PERFORMANCE OF EARLY MATURING HYBRIDS IN MANITOBA, CANADA.

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ABSTRACT

Early maturing hybrids are being tested at the Agriculture Canada Research Station in Morden that would be adapted for the short season of the Canadian prairies. The hybrids are up to 10 days earlier than the widely grown U.S. hybrid 894. More than half of these hybrids outyielded hybrid 894. The oil content varied from 48 to 54% (dry weight basis).

Of the early lines, the best female lines were selections from CM 338 and the U.S. lines HA 232 and HA 301. Among the restorers with good combining ability were derivatives of CM 469 and CM 497. Most of the hybrids have resistance to the North American race of downy mildew *(Plasmopora halstedii)*. Most of the early lines, however, were susceptible to head rot from sclerotinia *(Sclerotinia sclerotiorum)*.

INTRODUCTION

The objective of the breeding program by Agriculture Canada at Morden, Manitoba has been to develop early maturing hybrids that would be adapted to the Canadian prairies. At present, sunflower cultivation in Canada has been confined mostly to the extreme southern part of Manitoba. The hybrids grown in Canada so far have been of U.S. origin and are somewhat too late for most of the Canadian prairies. Hybrids that mature at least a week earlier are required before significant expansion of sunflower acreage occurs.

We have conducted extensive tests of U.S. and a few of our earlier maturing hybrids at several locations in Manitoba. This paper will report the results of these trials as well as the performance in hybrid combinations of some of the early maturing lines.

MATERIALS AND METHODS

Fourteen U.S. and three hybrids developed at the Morden Research Station were tested for 2 years at various sites in Manitoba (5 in 1979, 4 in 1980). The tests also included one open-pollinated variety, Saturn, derived from the U.S.S.R. variety, Salyut. These were grown in 4 replicates with 4 rows per plot but only the middle two rows were harvested for oil content and yield determinations.

About 200 preliminary hybrids were tested in 2-row plots with 3 replicates in 1980 at the Morden Research Station. The female lines used in hybrid combinations were the U.S. lines HA 301, HA 232 and HA 89 and several lines derived from the U.S.S.R. open-pollinated varieties. Various experimental restorers were used but lines derived from CM 469 and CM 497 gave the best combining ability and only the results from hybrids with these restorers will be reported. CM 469 and CM 497 were derived from a gene pool formed by allowing 50 selected inbred lines to interpollinate for two years. These hybrids were grown in tests with 25 entries each which included the hybrid 894 as a check.

RESULTS AND DISCUSSION

The summary of performance data of hybrids, most of them commercially grown and tested for two years in Manitoba are presented in Table 1. The mean yield of the U.S. hybrids was 2264 kg/ha and the mean maturity requirement was 118 days. The two early maturing hybrids requiring 113 and 115 days to mature had a mean yield of 2237 kg/ha. The earlier maturing hybrids therefore performed as well as the later maturing hybrids in spite of longer than usual frost-free seasons in 1979 and 1980.

Table 1. Two-year performance means of sunflower hybrids in 1979 and 1980 Manitoba tests (9 station-years).

Hybrid	Yield kg/ha	Oil %	Days to 80% bloom	Days to Maturity
IS 7101	2371	45.8	71	116
DO 164	2346	44.2	71	118
DO 844	2414	44.2	71	117
SigCo 449	2266	44.4	73	118
SigCo 450	2253	46.4	73	118
SigCo 894A	2184	45.4	74	119
Cargill 205	2285	47.2	72	118
J-401	2374	43.7	72	118
J-501	2261	45.5	73	118
S-304	2209	45.1	74	118
SF 101	2285	47.3	72	119
Sunbred 254	2161	45.5	75	120
Sunbred 265	2281	46.8	73	120
Morden 12	2309	48.5	67	113
Morden 15	2165	46.5	71	115
CMH 101	2085	46.7	73	116
894	2185	44.9	74	119
Saturn	2033	46.0	67	113

When the performance of several female lines in hybrid combinations were compared to the standard hybrid 894, the yields varied from 81 to 122% that of 894 (Table 2). A few of these hybrids matured 10 days earlier than 894 but most of them were about 5 — 6 days earlier. The oil content varied from 48 to 54% (on dry weight basis). Part of the reason for the lower yield of the early maturing hybrids was due to the higher frequency of head rot occurring in these hybrids from sclerotinia which resulted in significant yield losses in our 1980 tests. Two lines from Morden program, CM 338 and CM 392 as well as the U.S. lines HA 232 and HA 89 showed more resistance to head rot and this is reflected in higher yields.

Table 2. Comparison of combining ability of several female lines.

Female parent	No. of hybrids	Yield % of 894	Days to Maturity	Oil %
HA 301	13	102	105	51.5
HA 232	12	108	108	50.7
HA 89	5	99	111	51.6
CM 338	28	122	107	48.2
CM 392	15	113	109	51.5
CM 400	53	101	109	51.1
CM 414	9	90	104	49.9
CM 447	9	81	105	49.5
CM 577	10	94	105	50.7
Hybrid 894		100	111	47.2

A considerable portion of our restorer lines has been derived from the lines CM 469 and CM 497. Two recently released restorer lines from Agriculture Canada, CM 586 and CM 587 were derived from CM 469. Compared to the U.S. restorer line RHA 274, CM 469 and CM 497 derivatives in hybrid combinations outyielded RHA 274 hybrids by about 20% (Table 3). In addition the oil content of these hybrids was considerably higher than those with RHA 274. Most of the restorer lines also have resistance to the North American race of downy mildew. The rather short maturity requirements of RHA 274 hybrids is due to its rather short dry-down

period of the restorer line. In the case of the 894 hybrid, however, the apparent dominance of late maturity of the HA 89 line shows up in the hybrid.

Table 3. Comparison of combining ability of several restorer lines.

Restorer line	No. of hybrids	Yield % of 894	Days to Maturity	Oil %
CM 469	55	112	105	48.8
CM 497	22	111	108	49.7
RHA 274	6	91	106	46.6
Hybrid 894		100	111	47.2

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SUNFLOWER VARIETY EVALUATION COONABARABRAN NSW AUSTRALIA.

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ABSTRACT

Eleven variety trials were conducted in the Coonabarabran district (latitude 31°17'S longitude 149°17'E) over four seasons 1977/78 to 1980/81. Thirty seven (37) varieties and hybrids were included and the results demonstrated the superiority of several full season hybrids. Soils ranged from black clay loams to red loams. Annual rainfall ranged from 466 mm to 769 mm whilst summer rainfall (1st Oct to 31st March) was from 251 mm to 363 mm over the period. The table indicates the relative grain and oil yields of the common and new more interesting varieties. Suncross 52 is the standard; 100 = 1360 kgs/ha grain yield (9% moisture), 43.73% oil seed content (9% moisture) and 596 kgs/ha oil yield.

Variety	No. of yrs	Grain Yield	Oil%	Oil Yield/ha
Hybrid Suncross 52	**4**	**100**	**100**	**100**
Hybrid Hysun 31	**4**	**98**	**95**	**93**
Hybrid Sunking	**3**	**97**	**95**	**92**
Hybrid Hysun 30	**4**	**93**	**96**	**89**
Hybrid Dekalb 500	**2**	**93**	**93**	**87**
VNIIMK 6540	**4**	**89**	**94**	**83**
Hybrid Sunbred 707	**2**	**86**	**94**	**81**
Hybrid Sungold	**4**	**88**	**91**	**80**
Hybrid Cargill 205	**2**	**82**	**98**	**80**
Hybrid Lady	**2**	**85**	**91**	**77**

VNIIMK has been the best of the open pollinated lines. Quick maturing lines were usually poor performers.

INTRODUCTION

Over thirty hybrid and open pollinated sunflower varieties are marketed in New South Wales, Australia. The area sown has ranged from 38 000 hectares to 70 000 hectares (Colton, 1981) in the past five year, yet little effort has been made to regularly and accurately assess varieties on their suitability in terms of yield and oil content. Data from other states and from overseas indicates that large differences exist between varieties (Anon, 1974, 1977, 1980), sometimes in the order of 50% or more. It was therefore believed important to assess a range of both hybrid and open pollinated varieties currently recommended in the state.

The Coonabarabran district (latitude 31°17' south, longitude 149°17' east) where the experiments reported in this paper were carried out is typical in many respects of the main New South Wales sunflower growing areas. It adjoins the Gunnedah Quirindi district and they collectively produce about half of the New South Wales crop (Colton, 1981). The areas are climatically similar and there is little variation in soil type. Most other important sunflower areas in New South Wales are further north and north east of this region and they are hotter (average 2 degrees to 5 degrees Celsius daily average mean) during the growing period.