

SEED YIELDS AND OIL CONTENT OF SUNFLOWER HYBRIDS AT DIFFERENT LOCATIONS AND SEASONS IN CHILE.

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SUMMARY

A total of 150 sunflower hybrids obtained from 14 seed companies, was studied in Chile between latitudes 33° and 41° S. The main objectives were to select superior hybrids in seed and oil yields per hectare as compared with traditional open-pollinated cultivars (OPC), between Santiago (Lat. 33°40'S) and Los Angeles (Lat. 37°30'S) and to study the sunflower crop introduction possibilities between Los Angeles and Llanquihue (Lat. 41°15'S).

During a four season study between Santiago and Los Angeles, it was possible to select hybrids that overyielded up to 40% the oil yield/ha to the check OPC 'Mayak', showing seed yields up to 4500 kg/ha and oil contents up to 52%.

During a two season study it was determined that the sunflower crop was feasible south of Los Angeles using early hybrids. The maximum seed yields obtained was up to 4000 kg/ha and oil contents up to 55%.

These findings have opened the possibilities to replace the traditional OPC's for superior hybrids, and to double the potential sunflower area planted in Chile.

RESUMEN

Un total de 150 híbridos de girasol, provenientes de 14 empresas de semillas, fue estudiado en Chile entre las latitudes 33° y 41° S, con el fin de seleccionar híbridos superiores en rendimiento de semilla y aceite/ha que los cultivares de polinización abierta (CPA), entre Santiago (Lat. 33°40'S) y Los Angeles (Lat. 37°30'S) y la introducción del cultivo del girasol entre Los Angeles y Llanquihue (41°15'S).

Durante cuatro temporadas de estudio entre Santiago y Los Angeles, fue posible seleccionar híbridos superiores, hasta en un 40%, al rendimiento de aceite/ha del CPA testigo "Majak", mostrando rendimientos máximos de semilla de 4500 kg/ha y contenido de aceite de 52%.

Durante dos temporadas, se determinó que el cultivo del girasol al sur de Los Angeles, mediante el empleo de híbridos precoces, era factible y económico de realizar. Se obtuvieron rendimientos máximos de semilla de 4000 kg/ha y contenidos de aceite de 55%.

Estos resultados abren las posibilidades de reemplazar los CPA tradicionales por híbridos superiores y de doblar la superficie potencial de girasol sembrada en Chile.

INTRODUCCION

Chile in 1986 had 1,218,340 ha dedicated to 17 annual crops, being 2.5% of the total planted with sunflowers (30,070 ha) with an average seed yield of 1810 kg/ha.

The sunflower commercial production was initiated in 1939, being the main area located between Santiago (Lat. 33°40'S) and Chillan (Lat. 36°35'S). The maximum planted area of 54000 ha was performed during the 1950-51 growing season.

The sunflower hybrids introduction was started in the mid 70's and the first commercial plantings in 1977, though the main OPC's 'Mayak', 'Klein-A', and 'Conay' have significantly been replaced only since 1985.

In 1983, the Agronomy Faculty of the Catholic University of Chile, started a sunflower program evaluating and selecting superior hybrids to replace traditional OPC's and studying the possibility of extending the area planted further south. The main results obtained on seed and oil yields and oil contents, are summarized and analyzed in this paper.

MATERIALS AND METHODS

Seed and oil yields of 150 hybrids during the 1983-84 through 1986-87 seasons at seven locations were recorded. The criteria of location and hybrids selection was based on climate conditions and growing season duration.

Table 1. Average temperature and rainfall at different locations. Average of 1983-84 through 1986-87 seasons.

1 Location	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.
Temperature (°C)						
Santiago	15.0	16.7	19.6	20.5	19.9	17.7
Curico	13.6	16.0	18.9	19.9	19.0	16.4
Chillan	12.9	15.2	18.5	19.4	18.8	16.4
Temuco	11.2	13.1	15.1	16.0	15.9	13.8
Llanquihue	9.9	11.7	13.9	14.7	13.8	12.2
Rainfall (mm)						
Santiago	8.9	7.8	0.0	0.0	0.0	6.3
Curico	32.6	24.9	0.0	0.0	0.9	15.8
Chillan	74.7	67.8	4.2	13.3	13.1	38.3
Temuco	90.5	68.1	7.3	34.3	47.6	58.2
Llanquihue	120.6	91.4	55.4	91.7	107.6	88.1

1 Santiago: Lat. 33°20'S. Alt. 512m; Curico: Lat. 34°58'S. Alt. 225m; Chillan: Lat. 36°35'S. Alt. 146m; Temuco: Lat. 38°46'S. Alt. 114m; Llanquihue: Lat. 41°26'S. Alt. 81m.

Table 3. Ranges of seed and oil yields and oil content of early sunflower hybrids tested at different seasons and locations.

Season	N. of hybrids tested	Seed yield kg/ ha	Oil % (DM basis)	Oil yield kg/ha
Temuco Lat.38° 45'S Long.72° 35'W				
1985-86	24	1288-2177	40.9-50.3	527- 987
1986-87	20	1680-3315	41.3-52.1	756-1591
Average	22	1484-2746	41.1-51.2	642-1289
Puerto Varas Lat.41° 15'S Long.72° 40'W				
1985-86	24	1721-3385	49.0-56.3	793-1668
1986-87	20	2783-4176	46.6-54.6	1366-2067
Average	22	2252-3781	47.8-55.5	1080-1868

strong competition of sunflowers with other crops such as potatoes, corn, beans, or sugarbeets.

Early hybrids performance has opened the possibility to introduce the sunflower crop between Los Angeles and Llanquihue (Lat.41° 15'S), probably the southernmost planted sunflower area in the world, where new crops are highly useful to broad the rotations in an area that continuous wheat is common and only a few crops are available. However, this area must be carefully studied before massive commercial plantings could be made. There are a variety of problems that could affect the sunflower adaptation and yields in the south, such as lower temperatures near the Andes mountains, low rainfall areas, diseases, insects, and soil nutrition problems which could not be present in the northern and traditional sunflower areas of Chile.

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