

UNITED STATES DEPARTMENT OF AGRICULTURE  
AGRICULTURAL RESEARCH SERVICE  
Crops Research Division

and

Texas Agricultural Experiment Station

Report of

REGIONAL SUNFLOWER YIELD TESTS

1963

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CR-53-64

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Acknowledgment

This is the first report of the sunflower regional testing program which was initiated in a small way in 1962 but for which no report was assembled except as a part of the station annual report from College Station, Texas, of which cooperators were supplied copies. Interest in the 1963 tests and results obtained seem to warrant preparation of a more comprehensive report. The compilers wish to express their appreciation for the cooperation of each individual and agency that helped make this report possible.

Materials and Methods

Seed of the rust resistant hybrid T 56002 and 9 of the high-oil Russian varieties (Entry Nos. 1 and 4 through 12) were produced at College Station, Texas. Seed of the large-seeded hybrids, NK Hybrids 1 and 2, were supplied by Dr. D. B. Grissom of Northrup, King and Company. Seed of Mingreñ were supplied by Dr. R. G. Robinson of the University of Minnesota. Donski 695 and VNIIMK 65.40 were supplied by Dr. E. D. Putt of the Canada Department of Agriculture. Other entries reported from certain locations were supplied direct to the cooperators by Dr. E. D. Putt (Entry Nos. 16 through 21) and by Dr. R. G. Robinson (Entry Nos. 22 and 23).

Field design and size and shape of plots varied widely, ranging from nonreplicated bordered plots to single-row 6-replicate tests.

Oil content and iodine value of the oil were obtained from seed samples from locations selected to sample the various areas. Chemical composition values were based on the mean of 2 samples from a composite of seed obtained by mixing equal quantities of seed from each replication of an entry grown at a given location. Chemical determinations were made by the Cottonseed Products Research Laboratory of the Texas Engineering Experiment Station.

Data Obtained

Yield data, presented in Table 1, were obtained from tests grown at 16 of the 31 locations in 15 states receiving planting seed. The tests at other locations were lost due to a variety of reasons, including hail, bird damage and insect damage; these same factors resulted in low yields at some of the reporting locations. Mean seed yields were over 1400 pounds per acre at 9 of the 16 locations reporting. The generally high coefficients of variation may indicate that more attention should be given to number of replications, size and shape of plots and border effects in sunflower yield tests.

Oil content of the seed and iodine value of the oil from 11 locations are presented in Tables 2 and 3, respectively.

The rust resistant experimental hybrid T 56002 produced superior seed yields at most locations where it was tested. In spite of the low oil content of its seed, calculated oil production per acre was higher than the best of the high-oil introduced varieties when all comparable tests were considered. The large-seeded hybrids NK Hybrid 1 and NK Hybrid 2 exhibited superior yields only at Stoneville, Mississippi, and some North Carolina locations (unfortunately, no yield test data was obtained from California where these hybrids are in use); it is somewhat surprising that these late maturing, rust susceptible hybrids produced yields comparable with early maturing varieties at some northern locations. Considering all locations, differences in yielding ability among the high-oil introduction from the U.S.S.R. were not great, and their yields were generally within the range of those obtained from domestic open-pollinated varieties. Among the widely tested introductions, VNIIMK 16.46 and Armavirsky 93.43 had the highest mean oil content, Peredovik, Peredovik 15659 (these 2 may be the same), Smena and VNIIMK 89.31 which were

Table 1. Summary of seed yields in pounds per acre of sunflower strains grown at 16 locations in 1963.

Entry No.	Identity	Minnesota		Missouri		Montana		Nebraska		North Carolina		Oklahoma		South Dakota		Texas		Number of tests including T 56002	Mean of 11 tests	
		Kansas	Arkansas	Illinois	Indiana	Ohio	Michigan	Wisconsin	Minnesota	Nebraska	North Carolina	Oklahoma	South Dakota	Texas	Arkansas	Illinois	Indiana			Ohio
1	T 56002	2965	1956	1866	1126	---	---	1264	1971	2358	2439	794	3122	902	---	---	---	11	1890	1890
2	HK Hybrid 1	661	1732	1385	2226	647	589	2650	2104	1784	1552	904	718	1262	207	---	---	15	1381	1320
3	HK Hybrid 2	454	1952	1347	2088	533	909	1833	2350	1114	1584	713	645	1654	180	---	---	15	1267	1224
4	VNIIMK 16.46 (PI 265099)	886	1195	987	1650	700	1298	2083	1476	750	1120	1705	398	1966	289	2264	16	1252	1094	
5	Jdanovsky 82.81 (PI 265100)	804	1528	1269	1671	628	766	1880	1446	920	1223	1906	961	338	1939	292	2420	16	1263	1172
6	Amarskiy 93.43 (PI 265101)	896	1265	1319	1241	1015	1268	2181	940	602	1090	1628	1507	255	1740	422	1984	16	1210	1099
7	VNIIMK 88.83 (PI 265103)	1003	1405	1554	1070	925	1206	2415	---	1144	1116	1711	1583	347	1648	519	2122	15	1318	1184
8	Tchernianka 66 (PI 265104)	972	1267	1784	897	925	1111	1610	819	782	1289	1283	1280	389	1194	555	2231	16	1149	1039
9	Stepysk (PI 257641)	1040	1576	1385	1276	764	856	2235	1622	646	1746	2107	1443	335	1773	308	2037	16	1334	1233
10	Tchernianka 11 (PI 257640)	989	1371	1635	1545	627	1011	1765	---	1156	1555	1891	1124	258	1621	404	1970	15	1261	1199
11	VNIIMK 16.46 (PI 262516)	690	1705	1245	1514	756	1217	2272	---	834	940	1896	1026	347	1967	367	2289	15	1272	1147
12	VNIIMK 16.46 (PI 257642)	---	1461	1445	1390	867	1286	1997	1255	454	866	1801	1339	310	1767	418	---	14	1190	1102
13	Mingren (Him. No. 2)	---	1905	1605	---	---	---	---	---	---	1506	---	280	---	---	---	---	4	1324	---
14	Donski 695 (Horden 868)	806	1583	1321	1576	672	1158	1919	1046	930	1393	1885	705	622	---	230	---	14	1132	---
15	VNIIMK 65.40 (Horden 842)	828	1679	1214	1480	496	954	1909	---	738	1467	1824	668	386	---	204	---	13	1065	---
16	Peredovik (Horden 883)	---	---	---	---	---	---	---	---	---	1645	---	---	---	1832	---	---	2	1738	---
17	Peredovik 15659 (Horden 754)	---	1260	1413	---	---	---	---	---	---	18293/	---	---	---	1963	---	---	4	1616	---
18	Smena (Horden 882)	---	---	---	---	---	---	---	---	---	---	---	---	---	1791	---	---	1	1791	---
19	CM 30 X CM 54	---	---	---	---	---	---	---	---	---	---	---	---	---	1951	---	---	1	1951	---
20	VNIIMK 89.31	---	---	---	---	---	---	---	---	---	1814	---	---	---	---	---	---	1	1814	---
21	Advent	---	---	---	---	---	---	---	2100	2040	754	1423	1838	---	---	---	---	5	1635	---
22	Mannonite G	---	1555	1692	---	---	---	---	1812	1922	704	1564	1501	---	---	---	---	7	1536	---
23	Arrowhead	---	1709	1864	---	---	---	---	1985	1785	736	1670	1470	---	---	---	---	7	1603	---
Test mean		836	1617	1467	1535	763	1048	2040	1583	920	1404	1750	1213	455	1826	380	2165			
Coefficient of variation, %		17.3	21.7	18.6	13.7	19.8	17.3	4/	4/	4/	22.4	14.8	18.8	28.3	15.8	38.3	29.3			
L.S.D. at 5% level (lbs/acre)		208	571	461	300	216	260	---	---	---	430	285	383	276	410	236	N.S.			

1/ Means based on 2 replications except Entry No. 1 which was not included in analysis of variance.  
 2/ Means comparable only with entries tested at same locations.  
 3/ Mean of 3 replications, rest of entries and analysis of variance based on 6 replications.  
 4/ No analysis of variance since this was a 1-replicate test.

Table 2. Summary of percentage oil of seed from sunflower strains grown at 11 locations in 1963.<sup>1/</sup>

Entry No.	Identity	Kansas		Minnesota		Miss.		Nebr.		North Carolina		North Dakota		Okla.		South Dakota		Texas		Number of tests	Mean of 8 tests including T 56002	
		Manhattan	Crookston	St. Cloud	Rosemount	St. Cloud	Lincoln	Salisbury	Salisbury	Salisbury	Salisbury	Salisbury	Salisbury	Salisbury	Salisbury	Salisbury	Salisbury	Salisbury	Salisbury			Salisbury
1	T 56002	29.8	25.3	26.1	27.6	29.6	26.2	27.0	28.4	28.4	27.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0	8	27.5
2	NK Hybrid 1	23.2	26.7	25.0	24.6	28.4	22.8	24.0	22.7	22.7	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	10	25.0
3	NK Hybrid 2	22.6	27.0	24.0	23.0	27.8	20.4	27.6	24.7	24.7	27.6	27.6	27.6	27.6	27.6	27.6	27.6	27.6	27.6	27.6	10	24.7
4	VNIIMK 16.46 (PI 265099)	37.2	39.2	36.0	35.6	41.7	35.0	38.4	39.6	39.6	38.4	38.4	38.4	38.4	38.4	38.4	38.4	38.4	38.4	38.4	11	38.0
5	Jdanovsky 82.81 (PI 265100)	33.8	34.0	31.8	34.0	37.6	30.6	36.8	35.6	35.6	36.8	36.8	36.8	36.8	36.8	36.8	36.8	36.8	36.8	36.8	11	34.2
6	Amavirsky 93.43 (PI 265101)	35.0	35.6	37.7	37.5	42.2	34.4	38.2	36.2	36.2	38.2	38.2	38.2	38.2	38.2	38.2	38.2	38.2	38.2	38.2	11	37.3
7	VNIIMK 88.83 (PI 265103)	38.0	36.2	36.0	35.4	36.7	36.4	41.5	35.8	35.8	41.5	41.5	41.5	41.5	41.5	41.5	41.5	41.5	41.5	41.5	11	36.6
8	Tchernianka 66 (PI 265104)	34.6	34.2	35.4	34.8	37.7	32.7	37.8	34.6	34.6	37.8	37.8	37.8	37.8	37.8	37.8	37.8	37.8	37.8	37.8	11	35.5
9	Stepnyak (PI 257641)	32.3	32.7	33.4	30.0	37.7	31.1	36.2	32.8	32.8	36.2	36.2	36.2	36.2	36.2	36.2	36.2	36.2	36.2	36.2	11	33.1
10	Tchernianka 11 (PI 257640)	33.5	31.6	35.6	29.9	31.8	32.8	33.7	33.2	33.2	33.7	33.7	33.7	33.7	33.7	33.7	33.7	33.7	33.7	33.7	11	33.2
11	VNIIMK 16.46 (PI 262516)	33.3	33.0	34.3	31.6	33.9	33.2	35.6	35.6	35.6	35.6	35.6	35.6	35.6	35.6	35.6	35.6	35.6	35.6	35.6	11	33.9
12	VNIIMK 16.46 (PI 257642)	---	34.2	38.0	31.2	34.4	36.6	36.2	36.6	36.2	36.2	36.2	36.2	36.2	36.2	36.2	36.2	36.2	36.2	36.2	9	35.6
13	Mingren (Minn. No. 2)	---	24.2	25.0	---	---	---	24.8	---	---	---	---	---	---	---	---	---	---	---	---	4	24.0
14	Donski 695 (Morden 668)	33.0	35.5	37.0	34.2	35.1	30.4	36.6	36.6	36.6	36.6	36.6	36.6	36.6	36.6	36.6	36.6	36.6	36.6	9	34.7	
15	VNIIMK 65.40 (Morden 842)	35.8	35.6	37.2	33.4	35.9	29.4	34.5	---	---	---	---	---	---	---	---	---	---	---	---	9	35.0
16	Peredovik (Morden 883)	---	---	---	---	43.9	---	---	---	---	---	---	---	---	---	---	---	---	---	---	2	41.6
17	Peredovik 15659 (Morden 754)	---	39.2	39.2	---	44.2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	4	40.4
18	Sneua (Morden 882)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1	40.1
19	CM 30 X CM 54	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1	29.4
20	VNIIMK 89.31	---	---	---	---	43.4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1	43.4
21	Advent	---	---	---	---	30.4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	2	28.8
22	Mennonite G	---	25.8	21.2	---	24.1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	4	25.0
23	Arrowhead	---	26.1	27.3	---	27.2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	4	27.4
Test mean <sup>3/</sup>		32.7	32.3	32.7	31.2	32.7	30.9	33.7	34.0	34.0	33.7	33.9	34.0	34.0	34.0	34.0	34.0	34.0	34.0	34.0	37.8	

<sup>1/</sup> Values based on mean of two samples from a mixture of seed of all replications.

<sup>2/</sup> Means comparable only with entries tested at same locations.

<sup>3/</sup> Means comparable only for locations where the same entries were tested.

Table 3. Summary of iodine values of oil from seed of sunflower strains grown at 11 locations in 1963.<sup>1/</sup>

Entry No.	Identity	Kansas		Minnesota		Miss.		Neb.		North Carolina		North Dakota		Okla.		South Dakota		Texas		Number of tests	Mean of 8 tests including T 56002
		Hattan	Man-	Crooks-	Minnesota	Rose-	mount-	village	Lin-	Lin-	Lin-	Lin-	Lin-	Lin-	Lin-	Lin-	Lin-	Lin-	Lin-		
1	T 56002	124.4	126.8	110.0	129.5	122.7	101.0	116.6	104.8	117.0	117.0	117.0	117.0	117.0	117.0	117.0	117.0	117.0	117.0	8	117.0
2	KK Hybrid 1	111.3	130.0	112.1	125.4	128.6	102.8	120.6	113.4	120.5	120.5	120.5	120.5	120.5	120.5	120.5	120.5	120.5	120.5	10	120.5
3	KK Hybrid 2	111.3	129.1	108.2	125.7	128.8	103.5	120.2	115.9	120.7	120.7	120.7	120.7	120.7	120.7	120.7	120.7	120.7	120.7	10	120.7
4	WNIEK 16.46 (FI 265099)	107.1	124.7	105.3	120.8	129.6	103.9	119.8	113.0	119.1	119.1	119.1	119.1	119.1	119.1	119.1	119.1	119.1	119.1	11	119.1
5	Jdanovsky 82.81 (FI 265100)	110.4	127.1	104.2	120.7	127.8	107.0	119.1	111.9	119.3	119.3	119.3	119.3	119.3	119.3	119.3	119.3	119.3	119.3	11	119.3
6	Armavirsky 93.43 (FI 265101)	107.4	125.0	104.2	117.3	125.9	103.6	118.5	110.2	117.8	117.8	117.8	117.8	117.8	117.8	117.8	117.8	117.8	117.8	11	117.8
7	WNIEK 88.83 (FI 265103)	110.0	125.8	108.9	123.1	128.2	109.3	120.4	112.5	120.5	120.5	120.5	120.5	120.5	120.5	120.5	120.5	120.5	120.5	11	120.5
8	Tchernianka 66 (FI 265104)	114.2	125.7	108.3	119.1	127.4	115.4	117.8	119.7	121.9	121.9	121.9	121.9	121.9	121.9	121.9	121.9	121.9	121.9	11	121.9
9	Stepnyak (FI 257641)	108.3	127.4	106.7	118.8	126.0	106.6	120.5	110.9	119.6	119.6	119.6	119.6	119.6	119.6	119.6	119.6	119.6	119.6	11	119.6
10	Tchernianka 11 (FI 257640)	109.5	127.6	100.8	120.4	126.5	109.7	121.6	110.3	119.4	119.4	119.4	119.4	119.4	119.4	119.4	119.4	119.4	119.4	11	119.4
11	WNIEK 16.46 (FI 262516)	104.5	131.5	102.4	119.1	126.0	105.7	117.1	110.6	128.1	128.1	128.1	128.1	128.1	128.1	128.1	128.1	128.1	128.1	11	128.1
12	WNIEK 16.46 (FI 257642)	-----	129.4	131.7	106.1	116.8	107.3	119.2	112.0	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	9	119.8
13	Mingren (Minn. No. 2)	-----	128.0	130.7	-----	-----	-----	120.3	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	4	126.8
14	Donaki 695 (Morden 868)	109.8	131.3	107.6	120.6	126.7	130.1	104.9	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	9	120.7
15	WNIEK 65.40 (Morden 842)	109.5	129.5	104.1	116.9	128.5	101.0	121.0	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	9	118.9
16	Peredovik (Morden 883)	-----	-----	-----	-----	-----	-----	-----	110.8	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	2	120.4
17	Peredovik 15659 (Morden 736)	-----	124.9	129.8	-----	-----	-----	-----	108.7	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	4	123.6
18	Smena (Morden 882)	-----	-----	-----	-----	-----	-----	-----	109.6	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	1	109.6
19	CH 30 x CH 54	-----	-----	-----	-----	-----	-----	-----	119.6	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	1	119.6
20	WNIEK 89.31	-----	-----	-----	-----	-----	-----	-----	129.6	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	1	129.6
21	Advent	-----	-----	-----	-----	-----	-----	-----	128.8	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	2	128.6
22	Mamonite G	-----	131.7	129.6	-----	-----	-----	-----	124.8	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	4	127.2
23	Arrowhead	-----	129.3	128.9	-----	-----	-----	-----	126.2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	4	127.5
	Test means <sup>3/</sup>	109.4	127.9	130.2	106.4	120.4	105.8	119.8	112.1	128.2	128.2	128.2	128.2	128.2	128.2	128.2	128.2	128.2	128.2	128.9	

<sup>1/</sup> Values based on mean of two samples from a mixture of seed of all replications.

<sup>2/</sup> Means comparable only with entries tested at same locations.

<sup>3/</sup> Means comparable only for locations where the same entries were tested.

tested at only a few locations because of lack of seed are probably superior to other Russian varieties because of their higher oil content. As usual, iodine values (which reflect linoleic acid content of the oil) were more influenced by environment than by varietal differences. Linoleic acid content may be calculated from iodine value by means of the regression equation

$$Y = 46.3 + 1.253(X - 115.5).$$

#### New Varieties

The large-seeded Mennonite type variety, Mingren (formerly Minn. No. 2), has been released by the Minnesota Agricultural Experiment Station. Commander, another large-seeded Mennonite type, and the high-oil Russian variety Peredovik have been licensed by the Canada Department of Agriculture. Parental lines of the high yielding, rust resistant experimental hybrid T 56002 are currently being increased by the Texas, Minnesota and North Dakota Agricultural Experiment Stations; seed of this hybrid are probably best suited to the bird feed trade.

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