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PRACTICAL HORTICULTURE.

RED CLOVER.

This bulletin contains a brief resumé of the practical lines of horticultural work as carried on at the Station; also an account of a comparative study of red clover grown from seed obtained from twenty-nine different regions, in America, Europe, Asia, and New Zealand.

Requests for the Bulletins should be addressed to the
AGRICULTURAL EXPERIMENT STATION,
Orono, Maine.

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SUMMARY OF EXPERIMENTS IN PRACTICAL HORTICULTURE.

W. M. MUNSON.

In the horticultural work of the Experiment Station two distinct lines are kept in view: a study of the principles and laws affecting plant growth; and practical investigations for immediate guidance in the culture of fruits and vegetables. Mere variety testing, as such, has never occupied a leading place in the plan.

To be of value, work must extend uninterruptedly over a series of years, and general principles can be established only after repeated efforts; so that immediate "practical" results are not always possible. The following notes represent, in brief, a summary of the more immediately practical phases of the work which has received attention, with references to the particular bulletin or annual report where the details are published in full.

VEGETABLE GARDENING.

Vegetable gardening, while not of the commercial importance of some other lines of horticultural work in Maine, is nevertheless of interest and direct value to every citizen of the State—whether farmer or laborer or professional man. The leading questions considered have to do with the tomato, cabbage, cauliflower, egg plant, corn, radish and celery; also with the forcing of vegetables under glass.

Tomato.

With the tomato, the following questions were considered: The effect of trimming the vines; effect of bagging the fruit to produce early ripening; the effect of crossing; the cumulative effect of culture under glass.

It was found that a chill to tomato plants after setting is not necessarily fatal to success, and that, other things being equal, the earliness and productiveness of tomatoes were in direct ratio

with the earliness of setting in the field. Unless conditions are very unfavorable, the plants should be in the field by June 1st. Trimming the plants after a part of the fruit had set, increased the yield by more than one-third. The results from bagging the fruit were in general of a negative character, but this treatment reduced the loss from rot. Crossing between small fruited plants of prolific habit and the ordinary large fruited type was found to be a promising method of securing a valuable type for localities where the season is short, and for securing a productive sort for forcing under glass. The increase in yield of the Lorillard-Peach cross over that of the pure Lorillard was nearly 50 per cent. A derivative hybrid between Lorillard and Currant produced a type of special excellence for forcing. In some instances seed from plants grown under glass gave better results in house culture than did seed of the same variety grown in the field. Results were not uniform, however, and there appeared to be distinct varietal differences. (Reports for 1891-5.)

Cabbage.

Cabbage studies included investigations as to the importance of deep setting of the plants; the effect of trimming at the time of setting; the frequency of transplanting; the effect of mulching.

Contrary to the general notion concerning the treatment of "leggy" plants, it was found that depth of setting had very little influence upon the size of the heads. Plants handled three or four times invariably gave better results than those handled once or twice before transfer to the field. Frequent transplanting increased the average size of the heads. Handling the plants in pots before setting in the field increased the percentage of marketable heads; but trimming the plants at the time of setting appeared to be of no special importance. The practice of mulching instead of cultivating was found to give very satisfactory results. (Reports for 1891-5.)

Cauliflower.

Work with the cauliflower included studies of the relative influence of pot and box culture of young plants; the effect of trimming at time of setting in the field; the effect of mulch as compared with frequent cultivation; a comparison of varieties.

Plants handled in pots were kept at a more nearly uniform rate of growth, and produced a higher percentage of marketable heads; this difference in some cases amounting to 20 per cent. As a result of trimming it was found that there was practically no difference in earliness nor in size of head, while as a rule the per cent of heads formed was greater from plants not trimmed. In no case were as satisfactory results obtained from the mulching as from frequent cultivation.

Nearly all of the leading varieties have been grown, and it is evident that the cauliflower may be successfully cultivated in this region. The most valuable sorts are of the Dwarf Erfurt and Snowball types, with Algiers for late in the season. (Report for 1893 and Bulletin 10.)

Egg Plant.

Egg plant studies included methods of culture; varieties; and crossing.

It was demonstrated that with careful treatment the egg plant may be successfully grown in central Maine, the most important requisites being: early sowing; vigorous plants; late removal to the field; warm, rich soil. Most of the well-known varieties are too late for this climate, but Early Dwarf Purple, Early Long Purple and Long White were satisfactory. Several crosses were made between white-fruited and black-fruited types. After four years of breeding it was found that no type sufficiently constant in color to be of value commercially was produced. There was, however, a marked increase in vigor and productiveness as a result of crossing. In the first generation the purple-fruited types seem stronger in their power to transmit color to the offspring than do the white-fruited types; and this law appears to hold whether the purple type is used as the male or the female parent. In later generations the inherent strength of the white-fruited types appears stronger than in the first. In all cases the white-fruited types appear stronger than the purple in the power to transmit form and productiveness. (See Annual Reports, 1891-3.)

Radish.

With the radish, the principal questions considered have been, the relative value of large and small seed; the effect of sub-

watering in the greenhouse; the influence of different temperatures upon the period of maturity.

Large seeds were found to produce from 30 to 50 per cent more first-class roots than did small seed from the same lot. Sub-watering produced 12 to 15 per cent more first-class radishes on a given section of the greenhouse bench than did surface-watering on an equal area of the same bench. There was a much greater loss from damping off on the surface-watered section. Contrary to the usual notion, the crop matured earlier, and was of better quality, when grown in the tomato house, with a night temperature of 60 degrees, than when grown at a lower temperature. (See Annual Report, 1898.)

Celery.

The work with celery was mainly in the way of demonstration, and for the purpose of calling attention to this very useful garden plant. The questions of soil, fertilizers, planting, handling, blanching and storing were considered. (See Annual Report 1897 and Bulletin 40.)

WINTER GARDENING.

Principles and methods of building, heating, and ventilating greenhouses, and of managing the more important crops grown under glass, were discussed. In brief, it may be said, constant watchfulness and the exercise of good judgment are of more importance than adherence to set rules. One good man with occasional help should be able to do all of the work in houses covering 4,000 square feet of ground surface. In general, solid beds are advocated for plants requiring no bottom heat, such as cauliflower, lettuce and radishes, while for semi-tropical plants, like melons, beans, and tomatoes, benches are preferred. For large commercial houses, steam is the best method of heating, but for smaller houses hot water is preferable. (Annual Report, 1896.)

ORNAMENTAL GARDENING.

The ornamentation of rural homes is of the highest importance to the people of Maine, not only as a means of adding to the comfort and pleasure of home life, but as an attraction for the increasing number of summer visitors and as a means of enhancing the value of the property. For this reason suggestions were

made concerning the location of buildings ; construction of walks and drives ; making of lawns ; what, when and how to plant ; native trees and shrubs valuable for planting ; the best hardy sorts to get from nurseries ; trees and shrubs tried and found wanting. (Annual Report 1897, and Bul. 42 and 46.)

FRUIT GROWING.

Fruit growing undoubtedly offers better opportunities than any other line of commercial horticulture in Maine, and its increasing importance demands more special attention on the part of the Experiment Station in the future. From the nature of the case, results are necessarily slow ; but a large amount of work has been done, and partial reports have been made. Briefly summarized, the following statement indicates the nature and scope of this work :

Since 1890 the Station has had under observation, both at the home orchard and in northern Maine, hardy fruits from Russia and from the Northwest. All of these varieties are hardy and most of them are productive ; very few of them, however, are worthy of general dissemination in those parts of Maine where the well known varieties of English and American origin will thrive. In the extreme northern part of the State some of them are valuable, and a few are worthy of culture under any conditions. (See Annual Reports, 1891, '92, '96, and Bulletin 82.)

Many fruits of unknown, or of doubtful value in this State, are sold by agents every year. For the information of growers, a catalogue of the leading sorts was prepared with a statement as to their character, quality and value for home use or for market, both for the northern and for the southern counties. (Annual Report 1893 and Bulletin 6.)

For a study of the comparative effect of cultivation and mulching, as well as for experiments with fertilizers, a young orchard in Kennebec county was selected in 1898. In the same region an old orchard is the basis of work in orchard renovation ; and more recently another young orchard has been chosen for experiments in top-grafting. Studies in the use of cover crops are made in the Station orchard at Orono, and in orchards in other sections of the State. From data thus far published, it is found that, in the case of the Gravensteins, the number of trees producing some fruit was nearly 50 per cent greater on the culti-

vated than on the mulched land; while the average yield was as 72 and 59 respectively.

The use of different forms of potash as a factor in preventing apple scab gave negative results, agreeing in the main with results published elsewhere.

In the work of orchard renovation, the effect of cultivation was visible a half mile distant, the foliage being large, dark and healthy, as compared with the small, pale, sickly leaves on the adjacent check trees. The plot receiving complete fertilizer presented the best appearances at the end of the growing season. (For details see Bulletin 89.)

SPRAYING.

Spraying with fungicides and insecticides has received considerable attention, especially in the years 1891-5. Among the questions studied are the following: The effectiveness of the treatment in producing perfect fruit; the relative number of windfalls on sprayed and unsprayed trees; the preparation of spraying mixtures; the best time for spraying.

All trees sprayed with arsenical poisons had a smaller percentage of wormy fruit than did the unsprayed. Paris green was found less injurious to the foliage than was London purple or white arsenic. A mixture of one pound Paris green in 250 gallons of water was effective in reducing the amount of wormy fruit, but a stronger mixture (one pound to 100 gallons) was required to kill the tent caterpillar. The number of windfalls was greatly lessened by spraying with Paris green and the proportion of wormy fruit among the windfalls was also smaller from the sprayed trees. It was observed that most of the wormy fruits from sprayed trees are entered from the side or base, while in fruits from unsprayed trees the entrances at the calyx were largely in excess. Spraying three times with an ammoniacal solution of copper carbonate destroyed the apple scab fungus and resulted in saving 52 per cent of the crop, but the foliage and fruit were slightly injured. The most satisfactory and effective fungicide used was Bordeaux mixture and this is now generally used throughout the State. The effectiveness of Bordeaux mixture as a fungicide, and of Paris green as an insecticide for the orchard, was fully established by the work

of the Station in 1891-3. (Reports for 1891-3, Bulletins 8 and 52; and How to Fight Apple Enemies.)

THE BLUEBERRY.

There are vast areas in Maine which, while bearing a considerable number of blueberry bushes and yielding a profitable return to the few people who make a practice of gathering the wild fruit, are not utilized as they might be. Systematic treatment in the way of burning, planting and managing might with profit be given to these lands and extended to other sections.

Another phase of the subject which is worthy of careful attention is that of domestication and the improvement of types by selection and crossing. The fruit in its wild state is superior to that of most other small fruits, and is very susceptible to the influence of environment. Systematic experiments in this direction are in progress at the Station. The most promising species for this work is the high-bush blueberry, *Vaccinium corymbosum*. (Report for 1898 and Bulletin 76.)

PLANT BREEDING.

The general question of the improvement of plants, or "plant breeding," is a perennial one. Much of the work done at the Station has never been published, but certain phases have been touched upon. A general statement of the problem is given in the Annual Report for 1893.

From evidence at hand it appears that the secondary results of crossing may be of fully as much importance as are directly inherited qualities. Among these secondary effects are: The possible immediate influence of pollen upon the mother plant; the stimulating effect of pollen upon the ovary; and the influence of varying amounts of pollen. In a few important species there may be an immediate apparent effect of foreign pollen on the female organism of the current generation, but the greater portion of the food plants studied do not exhibit such effect. That pollen has a direct stimulating effect upon the ovary, independently of its action upon the ovules, seems a well established fact. Variations in the amount of pollen available may, to a large extent, determine the form and consequent value of the fruits of some species. (Annual Report 1892.)

RED CLOVER FROM VARIOUS SOURCES.

W. M. MUNSON.

During the seasons of 1902 and 1903 a coöperative study of red clover was made in connection with the United States Department of Agriculture. The object of this study was to determine, if possible, the best source from which to obtain seed for general farm purposes. To this end, seed obtained from various parts of the world, by the Department of Agriculture, was sent to this Station and careful notes were made as to rate and per cent of germination; date of blooming and consequent earliness of crop; date of cutting; yield per acre; general condition of the stand; and characteristics of the plants.

GERMINATION TESTS.

The sprouting of seeds in a "seed tester" or on blotting paper often gives erroneous impressions as to the real value of the seed. With this fact in mind, seeds of each lot were placed upon blotting paper under a bell jar, and two duplicate lots were planted in soil in the greenhouse. The comparative results, as also the percentage of germination obtained in case of each at Washington, before the seeds were sent out, are shown in the accompanying table.

In many cases seed which showed a high percentage of sprouting when placed under favorable conditions, both at Washington and at the Experiment Station, did not possess sufficient vitality to insure a heavy stand of plants when covered with soil, a fact which would indicate the necessity of heavy seeding and of light covering in such instances.

In most cases, the best results in the germination tests were obtained from seed grown in the higher regions of central Europe—though two lots of seed from Bohemia showed rather low vitality in the soil tests. The most vigorous seeds seemed to be those from Upper Austria, Styria, Hungarian Transyl-

vania, and Russia; while one lot from England and that from Denmark were specially low in vitality. Seed from Brittany showed a high percentage of germination (sprouting) at Washington, but was rather low both in the blotting paper and in the soil tests at the Station. Of the American seed tested, that from Ohio and Illinois were, in this trial, the strongest.

Results of Germination Tests.

Accession number.	Source of Seed.	Per cent germination Washington.	Per cent germination blotting paper.	Per cent germination in soil, 1st test.	Per cent germination in soil, 2d test.
10964	Oregon	89	90	41	30
10965	Tennessee	89	93	40	-
10990	Missouri	95	97	25	33
11791	Iowa	93	84	37	-
11813	Michigan	95	95	49	-
12010	Ohio	93	97	47	60
12090	Indiana	96	90	35	35
12165	Illinois	-	93	39	75
12169	Russia	91	93	55	80
12170	Brittany	96	72	27	40
12171	England	81	71	13	34
12172	Denmark	96	92	17	20
12173	New Zealand	77	72	27	40
12174	England	78	95	49	-
12175	Bohemia	96	93	34	38
12188	Nebraska	80	71	19	38
12223	Wisconsin	92	94	71	64
12540	Russia	96	91	45	80
12541	Minnesota	94	92	51	60
12635	Italy	88	90	29	35
12663	Upper Austria	97	94	75	83
12664	Silesia	88	89	77	48
12665	Hungarian Mountain Region	95	94	57	80
12666	Styria	91	93	78	85
12667	Galizia	85	89	77	40
12668	Hungarian Plains	97	85	81	42
12669	Bohemia	95	80	33	45
12670	Hungarian Transylvania	95	92	85	70

The above facts are presented for consideration. Only the most general inferences can be drawn, however, from a single sample, or even from two or three samples from any given source.

FIELD WORK, 1902.

Duplicate plats of twenty-nine different lots of seed were sown, May 19, on plats of two square rods each, at the rate of 12 pounds standard seed per acre. The location of the plats has a slightly northeastern aspect. The soil is a rich sandy loam, with a strong clay subsoil. A crop of buckwheat was grown upon

the land in 1901, and there was much trouble from young buckwheat plants, as well as from witchgrass and *Gnaphalium* which infested the ground. In general, however, the plats were kept free from weeds and the clover plants were given the best possible chance for growth.

The soil was in excellent condition at the time of planting. With the exception of very light showers, there was no rain until May 24. Between May 24 and 28, however, several inches of rain fell, and there was an abundance of rain thereafter.

Plants in all plats began to appear May 26. On the 28th no marked difference was observed in the appearance of the several plats. It was to be expected that seed from the far northern regions would germinate more rapidly than that from other parts of the world, but such difference was not detected. One plat, from Michigan seed, seemed rather behind the others at first, but this condition was attributed to a possible difference in depth of covering the seed.

The season as a whole was cool and moist, and in most cases growth was luxuriant. Marked differences were noted, however, and some of these differences are very significant. A particularly noticeable feature of the plants from European seed was an almost invariable absence of hairiness of stem and leaves, while all American grown seed produced very hairy plants. This characteristic may be of importance as affecting the amount of dust in the clover hay, though we have not as yet had sufficient quantity of hay to determine positively this point.*

The plants from northern Europe were, as a rule, later in maturing than were those from farther south and from American seed.

On August 30, or $3\frac{1}{2}$ months after seeding, plats 17 and 19, from Indiana and Bohemia respectively, were in prime condition for hay. Plats 18 and 20—duplicate plats from the same sources—were slightly less mature, but in accordance with the plan, one plat from seed of every source was cut and weighed at this time.

* Since this paper was ready for the press a personal communication to the writer from Professor N. E. Hansen of South Dakota Experiment Station confirms this observation. While travelling in Russia, Professor Hansen found that because of a shortage in the Russian crop of clover seed, American seed had been imported, and there was a very general complaint of the dustiness of the hay from such seed.

Relative yield and shrinkage of red clover grown in 1902 from seed from different localities.

Plot number.	Source of Seed.	Date of Cutting.	Yield green — lbs.	Yield dry — lbs.	Shrinkage in drying — per cent.	Yield per acre — lbs.
1	Illinois	August 30....	150	39	74	3120
2	Illinois	September 3....	135	37	73	2960
3	Hungarian Mountain Region.....	August 30....	138	36	74	2880
4	Hungarian Mountain Region.....	September 3....	126	33½	73	2680
5	Bohemia	August 30....	91	23	74	1840
6	Bohemia	September 3....	101	27	73	2160
7	Wisconsin.....	August 30....	81½	21	73	1680
8	Wisconsin.....	September 3....	146	45	69	3600
9	Russia	August 30....	98½	26	73	2080
10	Russia	September 12....	115	29	74	2320
11	Styria.....	August 30....	122	30	75	2400
12	Styria.....	September 12....	134	34	80	2720
13	Galizia	August 30....	107	27	74	2160
14	Galizia	September 12....	95½	21½	76	1720
15	Hungarian Plains	August 30....	129	31	75	2480
16	Hungarian Plains	September 3....	142	37½	73	3000
17	Indiana.....	August 30....	138½	35½	74	2840
18	Indiana.....	September 3....	173	49	70	3920
19	Bohemia	August 30....	160½	40	75	3200
20	Bohemia	September 3....	160	50½	68	4040
21	Minnesota	August 30....	159½	41	74	3280
22	Minnesota	September 3....	164½	50½	69	4040
23	Oregon	August 30....	154	35½	76	3440
24	Oregon	September 3....	164½	44	73	3520
25	Denmark.....	August 30....	131	32	82	2560
26	Denmark.....	September 12....	134½	31	76	2480
27	England	August 30....	85	22½	72	1800
28	England	September 12....	113	26½	77	2120
29	Norway.....	August 30....	65	13	80	1040
30	Norway.....	September 12....	63½	17	71	1560
31	Ohio	August 30....	174½	42	74	3360
32	Ohio	September 9....	151	37	75	2960
33	New Zealand	August 30....	158	36	77	2880
34	New Zealand	September 3....	128	36½	71	2920
35	Brittany.....	August 30....	188½	44	75	3520
36	Brittany.....	September 3....	133	36½	72	2920
37	Michigan	August 30....	110	27	75	2160
38	Michigan	September 12....	118½	27½	76	2200
39	Hungarian Transylvania.....	August 30....	147½	35	77	2800
40	Hungarian Transylvania.....	September 12....	128	34½	73	2760
41	Nebraska.....	August 30....	128	31	75	2480
42	Nebraska.....	September 9....	112	29	74	2120
43	England	August 30....	124	33	73	3520
44	England	September 3....	119	32	73	2560
45	Russia	August 30....	141½	34	75	2720
46	Russia	September 9....	153	34½	77	2760
47	Italy	August 30....	145	33	77	3520
48	Italy	September 9....	153½	35½	76	2840

Relative yield and shrinkage of red clover grown in 1902 from seed from different localities.

Plat number.	Source of Seed.	Date of Cutting.	Yield green —lbs.	Yield dry —lbs.	Shrinkage in drying —per cent.	Yield per acre —lbs.
49	Missouri.....	August 30.....	182	40½	78	3240
50	Missouri.....	September 9.....	132½	31	77	2480
51	Iowa.....	August 30.....	151	32½	78	2600
52	Iowa.....	September 12.....	131	32½	75	2600
53	Tennessee.....	August 30.....	137	31½	78	2520
54	Tennessee.....	September 9.....	135	32	76	2560
55	Silesia.....	August 30.	156	34½	71	2760
56	Silesia.....	September 12.....	130	33	74	2740
57	Upper Australia.....	August 30.....	192	42	70	3360
58	Upper Australia.....	September 12.....	127	35	71	2800

RELATIVE YIELDS OF DIFFERENT PLATS.

While conclusions cannot be drawn from a single season's work, a comparison of the yields and of the different lots is of interest. As already stated, one plat from every lot of seed was cut at the time the earliest plats—which happened to be Numbers 17 and 19—were ready for harvest. The duplicate plats were cut as they matured or, in a few cases, at the end of the season, to save them from destruction by rust.

The preceding tables give the results in detail.

The largest yields were obtained, in the order given, from plats with seed from Minnesota, Bohemia, Indiana, Wisconsin, Brittany and Ohio.

The shrinkage in drying ranged from 68 per cent on plat 20 (Bohemia), to 82 per cent on plat 25 (Denmark). The mature crop from Wisconsin and Minnesota plats each shrank 69 per cent, and from Indiana 70 per cent. The usual shrinkage, however, was about 73 to 75 per cent. In considering weights and shrinkages it should be borne in mind that green clover leaves are more numerous and in the aggregate heavier than the mature stalks, because of the greater amount of water contained. For this reason the weight of the undried product of some plats, which were late and very immature, appears greater than that of other plats which were in every way superior; the shrinkage in drying is, however, correspondingly greater.

All plats were very uneven in maturing, but the cutting was done so as to get as nearly as possible average conditions. Recovery after cutting was uniformly rapid, because of the favorable season.

FIELD NOTES, 1903.

The winter of 1902-3 was exceptionally favorable for clover seeding, as the ground was almost continuously covered with snow. In March, however, heavy rains and subsequent freezing caused some of the plats to suffer. But, with the exception of those indicated in the table, all plats were in excellent condition in the spring of 1903.

The early part of the season was exceptionally unfavorable to growth. Sharp frosts, which occurred May 23 and 24, severely checked the young growth, and the prolonged drought which prevailed throughout New England caused the first crop to mature early, with a very light yield.

The earliest plats to mature were those from Indiana, Hungarian Mountain Region, and Ohio, which were ready to cut June 29. These were closely followed by plats from Bohemia, Italy, Illinois and Wisconsin. As in the previous year, one plat of each lot was cut at the time the first one was ready, June 29, and the duplicate plats were cut as they matured.

Abundant rains soon after the first cutting insured rapid recovery and a vigorous growth for the second crop. The first plats ready for the second cutting were Nos. 1, 17, and 31, from Illinois, Indiana and Ohio, respectively, on August 13.

Relative yield and shrinkage of red clover in 1903, seeded in 1902 with seed from different localities.

FIRST CUTTING.					SECOND CUTTING.					Remarks.		
Source of Seed.	Date of cutting.	Yield green, pounds.	Yield dry, pounds.	Shrinkage in drying, per cent.	Yield per acre dry, pounds.	Date of cutting.	Yield green, pounds.	Yield dry, pounds.	Shrinkage in drying, per cent.		Yield per acre dry, pounds.	Total yield per acre, pounds.
1 Illinois	June 29	101½	28	72	2240	Aug. 13	216½	46½	78	3720	5960	One of the best plats; vigorous, erect, height 23 inches, conspicuously hairy.
2 Illinois	July 1	74	22½	69	1800	Aug. 21	201½	44½	78	3560	5560	Very good; stems smooth; very little rust.
3 Hung. Mt. Region..	June 29	70½	20½	70	1640	Aug. 13	201½	43½	78	3480	5120	Same as No. 3. Considerable rust.
4 Hung. Mt. Region..	July 1	73	20	72	1600	Aug. 21	200	46	77	3680	5280	Good stand; little rust; nearly smooth stem, recovery irregular.
5 Bohemia	June 29	90	26½	70	2120	Aug. 13	215½	45	79	3600	5720	Same as No. 5; but recovery very slow.
6 Bohemia	July 1	52½	16	69	1286	Aug. 21	168½	41½	76	3300	4580	Same as No. 5; but recovery very slow.
7 Wisconsin	June 29	87½	26½	69	2120	Aug. 13	188	37	79	2960	5080	
8 Wisconsin	July 1	94	30½	67	2460	Aug. 21	207	46	77	3680	6140	
9 Russia	June 29	80½	22½	72	1800	Aug. 13	202	38	81	3040	4840	
10 Russia	July 1	45	14½	69	1160	Aug. 21	199	42	78	3360	4520	
11 Styria	June 27	63	16½	73	1320	Aug. 13	204	40	80	3200	4520	
12 Styria	July 7	43½	24	60	1920	Aug. 21	179½	56	69	4480	6400	Some witch grass.
13 Galizia	June 27	64½	25½	60	2040	Aug. 13	188½	39½	74	3160	5200	
14 Galizia	July 7	27½	7½	74	620	Aug. 13	177½	56	69	4480	5100	Somewhat weedy.
15 Hung. Plains	June 29	46½	14	74	1120	Aug. 13	165½	35½	79	2840	3960	
16 Hung. Plains	July 1	92	27	70	2160	Aug. 21	192	47½	75	3800	5960	
17 Indiana	June 29	114	31	72	2480	Aug. 13	193½	43½	77	3480	5960	
18 Indiana	July 1	185	45	75	3600	Aug. 21	215½	52½	80	4200	7800	The best plot.
19 Bohemia	June 29	105½	32½	69	2600	Aug. 13	232½	49½	79	3960	6560	
20 Bohemia	July 1	84	28½	65	2300	Aug. 21	192½	46½	76	3720	6020	
21 Minn.	June 29	73	21	71	1680	Aug. 13	148	34½	70	2760	4440	
22 Minn.	July 1	74½	20	73	1600	Aug. 21	187½	43	77	3440	5040	
23 Oregon	June 29	78	24½	69	1980	Aug. 13	167½	34	79	2720	4700	
24 Oregon	July 1	63	20½	67	1640	Aug. 21	65½	28½	56	2280	3920	

25	Denmark	June 29	76	20½	73	1640	Aug. 13	156	28	82	2240	3880
26	Denmark	July 7	58½	18	69	1240	Aug. 28	108	44½	59	3560	4800
27	England	June 29	46½	14½	70	1160	Aug. 13	107	20	81	1600	2760
28	England	July 29	89	30½	65	2440	.....	.....	.....	.....	.....	2440
29	Norway	June 29	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
30	Norway	June 29	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
31	Norway	July 28	85	28	67	2240	Aug. 13	175	57	68	4560	6800
32	Ohio	June 29	103	31	69	2480	Aug. 28	173	34	79	2720	5200
33	Ohio	July 1	101½	35	65	2800	Aug. 28	131	38	76	3040	5840
34	N. Zealand	June 29	105½	19	82	1520	Aug. 13	132½	38	80	3040	4560
35	N. Zealand	July 1	88½	27½	67	2200	Aug. 28	134	50	62	4000	6200
36	Brittany	June 29	52½	17½	74	1400	Aug. 13	192	38	80	3040	4440
37	Brittany	July 1	50	17	66	1360	Aug. 28	143	51	64	4080	5440
38	Michigan	June 29	64½	20	60	1600	Aug. 13	166	31½	81	2520	4120
39	Michigan	July 7	44½	13	70	1040	Aug. 28	141	50	64	4000	5040
40	Hung. Transylvania	June 29	62	13½	78	1080	Aug. 13	164	32½	80	2600	3680
41	Hung. Transylvania	July 7	35½	10½	70	840	Aug. 28	140	48½	65	3880	4720
42	Nebraska	June 29	53½	15	71	1200	Aug. 13	146	31	78	2480	3680
43	Nebraska	July 7	36½	10½	71	840	Aug. 28	158½	50	68	4000	4840
44	England	June 29	28½	6½	77	520	Aug. 13	91½	18½	89	1480	2000
45	England	July 7	17½	6	64	480	Aug. 28	94½	31½	65	2520	3000
46	Russia	June 29	41½	7½	81	600	Aug. 13	149½	28½	80	2280	2880
47	Russia	July 7	78	24	79	1920	Aug. 28	149½	51	66	4120	6040
48	Italy	June 29	36½	12	69	960	Aug. 13	69½	14	79	1120	2080
49	Italy	July 7	32½	10½	67	840	.....	.....	.....	.....	.....	.....
50	Missouri	June 29	80½	16	80	1280	Aug. 13	164½	32½	80	2600	3880
51	Missouri	July 1	68	23½	66	1880	Aug. 28	154½	56½	63	4520	6400
52	Iowa	June 29	62	22½	63	1800	Aug. 13	139½	24½	82	1960	3760
53	Iowa	July 29	108½	46	58	3680	.....	.....	.....	.....	.....	.....
54	Tennessee	June 29	44½	14½	60	1160	Aug. 13	141	27	80	2160	3320
55	Tennessee	July 29	48	16½	65	1320	.....	.....	.....	.....	.....	.....
56	Silesia	June 29	20	4	75	360	.....	.....	.....	.....	.....	.....
57	Silesia	July 28	51	18½	63	1480	.....	.....	.....	.....	.....	.....
58	Upper Austria	June 29	37½	10	73	800	.....	.....	.....	.....	.....	.....
59	Upper Austria	July 28	29	10½	63	840	.....	.....	.....	.....	.....	.....

Badly killed out.
Discarded; very weedy.
Winter killed.

Exceptionally good.

Considerable witch grass.

Considerable witch grass.

Weedy; clover partly killed out.
One of the best.

Winter killed.

Probably not quite dry.

Injured by drought; failed to recover.
Winter killed in spots.

Badly winter killed.

Badly winter killed.

Badly winter killed.

Badly winter killed.

Plat No. 18 with seed from Indiana, and cut both times when in the best condition for hay, gave the highest total yield for the season; the amount being 3.9 tons per acre. Plat 19, seed from Bohemia, stands second in the list with a record of 3.28 tons. Plat 46, Russia, third with 3.02 tons, and Plat 20, Bohemia, fourth with 3.01 tons. Plats 1, Illinois, and 17, Indiana, follow with 2.98 tons each, while 32, Ohio, and 5, Bohemia, come next with 2.92 and 2.86 tons respectively.

It is interesting to note that with the exception of plat 17, Indiana, and plat 20, Bohemia, those which proved best in the long run are not included in the list of those giving the highest yields the first year. Nor are those lots which showed the highest per cent of germination in laboratory tests the ones which give the best final returns. Both Indiana and Bohemia seed showed a relatively low vitality in the soil test in the laboratory. Ohio, Illinois and Russia, however, were among those showing the best results in the laboratory.