a crop of corn; and the value of roots, when properly used in the ration of dairy cows, young animals, breeding stock, and even fattening animals, can hardly be over-estimated. They have a dietetic and health-giving effect, stimulating the organs of digestion and the functions of the animal body, as well as furnishing nutriment, though they should not be relied on to furnish any considerable part of the ration. It is safe to feed a full ration, and a fair allowance of roots in addition. During the past four years this station has grown for experimentation a dozen or more varieties, and we have settled down to three kinds for general stock crops, with the addition of carrots for horses. These varieties are the Red or Yellow Globe and the Golden Tankard Mangels for early planting, the Strap-leaved Flat Turnip for late planting, and a medium white or yellow carrot for horses. There are perhaps other similar varieties under different names that are about as good, but in our experience we have found none better than these, and feel safe in recommending them. The record of the crops grown in 1893 and 1894 is given below. Our root crop of 1892 is reported in BULLETIN No. 19. The yield reported is that of trimmed roots in each crop:

CROP OF 1893.

NAME OF VARIETY.	Date of planting.	Date of gathering.	Yield per acre in tons.
Golden Tankard.....	May 24	October 14	18
Red Globe.....	May 29	October 14	19.1
White Belgian Carrots.....	May 25	October 19	12.3
White Intermediate Carrots.....	May 25	October 19	15.3
Swede Turnips.....	June 13	October 25	6.4
Improved American Rutabaga.....	June 12	October 23	6

CROP OF 1894.

Golden Tankard.....	May 16	November 3	17.6
Red Globe.....	May 17	November 4	26.3
Sugar Beets.....	May 18	November 5	14

In the 1892 root crop report the largest yielding variety is the Medium Red Mangel. We have had the Medium Red and Red Globe Mangels from different seedsmen and grown them together for several years without finding any perceptible difference, and consider them practically the same. This variety, all things considered, has given us the best results. For a report of the flat turnip see article by Professor Wilson in this BULLETIN. The flat turnip grows less to top, gives a better yield and is more free from disease than Rutabaga and Swede Turnip, and is in this locality a more satisfactory root for late seeding. The Rutabaga Rot is treated in another article in this BULLETIN by Professor Pammel. While the flat turnip yields well and serves a good purpose for late planting, it is not as satisfactory a root crop for stock as the mangel, for the reason that it is not as good a keeper and contains less nutritive matter. The mangel, properly stored, may be kept fresh and sweet until May and June of the following year. Sugar beets grow well but are harder to start, and owing to their abundance of fibrous roots they are more difficult to gather and clean, and their composition makes them less desirable for feeding than the mangel. Carrots grow slowly for several weeks at the start and require more cultivation in the early stages, but come on vigorously later with a fair yield, and they are decidedly the best root for horses.

The root crop is not generally regarded with favor by the western farmer, owing to the impression prevailing that it involves irksome and expensive manual labor, while farming on a more extensive system is preferred. This impression is erroneous. The root crop in reality requires but little hand labor, and it is not necessarily an expensive one. In choosing between silage and roots for succulence the latter has a decided advantage in the matter of expense entailed. The first essential in root crop growing is thorough preparation of the soil. The crop is half raised when properly planted. Sandy clay loam is best, but any fairly good porous soil will do. The soil needs to be loosened to a good depth. Subsoiling is necessary to the best results, though a good crop can be grown without. The surface must be so thoroughly worked as to put it in the best possible condition to insure rapid and

even germination. The disc and harrow, and the roller when required, are the implements mainly relied upon. A clod crusher may be used to do the work of the roller. We usually plant in the latter part of May, when the ground is moist and warm, and in the most favorable condition for plant growth. Seed from any reliable seedsman is generally safe, and it requires from four to five pounds of mangel seed to plant an acre. A hand-seeder is a convenient implement for planting. Cover the seed from one and a half to three inches deep, depending upon the character and moisture of the soil. The seed bed must be moist, for an even stand is absolutely essential to a good crop. Early roots are best planted in low ridges to aid in cultivation, though this is not necessary, and may be a disadvantage if the soil is too dry. The first few weeks of cultivation is done with a small implement known as the wheel hoe. A man pushes this ahead of him, and can get over several acres a day. A combined hoe, cultivator and seed drill may be bought for about \$8.00, and will be found very satisfactory for all garden and small crop work. When the plants are about three inches high, thin to a distance of eight to ten inches in the row and pull out the weeds. This is all the hand work necessary. After thinning, the horse cultivator will do the rest. The rows should be from twenty-four to twenty-six inches apart, and with an even stand the tops will entirely shade the ground by the first of August, and drouth will not materially affect the crop after that. Dry weather is favorable to a better quality of roots than can be grown with abundant moisture. The excessive heat and aridity of soil and atmosphere of last July and August had but little, if any, effect upon our root crops that covered the soil, and 26.2 tons per acre of Red Globes were grown, as will be seen by reference to the record of yields. Heavier crops may be grown by using the larger varieties, but they have not been satisfactory with us on account of a tendency to grow coarse and pithy, and to crack open at the crown, thus hastening decay.

The picture on opposite page was photographed from our field in the latter part of October, and presents the appearance of a well grown crop of roots in the latter stages of growth.

The cost of growing and storing a crop of roots as herein described need not exceed \$1.00 per ton. In gathering the crop we run the subsoil plow alongside of the row, at a depth of twelve or fourteen inches. This loosens the roots so that they lift out easily. The tops may be cut with a sharp hoe before the roots are pulled, or with a knife as they are being thrown into piles. The former is the more rapid method, if the roots are well loosened, so that they will come up readily without the aid of the tops in pulling. The roots are thrown together in piles for a few days, to enable them to dry out a little in order that they may go into the cellar cleaner and in better condition. The piles are covered over with the tops, to prevent freezing while in the field.

SUGAR BEETS.

Considerable work has been done by this station in growing and testing sugar beets, a report of which may be found in BULLETINS 15, 17, 20 and 23. No extensive discussion of the subject will be entered into here, as we have nothing new to add, but a small plat of sugar beets was grown on the station grounds last season, and analysis made by the station chemist. The result is of interest in addition to what has already been done, inasmuch as it represents what may be expected from the crop in a season of unusual drouth. The report of cultivation and yield is given under the head of Root Crops for Stock, in this BULLETIN. The soil was clay loam, adjoining timber. The average weight of the beets trimmed was 16.6 ounces, and the analysis gave

Solids in juice	per cent	17.08
Sugar in juice.....	"	13.29
Purity of juice.....		77.75
Sugar in beets.....	per cent*	13.63
Sugar in an acre of the beets—calculated.....	lbs.	8,428

This record is hardly as good as has been obtained at this station in former years, though the quality of beets is quite good, and the discrepancy is probably due to less attention to cultivation, as this season's crop consisted of only a

*Calculated as 95 one-hundredths of the percentage of sugar in the juice.

Curtiss: Experimental crop notes for 1894.



VIEW OF EXPERIMENT STATION ROOT CROP, 1894.

small plat grown with the stock root crop, without any special sugar beet cultivation such as is necessary to the best results.

The drouth set in early last season, and, owing to somewhat uneven germination, the stand was a little defective. This tends to cut short the yield and impair the product. For growing sugar beets of the highest grade it is usually necessary to subsoil plow to a depth of twelve to fifteen inches, in order that the roots may grow in best form and not push above the surface. The exposed part of the beet is usually deficient in saccharine matter.