

RESULTS OF THE FOURTH EXPERIMENTAL CYCLE WITH SUNFLOWER CULTIVARS (1982—1983)

Authors : see Annex 1

Data processing and interpretation : Liaison
Centre of Fundulea, Romania (A. V. Vrân-
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INTRODUCTION

The subnetwork dealing with the exper-
imentation of sunflower hybrids and varie-
ties has completed four biennial cycles. The
results of the first three cycles were published
in Numbers 1 to 5 of this Bulletin, and they
constitute an useful guide for sunflower gro-
wers interested in the identification of the
best genotypes for certain specific environ-
ments, or for determining the optimum biolo-
gical parameters of sunflower cropping in dif-
ferent areas.

In the fourth cycle (1982—1983), the experi-
mentation was extended to other countries,
which have become interested in growing this
oil crop. So, the number of participants amoun-
ted to 41 research institutes or stations from
29 countries.

The participants which provided scientific,
rigorous results are listed in Annex 1.

Annex 1

List of participants in F.A.O. co-operative trials (1982—1983)

Country and location	Name and address	Trials conducted and year
1	2	3

EUROPE

Austria Fuchsenbigl	D. Wolffhardt, Bundesanstalt f. Pflan- zenbau und Samen- prüfung, Alliierten- strasse 1, Wien II	No. 2, 1982—1983
Bulgaria G. Toshevo	Fota Stoyanova Tzvet- kova, Institute for Wheat and Sunflower, General Toshevo 9520, Tolbuhin	No. 1, 1982
Czechoslo- vakia Vrakuna	A. Kováčik, Research Institute for Crop Production, 161.06 Prague 6-Ruzyne 507	No. 2, 1982—1983

1	2	3
France Cl.-Ferrand	P. Leclercq, Station d'Amélioration des Plantes, INRA, Do- maine de Crouelle, 63100 Clermont-Ferrand	No. 1, 1983
France CETIOM Cl.-Ferrand	E. Choné, CETIOM, 174 Avenue Victor Hugo, Paris 75116	No. 1, 1983
Germany F. Rep. Gross-Gerau	W. Schuster, Institut für Pflanzen- bau und Pflanzen- züchtung, Universität Giessen, 23 Ludwig- strasse, 6300 Giessen	No. 1, 1983
Hungary Iregszemcse	E. Kurnik, Takarmánytermesztési Kutató Intézet, Research Institute for Forage Crops, 7095 Iregszemcse	No. 1, 1982—1983 No. 2, 1982—1983
Hungary Szeged	Frank József, Gabonatermesztési Kuta- tó Intézet, Cereal Re- search Institute, Pf:391, H-6701 Szeged	No. 1, 1982—1983 No. 2, 1982—1983
Italy Pisa	G. P. Vannozi, Istituto di Agronomia Generale e Coltivazioni Erbacee, Via S. Michele degli Scalzi 2, Pisa 56100	No. 1, 1982—1983 No. 2, 1982—1983
Italy Udine	G. P. Venturi, Istituto di Produzione Vegetale, Facoltà Agra- ria-Università di Udine, Via Chiusaforte 54 ; 33100-Udine	No. 1, 1983 No. 2, 1982—1983
Poland Poznań	Z. Kloczowski, Plant Breeding and Ac- climatization Institute, Sieroca 1 a, 61-771 Poznań	No. 1, 1982
Portugal Elvas	Maria Y. Vivas, Estação Nacional de Melhoramento de Plan- tas. 7351 Elvas	No. 2, 1982(2)
Romania Fundulea	A. V. Vrânceanu and F. M. Stoenescu, Research Institute for Cereals and Industrial Crops, 8264 Fundulea, Jud. Călărași	No. 1, 1982—1983 No. 2, 1982—1983

1	2	3
Romania Podu-Iloaie	Elena Andrei, Agricultural Experimental Station, Podu-Iloaie, 6623, Jud. Iasi	No. 1, 1982—1983 No. 2, 1982—1983
Spain Córdoba	Juan Dominguez- Gimenez, National Research Centre for Oil Crops, INIA, Finca Alameda del Obispo, Apartado 240, Córdoba	No. 2, 1982
Turkey Edirne	E. Indelen, Agricultural Research Institute, P.O. Box 161, Edirne	No. 1, 1982—1983 No. 2, 1982—1983
Turkey Istanbul	Enver Hüsemoglu, Agricultural Research Institute, P.O. Box 18, Sefaköy Istanbul	No. 1, 1982—1983 No. 2, 1982—1983
Turkey Ankara	Kamil Ilisulu, Faculty of Agriculture, Industrial Plant De- partment, Ankara	No. 1, 1982—1983 No. 2, 1982—1983
Yugoslavia Novi Sad	D. Skorić, Institute of Field and Vegetable Crops, Mak- sima Gorkog 30, 21000 Novi Sad	No. 1, 1982—1983 No. 2, 1982—1983
Yugoslavia Osijek	Marija Vratarić, Agricultural Institute, Juzno predgradje 17 ; 54.000 Osijek	No. 1, 1982—1983 No. 2, 1982—1983

NEAR EAST, SOUTH AND SOUTH-EASTERN ASIA

Iran Karaj	M. A. Vahabian, Oil Crops Section, Seed and Plant Improvement Institute, Mard-Abad Ave, Karaj	No. 1, 1982—1983 No. 1, 1983
Pakistan Islamabad	Akhtar Beg, Pakistan Agricultural Research Council, L-13, Almarkaz f-7/2, P.O. Box 1031, Isla- mabad	No. 1, 1982—1983 No. 2, 1982
Philippines Muñoz	Filomena F. Campos, Director, Research & Development, Central Luzon State Universi- ty, Muñoz Nueva Ecija	No. 2, 1982

AFRICA

Algeria Mechraa, Kemis	Soiusi Mostefa, Directeur Général, Institut de Developpement des Cul- tures Industrielles, Jar- din d'essais du Ham- ma, B.P. 28 El-Anas- ser	No. 1, 1983
Egypt Sakha	Elahmar A. Badr, Agriculture Research Center, Field Crops Research Institute, Oil Crops Research Section Giza	No. 1, 1982—1983 No. 2, 1982—1983
Israel Beit-Dagan	Baruch Retig, Division of Field Crops, Agricultural Research Organization, Volcani Center, Beit-Dagan 50200	No. 2, 1982—1983

1	2	3
CENTRAL AND NORTH AMERICA		
U.S.A. Fargo	J. Miller, Oilseeds Investigations, 212 Waldron Hall, North Dakota State University, University Station, Fargo, North Dakota 58102	No. 1, 1982—1983 No. 2, 1982—1983
U.S.A. Fresno	David B. Ferguson, Stauffer Seeds, P.O. Box 1241, Clovis, California 93613	No. 1, 1982—1983 No. 2, 1982—1983

SOUTH AMERICA

Argentina Manfredi	Cruz Miguel Dreco, Estacion Experimental INTA, 5988 Manfredi (Córdoba)	No. 2, 1982
Argentina Miramar	Ana Lilia Gonzales de Schelotto, Chacra Experimental de Miramar, Casilla Cor- reo 35, Miramar 7607 (Buenos Aires)	No. 2, 1982 No. 2, 1983
Chile La Platina	Vital Valdivia, Research Station La Pla- tina, Santa Rosa 11610, Paradero 33, Casilla 5427, Santiago	No. 1, 1982—1983 No. 2, 1982—1983

MATERIALS AND METHODS

Two groups of entries with different lengths of vegetation period were tested, as follows :
— Trial No. 1, with 16 early and medium-early cultivars (Annex 2) ;
— Trial No. 2, with 20 medium-late culti-
vars (Annex 3).

Annex 2

TRIAL No. 1
with early and medium-early cultivars : single (SH)
and three-way (TH) hybrids, and open pollinated
varieties (OPV)

F.A.O. entry no.	Cultivars	Genetic type	Supplying country
77	H 9 P 1	SH	France
78	H 9 P 2	TH	"
79	G 9/76	SH	F. R. Germany
80	G 19/77	SH	"
81	G 24/77	SH	"
82	HNK-81	SH	Hungary
83	HNK-84	SH	"
84	Koflor-1	SH	"
85	Citosol-3	SH	"
86	RO-25	SH	Romania
87	RO-36	SH	"
88	RO-70	SH	"
89	NS-H-3	SH	Yugoslavia
90	NS-H-4	SH	"
91	NS-H-5	SH	"
92	Cerneanka	OPV	Italy

TRIAL No. 2
with medium-late cultivars : single (SH) and
three-way (TH) hybrids, and open pollinated
varieties (OPV)

F.A.O. entry no.	Cultivars	Genetic type	Supplying country
1	Peredovik	OPV	Bulgaria
200	HB-763	SH	"
110	H 9 P 4	TH	France
95	IH-56	SH	Hungary
96	IH-155	SH	"
97	Gahib-7	SH	"
98	Citosol-2	SH	"
99	RO-44	SH	Romania
100	RO-131	SH	"
101	RO-134	SH	"
103	RO-141	TH	"
104	RO-150	SH	"
111	Pemir	OPV	Spain
112	Sunbred-254	SH	U.S.A.
113	Cargill-205	SH	"
114	Seedtec-315	SH	"
108	Stauffer-3101	SH	"
105	NS-H-40	SH	Yugoslavia
106	NS-H-42	SH	"
107	NS-H-43	SH	"

The genotypes under study have represented the latest releases of sunflower breeders from Bulgaria, France, F. R. Germany, Hungary, Romania, Spain, U.S.A., and Yugoslavia.

The experimental design for both trials was the randomized blocks with 5 replications. The entry randomization for each location was established by the F.A.O. Crop and Grassland Production Service. The plot size was determined taking into account that, after discarding the borders (1 or 2 marginal rows and 2 frontal plants per each row), a minimum of 80 plants per plot be harvested. The plant population and other cultural practices were adapted to the local conditions. Some trials were conducted under irrigation, but most in dryland.

Along with seed samples, field books and instructions were provided for each trial, in order to facilitate the uniform data collection and evaluation. The interpretation of the experimental data was performed on the basis of the analysis of variance, particularly for seed yield and oil content.

Resistance to diseases and tolerance to unfavourable environmental conditions were estimated only in the field.

In comparison with the former experimental cycles, new traits were studied such as pollen self-fertility and the melliferous value. The degree of self-fertility was defined as the ratio between the mean number of filled seeds on the bagged heads and the mean number of filled seeds on the open-pollinated heads. Arcsine transformation of data was used prior to statistical analysis. The melliferous index was

calculated as the product of the nectar content and its sugar concentration. The nectar content was determined by using tiny capillary glass tubes weighed before and after nectar extraction and sugar concentration was established by means of a portable refractometer. Ten tubular flowers in the pistillate stage, situated in different zones of the head were analysed and the mean melliferous index of each entry was estimated on the basis of ten head determinations.

Some participants did not succeed in carrying out properly the trials due to either less favourable climatic conditions or to certain accidental causes. The hybrids Seedtec-S-315, Cargill-205 and Sunbred-245, as well as the open pollinated variety Pemir were not included in network trials in 1982, because their seed samples reached the destinations very late. The hybrid RO-36 was not tested in all locations in 1983 due to lack of seeds. Some samples got mixed up inside the package during the mailing. An important deficiency of the results of certain trials was the omission of data concerning the seed oil content.

RESULTS AND DISCUSSION

As in the previous experimental cycles, the trials carried out in 1982—1983 revealed a large diversity of the genotype response to the environmental variation, but some cultivars exhibited however a relatively constant behaviour in most locations, in the two years. In most cases, the year 1983 was more favourable for sunflower production than 1982.

TRIAL No. 1

Seed yield ranged greatly from 3.5 q/ha at El Khemis, Algeria, to 44.6 q/ha at Osijek, Yugoslavia (Table 1). The highest values were recorded in South-East of Europe (Romania, Hungary and Yugoslavia) where some hybrids surpassed the level of 40 q/ha, especially in 1983, and where the annual trial means ranged from 21.3 q/ha at Novi Sad, Yugoslavia, in 1982 when sunflower was badly damaged by *Phomopsis* sp., to 37.5 q/ha at Fundulea, Romania in the same year. Good results also were obtained in the Federal Republic of Germany, Czechoslovakia and Iran where the annual trial means ranged from 27.5 q/ha to 33.9 q/ha. In the other locations, the annual seed yield means of the whole set of cultivars were much lower, varying from 5.2 q/ha in Algeria to 28.2 q/ha in Egypt and thus contributing to the diminution of the general trial mean to 23.8 q/ha.

Judging from the standpoint of the general seed yield mean, 12 hybrids were significantly different from the early open pollinated variety Cerneanka, but the entire group of these hybrids, although ranging from 26.3 q/ha (RO-25) to 23.2 q/ha (G 19/77), was statistically similar.

Table 1

TRIAL No. 1/1982—1983. Seed yield (q/ha, 0% moisture)

Cultivars	Romania				Hungary				Yugoslavia				Bulgaria
	Fundulea		Podu Iloaie		Iregszemcse		Szeged		Novi Sad		Osijek		Toshevo
	1982	1983	1982	1983	1982	1983	1982	1983	1982	1983	1982	1983	1982
RO-25	42.0	38.2	32.5	31.9	28.6	38.1	32.9	34.8	30.7	38.3	41.5	39.0	23.1
HNK-81	39.4	35.6	23.4	39.1	32.4	38.6	34.7	35.4	27.7	34.3	31.8	39.1	21.6
H 9 P 2	40.4	34.4	34.6	42.5	29.1	31.0	35.7	35.0	23.4	33.4	29.6	38.3	25.6
Koflor-1	37.6	34.3	26.0	87.8	30.5	34.0	38.5	37.4	24.4	32.6	37.2	34.5	28.4
Citosol-3	37.9	33.8	25.9	41.1	29.1	32.2	34.3	39.9	15.2	29.0	38.0	36.9	27.5
H 9 P 1	37.1	32.0	32.6	35.0	26.6	36.1	26.6	36.5	23.8	32.9	34.8	36.5	25.5
RO-70	40.1	42.7	28.4	33.7	26.2	37.5	20.3	34.6	13.4	32.0	34.1	44.6	16.7
NS—H-3	38.4	26.2	23.0	35.9	29.1	30.2	43.4	35.5	22.5	27.1	32.7	30.7	23.1
HNK-84	38.1	32.1	26.0	29.7	27.6	37.0	33.6	36.5	25.1	34.1	32.5	38.3	15.7
NS—H-5	36.2	33.2	29.1	36.8	25.2	32.5	37.8	37.5	27.0	33.8	36.0	32.4	19.1
NS—H-4	36.2	32.8	29.5	33.1	26.2	34.3	38.4	35.0	21.6	29.0	35.5	36.6	18.6
G 19/77	37.5	34.3	24.8	35.1	23.3	29.6	32.9	34.2	17.3	30.0	29.5	37.2	11.8
G 9/76	35.8	31.4	21.1	34.3	23.3	33.7	32.9	36.4	19.0	27.5	34.9	36.0	11.2
G 24/77	36.1	32.2	28.0	35.0	21.4	34.2	36.4	34.3	17.7	26.1	31.6	36.2	9.9
Cerneanka	29.7	28.2	23.4	34.7	17.6	25.5	31.5	34.6	16.0	25.6	25.5	33.8	12.3
Mean	37.5	33.4	27.3	35.7	25.9	34.0	33.9	35.8	21.3	31.0	33.7	36.7	18.8
L.S.D. 5%	3.0	2.8	2.0	3.1	2.5	3.3	3.0	2.7	2.3	2.6	2.1	2.9	2.5
RO-36	37.7	—	28.9	—	18.6	—	32.9	—	16.5	—	33.6	—	9.9

Cultivars	Turkey						Italy			France		Poland	Germany	Czechoslovakia
	Edirne		Istanbul		Ankara		Udine		Pisa	Cl. — Fer-rand	CE-TIOM	Poz-nan	Gross-Gerau	Vra-kuna
	1982	1983	1982	1983	1982	1983	1983	1982	1983	1983	1983	1982	1983	1982
RO-25	17.5	22.8	11.1	8.5	26.5	20.6	7.0	17.3	9.3	17.2	29.2	29.9	39.3	32.9
HNK-81	14.6	29.0	11.2	10.7	24.2	24.2	9.4	16.0	7.3	13.7	28.6	35.0	29.8	34.7
H 9 P 2	15.5	23.4	13.5	8.9	23.3	21.1	8.0	17.3	10.8	11.1	25.0	26.5	31.4	35.7
Koflor-1	16.4	27.6	11.5	10.1	28.4	19.8	9.2	19.3	8.0	12.3	24.0	28.2	34.7	38.5
Citosol-3	18.9	22.5	13.2	8.6	26.7	22.5	7.5	17.3	9.7	11.9	27.2	28.2	29.8	34.3
H 9 P 1	15.5	25.1	12.7	10.8	25.0	21.5	7.7	16.0	8.1	17.0	25.4	37.6	30.5	26.6
RO-70	13.6	25.1	10.1	7.5	25.2	23.8	9.0	18.0	10.7	14.2	25.0	28.2	34.2	20.3
NS—H-3	15.0	22.5	12.2	8.6	22.7	24.1	6.3	19.3	6.7	14.0	26.2	29.0	27.6	43.4
HNK-84	14.1	25.5	10.2	10.7	25.3	25.0	9.0	19.3	8.7	13.0	24.6	30.8	31.3	33.6
NS—H-5	16.0	21.4	14.8	8.3	30.4	23.3	7.6	18.0	8.1	14.2	24.4	24.8	26.5	37.8
NS—H-4	15.5	25.0	12.0	12.3	17.7	21.1	10.6	16.0	8.0	13.9	23.7	24.8	30.9	38.4
G 19/77	14.1	23.0	12.5	10.5	24.4	21.4	6.7	18.0	11.7	11.6	22.7	26.5	33.0	32.9
G 9/76	13.6	21.0	10.8	9.0	13.8	18.1	8.9	17.3	10.8	11.3	28.0	28.2	29.2	32.9
G 24/77	13.1	23.9	11.3	8.7	31.0	20.0	8.3	18.0	8.7	17.3	28.4	24.8	30.5	36.4
Cerneanka	12.6	18.4	12.0	9.3	14.8	12.8	8.3	16.7	7.5	18.2	22.4	22.3	29.2	31.5
Mean	15.0	23.7	12.0	9.5	23.7	22.0	8.2	17.6	8.9	13.8	25.6	28.0	31.2	33.9
L.S.D. 5%	3.7	3.0	2.9	2.1	3.4	4.1	2.5	4.1	3.3	2.8	3.5	2.0	3.6	3.0
RO-36	13.1	—	12.7	—	20.0	—	—	19.3	—	9.6	—	23.9	—	32.9

Cultivars	Iran Karaj		Pakistan Islamabad		Egypt Sakha		Algeria		Chile La Platina		U.S.A. Fargo		Fresno	Mean q/ha	Grouping*
	1982	1983	1982	1983	1982	1983	Me-chraa	El-khemis	1982	1983	1982	1983	1982		
RO-25	37.0	32.0	11.9	12.4	25.9	34.2	11.8	6.70	10.1	25.7	13.9	19.2	10.4	26.3	A
HNK-81	33.5	28.1	11.1	15.7	22.8	34.2	16.2	5.93	9.6	32.8	17.6	18.7	12.5	25.6	AB
H9 P2	25.8	24.6	14.0	12.4	26.3	22.5	12.1	6.49	8.8	22.8	15.7	19.8	11.7	24.8	ABC
Koflor-1	30.9	30.6	12.0	15.0	21.9	30.3	14.2	3.47	8.3	28.3	14.4	14.1	7.4	24.6	ABC
Citosol-3	32.6	29.4	11.6	13.6	18.4	23.8	14.0	6.70	7.5	25.2	17.6	19.4	10.4	24.4	ABC
H9 P1	32.1	25.5	10.6	13.0	18.4	25.8	13.9	4.15	11.2	28.8	14.8	17.3	14.3	24.0	ABC
RO-70	32.0	27.8	12.1	12.5	17.5	31.7	15.9	4.98	8.5	30.7	21.3	16.4	13.3	24.0	ABC
NS—H-3	34.8	29.1	10.4	13.0	21.0	20.1	15.9	6.29	9.0	23.5	17.6	14.8	11.0	24.0	ABC
HNK-84	30.8	30.6	12.4	14.2	15.4	28.4	14.7	4.69	9.6	32.4	14.8	18.2	14.6	23.9	ABC
NS—H-5	28.5	20.5	11.3	14.3	18.4	22.8	10.0	5.10	8.8	25.9	14.8	15.5	11.6	23.6	ABC
NS—H-4	25.5	29.2	12.3	12.8	18.0	30.4	13.3	4.26	8.2	28.6	12.0	16.4	10.6	23.5	ABCD
G 19/77	27.4	25.2	12.4	13.0	26.3	33.2	14.2	4.37	9.2	29.3	16.7	20.4	11.3	23.2	ABCD
G 9/76	33.2	27.8	10.4	15.6	24.1	30.8	9.4	5.65	8.2	26.6	14.8	18.2	10.8	22.9	BCD
G 24/77	33.2	24.5	10.8	16.8	19.7	31.8	10.3	4.41	8.7	26.7	13.0	18.2	15.5	22.4	CD
Cerneanka	33.2	27.7	10.9	15.5	12.3	21.3	7.3	4.05	9.1	27.4	12.0	13.1	11.1	20.4	D
Mean	31.1	27.5	11.6	13.1	20.2	28.2	13.1	5.17	8.9	27.7	15.3	17.3	11.7	23.8	
L.S.D. 5%	5.1	3.6	2.6	3.8	3.3	3.9	1.8	1.3	3.1	3.1	2.1	1.7	2.7	3.1	
RO-36	27.4	—	12.1	—	16.7	29.4	15.8	3.54	8.2	—	13.0	—	11.2	—	

* Means with the same letter are not significantly different (Duncan's multiple range test)

Table 2

TRIAL No 1/1982—1983. Oil content in dry matter (%)

Cultivars	Romania				Hungary				Yugoslavia			Bulgaria	
	Fundulea		Podu Iloaie		Szeged		Iregszemcse		Novi Sad		Osijek	Toshevo	
	1982	1983	1982	1983	1982	1983	1982	1983	1982	1983	1982	1982	1983
RO-25	53.1	55.9	52.4	54.1	50.3	52.8	55.6	55.7	52.2	51.0	49.6	52.3	50.0
RO-70	53.3	53.0	50.1	52.4	39.0	48.7	54.3	53.9	39.7	42.2	48.0	48.1	44.9
NS-H-4	53.2	47.3	51.2	48.7	48.1	46.3	54.2	47.0	47.5	42.4	48.9	52.1	40.8
H9 P1	52.9	51.0	51.4	53.6	45.0	47.1	50.6	50.6	47.1	46.0	49.1	50.1	46.5
NS-H-5	50.2	47.1	49.3	50.7	47.0	46.3	51.8	46.3	47.7	43.1	47.5	50.2	43.1
HNK-81	50.8	48.6	45.8	51.7	44.1	48.1	50.3	50.1	44.4	44.0	46.2	50.0	42.8
Cerneanka	50.4	49.0	48.8	51.2	43.2	46.6	48.6	49.1	43.2	42.2	45.5	47.1	42.0
HNK-84	50.2	49.0	47.4	51.9	43.8	48.1	50.0	49.3	44.4	43.0	46.6	48.8	42.1
Citosol-3	51.1	48.8	50.1	49.0	46.2	47.2	50.6	46.2	41.3	42.1	46.8	46.7	44.2
G 9/76	50.3	47.9	47.0	51.1	43.3	46.6	50.3	48.4	45.0	41.4	46.5	45.7	40.0
G 24/77	48.7	47.9	47.1	51.6	44.2	46.1	49.2	47.3	43.2	41.0	46.5	46.3	43.3
NS-H-3	48.7	47.2	47.1	51.6	45.2	46.2	49.2	50.2	41.8	43.3	46.0	45.7	42.2
G 19/77	49.1	49.6	47.2	51.2	44.3	45.6	49.0	49.0	43.7	40.2	46.2	45.3	43.2
Koflor-1	48.0	46.3	45.8	47.9	43.9	46.4	48.7	46.2	43.1	42.0	45.9	45.1	43.2
H9 P2	49.1	45.8	46.3	47.1	43.6	46.0	50.1	46.0	43.0	40.9	45.9	45.3	42.1
Mean	50.6	49.0	48.5	50.9	44.7	47.2	50.8	49.0	44.5	43.0	47.0	48.0	43.3
L.S.D. 5%	2.6	3.0	3.1	3.8	2.2	3.9	4.9	3.6	2.1	3.1	4.7	2.9	3.1
RO-36	52.0	—	47.0	—	47.0	—	53.0	—	44.0	—	47.0	49.0	—

Cultivars	Turkey						France	Italy		Poland	Germany F.R.	
	Edirne		Istanbul		Ankara		Cl. Ferrand (CETIOM)	Pisa		Poznan	Gross-Gerau	
	1982	1983	1982	1983	1982	1983	1983	1982	1983	1982	1982	1983
RO-25	46.8	48.7	54.9	46.0	54.2	60.4	55.6	51.5	51.2	51.0	54.8	53.3
RO-70	46.6	46.4	52.8	40.1	52.9	58.6	54.0	50.2	48.1	49.3	53.7	52.2
NS-H-4	50.7	41.6	55.3	39.0	52.1	58.7	48.9	51.6	46.4	49.4	53.3	46.1
H9 P1	46.7	45.1	50.3	37.7	50.0	56.4	51.9	51.9	47.0	46.6	50.2	49.2
NS-H-5	44.8	44.9	48.3	37.9	49.0	56.5	50.5	48.9	44.9	46.0	50.0	47.3
HNK-81	45.3	47.1	50.6	38.1	52.3	58.7	51.9	50.9	44.2	45.9	49.3	46.1
Cerneanka	46.2	44.3	50.0	40.1	50.2	58.1	51.7	49.5	46.1	46.1	47.3	48.4
HNK-84	44.2	42.7	50.1	38.8	51.6	57.7	50.1	51.2	46.0	45.2	47.7	46.0
Citosol-3	45.3	47.7	48.6	38.7	48.1	57.4	50.5	50.3	46.6	45.3	48.1	46.6
G 9/76	44.1	43.1	48.8	41.0	49.5	58.3	49.7	51.0	44.1	46.5	48.0	45.3
G 24/77	43.6	41.5	48.1	39.3	50.3	57.4	48.9	50.2	44.9	45.3	49.4	45.7
NS-H-3	44.4	43.1	48.5	38.7	49.1	57.0	51.0	50.8	47.2	44.0	48.2	46.6
G 19/77	44.4	42.2	47.8	40.1	49.3	57.3	49.2	50.0	47.0	45.0	48.3	45.3
Koflor-1	43.5	44.1	47.0	41.8	50.5	59.8	47.6	48.2	44.7	43.2	46.3	46.3
H9 P2	43.8	45.8	46.6	39.0	49.1	58.1	50.1	47.1	44.9	43.6	47.1	44.0
Mean	45.4	44.5	49.8	39.7	50.5	58.0	50.8	50.2	46.2	46.2	49.4	49.2
L.S.D. 5%	4.7	4.3	3.7	3.1	6.2	7.7	3.2	2.8	2.2	2.5	2.8	2.9
RO-36	49.0	—	52.0	—	51.0	—	—	—	48.0	48.0	53.0	—

Cultivars	Czechoslovakia	Egypt		Iran		Chile	U.S.A.		Mean	
	Vrakuna	Sakha		Karaj		La Platina	Fargo		%	Grouping *
	1982	1982	1983	1982	1983	1982	1982	1983		
RO-25	54.1	42.8	38.4	53.6	50.7	47.2	48.6	43.6	51.3	A
RO-70	51.2	38.1	38.3	50.8	50.0	43.8	51.8	43.5	48.5	B
NS-H-4	53.6	43.9	34.0	47.1	43.8	43.4	44.9	38.3	47.5	BC
H 9 P 1	51.7	40.1	37.0	44.3	45.7	41.3	45.8	39.1	47.5	BC
NS-H-5	51.6	39.3	36.3	44.5	44.0	41.0	42.9	37.1	46.4	BCD
HNK-81	50.1	36.5	39.0	43.0	46.2	36.7	44.1	37.1	46.4	BCD
Cerneanka	48.3	39.3	35.1	46.0	45.6	41.2	45.7	41.3	45.3	BCD
HNK-84	49.3	35.4	39.1	45.2	46.3	36.3	42.7	45.7	45.9	CD
Citosol-3	50.1	38.1	35.1	41.7	45.2	39.2	43.5	39.1	45.8	CD
G 9/76	50.4	36.2	34.2	42.8	46.5	38.3	43.1	38.3	45.8	CD
G 24/77	50.1	38.6	37.1	46.1	46.2	38.3	42.5	39.2	45.6	CD
NS-H-3	51.1	37.1	34.1	44.3	45.8	37.2	41.8	37.3	45.4	CD
G 19/77	50.2	38.6	34.4	42.1	46.2	35.0	42.0	37.7	45.3	CD
Koflor-1	48.4	38.9	35.3	43.0	43.2	35.0	41.7	36.0	44.7	D
H 9 P 2	50.3	35.7	35.3	43.1	40.5	37.5	42.1	36.1	44.7	D
Mean	50.7	38.6	36.2	45.2	45.7	40.1	44.2	39.2	46.5	
L.S.D. 5%	4.0	4.9	5.3	5.7	4.0	5.1	2.4	2.8	2.5	
RO-36	53.0	41.0	—	51.0	—	43.0	49.0	—	—	

* Means with the same letter are not significantly different (Duncan's multiple range test)

Table 3

TRIAL No. 1/1982—1983. Morpho-physiological characteristics

Cultivars	No. of days from emergence to :				Head diameter (cm)		Plant height (cm)		Volumetric weight (kg/ha)		1,000 seed weight (g)		Husks (%)		Resistance to lodging Fundulea (1982—1983)
	flowering		maturity		limits	mean	limits	mean	limits	mean	limits	mean	limits	mean	
	limits	mean	limits	mean											
H9 P1	48—76	59	78—136	104	13—24	19	105—175	146	31—49	40	42—75	56	20—26	23	good
H9 P2	45—75	61	74—135	105	14—26	20	116—191	159	29—46	38	37—64	51	22—31	26	very good
G 9/76	46—74	60	76—133	105	15—25	21	106—175	144	31—46	38	41—74	55	19—27	24	good
G 19/77	47—74	58	76—132	104	14—28	20	99—166	139	30—45	37	40—71	56	20—27	24	good
G 24/77	42—77	60	72—135	104	12—24	19	106—185	140	30—46	38	42—72	56	21—29	25	good
HNK-81	39—70	62	68—131	104	12—26	20	122—178	149	32—50	41	45—87	66	20—30	25	very good
HNK-84	36—74	58	72—134	101	13—25	19	118—171	146	32—49	40	47—84	65	19—26	23	very good
Koflor-1	38—72	60	69—131	103	14—26	20	126—187	154	31—49	43	45—77	54	23—29	26	very good
Citosol-3	43—80	61	76—141	104	12—28	19	102—176	140	33—48	41	34—57	45	23—27	25	good
RO-25	49—75	59	80—134	104	15—26	22	96—180	142	34—50	41	39—84	63	18—25	22	very good
RO-36	45—57	55	75—117	99	13—27	22	93—146	129	35—49	41	41—70	55	19—26	23	very good
RO-70	46—75	63	76—136	105	14—25	21	115—190	150	28—44	38	41—69	54	20—26	23	very good
NS-H-3	41—78	62	72—138	104	12—27	19	91—170	129	32—49	42	34—72	52	21—28	25	good
NS-H-4	48—75	64	76—134	105	14—26	20	102—170	137	34—50	42	35—67	52	17—27	23	good
NS-H-5	47—75	64	76—136	105	13—26	20	118—180	147	32—47	41	42—74	52	22—29	26	good
Cerneanka	39—72	57	68—130	102	11—29	19	76—175	110	30—46	38	43—81	59	20—27	25	good

Table 4

TRIAL No. 1/1982—1983 : Resistance to diseases (naturally infected plants, %)

Cultivars	<i>Plasmopara helianthi</i>			<i>Sclerotinia Sclerotiorum</i>													
				head attack								stem attack					
	Fundulea		An-kara	Mean	Fundulea		Podu-Iloale	Gies-sen	G. Toshevo	Novi-Sad	Mean	Novi-Sad	Osijek	Szeged	Poz-nan	Gies-sen	Mean
	1982	1983	1982		1982	1983	1982	1982	1982	1983	1983	1982	1982	1983	1982	1982	
H9 P1	2	0	0	1	3	2	32	16	9	10	6	11	46	2	2	47	67
H9 P2	1	1	0	1	7	4	42	23	8	10	13	16	38	3	0	42	80
G 9/76	8	3	50	20	22	11	98	36	10	10	3	24	57	2	3	31	86
G 19/77	4	2	7	4	13	7	25	52	15	10	9	24	45	7	2	51	38
G 24/77	7	5	11	8	18	12	65	38	9	8	11	23	45	3	7	38	52
HNK-81	0	0	0	0	4	2	90	29	10	8	9	22	46	10	3	43	52
HNK-84	1	0	9	3	2	4	80	29	7	10	13	21	38	1	4	41	52
Koflor-1	3	0	0	1	4	3	87	27	8	7	8	21	55	1	3	43	69
Citosol-3	2	1	0	1	8	9	41	21	7	4	18	15	49	2	3	39	71
RO-25	0	0	0	0	1	2	31	23	9	10	9	12	37	3	1	48	65
RO-36	5	3	0	3	6	3	89	19	12	—	—	26	47	4	—	—	55
RO-70	3	2	0	2	7	5	53	23	10	10	13	17	46	3	5	52	71
NS-H-3	0	0	2	1	4	1	83	33	6	10	13	21	38	0	3	34	67
NS-H-4	2	0	2	1	12	7	35	33	9	0	5	14	44	0	7	18	70
NS-H-5	1	0	0	0	14	8	63	38	8	11	21	21	30	3	3	41	47
Cerneanka	29	11	34	25	14	10	93	39	12	10	20	28	30	8	8	45	63

Cultivars	<i>Sclerotinia sclerotiorum</i> root attack								<i>Botrytis cinerea</i>	<i>Phomopsis</i> sp.	<i>Verticillium</i> sp.	Leaf spots						<i>Puccinia helianthi</i>		<i>Erysiphe cichoracearum</i>	<i>Orobancha</i> sp.			
	G. Toshevo		Novi-Sad	Osijek	Szeged	Edirne		Mean	Boro-wo	Osijek	Man-fredl	Szeged		Osijek		Mean	Fargo		Mean		Osijek	Edirne		Mean
	1982	1983	1983	1982	1983	1982	1983		1983	1982	1982	1982	1983	1982	1983		1982	1983				1983	1982	
H9 P1	1	11	28	5	3	4	8	8	28	35	5	15	26	45	80	42	11	25	18	60	5	5	23	
H9 P2	4	6	26	6	7	12	12	10	15	10	4	20	25	30	60	34	11	10	11	5	5	5	4	
G 9/76	7	9	17	14	6	11	14	11	65	20	4	8	42	45	90	46	11	5	8	40	21	20	27	
G 19/77	23	10	40	20	8	6	8	17	30	25	12	11	18	35	30	24	11	1	6	35	12	12	20	
G 24/77	11	9	38	15	4	7	9	13	45	21	10	19	31	35	40	36	10	25	18	5	23	22	17	
HNK-81	2	12	18	14	2	2	4	18	35	25	5	14	27	50	45	34	10	1	6	40	20	20	27	
HNK-84	5	20	8	11	5	5	7	9	45	18	7	32	31	35	50	37	11	5	8	70	10	10	30	
Koflor-1	6	4	17	3	2	16	18	9	80	14	11	21	40	40	60	40	12	20	16	3	20	20	14	
Citosol-3	3	13	28	6	2	4	7	9	80	15	2	20	34	30	80	41	11	5	8	10	10	1	7	
RO-25	0	9	15	14	3	3	1	6	5	15	4	25	28	30	15	25	11	5	8	3	6	6	5	
RO-36	—	—	—	8	—	—	—	5	—	5	0	28	—	40	—	34	13	—	—	—	—	—	—	
RO-70	1	7	29	9	7	12	8	10	45	10	0	18	42	35	55	38	10	20	15	30	0	0	10	
NS-H-3	3	3	27	6	3	8	10	9	40	23	11	23	38	55	70	47	11	5	8	15	1	1	6	
NS-H-4	4	15	14	9	3	5	7	8	70	25	5	21	31	40	50	36	11	10	11	5	2	4	4	
NS-H-5	3	16	12	17	6	10	8	10	35	21	6	32	30	45	30	27	11	10	11	10	2	4	5	
Cerneanka	3	6	19	10	3	5	9	13	—	23	13	15	27	25	60	27	11	20	16	5	6	8	6	

However, in different countries and years certain hybrids were better discriminated, indicating their environmental specific adaptability.

Oil content in dried seeds varied also greatly from location to location and from year to year. Data from Table 2 point out that the cultivars of this trial were superior from the oil content standpoint to those studied in the previous network trials, the annual trial means being higher than 50% in 10 cases. Three hybrids (RO-25, RO-70 and NS-H-4) were significantly different from the rest of 12 cultivars, with a general mean oil content of 51%, 48% and 48% respectively.

The tested hybrids were generally later and taller than the open pollinated variety Cernanka, known as one of the earliest and shortest cultivar (Table 3). Some of them had larger seeds, superior values of volume weight, and a better resistance to lodging.

Table 4 gives some information concerning disease resistance under natural infection. Complete resistance to *Plasmopara helianthi* displayed the hybrids HNK-81 and RO-25. Hybrids H 9 P 1, RO-25, NS-H-4, Citosol-3, H 9 P 2 and RO-70 proved to be more resistant to the head attack of *Sclerotinia sclerotiorum*, RO-25 and H 9 P 2 to *Botrytis cinerea* and *Phomopsis* sp., RO-36 and RO-70 to *Verticillium* sp., G 19/77 and HNK-81 to *Puccinia helianthi*, Koflor-1 and RO-25 to *Erysiphe cichoracearum*, H 9 P 2, NS-H-4, RO-25, NS-H-5, NS-H-3, Cernanka and Citosol-3 to *Orobanche* sp.

In contrast with the open pollinated variety Cernanka, most hybrids manifested a much higher self-fertility degree (Table 5).

Table 5

TRIAL No. 1. Self-fertility degree and melliferous value * (Fundulea, 1982—1983 means)

Cultivars	Self-fertility degree (%)	Nectar mg/fl 24 h	Sugar concentr. (%)	Melliferous index
Koflor-1	53.3	0.71	33.5	0.24
NS-H-5	51.9	0.80	42.2	0.34
H9 P2	50.1	0.50	51.6	0.26
H9 P1	41.1	0.72	50.8	0.37
Citosol-3	39.1	0.44	42.8	0.19
RO-25	28.2	0.91	47.0	0.43
RO-70	26.3	0.80	40.8	0.33
HNK-81	21.6	0.80	44.5	0.36
HNK-84	19.5	0.92	42.4	0.39
NS-H-4	15.4	0.70	45.8	0.32
G 24/77	9.3	0.73	47.4	0.35
G 9/76	8.8	0.54	50.0	0.27
G 19/77	6.5	0.69	46.1	0.32
Cernanka	3.1	0.58	35.4	0.21
NS-H-3	0.3	0.91	43.8	0.40
L.S.D. 5%	6.2	0.08	3.7	0.50

* The determinations of nectar content and sugar concentration were performed by I. Balana, Elena Grosu and G. Fota (Research Institute for Apiculture, Bucharest).

TRIAL No. 2

As in the case of Trial No. 1, a great variation has been noticed among the medium-late cultivars of Trial No. 2, as a function of locations and years.

Seed yield ranged from 2.0 q/ha at Elvas, Portugal, to 48.6 q/ha at Osijek, Yugoslavia (Table 6). The highest annual trial means were recorded at Szeged, Hungary and Osijek, Yugoslavia, in 1983 (40.8 and 40.6 q/ha respectively) and the lowest at Islamabad, Pakistan (5.9 kg/ha). High average yields, over 30 q/ha, were also obtained in Romania, Austria, Israel (1983) and Argentina (Miramar). With the exception of Pakistan, very poor seed yields were recorded in Argentina (Manfredi), Italy (Pisa), Spain (Sevilla), Portugal (Elvas), U.S.A. (Fargo, N.D.).

Table 6

TRIAL No. 2/1982—1983. Seed yield (q/ha, 0% moisture)

Cultivars	Romania				Hungary				Yugoslavia				Bulgaria	
	Fundulea		Podu-Iloaie		Szeged		Iregszemcse		Novi Sad		Osijek		Toshevo	
	1982	1983	1982	1983	1982	1983	1982	1983	1982	1983	1982	1983	1982	1983
RO-44	41.5	35.0	38.2	36.3	43.3	37.1	34.2	38.0	29.6	30.4	40.4	39.2	33.5	27.3
RO-134	40.0	34.9	33.1	37.9	40.3	36.9	33.9	38.5	22.5	28.3	39.3	46.5	28.4	25.8
IH-56	38.8	33.3	33.2	36.5	31.2	36.4	29.2	36.5	24.0	32.0	36.7	48.6	27.6	28.4
RO-131	37.5	33.7	30.1	40.8	37.0	46.9	23.0	37.0	20.8	27.5	34.0	46.6	27.1	20.2
IH-155	40.1	33.0	26.0	40.6	31.7	40.5	27.6	37.5	28.1	33.4	39.4	34.7	35.2	26.5
RO-141	37.1	32.8	39.2	45.4	44.3	46.0	23.0	38.2	19.5	23.0	32.9	45.2	26.4	27.0
H9 P4	39.8	32.5	29.4	33.7	36.0	43.6	26.8	35.1	21.6	30.3	36.7	43.0	21.6	28.3
RO-150	37.6	37.0	27.8	36.6	27.5	34.8	19.0	37.2	13.6	23.9	33.5	45.9	18.0	25.4
Stauffer-3101	39.4	35.4	32.3	36.6	34.5	37.0	27.5	34.3	23.8	36.4	33.7	37.5	26.3	21.8
NS-H-43	35.5	34.1	30.1	38.4	36.6	35.2	19.1	36.7	24.8	32.5	30.1	43.4	16.6	26.0
Gahib-7	40.2	33.7	28.7	36.9	31.7	43.3	20.6	33.9	11.7	23.6	35.0	42.4	16.5	24.6
Citosol-2	37.2	31.9	34.9	37.4	34.2	35.2	26.5	35.6	18.2	23.4	34.9	35.7	22.8	24.5
Peredovik	37.2	31.4	31.7	33.8	31.5	39.3	26.7	38.1	14.3	23.1	33.2	38.5	23.3	20.9
HB-763	29.4	31.8	22.8	34.6	31.4	40.0	25.0	40.2	13.9	28.6	29.5	45.6	14.3	30.2
NS-H-42	38.4	32.2	30.4	34.7	25.9	43.5	—	26.4	19.9	29.2	31.1	32.2	17.0	20.5
NS-H-40	32.7	27.1	32.6	36.1	29.0	40.0	23.9	30.1	20.9	25.7	29.6	31.5	17.9	24.3
Mean	37.6	33.1	31.5	36.4	34.0	40.8	25.8	35.9	20.2	27.5	34.5	40.6	22.9	24.9
L.S.D. 5%	3.8	3.1	2.8	4.0	5.6	4.0	2.5	3.6	2.9	2.9	2.8	3.7	3.0	2.8
Seedtec-S-315	—	35.6	—	30.7	—	45.8	—	37.0	—	27.7	—	45.0	—	26.7
Pemir	—	31.3	—	31.6	—	43.6	—	38.6	—	24.5	—	39.2	—	22.4
Cargill-205	—	31.9	—	35.8	—	40.1	—	34.9	—	22.0	—	31.3	—	26.1
Sunbred-254	—	33.2	—	33.0	—	41.9	—	34.0	—	24.7	—	40.1	—	20.8

Table 6 (Continuation)

Cultivars	Turkey						Italy			Spain	Portugal		Austria	
	Edirne		Istanbul		Ankara		Udine		Pisa	Sevilla	Elvas 1	Elvas 2	Fuchsenbigl	
	1982	1983	1982	1983	1982	1983	1982	1983	1983	1982	1982	1982	1982	1983
RO-44	20.5	28.8	12.4	11.1	17.0	28.2	37.0	29.4	11.0	10.7	11.2	12.5	45.7	30.7
RO-134	18.9	25.7	10.9	13.4	22.3	36.6	28.4	24.9	10.6	10.7	10.1	21.7	37.1	31.8
IH-56	17.7	29.8	12.1	11.3	23.0	30.7	32.4	24.6	8.6	11.1	14.5	17.7	36.0	33.4
RO-131	19.1	28.2	10.8	13.4	23.5	27.8	27.0	32.7	11.1	10.2	11.5	16.3	37.0	32.9
IH-155	16.9	27.2	12.6	14.9	23.4	26.2	29.8	27.8	7.5	11.6	5.7	17.3	33.1	39.6
RO-141	18.0	28.5	11.7	11.2	21.9	27.3	29.4	22.6	10.1	10.5	8.7	10.7	32.8	28.4
H9 P4	20.3	27.1	11.2	13.7	19.8	31.8	31.4	27.8	8.0	10.4	13.2	9.0	34.5	30.3
RO-150	20.7	30.6	10.5	12.8	17.2	34.7	34.0	22.7	11.5	10.7	16.6	16.3	37.0	30.8
Stauffer-3101	18.1	25.6	12.7	15.5	—	23.9	33.9	27.4	8.7	10.9	14.2	16.0	32.4	24.9
NS-H-43	15.8	27.5	11.5	12.3	17.7	26.9	29.2	24.1	11.0	9.0	9.3	13.6	30.5	40.9
Gahib-7	18.4	27.0	12.4	13.2	19.4	27.5	29.3	23.9	9.5	9.3	14.2	24.6	33.9	29.6
Citosol-2	20.4	25.4	12.8	12.1	21.8	32.4	28.6	28.3	9.3	10.4	5.9	7.6	34.3	28.0
Peredovik	20.0	27.6	10.3	10.1	17.0	23.4	27.8	26.0	10.1	10.2	16.9	17.1	33.3	30.5
HB-763	18.0	29.5	11.1	14.3	30.3	27.9	31.4	22.8	9.7	10.2	11.3	20.0	35.2	31.3
NS-H-42	20.4	25.7	9.6	12.7	18.1	27.3	24.2	20.3	8.5	10.4	2.0	3.0	16.9	18.4
NS-H-40	18.6	21.4	12.2	10.4	16.4	24.5	25.7	20.1	8.0	12.1	5.0	8.3	31.6	25.7
Mean	18.8	27.5	11.5	12.9	19.4	29.1	25.3	25.8	9.6	10.5	10.4	14.1	32.6	31.0
L.S.D. 50%	2.5	4.1	3.0	3.3	4.1	3.4	2.7	3.2	3.3	1.9	2.2	3.0	2.9	3.6
Seedtec-S-315	—	30.6	—	16.4	—	38.0	—	24.1	11.7	—	—	—	—	39.2
Pemir	—	27.4	—	13.4	—	25.7	—	32.2	10.7	—	—	—	—	35.4
Cargill-205	—	28.2	—	13.8	—	33.2	—	32.9	8.0	—	—	—	—	27.3
Sunbred-254	—	27.3	—	11.2	—	27.4	—	25.4	11.0	—	—	—	—	32.8

Table 6 (Continuation)

Cultivars	Pakis- tan	Egypt		Israel		Phi- lippi- nes	Chile		Argentina			U.S.A.			Mean	Grou- ping *
	Isla- ma- bad	Sakha		Beit Dagan		Mu- noz	La Platina		Man- fredi	Miramar		Fargo		Fres- no	q/ha	
	1982	1982	1983	1982	1983	1982	1982	1983	1982	1982	1983	1982	1983	1983		
RO-44	4.3	15.8	24.4	24.1	35.2	14.8	24.0	28.5	9.9	31.3	39.8	25.0	22.9	10.7	26.7	A
RO-134	4.7	17.5	31.9	25.5	29.2	15.1	29.5	29.8	8.5	31.0	36.0	24.1	23.1	11.1	26.6	A
IH-56	6.1	17.5	27.6	27.7	34.5	18.3	29.3	30.9	6.8	33.7	34.0	24.0	21.5	12.2	26.1	A
RO-131	5.3	19.3	38.9	28.8	29.5	10.4	24.1	29.3	7.7	30.4	41.5	25.9	21.3	8.9	26.0	A
IH-155	5.0	21.0	36.9	28.1	36.2	16.0	21.8	32.3	7.7	35.0	34.3	16.9	15.7	9.9	25.8	A
RO-141	4.7	21.9	34.8	27.8	34.8	13.8	24.6	26.9	9.0	30.6	38.5	16.9	9.6	9.0	25.8	A
H-9 P 4	7.8	22.4	23.6	23.6	32.5	13.3	24.6	30.7	7.0	31.3	36.4	16.2	32.1	11.4	25.0	AB
RO-150	8.3	13.2	29.6	27.1	32.8	13.3	26.9	27.8	4.9	33.1	36.3	24.5	20.0	9.5	24.6	AB
Stauffer-3101	9.4	17.1	21.1	32.4	33.2	10.4	27.4	29.1	7.7	32.0	40.0	19.4	23.6	13.9	24.6	AB
NS—H-43	4.1	18.4	29.8	26.3	31.2	10.4	22.3	32.6	4.8	30.1	40.9	20.8	25.5	12.6	24.5	AB
Gahib-7	5.0	22.8	32.4	26.5	24.9	14.8	27.2	30.9	4.3	28.5	34.3	24.3	20.4	10.5	24.3	AB
Citosol-2	5.4	20.6	31.7	25.0	29.4	11.9	27.6	29.8	6.0	30.0	39.7	21.5	21.5	11.2	24.3	AB
Peredovik	5.0	21.0	38.4	33.7	29.7	13.3	22.9	39.0	4.8	26.7	32.4	19.4	19.9	11.8	24.1	AB
HB-763	6.8	18.4	27.2	27.5	30.2	15.1	23.1	35.0	4.5	31.3	32.4	26.1	20.8	11.8	24.0	AB
NS—H-42	4.8	18.4	36.4	24.1	41.1	11.9	21.3	22.6	6.0	29.8	36.1	24.0	11.3	10.0	22.2	B
NS—H-40	6.9	19.7	26.3	25.3	25.7	10.4	25.3	25.2	4.8	25.4	33.3	21.5	17.3	10.0	21.9	B
Mean	5.9	19.2	30.3	23.1	31.6	13.4	25.2	29.8	6.6	30.8	36.6	22.7	19.9	11.0	25.4	—
L.S.D. 5%	2.6	3.1	4.2	3.4	2.5	2.0	4.5	3.3	1.8	2.9	5.1	3.1	2.2	2.8	3.3	—
Seedtec-S-315	—	—	31.0	—	29.8	—	—	32.6	—	—	36.9	—	20.4	—	—	—
Pemir	—	—	34.3	—	28.3	—	—	30.7	—	—	36.0	—	15.7	—	—	—
Cargill-205	—	—	34.3	—	32.9	—	—	33.8	—	—	37.5	—	17.6	—	—	—
Sunbred-254	—	—	25.5	—	29.9	—	—	27.4	—	—	37.7	—	20.4	—	—	—

* Duncan's multiple range test. Means with the same letter are not significantly different.

The general mean of Trial No. 2 was quite close to that of Trial No. 1 (25.4 q/ha as against 23.8 q/ha), indicating that the difference in maturity of the two types of sunflower cultivars was not so great as to determine significant differences in seed yield.

Statistically, the majority of cultivars fell in the same group as far as the general seed yield mean is concerned. Thus, 14 entries, including 13 hybrids and the open pollinated variety Peredovik were practically similar according to Duncan's multiple range test, alt-

hough their average seed yield ranged from 26.7 q/ha (RO-44) to 24.0 q/ha (HB-763). Under more limited environments, certain hybrids were however better differentiated, according to their specific adaptability.

A similar reaction was noticed with respect to oil content (Table 7). So, the general mean of 13 cultivars fell in the same statistic group, although ranging from 47.8% to 45.0% and only two hybrids were significantly different, the hybrid RO-44 with the highest oil content (50.2%) and the hybrid Stauffer-3101 with the lowest oil content (41.6%).

TRIAL No. 2/1982-1983. Oil content in dry matter (%)

Table 7

Cultivars	Romania				Hungary				Yugoslavia			Bulgaria	
	Fundulea		Podu-Iloaie		Szeged		Iregszemcse		Novi Sad		Osijek	Toshevo	
	1982	1983	1982	1983	1982	1983	1982	1983	1982	1983	1982	1982	1983
RO-44	53.8	56.0	55.3	57.8	52.0	52.9	56.4	55.0	53.2	45.4	50.8	52.3	50.2
RO-150	52.4	55.0	49.2	55.0	45.3	48.6	52.7	54.1	46.1	41.7	48.3	49.0	44.6
RO-141	54.2	52.3	46.4	54.2	45.7	48.6	53.1	51.3	47.2	40.0	50.3	48.5	46.6
Peredovik	53.1	52.7	48.0	55.5	45.2	49.0	52.3	52.7	45.8	40.1	47.6	49.2	41.5
HB-763	51.6	52.1	51.1	53.1	43.9	49.0	51.6	52.2	43.3	41.1	50.5	50.2	44.1
Citosol-2	52.9	49.0	40.6	53.0	48.2	47.0	50.6	52.4	45.1	40.1	50.3	48.5	43.6
RO-134	53.7	53.3	50.3	53.4	47.3	50.5	52.6	51.0	46.8	42.1	48.3	46.7	42.8
H9 P4	51.0	49.9	50.3	52.9	46.7	47.1	46.1	49.3	47.6	42.2	48.1	48.8	43.3
RO-131	54.2	53.3	52.4	52.0	46.9	48.5	52.1	51.0	46.0	40.3	48.5	47.7	47.1
NS-H-40	50.0	51.1	49.6	52.6	42.3	48.6	52.0	52.3	46.0	40.1	46.5	47.7	47.2
IH-56	51.0	48.8	51.8	52.8	42.2	48.3	49.4	50.1	43.5	43.1	46.5	48.6	41.2
NS-H-43	50.6	49.0	47.3	51.2	46.0	44.5	50.1	48.2	47.0	41.7	47.3	48.9	44.1
Gahib-7	51.1	51.5	51.5	52.8	44.0	48.2	50.5	51.3	42.2	40.0	47.6	48.1	44.6
IH-155	48.7	47.4	51.1	50.1	47.6	46.0	47.5	46.3	41.7	41.4	46.1	49.2	42.6
Stauffer-3101	44.8	44.0	47.5	44.3	41.1	40.1	43.5	44.3	38.2	36.4	43.5	42.3	32.6
Mean	51.5	51.0	50.0	52.7	45.6	47.8	50.7	50.8	45.3	41.1	48.0	48.4	43.7
L.S.D. 5%	2.8	2.2	4.3	4.9	2.8	4.3	3.9	3.1	2.6	3.2	2.8	3.6	3.1
Pemir	—	51.7	—	54.7	—	48.2	—	51.2	—	41.2	—	—	47.1
Cargill-205	—	51.0	42.4	54.9	—	48.1	—	52.5	—	42.5	—	—	43.0
Sunbred-254	—	50.0	50.3	50.0	—	45.5	—	48.1	—	40.3	—	—	44.8
Seedtec-S-315	—	49.7	—	50.2	—	46.2	—	50.1	—	38.6	—	—	39.7

Cultivars	Turkey						Italy		Spain	Portugal		Austria	
	Edirne		Istanbul		Ankara		Udine	Pisa	Sevilla	Elvas 1	Elvas 2	Fuchsenbigl	
	1982	1983	1982	1983	1982	1983	1982	1982	1982	1982	1982	1982	1983
RO-44	45.0	50.2	53.6	48.8	57.9	58.3	52.4	52.8	48.8	55.1	55.0	49.4	46.7
RO-150	44.2	45.2	50.5	45.0	57.1	60.6	50.1	52.6	45.7	55.2	53.8	52.4	48.1
RO-141	46.1	47.0	52.9	45.2	60.6	59.3	48.2	48.7	45.0	54.2	52.8	51.1	48.1
Peredovik	44.3	43.0	52.9	46.4	57.6	59.5	47.2	49.2	44.0	55.6	53.3	52.1	47.1
HB-763	47.0	45.6	52.2	46.1	58.7	57.6	49.3	50.6	45.2	53.0	51.9	52.2	46.8
Citosol-3	43.2	47.1	52.8	45.2	59.7	59.1	50.1	50.2	46.6	54.3	51.4	52.7	46.9
RO-134	42.2	42.6	51.3	45.1	56.0	58.6	48.2	50.6	—	54.2	51.5	50.1	44.3
H9 P4	45.4	44.1	51.0	42.5	57.0	57.0	—	48.1	—	53.1	51.6	51.2	47.1
RO-131	40.0	47.2	50.4	44.6	56.1	57.7	48.0	50.7	42.4	53.5	53.1	50.2	47.6
NS-H-40	41.5	41.1	49.2	44.2	56.6	58.9	45.3	50.1	42.1	50.0	50.3	52.5	46.7
IH-56	43.2	44.5	49.3	44.1	57.9	56.8	42.3	50.1	41.3	51.2	51.0	50.2	44.5
NS-H-43	41.6	43.3	48.1	43.9	55.1	59.6	45.3	45.9	44.1	50.0	49.8	50.1	45.7
Gahib-7	39.3	43.2	50.5	43.5	57.8	57.2	47.0	46.7	38.6	52.2	50.2	52.4	43.5
IH-155	43.0	42.9	48.1	40.6	58.1	55.3	42.1	47.3	40.0	53.8	50.2	48.2	44.0
Stauffer-3101	38.2	38.1	43.0	37.7	56.1	54.6	40.4	41.7	36.2	47.0	45.9	44.0	47.3
Mean	43.0	44.3	50.4	44.2	57.5	58.0	46.9	49.0	43.1	52.8	51.5	50.3	46.3
L.S.D. 5%	3.0	3.4	4.6	3.8	6.6	5.7	4.2	2.2	2.4	3.7	3.3	3.6	2.2
Pemir	—	43.5	—	46.3	—	59.9	—	49.1	—	—	—	—	49.2
Cargill-205	—	48.1	—	47.3	—	57.6	—	48.7	—	—	—	—	47.9
Sunbred-254	—	43.1	—	43.6	—	57.5	—	50.3	—	—	—	—	47.5
Seedtec-S-315	—	44.2	—	42.3	—	59.5	—	45.8	—	—	—	—	47.1

Cultivars	Egypt		Israel		Chile	Argentina			U.S.A.			Mean %	Grouping*
	Sakha		Beit Dagan		La Platina	Manfredi	Miramar		Fargo		Fresno		
	1982	1983	1982	1983	1982	1982	1982	1983	1982	1983	1982		
RO-44	41.2	39.3	45.7	44.3	44.9	42.3	48.0	50.0	49.1	41.7	45.0	50.2	A
RO-150	34.7	37.2	42.0	43.1	42.8	39.1	46.2	49.2	48.5	42.2	40.2	47.8	B
RO-141	37.6	36.3	43.4	42.7	41.7	40.3	44.6	47.1	49.1	40.2	39.2	47.6	B
Peredovik	40.3	38.6	44.0	42.9	42.4	37.3	45.6	46.7	46.0	38.5	42.8	47.4	B
HB-763	41.3	37.4	45.5	45.0	35.1	33.3	46.8	47.2	49.0	40.1	43.4	47.4	B
Citosol-2	40.2	35.1	45.1	42.8	43.2	36.2	47.4	46.5	46.5	40.3	41.5	47.4	B
RO-134	41.1	35.6	44.2	43.2	42.3	34.6	40.2	44.3	48.2	41.0	40.0	46.9	B
H 9 P 4	41.2	36.8	—	46.2	40.7	37.3	47.0	46.1	43.9	40.1	40.7	46.8	B
RO-131	35.2	36.1	41.0	41.7	42.1	40.3	40.1	46.4	46.5	40.1	38.4	46.7	B
NS-H-40	35.1	33.2	41.6	42.5	42.4	33.1	43.9	46.1	47.1	40.6	48.3	46.2	B
IH-56	38.1	37.3	42.6	43.0	40.2	35.8	46.1	44.8	45.5	40.3	39.2	45.9	B
NS-H-43	38.3	35.5	42.5	44.1	42.3	32.6	44.0	45.2	46.3	37.6	43.1	45.7	B
Gahib-7	34.6	36.2	42.1	41.0	41.1	32.7	42.3	45.1	45.5	40.1	42.3	45.6	B
IH-155	34.7	37.2	45.1	44.0	38.7	36.3	45.2	44.1	42.6	36.1	41.8	45.0	B
Stauffer-3101	36.8	33.1	42.6	42.3	34.1	33.7	42.2	41.2	44.1	35.7	39.4	41.6	C
Mean	38.0	36.3	43.4	43.3	41.0	36.3	44.6	46.0	46.5	39.6	41.8	46.5	—
L.S.D. 5%	2.8	1.3	2.0	4.6	5.4	2.3	3.7	4.7	3.1	2.7	2.6	3.2	—
Pemir	—	37.8	—	46.2	—	—	—	46.8	41.3	—	—	—	—
Cargill-205	—	36.4	—	45.0	—	—	—	48.1	—	40.7	—	—	—
Sunbred-254	—	36.4	—	44.1	—	—	—	46.6	—	40.1	—	—	—
Seedtec S-315	—	34.0	—	43.0	—	—	—	44.3	—	36.8	—	—	—

* Duncan's multiple range test. Means with the same letter are not significantly different.

Most hybrids had a vegetation period similar to the open pollinated varieties Peredovik and Pemir, but they were shorter and more resistant to lodging (Table 8). The earliest entries were Stauffer-3101 and IH-155. Higher values of volume seed weight and a better resistance to lodging were noted for almost all hybrids.

Excepting Gahib-7, all the other hybrids proved to possess a total or a very good resistance to *Plasmopara helianthi* (Table 9). Certain genotypes had a better response to the attack of the other important pathogens (*Scler-*

rotinia sclerotiorum: RO-44, RO-131, Stauffer-3101, Cargill-205, RO-134; leaf spots: IH-26, NS-H-43; *Puccinia helianthi*: H 9 P 4; *Verticillium* sp.: RO-134; *Orobanche* sp.: Citosol-3, RO-44, Pemir). Most hybrids exhibited much higher self-fertility degree but a lower melliferous value than the open pollinated varieties Peredovik and Pemir (Table 10). The negative correlation between these two traits should be taken into consideration when defining the breeding objectives, in order to avoid a too strong divergent selection.

Table 8

TRIAL No. 2/1982—1983. Morpho-physiological characteristics

Cultivars	No. of days from emergence to :				Head diameter (cm)		Plant height (cm)		Volumetric weight (kg/hl)		1,000 seed weight (g)		Husks (%)		Resistance to lodging Fundulea (1982-83)
	flowering		maturity												
	limits	mean	limits	mean	limits	mean	limits	mean	limits	mean	limits	mean	limits	mean	
Peredovik	42-84	63	70-144	106	14-27	20	123-205	169	27-45	38	53-84	67	19-28	23	good poor
HB-763	44-93	62	66-152	104	15-28	22	118-190	151	31-52	41	47-77	59	18-28	22	good
H 9 P 4	39-91	63	69-143	106	12-26	20	120-188	154	30-51	41	42-69	56	20-30	23	good
IH-56	35-84	59	65-143	103	13-29	22	123-191	155	30-53	41	49-80	61	21-33	24	very good
IH-155	32-81	58	62-134	101	16-28	21	117-187	152	30-54	43	43-70	57	21-34	25	very good
Gahib-7	30-85	61	60-145	103	12-27	20	118-175	147	26-44	37	43-69	56	19-29	23	very good
Citosol-2	39-84	64	69-143	107	14-28	21	121-183	153	28-49	41	38-63	49	19-28	22	good
RO-44	39-84	63	69-144	105	16-29	22	116-182	150	31-47	41	45-76	59	16-26	20	very good
RO-131	35-90	64	64-146	106	17-27	21	121-198	166	26-45	39	43-84	67	19-27	22	very good
RO-134	42-86	65	71-143	107	15-29	22	117-191	162	28-47	39	47-89	70	20-28	22	good
RO-141	36-89	67	61-145	108	16-28	21	116-189	150	31-44	39	42-73	62	19-29	23	very good
RO-150	41-88	62	71-146	106	16-29	22	120-186	152	29-44	39	41-71	56	20-30	23	very good
NS-H-40	43-92	67	71-143	107	12-25	19	90-148	120	32-52	41	40-64	51	23-32	26	very good
NS-H-43	39-90	63	69-143	105	14-27	19	119-190	158	28-49	41	40-73	54	23-33	26	good
Stauffer-3101	30-78	55	62-142	101	11-26	18	92-152	125	31-47	41	38-59	46	26-39	30	very good
Sunbred-254	40-86	62	68-137	106	15-26	20	115-187	152	32-48	41	35-60	45	19-27	23	very good
Cargill-205	37-83	62	66-138	105	13-27	19	109-170	141	33-46	39	42-65	54	18-26	21	good
Seedtec-S-315	39-89	61	69-138	104	14-28	20	124-201	162	34-49	42	39-64	50	20-28	25	good
Pemir	41-86	66	71-139	107	15-28	20	125-218	168	30-43	38	51-81	65	21-29	24	very good

Table 9

TRIAL No. 2/1982—1983. Resistance to diseases (naturally infected plants, %)

Table 9-A

Table 9-A																												
Cultivars	<i>Plasmopara helianthi</i>				<i>Sclerotinia sclerotiorum</i>																							
	Fundulea				Ankara				Mean				head attack						stem attack									
													Fundulea		Podu- loale		Novi Sad	G. To- shevo	Mean	Fundulea		G. To- shevo	Ireg- szemcse	Szeged		Udine	Man- fredi	Mean
													Fundulea	Podu- loale	Fundulea	G. To- shevo				Fundulea	G. To- shevo			Szeged	Udine			
	1982	1983	1982	1983	1982	1983	1982	1983	1983	1983	1983	1982	1983	1982	1982	1982	1983	1982	1982	1982	1982							
Peredovik	17	11	20	16	10	5	44	19	17	4	17	9	5	6	12	68	60	30	5	24								
HB-763	5	3	3	4	35	21	85	26	33	6	34	10	6	1	17	64	41	37	40	27								
H9 P4	2	1	1	1	13	6	47	34	17	8	21	6	3	6	19	38	19	30	10	46								
IH-56	2	1	1	1	7	4	61	19	15	7	19	5	4	2	10	70	38	20	10	20								
IH-155	1	0	0	0	3	3	68	21	17	7	20	3	0	3	8	46	27	15	40	18								
Gahib-7	27	16	23	22	7	6	76	24	28	8	25	4	4	10	13	62	45	20	10	21								
Citosol-2	4	2	1	2	16	6	36	31	16	8	19	9	7	5	19	45	31	25	20	20								
RO-44	1	0	0	0	2	0	38	10	15	7	12	0	1	3	11	31	33	10	5	12								
RO-131	0	0	0	0	2	1	40	8	13	8	12	3	2	5	5	60	35	25	5	18								
RO-134	1	0	0	0	4	3	19	9	17	8	16	5	1	3	8	61	46	22	5	19								
RO-141	0	0	0	0	7	1	33	20	24	8	20	0	0	0	14	45	61	30	5	19								
RO-150	0	0	0	0	9	7	66	18	15	7	20	2	1	4	12	52	42	45	10	21								
NS-H-40	2	1	1	1	5	4	64	26	21	8	21	4	1	3	21	83	29	40	20	25								
NS-H-43	0	0	1	0	8	6	66	13	2	5	17	7	5	3	6	42	30	28	40	20								
Stauffer-3101	0	0	0	0	3	2	40	20	2	2	12	9	7	2	8	82	34	15	40	26								
Sunbred-254	—	—	—	—	—	—	—	15	14	8	12	—	—	—	—	—	53	—	—	—								
Cargill-205	—	0	—	—	—	—	—	44	14	12	23	—	—	—	—	—	38	—	—	—								
Seedtec-S-315	—	1	—	—	—	—	—	13	6	1	7	—	—	—	—	—	49	—	—	—								
Pemir	—	7	—	—	—	—	—	19	22	12	8	—	—	—	—	—	25	—	—	—								

Table 9 (Continuation)

Cultivars	Sclerotinia sclerotiorum root attack						Leaf spots					Puccinia helianthi			Verticillium sp.			Orobanche sp.
	Novi Sad		Sze- ged	G. To- shevo	Edirne	Mean	Sze- ged		Udine	Sakha	Mean	Fargo		Mean	Udine	Man- fredi	Mean	Edirne
	1982	1983					1982	1983				1982	1983					
																		1983
Peredovik	55	42	2	17	6	24	21	34	15	35	26	13	5	9	24	40	32	10
HB-763	74	19	5	38	4	28	9	14	5	35	16	13	15	14	18	27	23	5
H9 P4	46	18	10	7	2	17	11	10	10	35	17	11	1	6	18	5	12	2
IH-56	41	32	2	13	3	18	14	16	8	10	12	13	45	29	15	17	16	7
IH-155	35	32	4	33	6	22	16	21	26	20	21	11	20	16	20	10	15	71
Gahib-7	79	12	4	22	11	26	22	19	12	8	15	11	10	11	10	20	15	4
Citosol-2	51	32	5	16	3	21	11	8	8	36	16	11	20	16	26	38	32	1
RO-44	54	27	17	9	3	22	12	18	10	40	20	11	25	18	0	7	4	1
RO-131	50	13	1	10	1	15	12	12	10	45	20	11	25	18	30	13	22	11
RO-134	32	25	3	4	2	13	15	25	10	15	16	14	35	25	0	2	1	2
RO-141	43	27	6	6	10	18	16	27	15	25	21	11	33	22	5	22	14	5
RO-150	53	33	10	20	4	24	20	24	5	5	14	12	25	19	10	25	18	2
NS-H-40	58	34	2	4	9	21	13	10	25	12	15	12	—	—	25	8	17	2
NS-H-43	39	26	5	21	6	19	11	17	5	15	12	12	40	26	25	25	25	5
Stauffer-3101	42	18	20	36	10	25	13	13	10	30	17	12	—	—	28	20	24	99
Sunbred-254	—	30	2	20	9	15	—	22	—	—	—	—	5	—	—	—	—	4
Cargill-205	—	31	1	11	1	11	—	21	—	—	—	—	20	—	—	—	—	4
Seedtec-S-315	—	23	1	8	2	9	—	27	—	—	—	—	30	—	—	—	—	2
Pemir	—	15	4	25	7	13	—	13	—	—	—	—	28	—	—	—	—	1

Table 10

TRIAL No. 2. Self-fertility degree and melliferous value * (Fundulea, average 1982—1983)

Cultivars	Self-fertility degree (%)	Nectar mg/fl/24 h	Sugar concentration (%)	Melliferous index
IH-56	66.3	0.65	49.0	0.32
RO-131	59.8	0.69	43.0	0.30
Stauffer-3101	57.9	1.92	30.6	0.59
Cargill-205	48.2	0.85	29.0	0.25
Seedtec-S-315	45.0	1.06	40.4	0.43
Citosol-2	41.4	0.38	38.0	0.14
NS-H-42	39.7	0.86	32.4	0.28
IH-155	31.8	0.70	48.6	0.34
Sunbred-254	28.6	1.01	41.4	0.42
RO-44	23.7	0.45	63.8	0.29
NS-H-43	18.7	1.08	41.2	0.44
RO-141	16.1	1.11	43.8	0.49
RO-150	14.9	1.32	37.4	0.49
H 9 P 4	12.4	0.48	61.9	0.30
NS-H-40	11.2	0.81	38.6	0.31
Pemir	9.7	1.19	39.4	0.47
Peredovik	8.8	0.98	44.8	0.44
HB-763	7.8	0.67	55.6	0.37
Gahib-7	6.3	0.78	52.8	0.42
L.D.S. 5%	5.3	0.11	4.2	0.06

* The determinations of nectar content and sugar concentration were performed by I. Balana, Elena Grosu and G. Fota. (Research Institute for Apiculture, Bucharest).

CONCLUSIONS

The extremely different environmental conditions determined, as excepted, a great variation in the response of sunflower genotypes, both for seed yield and oil content, as well as for other agronomic characteristics. Notwithstanding this great variation, the mean values for all environments were statistically similar in most cases, suggesting a possible genetic resemblance of the cultivars under testing.

Certain sunflower hybrids were however better differentiated within some limited areas, allowing growers to identify the best adapted and suitable genotypes.

RÉSULTATS DU QUATRIÈME CYCLE EXPÉRIMENTAL AVEC DES CULTIVARS DE TOURNESOL (1982—1983)

Résumé

Un nouveau cycle biennal d'expérimentation, contenant 16 cultivars et hybrides de tournesol demi-précoces et précoces, et 20 demi-tardifs, a été effectué en 32 localités, dont 20 localités de 13 pays européens et 12 localités de 9 pays hors de l'Europe.

Les conditions de milieu extrêmement différentes ont déterminé une large variation de la réaction des génotypes de tournesol, tant concernant le rendement en semences et la teneur en huile, que les autres caractéristiques agronomiques.

Malgré cette importante variation, les valeurs moyennes pour toutes les localités ont été, pour la plupart des cas, similaires du point de vue statistique, en suggérant l'existence de certaines ressemblances génétiques des cultivars testés. Certains hybrides de tournesol se sont, toutefois, différenciés dans le cadre de certaines zones plus restreintes, en permettant aux cultivateurs d'identifier les génotypes adéquats, les mieux adaptés.

RESULTADOS DEL CUARTO CICLO EXPERIMENTAL CON CULTIVARES DE GIRASOL (1982—1983)

Resumen

Un nuevo ciclo bienal de experimentación, comprendiendo 16 variedades e híbridos de girasol semiprecoces y 20 semitardíos, se ha efectuado en 32 localidades de 13 países europeos y 12 localidades de 9 países fuera de Europa.

Las condiciones de medio extremadamente diferentes han determinado una gran variación de los genotipos de girasol tanto en cuanto a la producción de semillas y del contenido en aceite, como a otras características agronómicas.

A pesar de esta gran variación, los valores medios para todas las localidades fueron en la mayoría de los casos similares desde el punto de vista estadístico, sugiriendo la existencia de ciertas semblanzas genéticas de los cultivares testados. Sin embargo, algunos de los híbridos de girasol se diferenciaron mejor dentro de unas zonas más restringidas, permitiendo a los cultivadores identificar los genotipos correspondientes, los mejores adaptados.