A Report on the Working Meeting of FAO Subnetworks on Genetics, Breeding and Experimentation of Sunflower Hybrids Held in Istanbul, Turkey, on July 25-28, 1989

AGENDA AND TIMETABLE

Tuesday, July 25, 1989

9.00-9.30	Opening of the meeting
9.30-11.00	Progress report by the Liaison Center of the subnetwork on "Sunflower Genetics and Breeding" on past activities (1987-1989) and proposals for the next two-year period (1990-1991).
11.00-13.00	General discussion on the management and coordination of joint activities of the genetic and breeding subnetwork and implementation of the proposed program of work.
15.30-17.00	Information by the leader of the working group 'Genetic Study of Sunflower Agronomic Traits' on results and future activity. Discussion on specific measures to improve cooperation.

Wednesday, July 26, 1989

9.00-10.30	Information by the leader of the working group 'Genetic Study of Physiological and Biochemical Characters' on results and future activity. Discussion on specific measures to improve cooperation.
10.30-11.30	Information by the leader of the working group 'Evaluation of Morpho-Physiological and Biochemical Characteristics and Taxonomical Aspects of Wild Species' on results and future activity. Discussion on specific measures to improve cooperation.
11.30-13.00	Information by the leader of the working group 'Identification, Study and Use of CMS and Rf Sources in Sunflower Breeding' on results and future activity. Discussion on specific measures to improve cooperation.
14.30-16.00	Information by the leader of the working group 'Application of Biotechnology in Sunflower Genetics and Breeding' on results and future activity. Discussion on specific measures to improve cooperation.
16.00-19.00	Presentation and discussion of scientific papers resulted from cooperation.

Thursday, July 27, 1989

8.00-18.00	Study trip to Edirne Agricultural Research Institute: FAO international sunflower trials, breeding nursery, hybrid seed production, sunflower production fields.

Friday, July 28, 1989

9.00-13.00	Discussion in groups in connection with the conclusions and suggested programs.
14.00-17.00	Discussion in groups in connection with the conclusions and suggested programs.

Election of officers

Since Dr. A.V. Vranceanu, Network Coordinator, did not attend the meeting, Prof. D.Škorić took over the coordination of the meeting.

Adoption of agenda and timetable

Because the subnetwork 'Experimentation of Sunflower Hybrids' could not be included in the program due to the absence of Dr. Vranceanu, the agenda and timetable were modified and the subnetwork 'Sunflower Genetics and Breeding' remained.

Progress report on activities of the subnetwork and future work program

In his report, Dr. D. Škorić, Subnetwork Coordinator, emphasized the following.

Although the work of the subnetwork in the previous period was somewhat deferred by the preparations of all participants for the Twelfth International Sunflower Conference held in 1988, significant results have nevertheless been obtained.

The speaker singled out the working group 'Identification, Study and Utilization of New CMS Sources in Breeding Programs' for outstanding activity which had been initiated and led by dr. H. Serieys, Group Leader.

In conclusion, Dr. D. Škorić emphasized the importance of improving the cooperation on the execution of voluntarily accepted duties.

After that, working group leaders presented detailed reports on the results achieved in the previous two years and made proposals of work programs for the following period. There was a serious discussion on all reports submitted, especially on the proposed programs of future cooperation.

Working Group: "Genetic Study of Sunflower Agronomic Traits"
Group Leader: Prof. Dr. A. Kovačik

Prof A. Kovačik presented the results of the two-year cooperation, which are best illustrated by the number of research papers from that field presented at the Twelfth International Sunflower Conference, identified weaknesses in work and suggested direction of further cooperation.

He and V. Škaloud presented the mode of inheritance of agronomically important sunflower traits:

1. Traits conditioned by interaction of two to four oligogenes; examples were given of the inheritance of genic pollen sterility and ramification.
2. Traits conditioned by interaction of five to 12 oligogens; example was given of the inheritance of head inclination.
3. Polygenes conditioning direct yield components, oil content, husk content, achene mass, number of achenes per head, yield of achenes per plant, plant height and self-fertility.

Subjects proposed for further work:

1. Choice of traits for genetic studies
2. Grouping the traits according to inheritance
3. Determining genetic parameters for characterizing the traits
4. Methods for determining genetic parameters

5. Compilation of the present knowledge of inheritance of the traits and their genetic parameters.

Working Group: "Genetic Study of Physiological and Biochemical Characters"
Group Leader: Dr. J. Fernandez-Martinez

The speaker presented the results obtained in the following studies:
1. Genetic study of self-fertility
2. Studies on the mode of inheritance of protein and oil content and amino acid composition
3. Studies on the inheritance of oleic and linoleic acids in the oil of sunflower seed
4. Other physiological studies:
- drought tolerance
- photosyntesis and accumulation of assimilates

Subjects proposed for further work:
1. Genetic study of self-fertility
2. Studies of the inheritance of oleic and linoleic acids
3. Studies of the variability and inheritance of high linoleic (low oleic) content
4. Study of the inheritance of protein and oil content in cultivated sunflower
5. Comparison of protein hybrids under different environmental conditions.

Working Group: "Evalutation of Morphological, Physiological and Biochemical Characters and Taxonomic Aspects of Wild Helianthus Species"
Group Leader: Dr. D. Škorić

Because all participants in the group have not sent their reports, summaries were presented of the activities carried out in some research centers.

1. Institute of Field and Vegetable Crops, Novi Sad
- Resistance of wild species to Diaporthe/Phomopsis helianthi
- Resistance of wild species to downy mildew
- Resistance of wild species to rust races present in Yugoslavia
- Resistance of wild species to Alternaria helianthi
- Resistance of wild species to Sclerotinia sclerotiorum
- Evaluation of wild species for drought resistance
- Germination capacity of wild species
- Cytogenetic studies of wild species and interspecific hybrids

2. INRA Center, Montpellier
- Resistance of wild species to Sclerotinia sclerotiorum
- Evaluation of wild species for drought resistance

3. USDA-ARS, Bushland, TX
- Evalutation of wild species for drought resistance

4. USDA-ARS, Fargo, ND
- Germination capacity of wild species
- Cytogenetic studies of wild species and interspecific hybrids

5. Pisa University, Pisa
- Germination capacity of wild species

6. Institute of Genetics, Sofia
- Cytogenetic studies of wild species and interspecific hybrids
7. Agricultural Institute, Cordoba
- Evaluation of wild species for drought resistance

Subjects proposed for further work:
1. Determination of morphological, biological and botanical characteristics of wild species
2. Interspecific hybridization between wild species and the cultivated sunflower
3. Use of wild species in breeding for oil and protein content and quality
4. Evalutation of wild species for pest resistance
5. Evaluation of wild species for resistance to drought and salinity
6. Cytogenetic study of wild species and interspecific hybrids
7. Study of germination capacity of wild species and interspecific hybrids.

Working Group: "Identification, Study and Utilization of New CMS Sources in Breeding Programs"
Group Leader: Dr. H. Serieys

The cooperative work within this group included:
1. Identification of new CMS sources
2. Collection and multiplication of different CMS sources
3. Evaluation of male sterility stability in different locations.

Subjects proposed for further work:
1. Comparison of the restoration ability and of CMS nature
2. Genetic determinism of restoration of different CMS sources
3. Identification of restorer genes in CMS sources.

Working Group: 'Use of Biotechnology in Interspecific Hybridization'
Group Leader: Prof. Dr. W. Friedt

Within the working group, the following subjects were studied:
1. Overcoming problems of using wild species in breeding via interspecific hybridization
2. Development of efficient chromosome doubling techniques
3. Asexual hybridization using somatic cell fusion
4. Tissue culture for rapid propagation and genetic engineering
5. Regeneration of androgenetic haploids for an accelerated development of inbred lines (doubled haploids)
6. Recent progress in molecular genetics of sunflower
7. Application of 'genetic engineering'

Subjects proposed for furher work:
1. Overcoming problems of using wild species in breeding via sexual interspecific hybridization and embryo rescue
2. Asexual hybridization using somatic cell fusion
3. Tissue culture for rapid propagation and screening in vitro
4. Regeneration of androgenetic haploids for an accelerated development of inbred lines

5. Studies on biochemical and molecular genetics of Helianthus sp.
6. Application of 'genetic engineering'.

Study tour

On July 27, the participants in the meeting visited the Agricultural Reseach Institute in Edirne where they saw FAO international sunflower trials, breeding nursery, hybrid seed production and the program of breeding for resistance to Orobanche cumana.