



Report No. 30

***MANITOBA
REGIONAL
SUNFLOWER
PERFORMANCE TEST - 2009***

***A report on tests of Commercial Hybrids
Sponsored by the Manitoba Sunflower Committee***

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Manitoba

Building for the Future

MANITOBA REGIONAL SUNFLOWER PERFORMANCE TESTS 2009 SPONSORED BY THE MANITOBA SUNFLOWER COMMITTEE

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<i>Minto Site</i>	David Rourke / Ashley Robertson (Ag-Quest)
<i>Rosenfeld Site</i>	Khalid Rashid (AAFC) / Luc Remillard

INTRODUCTION

The Manitoba Sunflower Committee (MSC) was organized under the authority of the Minister of Agriculture for Manitoba to provide a vehicle for testing sunflower hybrids in Manitoba. The Committee has conducted performance cooperative trials since 1979. The data generated through these trials is used to support registration of sunflower hybrids in Canada. A minimum of two years performance data is required in order to determine the acceptability of hybrids for registration. However, hybrids can be recommended for registration based on one-year cooperative data supported by another year of private data. The Committee conducted trials at four locations in 2009; Rosenfeld, Morden, Rathwell, and Minto. However, due to the heavy hail damage on July 27 (growth stages 2 and 4) that was very severe especially on the confection trial in comparison to the oilseed trial, and the high CV >20% in Rosenfeld, the data from the three locations (Morden, Rathwell and Minto) was used by the MSC for recommending confection and oilseed hybrids in 2009.

Growing conditions in 2009 were normal in terms of rainfall accumulation but was below normal for temperatures throughout the summer. The above normal temperatures and humidity in September were favourable for the fast development of sclerotinia head rot in most areas in Manitoba. The growing season for sunflower was exceptionally long and no severe frosts were reported until early October in 2009, and overall good yield and seed quality are expected. Local epidemics of sclerotinia head rot and rust have been reported in southern Manitoba. Total seeded sunflower acres in 2009 as reported by MASC were ~150,000 acres with ~80% confections and ~20% oils.

Due to the recent changes in the guidelines for sunflower registration by the Canadian Food Inspection Agency (CFIA) and the removal of the pre-registration merits for sunflower, the Manitoba Sunflower Committee has no mandate to conduct sunflower Cooperative trials and Recommend for registration of sunflower hybrids. The National Sunflower Association of Canada (NSAC) has taken over most of the MSC activities related to promoting the sunflower industry and conducting the MCVET trials for provincial recommendations. Therefore, MSC will end its activities by the end of 2009, and a proposal to dissolve the MSC will be introduced.

Khalid Y. Rashid, Test Coordinator
Manitoba Sunflower Committee

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TABLE 1: MANITOBA SUNFLOWER COMMITTEE - 2009 OILSEED CANDIDATE HYBRIDS.

COMPANY	HYBRID		TYPE	YEAR	
SEEDS 2000	X5619	(Treated)	Oil	1	
MYCOGEN	8N358CLDM	(Treated)	Nus	2	
MYCOGEN	8H270CLDM	(Treated)	Oil	1	
MYCOGEN	8H288CLDM	(Treated)	HO	1	
CANTERRA/ADVANTA	F51313-NS-CL-DM-E	(Treated)	Nus	1	
INTERSTATE	DKF29-30 DM	IS 2930 NS/DM (Treated)	Nus	2	
INTERSTATE	DKF34-80CL DM	IS 3480 CL (Treated)	Nus	2	
INTERSTATE	IS7120 DM	(Treated)	HO	2	
CROPLAN GENETICS	306 DMR-NS	(Treated)	Nus	1	
CROPLAN GENETICS	460E-NS	(Treated)	Nus	1	
PIONEER	63N82Ex	(Treated)	Nus	2	
LA COOP FÉDÉRÉE	CFT08.00 Pomar RM	(Treated)	Oil	2	
LA COOP FÉDÉRÉE	CFT08.01 Pacific RMO	(Treated)	HO	2	
PIONEER	63M52	(XF306)	(Treated)	Nus	Check
INTERSTATE	6511	(Hysun 511)	(Treated)	Nus	Check
SEEDS 2000	Defender Plus	(Treated)	Nus	Check	

TABLE 2: MANITOBA SUNFLOWER COMMITTEE - 2009 CONFECTIONARY CANDIDATE HYBRIDS.

COMPANY	HYBRID		TYPE	YEAR	
SEEDS 2000	6946-DMR	(X3551-DMR) (Treated)	Con	2	
MYCOGEN	8C451	(Treated)	Con	2	
DAHLGREN	95EXCL	(Treated)	Con	1	
CHS Sunflower	RH400CL	(Treated)	Con	1	
CHS Sunflower	09EXP01	(Treated)	Con	1	
PIONEER	6946	(DE-1950)	(Treated)	Con	Check
INTERSTATE	IS 8048	(Treated)	Con	Check	
SEEDS2000	Jaguar	(Treated)	Con	Check	

**Table 3: Performance data from the Manitoba Oilseed Sunflower Co-op Trial 2009
(Morden, Minto and Rathwell).**

Hybrid*		Yield (kg/ha)	Yield (lbs/acre)	% Oil	Days to 80% Bloom	Days to Maturity*	Plant Height (cm)	Kernel Density (g/litre)	Kernel Weight (mg)
63M52	(XF306)	2487	2213	45.9	80	122	150	360	53
6511	(Hysun 511)	2558	2276	45.5	78	122	130	399	47
Defender Plus		2685	2389	44.3	76	122	143	396	54
8N358CLDM		2551	2270	46.3	82	127	148	389	43
DKF29-30 DM	(IS 2930 NS/DM)	2242	1996	45.2	77	120	154	370	40
DKF34-80CL DM	(IS 3480 CL)	2306	2052	45.0	82	126	154	375	48
IS7120 DM		2505	2229	45.6	76	122	144	373	53
63N82Ex		2807	2498	46.9	81	130	161	411	53
CFT08.00 Pomar RM		2850	2536	45.4	84	127	172	390	51
CFT08.01 Pacific RMO		2714	2416	44.5	82	124	171	367	51
X5619		2705	2408	44.9	80	124	138	369	57
8H270CLDM		2631	2341	45.4	76	122	153	404	50
8H288CLDM		2733	2432	46.2	78	126	151	393	45
F51313-NS-CL-DM-E		2655	2363	43.2	83	130	153	387	42
306 DMR-NS		2758	2455	46.5	77	123	151	387	51
460E-NS		2541	2262	46.4	83	127	169	372	49
Mean (All)		2608	2321	45.5	80	125	153	384	49
Mean (63M52 & 6511)		2522	2245	45.7	79	122	140	380	50
Mean (6511 & Defender Plus)		2621	2333	44.9	77	122	136	397	51
C.V.		14	14	3.6	3	3	8	5	8
LSD 5%		283	252	1.3	2	3	10	14	3

★ - All varieties had treated seed.

♣ - Maturity is based on three locations (Morden, Minto and Rathwell)

Table 4: Performance data from the Manitoba Oilseed Sunflower Co-op Trial 2009 (Morden).

Hybrid*	Yield (kg/ha)	Yield (lbs/acre)	% Oil	Days to 80% Bloom	Days to Maturity	Plant Height (cm)	Kernel Density (g/litre)	Kernel Weight (mg)	Meal Protein (%)	Fatty Acids		% Moisture*	% Downy Mildew		Rust*
										Oleate 18:1	Linoleate 18:2				
63M52 (XF306)	2854	2540	47.9	78	122	164	364	51	48	61.9	28.1	11	0	5	
6511 (Hysun 511)	2940	2617	49.4	76	119	148	404	43	52	58.5	31.5	13	0	3	
Defender Plus	3056	2720	47.3	76	121	162	405	52	55	57.8	31.9	11	0	3	
8N358CLDM	2782	2476	49.9	83	134	148	386	42	53	65.5	25.1	19	0	3	
DKF29-30 DM (IS 2930 NS/DM)	2234	1988	45.8	76	117	169	359	36	49	59.6	30.5	10	0	7	
DKF34-80CL DM (IS 3480 CL)	2614	2327	47.7	82	129	165	363	45	52	52.3	36.4	14	1	4	
IS7120 DM	2881	2564	47.8	76	118	164	361	51	51	82.3	9.3	10	0	6	
63N82Ex	3337	2970	48.9	81	137	165	415	53	53	64.3	26.0	16	3	5	
CFT08.00 Pomar RM	3185	2835	46.6	84	132	192	391	51	52	26.5	61.7	14	0	3	
CFT08.01 Pacific RMO	2676	2382	45.5	79	123	186	353	49	49	86.3	5.9	13	0	5	
X5619	3264	2905	48.3	78	124	144	370	56	49	63.4	26.0	15	13	4	
8H270CLDM	2949	2624	49.4	76	125	171	398	51	52	68.7	22.0	16	0	3	
8H288CLDM	3092	2752	49.2	77	128	177	390	43	52	81.1	10.4	18	0	3	
F51313-NS-CL-DM-E	3051	2715	45.2	83	139	155	397	41	53	57.6	32.3	21	0	1	
306 DMR-NS	2981	2653	49.1	77	123	166	365	48	49	69.0	22.0	16	0	5	
460E-NS	2593	2308	47.6	85	133	183	366	48	49	68.7	21.6	16	14	4	
Mean (All)	2906	2586	47.9	79	126	166	380	48	51	64.0	26.3	15	2	4	
Mean (63M52 & 6511)	2897	2578	48.7	77	120	156	384	47	50	60.2	29.8	12	0	4	
Mean (6511 & Defender Plus)	2998	2668	48.4	76	120	155	404	48	53	58.2	31.7	12	0	3	
C.V.	10	10	2.2	2	3	9	3	6	2	6.8	15.8	9	445	30	
LSD 5%	401	357	1.5	2	6	22	15	4	3	6.2	5.9	3	12	2	

★ - All varieties had treated seed.

♣ - Percent moisture is based on Rep 2 and Rep 4.

☆ - Rust is based on a scale of 1-10 (1 clean; 10 highly infected).

Seeded: May 19th, 2009; Harvested: September 28th, 2009

Table 5: Performance data from the Manitoba Oilseed Sunflower Co-op Trial 2009 (Minto).

Hybrid*		Yield (kg/ha)*	Yield (lbs/acre)*	% Oil	Days to 80% Bloom	Days to Maturity	Plant Height (cm)	Kernel Density (g/litre)	Kernel Weight (mg)	% Moisture
63M52	(XF306)	2705	2407	45.6	86	124	146	365	56	13
6511	(Hysun 511)	2951	2626	42.3	82	128	123	395	51	11
Defender Plus		3131	2786	42.4	79	126	131	391	59	10
8N358CLDM		2920	2599	44.7	86	128	142	388	45	12
DKF29-30 DM	(IS 2930 NS/DM)	2482	2209	46.0	80	123	142	380	44	10
DKF34-80CL DM	(IS 3480 CL)	2201	1959	41.8	86	127	143	383	54	10
IS7120 DM		2634	2344	44.2	79	126	129	376	59	11
63N82Ex		2951	2626	45.4	83	130	156	402	56	12
CFT08.00 Pomar RM		3013	2682	45.4	88	129	161	380	53	13
CFT08.01 Pacific RMO		3159	2812	44.8	88	128	160	372	51	12
X5619		3032	2699	43.9	84	128	136	376	61	11
8H270CLDM		2656	2364	43.2	79	126	148	412	52	10
8H288CLDM		2912	2591	45.0	81	130	128	386	50	11
F51313-NS-CL-DM-E		2866	2550	42.5	86	130	148	397	45	11
306 DMR-NS		3074	2736	45.0	79	125	142	394	55	10
460E-NS		2804	2495	46.2	84	128	161	369	47	12
Mean (All)		2843	2530	44.3	83	127	144	385	53	11
Mean (63M52 & 6511)		2828	2517	44.0	84	126	134	380	53	12
Mean (6511 & Defender Plus)		3041	2706	42.4	81	127	127	393	55	10
C.V.		11	11	3.5	2	0.3	6	4	10	17
LSD 5%		452	403	2.2	3	1	11	22	7	3

★ - All varieties had treated seed.

❖ - Yield is adjusted for 10% moisture.

Seeded: May 22nd, 2009; Harvested: October 23rd, 2009

Table 6: Performance data from the Manitoba Oilseed Sunflower Co-op Trial 2009 (Rathwell).

Hybrid*		Yield (kg/ha)*	Yield lb/ acre)*	% Oil	Days to 80% Bloom	Days to Maturity	Plant Height (cm)	Kernel Density (g/litre)	Kernel Weight (mg)	% Moisture	% Downy Mildew [■]	% Rust [■]	% Sc [■]
63M52	(XF306)	1902	1693	44.2	76	121	141	352	54	10	3	3	73
6511	(Hysun 511)	1781	1585	44.8	76	119	118	398	48	10	0	0	58
Defender Plus		1867	1662	43.3	74	118	136	393	50	11	0	0	30
8N358CLDM		1951	1736	44.4	78	120	153	391	40	10	3	0	60
DKF29-30 DM	(IS 2930 NS/DM)	2010	1789	43.8	75	120	150	371	40	8	0	11	85
DKF34-80CL DM	(IS 3480 CL)	2102	1871	45.5	78	123	155	379	44	8	0	10	25
IS7120 DM		1999	1779	45.0	74	121	138	382	48	8	0	0	60
63N82Ex		2133	1899	46.4	79	123	160	416	51	11	1	4	30
CFT08.00 Pomar RM		2352	2093	44.3	81	121	164	401	49	11	0	0	13
CFT08.01 Pacific RMO		2308	2054	43.1	78	120	168	375	52	8	0	0	40
X5619		1819	1619	42.5	80	119	135	361	53	11	3	0	25
8H270CLDM		2287	2035	43.6	73	115	141	402	48	9	0	0	45
8H288CLDM		2196	1954	44.6	75	121	146	405	40	8	0	4	43
F51313-NS-CL-DM-E		2048	1823	41.9	81	120	158	366	39	10	0	0	38
306 DMR-NS		2220	1976	45.4	75	120	144	403	49	8	5	3	55
460E-NS		2226	1981	45.5	81	122	164	383	50	12	7	5	18
Mean (All)		2075	1847	44.3	77	120	148	386	47	9	1	2	43
Mean (63M52 & 6511)		1842	1639	44.5	76	120	129	375	51	10	1	1	65
Mean (6511 & Defender Plus)		1824	1624	44.1	75	118	127	396	49	11	0	0	44
C.V.		15	15	3.4	2	1	4	6	7	39	179	122	28
LSD 5%		436	388	2.1	2	2	9	32	5	5	3	4	17

★ - All varieties had treated seed.

❖ - Yield is adjusted for 10% moisture.

■ - Disease percentage is based on natural infection.

Seeded: May 30th, 2009; Harvested: October 9th, 2009

Table 7: Performance data from the Manitoba Oilseed Sunflower Co-op Trials, candidate and check hybrids, 2008 and 2009 combined.

Hybrid	Year *	Yield (kg/ha)	Yield (lbs/acre)	% Oil	Days to 80% Bloom	Days to Maturity	Plant Height (cm)	Kernel Density (g/litre)	Kernel Weight (mg)
8N358CLDM	2008 (3)*	3201	2849	49.4	87	131	175	381	49
	2009 (3)*	2551	2270	46.3	82	127	148	389	43
Mean		2876	2560	47.9	85	129	161	385	46
DKF29-30 DM (IS 2930 NS/DM)	2008 (3)*	2941	2618	48.2	80	123	165	408	54
	2009 (3)*	2242	1996	45.2	77	120	154	370	40
Mean		2592	2307	46.7	79	121	159	389	47
DKF34-80CL DM (IS 3480 CL)	2008 (3)*	3041	2707	46.7	87	128	165	381	56
	2009 (3)*	2306	2052	45.0	82	126	154	375	48
Mean		2673	2379	45.9	84	127	160	378	52
IS7120 DM	2008 (3)*	3190	2839	47.8	82	128	154	384	58
	2009 (3)*	2505	2229	45.6	76	122	144	373	53
Mean		2847	2534	46.7	79	125	149	378	55
63N82Ex	2008 (3)*	3405	3030	50.4	83	136	170	438	64
	2009 (3)*	2807	2498	46.9	81	130	161	411	53
Mean		3106	2764	48.7	82	133	165	424	59
CFT08.00 Pomar RM	2008 (3)*	3622	3224	47.1	87	129	187	397	56
	2009 (3)*	2850	2536	45.4	84	127	172	390	51
Mean		3236	2880	46.3	86	128	180	394	54
CFT08.01 Pacific RMO	2008 (3)*	3379	3007	45.3	85	129	183	368	58
	2009 (3)*	2714	2416	44.5	82	124	171	367	51
Mean		3047	2712	44.9	83	126	177	367	54
Oil Check (6511)	2008 (3)*	3172	2823	46.6	80	123	129	411	60
	2009 (3)*	2558	2276	45.5	78	122	130	399	47
Mean		2865	2550	46.1	79	122	130	405	54
Nusun Check (63M52)	2008 (3)*	3189	2838	49.8	84	126	160	402	64
	2009 (3)*	2487	2213	45.9	80	122	150	360	53
Mean		2838	2526	47.9	82	124	155	381	59

• - Value between parentheses is the number of trials tested per year.

★ - These varieties had treated seed.

**Table 8: Performance data from the Manitoba Confectionary Sunflower Co-op Trial 2009
(Morden, Minto and Rathwell).**

Hybrid*	Yield (kg/ha)	Yield lbs/ acre)	Days to 80% Bloom	Days to Maturity	Plant Height (cm)	Kernel Density (g/litre)	Kernel Weight (mg)	% Nut- meat	Seed Size % Over Screen [♦]			
									>22	20-22	16-20	<16
6946 (DE-1950)	2695	2398	79	121	164	323	111	57	24	39	33	4
IS 8048	2452	2182	76	124	162	328	124	53	35	34	26	5
Jaguar	2196	1954	78	119	177	284	113	52	47	32	19	3
6946-DMR (X3551-DMR)	2669	2376	79	123	163	324	105	56	12	39	44	6
8C451	1883	1676	81	122	181	281	117	52	52	30	15	4
95EXCL	2154	1917	84	125	194	292	131	50	54	33	11	3
RH400CL	2001	1781	77	120	171	289	134	51	51	36	11	3
09EXP01	2026	1803	82	125	185	285	144	49	67	23	6	4
Mean (All)	2259	2011	80	122	175	301	122	53	42	33	20	4
Mean (6946 & IS 8048)	2573	2290	78	122	163	325	117	55	29	37	30	5
Mean (IS 8048 & Jaguar)	2324	2068	77	121	170	306	118	52	41	33	22	4
C.V.	18	18	2	1	6	5	11	4	28	29	38	38
LSD 5%	335	298	1	1	9	11	11	2	12	10	8	2

★ - All varieties had treated seed.

♦ - Seed size is based on two locations (Morden and Rathwell)

Table 9: Performance data from the Manitoba Confectionary Sunflower Co-op Trial 2009 (Morden).

Hybrid*	Yield (kg/ha) ❖	Yield (lbs acre) ❖	Days to 80% Bloom	Days to Maturity	Plant Height (cm)	Kernel Density (g/litre)	Kernel Weight (mg)	% Nut-meat	Seed Size % Over Screen	% Moisture*	% Bird Damage	Rust*
									>22 20-22 16-20 <16			
6946 (DE-1950)	3232	2876	76	119	187	304	106	60	17 37 40 6	12	10	5
IS 8048	3030	2697	74	120	192	319	119	53	29 36 30 6	12	13	8
Jaguar	2263	2014	77	116	212	248	95	53	21 43 32 5	10	13	9
6946-DMR (X3551-DM)	3016	2684	76	119	191	303	93	59	7 28 57 9	12	10	6
8C451	2270	2020	79	120	204	261	112	54	46 35 15 5	11	10	9
95EXCL	2408	2143	84	123	232	263	118	51	34 46 17 4	18	10	8
RH400CL	2138	1903	76	119	206	268	123	53	51 35 10 4	11	10	9
09EXP01	2149	1913	82	123	224	265	124	49	55 31 10 5	15	10	7
Mean (All)	2563	2281	78	120	206	279	111	54	33 36 26 5	12	11	8
Mean (6946 & IS 8048)	3131	2787	75	119	190	311	113	56	23 36 35 6	12	11	7
Mean (IS 8048 & Jaguar)	2647	2356	75	118	202	283	107	53	25 39 31 5	11	13	8
C.V.	10	10	2	1	5	2	4	3	18 15 21 25	9	24	9
LSD 5%	356	317	2	3	14	10	7	2	9 8 8 2	3	4	1

★ - All varieties had treated seed.

❖ - Yield is adjusted for bird damage.

♣ - Percent moisture is taken at harvest and based on Rep 3 and Rep 4.

☆ - Rust is based on a scale of 1-10 (1 clean; 10 highly infected).

Seeded: May 19th, 2009; Harvested: September 23rd, 2009

Table 10: Performance data from the Manitoba Confectionary Sunflower Co-op Trial 2009 (Minto).

Hybrid*		Yield (kg/ha) ♦	Yield (lbs/acre) ♦	Days to 80% Bloom	Days to Maturity	Plant Height (cm)	Kernel Density (g/litre)	Kernel Weight (mg)	% Nut- meat	% Moisture
6946	(DE-1950)	3069	2732	85	127	164	334	129	55	15
IS 8048		2968	2642	80	132	151	335	143	54	15
Jaguar		2486	2213	83	127	159	306	130	51	13
6946-DMR	(X3551-DMR)	3026	2694	84	128	149	338	131	54	14
8C451		1795	1598	86	128	166	294	131	51	14
95EXCL		2478	2205	89	130	170	315	148	51	13
RH400CL		2005	1784	80	126	164	305	151	51	14
09EXP01		3017	2685	86	132	173	312	169	50	14
Mean (All)		2606	2319	84	129	162	317	142	52	14
Mean (6946 & IS 8048)		3019	2687	83	129	157	334	136	55	15
Mean (IS 8048 & Jaguar)		2727	2427	81	129	155	320	137	52	14
C.V.		14	14	2	0.3	6	5	14	6	12
LSD 5%		544	484	2	1	13	23	30	5	3

★ - All varieties had treated seed.

♦ - Yield is adjusted for 10% moisture.

Seeded: May 22nd, 2009

Harvested: October 23rd, 2009

Table 11: Performance data from the Manitoba Confectionary Sunflower Co-op Trial 2009 (Rathwell).

Hybrid*	Yield (kg/ha) ♦	Yield (lbs/ acre) ♦	Days to 80% Bloom	Days to Maturity	Plant Height (cm)	Kernel Density (g/litre)	Kernel Weight (mg)	% Nut- meat*	Seed Size %				% Moisture	% Downy Mildew ■	% Rust ■	% Scl ■
									>22	20-22	16-20	<16				
6946 (DE-1950)	1783	1587	76	116	141	332	98	56	30	41	26	3	8	10	6	60
IS 8048	1357	1208	75	121	144	330	109	53	41	33	22	4	8	3	13	63
Jaguar	1837	1635	76	115	160	300	112	52	72	21	5	1	8	3	20	35
6946-DMR (X3551-DM)	1966	1749	77	121	148	332	90	56	16	49	31	4	10	0	10	63
8C451	1585	1411	78	117	174	288	108	51	57	26	14	3	8	8	40	40
95EXCL	1575	1402	81	122	179	298	128	49	73	20	4	3	8	8	20	20
RH400CL	1861	1657	75	115	144	295	128	49	50	36	12	2	9	5	15	55
09EXP01	912	812	79	121	159	277	139	49	79	15	3	4	8	3	5	83
Mean (All)	1610	1433	77	118	156	306	114	52	52	30	15	3	8	5	16	52
Mean (6946 & IS 8048)	1570	1397	75	119	143	331	103	54	36	37	24	3	8	6	9	61
Mean (IS 8048 & Jaguar)	1597	1421	75	118	152	315	110	52	57	27	14	3	8	3	16	49
C.V.	17	17	2	1	6	5	7	4	19	21	46	56	26	111	45	27
LSD 5%	405	360	2	2	13	23	11	3	15	10	10	2	3	8	11	21

★ - All varieties had treated seed.

♦ - Yield is adjusted for 10% moisture.

■ - Disease percentage is based on natural infection.

Seeded: May 30th, 2009

Harvested: October 9th, 2009

Table 12: Performance data from the Manitoba Confectionary Sunflower Co-op Trials, candidate and check hybrids, 2008 and 2009 combined.

Hybrid	Year *	Yield (kg/ha)	Yield (lbs/acre)	Days to 80% Bloom	Days to Maturity	Plant Height (cm)	Kernel Density (g/litre)	Kernel Weight (mg)	% Nut- meat	Seed Size % Over Screen		
										>22	20-22	16-20
6946-DMR	2008 (3)*	3297	2935	83	127	171	339	110	60	17	37	42
(X3551-DMR)	2009 (3)**	2669	2376	79	123	163	324	105	56	12	39	44
Mean		2983	2655	81	125	167	331	107	58	14	38	43
8C451	2008 (3)*	3143	2797	86	131	178	308	145	51	49	31	17
	2009 (3)**	1883	1676	81	122	181	281	117	52	52	30	15
Mean		2513	2237	83	126	180	294	131	51	50	31	16
6946	2008 (3)*	3423	3047	81	125	164	321	119	60	29	38	29
(DE-1950)	2009 (3)**	2695	2398	79	121	164	323	111	57	24	39	33
Mean		3059	2722	80	123	164	322	115	59	26	39	31
IS 8048	2008 (3)*	2977	2649	79	127	164	347	138	54	32	35	29
	2009 (3)**	2452	2182	76	124	162	328	124	53	35	34	26
Mean		2714	2416	78	126	163	337	131	54	34	34	28

- - Value between parentheses is the number of trials tested per year.
- ★ - These varieties had treated seed.
- ◆ - Seed size is based on two locations (Morden and Rathwell)

Table 13: Disease reactions of the Manitoba Sunflower Co-operative Trial 2009.

Hybrids	Mean Rust Index*				Verticillium* Wilt Index Nursery	% Resistance*		% Survivor Sclerotinia With Inoculum [◇]	
	Race 2		Race 336			Downy Mildew			
	Score	Class	Score	Class		Race 2	Race 3		
Oil Type									
Checks									
63M52	(XF306)	4.0	S	5.0	HS	2.3	96	32	2
6511*	(Hysun 511)	3.0	MS	4.0	S	2.2	98	79	43
Defender Plus		5.0	HS	5.0	HS	3.5	94	96	9
2 Year Entry									
8N358CLDM		4.0	S	4.0	S	2.7	96	100	15
DKF29-30 DM*	(IS 2930 NS/	5.0	HS	4.0	S	2.5	94	68	26
DKF34-80CL DM*	(IS 3480 CL)	4.0	S	4.0	S	2.4	90	68	35
IS7120 DM*		4.0	S	4.0	S	2.5	96	92	33
63N82Ex		5.0	HS	3.0	MS	2.3	38	35	8
CFT08.00 Pomar RM*		3.0	MS	5.0	HS	2.1	96	96	10
CFT08.01 Pacific RMO*		2.0	MR	5.0	HS	2.2	79	87	26
1 Year Entry									
X5619		4.0	S	4.0	S	2.3	74	59	11
8H270CLDM		5.0	HS	4.0	S	2.4	98	100	8
8H288CLDM		5.0	HS	4.0	S	3.0	94	83	10
F51313-NS-CL-DM-E		0.0	HR-I	1.0	R	2.5	100	100	7
306 DMR-NS		4.0	S	4.0	S	2.4	97	100	8
460E-NS		5.0	HS	5.0	HS	2.3	97	70	10
Non-Oil Type									
Checks									
6946	(DE-1950)	4.0	S	4.0	S	2.4	57	38	3
IS 8048		1.0	R	5.0	HS	3.2	94	9	12
Jaguar		2.0	MR	4.0	S	3.4	42	10	7
2 Year Entry									
6946-DMR	(X3551-DMR	5.0	HS	5.0	HS	2.4	100	93	10
8C451		5.0	HS	5.0	HS	3.7	37	0	14
1 Year Entry									
95EXCL*		4.0	S	4.0	S	3.8	24	6	45
RH400CL*		0.0	HR-I	2.0	MR	3.4	58	6	29
09EXP01*		2.0	MR	5.0	HS	2.6	40	0	29

* - These hybrids had treated seed.

✦ - Reaction to rust races 2 and 3 under growth room controlled conditions.

Disease index 1-5 based on % leaf area infected; 0-1=highly resistant (0-5%); 2=moderately resistant (5-10%);

3=moderately susceptible (10-30%); 4=susceptible (30-50%); and 5=susceptible (>50%);

MR=Resistant to Race 2, Susceptible to Race 3; S & HS=Susceptible to both races.

* - Field reaction to Verticillium wilt in naturally infested soil. Indices of 1 (healthy), 2 (mild), 3 (moderate), 4 (severe), and 5 (dead) were assigned; the mean disease index was obtained by multiplying the number of plants in each class by the corresponding index, and the total divided by the total number of plants.

* - Reaction to downy mildew races 2 and 3 under controlled conditions in growth rooms.

◇ - Field reaction to early Sclerotinia infection using artificial inoculum at Morden, as a percent of the control.

Table 14: Mean disease reactions of the Manitoba Sunflower Co-operative Trial 2008-09.

Hybrids	Year	Mean Rust Index [★]			Verticillium [*] Wilt		% Resist. Downy Mildew [*]			
		Race 2	Race 3 (336) [◆]	Class	Index	Class	Race 2	Race 3	Class	
Oil Type										
Checks										
63M52	(XF306)	2008	5.0	5.0		2.4		79	0	
		2009	4.0	5.0		2.3		96	32	
		Mean	4.5	5.0	HS	2.4	MR	88	16	MS
6511	(Hysun 511)	2008 [*]	5.0	5.0		2.4		68	13	
		2009 [*]	3.0	4.0		2.2		98	79	
		Mean	4.0	4.5	HS	2.3	MR	83	46	MS
Candidate Hybrids										
8N358CLDM		2008 [*]	4.0	5.0		2.6		69	92	
		2009	4.0	4.0		2.7		96	100	
		Mean	4.0	4.5	HS	2.7	MR	83	96	R
DKF29-30 DM	(IS 2930 NS/C)	2008 [*]	4.0	5.0		2.6		56	80	
		2009 [*]	5.0	4.0		2.5		94	68	
		Mean	4.5	4.5	HS	2.6	MR	75	74	MR
DKF34-80CL DM	(IS 3480 CL)	2008 [*]	5.0	5.0		2.7		79	83	
		2009 [*]	4.0	4.0		2.4		90	68	
		Mean	4.5	4.5	HS	2.6	MR	85	76	MR
IS7120 DM		2008 [*]	4.0	5.0		2.4		48	85	
		2009 [*]	4.0	4.0		2.5		96	92	
		Mean	4.0	4.5	HS	2.5	MR	72	89	MR
63N82Ex		2008 [*]	5.0	5.0		2.7		62	3	
		2009	5.0	3.0		2.3		38	35	
		Mean	5.0	4.0	HS	2.5	MR	50	19	S
CFT08.00 Pomar RM		2008 [*]	2.0	5.0		2.2		89	90	
		2009 [*]	3.0	5.0		2.1		96	96	
		Mean	2.5	5.0	MS	2.2	MR	93	93	R
CFT08.01 Pacific RMO		2008 [*]	2.0	5.0		2.4		62	46	
		2009 [*]	2.0	5.0		2.2		79	87	
		Mean	2.0	5.0	MS	2.3	MR	71	67	MR
Non-Oil Type										
Checks										
6946	(DE-1950)	2008	4.0	5.0		2.8		15	0	
		2009	4.0	4.0		2.4		57	38	
		Mean	4.0	4.5	HS	2.6	MR	36	19	S
IS 8048	(X5432)	2008	2.0	5.0		3.6		27	6	
		2009	1.0	5.0		3.2		94	9	
		Mean	1.5	5.0	MS	3.4	MS	61	8	S
Candidate Hybrids										
6946-DMR	(X3551-DMR)	2008	5.0	5.0		3.1		65	88	
		2009	5.0	5.0		2.4		100	93	
		Mean	5.0	5.0	HS	2.8	MR	83	91	R
8C451		2008	3.0	5.0		3.7		28	8	
		2009	5.0	5.0		3.7		37	0	
		Mean	4.0	5.0	HS	3.7	MS	33	4	S

★ - These varieties had treated seed.

◆ - Reaction to rust races 2 and 3 under growth room controlled conditions. Disease Index 1-5 based on % leaf area infected; 0-1=highly resistant (0-5%); 2=moderately resistant (5-10%); 3=moderately susceptible (10-30%); 4=susceptible (30-50%); and 5=susceptible (>50%); MR=Resistant to Race 2, Susceptible to Race 3; S & HS=Susceptible to both races.

* - Field reaction to Verticillium wilt in naturally infested soil. Indices of 1 (healthy), 2 (mild), 3 (moderate), 4 (severe), and 5 (dead) were assigned; the mean disease index was obtained by multiplying the number of plants in each class by the corresponding index, and the total divided by the total number of plants.

* - Reaction to downy mildew races 2 and 3 under controlled conditions in growth rooms.

◆ - Race 3 was used in 2008 and Race 336 was used in 2009.