

POTENTIALITIES AND LIMITATIONS OF SUNFLOWER (*Helianthus annuus* L.)  
IN VENEZUELA.

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## ABSTRACT

The experience of research and commercial field production, have shown that is possible to obtain good sunflower yields in Venezuela. Since 1985 growers have been using hybrids from U.S.A. and Argentina. The venezuelan region more suitable for sunflower are the western plains, which includes Portuguesa, Barinas and Cojedes states. The average experimental yield is 1,500 kg/ha. The best planting dates are October and November in the high areas, and between November and December in the low areas. The harvest is done at the beginning of year, in absence of rainfall. The main problems detected are: Selection and soil preparation; late planting dates; use of hybrids that are not adapted to tropical conditions, besides of the high price of the seed, which is totally imported.

## INTRODUCTION

The traditional sources of raw material for oil production in Venezuela have been coconut (*Cocos nucifera*), sesame (*Sesamum indicum*), peanuts (*Arachis hypogea*) and in minor scale cotton seed (*Gossypium hirsutum*).

The supply of these oil seeds in base of it's national production have been decreased from 56 % in 1945 to 10 % in 1992. To supply this high deficit, official actions have been implemented to promote annual and perennial oil crops production, one of these alternatives is sunflower.

The first studies respect the factibility of this crop in Venezuela were initiated in 1973, realising a first approach upon the zonification of the crop and the introduction of some cultivars from Rumania.

Now days are available detailed studies respect the crop zonification, sowing dates, and a large number of hybrids from USA, Argentina and France have been evaluated.

## MATERIALS AND METHODS

Since 1985 was initiated a research programm with the objective to develop the sunflower crop in Venezuela to medium and big farmers.

A total of 152 commercial hybrids from USA, Argentina and France have been evaluated in localities considered with potential for the production of this crop (states of Aragua, Apure, Portuguesa, Barinas, Guarico, Yaracuy, Cojedes, Lara, Trujillo, Monagas y Zulia) in function of grain and oil yield and diseases tolerance.

There have been evaluated the possible sowing dates, and at the same time have been detailed the zonification of the crop and it's nutritional requirements. There were realised the pests and diseases diagnostic.

## RESULTS AND DISCUSSION

The research results obtained during last years and commercial seedings that were parallely developed have showed that is factible to produce sunflower in Venezuela with profitable economical production levels.

The zonification studies of this crop showed that there exist about 140,000 hectares that have the optimum conditions for a good development of the sunflower plants. These are ubicated in the states of Portuguesa, Barinas and Cojedes.

This zone correspond to the western plains (Llanos Occidentales) which are located at the altitud from 0 to 500 m.a. s.l. with an average temperature of 26 - 27 °C, minimum temperature of 18°C, and a maximum temperature of 32°C. The rainfall varies between 1,200 and 2,000 m.m.

The rain season (winter) is concentrated between april and august, during this period is developed the corn crop. During the last trimester of the year, some sporadical rains are present that constitute the " rains of the north period ". During this season is realised the sunflower seeding.

The best planting date in this zone is between october 15 and december 15. The main disease present in this season is the charcoal rot caused by *Macrophomina phaseolina*.

The experiments realised with commercial hybrids, not withstanding to be all these from foreing origin have demonstrated that a good part of these materials show profitable seed and oil produccion in Kg/ha. (Table 1). In commercials seedings have been obtained a maximum crop yield of 2.000 Kg/ha. At commercial level the national's yield average has been varying between 800 and 1,200 Kg/ha. (Figure 1).

Until the present, any pest of great importance does not have been detected. Not withstanding from the year 1991 high populations of white fly (*Bemisia tabaci*) in tomato (*Solanum lycopersicum*), tobacco (*Nicotiana tabacum*) and sesame (*Sesamum indicum*) damaged also sunflower causing economical losses.

The crop has great acceptance among farmers; it is totally mechanised and adapted to a farm extension varying between 80 to 400 has.

More over the zone considered optimum for sunflower crop (States of Portuguesa, Barinas and Cojedes), there exist approximately 400,000 hectares considered with potentiality for the crop, corresponding to central plains and part of the states Yaracuy, Lara and Monagas. In this zone one of the main limitants it's the natural low fertility of soils. For this reason is necessary the application of agrochemicals to supply the crop demands, with consequence there is an increasing of production costs.

In these conditions the sowing season varies between July 15 and August 15.

As a consequence of the erratic behaviour of the rain season under tropical conditions, frequently sunflower crops are under drought stress; contributing to yield losses at the end of the late planting dates (Table 2).

In other way in the occidental plains region is realised an intensive agriculture, for this reason there is frequently founded a soil compactation. Only the best farmers use the subsoil practice, this one must be realised at the beginning of soil preparation for corn seeding.

The total dependance of selected seed from other countries influence the high cost of this one (6 US dols./Kg). In fact, not all the foreign materials have been showed adaptability to Venezuelan agroclimatic conditions, so is of vital importance to develop a plant breeding programme to obtain national cultivars of high productivity.

#### CONCLUSIONS

- According from research results and commercial seedings it is possible to produce sunflower in Venezuela with profitable economic production levels, using materials of recognised adaptation and adequate agronomic management.
- Now days are disposable 140,000 hectares with optimum aptitude for the crop.
- The sunflower crop have been had a wide acceptance among the producers, so constitutes a profitable alternative to corn-sesame rotation system.
- One of the main limitants is the late sowing dates.
- It is necessary the obtention of national cultivars to allow to decrease the dependance from foreign seeds and put to the farmers disposition this intake at a more reasonable economic price.

TABLE 1. YIELD (KG/ha) AND OIL PERCENTAGE IN SUNFLOWER HYBRIDS EVALUATED IN REGIONAL TRIALS IN VENEZUELA

Average of 6 localities	Year 1986				Year 1989				Year 1991			
	State Portuguesa		Valle de la Pascua		State Portuguesa		Valle de la Pascua		State Barinas		State Barinas	
	Cultivar	Yield	Cultivar	Yield	Cultivar	Yield	Cultivar	Yield	Cultivar	Yield	Cultivar	Yield
GV-8665	1709	CF-7	2577	41	1305	36	GV-28074	2784	43			
S-530	1674	M-701	2545	46	1529	40	M-702	2508	48			
P-81	1633	DO-666	2531	42	1388	41	V.E. 1	2448	46			
S-400	1586	XF-584	2460	39	1583	39	T-560A	2553	47			
S-405	1566	CTS-300	2404	40	1933	38	S-407	2342	47			
S-336	1561	DO-728	2315	45	1733	45	GV-37027	2187	44			
CERFLOR	1538	V.E. 1	2311	41	1402	44	M-736	2174	48			
NK-3003	1524	S-406	2273	42	1356	42	F-113	2150	44			
XF-4512	1477	6580	2269	42	1315	48	RS-500	2113	44			
AS-522	1430	T-560A	2225	46	1633	47	DO-666	2082	46			
LAUREAT	1430	M-702	2153	47	1297	39	CF-10	2067	47			
MARIFLOR	1422	T-565	2138	46	1432	44	CF-3	2044	39			
AS-521	1419	M-731	2135	42	1529	42	S-412	1995	45			
RODEO	1392	IS-3130	2131	42	1662	42	XF-517	1902	45			
XF-456	1381	DO-670	2058	42	1456	39	T-565	1896	48			
FG-653	1359	M-734	2048	41	1188	42	DO-728	1895	48			
DO-705	1300	SF-206	2002	43	1214	37	M-733	1821	47			
NK-2012	1280	RS-500	1896	42	1556	38	CF-7	1775	45			
FG-661	1253	U-33282	1855	43	1791	43	SF-207	1766	43			
SB-254	1139	P-81	1831	42	1508	41	XF-491	1760	47			
GN-8665	973	6510	1818	46	1390	44	DO-670	1707	46			
		F-113	1745	41			P-81	1687	46			
		S-430	1743	40	1303	37	S-406	1593	45			
		T-650	1724	44	1485	41	XF-584	1460	41			
		S-401	1666	42	1375	38	YF-598	1400	45			
		X	1975		1231			1996				
		cv	15%		17%			20%				

Fig. 1 Sunflower yield in Venezuela during the years 1986-1991

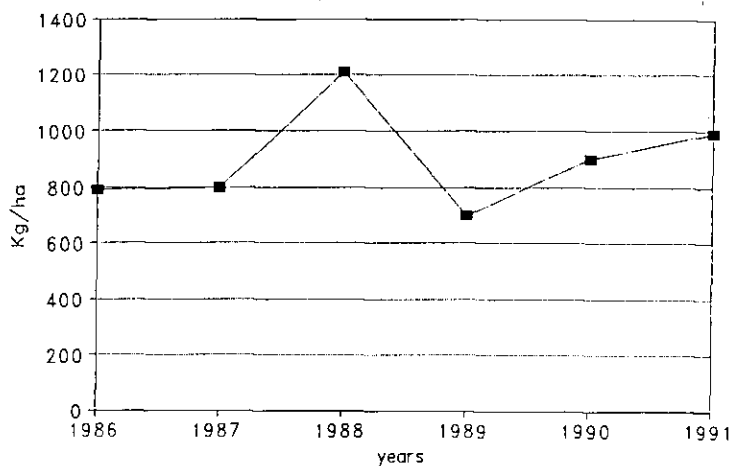


TABLE 2. YIELD IN COMMERCIAL FIELDS IN DIFFERENT PLANTING DATES IN THE STATE OF PORTUGUESA, 1992

Planting date	Ha	Yield kg\ha	Oil %
01-10 november	202	1168	38.16
21-30 november	98	1080	36.83
01-10 december	1575	1170	35.91
11-20 december	2065	1031	35.50
21-31 december	610	859	34.03

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## REFERENCES

1. APONTE, A., A. RINCON, R. NAVAS Y W. PACHECO. 1989. Enfermedades del girasol y su influencia en los rendimientos en dos épocas de siembra en Maracay, Estado Aragua. XII Congreso Venezolano de Fitopatología. Resúmenes, 1991. p. 46.
2. ARNAL, E. 1988. Selección de cultivares de girasol resistentes a insectos plagas de importancia económica. Maracay. FONAIAP-CENIAP. 7 pp. (Informe Técnico). Mecanografiado.
3. FUNDACION PARA EL DESARROLLO DE LAS OLEAGINOSAS. 1992. Proyecto de evaluación del girasol. Tomo I. Aspectos agronómicos. 108 pp.
4. MAZZANI, B. 1989. Producción de materias primas oleaginosas en Venezuela. 29 pp. Mecanografiado.
5. MINISTERIO DE AGRICULTURA Y CRÍA. 1992. Taller de trabajo sobre perspectivas del desarrollo agropecuario. Ponencia: Oleaginosas. 33 pp. Mimeografiado.
6. PINEDA, J. 1989. Enfermedades detectadas en girasol en el Estado Portuguesa. En: El girasol, su cultivo. Araure, Noviembre 1989. pp. 15-20.
7. RINCON, C.A. 1989. Ensayos regionales de girasol 1988. Maracay. FONAIAP. 18 pp. (Serie D N° 19).
8. RINCON, C.A. 1990. Ensayos regionales de girasol 1989. Maracay. FONAIAP. 15 pp. (Serie D N° 11).
9. RINCON, C.A. y W. PACHECO. 1991. Ensayos regionales de girasol 1991. FONAIAP. 14 pp. (Serie D N° 11).

10. RINCON, C.A., SOTO, E.R., PEREZ, D.M., ALVAREZ, M.M., FERNANDEZ, H., SALAZAR, N., ROMERO, R., NARANJO, A. y PACHECO, W. 1991. Recursos fitogenéticos y mejoramiento genético de cultivos oleaginosos. En: Jornadas Técnicas CENIAP-91. Instituto de Investigaciones Agrícolas Generales. Publicación Especial N° 25. Trabajo N° 33.
11. SOTO, E. 1987. Ensayos regionales de girasol 1986. FONAIAP-CENIAP. 28 pp. (Informe Técnico). Mecanografiado.
12. SOTO, E. 1988. Ensayos regionales de girasol 1987. FONAIAP-CENIAP. 29 pp. (Informe Técnico). Mecanografiado.
13. VELASQUEZ, L., A. DIAZ, A. RINCON, H. FERNANDEZ, N. GOMEZ y N. DIAZ. 1990. Análisis de la tecnología sobre el cultivo de girasol en el Estado Barinas. Memorias 1990. 166 pp.
14. VOINEA, S. 1976. Cuatro años de investigación en girasol. 1973-1976., Araure. Centro Nacional de Investigaciones de la Región Centro Occidental. 25 pp. Publicación miscelánea N° 1.