# SUNFLOWER PRODUCTION, RESEARCH, AND UTILIZATION TRENDS IN CHILE

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The trend during the last few years of the area devoted to sunflower has gone downward. In the 1964/65-1968/69 five-year period, the average area planted with sunflower was 35,000 hectares, with an average yield of 1,200 kg per hectare. In the same period, the area devoted to rapeseed - the other oil crop grown in Chile - was 61,000 hectares and the yield was 1,100 kg per hectare.

In the 1969-70 last growing season, the sunflower acreage declined to 23,000 hectares.

Acreage decline has occurred in spite of the promotion program sponsored by the industry in order to increase the sunflower seed production. The crop is grown under contract and the grower receives financial help and free technical assistance. It should be noted that at present there is a great demand for edible oil and high protein feed supplements in the domestic market, and it is necessary to import edible oil and meal to meet the needs of the country.

There are several factors dealing with the decline of the sunflower acreage. We can mention the following ones:

a) Sunflower is grown on irrigated land in economical competition with other crops that produce a higher return;

b) The sunflower yields have not increased at the same rate as other crops like corn and sugar beets;

c) The disease caused by the Sclerotinia sclerotiorum and the bird damages make it a hazardous crop;

d) A rather high amount of hand labor is still used in the crop.

The price of the sunflower seed is fixed by the government as a percentage of the wheat price. The industry pays a premium for the higher oil content varieties. For the 1969-70 harvest, the price of the high oil Russian varieties was twice the price of the wheat.

The most widely grown varieties have been Armavirski 3497, Peredovik and Klein A. The last one is a late variety with lower oil content and higher yield potential. It occupies about 40% of the sunflower acreage. The commercial inbred line x variety hybrids are no longer grown because of the lower oil content compared with the best varieties.

At present, both the government and Comarsa - a commercial organization that represents the six major oil extraction and refining companies - taking into consideration the merits of sunflower, have undertaken a strong promotion program to increase the production of sunflower seed.

Sunflower is important to the country, because it produces a very good quality oil and the meal is a high quality protein source.

With respect to the oil, it must be mentioned that nearly all the oil production is utilized as a liquid oil and is marketed in 55-gallon drums. This oil is dispensed from the drum, via a hand pump, into the customer's bottle. Since about two years ago, however, an oilseed processing company began marketing sunflower oil in plastic bottles. Most of the companies are now marketing sunflower oil in this way. This has permitted the Chilean consumers to be aware of the good quality properties of sunflower oil, which has become a premium oil in spite of the fact that the government fixes the same price for all vegetable oils, regardless of their source.

Regarding the sunflower meal, a government special project is underway, using the meal directly as food for children in order to meet the urgent needs for proteins in the diets of the lower income groups.

The sunflower researches are conducted by the Chilean Agricultural Research Institute of the Ministry of Agriculture, and some universities. The universities have undertaken specific projects such as investigations in Sclerotinia disease, oil and meal quality, etc., under the support of Comarsa, which provides funds and/or equipment.

The most important achievements toward the improvement of the sunflower crop production in the last two years, may be summarized as follows:

a) More than 70% of the growers are harvesting sunflower directly with the combine. It must be noted that a few years ago the common practices of harvesting sunflower included cutting the heads by hand, placing the heads on the cut end of the stalk for drying, and later removing the heads and tossing them into a combine;

b) The use of calibrated seed was started. All the seed used by the growers is certified seed and treated with both a fungicide and an insecticide;

c) The farmer is doing a more adequate use of fertilizers;

d) Herbicides that have demonstrated to be effective to control weed in sunflower, are available to the growers;

e) The importance of the irrigations for increasing yields has been investigated;

f) A number of new varieties best suited to local conditions are

being developed. During the last three years, new introductions have been studied. Smena, a Russian variety has been one of the most promising ones (Table 1).

Table 1

Yield and Oil Content of New Sunflower Introductions

| Variety | Yield in Kg/Ha | | | | |
|---|---|---|---|---|---|
| | 1967 -68 | 1968 -69 | 1969 -70 | 3 Year Avg. | % Oil |
| Smena | 2,431 | 2,000 | 3,200 | 2,544 | 43,0 |
| Vniimk 8931 | 2,333 | 2,085 | 2,909 | 2,442 | 42,4 |
| Armavirski 3497 (check) | 2,490 | 2,024 | 3,020 | 2,511 | 42,4 |
| Peredovik (check) | 2,230 | 1,992 | 2,658 | 2,293 | 42,3 |
| N° of Locations | 3 | 3 | 5 | | |

g) The breeding program to produce single cross hybrids using self incompatible lines as female parents has not been successful, because the low percentage of hybrid seed obtained under natural pollination has resulted in low yield (Table 2).

Table 2

Yield and Oil Content of an Experimental Sunflower Single Cross Produced by Hand and Natural Pollination

| Single Cross and Variety | Yield in Kg/Ha | | % Oil |
|---|---|---|---|
| $P_{11} \times P_{334}$ (hand pollination) | 4,836 | ----- | 38,5 |
| Klein A (check) | 2,346 | ----- | 38,3 |
| $P_{11} \times P_{334}$ (natural pollination) | ----- | 2,786 | 35,9 |
| Klein A (check) | ----- | 3,072 | 37,3 |
| No. of Trials | 4 | 3 | |

At present the breeding program for production of commercial hydrids is trying to isolate male sterile lines to be used as female parents. We hope that the eventual use of $F_1$ hybrids in commercial production, the acreage planted with sunflower could be maintained at a more uniform and higher level.

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