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EFFECT OF DATE OF SEEDING ON GERMINATION, GROWTH, AND DEVELOPMENT OF CORN.

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COMMONLY OBSERVED EFFECTS OF DATE OF SEEDING.

Corn growers in localities with a long season have observed that early and late seedings of the same variety of corn usually show wide differences in rate of growth, total growth, and number of days required to reach maturity. In general, corn which is seeded early requires a longer time to come up than that which is seeded later. The plants also grow more slowly, bear their ears lower, and do not attain so great a height. The number of ears to the plant, the size of the ears, and the number of suckers have not been found to be affected consistently by the time of seeding.

STATE EXPERIMENTS.

Numerous experiments on seeding at different dates have been conducted by the State agricultural experiment stations. The primary purpose of most of these experiments has been to determine the relative value of the different dates of seeding in influencing the crop yields. In the published results of some of the experiments the only data presented have been comparisons of yields from the different seedings. In others, additional data have been presented upon the height of stalks and the number of days from seeding to maturity.

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In two series of experiments conducted by the Ohio Agricultural Experiment Station from 1883 to 1889, inclusive, and from 1908 to 1913, inclusive, the average yields from the different dates of seeding were as shown in Table 1. From 1885 to 1889 dates of ripening were recorded. The number of days to maturity is obtained from the recorded dates of seeding and ripening.

TABLE 1.—*Results of the date-of-seeding experiments with corn at the Ohio Agricultural Experiment Station in the 7-year period from 1883 to 1889, inclusive, and in the 6-year period from 1908 to 1913, inclusive.*

Series I.—1883 to 1889, inclusive.			Series II.—1908 to 1913, inclusive.	
Date of seeding.	Growth to maturity.	Yield per acre.	Date of seeding.	Yield per acre.
	Days.	*Bushels.*		*Bushels.*
Apr. 26 to 28	[a] 126	[a] 62.4	Apr. 24 to 29	63.9
May 2 to 6	[a] 121	[a] 61.1	May 4 to 10	68.5
May 13 to 16	[b] 118	[b] 70.9	May 14 to 17	67.4
May 22 to 26	[c] 119	[a] 62.4	May 25 to 28	54.9
June 2 to 5	[c] 115	[a] 53.0	June 2 to 6	44.3
June 14	[d] 116	[d] 51.5		

[a] Average of the records for five years.
[b] Average of the records for four years.
[c] Average of the records for three years.
[d] Average of the records for two years.

In experiments reported by the Indiana Agricultural Experiment Station for the years 1892, 1893, and 1894, the number of days from seeding to maturity decreased as the date of seeding was advanced at intervals of 10 days from May 6 to June 15. The averages of the results for the three years show that corn when sown on May 6 required 125 days from seeding to maturity; when sown on May 16, 120 days; and when sown May 24 to 26, 114 days. When sown June 4 and 5 it required 111 days, and when sown June 14 and 15 only 104 days. The average yields from experiments conducted during seven years (1888–1896)[1] were 46.7 bushels per acre[2] when sown May 1, 42 bushels when sown May 8 to 11, 39.5 bushels when sown May 15 and 16, 41.3 bushels when sown May 21 to 22, and 38.6 bushels when sown May 28 to 30.

The Illinois Agricultural Experiment Station during 1891, 1892, and 1893 conducted experiments in which seedings were made at weekly intervals from April 25 to June 3. The average results from the experiments during these three years showed that corn sown April 25 and 26 required 136 days from seeding to mature; May 2 to 7, 131 days; May 13 to 16, 131 days; May 20 to 27, 122 days; and June 1 to 3, 118 days. The maximum height of stalks was attained in the seedings made from May 10 to June 1. In experiments covering eight years (1888 to 1895) the maximum yields were obtained from the seedings of May 4 to 18. Seedings made in April and those made later than May 18 produced smaller average yields.

[1] No yields were reported for 1891 and 1895.
[2] Average of six years

The Kansas Agricultural Experiment Station in 1895 and again in 1896 made seven seedings of corn at intervals of one week from April 18 to May 30. The early seedings were slower in coming up than the later seedings. There were no consistent differences in yield from the seedings of April 18 to May 9, the April seedings yielding highest in some instances and the May seedings in others. The seedings of May 1 and 2, however, gave the highest yields of good ears. Seedings made later than May 9 gave greatly reduced yields.

The Oklahoma Agricultural Experiment Station in 1898 made seedings at intervals of one week from March 28 to April 25 and a last seeding on May 13. The March 28 seeding gave the greatest yield. The seeding of May 13 outyielded that of April 25; otherwise, the general tendency was for the yields to decrease as the seeding date was delayed. The plants from later seedings matured in less time than those from the early seedings; a difference of four weeks in the dates of seeding caused only eight days difference in the dates of maturity.

The Nevada Agricultural Experiment Station in 1894 made seven seedings of corn at intervals of 10 days from April 20 to June 20. The plants from the April 20 seeding required 142 days to mature; those of April 30 required 135 days and those of May 10 only 126 days. Data upon ripening were not recorded in connection with seedings made after May 10. The highest yield of ears was obtained from the April 20 seeding and the highest yield of stalks from the seeding of June 20. A difference of 10 days between the dates of seeding, April 20 and April 30, caused only three days' difference in the dates of ripening. A difference of 20 days between the dates of seeding, April 20 and May 10, caused but four days' difference in the dates of ripening.

Seedings of both dent and flint varieties were made by the South Dakota Agricultural Experiment Station at intervals of five days from May 1 to June 10 during 1888, 1889, and 1890. It is concluded from the experiments "that corn may be planted any time after May 1 without danger of the seed rotting, but no gain is made in yield or maturity by planting before conditions of soil and atmosphere are right. These conditions usually come between May 10 and 20. Plantings made during the first half of May showed no difference in yield or maturity."

In general, the experiments reviewed indicate that the best yields of grain may be expected from the early seedings and the most rapid development and the greatest growth from the later seedings. Neither the extremely early nor the very late seedings are desirable.

EXPERIMENTS AT THE ARLINGTON EXPERIMENTAL FARM.

The investigations reported in this bulletin were begun at the Arlington Experimental Farm, Rosslyn, Va., near Washington, D. C., in 1915, and have been continued since that date. They have been

directed more to a study of the effects upon growth and development than to determining the most desirable date of seeding from the standpoint of yield. Data have been obtained upon the rapidity of germination, the number of days from seeding to emergence, emergence to first silks, and emergence to ripening, the height of stalks, the number of ears per plant, the average weight of ears, the average yield per plant, and the number of suckers.

The varieties of corn used in the experiments cover a wide range in the length of the growing season required. No consistent effects have been observed upon the number of ears per plant, the size of ears, or the number of suckers. The data presented in the tables are limited to the characters that seem to have been consistently affected.

In 1915 24 varieties of corn were grown. The dates of seeding were April 20, May 20, June 21, and July 22. The varieties in each of the different seedings were sown in single rows 132 feet long and 3.3 feet apart on fairly uniform upland that had been in a mixed clover and grass sod the previous year. The rate of seeding was four kernels every 15 inches in the row for the first seedings and three kernels for the later seedings. The stands were thinned to one plant every 15 inches. The data obtained from this and succeeding experiments are shown in Table 2.

In 1916 22 varieties were grown. The dates of seeding were April 20, May 20, and July 7. It was planned to make a third seeding about June 20 and a fourth about July 20. The wet condition of the land, however, made it necessary to delay the third seeding until July 7, and because of this late date a fourth seeding was not made. The different seedings were made in single rows 132 feet long and 3.3 feet apart on uniform reclaimed river land that had not been previously cropped. The rate of seeding was three kernels every 15 inches in the row. The stands were thinned to one plant every 15 inches.

In 1917 19 varieties were grown. The dates of seeding were April 12, May 19, June 21, and July 16. The different seedings were made in single rows 82.5 feet long and 3.3 feet apart on fairly uniform upland where a crop of rye had been plowed under. The rye had been preceded by soy beans. The seedings were made in hills 3.3 feet apart and the stands were thinned to two plants per hill.

In 1918 14 varieties were grown. The dates of seeding were May 7, May 24, June 20, and July 19. Owing to unfavorable weather the earliest seeding was delayed beyond the date intended. The different seedings were made in single rows 66 feet long and 3.3 feet apart on well-drained, fertile, uniform upland that had been cropped to corn the previous year. The stand of the smaller varieties was one plant every 12 to 14 inches in the row and of the later, larger growing varieties one plant every 16 to 18 inches.

TABLE 2.—*Effects of seeding on different dates upon the germination, growth, and development of corn, in experiments conducted at Arlington Experimental Farm, near Washington, D. C., during the 6-year period from 1915 to 1920, inclusive.*

[The symbol F indicates that the crop was killed by frost before reaching maturity. In 1918 the first (April) seeding, delayed by weather conditions, was actually made on May 7.]

Name of variety.	Number of days from—												Height of plants (feet).			
	Seeding to emergence.				Emergence to first silks.				Emergence to ripening.							
	Apr.	May.	June.	July.	Apr.	May.	June.	July.	Apr.	May.	June.	July.	Apr.	May.	June.	July.
Season of 1915:																
North western Dent	12	12	10	8	50	41	33	33	99	82	82	96	5.5	5.5	4.5	5.5
Brown County Yellow	11	12	10	8	50	43	35	33	99	82	83	96	6.3	6.3	5.3	5.7
U. S. Selection 133	12	12	10	8	50	45	37	41	107	86	85	98	7.0	7.3	7.5	7.5
Minnesota 13	12	12	10	8	50	45	36	37	107	86	85	98	7.0	7.3	7.0	7.5
Martens White Dent	13	12	10	8	53	46	37	42	107	86	85	98	5.7	6.3	6.5	6.0
Rustler White Dent	12	12	10	8	50	41	33	35	105	82	79	96	5.0	5.2	5.2	6.0
Australian White Flint	12	12	10	8	51	47	37	40	112	90	88	.....	6.5	6.0	5.7	6.0
Gehu Yellow Flint	13	12	10	8	41	39	30	31	104	80	78	93	3.7	4.0	4.0	3.5
Disco 90-Day	12	12	10	8	53	48	39	41	110	86	85	.....	6.0	6.0	5.5	6.0
Disco 85-Day	14	12	10	8	50	46	37	37	107	82	85	98	5.3	5.0	4.7	5.0
Blue Squaw Flour	13	12	10	8	41	39	31	31	99	80	76	91	4.0	4.2	4.5	3.5
Idaho Flint	16	14	10	8	56	45	39	41	112	86	85	.....	4.7	5.2	5.0	5.7
Cornforth Dent	14	12	10	8	50	43	33	31	105	82	78	F	5.2	5.2	5.0	5.7
Early Huron	15	12	10	8	58	51	40	41	112	90	90	F	6.5	6.2	6.2	7.2
Rocky Mountain Dent	16	12	10	8	56	48	39	41	112	90	88	F	7.2	6.2	6.7	7.0
Stickney Flint	16	12	10	8	56	51	40	41	112	93	88	F	5.5	5.7	6.5	6.0
Fairfield Yellow Dent	16	12	10	8	57	51	39	41	114	90	88	F	6.2	6.2	7.5	7.0
U. S. Selection 193	13	12	10	8	56	52	41	41	117	93	92	F	7.0	6.2	7.5	7.0
Davis Yellow Dent	14	12	10	8	58	54	44	43	118	93	92	F	7.5	8.7	9.0	7.2
Wilson White Cap	12	12	10	8	54	49	39	41	112	90	88	F	7.2	8.0	8.5	7.2
Long Island Yellow Dent	14	12	10	8	58	52	41	43	117	93	88	F	6.7	8.0	7.5	6.7
Woods Northern White Dent	13	12	10	8	60	57	46	45	119	98	93	F	6.5	8.2	7.5	7.0
100-Day Bristol	13	12	10	8	61	58	46	47	117	101	93	F	8.2	8.5	8.7	7.0
U. S. Selection 119	14	12	10	8	70	66	53	51	121	106	102	F	9.0	9.5	10.2	8.0
Average (24 varieties)	13	12	10	8	54	48	39	40	110	89	87	[a]96	6.2	6.4	6.5	6.3
Season of 1916:																
North western Dent	15	9	....	7	54	48	....	35	89	84	.....	79	5.0	4.0	.....	4.0
Brown County Yellow	15	9	....	7	55	49	....	32	89	95	.....	79	5.0	4.0	.....	4.0
U. S. Selection 133	16	9	....	7	58	52	....	38	103	97	.....	83	6.5	4.0	.....	4.7
Minnesota 13	16	9	....	7	60	49	....	35	103	99	.....	83	6.5	4.0	.....	4.7
Martens White Dent	16	9	....	7	60	53	....	43	103	98	.....	83	5.5	3.0	.....	4.3
Rustler White Dent	15	9	....	7	53	48	....	35	89	99	.....	83	3.5	3.0	.....	4.0
Disco 90-Day	16	10	....	7	55	52	....	38	106	103	.....	83	6.3	4.5	.....	4.3
Disco 85-Day	16	10	....	7	58	51	....	38	105	101	.....	83	4.0	3.7	.....	5.3
Fulton	16	9	....	7	60	50	....	41	107	105	.....	88	5.3	4.0	.....	4.5
Cornforth Dent	15	9	....	7	55	48	....	31	89	105	.....	88	5.0	4.0	.....	4.7
Early Huron	16	9	....	7	66	61	....	40	107	108	.....	93	5.7	3.5	.....	5.5
Rocky Mountain Dent	16	9	....	7	69	63	....	45	107	112	.....	F	6.0	4.3	.....	6.3
Fairfield Yellow Dent	16	9	....	7	68	53	....	41	107	115	.....	F	5.7	4.5	.....	6.7
U. S. Selection 193	16	9	....	7	69	63	....	48	114	114	.....	F	5.7	4.5	.....	6.3
Davis Yellow Dent	16	9	....	7	71	64	....	41	118	115	.....	F	6.0	4.5	.....	6.5
Wilson White Cap	16	9	....	7	69	63	....	40	107	112	.....	F	5.5	5.0	.....	6.7
Long Island Yellow Dent	16	9	....	7	69	64	....	49	119	115	.....	F	5.5	4.7	.....	5.3
Woods Northern White Dent	16	9	....	7	75	66	....	50	122	113	.....	F	6.0	4.5	.....	6.0
100-Day Bristol	16	9	....	7	75	63	....	50	133	133	.....	F	6.0	5.0	.....	6.5

[a] Average of 9 varieties that matured. The same 9 varieties from the April, May, and June seedings averaged 104, 83, and 81 days, respectively.

TABLE 2.—*Effects of seeding on different dates upon the germination, growth, and development of corn, in experiments conducted at Arlington Experimental Farm, near Washington, D. C., during the 6-year period from 1915 to 1920, inclusive*—Continued.

Name of variety	Number of days from— Seeding to emergence.				Emergence to first silks.				Emergence to ripening.				Height of plants (feet).			
	Apr.	May.	June.	July.	Apr.	May.	June.	July.	Apr.	May.	June.	July.	Apr.	May.	June.	July.
Season of 1916—Con.																
U. S. Selection 120.	16	9	....	7	84	66	....	51	137	140	.....	F	6.0	7.0	.....	7.3
Laguna	18	11	....	7	91	73	....	58	F	F	.....	F	7.5	.....	.....	7.7
U. S. Selection 119.	17	10	....	7	87	70	....	55	157	140	.....	F	6.5	7.0	.....	6.5
Average (22 varieties)	16	9	....	7	66	58	....	42	110	109	.....	[b]84	5.6	4.4	.....	5.5
Season of 1917:																
Northwestern Dent	20	10	6	6	57	43	34	34	92	83	72	83	3.0	5.5	5.5	4.0
Brown County Yellow	20	10	6	6	57	43	35	34	92	83	72	83	3.0	5.0	5.5	4.5
U. S. Selection 133.	20	10	6	6	65	47	38	38	107	90	81	F	3.5	7.5	6.5	5.5
Minnesota 13	20	10	6	6	63	42	37	35	107	88	79	F	3.5	6.5	6.5	4.5
Martens White Dent	20	10	6	6	58	43	35	39	107	93	85	F	3.0	5.5	6.0	4.0
Rustler White Dent	20	10	6	6	63	47	40	37	107	93	85	F	3.0	5.7	5.5	4.0
Disco 90-Day	20	10	6	6	65	48	40	39	107	95	87	F	3.0	6.2	7.0	4.2
Fulton	20	10	6	6	64	46	39	38	107	98	87	F	3.0	5.7	6.5	5.2
Cornforth Dent	20	10	6	6	57	41	33	37	92	85	72	F	3.0	5.0	6.5	4.5
Early Huron	20	10	6	6	65	48	40	36	107	101	92	F	3.0	7.2	7.5	5.5
Rocky Mountain Dent	20	10	6	6	65	51	42	41	107	101	97	F	3.5	8.0	8.0	5.5
U. S. Selection 193.	20	10	6	6	65	48	43	41	107	101	97	F	5.0	8.0	8.0	5.7
Wilson White Cap.	20	10	6	6	68	48	43	40	107	101	92	F	5.0	8.0	8.0	5.7
Long Island Yellow Dent	20	10	6	6	71	51	44	41	112	108	101	F	5.5	8.5	8.0	5.7
Woods Northern White Dent	20	10	6	6	75	51	46	46	128	108	107	F	6.7	8.2	8.5	5.2
100-Day Bristol	20	10	6	6	77	55	47	47	131	115	108	F	7.5	10.0	9.0	6.0
U. S. Selection 120.	20	10	6	6	84	61	49	51	138	123	F	F	8.0	10.5	10.0	6.2
Laguna	20	10	6	6	96	70	61	67	145	133	F	F	8.0	12.0	10.5	5.7
U. S. Selection 119.	20	10	6	6	87	62	56	58	140	126	F	F	8.0	11.5	10.0	5.7
Average (19 varieties)	20	10	6	6	68	50	42	42	113	102	[c]88	[d]83	4.6	7.6	7.5	5.1
Season of 1918:																
Northwestern Dent	10	10	8	7	42	40	38	34	82	81	82	.....	5.0	5.2	5.5	5.2
Cornforth Dent	10	10	8	7	41	36	37	33	79	78	85	.....	5.0	5.0	5.7	5.2
U. S. Selection 133.	10	10	8	7	48	45	45	40	89	86	.....	.....	5.7	6.0	6.2	5.7
Minnesota 23	10	10	8	7	47	43	42	33	87	81	82	.....	5.0	5.2	5.7	5.5
Martens White Dent	10	10	8	7	48	42	44	39	89	84	.....	.....	5.0	5.5	5.7	5.5
Disco 90-Day	10	10	8	7	49	46	47	40	92	88	.....	.....	5.7	6.0	6.5	5.7
Fulton	10	10	8	7	50	47	45	40	94	91	.....	.....	5.2	6.0	6.5	5.7
Early Huron	10	10	8	7	49	46	44	40	94	91	.....	.....	6.5	6.7	7.0	7.0
U. S. Selection 193.	10	10	8	7	54	50	47	44	101	93	.....	.....	6.5	7.2	7.0	7.0
Wilson White Cap.	10	10	8	7	49	49	46	45	96	92	.....	.....	6.5	7.2	7.2	7.5
100-Day Bristol	10	10	8	7	55	53	50	47	101	97	.....	.....	7.7	8.7	7.5	8.2
U. S. Selection 120.	10	10	8	7	62	58	56	52	105	110	.....	.....	8.7	8.5	9.0	8.2
Laguna	10	10	8	7	73	72	67	65	127	.....	.....	.....	9.2	8.2	9.0	8.5
U. S. Selection 119.	10	10	8	7	69	64	59	62	111	113	.....	.....	8.5	8.2	9.0	8.5
Average (14 varieties)	10	10	8	7	53	49	48	44	96	91	.....	.....	6.4	6.7	7.0	6.7
Season of 1919:																
White Ree	14	10	6	6	45	33	41	....	.....	.....	.....	81	71	4.2	4.2	3.7	3.3
Cornforth Dent	14	10	6	6	51	36	41	....	.....	.....	.....	84	83	6.0	5.0	5.5	5.2
Northwestern Dent	14	10	6	6	52	37	44	....	.....	.....	.....	86	86	5.0	5.0	5.5	5.2

[b] Average of 11 varieties that matured. The same 11 varieties averaged 99 days from both the April and May seedings.

[c] Average of 16 varieties that matured. The same 16 varieties averaged 107 and 97 days from the April and May seedings, respectively.

[d] Average of 2 varieties that matured. The same 2 varieties averaged 92, 85, and 72 days from the April, May, and June seedings, respectively.

TABLE 2.—*Effects of seeding on different dates upon the germination, growth, and development of corn, in experiments conducted at Arlington Experimental Farm near Washington, D. C., during the 6-year period from 1915 to 1920, inclusive*—Continued.

Name of variety.	Number of days from—												Height of plants (feet).			
	Seeding to emergence.				Emergence to first silks.				Emergence to ripening.							
	Apr.	May.	June.	July.	Apr.	May.	June.	July.	Apr.	May.	June.	July.	Apr.	May.	June.	July.
Season of 1919—Contd.																
Martens White Dent	14	10	6	6	56	42	45	....	.....	.....	91	96	6.5	6.0	6.0	5.0
U. S. Selection 133	14	10	6	6	56	40	46	....	.....	.....	96	98	6.5	6.5	6.2	6.2
Wilson White Cap	14	10	6	6	61	47	46	....	.....	.....	105	101	7.5	7.5	8.5	7.2
Fulton	14	10	6	6	57	43	46	....	.....	.....	97	108	7.0	7.0	6.0	7.0
U. S. Selection 193	14	10	6	6	60	50	51	....	.....	.....	111	F	8.0	8.0	7.7	7.5
100-Day Bristol	14	10	6	6	61	51	52	....	.....	.....	115	F	8.2	8.7	8.7	8.0
U. S. Selection 120	14	10	6	6	68	60	59	....	.....	.....	120	F	8.7	8.7	9.2	8.0
Laguna	14	10	6	6	80	65	67	65	.....	.....	127	F	11.0	10.2	11.5	10.0
U. S. Selection 119	14	10	6	6	71	61	62	59	.....	.....	122	F	9.7	9.5	9.7	9.7
Average (12 varieties)	14	10	6	6	60	47	50	....	.....	.....	103	*e* 92	7.6	7.2	7.6	6.9
Season of 1920:																
Cornforth Dent	20	9	6	5	56	47	39	38	100	94	76	87	3.7	5.5	5.5	5.2
Northwestern Dent	20	9	6	5	58	47	40	39	100	94	79	87	3.7	5.0	5.2	5.0
U. S. Selection 133	20	9	6	5	65	52	43	43	109	97	86	92	6.2	7.0	7.0	6.7
San Miguel	20	9	6	5	67	54	46	49	113	100	105	97	6.2	6.5	7.0	6.5
Fulton	20	9	6	5	67	52	43	44	112	100	91	97	6.5	7.5	8.0	7.0
100-Day Bristol	20	9	6	5	72	62	53	50	119	111	114	F	8.2	9.2	9.2	9.0
U. S. Selection 119	20	9	6	5	80	68	57	57	125	121	122	F	9.5	10.2	10.5	10.5
Laguna	20	9	6	5	90	77	65	66	130	133	F	F	10.5	10.7	10.7	8.7
Average (8 varieties)	20	9	6	5	69	57	48	48	113	106	*f* 96	*g* 92	6.8	7.7	7.9	7.3

SUMMARY OF THE DATA FOR THE YEARS 1915, 1917, 1919, AND 1920 (1916 AND 1918 NOT INCLUDED).

Date of seeding (on approximately the 20th of the month).	Number of seedings.	Number of days from—			Height of plants (feet).
		Seeding to emergence.	Emergence to first silks.	Emergence to ripening.	
April	63	17	63	*h* 112	6.3
May	63	10	51	*h* 99	7.2
June	63	7	45	*i* 93	7.4
July	63	6	43	*j* 91	6.4

e Average of 7 varieties. The same 7 varieties averaged 91 days from the June seeding.
f Average of 7 varieties. The same 7 varieties averaged 111 and 102 days for the April and May seedings, respectively.
g Average of 5 varieties. The same 5 varieties averaged 107, 97, and 87 days for the April, May, and June seedings, respectively.
h Data from 51 seedings.
i Data from 59 seedings.
j Data from 23 seedings. These 23 seedings were of the earliest maturing varieties. The same varieties required 103, 87, and 85 days from the April, May, and June seedings, respectively.

In 1919 12 varieties were grown. The dates of seeding were April 21, May 20, June 20, and July 21. The different seedings were made in single rows 66 feet long and 3.3 feet apart on uniform reclaimed river land that had been cropped to corn the previous year. The stand of the earlier small varieties was one plant every 10 inches in the row and of the larger varieties one plant every 16 inches.

In 1920 eight varieties were grown. The dates of seeding were April 20, May 20, June 24, and July 20. The different seedings were made in single rows 66 feet long and 3.3 feet apart on uniform reclaimed river land that had been cropped to corn the previous year. The stands varied from one plant every 10 inches for the smaller varieties to one plant every 16 inches for the larger varieties.

A summary of the data obtained from the experiments conducted in 1915, 1917, 1919, and 1920 is shown in Table 2. Data from the experiments conducted in 1916 and 1918 are not included in this summary, as only three seedings were made in 1916, and in 1918 two of the seedings were made in May.

RESULTS OBTAINED.

In all the experiments there was a consistent decrease in the number of days from seeding to emergence as the date of seeding was delayed, although frequently the June and July seedings showed such slight differences that they were not recorded. The number of days from emergence to silking and from emergence to ripening consistently decreased except in the July seedings, which tended to show increases as compared with the June seedings. The maximum heights of most of the varieties were attained in the June seedings. The May seedings ranked second, the July seedings third, and the April seedings fourth in height of stalks.

EFFECTS ON GERMINATION.

When sown early the short-season northern varieties came up sooner than the varieties from the Central and Southern States. When sown later the differences in this respect usually were not apparent; where differences occurred the early-maturing northern varieties were found to be the first to come up. The results indicate that these northern-grown varieties are capable of starting growth at lower temperatures than the later maturing varieties of the Central and Southern States. Germination, as would be expected, was much more rapid from the later than from the earlier seedings. Seeds sown in April required an average of 17 days to come up to a stand, whereas those sown in July were as far advanced 6 days after seeding.

EFFECTS ON HEIGHT AND RATE OF GROWTH.

The average height of stalk and the average daily increase in height in the different seedings are shown in Table 3.

The total height and the daily increase in height were greatest from the June seeding. The total height was greater from the May seeding than from the July seeding, but the rate of growth was slower. The least height and the slowest rate of increase resulted from the April seeding.

TABLE 3.—*Total height and average daily increase in height of corn at the Arlington Experimental Farm, near Washington, D. C., when planted on different dates in 1915, 1917, 1919, and 1920.*

Date of seeding.	Emergence to full growth (days).	Height of stalks (inches).	
		Total.	Average daily increase.
Apr. 19	63	75.6	1.20
May 20	51	86.4	1.69
June 21	45	88.8	1.97
July 20	43	76.8	1.79

EFFECTS ON DEVELOPMENT.

The number of days from emergence to first silks decreased as the date of seeding was delayed from April to July. The number of days from emergence to ripening also decreased except in the case of the July seedings. These showed an increase as compared with the June seedings. Development to the silking stage was more rapid as the date of seeding was delayed. The plants from the April seeding required 63 days from emergence to reach the same stage of development which those from the July seeding attained in 43 days.

The duration of the pollen-shedding period depended upon the degree of inherent variation within the variety, the lack of uniformity in coming up, the amount of suckering, the variation in the fertility of the soil, and weather conditions. How these various factors might influence the duration of pollen shedding in a variety is evident and need not be treated in detail. Except under unusual conditions, the experiments indicate that the duration of this period is longer in plants from the earlier seedings than in those from the later seedings. The average for the plants from the April seedings was 22 days; May, 19 days; June, 18 days; and July, 17 days.

CORRELATION OF EFFECTS.

It is of interest to know how closely the difference in number of days between the dates of seeding corresponds with the differences between dates of emergence, dates of first silking, and dates of ripening. The average results from all the experiments are shown in Table 4.

As the date of seeding was delayed the differences in the time of emergence, silking, and ripening more nearly approximated those in the date of seeding.

In the comparison of April and May seedings a difference of 32 days in time of seeding represents a gain of 14 days in time of ripening. May 20, however, is later than the usual date of seeding in

the vicinity of Washington, and this gain in time of maturity does not represent the gain of early over normal seedings. In this connection, some comparisons of early seedings made in April with seedings made at more nearly the normal date of seeding (May 1 to 15) will be of interest.

TABLE 4.—*Differences in the dates of seeding and the resulting differences in the dates of emergence, silking, and ripening of corn in experiments conducted at the Arlington Experimental Farm, near Washington, D. C., during the 6-year period from 1915 to 1920, inclusive.*

Average dates of seeding.	Seedings compared.	Years of data.	Number of days difference in—			
			Seedings.	Emergence.	Appearance of first silks.	Ripening.
Apr. 18 May 20	April and May	1915, 1916, 1917, and 1920	32	25	14	14
May 20 June 22	May and June	1915, 1917, and 1920	33	30	22	23
June 21 July 19	June and July	1915, 1917, 1918, and 1920	28	27	26	.....

Data from such comparisons made in 1917, 1919, and 1920 are shown in Table 5. In 1917 the experimental plats were located on fairly uniform upland. The seeding made on April 12 was on land that had been cropped to soy beans the previous year, followed by rye that had been plowed under preparatory to seeding corn. The plat seeded on May 14 was on land that had been in sod the previous year. The two plats, however, were sufficiently similar to permit reliable comparisons in respect to the characters dealt with in Table 5. In 1919 and 1920 all the seedings were made in adjacent or neighboring plats on uniform reclaimed river land that had been previously cropped to corn.

The results presented in Table 5 show that in the season of 1917 plants from seedings made a month earlier than normal were about a week earlier in silking than plants from normal seedings. In 1919 the gain in earliness was less than a week. In 1920 a difference of 17 days between seedings resulted in a gain of 7 to 9 days in the time of silking. The differences in the time of silking correspond fairly closely with the differences in the time of ripening and can be determined more readily and with a greater degree of accuracy. The data available indicate that the differences at the time of ripening are slightly less than at the time of silking.

TABLE 5.—*Differences in the time of emergence and in the silking of corn seeded on early and normal dates at the Arlington Experimental Farm, near Washington, D. C., in 1917, 1919, and 1920.*

Variety.	Dates of seedings.	Number of days difference in—		
		Seedings.	Emergence.	Appearance of first silks.
Season of 1917:				
Northwestern	Apr. 12 and May 14.	32	25	14
U. S. Selection 133	do	32	25	9
Early Huron	do	32	25	8
Rocky Mountain Dent	do	32	25	13
100-Day Bristol	do	32	25	4
U. S. Selection 119	do	32	25	3
Season of 1919:				
White Ree	Apr. 9 and 30	21	12	5
U. S. Selection 133	do	21	12	6
U. S. Selection 193	do	21	12	6
U. S. Selection 119	do	21	12	0
White Ree	Apr. 9 and May 14	35	22	5
U. S. Selection 133	do	35	22	7
U. S. Selection 193	do	35	22	10
U. S. Selection 119	do	35	22	3
White Ree	Apr. 30 and May 14.	14	9	0
U. S. Selection 133	do	14	9	1
U. S. Selection 193	do	14	9	3
U. S. Selection 119	do	14	9	3
White Ree	Apr. 21 and May 14.	23	18	3
U. S. Selection 133	do	23	18	7
U. S. Selection 193	do	23	18	6
U. S. Selection 119	do	23	18	8
Season of 1920:				
U. S. Selection 133	Apr. 20 and May 7	17	9	9
U. S. Selection 119	do	17	9	7

SUMMARY.

The results of the experiments at the Arlington Experimental Farm, near Washington, D. C., are as follows:

(1) The germination of corn increased in rapidity as the date of seeding occurred later.

(2) The total growth of stalk was greatest from the seedings in June and May. The rate of growth was most rapid from the June and July seedings. The total growth was least and rate of growth slowest from the April seedings.

(3) Development was more rapid in the later than in the earlier seedings.

(4) The number of ears per stalk, the size of the ear, and the amount of suckering bore no consistent relation to the date of seeding.

(5) The pollen-shedding period was longer in plants from the early seedings than those from the later seedings.

(6) Seedings earlier than normal resulted in slight gains in the date of silking.

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