CENTRAAL INSTITUUT VOOR LANDBOUWKUNDIG ONDERZOEK

(Central Institute of Agricultural Research)

Wageningen, Netherlands

Report of Field Experiments with Maize Varieties in the Netherlands in 1953

by

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Meteorological data (table 1 and 2)

The average temperature in April, May and June was a little higher than normal, although two cold spells, the first decades of May and June, with some dangerous nightfrosts around the 10th of May, reduced growth and development of the young maize plants. April and June got more, May less than the normal rainfall, but these differences were not exceptionally great. The summer temperature was just a little below normal, summer rains were normal in July, abundant in August and rather scarce in September. The maize season ended with an exceptionally dry and warm October. The ripening process was accordingly favoured.

Variety trials

Table 3 shows the results of 37 experiment fields, designed as simple blocks, of which 11 had 2, the others 3 replications. These fields were scattered in different regions of the country and grouped accordingly. The yields are expressed in relative figures, the standards (= 100) being the average of all varieties in all fields in a region. Figures in brackets are considered to be less significant because of the small number of observations.

Table 4 shows the results of one field experiment (CI 1487) in which the same varieties as in table 3 were compared with many new and experimental hybrids of American (specially Wisconsin), Canadian and Dutch origin.

It is obvious that the data of column (b) have very little meaning regarding Dutch conditions. Within the 80-85 day group differences in actual date of maturity of 20 days occur (column (o)), in spite of the fact that the weather in September was not unfavourable and in October very favourable for the ripening. Thanks to this mild autumn several late varieties got a chance to show their productivity (columns (m) and (n) in connection with (o)). This effect was undoubtedly accentuated by an attack of rust (Puccinia maydis), several early varieties being more susceptible to this disease than late ones.

Planting date experiments

In 1952 and 1953 experiments with different dates of planting were carried out. Two problems were studied:

1. the influence of planting date on grain yield;
2. the difference between reciprocal crosses of flint-dents.

For this purpose seed of flint-dent hybrids, produced on the flint as well as on the dent parent, was used and planted with principally nine day intervals, beginning the first of April.

To begin with the expected advantage of flints with regard to germination and emergence, it must be stated that in both years no significant differences were observed. In some cases even an

opposite effect was seen, a dent emerging one day earlier than its reciprocal flint.

In 1952 the time from planting to emergence was very little influenced by the planting dates. This was a consequence of the exceptionally mild weather in April. The May plantings took more time to emerge, caused by a drought.

In 1953 the temperatures of April and May were on the average nearly normal, but the first decade of May was cold with a nightfrost on the tenth causing the loss of the first and second plantings of one experiment (CI 1490 on sandy soil). Only a few plants of these plantings survived.

Table 5 and 6 show the grain yields of these experiment fields. The exceptional climatic conditions of April 1952 are demonstrated in the high yields of the first plantings. In 1953, under nearly normal conditions, planting on April 20 gave the best results on the clay soil. On the sandy soil the third planting was a little damaged by the frost. Situation and soil characteristics of this field caused a better profit of sunshine than on the clay field. This is demonstrated in the good results of the planting of May 7.

A very interesting effect of the difference in planting date on the vegetative growth was observed in 1952 (see table 7). Later planting caused taller growth of the plants. This effect was not so striking in 1952, but again the late plantings were a little higher and more leafy than the earlier ones.

In figures 1 and 2 the influence of the planting dates on the time of tasseling is shown. Again the difference in conditions between 1952 and 1953 is clearly demonstrated by the steep lines of 1952.

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Table 1

Average 24 hours temperature[1] (° C) in 1953, April - October inclusive (decades I, II and III), monthly (M 24), average 1911 - 1950 (N 40) and monthly deviation (Dev.).

Meteorological Station de Bilt (30 km West from CI 1487, 1489 and 1490)

	April	May	June	July	August	September	October
I	7.3	10.2	11.4	17.8	15.7	14.4	11.4
II	8.3	13.2	15.0	15.9	18.1	13.6	12.0
III	9.7	14.9	20.2	16.7	15.2	13.1	10.7
M 24	8.5	12.9	15.5	16.8	16.3	13.7	11.3
N 40	8.3	12.6	15.1	17.0	16.6	14.0	9.6
Dev.	+0.2	+0.3	+0.4	-0.2	-0.3	-0.3	+1.7

Mean figures for the whole country

I	7.4	9.8	11.4	17.3	16.0	15.0	12.2
II	8.2	13.1	14.9	15.9	18.3	13.9	12.3
III	9.5	14.7	19.4	16.8	15.4	13.6	10.8
M 24	8.4	12.5	15.2	16.7	16.6	14.2	11.7
N 40	7.9	12.1	14.7	16.8	16.7	14.3	10.0
Dev.	+0.5	+0.4	+0.5	-0.1	-0.1	-0.1	+1.7

Table 2

Average rainfall (mm) in 1953, April - October inclusive (decades I, II and III), monthly (M), average 1911 - 1950 (N 40) and monthly deviation (Dev.).

Meteorological Station de Bilt (30 km West from CI 1487,1489 and 1490)

	April		May		June		July		August		September		October	
	mm	days	mm	days	mm	days	mm	days	mm	days	mm	days	mm	days
I	42	5	4	0	26	3	16	4	16	2	5	1	2	1
II	9	2	9	3	19	4	41	5	5	1	11	2	3	0
III	16	3	21	3	37	3	18	3	93	8	22	4	2	1
M	66	10	34	6	82	10	75	12	114	11	39	7	8	2
N 40	50	10	54	9	61	10	74	11	82	11	68	11	71	12
Dev.	+16	0	-20	-3	+21	0	+1	+1	+32	0	-29	-4	-63	-10

Mean figures for the whole country

	April		May		June		July		August		September		October	
	mm	days	mm	days	mm	days	mm	days	mm	days	mm	days	mm	days
I	36	6	2	1	31	4	16	3	17	2	7	2	3	1
II	9	2	10	3	20	4	37	6	7	2	13	3	2	1
III	14	3	21	4	36	4	20	4	87	8	29	3	4	2
M	59	11	34	7	87	12	74	13	111	12	50	9	10	4
N 40	47	10	49	9	57	9	72	10	76	11	69	11	72	12
Dev.	+12	+1	-15	-2	+30	+3	+2	+3	+35	+1	-19	-2	-62	-8

[1]) In former years average daily temperatures were mentioned. The average of 24 hours is supposed to be a better datum.

Table 3 Relative yields of maize (15.5 % moisture) of 37 variety trials, scattered over different regions of the country.

Region	Central clay		Northern sand		Northern peat		River clay		South.E.löss		South.W.clay		South.E.sand	
	Relative yield	Number of fields	Relative yield	Number of fields	Relative yield	Number of fields	Relative yield	Number of fields	Relative yield	Number of fields	Relative yield	Number of fields	Relative yield	Number of fields
100=..quint/ha	48.7	2	61.2	9	54.7	1	47.5	3	71.4	1	55.6	8	62.6	13
Varieties														
Vroege gele ronde C.B. [1]	101	2	97	9	(103)	1	(144)	1	(97)	1	104	8	95	12
Kuma [1]	95	2	97	9	(99)	1	-	-	-	-	-	-	(88)	1
Unicum [1]	-	-	75	9	(60)	1	-	-	-	-	-	-	(78)	1
Goudster P [2]	111	2	111	9	(102)	1	96	3	(106)	1	104	8	109	12
Goudster R [2]	111	2	111	8	(107)	1	(112)	1	-	-	106	8	103	10
Wisconsin 240	81	2	96	9	(94)	1	98	3	(98)	1	93	8	96	13
C.B. 32	115	2	102	9	(107)	1	119	3	(107)	1	111	8	101	13
C.B. 41	91	2	99	9	(99)	1	101	3	(94)	1	102	8	102	13
C.I.V. 2	113	2	111	9	(125)	1	-	-	(107)	1	112	5	106	12
C.I.V. 5	121	2	109	9	(110)	1	119	3	(111)	1	112	8	109	13
C.I.V. 6	103	2	(105)	2	-	-	98	3	(101)	1	106	8	102	13
Amtwee	83	2	97	9	(94)	1	-	-	-	-	90	5	102	5
Reynders 777 [1]	(71)	1	(83)	2	-	-	78	3	(81)	1	78	8	81	12
Wisconsin 255	-	-	-	-	-	-	101	3	(98)	1	99	8	97	13
K.F. 1	-	-	-	-	-	-	(101)	2	-	-	91	7	108	7
Pioneer 396	-	-	-	-	-	-	99	3	-	-	98	7	92	6
K.E. 3	-	-	-	-	-	-	94	3	-	-	101	8	102	7
Nodak 301	-	-	-	-	-	-	(97)	2	-	-	93	7	91	6
Wisconsin 1602	89	2	(81)	2	-	-	-	-	-	-	97	4	97	5
C.B. 33	-	-	-	-	-	-	-	-	-	-	104	5	105	5

[1]) Open-pollinated varieties. 2) P and R mean: produced on dent and flint respectively.

The author acknowledges the Government Institute for Research on Varieties of Field Crops for the computation of these figures.

Table 4

PERFORMANCE RECORDS OF MAIZE VARIETIES ON EXPERIMENTAL FIELD CI 1487

Year: 1953
Country: Netherlands
Location of experiment: Ede
Name of farmer: W. Jochemsen
Geographic position: 5° East, 52° North
Altitude above sea-level: ± 12 metres
Size of plot: 10.92 square metres (1.20 x 9.10)
Soil type: light, sandy soil
Meteorological data: see table 1 and 2
Date of planting: April 28th, 29th, 1953

Rate of seeding: 71000 plants per hectare, except Baanbreker, Unicum, Kuma and Vroege Gele Ronde 107000 plants per hectare.
Damage by diseases: some stalk rot (see f, g and h), Puccinia maydis
Damage by insects, rodents or birds: none
Seasonal conditions, whether usual or abnormal: normal spring, normal summer, dry fall (table 1 and 2)
Experimental design: partial balanced 8 x 8 latice
Number of replications: 4
2) Significant differences: 5 % level 6.1 ql/ha, 1 % level 8.1 ql/ha
(n) Standard=100=50.6 ql/ha, significant differences for (n) 5 % level 12.0, 1 % level 16.0

Best adapted hybrids or maturity ratings: 70-85 days R.M., less than 155 days (column o)

(a) Variety or strain	(b) American maturity rating	(c) Days to emergence	(d) Days to tasseling	(e) Days to harvest	(f) % plants root lodged	(g) % plants stalk lodged or broken	(h) % erect plants	(i) Plant height in cm	(j) Ear height in cm	(k) Ears per plant	(l) Moisture content at harvest	(m) Grain yield ql/ha at 15.5% moisture	(n) Relative yield % of standard	(o) Days to maturity 40 % moisture
C.I.V. KN 23	80-85	15	75	160	1.2	2.0	96.8	190	85	0.98	39.6	67.6	134	160
Canbred OX 216	80-85	14	78	153	2.6	3.3	94.1	190	85	0.97	40.6	65.8	130	155
Wisconsin 1613	80-85	16	74	160	1.3	2.0	96.7	190	90	1.00	40.8	65.2	129	160
Wisconsin 1616	80-85	15	76	161	1.3	1.3	97.4	190	85	1.01	38.2	64.6	128	160
K.E. 3	80-85	16	80	160	0.0	0.0	100.0	195	85	1.04	41.9	63.6	126	165
C.I.V. KN 19	80-85	15	78	160	2.6	1.7	95.7	190	80	1.06	38.9	63.5	125	160
Canbred OX 227	80-85	14	76	153	0.0	1.3	98.7	205	100	1.01	41.2	62.8	124	155
C.I.V. KN 11	80-85	15	77	160	5.0	2.7	92.3	200	90	0.96	37.4	62.5	124	155
Canbred OX 112	75-80	15	69	145	1.4	7.2	91.4	195	80	1.05	39.4	59.5	118	145
C.I.V. KN 5	70-75	15	69	140	2.4	2.1	95.5	190	90	1.22	38.4	59.3	117	135
Goudster rond	75-80	15	67	140	3.4	3.7	92.9	170	75	1.06	39.1	57.8	114	140
Goudster plat	75-80	15	67	140	2.2	2.9	94.9	180	80	1.02	40.4	57.8	114	140
K.F. 1	80-85	16	74	160	0.0	4.2	95.8	185	80	0.96	39.4	57.8	114	160
Canbred OX 230	80-85	16	71	151	1.4	5.1	93.5	190	95	1.01	37.5	56.8	112	145
C.I.V. 2	80-85	16	67	141	1.9	5.8	92.3	170	80	1.06	43.5	56.6	112	145
Canbred OX 229	80-85	15	70	152	4.8	7.9	87.3	175	70	1.06	37.6	56.0	111	145
C.I.V. K 70 N	80-85	16	75	159	6.2	4.6	89.2	200	95	1.08	42.0	55.4	109	165
Morden 74	80-85	16	71	151	2.7	9.0	88.3	185	85	1.02	37.2	55.1	109	145
Nodak 301	80-85	16	75	161	0.0	3.0	97.0	170	75	1.03	39.4	55.0	109	160
C.I.V. KN 52	80-85	16	76	160	4.4	3.3	92.3	205	100	1.00	39.2	54.6	108	160
Wisconsin 255	80-85	16	77	160	0.0	3.3	96.7	180	80	1.04	37.8	54.5	108	155
[illegible]	75-80	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

C.I.V. KA 4	75-80	17	70	140	1.7	5.6	92.7	185	85	1.02	40.1	54.4	108	140
v.d.H. 38	80-85	16	69	151	0.0	2.3	97.7	180	80	1.10	38.3	54.2	107	150
C.I.V. 1	80-85	16	69	141	0.0	3.3	96.7	175	75	1.03	42.7	54.0	108	145
v.d.H. 34	80-85	15	71	152	2.8	6.0	91.2	185	80	1.21	39.6	54.0	108	150
v.d.H. 35	80-85	15	70	152	5.1	3.6	91.3	180	80	1.02	36.2	52.7	104	145
v.d.H. Caldera 402	80-85	17	79	159	1.4	2.9	95.7	185	90	1.08	41.3	52.2	103	160
Wisconsin 1612	80-85	17	75	159	0.0	5.7	94.3	185	85	1.01	39.0	52.0	103	155
C.I.V. 6	80-85	15	71	151	0.0	3.6	96.4	195	90	1.04	40.9	51.2	101	155
I.v.P. Kr. 655	80-85	16	76	160	2.7	4.3	93.0	190	90	1.04	40.1	51.0	101	160
v.d.H. 37	80-85	16	69	151	2.2	8.2	89.6	180	80	1.15	36.8	50.4	100	145
v.d.H. 30	80-85	16	71	151	0.0	5.8	94.2	180	70	1.04	39.7	50.3	99	150
v.d.H. Caldera 401	80-85	18	78	158	1.4	6.0	92.6	185	80	1.16	39.3	50.1	99	155
Wisconsin 240	80-85	16	70	140	0.0	1.3	98.7	180	75	0.99	41.4	49.2	97	145
C.I.V. 5	80-85	16	69	141	1.1	2.6	96.3	165	70	1.02	44.1	48.3	95	150
I.v.P. Kr. 656	80-85	16	79	160	2.6	2.8	94.6	190	90	0.97	38.3	48.3	95	155
v.d.H. 29	80-85	16	73	150	1.4	5.2	93.4	180	70	1.04	37.8	47.7	94	145
Canbred 210	80-85	16	74	151	1.8	8.8	89.4	175	80	0.99	40.9	47.6	94	155
v.d.H. 27	80-85	17	70	149	2.0	2.4	95.6	190	95	1.04	41.0	47.4	94	150
C.I.V. K5B	70-75	16	62	139	0.0	8.0	92.0	165	70	1.11	34.5	47.4	94	130
I.v.P. Kr. 663	80-85	17	76	159	3.0	2.0	95.0	190	85	1.00	35.9	47.3	93	150
Pioneer 396	80-85	16	76	151	1.4	10.0	88.6	180	80	1.04	39.6	47.3	93	150
Wisconsin 1602	80-85	16	70	144	0.0	0.0	100.0	165	80	1.02	41.5	46.0	91	145
I.v.P. Kr. 654	80-85	15	71	151	1.2	2.2	96.6	185	85	0.95	37.3	45.9	91	145
v.d.H. 41	80-85	16	69	144	2.8	4.2	93.0	170	70	1.03	42.0	45.8	91	150
C.I.V. KB 19	80-85	17	70	159	0.0	7.1	92.9	180	75	1.01	37.5	45.7	90	155
C.B. 41	80-85	16	70	151	1.3	7.4	91.3	185	80	1.00	37.6	45.7	90	145
I.v.P. Kr. 661	80-85	16	74	160	3.9	2.6	93.5	190	85	0.98	40.0	45.7	90	160
I.v.P. Kr. 662	80-85	16	76	160	0.0	6.6	93.4	185	80	0.98	38.0	45.0	89	155
C.B. 33	80-85	17	72	150	0.0	5.6	94.4	190	85	1.01	**41.1**	44.9	89	150
v.d.H. 39	80-85	16	70	151	1.9	3.6	94.5	170	70	1.16	41.2	44.8	89	155
I.v.P. Kr. 665	80-85	16	78	160	1.2	5.3	93.5	195	90	1.02	38.3	44.4	88	155
I.v.P. Kr. 659	80-85	17	74	159	0.0	12.5	87.5	185	85	1.01	38.9	43.5	86	155
Raymakers 777')	80-85	18	74	158	8.6	9.1	82.3	190	85	0.97	39.5	43.4	86	155
I.v.P. Kr. 657	80-85	17	73	150	0.0	4.8	95.2	195	95	1.02	39.6	43.2	85	150
Amtwee	75-80	16	68	140	0.0	2.0	98.0	185	80	1.01	39.6	43.1	85	140
C.B. 32	75-80	16	62	140	3.4	7.8	88.8	165	70	1.06	36.4	43.0	85	135
v.d.H. 10	80-85	15	69	145	2.3	6.2	91.5	185	80	0.97	43.0	42.4	84	150
I.v.P. Kr. 658	80-85	16	68	151	3.8	11.8	84.4	190	90	0.98	38.6	36.4	72	150
Baanbreker ')	70-75	17	60	140	3.3	11.2	85.5	150	60	0.92	38.6	36.4	72	135
Vroege gelerande')	75-80	17	65	140	3.5	8.8	87.7	150	50	1.00	39.6	36.1	71	140
Kuma')	75-80	18	66	139	2.0	10.3	87.7	160	70	0.98	**42.9**	35.4	70	140
Unicum ')	75-80	19	66	138	3.6	8.4	88.0	145	55	1.14	43.6	29.3	58	140

') Open-pollinated varieties

2) Analysis of variance from C. Lugt, Statistical Department of the Institute

Table 5

Planting date experiment CI 1366 in 1952 at Wageningen, Netherlands, on sandy soil. Grain yields in quintals per hectare (15.5 % moisture)

Planting date→	April 3	April 10	April 19	April 28	May 7	May 16
Variety						
Goudster	75.0	77.7	73.7	68.6	66.1	61.4
Wisconsin 240	68.7	71.0	68.0	72.2	53.4	52.9
K.F. 1	72.5	71.2	71.9	72.9	50.0	43.9
Average	72.1	73.3	71.2	71.2	56.5	52.7

Critical difference D 0.05 = 2.3, D 0.01 = 3.0

Table 6

Planting date experiments CI 1489 on clay and CI 1490 on sandy soil near Wageningen, Netherlands, in 1953. Grain yields in quintals per hectare (15.5 % moisture)

	Planting date→	April 1	April 10	April 20	April 28	May 7	May 15
Exp.number	Variety						
Critical diff.							
CI 1489	Goudster	62.1	61.0	66.7	61.8	53.8	54.8
D 0.05=3.8	Wisconsin 240	56.8	54.2	58.8	52.2	43.6	46.0
D 0.01=5.1	Average	59.5	57.6	62.7	57.0	48.7	50.4
	Goudster	x	x	67.0	74.1	75.0	65.8
CI 1490	Wisconsin 240	x	x	62.3	65.7	62.8	56.3
D 0.05=3.8							
D 0.01=5.1	Average			64.6	69.9	68.9	61.1

x Most plants lost by nightfrosts in the spring

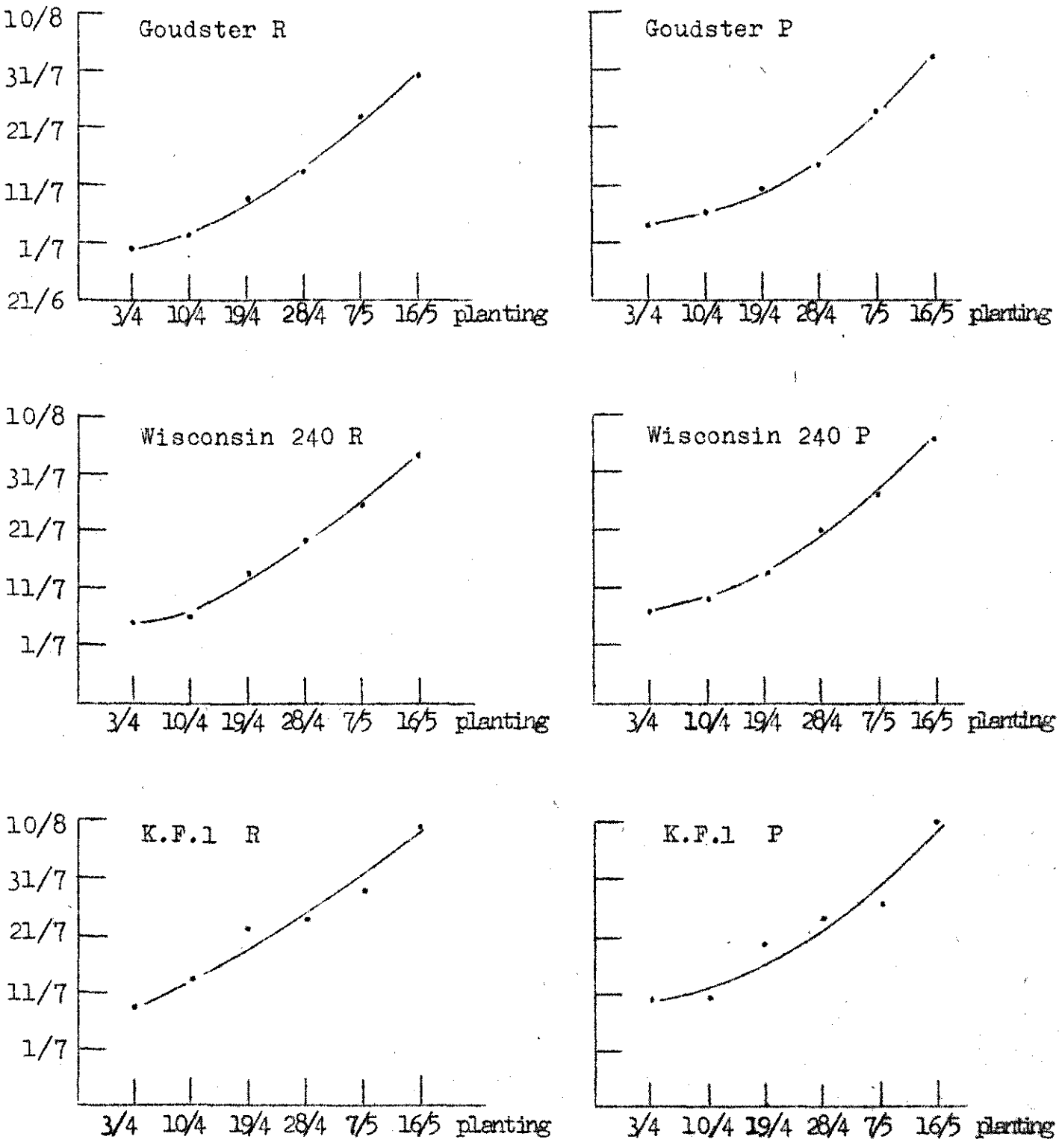
Table 7

Influence of planting date on height of plants (cm) Experiment field CI 1366 in 1952

Planting date→	April 3	April 10	April 19	April 28	May 7	May 16
Variety						
Goudster	130	150	160	170	175	190
Wisconsin 240	140	150	175	180	190	200
K.F. 1	160	165	185	190	190	200
Average	145	155	175	180	185	195

CI 1366 1952

Fig. 1
Tasseling

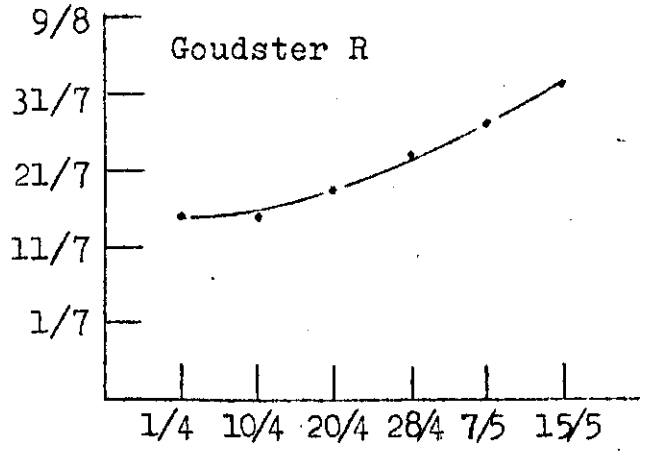


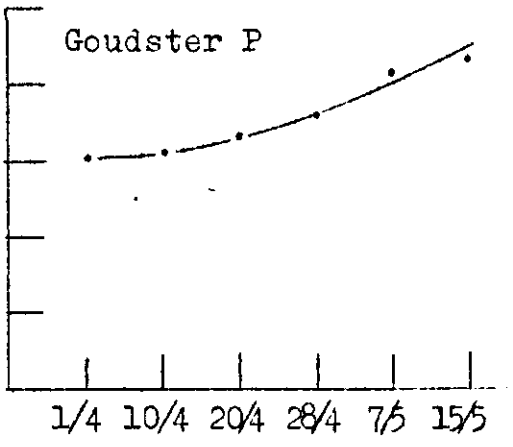
Influence of date of planting on date of tasseling

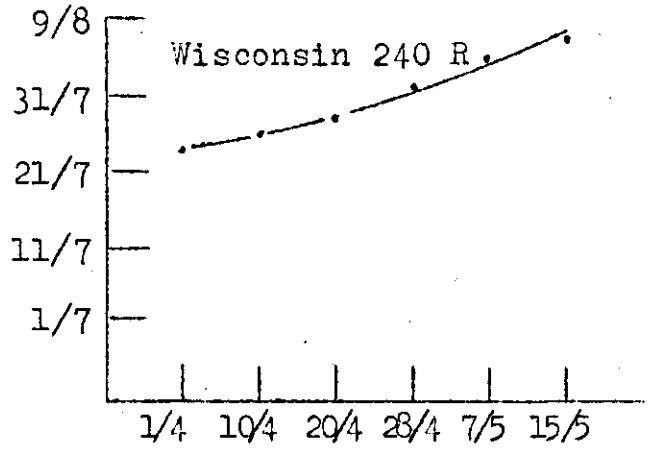
N.B. In these graphs a "R" behind the name of a hybrid means "flint", a "P" means "dent", referring to the type of seed used for planting.

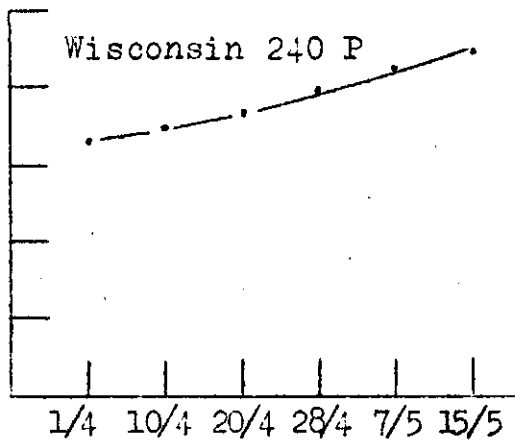
Fig. 2
Tasseling

CI 1489 1953









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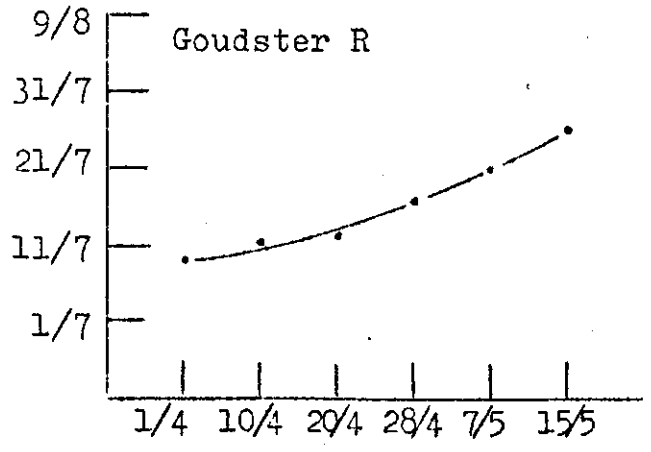

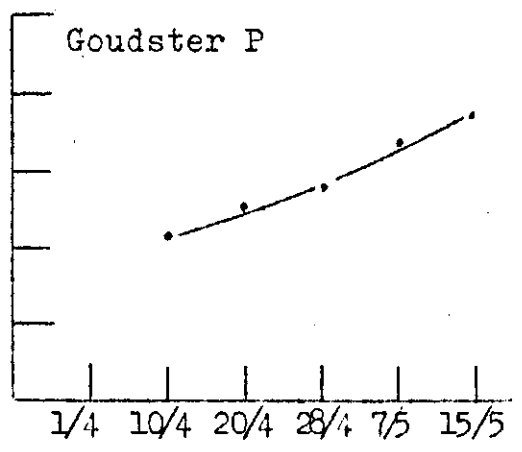

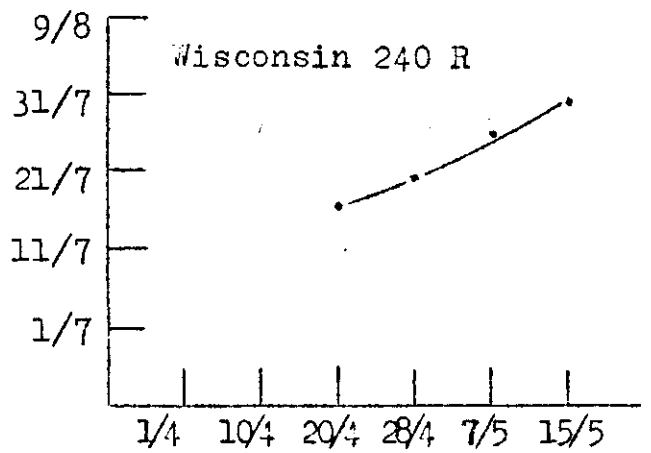

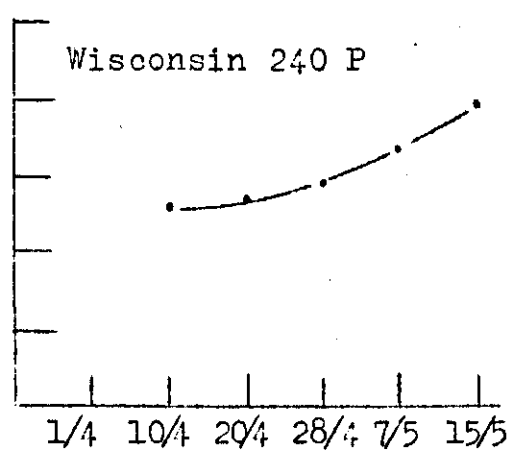

Influence of date of planting on date of tasseling

N.B. In these graphs a "R" behind the name of a hybrid means "flint", a "P" means "dent", referring to the type of seed used for planting.